October 9, 2001

Mr. Steve Larson
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Application for Certification Docket No. 01-AFC-18
Henrietta Peaker Project – GWF Energy LLC

Dear Mr. Larson:

GWF Energy LLC is pleased to submit this Supplement to Application for Certification 01-AFC-18 for the Henrietta Peaker Project.

Please contact Mr. Doug Wheeler, Vice President, GWF Power Systems Company, at (925) 431-1443 or me at (510) 874-3143 if there are any questions regarding the enclosed materials.

Sincerely,

URS CORPORATION

David A. Stein, P.E.
Program Director

cc: Doug Wheeler
John Grattan
Joe Morgan

APPLICATION FOR CERTIFICATION SUPPLEMENT

HENRIETTA PEAKER PROJECT

DOCKET NO. 01-AFC-18

KINGS COUNTY, CALIFORNIA

Prepared for:

GWF Energy LLC
4300 Railroad Avenue
Pittsburg, CA 94565

Contact: Doug Wheeler (925) 431-1443

Prepared by

URS Corporation
500 12th Street, Suite 200
Oakland, CA 94607-4014

Contact: David Stein (510) 874-3143

October 2001

TABLE OF CONTENTS

1.0 INTRODUCTION

1.0 INTRODUCTION

GWF Energy LLC (GWF) submitted an Application for Certification (AFC) to the California Energy Commission (CEC) for the construction and operation of the Henrietta Peaker Project (HPP) on August 23, 2001. GWF proposes to build and operate the HPP, a nominal 91.4-megawatt (MW), simple-cycle power plant, on a seven-acre fenced site within a 20-acre parcel in an unincorporated portion of Kings County.

This AFC Supplement provides responses to the data inadequacies identified by the CEC staff in Attachment B of the CEC's September 10, 2001, Henrietta Peaker Project Data Adequacy Recommendation, as approved by the CEC on September 12, 2001.

To facilitate review by the CEC, this AFC Supplement includes the following material:

- **2.0 DATA ADEQUACY RESPONSES:** Issues are identified in the Data Adequacy Worksheets by technical area. Responses are given by technical area in the order listed in the Data Adequacy Worksheets.

2.0 DATA ADEQUACY RESPONSES

2.0 DATA ADEQUACY RESPONSES

Please note that data adequacy responses provided in this section are arranged in the order and by the topics contained in Attachment B of the CEC's staff September 10, 2001, Henrietta Peaker Project Data Adequacy Recommendation.

Air Quality

Technical Staff: Lisa Blewitt/William Walters
Technical Senior: M. Laylon/M. Ringer
Project Manager: Bob Eller

2.1 Air Quality

Siting Regulations and Information

Appendix B (g) (8) (B): The heating value and chemical characteristics of the proposed fuels, the stack height and diameter, the exhaust velocity and temperature, the heat rate and the expected capacity factor of the proposed facility.

Information Required to Make AFC Conform with Regulations

Provide heating value and chemical characteristics of proposed fuel (natural gas).

RESPONSE 1

This information is provided in Attachment 2.1-1.

Siting Regulations and Information

Appendix B (g) (8) (E): The emission rates of criteria pollutants from the stack, cooling towers, fuels and materials handling processes, delivery and storage systems, and from all secondary emission sources.

Information Required to Make AFC Conform with Regulations

Emission estimates from ammonia and other expected regular deliveries (secondary emission sources).

RESPONSE 2

Exhaust emissions were calculated for delivery trucks transporting construction materials, aqueous ammonia, and other operational materials to the site. The number of truck trips per day or per month and the materials being transported are described in Section 8.10 (Traffic and Transportation), in the Henrietta Peaker Project AFC.

Emission factors were obtained from EMFAC2000, the latest California Air Resources Board mobile source emission factor model, assuming a vehicle class of light-heavy duty trucks (8,500–14,000 pounds gross vehicle weight). Emissions were calculated for the area within 10 kilometers (six miles) of the project site. As discussed in Section 8.10, trucks would travel to the HPP site from the south via State Route (SR) 43 to SR 198, from the north via SR 41 or SR 43 to SR 198, and from the east (from Tulare and Kings counties) via SR 198. The average trip distance considering these origination directions is estimated at 10 miles within the 10-kilometer radius. Estimated emissions for construction materials and operational materials are summarized in the Table in Attachment 2.1-2 titled “Estimates of Secondary Emissions from Deliveries.”

Siting Regulations and Information

Appendix B (g) (8) (I) (iii): A protocol for a cumulative air quality modeling impacts analysis of the project's typical operating mode in combination with other stationary emissions sources within a six mile radius which have received construction permits but are not yet operational, or are in the permitting process. The cumulative inert pollutant impact analysis should assess whether estimated emissions concentrations will cause or contribute to a violation of any ambient air quality standard.

Information Required to Make AFC Conform with Regulations

Cumulative air quality modeling protocol. (The Applicant's assumption stated in Section 8.1.6 that only other power projects within 6 miles of the project need to be included in the cumulative modeling analysis is incorrect. All stationary sources meeting the required criteria must be evaluated.)

RESPONSE 3

The applicant has contacted the San Joaquin Valley Air Pollution Control District (SJVAPCD) regarding potential sources that would need to be included in a cumulative modeling analysis. The request included the identification of all sources within six miles of the proposed Henrietta Peaker Project that have been permitted but are not yet operating and potential sources currently involved in the permitting process that will emit greater than five tons per year of nitrogen dioxide, carbon monoxide, and PM_{10}. The five tons per year threshold is based on one half of the VOC and NO_2 offset threshold of ten tons per year. The SJVAPCD does not require that offsets be obtained for projects that emit less than ten tons per year of VOCs and NO_2. The SJVAPCD identified no sources meeting these criteria (see Attachment 2.1-8). Therefore, no cumulative air quality impact analysis or protocol is necessary.

In response to data adequacy issues concerning the potential health impacts from diesel exhaust construction emissions, Section 2.7 describes proposed mitigation that results in lower overall PM_{10} concentrations. Attachments 2.1-3, 2.1-4, and 2.1-5 present revised PM_{10} concentrations from construction that resulted from this mitigation. Specifically, attachments are as follows:

- Attachment 2.1-3: Revised Table 8.1-18
- Attachment 2.1-4: Revised Appendix B Construction Emission Calculations (replace entire section)
- Attachment 2.1-5: Revised Appendix B Construction Impacts Modeling Files (replace only first table, plus 24-hour PM_{10} and annual PM_{10} modeling files)

SB 28 Sher Requirements and Information

§25552(e)(1) (All): [a]ssure that the thermal powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation;

Information Required to Make AFC Conform with Regulations

Specific conditions of certification (such as emission limits, source testing, continuous monitoring, etc.) as would be generally required by the Commission and District.

RESPONSE 4

Please refer to the Preliminary Determination of Compliance (PDOC) for these conditions. The PDOC is provided as Attachment 2.1-6. See also revised condition of certification AQ-C3 (Attachment 2.1-7).

SB 28 Sher Requirements and Information

§25552(e)(2) (All): [a]ssure protection of public health and safety;

Information Required to Make AFC Conform with Regulations

Specific conditions of certification (such as emission limits, source testing, continuous monitoring, etc.) as would be generally required by the Commission and District.

RESPONSE 5

Please refer to the PDOC (Attachment 2.1-6) for these conditions. See also revised condition of certification AQ-C3 (Attachment 2.1-7).

SB 28 Sher Requirements and Information

§25552(e)(3) (All): [r]esult in compliance with all applicable federal, state, and local laws, ordinances, and standards;

Information Required to Make AFC Conform with Regulations

Specific conditions of certification (such as emission limits, source testing, continuous monitoring, etc.) as would be generally required by the Commission and District.

RESPONSE 6

Please refer to the PDOC (Attachment 2.1-6) for these conditions. See also revised condition of certification AQ-C3 (Attachment 2.1-7).

SB 28 Sher Requirements and Information

§25552(e)(5)(B) (Air Quality): [t]hat the thermal powerplant will be recertified, modified, replaced, or removed within a period of three years with a cogeneration or combined cycle thermal powerplant that uses best available control technology and obtains necessary offsets, as determined at the time the combine-cycle thermal powerplant is constructed, and that complies with all other applicable laws, ordinances, and standards;

Information Required to Make AFC Conform with Regulations

Applicant requests waiver of requirement. Pending legislation may also waive requirement.

RESPONSE 7

GWF Energy LLC has entered into a contract with California Department of Water Resources to meet the State's critical electricity needs. The contract requires that power from the project be supplied for a 10-year period. Accordingly, GWF Energy LLC has requested that the 3-year limitation be waived. This waiver would be consistent with both the spirit and the intent of the Governor's executive orders.

Attachment 2.1-1

Natural Gas Thermal and Chemical Analysis

ZALCO LABORATORIES, INC.
Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

GWF Power
4300 Railroad Avenue
Pittsburg CA 94565

Attention: Bob Okubo
CC:
Sample Description:
Natural Gas Main To Plant (stainless steel sample cylinder)
Sampled 08/21/00 @ 13:00 by S. Howard

Laboratory No: 0008313-1
Date Received: 08/22/2000
Date Analyzed: 08/22/2000
Purchase Order:
Q0005010
Date Reprinted: 08/22/2000
Test Code: 1635

CHONS Chromatographic Analysis, ASTM D-1945-81, ASTM D-3588-89, GPA 2145-94

Constituent:	Norm Mol%	Norm Wt%	GPM	CHONS%
				Carbon, C
Oxygen	2.467	3.930		60.85
Nitrogen	9.463	13.198		
				Hydrogen, H
Carbon Dioxide	2.128	4.663		18.63
Carbon Monoxide	0.000	0.000		
				Oxygen, O
Methane	75.465	60.276		7.32
Ethane	7.954	11.907		
Propane	2.008	4.409	0.552	Nitrogen, N
IsoButane	0.124	0.359	0.041	13.20
n-Butane	0.267	0.773	0.084	
IsoPentane	0.038	0.136	0.014	Sulfur, S
n-Pentane	0.034	0.121	0.012	0.00
Hexanes +	0.053	0.226	0.023	
Totals:	100.000	100.000	0.726	100.00

Gas Properties calculated at STP:	degrees F.	60.00	H/C Ratio:
Measurement Base Pressure at STP:	psia	14.696	0.31

Gross Btu/Cu.Ft.,	Dry Gas HHV	973.9
Ideal Gross Btu/Lb.	Dry Gas HHV	8357.2
Net Btu/Cu.Ft.	Dry Gas LHV	880.3
Ideal Net Btu/Lb	Dry Gas LHV	6593.4
Gross Btu/Cu.Ft., water saturated		954.7

Relative Gas Density; Ideal gas:	0.6935
Specific Gravity, (Air = 1) Real gas:	0.6947
Real Gas Density, Lb/Cu.Ft.	0.05305
Specific Volume, Cu.Ft./Lb	18.8491
Compressibility, 'z'	0.9977

			Gross or HHV:	Net or LHV:
"F" Factor,	DSCF/MMBtu	at 60F.	8552.3	9461.4
"F" Factor,	DSCF/MMBtu	at 68F.	8682.6	9605.5
"F" Factor,	DSCF/MMBtu	at 70F.	8715.5	9642.0
"FC" Factor,	DSCF CO2/MMBtu60F.		1048.2	1159.6
"FC" Factor,	DSCF CO2/MMBtu68F.		1064.1	1177.2

Jim Etherton
Laboratory Operations Manager

ZALCO LABORATORIES, INC.
Analytical & Consulting Services

4309 Armour Avenue
Bakersfield, California 93308

(661) 395-0539
FAX (661) 395-3069

GWF Power
4300 Railroad Avenue
Pittsburg, CA 945656006

Attention: Bob Okubo

Sample Type: Gas/NGL/LPG

Description: Natural Gas Main to Plant
Sampled by Steve Howard

Laboratory No: 0008313-1
Date Received: 08/22/00
Date Reported: 08/24/00
Contract No. : 00-0534
Date Sampled : 08/21/00
Time Sampled : 13:00

REPORT OF ANALYTICAL RESULTS

Constituents	Results	Units	DLR	Method/Re
Total Sulfur				
Hydrogen Sulfide, Total H_2S	1.6	ppmv	1.0	D 3246/3
Total Sulfur, S	0.10	Gr/100 SCF	0.06	D-3246/3

Date Analyzed: 08/23/00 JAH

Jim Etherton, Lab Operations Manager

cc:

Method Reference
3. Annual Book of A.S.T.M. Standards

mg/L . milligrams per Liter (parts per million)
ug/L : micrograms per Liter (parts per billion)
umhos/cm . micromhos/cm at 25 C
mmhos/cm : millimhos/cm at 25 C
ND : None Detected
N/A : Not Applicable
DLR : Detection Limit for Reporting Purposes
MBAS : Methylene Blue Active Substances

Attachment 2.1-2

Estimates of Secondary Emissions from Deliveries

Attachment 2.1-2. Estimates of Secondary Emissions from Deliveries

EMISSION FACTORS				ONE-WAY TRUCK DISTANCES WITHIN 10 KILOMETERS (6 MI) OF THE HENRIETTA PEAKER PROJECT SITE		
ROG (g/mi)	CO (g/mi)	NO_x (g/mi)	PM_{10} (g/mi)	From the S. Via SR48 to SR198 to 25th Ave. [50% of Trucks] (mi)	From the N. via SR41 or SR43 to SR198 to 25th Ave [35% of Trucks] (mi)	From the E. via SR198 to 25th Ave [15% of Trucks] (mi)
2.43	26.87	2.76	0.02	7.5	12	11.8

from EMFAC2000, vehicle class of light heavy-duty trucks (8,5000 - 14,000 pounds gross vehicle weight)

CONSTRUCTION MATERIALS DELIVERY TRUCKS EMISSIONS

	One-Way Trips/Day	ROG Emissions (lb/day)	CO Emissions (lb/day)	NO_x Emissions (lb/day)	PM_{10} Emissions (lb/day)
Months 2 & 3 of Construction Period	7	0.365	4.031	0.414	0.003
Months 1, 4, 5, & 6 of Construction Period	15	0.781	8.637	0.887	0.006

OPERATIONAL MATERIALS DELIVERY TRUCKS EMISSIONS

	Round Trips/Mo.	ROG Emissions (lb/mo)	CO Emissions (lb/mo)	NO_x Emissions (lb/mo)	PM_{10} Emissions (lb/mo)
Aqueous Ammonia Delivery Trucks	3	0.312	3.455	0.355	0.003
Wastewater Trucks	8	0.833	9.213	0.946	0.007

	Round Trips/Year	ROG Emissions (lb/yr)	CO Emissions (lb/yr)	NO_x Emissions (lb/yr)	PM_{10} Emissions (lb/yr)
Nalco water treatment chemicals	12	1.250	13.819	1.419	0.010
Liquid CO, Diesel Fuel, CTG wash soap	3	0.312	3.455	0.355	0.003
Process gases (nitrogen, nitric oxide, carbon monoxide)	4	0.417	4.606	0.473	0.003

Attachment 2.1-3

Revised Table 8.1-18

(HPP ISCST3 Modeling Results—Construction Activities)

Table 8.1-18
HPP ISCST3 Modeling Results – Construction Activities

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	Lowest AAQS ($\mu g/m^3$)	UTM Coordinates East (m)	UTM Coordinates North (m)
CO	1-hour	2,884	12,941	15,825	23,000	633,050	4,174,475
	8-hour	1,552	9,047	10,599	10,000	633,050	4,174,450
NO_2	1-hour	224[a]	224	448	470	632,918	4,174,605
	Annual	29.1	45	74.1	100	633,112	4,174,483
PM_{10}	24-hour	26.1	150	184	50	632,863	4,174,646
	Annual	1.63	36.4	39.3	30	633,112	4,174,482
SO_2	1-hour	218	128	346	655	633,050	4,174,475
	3-hour	136.2	--	136.2	1,300	633,075	4,174,475
	24-hour	35.9	31	67	105	633,111	4,174,482
	Annual	2.77	5.2	8	80	633,112	4,174,482

[a] Results based on OLM applied with maximum ambient ozone concentration of 287.5 $\mu g/m^3$.

AAQS = most stringent ambient air quality standard for the averaging period
OLM = ozone limiting method
m = meters
$\mu g/m^3$ = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than or equal to 10 micrometers in diameter
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

Attachment 2.1-4

Revised Appendix B Construction

Emission Calculations

(Replace Entire Section)

GWF -Construction Equipment Emission Factors

Construction Equipment	HP Rating	Equipment Catagory	SCAQMD Table[1]	% PM10 Reduction	CO	ROC	NOx	SOx	PM10
					Emission Factor (Table A9-8-A: lb/hr)				
Sitework (Earthwork and Civil)									
Backhoe, 1.0 Cy	70	Wheeled Tractor	A9-8-A	0%	3.580	0.180	1.270	0.090	0.140
Front End Loader, 2 Cyd	98	Wheeled Loader	A9-8-A	90%	0.572	0.230	1.900	0.182	0.017
Grader, 200 Hp 14 Ft	215	Motor Grader	A9-8-A	90%	0.151	0.039	0.713	0.086	0.006
Vibratory Plate (hand held)	5	Miscellaneous	A9-8-A	0%	17.020	0.543	0.412	0.023	0.026
Rammer/Jumping Jack (hand held)	5	Miscellaneous	A9-8-A	0%	17.020	0.543	0.412	0.023	0.026
Riding Vibratory Compactor	50	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Asphalt Paver	174	Miscellaneous	A9-8-A	90%	0.675	0.150	1.700	0.143	0.014
Asphalt Cutter/Grinder	174	Miscellaneous	A9-8-A	90%	0.675	0.150	1.700	0.143	0.014
Asphalt Compactor, Tandem Steel Drum Roller	30.2	Roller	A9-8-A	0%	0.300	0.065	0.870	0.067	0.050
Erection Support Equipment									
Air Compressor, 185 CFM	75	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Air Compressor, 185 CFM	75	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Concrete Pump	300	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Scissors Lift	42	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
JLG 60 Ft	65	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
JLG 60 Ft	65	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
JLG 60 Ft	65	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Forklift Extended Boom	105	Fork Lift - 175 Hp	A9-8-A	90%	0.180	0.053	0.441	---	0.031
Crane 110 Ton	300	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
Hydraulic Truck Crane 55 Ton	350	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
Hydraulic Truck Crane 55 Ton	350	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
Hydraulic Truck Crane 35 Ton	300	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
Hydraulic Truck Crane 22 Ton	300	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
Hydraulic Truck Crane 22 Ton	300	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026
7000 Watt Portable Generator	10.5	Miscellaneous	A9-8-A	0%	17.020	0.543	0.412	0.023	0.026
Welder - Miller 400d	45	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Welder - Miller 400d	45	Miscellaneous	A9-8-A	0%	0.675	0.150	1.700	0.143	0.140
Highway Tractor	300	Miscellaneous	A9-8-A	90%	0.675	0.150	1.700	0.143	0.014
Flat Bed Truck w/ Rails	245	Miscellaneous	A9-8-A	90%	17.020	0.543	0.412	0.023	0.003
Water Truck	245	Trucks:Off-Hwy	A9-8-A	90%	1.800	0.190	4.170	0.450	0.026

[1] South Coast Air Quality Management District CEQA Air Quality Handbook, 1993.

GWF - Construction Equipment Utilization

Sitework (Earthwork and Civil)	1	2	3	4	5	Work Days Per Month[1]	Hours Per Work Day	Total Equip. Actual % Use
Backhoe, 1.0 Cy	1	1	1	1	1	26.07	20	35%
Front End Loader, 2 Cyd	1	1	1	1	1	26.07	20	35%
Grader, 200 Hp 14 Ft	1	1	1	1	1	26.07	20	25%
Vibratory Plate (hand held)	1	1	1	1	1	26.07	20	30%
Rammer/Jumping Jack (hand held)	1	1	1	1	1	26.07	20	30%
Riding Vibratory Compactor		1	1			26.07	20	20%
Asphalt Paver						26.07	20	60%
Asphalt Cutter/Grinder						26.07	20	60%
Asphalt Compactor, Tandem Steel Drum Roller						26.07	20	60%
Erection Support Equipment								
Air Compressor, 185 CFM	1	1	1	1	1	26.07	20	75%
Air Compressor, 185 CFM			1	1	1	26.07	20	75%
Concrete Pump	1	1	1	1		26.07	20	90%
Scissors Lift		1	1	1		26.07	20	40%
JLG 60 Ft		1	1	1	1	26.07	20	50%
JLG 60 Ft			1	1	1	26.07	20	50%
JLG 60 Ft				1	1	26.07	20	50%
Forklift Extended Boom	1	1	1	1	1	26.07	20	25%
Crane 110 Ton			1	1	1	26.07	20	40%
Hydraulic Truck Crane 55 Ton	1	1	1	1	1	26.07	20	60%
Hydraulic Truck Crane 55 Ton		1	1	1	1	26.07	20	60%
Hydraulic Truck Crane 35 Ton		1	1	1	1	26.07	20	60%
Hydraulic Truck Crane 22 Ton	1	1	1	1	1	26.07	20	60%
Hydraulic Truck Crane 22 Ton					1	26.07	20	70%
7000 Watt Portable Generator	1	1	1	1	1	26.07	20	40%
Welder - Miller 400d		1	1	1	1	26.07	20	70%
Welder - Miller 400d			1	1	1	26.07	20	70%
Highway Tractor		1	1	1	1	26.07	20	30%
Flat Bed Truck w/ Rails		1	1	1	1	26.07	20	40%
Water Truck	1	1	1	1	1	26.07	20	50%

GWF - Hourly Construction Equipment Emissions

Carbon Monoxide

Pounds Per Hour

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	1.3	1.3	1.3	1.3	1.3
Front End Loader, 2 Cyd	0.2	0.2	0.2	0.2	0.2
Grader, 200 Hp 14 Ft	0.0	0.0	0.0	0.0	0.0
Vibratory Plate (hand held)	5.1	5.1	5.1	5.1	5.1
Rammer/Jumping Jack (hand held)	5.1	5.1	5.1	5.1	5.1
Riding Vibratory Compactor	0.0	0.1	0.1	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	0.5	0.5	0.5	0.5	0.5
Air Compressor, 185 CFM	0.0	0.0	0.5	0.5	0.5
Concrete Pump	0.6	0.6	0.6	0.6	0.0
Scissors Lift	0.0	0.3	0.3	0.3	0.0
JLG 60 Ft	0.0	0.3	0.3	0.3	0.3
JLG 60 Ft	0.0	0.0	0.3	0.3	0.3
JLG 60 Ft	0.0	0.0	0.0	0.3	0.3
Forklift Extended Boom	0.0	0.0	0.0	0.0	0.0
Crane 110 Ton	0.0	0.0	0.7	0.7	0.7
Hydraulic Truck Crane 55 Ton	1.1	1.1	1.1	1.1	1.1
Hydraulic Truck Crane 55 Ton	0.0	1.1	1.1	1.1	1.1
Hydraulic Truck Crane 35 Ton	0.0	1.1	1.1	1.1	1.1
Hydraulic Truck Crane 22 Ton	1.1	1.1	1.1	1.1	1.1
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	1.3
7000 Watt Portable Generator	6.8	6.8	6.8	6.8	6.8
Welder - Miller 400d	0.0	0.5	0.5	0.5	0.5
Welder - Miller 400d	0.0	0.0	0.5	0.5	0.5
Highway Tractor	0.0	0.2	0.2	0.2	0.2
Flat Bed Truck w/ Rails	0.0	6.8	6.8	6.8	6.8
Water Truck	0.9	0.9	0.9	0.9	0.9
Sitework (Earthwork and Civil) lbs/hr:	11.7	11.8	11.8	11.7	11.7
Erection Support Equipment lbs/hr:	11.0	21.3	23.3	23.7	24.0

GWF - Hourly Construction Equipment Emissions

Reactive Organic Compounds

Pounds Per Hour

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	0.1	0.1	0.1	0.1	0.1
Front End Loader, 2 Cyd	0.1	0.1	0.1	0.1	0.1
Grader, 200 Hp 14 Ft	0.0	0.0	0.0	0.0	0.0
Vibratory Plate (hand held)	0.2	0.2	0.2	0.2	0.2
Rammer/Jumping Jack (hand held)	0.2	0.2	0.2	0.2	0.2
Riding Vibratory Compactor	0.0	0.0	0.0	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	0.1	0.1	0.1	0.1	0.1
Air Compressor, 185 CFM	0.0	0.0	0.1	0.1	0.1
Concrete Pump	0.1	0.1	0.1	0.1	0.0
Scissors Lift	0.0	0.1	0.1	0.1	0.0
JLG 60 Ft	0.0	0.1	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.0	0.1	0.1
Forklift Extended Boom	0.0	0.0	0.0	0.0	0.0
Crane 110 Ton	0.0	0.0	0.1	0.1	0.1
Hydraulic Truck Crane 55 Ton	0.1	0.1	0.1	0.1	0.1
Hydraulic Truck Crane 55 Ton	0.0	0.1	0.1	0.1	0.1
Hydraulic Truck Crane 35 Ton	0.0	0.1	0.1	0.1	0.1
Hydraulic Truck Crane 22 Ton	0.1	0.1	0.1	0.1	0.1
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	0.1
7000 Watt Portable Generator	0.2	0.2	0.2	0.2	0.2
Welder - Miller 400d	0.0	0.1	0.1	0.1	0.1
Welder - Miller 400d	0.0	0.0	0.1	0.1	0.1
Highway Tractor	0.0	0.0	0.0	0.0	0.0
Flat Bed Truck w/ Rails	0.0	0.2	0.2	0.2	0.2
Water Truck	0.1	0.1	0.1	0.1	0.1
Sitework (Earthwork and Civil) lbs/hr:	0.5	0.5	0.5	0.5	0.5
Erection Support Equipment lbs/hr:	0.8	1.5	1.9	2.0	1.9

GWF - Hourly Construction Equipment Emissions

Nitrogen Oxides

Pounds Per Hour

	1	**2**	**3**	**4**	**5**
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	0.4	0.4	0.4	0.4	0.4
Front End Loader, 2 Cyd	0.7	0.7	0.7	0.7	0.7
Grader, 200 Hp 14 Ft	0.2	0.2	0.2	0.2	0.2
Vibratory Plate (hand held)	0.1	0.1	0.1	0.1	0.1
Rammer/Jumping Jack (hand held)	0.1	0.1	0.1	0.1	0.1
Riding Vibratory Compactor	0.0	0.3	0.3	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	1.3	1.3	1.3	1.3	1.3
Air Compressor, 185 CFM	0.0	0.0	1.3	1.3	1.3
Concrete Pump	1.5	1.5	1.5	1.5	0.0
Scissors Lift	0.0	0.7	0.7	0.7	0.0
JLG 60 Ft	0.0	0.9	0.9	0.9	0.9
JLG 60 Ft	0.0	0.0	0.9	0.9	0.9
JLG 60 Ft	0.0	0.0	0.0	0.9	0.9
Forklift Extended Boom	0.1	0.1	0.1	0.1	0.1
Crane 110 Ton	0.0	0.0	1.7	1.7	1.7
Hydraulic Truck Crane 55 Ton	2.5	2.5	2.5	2.5	2.5
Hydraulic Truck Crane 55 Ton	0.0	2.5	2.5	2.5	2.5
Hydraulic Truck Crane 35 Ton	0.0	2.5	2.5	2.5	2.5
Hydraulic Truck Crane 22 Ton	2.5	2.5	2.5	2.5	2.5
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	2.9
7000 Watt Portable Generator	0.2	0.2	0.2	0.2	0.2
Welder - Miller 400d	0.0	1.2	1.2	1.2	1.2
Welder - Miller 400d	0.0	0.0	1.2	1.2	1.2
Highway Tractor	0.0	0.5	0.5	0.5	0.5
Flat Bed Truck w/ Rails	0.0	0.2	0.2	0.2	0.2
Water Truck	2.1	2.1	2.1	2.1	2.1
Sitework (Earthwork and Civil) lbs/hr:	1.5	1.9	1.9	1.5	1.5
Erection Support Equipment lbs/hr:	10.2	18.6	23.6	24.4	25.1

GWF - Hourly Construction Equipment Emissions

Sulfur Dioxide

Pounds Per Hour

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	0.0	0.0	0.0	0.0	0.0
Front End Loader, 2 Cyd	0.1	0.1	0.1	0.1	0.1
Grader, 200 Hp 14 Ft	0.0	0.0	0.0	0.0	0.0
Vibratory Plate (hand held)	0.0	0.0	0.0	0.0	0.0
Rammer/Jumping Jack (hand held)	0.0	0.0	0.0	0.0	0.0
Riding Vibratory Compactor	0.0	0.0	0.0	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	0.1	0.1	0.1	0.1	0.1
Air Compressor, 185 CFM	0.0	0.0	0.1	0.1	0.1
Concrete Pump	0.1	0.1	0.1	0.1	0.0
Scissors Lift	0.0	0.1	0.1	0.1	0.0
JLG 60 Ft	0.0	0.1	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.0	0.1	0.1
Forklift Extended Boom	---	---	---	---	---
Crane 110 Ton	0.0	0.0	0.2	0.2	0.2
Hydraulic Truck Crane 55 Ton	0.3	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 55 Ton	0.0	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 35 Ton	0.0	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 22 Ton	0.3	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	0.3
7000 Watt Portable Generator	0.0	0.0	0.0	0.0	0.0
Welder - Miller 400d	0.0	0.1	0.1	0.1	0.1
Welder - Miller 400d	0.0	0.0	0.1	0.1	0.1
Highway Tractor	0.0	0.0	0.0	0.0	0.0
Flat Bed Truck w/ Rails	0.0	0.0	0.0	0.0	0.0
Water Truck	0.2	0.2	0.2	0.2	0.2
Sitework (Earthwork and Civil) lbs/hr:	0.1	0.2	0.2	0.1	0.1
Erection Support Equipment lbs/hr:	1.0	1.8	2.3	2.4	2.5

GWF - Hourly Construction Equipment Emissions

<u>Particulate Matter <10um</u>

Pounds Per Hour

	1	**2**	**3**	**4**	**5**
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	0.0	0.0	0.0	0.0	0.0
Front End Loader, 2 Cyd	0.0	0.0	0.0	0.0	0.0
Grader, 200 Hp 14 Ft	0.0	0.0	0.0	0.0	0.0
Vibratory Plate (hand held)	0.0	0.0	0.0	0.0	0.0
Rammer/Jumping Jack (hand held)	0.0	0.0	0.0	0.0	0.0
Riding Vibratory Compactor	0.0	0.0	0.0	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	0.1	0.1	0.1	0.1	0.1
Air Compressor, 185 CFM	0.0	0.0	0.1	0.1	0.1
Concrete Pump	0.1	0.1	0.1	0.1	0.0
Scissors Lift	0.0	0.1	0.1	0.1	0.0
JLG 60 Ft	0.0	0.1	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.1	0.1	0.1
JLG 60 Ft	0.0	0.0	0.0	0.1	0.1
Forklift Extended Boom	0.0	0.0	0.0	0.0	0.0
Crane 110 Ton	0.0	0.0	0.0	0.0	0.0
Hydraulic Truck Crane 55 Ton	0.0	0.0	0.0	0.0	0.0
Hydraulic Truck Crane 55 Ton	0.0	0.0	0.0	0.0	0.0
Hydraulic Truck Crane 35 Ton	0.0	0.0	0.0	0.0	0.0
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	0.0
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	0.0
7000 Watt Portable Generator	0.0	0.0	0.0	0.0	0.0
Welder - Miller 400d	0.0	0.1	0.1	0.1	0.1
Welder - Miller 400d	0.0	0.0	0.1	0.1	0.1
Highway Tractor	0.0	0.0	0.0	0.0	0.0
Flat Bed Truck w/ Rails	0.0	0.0	0.0	0.0	0.0
Water Truck	0.0	0.0	0.0	0.0	0.0
Sitework (Earthwork and Civil) lbs/hr:	0.1	0.1	0.1	0.1	0.1
Erection Support Equipment lbs/hr:	0.3	0.6	0.8	0.9	0.7

GWF - Daily Construction Equipment Emissions

Carbon Monoxide

Pounds Per Day

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	25.1	25.1	25.1	25.1	25.1
Front End Loader, 2 Cyd	4.0	4.0	4.0	4.0	4.0
Grader, 200 Hp 14 Ft	0.8	0.8	0.8	0.8	0.8
Vibratory Plate (hand held)	102.1	102.1	102.1	102.1	102.1
Rammer/Jumping Jack (hand held)	102.1	102.1	102.1	102.1	102.1
Riding Vibratory Compactor	0.0	2.7	2.7	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	10.1	10.1	10.1	10.1	10.1
Air Compressor, 185 CFM	0.0	0.0	10.1	10.1	10.1
Concrete Pump	12.2	12.2	12.2	12.2	0.0
Scissors Lift	0.0	5.4	5.4	5.4	0.0
JLG 60 Ft	0.0	6.8	6.8	6.8	6.8
JLG 60 Ft	0.0	0.0	6.8	6.8	6.8
JLG 60 Ft	0.0	0.0	0.0	6.8	6.8
Forklift Extended Boom	0.9	0.9	0.9	0.9	0.9
Crane 110 Ton	0.0	0.0	14.4	14.4	14.4
Hydraulic Truck Crane 55 Ton	21.6	21.6	21.6	21.6	21.6
Hydraulic Truck Crane 55 Ton	0.0	21.6	21.6	21.6	21.6
Hydraulic Truck Crane 35 Ton	0.0	21.6	21.6	21.6	21.6
Hydraulic Truck Crane 22 Ton	21.6	21.6	21.6	21.6	21.6
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	25.2
7000 Watt Portable Generator	136.2	136.2	136.2	136.2	136.2
Welder - Miller 400d	0.0	9.5	9.5	9.5	9.5
Welder - Miller 400d	0.0	0.0	9.5	9.5	9.5
Highway Tractor	0.0	4.1	4.1	4.1	4.1
Flat Bed Truck w/ Rails	0.0	136.2	136.2	136.2	136.2
Water Truck	18.0	18.0	18.0	18.0	18.0
Sitework (Earthwork and Civil) lbs/day:	234.1	236.8	236.8	234.1	234.1
Erection Support Equipment lbs/day:	220.5	425.6	466.3	473.0	480.7

GWF - Daily Construction Equipment Emissions

Reactive Organic Compounds

Pounds Per Day

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	1.3	1.3	1.3	1.3	1.3
Front End Loader, 2 Cyd	1.6	1.6	1.6	1.6	1.6
Grader, 200 Hp 14 Ft	0.2	0.2	0.2	0.2	0.2
Vibratory Plate (hand held)	3.3	3.3	3.3	3.3	3.3
Rammer/Jumping Jack (hand held)	3.3	3.3	3.3	3.3	3.3
Riding Vibratory Compactor	0.0	0.6	0.6	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	2.3	2.3	2.3	2.3	2.3
Air Compressor, 185 CFM	0.0	0.0	2.3	2.3	2.3
Concrete Pump	2.7	2.7	2.7	2.7	0.0
Scissors Lift	0.0	1.2	1.2	1.2	0.0
JLG 60 Ft	0.0	1.5	1.5	1.5	1.5
JLG 60 Ft	0.0	0.0	1.5	1.5	1.5
JLG 60 Ft	0.0	0.0	0.0	1.5	1.5
Forklift Extended Boom	0.3	0.3	0.3	0.3	0.3
Crane 110 Ton	0.0	0.0	1.5	1.5	1.5
Hydraulic Truck Crane 55 Ton	2.3	2.3	2.3	2.3	2.3
Hydraulic Truck Crane 55 Ton	0.0	2.3	2.3	2.3	2.3
Hydraulic Truck Crane 35 Ton	0.0	2.3	2.3	2.3	2.3
Hydraulic Truck Crane 22 Ton	2.3	2.3	2.3	2.3	2.3
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	2.7
7000 Watt Portable Generator	4.3	4.3	4.3	4.3	4.3
Welder - Miller 400d	0.0	2.1	2.1	2.1	2.1
Welder - Miller 400d	0.0	0.0	2.1	2.1	2.1
Highway Tractor	0.0	0.9	0.9	0.9	0.9
Flat Bed Truck w/ Rails	0.0	4.3	4.3	4.3	4.3
Water Truck	1.9	1.9	1.9	1.9	1.9
Sitework (Earthwork and Civil) lbs/day:	9.6	10.2	10.2	9.6	9.6
Erection Support Equipment lbs/day:	16.0	30.6	38.0	39.5	38.3

GWF - Daily Construction Equipment Emissions

Nitrogen Oxides

Pounds Per Day

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	8.9	8.9	8.9	8.9	8.9
Front End Loader, 2 Cyd	13.3	13.3	13.3	13.3	13.3
Grader, 200 Hp 14 Ft	3.6	3.6	3.6	3.6	3.6
Vibratory Plate (hand held)	2.5	2.5	2.5	2.5	2.5
Rammer/Jumping Jack (hand held)	2.5	2.5	2.5	2.5	2.5
Riding Vibratory Compactor	0.0	6.8	6.8	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	25.5	25.5	25.5	25.5	25.5
Air Compressor, 185 CFM	0.0	0.0	25.5	25.5	25.5
Concrete Pump	30.6	30.6	30.6	30.6	0.0
Scissors Lift	0.0	13.6	13.6	13.6	0.0
JLG 60 Ft	0.0	17.0	17.0	17.0	17.0
JLG 60 Ft	0.0	0.0	17.0	17.0	17.0
JLG 60 Ft	0.0	0.0	0.0	17.0	17.0
Forklift Extended Boom	2.2	2.2	2.2	2.2	2.2
Crane 110 Ton	0.0	0.0	33.4	33.4	33.4
Hydraulic Truck Crane 55 Ton	50.0	50.0	50.0	50.0	50.0
Hydraulic Truck Crane 55 Ton	0.0	50.0	50.0	50.0	50.0
Hydraulic Truck Crane 35 Ton	0.0	50.0	50.0	50.0	50.0
Hydraulic Truck Crane 22 Ton	50.0	50.0	50.0	50.0	50.0
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	58.4
7000 Watt Portable Generator	3.3	3.3	3.3	3.3	3.3
Welder - Miller 400d	0.0	23.8	23.8	23.8	23.8
Welder - Miller 400d	0.0	0.0	23.8	23.8	23.8
Highway Tractor	0.0	10.2	10.2	10.2	10.2
Flat Bed Truck w/ Rails	0.0	3.3	3.3	3.3	3.3
Water Truck	41.7	41.7	41.7	41.7	41.7
Sitework (Earthwork and Civil) lbs/day:	30.7	37.5	37.5	30.7	30.7
Erection Support Equipment lbs/day:	203.4	371.4	471.0	488.0	502.2

GWF - Daily Construction Equipment Emissions

Sulfur Dioxide

Pounds Per Day

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	0.6	0.6	0.6	0.6	0.6
Front End Loader, 2 Cyd	1.3	1.3	1.3	1.3	1.3
Grader, 200 Hp 14 Ft	0.4	0.4	0.4	0.4	0.4
Vibratory Plate (hand held)	0.1	0.1	0.1	0.1	0.1
Rammer/Jumping Jack (hand held)	0.1	0.1	0.1	0.1	0.1
Riding Vibratory Compactor	0.0	0.6	0.6	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	2.1	2.1	2.1	2.1	2.1
Air Compressor, 185 CFM	0.0	0.0	2.1	2.1	2.1
Concrete Pump	2.6	2.6	2.6	2.6	0.0
Scissors Lift	0.0	1.1	1.1	1.1	0.0
JLG 60 Ft	0.0	1.4	1.4	1.4	1.4
JLG 60 Ft	0.0	0.0	1.4	1.4	1.4
JLG 60 Ft	0.0	0.0	0.0	1.4	1.4
Forklift Extended Boom	---	---	---	---	---
Crane 110 Ton	0.0	0.0	3.6	3.6	3.6
Hydraulic Truck Crane 55 Ton	5.4	5.4	5.4	5.4	5.4
Hydraulic Truck Crane 55 Ton	0.0	5.4	5.4	5.4	5.4
Hydraulic Truck Crane 35 Ton	0.0	5.4	5.4	5.4	5.4
Hydraulic Truck Crane 22 Ton	5.4	5.4	5.4	5.4	5.4
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	6.3
7000 Watt Portable Generator	0.2	0.2	0.2	0.2	0.2
Welder - Miller 400d	0.0	2.0	2.0	2.0	2.0
Welder - Miller 400d	0.0	0.0	2.0	2.0	2.0
Highway Tractor	0.0	0.9	0.9	0.9	0.9
Flat Bed Truck w/ Rails	0.0	0.2	0.2	0.2	0.2
Water Truck	4.5	4.5	4.5	4.5	4.5
Sitework (Earthwork and Civil) lbs/day:	2.6	3.2	3.2	2.6	2.6
Erection Support Equipment lbs/day:	20.2	36.6	45.8	47.2	49.8

GWF - Daily Construction Equipment Emissions

Particulate Matter <10um

Pounds Per Day

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	1.0	1.0	1.0	1.0	1.0
Front End Loader, 2 Cyd	0.1	0.1	0.1	0.1	0.1
Grader, 200 Hp 14 Ft	0.0	0.0	0.0	0.0	0.0
Vibratory Plate (hand held)	0.2	0.2	0.2	0.2	0.2
Rammer/Jumping Jack (hand held)	0.2	0.2	0.2	0.2	0.2
Riding Vibratory Compactor	0.0	0.6	0.6	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	2.1	2.1	2.1	2.1	2.1
Air Compressor, 185 CFM	0.0	0.0	2.1	2.1	2.1
Concrete Pump	2.5	2.5	2.5	2.5	0.0
Scissors Lift	0.0	1.1	1.1	1.1	0.0
JLG 60 Ft	0.0	1.4	1.4	1.4	1.4
JLG 60 Ft	0.0	0.0	1.4	1.4	1.4
JLG 60 Ft	0.0	0.0	0.0	1.4	1.4
Forklift Extended Boom	0.2	0.2	0.2	0.2	0.2
Crane 110 Ton	0.0	0.0	0.2	0.2	0.2
Hydraulic Truck Crane 55 Ton	0.3	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 55 Ton	0.0	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 35 Ton	0.0	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 22 Ton	0.3	0.3	0.3	0.3	0.3
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	0.4
7000 Watt Portable Generator	0.2	0.2	0.2	0.2	0.2
Welder - Miller 400d	0.0	2.0	2.0	2.0	2.0
Welder - Miller 400d	0.0	0.0	2.0	2.0	2.0
Highway Tractor	0.0	0.1	0.1	0.1	0.1
Flat Bed Truck w/ Rails	0.0	0.0	0.0	0.0	0.0
Water Truck	0.3	0.3	0.3	0.3	0.3
Sitework (Earthwork and Civil) lbs/day:	1.4	2.0	2.0	1.4	1.4
Erection Support Equipment lbs/day:	5.9	11.1	16.7	18.1	14.9

GWF - Monthly Construction Equipment Emissions

Carbon Monoxide

Pounds Per Month

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	653.4	653.4	653.4	653.4	653.4
Front End Loader, 2 Cyd	104.4	104.4	104.4	104.4	104.4
Grader, 200 Hp 14 Ft	19.7	19.7	19.7	19.7	19.7
Vibratory Plate (hand held)	2,662.4	2,662.4	2,662.4	2,662.4	2,662.4
Rammer/Jumping Jack (hand held)	2,662.4	2,662.4	2,662.4	2,662.4	2,662.4
Riding Vibratory Compactor	0.0	70.4	70.4	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	264.0	264.0	264.0	264.0	264.0
Air Compressor, 185 CFM	0.0	0.0	264.0	264.0	264.0
Concrete Pump	316.8	316.8	316.8	316.8	0.0
Scissors Lift	0.0	140.8	140.8	140.8	0.0
JLG 60 Ft	0.0	176.0	176.0	176.0	176.0
JLG 60 Ft	0.0	0.0	176.0	176.0	176.0
JLG 60 Ft	0.0	0.0	0.0	176.0	176.0
Forklift Extended Boom	23.5	23.5	23.5	23.5	23.5
Crane 110 Ton	0.0	0.0	375.4	375.4	375.4
Hydraulic Truck Crane 55 Ton	563.1	563.1	563.1	563.1	563.1
Hydraulic Truck Crane 55 Ton	0.0	563.1	563.1	563.1	563.1
Hydraulic Truck Crane 35 Ton	0.0	563.1	563.1	563.1	563.1
Hydraulic Truck Crane 22 Ton	563.1	563.1	563.1	563.1	563.1
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	657.0
7000 Watt Portable Generator	3,549.9	3,549.9	3,549.9	3,549.9	3,549.9
Welder - Miller 400d	0.0	246.4	246.4	246.4	246.4
Welder - Miller 400d	0.0	0.0	246.4	246.4	246.4
Highway Tractor	0.0	105.6	105.6	105.6	105.6
Flat Bed Truck w/ Rails	0.0	3,549.9	3,549.9	3,549.9	3,549.9
Water Truck	469.3	469.3	469.3	469.3	469.3
Sitework (Earthwork and Civil) lbs/month:	6,102.3	6,172.7	6,172.7	6,102.3	6,102.3
Erection Support Equipment lbs/month:	5,749.7	11,094.6	12,156.3	12,332.3	12,531.8

GWF - Monthly Construction Equipment Emissions

Reactive Organic Compounds

Pounds Per Month

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	32.9	32.9	32.9	32.9	32.9
Front End Loader, 2 Cyd	42.0	42.0	42.0	42.0	42.0
Grader, 200 Hp 14 Ft	5.1	5.1	5.1	5.1	5.1
Vibratory Plate (hand held)	84.9	84.9	84.9	84.9	84.9
Rammer/Jumping Jack (hand held)	84.9	84.9	84.9	84.9	84.9
Riding Vibratory Compactor	0.0	15.6	15.6	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	58.7	58.7	58.7	58.7	58.7
Air Compressor, 185 CFM	0.0	0.0	58.7	58.7	58.7
Concrete Pump	70.4	70.4	70.4	70.4	0.0
Scissors Lift	0.0	31.3	31.3	31.3	0.0
JLG 60 Ft	0.0	39.1	39.1	39.1	39.1
JLG 60 Ft	0.0	0.0	39.1	39.1	39.1
JLG 60 Ft	0.0	0.0	0.0	39.1	39.1
Forklift Extended Boom	6.9	6.9	6.9	6.9	6.9
Crane 110 Ton	0.0	0.0	39.6	39.6	39.6
Hydraulic Truck Crane 55 Ton	59.4	59.4	59.4	59.4	59.4
Hydraulic Truck Crane 55 Ton	0.0	59.4	59.4	59.4	59.4
Hydraulic Truck Crane 35 Ton	0.0	59.4	59.4	59.4	59.4
Hydraulic Truck Crane 22 Ton	59.4	59.4	59.4	59.4	59.4
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	69.4
7000 Watt Portable Generator	113.3	113.3	113.3	113.3	113.3
Welder - Miller 400d	0.0	54.8	54.8	54.8	54.8
Welder - Miller 400d	0.0	0.0	54.8	54.8	54.8
Highway Tractor	0.0	23.5	23.5	23.5	23.5
Flat Bed Truck w/ Rails	0.0	113.3	113.3	113.3	113.3
Water Truck	49.5	49.5	49.5	49.5	49.5
Sitework (Earthwork and Civil) lbs/month:	249.8	265.4	265.4	249.8	249.8
Erection Support Equipment lbs/month:	417.6	798.4	990.5	1,029.6	997.3

GWF - Monthly Construction Equipment Emissions

Nitrogen Oxides

Pounds Per Month

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	231.8	231.8	231.8	231.8	231.8
Front End Loader, 2 Cyd	346.8	346.8	346.8	346.8	346.8
Grader, 200 Hp 14 Ft	92.9	92.9	92.9	92.9	92.9
Vibratory Plate (hand held)	64.4	64.4	64.4	64.4	64.4
Rammer/Jumping Jack (hand held)	64.4	64.4	64.4	64.4	64.4
Riding Vibratory Compactor	0.0	177.3	177.3	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	664.8	664.8	664.8	664.8	664.8
Air Compressor, 185 CFM	0.0	0.0	664.8	664.8	664.8
Concrete Pump	797.8	797.8	797.8	797.8	0.0
Scissors Lift	0.0	354.6	354.6	354.6	0.0
JLG 60 Ft	0.0	443.2	443.2	443.2	443.2
JLG 60 Ft	0.0	0.0	443.2	443.2	443.2
JLG 60 Ft	0.0	0.0	0.0	443.2	443.2
Forklift Extended Boom	57.5	57.5	57.5	57.5	57.5
Crane 110 Ton	0.0	0.0	869.7	869.7	869.7
Hydraulic Truck Crane 55 Ton	1,304.6	1,304.6	1,304.6	1,304.6	1,304.6
Hydraulic Truck Crane 55 Ton	0.0	1,304.6	1,304.6	1,304.6	1,304.6
Hydraulic Truck Crane 35 Ton	0.0	1,304.6	1,304.6	1,304.6	1,304.6
Hydraulic Truck Crane 22 Ton	1,304.6	1,304.6	1,304.6	1,304.6	1,304.6
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	1,522.1
7000 Watt Portable Generator	85.9	85.9	85.9	85.9	85.9
Welder - Miller 400d	0.0	620.5	620.5	620.5	620.5
Welder - Miller 400d	0.0	0.0	620.5	620.5	620.5
Highway Tractor	0.0	265.9	265.9	265.9	265.9
Flat Bed Truck w/ Rails	0.0	85.9	85.9	85.9	85.9
Water Truck	1,087.2	1,087.2	1,087.2	1,087.2	1,087.2
Sitework (Earthwork and Civil) lbs/month:	800.4	977.7	977.7	800.4	800.4
Erection Support Equipment lbs/month:	5,302.4	9,681.8	12,280.1	12,723.3	13,093.0

GWF - Monthly Construction Equipment Emissions

Sulfur Dioxide

Pounds Per Month

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	16.4	16.4	16.4	16.4	16.4
Front End Loader, 2 Cyd	33.2	33.2	33.2	33.2	33.2
Grader, 200 Hp 14 Ft	11.2	11.2	11.2	11.2	11.2
Vibratory Plate (hand held)	3.6	3.6	3.6	3.6	3.6
Rammer/Jumping Jack (hand held)	3.6	3.6	3.6	3.6	3.6
Riding Vibratory Compactor	0.0	14.9	14.9	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	55.9	55.9	55.9	55.9	55.9
Air Compressor, 185 CFM	0.0	0.0	55.9	55.9	55.9
Concrete Pump	67.1	67.1	67.1	67.1	0.0
Scissors Lift	0.0	29.8	29.8	29.8	0.0
JLG 60 Ft	0.0	37.3	37.3	37.3	37.3
JLG 60 Ft	0.0	0.0	37.3	37.3	37.3
JLG 60 Ft	0.0	0.0	0.0	37.3	37.3
Forklift Extended Boom	---	---	---	---	---
Crane 110 Ton	0.0	0.0	93.9	93.9	93.9
Hydraulic Truck Crane 55 Ton	140.8	140.8	140.8	140.8	140.8
Hydraulic Truck Crane 55 Ton	0.0	140.8	140.8	140.8	140.8
Hydraulic Truck Crane 35 Ton	0.0	140.8	140.8	140.8	140.8
Hydraulic Truck Crane 22 Ton	140.8	140.8	140.8	140.8	140.8
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	164.3
7000 Watt Portable Generator	4.8	4.8	4.8	4.8	4.8
Welder - Miller 400d	0.0	52.2	52.2	52.2	52.2
Welder - Miller 400d	0.0	0.0	52.2	52.2	52.2
Highway Tractor	0.0	22.4	22.4	22.4	22.4
Flat Bed Truck w/ Rails	0.0	4.8	4.8	4.8	4.8
Water Truck	117.3	117.3	117.3	117.3	117.3
Sitework (Earthwork and Civil) lbs/month:	68.1	83.0	83.0	68.1	68.1
Erection Support Equipment lbs/month:	526.7	954.8	1,194.0	1,231.3	1,298.6

GWF - Monthly Construction Equipment Emissions

Particulate Matter <10um

Pounds Per Month

	1	2	3	4	5
Sitework (Earthwork and Civil)					
Backhoe, 1.0 Cy	25.6	25.6	25.6	25.6	25.6
Front End Loader, 2 Cyd	3.1	3.1	3.1	3.1	3.1
Grader, 200 Hp 14 Ft	0.8	0.8	0.8	0.8	0.8
Vibratory Plate (hand held)	4.1	4.1	4.1	4.1	4.1
Rammer/Jumping Jack (hand held)	4.1	4.1	4.1	4.1	4.1
Riding Vibratory Compactor	0.0	14.6	14.6	0.0	0.0
Asphalt Paver	0.0	0.0	0.0	0.0	0.0
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0
Erection Support Equipment					
Air Compressor, 185 CFM	54.8	54.8	54.8	54.8	54.8
Air Compressor, 185 CFM	0.0	0.0	54.8	54.8	54.8
Concrete Pump	65.7	65.7	65.7	65.7	0.0
Scissors Lift	0.0	29.2	29.2	29.2	0.0
JLG 60 Ft	0.0	36.5	36.5	36.5	36.5
JLG 60 Ft	0.0	0.0	36.5	36.5	36.5
JLG 60 Ft	0.0	0.0	0.0	36.5	36.5
Forklift Extended Boom	4.0	4.0	4.0	4.0	4.0
Crane 110 Ton	0.0	0.0	5.4	5.4	5.4
Hydraulic Truck Crane 55 Ton	8.1	8.1	8.1	8.1	8.1
Hydraulic Truck Crane 55 Ton	0.0	8.1	8.1	8.1	8.1
Hydraulic Truck Crane 35 Ton	0.0	8.1	8.1	8.1	8.1
Hydraulic Truck Crane 22 Ton	8.1	8.1	8.1	8.1	8.1
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	9.5
7000 Watt Portable Generator	5.4	5.4	5.4	5.4	5.4
Welder - Miller 400d	0.0	51.1	51.1	51.1	51.1
Welder - Miller 400d	0.0	0.0	51.1	51.1	51.1
Highway Tractor	0.0	2.2	2.2	2.2	2.2
Flat Bed Truck w/ Rails	0.0	0.5	0.5	0.5	0.5
Water Truck	6.8	6.8	6.8	6.8	6.8
Sitework (Earthwork and Civil) lbs/month:	37.6	52.2	52.2	37.6	37.6
Erection Support Equipment lbs/month:	153.0	288.8	436.5	473.0	387.6

GWF - Quarterly Construction Equipment Emissions

Carbon Monoxide

Quarterly Emissions

	1	2	3	4	5	6
Sitework (Earthwork and Civil)						
Backhoe, 1.0 Cy	653.4	653.4	653.4	653.4	653.4	- -
Front End Loader, 2 Cyd	104.4	104.4	104.4	104.4	104.4	- -
Grader, 200 Hp 14 Ft	19.7	19.7	19.7	19.7	19.7	- -
Vibratory Plate (hand held)	2,662.4	2,662.4	2,662.4	2,662.4	2,662.4	- -
Rammer/Jumping Jack (hand held)	2,662.4	2,662.4	2,662.4	2,662.4	2,662.4	- -
Riding Vibratory Compactor	0.0	70.4	70.4	0.0	0.0	- -
Asphalt Paver	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0	- -
Erection Support Equipment						
Air Compressor, 185 CFM	264.0	264.0	264.0	264.0	264.0	- -
Air Compressor, 185 CFM	0.0	0.0	264.0	264.0	264.0	- -
Concrete Pump	316.8	316.8	316.8	316.8	0.0	- -
Scissors Lift	0.0	140.8	140.8	140.8	0.0	- -
JLG 60 Ft	0.0	176.0	176.0	176.0	176.0	- -
JLG 60 Ft	0.0	0.0	176.0	176.0	176.0	- -
JLG 60 Ft	0.0	0.0	0.0	176.0	176.0	- -
Forklift Extended Boom	23.5	23.5	23.5	23.5	23.5	- -
Crane 110 Ton	0.0	0.0	375.4	375.4	375.4	- -
Hydraulic Truck Crane 55 Ton	563.1	563.1	563.1	563.1	563.1	- -
Hydraulic Truck Crane 55 Ton	0.0	563.1	563.1	563.1	563.1	- -
Hydraulic Truck Crane 35 Ton	0.0	563.1	563.1	563.1	563.1	- -
Hydraulic Truck Crane 22 Ton	563.1	563.1	563.1	563.1	563.1	- -
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	657.0	- -
7000 Watt Portable Generator	3,549.9	3,549.9	3,549.9	3,549.9	3,549.9	- -
Welder - Miller 400d	0.0	246.4	246.4	246.4	246.4	- -
Welder - Miller 400d	0.0	0.0	246.4	246.4	246.4	- -
Highway Tractor	0.0	105.6	105.6	105.6	105.6	- -
Flat Bed Truck w/ Rails	0.0	3,549.9	3,549.9	3,549.9	3,549.9	- -
Water Truck	469.3	469.3	469.3	469.3	469.3	- -
Sitework (Earthwork and Civil) lbs/month:	6,102.3	6,172.7	6,172.7	6,102.3	6,102.3	0.0
Sitework (Earthwork and Civil) Tons/Qtr:			9.2			6.1
Erection Support Equipment lbs/month:	5,749.7	11,094.6	12,156.3	12,332.3	12,531.8	0.0
Erection Support Equipment Tons/Qtr:			14.5			12.4

GWF - Quarterly Construction Equipment Emissions

Reactive Organic Compounds

Quarterly Emissions

	1	2	3	4	5	6
Sitework (Earthwork and Civil)						
Backhoe, 1.0 Cy	32.9	32.9	32.9	32.9	32.9	- -
Front End Loader, 2 Cyd	42.0	42.0	42.0	42.0	42.0	- -
Grader, 200 Hp 14 Ft	5.1	5.1	5.1	5.1	5.1	- -
Vibratory Plate (hand held)	84.9	84.9	84.9	84.9	84.9	- -
Rammer/Jumping Jack (hand held)	84.9	84.9	84.9	84.9	84.9	- -
Riding Vibratory Compactor	0.0	15.6	15.6	0.0	0.0	- -
Asphalt Paver	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0	- -
Erection Support Equipment						
Air Compressor, 185 CFM	58.7	58.7	58.7	58.7	58.7	- -
Air Compressor, 185 CFM	0.0	0.0	58.7	58.7	58.7	- -
Concrete Pump	70.4	70.4	70.4	70.4	0.0	- -
Scissors Lift	0.0	31.3	31.3	31.3	0.0	- -
JLG 60 Ft	0.0	39.1	39.1	39.1	39.1	- -
JLG 60 Ft	0.0	0.0	39.1	39.1	39.1	- -
JLG 60 Ft	0.0	0.0	0.0	39.1	39.1	- -
Forklift Extended Boom	6.9	6.9	6.9	6.9	6.9	- -
Crane 110 Ton	0.0	0.0	39.6	39.6	39.6	- -
Hydraulic Truck Crane 55 Ton	59.4	59.4	59.4	59.4	59.4	- -
Hydraulic Truck Crane 55 Ton	0.0	59.4	59.4	59.4	59.4	- -
Hydraulic Truck Crane 35 Ton	0.0	59.4	59.4	59.4	59.4	- -
Hydraulic Truck Crane 22 Ton	59.4	59.4	59.4	59.4	59.4	- -
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	69.4	- -
7000 Watt Portable Generator	113.3	113.3	113.3	113.3	113.3	- -
Welder - Miller 400d	0.0	54.8	54.8	54.8	54.8	- -
Welder - Miller 400d	0.0	0.0	54.8	54.8	54.8	- -
Highway Tractor	0.0	23.5	23.5	23.5	23.5	- -
Flat Bed Truck w/ Rails	0.0	113.3	113.3	113.3	113.3	- -
Water Truck	49.5	49.5	49.5	49.5	49.5	- -
Sitework (Earthwork and Civil) lbs/month:	249.8	265.4	265.4	249.8	249.8	0.0
Sitework (Earthwork and Civil) Tons/Qtr:			0.4			0.2
Erection Support Equipment lbs/month:	417.6	798.4	990.5	1,029.6	997.3	0.0
Erection Support Equipment Tons/Qtr:			1.1			1.0

GWF - Quarterly Construction Equipment Emissions

Nitrogen Oxides

Quarterly Emissions

	1	2	3	4	5	6
Sitework (Earthwork and Civil)						
Backhoe, 1.0 Cy	231.8	231.8	231.8	231.8	231.8	- -
Front End Loader, 2 Cyd	346.8	346.8	346.8	346.8	346.8	- -
Grader, 200 Hp 14 Ft	92.9	92.9	92.9	92.9	92.9	- -
Vibratory Plate (hand held)	64.4	64.4	64.4	64.4	64.4	- -
Rammer/Jumping Jack (hand held)	64.4	64.4	64.4	64.4	64.4	- -
Riding Vibratory Compactor	0.0	177.3	177.3	0.0	0.0	- -
Asphalt Paver	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0	- -
Erection Support Equipment						
Air Compressor, 185 CFM	664.8	664.8	664.8	664.8	664.8	- -
Air Compressor, 185 CFM	0.0	0.0	664.8	664.8	664.8	- -
Concrete Pump	797.8	797.8	797.8	797.8	0.0	- -
Scissors Lift	0.0	354.6	354.6	354.6	0.0	- -
JLG 60 Ft	0.0	443.2	443.2	443.2	443.2	- -
JLG 60 Ft	0.0	0.0	443.2	443.2	443.2	- -
JLG 60 Ft	0.0	0.0	0.0	443.2	443.2	- -
Forklift Extended Boom	57.5	57.5	57.5	57.5	57.5	- -
Crane 110 Ton	0.0	0.0	869.7	869.7	869.7	- -
Hydraulic Truck Crane 55 Ton	1,304.6	1,304.6	1,304.6	1,304.6	1,304.6	- -
Hydraulic Truck Crane 55 Ton	0.0	1,304.6	1,304.6	1,304.6	1,304.6	- -
Hydraulic Truck Crane 35 Ton	0.0	1,304.6	1,304.6	1,304.6	1,304.6	- -
Hydraulic Truck Crane 22 Ton	1,304.6	1,304.6	1,304.6	1,304.6	1,304.6	- -
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	1,522.1	- -
7000 Watt Portable Generator	85.9	85.9	85.9	85.9	85.9	- -
Welder - Miller 400d	0.0	620.5	620.5	620.5	620.5	- -
Welder - Miller 400d	0.0	0.0	620.5	620.5	620.5	- -
Highway Tractor	0.0	265.9	265.9	265.9	265.9	- -
Flat Bed Truck w/ Rails	0.0	85.9	85.9	85.9	85.9	- -
Water Truck	1,087.2	1,087.2	1,087.2	1,087.2	1,087.2	- -
Sitework (Earthwork and Civil) lbs/month:	800.4	977.7	977.7	800.4	800.4	0.0
Sitework (Earthwork and Civil) Tons/Qtr:			1.4			0.8
Erection Support Equipment lbs/month:	5,302.4	9,681.8	12,280.1	12,723.3	13,093.0	0.0
Erection Support Equipment Tons/Qtr:			13.6			12.9

GWF - Quarterly Construction Equipment Emissions

Sulfur Dioxide

Quarterly Emissions

	1	2	3	4	5	6
Sitework (Earthwork and Civil)						
Backhoe, 1.0 Cy	16.4	16.4	16.4	16.4	16.4	- -
Front End Loader, 2 Cyd	33.2	33.2	33.2	33.2	33.2	- -
Grader, 200 Hp 14 Ft	11.2	11.2	11.2	11.2	11.2	- -
Vibratory Plate (hand held)	3.6	3.6	3.6	3.6	3.6	- -
Rammer/Jumping Jack (hand held)	3.6	3.6	3.6	3.6	3.6	- -
Riding Vibratory Compactor	0.0	14.9	14.9	0.0	0.0	- -
Asphalt Paver	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0	- -
Erection Support Equipment						
Air Compressor, 185 CFM	55.9	55.9	55.9	55.9	55.9	- -
Air Compressor, 185 CFM	0.0	0.0	55.9	55.9	55.9	- -
Concrete Pump	67.1	67.1	67.1	67.1	0.0	- -
Scissors Lift	0.0	29.8	29.8	29.8	0.0	- -
JLG 60 Ft	0.0	37.3	37.3	37.3	37.3	- -
JLG 60 Ft	0.0	0.0	37.3	37.3	37.3	- -
JLG 60 Ft	0.0	0.0	0.0	37.3	37.3	- -
Forklift Extended Boom	---	---	---	---	---	- -
Crane 110 Ton	0.0	0.0	93.9	93.9	93.9	- -
Hydraulic Truck Crane 55 Ton	140.8	140.8	140.8	140.8	140.8	- -
Hydraulic Truck Crane 55 Ton	0.0	140.8	140.8	140.8	140.8	- -
Hydraulic Truck Crane 35 Ton	0.0	140.8	140.8	140.8	140.8	- -
Hydraulic Truck Crane 22 Ton	140.8	140.8	140.8	140.8	140.8	- -
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	164.3	- -
7000 Watt Portable Generator	4.8	4.8	4.8	4.8	4.8	- -
Welder - Miller 400d	0.0	52.2	52.2	52.2	52.2	- -
Welder - Miller 400d	0.0	0.0	52.2	52.2	52.2	- -
Highway Tractor	0.0	22.4	22.4	22.4	22.4	- -
Flat Bed Truck w/ Rails	0.0	4.8	4.8	4.8	4.8	- -
Water Truck	117.3	117.3	117.3	117.3	117.3	- -
Sitework (Earthwork and Civil) lbs/month:	68.1	83.0	83.0	68.1	68.1	0.0
Sitework (Earthwork and Civil) Tons/Qtr:			0.1			0.1
Erection Support Equipment lbs/month:	526.7	954.8	1,194.0	1,231.3	1,298.6	0.0
Erection Support Equipment Tons/Qtr:			1.3			1.3

GWF - Quarterly Construction Equipment Emissions

Particulate Matter <10um

Quarterly Emissions

	1	2	3	4	5	6
Sitework (Earthwork and Civil)						
Backhoe, 1.0 Cy	25.6	25.6	25.6	25.6	25.6	- -
Front End Loader, 2 Cyd	3.1	3.1	3.1	3.1	3.1	- -
Grader, 200 Hp 14 Ft	0.8	0.8	0.8	0.8	0.8	- -
Vibratory Plate (hand held)	4.1	4.1	4.1	4.1	4.1	- -
Rammer/Jumping Jack (hand held)	4.1	4.1	4.1	4.1	4.1	- -
Riding Vibratory Compactor	0.0	14.6	14.6	0.0	0.0	- -
Asphalt Paver	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Cutter/Grinder	0.0	0.0	0.0	0.0	0.0	- -
Asphalt Compactor, Tandem Steel Drum Roller	0.0	0.0	0.0	0.0	0.0	- -
Erection Support Equipment						
Air Compressor, 185 CFM	54.8	54.8	54.8	54.8	54.8	- -
Air Compressor, 185 CFM	0.0	0.0	54.8	54.8	54.8	- -
Concrete Pump	65.7	65.7	65.7	65.7	0.0	- -
Scissors Lift	0.0	29.2	29.2	29.2	0.0	- -
JLG 60 Ft	0.0	36.5	36.5	36.5	36.5	- -
JLG 60 Ft	0.0	0.0	36.5	36.5	36.5	- -
JLG 60 Ft	0.0	0.0	0.0	36.5	36.5	- -
Forklift Extended Boom	4.0	4.0	4.0	4.0	4.0	- -
Crane 110 Ton	0.0	0.0	5.4	5.4	5.4	- -
Hydraulic Truck Crane 55 Ton	8.1	8.1	8.1	8.1	8.1	- -
Hydraulic Truck Crane 55 Ton	0.0	8.1	8.1	8.1	8.1	- -
Hydraulic Truck Crane 35 Ton	0.0	8.1	8.1	8.1	8.1	- -
Hydraulic Truck Crane 22 Ton	8.1	8.1	8.1	8.1	8.1	- -
Hydraulic Truck Crane 22 Ton	0.0	0.0	0.0	0.0	9.5	- -
7000 Watt Portable Generator	5.4	5.4	5.4	5.4	5.4	- -
Welder - Miller 400d	0.0	51.1	51.1	51.1	51.1	- -
Welder - Miller 400d	0.0	0.0	51.1	51.1	51.1	- -
Highway Tractor	0.0	2.2	2.2	2.2	2.2	- -
Flat Bed Truck w/ Rails	0.0	0.5	0.5	0.5	0.5	- -
Water Truck	6.8	6.8	6.8	6.8	6.8	- -
Sitework (Earthwork and Civil) lbs/month:	37.6	52.2	52.2	37.6	37.6	0.0
Sitework (Earthwork and Civil) Tons/Qtr:			0.1			0.0
Erection Support Equipment lbs/month:	153.0	288.8	436.5	473.0	387.6	0.0
Erection Support Equipment Tons/Qtr:			0.4			0.4

GWF - Annual Construction Equipment Emissions

Construction Equipment	CO	ROC	NOx	SOx	PM10
	Maximum Annual Emissions				
Sitework (Earthwork and Civil) (ton/year):	15.3	0.6	2.2	0.2	0.1
Erection Support Equipment (tons/year)	26.9	2.1	26.5	2.6	0.9
Total	42.2	2.7	28.7	2.8	1.0

HENRIETTA PEAKER PROJECT

Construction Maximum Total Hourly Emission Rates (90% PM10 Control for Equipment > 100hp)

TAIL PIPE EMISSIONS ("EXHAUST")	NO_x		CO		PM_{10}		SO_2	
	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]	(lb/hr)	(g/s) [1]
Sitework (Earthwork and Civil) Equipment Construction Emissions								
Maximum Hourly	1.9	0.236	11.8	1.492	----	----	0.16	0.020
Maximum 3-Hour [2]	----	----	----	----	----	----	0.16	0.020
Maximum 8-Hour [2]	----	----	11.8	1.492	----	----	----	----
Maximum 24-Hour [3]	----	----	----	----	0.083	0.010	0.13	0.016
Annual [4]	0.50	0.063	----	----	0.023	0.0029	0.05	0.006
Erection Support Equipment Construction Emissions								
Maximum Hourly	25.1	3.164	24.0	3.028	----	----	2.49	0.314
Maximum 3-Hour [2]	----	----	----	----	----	----	2.49	0.314
Maximum 8-Hour [2]	----	----	24.0	3.028	----	----	----	----
Maximum 24-Hour [3]	----	----	----	----	0.76	0.096	2.08	0.262
Annual [4]	6.05	0.762	----	----	0.21	0.026	0.59	0.074
TOTAL EMISSIONS (used as model input)								
Maximum Hourly	27.0	3.399	35.9	4.520	----	----	2.7	0.334
Maximum 3-Hour [2]	----	----	----	----	----	----	2.7	0.334
Maximum 8-Hour [2]	----	----	35.9	4.520	----	----	----	----
Maximum 24-Hour [3]	----	----	----	----	0.84	0.1062	2.2	0.278
Annual [4]	6.6	0.825	----	----	0.23	0.02936	0.6	0.081

FUGITIVE DUST EMISSIONS (Onsite Construction)	PM_{10} (lb/hr)	PM_{10} (g/s) [1]
Construction Dust (PM_{10}) Emissions- Plant Site		
Maximum 24-Hour [5]	0.48	0.0605
Construction Dust (PM_{10}) Emissions - Plant Site		
Annual [6]	0.17	0.0214

1 Grams per second (g/s) = lbs/hr * 0.126

2 3-hour Lbs/Hr and 8-hour Lbs/Hr = Maximum Lbs/Hr

3 24-hour lbs/hr = Maximum daily PM_{10} emissions (lb/day) divided by 24 hours.

4 Annual Tail Pipe (Exhaust) Lbs/Hr = Annual emissions (TPY) * (2000 hrs/yr) * (1 yr/8760 hours).

5 24-hour fugitive dust emissions are based on 7.33 lbs/acre/day (0.11 ton/acre/month) (Midwest Research Institute 1996) PM_{10}, 20-hour workdays and 50% control efficiency.

6 Annual fugitive dust emissions are based on 5 months disturbance, assume one half of the plant site disturbed at any given time, 6 days per week, 20-hour workdays and assume a 50% control efficiency.

HENRIETTA PEAKER PROJECT

Construction Activities Emission Rates - Model Input (90% PM10 Control for Equipment > 100hp)

TAIL PIPE EMISSIONS ("EXHAUST")	NO_x [5] (g/s)	CO [5] (g/s)	PM_{10} [5,6] (g/s)	SO_2 [5,6] (g/s)
Sitework (Earthwork and Civil) Equipment Construction Emissions				
Maximum Hourly	0.039	0.249	----	0.0033
Maximum 3-Hour	----	----	----	0.0033
Maximum 8-Hour	----	0.249	----	----
Maximum 24-Hour	----	----	0.0017	0.0027
Annual	0.011	----	0.00048	0.0010
Erection Support Equipment Construction Emissions				
Maximum Hourly	0.527	0.505	----	0.052
Maximum 3-Hour	----	----	----	0.052
Maximum 8-Hour	----	0.505	----	----
Maximum 24-Hour	----	----	0.0160	0.044
Annual	0.127	----	0.00433	0.012
TOTAL EMISSIONS (used as model input)				
Maximum Hourly	0.566	0.754	----	0.055
Maximum 3-Hour	----	----	----	0.055
Maximum 8-Hour	----	0.754	----	----
Maximum 24-Hour	----	----	0.0177	0.047
Annual	0.138	----	0.00481	0.013

FUGITIVE DUST EMISSIONS [2]	PM_{10} (g/s)
Construction Dust (PM10) Emissions- Plant Site	
Maximum 24-Hour	0.0605
Construction Dust (PM10) Emissions - Plant Site	
Annual	0.0214

[1] For modeling purposes, the tailpipe ("Exhaust") emissions were split evenly between six point sources.

[2] Fugitive dust PM_{10} emissions were modeled as a single volume source within the proposed plant construction site.

Attachment 2.1-5

Revised Appendix B Construction

Impacts Modeling Files

(Replace Only 24-Hour

PM_{10} Modeling Files and Annual PM_{10} Modeling Files)

Attachment 2.1-5

Revised Appendix B Construction

Impacts Modeling Files

(Replace Only 24-Hour

PM_{10} Modeling Files and Annual PM_{10} Modeling Files)

*** ISCST3 - VERSION 00101 ***
*** GWF Henrietta 90% PM10 control for equipment > 100hp ***
*** Model Executed on 09/13/01 at 16:53:17 ***

BEE-Line ISCST3 "BEEST" Version 8.10

Input File - C:\Vicki\work\Henrietta\Construction\Hc100hpPM24.DTA
Output File - C:\Vicki\work\Henrietta\Construction\Hc100hpPM24.LST
Met File - C:\Vicki\work\Henrietta\Construction\Lnas68.asc

Number of sources - 7
Number of source groups - 3
Number of receptors - 2903

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
EQUIP1	0	0.17700E-01	239074.6	4014319.0	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP2	0	0.17700E-01	239169.2	4014262.8	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP3	0	0.17700E-01	239124.5	4014263.3	68.3	3.48	700.00	40.00	0.05	NO	
EQUIP4	0	0.17700E-01	239071.1	4014262.0	68.5	3.48	700.00	40.00	0.05	NO	
EQUIP5	0	0.17700E-01	239124.5	4014320.0	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP6	0	0.17700E-01	239170.6	4014319.3	68.6	3.48	700.00	40.00	0.05	NO	

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
DUST	0	0.60000E-01	239123.8	4014298.8	68.4	1.50	27.67	1.42	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	EQUIP1 , EQUIP2 , EQUIP3 , EQUIP4 , EQUIP5 , EQUIP6 , DUST ,
EQUIP	EQUIP1 , EQUIP2 , EQUIP3 , EQUIP4 , EQUIP5 , EQUIP6 ,
DUST	DUST ,

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM24HR IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	71.32041c	ON 68122724:	AT (239074.70, 4014369.75, 68.60, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	64.21832c	ON 68122224:	AT (239097.50, 4014369.75, 68.60, 0.00)	DC	NA
EQUIP	HIGH 1ST HIGH VALUE IS	20.09609	ON 68101424:	AT (239175.00, 4014175.00, 68.30, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	18.39959c	ON 68020424:	AT (239175.00, 4014175.00, 68.30, 0.00)	DC	NA
DUST	HIGH 1ST HIGH VALUE IS	60.28648c	ON 68122724:	AT (239074.70, 4014369.75, 68.60, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	59.01527c	ON 68122224:	AT (239097.50, 4014369.75, 68.60, 0.00)	DC	NA

*** ISCST3 - VERSION 00101 ***
*** GWF Henrietta 90% PM10 control for equipment > 100hp ***
*** Model Executed on 09/13/01 at 17:02:34 ***

BEE-Line ISCST3 "BEEST" Version 8.10

Input File - C:\Vicki\work\Henrietta\Construction\HC100hpPMAnn.DTA
Output File - C:\Vicki\work\Henrietta\Construction\HC100hpPMAnn.LST
Met File - C:\Vicki\work\Henrietta\Construction\Lnas68.asc

Number of sources - 7
Number of source groups - 3
Number of receptors - 2903

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
EQUIP1	0	0.48100E-02	239074.6	4014319.0	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP2	0	0.48100E-02	239169.2	4014262.8	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP3	0	0.48100E-02	239124.5	4014263.3	68.3	3.48	700.00	40.00	0.05	NO	
EQUIP4	0	0.48100E-02	239071.1	4014262.0	68.5	3.48	700.00	40.00	0.05	NO	
EQUIP5	0	0.48100E-02	239124.5	4014320.0	68.6	3.48	700.00	40.00	0.05	NO	
EQUIP6	0	0.48100E-02	239170.6	4014319.3	68.6	3.48	700.00	40.00	0.05	NO	

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
DUST	0	0.21000E-01	239123.8	4014298.8	68.4	1.50	27.67	1.42	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	EQUIP1 , EQUIP2 , EQUIP3 , EQUIP4 , EQUIP5 , EQUIP6 , DUST ,
EQUIP	EQUIP1 , EQUIP2 , EQUIP3 , EQUIP4 , EQUIP5 , EQUIP6 ,
DUST	DUST ,

*** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS ***

** CONC OF PMANN IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	8.23051 AT (	239165.70,	4014213.00,	68.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	8.12382 AT (	239143.00,	4014213.00,	68.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	7.22575 AT (	239188.50,	4014213.00,	68.30,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	7.08130 AT (	239150.00,	4014200.00,	68.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	7.06713 AT (	239175.00,	4014200.00,	68.30,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	6.39597 AT (	239120.20,	4014213.00,	68.30,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	6.00637 AT (	239200.00,	4014200.00,	68.30,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	5.83267 AT (	239125.00,	4014200.00,	68.30,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	5.58992 AT (	239211.30,	4014235.50,	68.30,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	5.55659 AT (	239175.00,	4014175.00,	68.30,	0.00)	DC	NA
EQUIP	1ST HIGHEST VALUE IS	1.88342 AT (	239143.00,	4014213.00,	68.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	1.78486 AT (	239150.00,	4014200.00,	68.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	1.73014 AT (	239165.70,	4014213.00,	68.30,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	1.67636 AT (	239175.00,	4014200.00,	68.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	1.65923 AT (	239125.00,	4014200.00,	68.30,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	1.62527 AT (	239120.20,	4014213.00,	68.30,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	1.58678 AT (	239188.50,	4014213.00,	68.30,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	1.58572 AT (	239097.50,	4014213.00,	68.30,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	1.53292 AT (	239175.00,	4014175.00,	68.30,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	1.52665 AT (	239100.00,	4014200.00,	68.30,	0.00)	DC	NA
DUST	1ST HIGHEST VALUE IS	6.50042 AT (	239165.70,	4014213.00,	68.30,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	6.24046 AT (	239143.00,	4014213.00,	68.30,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	5.63903 AT (	239188.50,	4014213.00,	68.30,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	5.39080 AT (	239175.00,	4014200.00,	68.30,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	5.29647 AT (	239150.00,	4014200.00,	68.30,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	4.78914 AT (	239211.30,	4014257.75,	68.30,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	4.77076 AT (	239120.20,	4014213.00,	68.30,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	4.68084 AT (	239211.30,	4014235.50,	68.30,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	4.58926 AT (	239200.00,	4014200.00,	68.30,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	4.45721 AT (	239211.30,	4014280.25,	68.30,	0.00)	DC	NA

Attachment 2.1-6

Notice of Preliminary Determination of Compliance (PDOC)

Project Number C1011099: Henrietta Peaker Project (01-AFC-18)

San Joaquin Valley
Air Pollution Control District

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SEP 1 0 2001
GWF Corporate Office

September 6, 2001

Doug Wheeler
GWF Energy, LLC
4300 Railroad Avenue
Pittsburg, CA 94565

Re: Notice of Preliminary Determination of Compliance (PDOC)
Project Number: C1011099 – Henrietta Peaker Project (01-AFC-18)

Dear Mr. Wheeler:

Enclosed for your review and comments is the District's preliminary determination of compliance (PDOC) for GWF Energy, LLC – Henrietta Peaker Project, for the installation of a nominal 93.8 MW simple cycle power plant to be located at NW ¼ Section 34, Township 19 South, Range 19 East – Mount Diablo Base Meridian in Kings County.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Errol Villegas of Permit Services at (559) 230-5906.

Sincerely,

Seyed Sadredin
Director of Permit Services

SS/EV
Enclosures
c: David Warner, Permit Services Manager
Mark Kehoe, GWF Energy LLC.

David L. Crow
Executive Director/Air Pollution Control Officer

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DETERMINATION OF COMPLIANCE EVALUATION

Henrietta Peaker Project
California Energy Commission
Application for Certification Docket #: 01-AFC-18

Facility Name:	GWF Energy, LLC – Henrietta Peaker Power Plant
Mailing Address:	4300 Railroad Avenue Pittsburg, CA 94565
Contact Name:	Doug Wheeler
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E-Mail:	mkehoe@gwfpower.com
Engineer:	Errol Villegas, Air Quality Engineer
Lead Engineer:	Dave Warner, Permit Services Manager
Date:	September 4, 2001
Project #:	C1011099
Application #'s:	C-3929-1-0 , C-3929-2-0, and C-3929-3-0
Submitted:	August 27, 2001

Table of Contents

I. PROPOSAL:

GWF Energy, LLC – Henrietta Peaker Power Plant hereinafter referred to as "Henrietta Peaker Project" is seeking approval from the San Joaquin Valley Air Pollution Control District (the "District") for the installation of a "peaking" electrical power generation facility. The Henrietta Peaker Project will be a simple cycle power generation facility consisting of two natural gas fired combustion turbine generators (CTGs), with a nominal output of 93.8 megawatts (MW) electrical power, a 397 hp diesel-fired emergency IC engine, and associated facilities. The project will interconnect to the PG&E Henrietta Substation through a 550 foot, 70 kilovolt (kV) transmission line.

The Henrietta Peaker Project is subject to approval by the California Energy Commission (CEC). Pursuant to SJVAPCD Rule 2201, Section 5.8, the Determination of Compliance (DOC) review is functionally equivalent to an Authority to Construct (ATC) review. The Determination of Compliance (DOC) will be issued and submitted to the CEC contingent upon SJVAPCD approval of the project.

The California Energy Commission (CEC) is the lead agency for this project for the requirements of the California Environmental Quality Act (CEQA).

II. APPLICABLE RULES:

Rule 1080	Stack Monitoring (12/17/92)
Rule 1081	Source Sampling (12/16/93)
Rule 2010	Permits Required (12/17/92)
Rule 2201	New and Modified Stationary Source Review (8/20/98)
Rule 2520	Federally Mandated Operating Permits (6/15/95)
Rule 2540	Acid Rain Program (11/13/97)
Rule 4001	NSPS Subpart GG - Standards of Performance for Stationary Gas Turbines
Rule 4101	Visible Emissions (12/17/92)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4202	Particulate Matter Emission Rate (12/17/92)
Rule 4701	Internal Combustion Engines (11/12/98)
Rule 4703	Stationary Gas Turbines (10/16/97)
Rule 4801	Sulfur Compounds (12/17/92)
Rule 8010	Fugitive Dust Administrative Requirements for Control of Fine Particulate Matter (4/25/96)
Rule 8020	Fugitive Dust Requirements for Control of Fine Particulate Matter (PM-10) From Construction, Demolition, Excavation, and Extraction Activities (4/25/96)

CH&S Code, Sections 41700, 42301.6 (School Notice), and 44300 (Air Toxic "Hot Spots")

III. PROJECT LOCATION:

NW ¼ Section 34, Township 19 South, Range 19 East – Mount Diablo Base Meridian on Assessor's Parcel Number 027-190-065.

The site is located on the eastern side of 25th Avenue, approximately one mile south of State Route (SR) 198, in Kings County. The proposed location is not within 1,000' of a K-12 school.

IV. PROCESS DESCRIPTION:

The proposed facility will consist of two natural gas-fired General Electric (GE) Model LM6000 PC Sprint combustion turbine generators (CTGs), each equipped with a water spray premixed combustion system, a selective catalytic reduction (SCR) system with ammonia injection, an oxidation catalyst, and associated support equipment and a 397 hp Caterpillar Model 3306 diesel-fired emergency IC engine powering a 250 kW generator. Each CTG system will consist of a stationary, heavy duty, industrial CTG, designed to use natural gas to produce electricity at a nominal output of 46.9 MW for each CTG. The total facility nominal output will be 93.8 MW. No cooling towers or heat recovery steam generators (HRSGs) will be installed. The applicant has not proposed any black start equipment.

The CTGs will operate during periods of peak electricity demand. Peak electricity demand periods typically occur during daylight hours in the second and third quarters of the calendar year, but can also occur during other periods when unusual temperature extremes cause unseasonably high electricity demand or when other electricity resource constraints reduce the amount of power otherwise available to the grid. This facility could operate during any of these periods.

The facility has proposed an operating scenario of 8,000 hours of full load operation per year with 300 total startups and shutdown events. GWF does not wish to be restricted to a specific number of hours of operation and startup/shutdown events per quarter. Actual emissions from the facility will vary depending on electricity demand from California. A hypothetical operating scenario has been developed for purposes of demonstrating that the project will comply with SJVAPCD emission offset requirements with the ERC's that have already been obtained for this project.

C-3929-1-0 and C-3929-2-0 Henrietta Peaker Project – Hypothetical Operating Scenario					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Number of Startups/Shutdown Events	50	100	100	50	300
Number of Full Load Hours	2,000	2,000	2,000	2,000	8,000

IV. PROCESS DESCRIPTION (Continued):

The CTGs will utilize water injection, SCR with ammonia injection, and an oxidation catalyst to achieve the following emission rates:

NO_X: 3.6 ppmvd @ 15% O_2
VOC: 2.0 ppmvd @ 15% O_2
CO: 6.0 ppmvd @ 15% O_2
SO_X: 0.00071 lb/MMBtu
PM_{10}: 3.3 lb/hr

Continuous emissions monitoring systems (CEM's) will sample, analyze, and record NO_X, CO, and O_2 concentrations in the exhaust gas for each CTG.

V. EQUIPMENT LISTING:

C-3929-1-0: 46.9 MW nominally rated Simple-Cycle Peak-Demand Power Generating System #1 consisting of a General Electric Model LM6000 natural gas-fired Combustion turbine Generator with water spray premixed combustion systems, served by a selective catalytic reduction (SCR) system with ammonia injection and an oxidation catalyst.

C-3929-2-0: 46.9 MW nominally rated Simple-Cycle Peak-Demand Power Generating System #1 consisting of a General Electric Model LM6000 natural gas-fired Combustion turbine Generator with water spray premixed combustion systems, served by a selective catalytic reduction (SCR) system with ammonia injection and an oxidation catalyst.

C-3929-3-0: 397 hp Caterpillar Model 3306 diesel-fired emergency IC engine powering a 250 kW generator.

VI. EMISSION CONTROL TECHNOLOGY EVALUATION:

C-3929-1-0 and C-3929-2-0

Each CTG will be equipped with water spray premixed combustion systems and will exhaust into a Selective Catalytic Reduction [SCR] system with ammonia injection, and a CO & VOC catalyst. The use of water injection and a SCR system with ammonia injection can achieve a NO_X emission rate of 3.6 ppmvd @ 15% O_2. CO emissions of 6 ppmvd @ 15% O_2 and VOC emissions of 2 ppmvd @ 15% O_2 have been demonstrated with the use of an oxidation catalyst (1).

Emissions from natural gas-fired turbines include NO_X, CO, VOC, PM_{10}, and SO_X.

[1] Based on information supplied by the CTG manufacturer and information contained in the California Air Resources Board's September 1999 Guidance for Power Plant Siting and Best Available Control Technology document.

VI. EMISSION CONTROL TECHNOLOGY EVALUATION (Continued):

NO_X is the major pollutant of concern when combusting natural gas. Virtually all gas turbine NO_X emissions originate as NO. This NO is further oxidized in the exhaust system or later in the atmosphere to form the more stable NO_2 molecule. There are two mechanisms by which NO_X is formed in turbine combustors: 1) the oxidation of atmospheric nitrogen found in the combustion air (thermal NO_X and prompt NO_X), and 2) the conversion of nitrogen chemically bound in the fuel (fuel NO_X).

Thermal NO_X is formed by a series of chemical reactions in which oxygen and nitrogen present in the combustion air dissociate and subsequently react to form oxides of nitrogen. Prompt NO_X, a form of thermal NO_X, is formed in the proximity of the flame front as intermediate combustion products such as HCN, H, and NH are oxidized to form NO_X.

Fuel NO_X is formed when fuels containing nitrogen are burned. Molecular nitrogen, present as N_2 in some natural gas, does not contribute significantly to fuel NO_X formation. With excess air, the degree of fuel NO_X formation is primarily a function of the nitrogen content in the fuel. When compared to thermal NO_X, fuel NO_X is not currently a major contributor to overall NO_X emissions from stationary gas turbines firing natural gas.

The level of NO_X formation in a gas turbine, and hence the NO_X emissions, is unique (by design factors) to each gas turbine model and operating mode. The primary factors that determine the amount of NO_X generated are the combustor design, the types of fuel being burned, ambient conditions, operating cycles, and the power output of the turbine.

Selective Catalytic Reduction systems selectively reduce NO_X emissions by injecting ammonia (NH_3) into the exhaust gas stream upstream of a catalyst. Nitrogen oxides, NH_3, and O_2 react on the surface of the catalyst to form molecular nitrogen (N_2) and H_2O. SCR is capable of over 90 percent NO_X reduction. Titanium oxide is the SCR catalyst material most commonly used, though vanadium pentoxide, noble metals, or zeolites are also used. The ideal operating temperature for a conventional SCR catalyst is 600 to 750 °F. Exhaust gas temperatures greater than the upper limit (750 °F) will cause NO_X and NH_3 to pass through the catalyst unreacted. Ammonia slip will be limited to 10 ppmvd @ 15% O_2.

An oxidation catalyst utilizes a precious metal catalyst bed to convert carbon monoxide (CO) to carbon dioxide (CO_2). This type of control device is also somewhat effective for controlling VOC emissions by a similar chemical reaction to that of carbon monoxide.

C-3929-3-0

The engine will be equipped with:

[X] Turbocharger
[X] Intercooler/aftercooler
[X] Positive Crankcase Ventilation (PCV) or 90% efficient control device
[X] Low (0.05%) sulfur diesel

VI. EMISSION CONTROL TECHNOLOGY EVALUATION (Continued):

The emission control devices/technologies and their effect on diesel engine emissions are detailed below.[2]

The turbocharger reduces the NO_X emission rate from the engine by approximately 10% by increasing the efficiency and promoting more complete burning of the fuel.

The intercooler/aftercooler functions in conjunction with the turbocharger to reduce the inlet air temperature. By reducing the inlet air temperature, the peak combustion temperature is lowered, which reduces the formation of thermal NO_X. NO_X emissions are reduced by approximately 15% with this control technology.

The PCV system reduces crankcase VOC and PM_{10} emissions by at least 90% over an uncontrolled crankcase vent.

The use of low sulfur (0.05% by weight sulfur maximum) diesel fuel reduces SO_X emissions by approximately 90% from standard diesel fuel.

VII. CALCULATIONS:

A. Assumptions

C-3929-1-0 and C-3929-2-0

- BACT emission concentration limits of 3.6 ppmvd @ 15% O_2, 6.0 ppmvd @ 15% O_2, and 2.0 ppmvd @ 15% O_2 are proposed for NO_X, CO, and VOC, respectively, at all operating loads (except during start-ups and shutdowns).

- The applicant proposes NO_X, CO and VOC mass emission rates of 5.9 lb/hr, 2.44 lb/hr and 0.33 lb/hr, respectively, at 100% load and 63 °F (average ambient temperature).

- The applicant proposes a PM_{10} mass emission rate of 3.3 lb/hr for each CTG based on the vendor's guarantee for both the filterable and condensable portions of PM_{10}.

- A SO_X emissions rate of 0.33 lb/hr was calculated using the CTGs maximum heat input of 459.6 MMBtu/hr (@ 100% load and 63 °F) by performing a mass balance assuming 1,000 Btu/scf (hhv) for natural gas, and a natural gas sulfur content of 0.25 gr S/100 scf.

  (0.25 ~~gr S~~/100 ~~dscf~~ x 1 ~~lb S~~/7000 ~~gr~~ x 64 lb SO_X/32 ~~lb S~~ x 1 ~~scf~~/1000 ~~Btu~~ x 10^6 ~~Btu~~/MMBtu)
  = 0.00071 lb/MMBtu

[2] From "Non-catalytic NO_x Control of Stationary Diesel Engines", by Don Koeberlein, CARB.

VII. CALCULATIONS (Continued):

- Maximum daily emissions for each CTG were estimated assuming 100% capacity, an ambient temperature of 63 °F, one 1-hour startup/shutdown event, followed by 23 hours of full load operation.
- SO_X emissions are proportional to fuel use, so the maximum daily emission rate is based on 24 hours of operation, @ 100% capacity and 63 °F.
- Quarterly emissions are based on the following hypothetical operating schedule:

C-3929-1-0 and C-3929-2-0 Henrietta Peaker Project – Hypothetical Operating Scenario (Repeated from P. 2)					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Number of Startups/Shutdown Events	50	100	100	50	300
Number of Full Load Hours	2,000	2,000	2,000	2,000	8,000

C-3929-3-0

- Diesel F factor is 9,190 dscf/MMBtu.
- Density of diesel is 7.1 lb/gal.
- Higher Heating Value of diesel is 137,000 Btu/scf.
- BHP to Btu/hr conversion is 2,542.5 Btu/hp·hr.
- Thermal efficiency of the engine: commonly ≈ 35%.
- Emissions are based on 24 hours per day and 200 hours per year of operation. (maximum non-emergency use)

B. Emission Factors

C-3929-1-0 and C-3929-2-0

The maximum air contaminant mass emission rates (lb/hr), concentrations (ppmvd @ 15% O_2), and startup and shutdown emissions rates estimated by the manufacturer (see Attachment B for manufacturer's emissions data) for the proposed CTG's are summarized below:

VII. CALCULATIONS (Continued):

Maximum Emission Rates and Concentrations (@ 100% Load & 63 °F)						
	NO_X	CO	VOC	PM_{10}	SO_X	NH_3
Mass Emission Rates (per turbine, lb/hr)	5.9	2.44	0.33	3.3	0.33	6.25
ppmvd @ 15% O_2 limits	3.6	6.0	2.0	--	--	10.0

Startup and Shutdown Emissions (1-hour duration)*					
	NO_X (lb/event)	CO (lb/event)	VOC (lb/event)	PM_{10} (lb/event)	SO_X (lb/event)
Mass Emission Rate (per turbine)	7.7	7.7	0.68	3.14	N/A[3]

* Pursuant to the turbine vendor, "A start-up/shutdown event is estimated to be completed in 10 minutes; however, for simplification the emissions for a start-up/shutdown event are calculated as hourly emissions with the 10 minute start-up emissions being added to 50 minutes of baseload operating emissions."

C-3929-3-0

For the new emergency IC engine, the emissions factors for NO_X, CO, VOC, and PM_{10} are provided by the applicant and are guaranteed by the engine manufacturer. The SO_X emission factor is calculated using the sulfur content in the diesel fuel (0.05% sulfur).

IC Engine Emission Factors		
	g/hp·hr	Source
NO_X	5.09	Engine Manufacturer
CO	1.13	Engine Manufacturer
VOC	0.14	Engine Manufacturer
PM_{10}	0.13	Engine Manufacturer
*SO_X	0.171	Mass Balance Equation Below

$$^{*}0.05\% \times \frac{7.1\,lb \cdot fuel}{gallon} \times \frac{2\,lb \cdot SO_2}{1\,lb \cdot S} \times \frac{1\,gal}{137{,}000\,Btu} \times \frac{1\,hp\,input}{0.35\,hp\,out} \times \frac{2{,}542.5\,Btu}{hp \cdot hr} \times \frac{453.6\,g}{lb} = 0.171\,\frac{g\,SOx}{hp \cdot hr}$$

C. <u>Potential to Emit (PE):</u>

Section 3.26 of Rule 2201 defines the potential to emit (PE) as the maximum capacity of an emissions unit to emit a pollutant under its physical and operational design. The criteria pollutant potentials to emit for each emission unit is presented below:

[3] SO_X emissions during startups and shutdowns are always lower than maximum hourly emissions as SO_X emissions are proportional to fuel flow.

VII. CALCULATIONS (Continued):

C-3929-1-0 and C-3929-2-0

1. Maximum Hourly Emissions

The maximum hourly emissions for NO_X, CO, and VOC from each CTG will occur when the unit undergoes one startup/shutdown event. The maximum hourly emissions are summarized in the table below:

Maximum Hourly Emissions (C-3929-1-0 and C-3929-2-0)				
	Startup Emissions (lb/event)	Turbine #1 Emissions	Turbine #2 Emissions	Maximum Hourly Emissions for Both Turbines
NO_X	7.7 lb	7.7 lb	7.7 lb	15.4 lb/hr
CO	7.7 lb	7.7 lb	7.7 lb	15.4 lb/hr
VOC	0.68 lb	0.68 lb	0.68 lb	1.36 lb/hr
PM_{10}	N/A[4]	3.3 lb	3.3 lb	6.6 lb/hr
SO_X	N/A[4]	0.33 lb	0.33 lb	0.66 lb/hr
NH_3	N/A[4]	6.25 lb	6.25 lb	12.5 lb/hr

2. Maximum Daily PE

The maximum daily emissions occur when each CTG undergoes one 1-hour startup/shutdown period, followed by 23 hours of operation at 100% load. The results are summarized in the table below:

Maximum Daily Emissions					
	Startup/ Shutdown Emissions (lb/event)	Emissions Rate @ 100% Load	Emissions @ Normal Operation	DEL (per CTG)	Combined DEL for 2 CTGs
NO_X	7.7 lb	5.9 lb/hr	141.6 lb/day	143.4 lb/day	286.8 lb/day
CO	7.7 lb	2.44 lb/hr	58.6 lb/day	63.8 lb/day	127.6 lb/day
VOC	0.68 lb	0.33 lb/hr	7.9 lb/day	8.3 lb/day	16.6 lb/day
PM_{10}	N/A[5]	3.3 lb/hr	79.2 lb/day	79.2 lb/day	158.4 lb/day
SO_X	N/A[5]	0.33 lb/hr	7.9 lb/day	7.9 lb/day	15.8 lb/day
NH_3	N/A[5]	6.25 lb/hr	150.0 lb/day	150.0 lb/day	300.0 lb/day

[4] The maximum hourly emissions for this pollutant occur when each CTG operates at 100% load for 1 hour.
[5] Maximum daily emissions for this pollutant occur when each CTG is operated at 100% load for 24 hr/day.

VII. CALCULATIONS (Continued):

3. _Maximum Quarterly PE_

Maximum quarterly emissions for each unit will be determined by the following equation:

$$PE\left(\frac{lb}{qtr}\right) = \left(\frac{events}{qtr} \times \text{startup/shutdown events}\left(\frac{lb}{event}\right)\right) + \left(2{,}000\frac{hr}{qtr} \times \text{mass emission rate}\left(\frac{lb}{hr}\right)\right)$$

Quarters 1 and 4
The maximum emissions from each CTG during the first and fourth quarters will occur when each unit undergoes fifty (50) startup/shutdown events and 2,000 hours of operation at 100% load, as summarized in the tables below:

First Quarter Emissions					
	Startup/ Shutdown Emissions (lb/event)	Emissions Rate @ 100% Load	Emissions @ Normal Operation	Quarterly PE (per CTG)	Combined PE for 2 CTGs
NO_X	7.7 lb	5.9 lb/hr	11,800 lb/qtr	12,185 lb/qtr	24,370 lb/qtr
CO	7.7 lb	2.44 lb/hr	4,880 lb/qtr	5,265 lb/qtr	10,530 lb/qtr
VOC	0.68 lb	0.33 lb/hr	660 lb/qtr	694 lb/qtr	1,388 lb/qtr
PM_{10}	N/A[6]	3.3 lb/hr	6,600 lb/qtr	6,600 lb/qtr	13,200 lb/qtr
SO_X	N/A[6]	0.33 lb/hr	660 lb/qtr	660 lb/qtr	1,320 lb/qtr
NH_3	N/A[6]	6.25 lb/hr	12,500 lb/qtr	12,500 lb/qtr	25,000 lb/qtr

Fourth Quarter Emissions					
	Startup/ Shutdown Emissions (lb/event)	Emissions Rate @ 100% Load	Emissions @ Normal Operation	Quarterly PE (per CTG)	Combined PE for 2 CTGs
NO_X	7.7 lb	5.9 lb/hr	11,800 lb/qtr	12,185 lb/qtr	24,370 lb/qtr
CO	7.7 lb	2.44 lb/hr	4,880 lb/qtr	5,265 lb/qtr	10,530 lb/qtr
VOC	0.68 lb	0.33 lb/hr	660 lb/qtr	694 lb/qtr	1,388 lb/qtr
PM_{10}	N/A[6]	3.3 lb/hr	6,600 lb/qtr	6,600 lb/qtr	13,200 lb/qtr
SO_X	N/A[6]	0.33 lb/hr	660 lb/qtr	660 lb/qtr	1,320 lb/qtr
NH_3	N/A[6]	6.25 lb/hr	12,500 lb/qtr	12,500 lb/qtr	25,000 lb/qtr

[6] Maximum quarterly emissions for this pollutant occur when each CTG is operated at 100% load for 2,000 hr/qtr.

VII. CALCULATIONS (Continued):

Quarters 2 and 3

The maximum emissions from each CTG during the second and third quarters will occur when each unit undergoes one hundred (100) startup/shutdown events and 2,000 hours of operation at 100% load, as summarized in the tables below:

Second Quarter Emissions					
	Startup/ Shutdown Emissions (lb/event)	Emissions Rate @ 100% Load	Emissions @ Normal Operation	Quarterly PE (per CTG)	Combined PE for 2 CTGs
NO_X	7.7 lb	5.9 lb/hr	11,800 lb/qtr	12,570 lb/qtr	25,140 lb/qtr
CO	7.7 lb	2.44 lb/hr	4,880 lb/qtr	5,650 lb/qtr	11,300 lb/qtr
VOC	0.68 lb	0.33 lb/hr	660 lb/qtr	728 lb/qtr	1,456 lb/qtr
PM_{10}	N/A[7]	3.3 lb/hr	6,600 lb/qtr	6,600 lb/qtr	13,200 lb/qtr
SO_X	N/A[7]	0.33 lb/hr	660 lb/qtr	660 lb/qtr	1,320 lb/qtr
NH_3	N/A[7]	6.25 lb/hr	12,500 lb/qtr	12,500 lb/qtr	25,000 lb/qtr

Third Quarter Emissions					
	Startup/ Shutdown Emissions (lb/event)	Emissions Rate @ 100% Load	Emissions @ Normal Operation	Quarterly PE (per CTG)	Combined PE for 2 CTGs
NO_X	7.7 lb	5.9 lb/hr	11,800 lb/qtr	12,570 lb/qtr	25,140 lb/qtr
CO	7.7 lb	2.44 lb/hr	4,880 lb/qtr	5,650 lb/qtr	11,300 lb/qtr
VOC	0.68 lb	0.33 lb/hr	660 lb/qtr	728 lb/qtr	1,456 lb/qtr
PM_{10}	N/A[7]	3.3 lb/hr	6,600 lb/qtr	6,600 lb/qtr	13,200 lb/qtr
SO_X	N/A[7]	0.33 lb/hr	660 lb/qtr	660 lb/qtr	1,320 lb/qtr
NH_3	N/A[7]	6.25 lb/hr	12,500 lb/qtr	12,500 lb/qtr	25,000 lb/qtr

4. Maximum Annual PE

The maximum annual PE is merely the sum of the maximum quarterly PE calculated in section VII.C.3 of this document. The results are summarized in the table below:

[7] Maximum quarterly emissions for this pollutant occur when each CTG is operated at 100% load for 2,000 hr/qtr.

VII. CALCULATIONS (Continued):

Maximum Annual Emissions (each CTG)						
Quarter	NO_X	CO	VOC	PM_{10}	SO_X	NH_3
1st (lb/qtr)	12,185	5,265	694	6,600	660	12,500
2nd (lb/qtr)	12,570	5,650	728	6,600	660	12,500
3rd (lb/qtr)	12,570	5,650	728	6,600	660	12,500
4th (lb/qtr)	12,185	5,265	694	6,600	660	12,500
Annual PE (lb/yr)	49,510	21,830	2,844	26,400	2,640	50,000

Maximum Annual Emissions (both CTGs)						
Quarter	NO_X	CO	VOC	PM_{10}	SO_X	NH_3
1st (lb/qtr)	24,370	10,530	1,388	13,200	1,320	25,000
2nd (lb/qtr)	25,140	11,300	1,456	13,200	1,320	25,000
3rd (lb/qtr)	25,140	11,300	1,456	13,200	1,320	25,000
4th (lb/qtr)	24,370	10,530	1,388	13,200	1,320	25,000
Annual PE (lb/yr)	99,020	43,660	5,688	52,800	5,280	100,000

C-3929-3-0

5. Potential to Emit

The emissions for the emergency IC engine is calculated as follows, and summarized in the table below:

$$PE_{NOx} = (5.09 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb})$$
$$= 4.45 \text{ lb } NO_X\text{/hr}$$

$$= (5.09 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb}) * (24 \text{ hr/day})$$
$$= 106.9 \text{ lb } NO_X\text{/day}$$

$$= (5.09 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb}) * (50 \text{ hr/year})$$
$$= 223 \text{ lb } NO_X\text{/qtr}$$

$$= (5.09 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb}) * (200 \text{ hr/year})$$
$$= 891 \text{ lb } NO_X\text{/year}$$

$$PE_{CO} = (1.13 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb})$$
$$= 0.99 \text{ lb CO/hr}$$

$$= (1.13 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb}) * (24 \text{ hr/day})$$
$$= 23.7 \text{ lb CO/day}$$

$$= (1.13 \text{ g/hp·hr}) * (397 \text{ hp}) \div (453.6 \text{ g/lb}) * (50 \text{ hr/year})$$
$$= 50 \text{ lb CO/qtr}$$

VII. CALCULATIONS (Continued):

= (1.13 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (200 hr/year)
= 198 lb CO/year

PE_{VOC} = (0.14 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb)
= 0.12 lb VOC/hr

= (0.14 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (24 hr/day)
= 2.9 lb VOC/day

= (0.14 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (50 hr/year)
= 6 lb VOC/qtr

= (0.14 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (200 hr/year)
= 25 lb VOC/year

PE_{PM10} = (0.13 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb)
= 0.11 lb PM_{10}/hr

= (0.13 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (24 hr/day)
= 2.7 lb PM_{10}/day

= (0.13 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (50 hr/year)
= 6 lb PM_{10}/qtr

= (0.13 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (200 hr/year)
= 23 lb PM_{10}/year

PE_{SOx} = (0.171 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb)
= 0.15 lb SO_X/hr

= (0.171 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (24 hr/day)
= 3.6 lb SO_X/day

= (0.171 g/hp·hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (50 hr/year)
= 8 lb SO_X/qtr

= (0.171 g/hp·-hr) ∗ (397 hp) ÷ (453.6 g/lb) ∗ (200 hr/year)
= 30 lb SO_X/year

VII. CALCULATIONS (Continued):

Potential to Emit (PE) (C-3929-3-0)				
	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Quarterly Emissions (lb/qtr)	Annual Emissions (lb/year)
NO_X	4.45	106.9	223	891
CO	0.99	23.7	50	198
VOC	0.12	2.9	6	25
PM_{10}	0.11	2.7	6	23
SO_X	0.15	3.6	8	30

D. Increase in Permitted Emissions (IPE):

1. Daily Increase in Permitted Emissions

For new emissions units, the daily IPE is the proposed daily PE for that emissions unit. Please refer to Sections VII.C.2 and VII.C.5 of this document for the maximum daily PE for each unit.

2. Quarterly Increase in Permitted Emissions

For new emissions units, the quarterly IPE is the proposed quarterly PE for that emissions unit. Please refer to section VII.C.3 and VII.C.5 of this document for the maximum quarterly PE for each unit.

3. Annual Increase in Permitted Emissions

For new emissions units, the annual IPE is the proposed annual PE for that emissions unit. Please refer to section VII.C.4 and VII.C.5 of this document for the maximum annual PE for each unit.

4. Adjusted Increase in Permitted Emissions (AIPE)

The AIPE is used to determine if BACT is required for emission units which are being modified. District Rule 2201, section 4.3 defines AIPE as the difference between an emission unit's post-project potential to emit (PE2) and the emission unit's Historically Adjusted Potential to Emit (HAPE): AIPE = PE2 – HAPE. Since these are new units and are not being modified, the BACT requirements are based on the daily IPE calculated above. Therefore the AIPE will not be calculated.

VII. CALCULATIONS (Continued):

5. Stationary Source Increase in Permitted Emissions (SSIPE)

Since this is a new stationary source, the Stationary Source Project Increase in Permitted Emissions (SSIPE) is equal to the Post-Project Stationary Source Potential to Emit (SSPE2). The SSIPE is summarized in the table below:

SSIPE (lb/yr)						
Permit Unit	NO_X	CO	VOC	PM_{10}	SO_X	NH_3
C-3929-1-0	49,510	21,830	2,844	26,400	2,640	50,000
C-3929-2-0	49,510	21,830	2,844	26,400	2,640	50,000
C-3929-3-0	891	198	25	23	30	0
Total	99,911	43,858	5,713	52,823	5,310	100,000

6. Contemporaneous Increase in Permitted Emissions (CIPE)

Calculating CIPE is required for existing Major Sources to determine if the current project will increase emissions above Title I Modification thresholds. Since this facility is not an existing Major Source, the CIPE will not be calculated.

E. <u>Facility Emissions:</u>

1. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, the Pre-project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site. Since this is a new facility, there are no valid ATCs, PTOs, or ERCs at the Stationary Source; therefore, the SSPE1 will be equal to zero.

2. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post-project Stationary Source Potential to Emit (SSPE2) is the post-project annual PE of all units at the Stationary Source.

VII. CALCULATIONS (Continued):

Post-project Stationary Source Potential to Emit [SSPE2] (lb/year)						
Permit Unit	NO_X	CO	VOC	PM_{10}	SO_X	NH_3
Pre-project SSPE (SSPE1)	0	0	0	0	0	0
C-3929-1-0	49,510	21,830	2,844	26,400	2,640	50,000
C-3929-2-0	49,510	21,830	2,844	26,400	2,640	50,000
C-3929-3-0	891	198	25	23	30	0
Post-project SSPE (SSPE2)	99,911	43,858	5,713	52,823	5,310	100,000

3. *Baseline Emissions (BE)*

Baseline Emissions calculations are required to determine the quantity of offsets for facilities with an increase in stationary source emissions and a pre-project Stationary Source Potential to Emit (SSPE1) greater than emission offset thresholds. Since this is a new facility and the SSPE1 is less than emission offset thresholds, Baseline Emissions calculations are not necessary.

VIII. COMPLIANCE:

Rule 1080 *Stack Monitoring (12/17/92)*

This Rule grants the APCO the authority to request the installation and use of continuous emissions monitors (CEM's), and specifies performance standards for the equipment and administrative requirements for record keeping, reporting, and notification. The facility will be equipped with operational CEM's for NO_X, CO, and O_2. Provisions included in the operating permit are consistent with the requirements of this Rule. Compliance with the requirements of this Rule is anticipated.

Proposed Rule 1080 Conditions:

- Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]

- Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and compliance source testing are both performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]

VIII. COMPLIANCE (Continued):

- Permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080]

- Permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions; nature and cause of excess (averaging period used for data reporting shall correspond to the averaging period for each respective emission standard); corrective actions taken and preventive measures adopted; applicable time and date of each period during a CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080]

Rule 1081 *Source Sampling (12/16/93)*

This Rule requires adequate and safe facilities for using in sampling to determine compliance with emissions limits, and specifies methods and procedures for source testing and sample collection. The requirements of this Rule will be included in the operating permit. Compliance with this Rule is anticipated.

Proposed Rule 1081 Conditions:

- The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

- Source testing to measure the NO_X, CO, and VOC emission limits (lb/hr and ppmvd @ 15% O_2) shall be conducted within 60 days of initial operation of the CTG and at least once every twelve months thereafter. [District Rule 1081]

- Source testing to measure the PM_{10} emission limit (lb/hr), the natural gas sulfur content limit, and the ammonia emission limit shall be conducted within 60 days of initial operation and at least once every twelve months thereafter. [District Rule 1081]

VIII. COMPLIANCE (Continued):

- Source testing of startup NO_X, CO, VOC, and PM_{10} mass emission rates shall be conducted for one of the gas turbine engines (C-3929-1 or C-3929-2) upon initial operation and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [District Rule 1081]

- Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

- The following test methods shall be used PM10: EPA Method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA Method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA Method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 4001, and 4703]

Rule 2010 *Permits Required (12/17/92)*

This Rule requires any person building, altering, or replacing any operation, article, machine, equipment, or other contrivance, the use of which may cause the issuance of air contaminants, to first obtain authorization from the District in the form of an ATC. By the submission of an ATC application, GWF Energy LLC is complying with the requirements of this Rule.

Rule 2201 *New and Modified Stationary Source Review Rule (08/20/01)*

A. BACT:

1. BACT Applicability

Pursuant to Sections 4.1.1 and 4.1.2, BACT shall be applied to a new, relocated, or modified emissions unit if the new or relocated unit has a Potential to Emit (PE) exceeding two pounds in any one day or the modified emissions unit results in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2 lb/day for NO_X, CO, VOC, PM_{10}, or SO_X. For CO emissions, the CO Post-project Stationary Source Potential to Emit (SSPE2) must also exceed 200,000 lb/year to trigger BACT.

VIII. COMPLIANCE (Continued):

As seen in Section VII.D of this evaluation, the applicant is proposing to install three new emissions units with PEs greater than 2 lb/day for NO_X, CO, VOC, PM_{10}, and SO_X. BACT is triggered for NO_X, VOC, PM_{10}, and SO_X criteria pollutants since the PEs are greater than 2 lbs/day, but BACT is not triggered for CO emissions since the SSPE2 for CO is not greater than 200,000 lbs/year, as demonstrated in Section VII.E.2 of this document.

The PE of ammonia is greater than two pounds per day. However, the ammonia emissions are intrinsic to the operation of the SCR system, which is BACT for NO_X. The emissions from a control device that is determined by the District to be BACT are not subject to BACT.

2. BACT Guidance

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule. The District BACT Clearinghouse recently included a new BACT Guideline (3.4.8) applicable to the turbine installations [Simple Cycle Gas Fired Turbines less than 50 MW, Powering an Electrical Generation Operation]. (See Attachment C) BACT Guideline 3.1.2, which also appears in Attachment C of this report, covers diesel-fired emergency IC engines greater than or equal to 175 hp and less than 400 hp.

3. BACT Summary:

C-3929-1-0 and C-3929-2-0

BACT has been satisfied by the following:

NO_X: 3.6 ppmv @ 15% O2 (3 hour rolling average) using water injection, SCR with ammonia injection, an oxidation catalyst and natural gas fuel - except during startup/shutdown.

VOC: 2.0 ppmv @ 15% O2 (3 hour rolling average) - except during startup/shutdown.

PM_{10}: Air inlet filter cooler, lube oil vent coalescer, and natural gas fuel

SO_X: Natural gas with a sulfur content of 0.25 gr/100 scf

C-3929-3-0

BACT has been satisfied by the following:

NO_X: Certified NO_X emissions of 5.09 g/hp·hr

VIII. COMPLIANCE (Continued):

VOC: Positive Crankcase Ventilation (PCV)

PM_{10}: Certified PM_{10} emissions of 0.13 g/hp·hr

SO_X: Low-sulfur diesel fuel (500 ppmv sulfur or less) or Very Low-sulfur diesel fuel (15 ppmv or less) where available

4. Top-Down Best Available Control Technology (BACT) Analysis

For Permit Units C-3929-1-0 and -2-0 see Attachment D.

For Permit Unit C-3929-3-0 see Attachment E.

<u>B. Offsets:</u>

1. Offset Applicability:

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post-project Stationary Source Potential to Emit (SSPE2) equals to or exceeds emissions of 20,000 lbs/year for NO_X and VOC, 200,000 lbs/year for CO, 54,750 lbs/year for SO_X and 29,200 lbs/year for PM_{10}. As seen in Section VII.E.2 of this document, the facility's SSPE2 is greater than the offset thresholds for NO_X and PM_{10} emissions. Therefore, offset calculations are necessary.

2. Quantity of Offsets Required:

Per Sections 4.7.2 and 4.7.3, the quantity of offsets in pounds per year for NO_X and PM_{10} is calculated as follows for sources with an SSPE1 less than the offset threshold levels before implementing the project being evaluated.

Offset = [SSPE2 – offset threshold] ∗ Offset Ratio

Where, Offset Ratio = Distance or interpollutant ratio of Sections 4.8 and 4.13.3

Per Section 4.6.2, emergency equipment that is used exclusively as emergency standby equipment for electrical power generation or any other emergency equipment as approved by the APCO that does not operate more than 200 hours per year of non-emergency purposes and is not used pursuant to voluntary arrangements with a power supplier to curtail power, is exempt from providing emission offsets. Therefore, permit unit C-3929-3-0 will be exempt from providing offsets and the emissions associated with this permit unit contributing to the SSPE2 should be removed prior to calculating actual offset amounts.

Offset = [SSPE2 – (emergency equipment) – offset threshold] ∗ Offset Ratio

VIII. COMPLIANCE (Continued):

NO_X Offset Calculations:

NO_X SSPE2	= 99,911 lb/year
C-3929-3-0 (NO_X)	= 891 lb/year
NO_X offset threshold	= 20,000 lb/year

Offsets = [99,911 – (891) – 20,000]
= 79,020 lb/year

As discussed in Section VII.C.3, the hypothetical operating scenario for each turbine unit assumes 50 startup/shutdown events in the 1st and 4th Quarters and 100 startup/shutdown events occurring in the 2nd and 3rd Quarters. Calculating the appropriate quarterly emissions to be offset is as follows:

$PE_{1st\ Qtr}$ = [(7.7 lb NO_X/event) ∗ (50 event/1st qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] + [(7.7 lb NO_X/event) ∗ (50 event/1st qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] – [5,000 lb/1st qtr]
= 19,370 lbs of NO_X

$PE_{2nd\ Qtr}$ = [(7.7 lb NO_X/event) ∗ (100 event/2nd qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] + [(7.7 lb NO_X/event) ∗ (100 event/2nd qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] – [5,000 lb/2nd qtr]
= 20,140 lbs of NO_X

$PE_{3rd\ Qtr}$ = [(7.7 lb NO_X/event) ∗ (100 event/3rd qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] + [(7.7 lb NO_X/event) ∗ (100 event/3rd qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] – [5,000 lb/3rd qtr]
= 20,140 lbs of NO_X

$PE_{4th\ Qtr}$ = [(7.7 lb NO_X/event) ∗ (50 event/4th qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] + [(7.7 lb NO_X/event) ∗ (50 event/4th qtr) + (5.9 lb/hr) ∗ (2,000 hr/qtr)] – [5,000 lb/4th qtr]
= 19,370 lbs of NO_X

Assuming an offset ratio of 1.5: 1, the amount of NO_X ERC credits that need to be surrendered to the District is:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
29,055	30,210	30,210	29,055

The applicant has stated that the facility plans to use ERC certificates C-410-2, C-411-2, C-412-2, and S-1585-2 to offset the increases in NO_X emissions associated with this project. The above Certificates have available quarterly NO_X credits as follows:

VIII. COMPLIANCE (Continued):

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
ERC #C-410-2	22,510	0	0	5,708
ERC #C-411-2	5,205	4,562	4,562	7,991
ERC #C-412-2	0	0	0	1,915
ERC #S-1585-2[(8)]	110,866	112,097	113,330	113,330
Total:	138,582	116,661	117,895	128,948

As seen above, the facility has sufficient credits to fully offset the quarterly NO_X emissions.

PM_{10} Offset Calculations:

PM_{10} SSPE2 = 52,823 lb/year
C-3929-3-0 (PM_{10}) = 23 lb/year
PM_{10} offset threshold = 29,200 lb/year

Offsets = [52,823 – (23) – 29,200]
= 23,600 lb/year

Since the maximum annual emissions are equivalent to operating at normal baseload conditions, calculating the appropriate quarterly PM_{10} emissions to be offset is as follows: (= Annual offsets ÷ 4 qtrs)

$PE_{1st\ Qtr}$ = 5,900 lbs of PM_{10}
$PE_{2nd\ Qtr}$ = 5,900 lbs of PM_{10}
$PE_{3rd\ Qtr}$ = 5,900 lbs of PM_{10}
$PE_{4th\ Qtr}$ = 5,900 lbs of PM_{10}

Assuming an offset distance ratio of 1.5: 1, the amount of PM_{10} ERC credits that need to be surrendered to the District is:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
8,850	8,850	8,850	8,850

The applicant has stated that the facility plans to use ERC certificate C-0366-4 to offset the increases in PM_{10} emissions associated with this project. Certificate C-0366-4 has available quarterly PM_{10} credits as follows:

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
ERC #C-0366-4	5,699	5,087	7,081	6,732

[8] Project #S-1010808 to transfer ERC Certificate S-1585-2 from Occidental of Elk Hills to GWF Energy is currently in progress.

VIII. COMPLIANCE (Continued):

As seen above, the facility is lacking sufficient credits to fully offset the emissions increases for PM_{10}. As proposed by the applicant, in order to satisfy District offset requirements the applicant has proposed providing SO_X reductions in place of PM_{10} reductions. District Rule 2201 Section 4.13.3 allows such interpollutant substitutions provided the applicant shows that the substitution will not cause or contribute to the violation of an ambient air quality standard and that the appropriate interpollutant offset ratio is utilized.

Interpollutant Offset Ratio:

GWF Energy LLC, has proposed to provide SO_X credits to offset PM_{10} credits at a distance offset ratio of 1.5:1 and an interpollutant offset ratio of 1.4:1 (totaling a 1.9:1 ratio). In order for the District to approve interpollutant offsetting, the facility has to demonstrate that the emissions increases will not cause or contribute to a violation of an Ambient Air Quality Standard. Because the ambient PM_{10} concentrations in the San Joaquin Valley currently exceed the state and federal standards, the District is accepting a demonstration that the project will not cause PM_{10} ambient concentrations in excess of the significance criteria in Title 40 Code of Federal Regulations Part 51.165(b)(2). These thresholds are 1.0 $\mu g/m^3$ for the annual standard and 5.0 $\mu g/m^3$ for the 24 hour standard.

To support this interpollutant substitution ratio the District conducted an air quality modeling analysis to determine the impact of the increased PM_{10} emissions from this project on the ambient air quality standards. According to the modeling results, the project will not cause or contribute to a violation of any Air Quality Standards (See Attachment F). GWF also provided information from a memo dated August 8, 2001 from a Mr. David Deckman, of Sierra Research (See Attachment G). In the memo, a speciated linear rollback analysis using ambient monitoring data from Kings County is used to develop an interpollutant offset ratio for SO_X and PM_{10}. Based upon the above information, the District will accept GWF Energy's proposal and accept SO_X credits in place of PM_{10} credits at a 1.9:1 ratio.

To offset the remaining PM_{10} emissions:

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Remaining emissions: (already at a 1.5:1 ratio)	3,151	3,763	1,769	2,118
@ an additional 1.4:1 ratio	4,411	5,268	2,477	9,965

The facility has proposed to use the SO_X ERC certificate C-414-5 to offset the remaining increases in PM_{10} emissions. C-414-5 has available quarterly SO_X credits as follows:

VIII. COMPLIANCE (Continued):

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
ERC #C-414-5	23,108	13,700	14,900	16,579

With ERC Certificate C-414-5, the facility should have sufficient emission reduction credits to fully offset the PM_{10} emissions associated with this project.

3. Actual Emission Reductions

There are no actual emissions reductions (AERs) proposed as a result of this application. AER = 0.

C. Public Notification:

1. Applicability

District Rule 2201, section 5.4, requires a public notification for the affected pollutants from the following types of projects:

- New Major Sources
- Title I modifications
- New emission units with a PE > 100 lb/day of any one pollutant (IPE Notifications)
- Modifications with SSPE1 below an offset threshold and SSPE 2 above an offset threshold on a pollutant by pollutant basis (Existing Facility - Offset Threshold Notification)
- New stationary sources with SSPE2 exceeding offset thresholds (New Facility - Offset Threshold Notification)
- Any permitting action with a SSIPE exceeding 20,000 lb/yr for any one pollutant. (SSIPE Notice)

a. New Major Source Notice Determination:

Major Source Determination					
	NO_X	CO	VOC	PM_{10}	SO_X
Post-project SSPE (SSPE2)	99,911	43,858	5,713	52,823	5,310
Major Source Threshold	100,000	200,000	100,000	140,000	140,000
Major Source?	No	No	No	No	No

As shown in the table above, the SSPE2 for every criteria pollutant for the facility is below the specific thresholds. Therefore, public noticing is not required for this project for new Major Source purposes because this facility is not becoming a new Major Source.

VIII. COMPLIANCE (Continued):

b. Title I Modification Notice Determination:

For facilities that are non-major sources prior to the modification, a Title I modification is triggered if the post project stationary source potential to emit (SSPE2) is increased to levels above the thresholds listed in Table 3-4 of District Rule 2201.

Title I Modification Determination (lb/year)					
	NO_X	CO	VOC	PM_{10}	SO_X
Post-project SSPE (SSPE2)	99,911	43,858	5,713	52,823	5,310
Title I Modification Threshold	100,000	200,000	100,000	140,000	140,000
Title I Modification?	No	No	No	No	No

As shown in the table above, the SSPE2 is not increased above the thresholds, therefore public noticing is not require for this project for Title I modification purposes.

c. PE Notification:

Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. The potential to emit for each unit is summarized in the tables below.

Post-Project Potential to Emit: (C-3929-1-0)						
Permit Unit	NO_X (lb/day)	CO (lb/day)	VOC (lb/day)	PM_{10} (lb/day)	SO_X (lb/day)	NH_3 (lb/day)
C-3929-1-0	143.4	63.8	8.27	79.2	7.92	150
Threshold (lb/day)	100	100	100	100	100	100
Notification Required?	**Yes**	No	No	No	No	**Yes**

Post-Project Potential to Emit: (C-3929-2-0)						
Permit Unit	NO_X (lb/day)	CO (lb/day)	VOC (lb/day)	PM_{10} (lb/day)	SO_X (lb/day)	NH_3 (lb/day)
C-3929-2-0	143.4	63.8	8.27	79.2	7.92	150
Threshold (lb/day)	100	100	100	100	100	100
Notification Required?	**Yes**	No	No	No	No	**Yes**

VIII. COMPLIANCE (Continued):

Post-Project Potential to Emit: (C-3929-3-0)					
Permit Unit	NO_X (lb/day)	CO (lb/day)	VOC (lb/day)	PM_{10} (lb/day)	SO_X (lb/day)
C-3929-3-0	106.9	23.7	2.9	2.7	3.6
Threshold (lb/day)	100	100	100	100	100
Notification Required?	**Yes**	No	No	No	No

According to the tables above, permit units C-3929-1-0 and -2-0 will each have a Potential to Emit greater than 100 lbs/day for NO_X and NH_3 emissions, and permit unit C-3929-3-0 will have a Potential to Emit greater than 100 lbs/day for NO_X emissions. Therefore, public noticing will be required for PE > 100 lbs/day purposes.

d. Existing Facility - Offset Threshold Notification

This is not an existing facility. This section does not require a public notification.

e. New Facility - Offset Threshold Notification

New Stationary Sources with an SSPE2 exceeding the emission offset threshold level for one or more pollutants will require public noticing. As shown in Section VII.E.2 and discussed in Section VIII.B.1 (Rule 2201), offset thresholds for NO_X and PM_{10} emissions are exceeded with this project. Therefore, public noticing is required for offset purposes.

Since this is a new stationary source, the SSPE1 for all pollutants is below the offset thresholds. As shown in section VII.E.2 of this document, the SSPE2 for NO_x, VOC, and PM_{10} emissions will exceed the offset thresholds. Therefore, a public notification is required for NO_x, VOC, and PM_{10} emissions.

f. SSIPE Notification:

A notification is required for any permitting action that results in a SSSIPE of more than 20,000 lb/yr of any affected pollutant. As shown in section VII.D.5 of this document, the SSIPE for NO_X, CO, VOC, PM_{10}, and NH_3 will be more than 20,000 pounds per year. Therefore, a SSIPE notification is required for NO_X, CO, VOC, PM_{10}, and NH_3.

2. Public Notice Requirements

Section 5.5 details the actions taken by the District when pubic noticing is triggered according to the application types above. Since public noticing requirements are triggered for this project (i.e. PEs > 100 lbs/day, offset thresholds being exceeded, and SSIPEs greater than 20,000 lbs/year), the District shall public notice this project according to the requirements of Section 5.5.

VIII. COMPLIANCE (Continued):

C. Daily Emission Limits:

Daily emissions limitations (DELs) and other enforceable conditions are required by Section 3.17 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.17.1 and 3.17.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis.

C-3929-1-0 and C-3929-2-0 (Turbines)

For the turbines, the DELs for NO_X, CO, VOC, PM_{10}, and SO_X will consist of lb/day and/or emission factors.

- The NOx emissions shall not exceed 143.4 pounds per day.
- The NOx emissions during steady state operation shall not exceed 3.6 ppmvd @ 15% O_2 over a three hour averaging period. Steady-state period refers to any period that is not a start-up or shutdown period.
- The CO emissions shall not exceed 63.8 pounds per day.
- The CO emissions during steady state operation shall not exceed 6.0 ppmvd @ 15% O_2. Steady-state period refers to any period that is not a start-up or shutdown period.
- The VOC emissions shall not exceed 8.3 pounds per day.
- The VOC emissions during steady state operation shall not exceed 2.0 ppmvd, as methane, @ 15% O_2. Steady-state period refers to any period that is not a start-up or shutdown period.
- The PM10 emissions shall not exceed 79.2 pounds per day.
- The SOx emissions shall not exceed 7.9 pounds per day.
- The ammonia emission concentration shall not exceed 10 ppmvd @ 15% O_2.

VIII. COMPLIANCE (Continued):

C-3929-1-0 (IC engine)

For the emergency IC engine, the DELs will be stated in the form of emission factors, the maximum engine horsepower rating, and the maximum operational time of 24 hours per day.

- NO_X emissions shall not exceed 5.9 g/hp·hr.
- PM_{10} emissions shall not exceed 0.13 g/hp·hr.

D. Compliance Certification

Section 4.14.3 of this Rule requires the owner of a new major source or a source undergoing a Title I modification to demonstrate to the satisfaction of the District that all other major sources owned by such person and operating in California are in compliance with all applicable emission limitations and standards. As discussed in Sections VIII.C.1.a and VIII.C.1.b, this facility is not a new major source and this project does not constitute a Title I modification, therefore this requirement is not applicable.

E. Air Quality Impact Analysis:

Section 4.14.2 of this Rule requires that an air quality impact analysis (AQIA) be conducted for the purpose of determining whether the operation of the proposed equipment will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVAPCD conducted the required analysis. Refer to Attachment F of this document for the AQIA summary sheet.

The proposed location is in an attainment area for NO_X, CO and SO_X. As shown by the AQIA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_X, CO or SO_X.

The proposed location is located in a non-attainment area for PM_{10}. The increase in the ambient PM_{10} concentration due to the proposed equipment is shown on the table titled Calculated Contribution. The levels of significance, from 40 CFR Part 51.165 (b)(2), are shown on the table titled Significance Levels.

Significance Levels					
Pollutant	Significance Levels ($\mu g/m^3$) - 40 CFR Part 51.165 (b)(2)				
	Annual Avg.	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	1.0	5	N/A	N/A	N/A

VIII. COMPLIANCE (Continued):

Calculated Contribution					
Pollutant	Calculated Contributions ($\mu g/m^3$)				
	Annual Avg.	24 hr Avg.	8 hr Avg.	3 hr Avg.	1 hr Avg.
PM_{10}	0.05	1.96	N/A	N/A	N/A

As shown, the calculated contribution of PM_{10} will not exceed the EPA significance level. This project is not expected to cause or make worse a violation of an air quality standard.

F. Compliance Assurance

1. Source Testing

C-3929-1-0 and C-3929-2-0

District Rule 4703 requires NO_X and CO emission testing as well as percent turbine efficiency testing on an annual basis. The District Source Test Policy (APR 1705 10/09/97) requires annual testing for all pollutants controlled by catalysts. The control equipment will include a SCR system and an oxidation catalyst. Ammonia slip is an indicator of how well the SCR system is performing and PM_{10} emissions are a good indicator of how well the inlet air cooler/filter are performing.

Therefore, source testing for NO_X, VOC, CO, PM_{10}, and ammonia slip will be required within 60 days of initial operation and at least once every 12 months thereafter.

Also, initial source testing of NO_X, CO, and VOC startup emissions will be required for one gas turbine engine initially and not less than every seven years thereafter. This testing will serve two purposes: to validate the startup emission estimates used in the emission calculations and to verify that the CEMs accurately measure startup emissions.

Each CTG will have a separate exhaust stack. The units will be equipped with CEMs for NO_X, CO, and O_2. Each CTG will be equipped with an individual CEM. Each CEM will have two ranges to allow accurate measurements of NO_X and CO emissions during startup. The CEMs must meet the installation, performance, relative accuracy, and quality assurance requirements specified in 40 CFR 60.13 and Appendix B (referenced in the CEM requirements of Rule 4703) and the acid rain requirements in 40 CFR part 75.

40 CFR Part 60 subpart GG requires fuel nitrogen content testing. The District will accept the NO_X source testing required by District Rule 4703 as equivalent to fuel nitrogen content testing.

40 CFR Part 60 subpart GG requires that fuel sulfur content be monitored. Refer to the monitoring section of this document for a discussion of the fuel sulfur testing requirements.

VIII. COMPLIANCE (Continued):

C-3929-3-0

District Rule 4701 requires NO_X, CO and VOC emission testing on a biennial basis (once every 24 months). Since the engine is limited to emergency operation only, it is exempt from the source testing requirements of the rule. Therefore, no source testing will be required for this permit unit.

2. Monitoring

C-3929-1-0 and C-3929-2-0

Monitoring of NO_X emissions is required by District Rule 4703. The applicant has proposed a CEMS for NO_X.

CO monitoring is not specifically required by any applicable Rule or Regulation. Nevertheless, due to erratic CO emission concentrations during start-up and shutdown periods, it is necessary to limit the CO emissions on a pound per hour basis. Therefore, a CO CEMS is necessary to show compliance with the CO limits of this permit. The applicant has proposed a CO CEMS.

District Rule 4703 requires the facility to monitor the SCR system ammonia injection rate. Ammonia injection rate monitoring will be required.

District Rule 4703 requires the facility to monitor the exhaust temperature and exhaust flow rate. Exhaust temperature and exhaust flow rate monitoring will be required.

District Rule 4703 requires that the elapsed time of operation, on an annual basis be monitored. Such monitoring will be required.

40 CFR Part 60 Subpart GG requires monitoring of the fuel consumption. Fuel consumption monitoring will be required.

40 CFR Part 60 Subpart GG requires monitoring of the fuel nitrogen content. As stated in the Subpart GG compliance section of this document, the District will allow the annual NO_X source test to substitute for this requirement.

40 CFR Part 60 Subpart GG requires monitoring of the fuel sulfur content. The gas supplier, Pacific Gas and Electric Company, may deliver gas with a sulfur content of up to 1.0 gr/scf. Since the sulfur content of the natural gas would not exceed this value, it is District practice to require only annual fuel sulfur content testing if the SO_X emission factor is based on a fuel sulfur content of 1.0 gr/scf. However, the applicant is proposing a SO_X emission factor based on a fuel sulfur content of 0.25 gr/scf. For such units, fuel sulfur content testing is required more frequently. The facility will be required to test fuel sulfur content weekly until eight consecutive tests show compliance. After that, the

VIII. COMPLIANCE (Continued):

testing frequency may be reduced to quarterly. If a quarterly test fails to show compliance then the testing returns to weekly until eight consecutive weekly tests show compliance. After that, the testing frequency may return to quarterly.

C-3929-3-0

District Rule 4701 requires the monitoring of NO_X and CO emission. As discussed earlier, since the engine is limited to emergency operation only, it is exempt from the monitoring requirements of the rule. Therefore, no monitoring will be required for this permit unit.

3. Recordkeeping

C-3929-1-0 and C-3929-2-0

The applicant will be required to keep records of all of the parameters that are required to be monitored. Refer to section VIII.F.2 of this document for a discussion of the parameters that will be monitored.

C-3929-3-0

The applicant will be required to keep records of the hours of emergency and non-emergency operation in order to maintain the exemption from the other requirements of District Rule 4701.

4. Reporting

C-3929-1-0 and C-3929-2-0

40 CFR Part 60 Subpart GG requires that the facility report the use of fuel with a sulfur content of more than 0.8% by weight. Such reporting will be required.

40 CFR Part 60 Subpart GG requires the reporting of exceedences of the NO_X emission limit of the permit. Such reporting will be required.

C-3929-3-0

There are no reporting requirements applicable to this emergency IC engine.

VIII. COMPLIANCE (Continued):

Rule 2520 *Federally Mandated Operating Permits (06/15/95)*

This project will be subject to Rule 2520 (Title V) because it will meet the following criteria specified in section 2.0. Section 2.5 states "A source with an acid rain unit for which application for an acid rain permit is required pursuant to Title IV (Acid Rain Program) of the CAA.

Pursuant to Rule 2520 section 5.3.1 GWF Energy must submit a Title V application within 12 months of commencing operations. No action is required at this time.

Rule 2540 *Acid Rain Program (11/13/97)*

The proposed CTGs are subject to the acid rain program as phase II units, i.e. they will be installed after 11/15/90 and each has a generator nameplate rating greater than 25 MW.

The acid rain program will be implemented through a Title V operating permit. Federal regulations require submission of an acid rain permit application at least 24 months before the later of 1/1/2000 or the date the unit expects to generate electricity. The facility anticipates beginning commercial operation in June of 2002.

The acid rain program requirements for this facility are relatively minimal. Monitoring of the NO_X and SO_X emissions and a relatively small quantity of SO_X allowances (from a national SO_X allowance bank) will be required as well as the use of a NO_X CEM.

Rule 4001 *New Source Performance Standards, 40 CFR 60 – Subpart GG*

40 CFR Part 60 Subpart GG applies to all stationary gas turbines with a heat input greater than 10.7 gigajoules per hour (10.2 MMBtu/hr), that commence construction, modification, or reconstruction after 10/03/77. Therefore, this subpart applies to the new turbine installations.

NO_X Requirement §60.332(a):
Under the standard, NO_X emissions from the turbine with a minimum heat input rating of 250 MMBtu/hr are limited by the following equation:

NO_X (% by vol@ 15% O_2) 1 hr avg = 0.0075(14.4/Y)+ F

where: Y = manufacturers rated heat load (kJ/W-hr)
= (10,317 Btu/kW-hr)(kW/1,000 W)(1,054.2 J/Btu)(kJ/1,000 J)[(9)]
= 10.88 kJ/W-hr (less than 14.4 kJ/W hour)

[9] The rated heat load for the GE LM6000 is 10,317 Btu/kW-hr, per GWF Energy, LLC.

VIII. COMPLIANCE (Continued):

F = 0 (fuel bound nitrogen for natural gas fuel)

NO_X (% by vol@ 15% O_2) = 0.0075(14.4/10.88)+ 0
= 0.0099 %
= 99 ppmv @ 15% O2

GWF Energy, LLC is proposing a NO_X concentration limit of 3.6 ppmv @ 15% O_2 (3 hr average) as required by BACT. Therefore, compliance with the NSPS NO_X standard is expected.

<u>SO_X Requirement §60.333(a) and (b):</u>
The applicable SO_X limits specified in section 60.333 are as follows:

SO_X = 0.015% by vol @ 15% O_2
= 150 ppmv @ 15% O_2

or fuel S $\leq$ 0.8% by weight.

The 150 ppmv @ 15% O_2 limit specified in section 60.333, paragraph (a) is equivalent to 0.769 lb-SO_X/MMBtu as follows:

$$\frac{(150\text{ ppmvd})\times\left(8{,}578\frac{\text{ft}^3}{\text{MMBtu}}\right)\times\left(64\frac{\text{lb}-\text{SO}_x}{\text{lb}-\text{mol}}\right)\times\left(\frac{20.9}{20.9-15}\right)}{\left(379.5\frac{\text{ft}^3}{\text{lb}-\text{mol}}\right)\times\left(10^6\right)} = 0.769\frac{\text{lb}-\text{SO}_x}{\text{MMBtu}}$$

SO_X emissions are based on combusting natural gas with a fuel sulfur content of 0.25 gr/100 scf, which results in an emission rate of 0.00071 lb-SO_X/MMBtu. The percent sulfur by weight of natural gas of 0.25 gr-S/100 scf natural gas is 0.000842, determined as follows (assuming a 100 scf sample comprised of methane at 60 °F):

$$\left(\frac{0.25\,\text{gr}-\text{S}}{100\,\text{ft}^3-\text{NG}}\right)\times\left(\frac{\text{lb}-\text{S}}{7000\,\text{gr}-\text{S}}\right)\times\left(\frac{\text{ft}^3-\text{NG}}{0.0424\,\text{lb}-\text{NG}}\right) = 8.42\times10^{-6}\frac{\text{lb}-\text{S}}{\text{lb}-\text{NG}}$$

Both SO_X emissions and fuel sulfur content are less than that required by Subpart GG. Recordkeeping and reporting of the fuel sulfur content is required as specified in section 60.334 (b)(2). Reporting will be performed using an alternative custom reporting schedule.

Reporting and notifications, and initial compliance testing will be required as specified in 40 CFR, Subpart A. Compliance is expected.

VIII. COMPLIANCE (Continued):

Rule 4101 *Visible Emissions (12/17/92)*

Per Section 5.0, no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity).

C-3929-1-0 and C-3929-2-0

The CTGs including lube oil vents will be limited by permit condition to not have visible emissions, except for three minutes in any hour, greater than 5% opacity as a BACT requirement. This is more restrictive than the 20% opacity limit in Rule 4101, therefore compliance is expected.

C-3929-3-0

Under normal operating conditions, the visible emissions limit is not expected to be exceeded for the emergency IC engine, based on similar operations. Therefore, compliance is expected.

Rule 4102 *Nuisance (12/17/92)*

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained as required by permit conditions. Therefore, compliance with this rule is expected.

A. California Health & Safety Code 41700 (Health Risk Analysis)

A Health Risk Assessment (HRA) is required for any increase in hourly or annual emissions of hazardous air pollutants (HAPs). HAPs are limited to substances included on the list in CH&SC 44321 and that have an OEHHA approved health risk value. The installation of the new gas turbine engines and the emergency IC engine results in increases in emissions of HAPs.

A health risk screening assessment was performed for the proposed project. The acute and chronic hazard indices were less than 1.0 and the cancer risk was less than one in a million. Under the District's risk management policy, Policy TOX 1, TBACT is not required for any proposed emissions unit as shown in the table below:

VIII. COMPLIANCE (Continued):

SCREEN HRA SUMMARY				
	Natural Gas Turbine #1	Natural Gas Turbine #2	Emergency Diesel IC Engine	Project Total
Acute Hazard Index	0.02	0.02	N/A	0.04
Chronic Hazard Index	0.0	0.0	N/A	0.00
70 yr Cancer Risk	0.0	0.0	0.1	0.1
T-BACT Required?	No	No	No	

B. Discussion of Toxics BACT (TBACT)

TBACT is triggered if the cancer risk exceeds one in one million and if either the chronic or acute hazard index exceeds 1. The results of the health risk assessment show that none of the TBACT thresholds are exceeded. TBACT is not triggered.

Proposed Rule 4102 Conditions:

- No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
- During startup or shutdown of any gas turbine engine, combined emissions from the two gas turbine engines (C-3929-1 and C-3929-2) shall not exceed the following: NO_x – 15.4 lb, CO – 15.4 lb, and VOC – 1.4 lb in any one hour. [California Environmental Quality Act]

Rule 4201 *Particulate Matter Concentration (12/17/92)*

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

$$PM\ Conc.\ (gr/scf) = \frac{(PM\ emission\ rate) \times (7000\ gr/lb)}{(Air\ flow\ rate) \times (60 min/hr)}$$

C-3929-1-0 and C-3929-2-0

PM_{10} emission rate = 3.3 lb/hr. Assuming 100% of PM is PM_{10}

PM Conc. (gr/scf)=[(3.3 lb/hr) ∗ (7,000 gr/lb)] ÷ [(135,000 ft^3/min) ∗ (60 min/hr)]
PM Conc. = 0.0029 gr/scf

VIII. COMPLIANCE (Continued):

C-3929-3-0

$$0.13\ \frac{g}{hp\cdot hr} \times \frac{1\ hp\cdot hr}{2{,}542.5\ Btu} \times \frac{10^6\ Btu}{9{,}190\ dscf} \times \frac{0.35\ Btu_{out}}{1\ Btu_{in}} \times \frac{15.43\ grain}{g} = 0.03\ gr/dscf$$

Calculated emissions are well below the allowable emissions level. It can be assumed that emissions from all three permit units will not exceed the allowable 0.1 gr/scf. Therefore, compliance with Rule 4201 is expected.

Rule 4202 *Particulate Matter Emission Rate (12/17/92)*

Rule 4202 establishes PM emission limits as a function of process weight rate in tons/hr. Gas and liquid fuels are excluded from the definition of process weight. Therefore, Rule 4202 does not apply to the proposed units.

Rule 4701 *Stationary Internal Combustion Engines (10/16/97)*

Pursuant to Section 4.2.1, emergency IC engines that do not operate more than 200 hours per year for non-emergency use are exempt from the requirements of this rule except for the recordkeeping requirements. The following condition will be included on the permit to satisfy the recordkeeping requirement of the Rule.

- The permittee shall maintain records of hours of emergency and non-emergency operation. Records shall include the date, the number of hours of operation, the purpose of the operation (e.g., load testing, weekly testing, rolling blackout, general area power outage, etc.), and the sulfur content of the diesel fuel used. Such records shall be retained on site for a period of at least two years and made available for District inspection upon request. [District Rule 4701]

Therefore, compliance with Rule 4701 is expected.

Rule 4703 *Stationary Gas Turbines (10/16/97)*

Rule 4703 is applicable to stationary gas turbines with a rating greater than 0.3 megawatts. The facility proposes to install two 46.9 MW gas turbines, therefore this rule applies.

Section 5.1.1 of this rule limits the NO_X emissions from stationary gas turbine systems greater than 10 MW, and equipped with Selective Catalytic Reduction (SCR), based on the following equation:

VIII. COMPLIANCE (Continued):

$$NO_X \text{ (ppmv @ 15\% } O_2) = 9 \times \left(\frac{EFF}{25} \right)$$

Where EFF is the higher of EFF_1 or EFF_2 where:

$$EFF_1 = \frac{3{,}412 \frac{Btu}{kW-hr}}{\text{Actual Heat Rate @ HHV } (\frac{Btu}{kW-hr})} \times 100 \text{, and } EFF_2 = EFF_{MFR} \frac{LHV}{HHV}$$

EFF_2 = EFF_{mfr} * (LHV/HHV)

Manufacturer's data indicates that the Actual Heat Rate @ HHV is 10,317 Btu/KW-hr. Therefore:

$$EFF_1 = \frac{3{,}412 \frac{Btu}{kW-hr}}{10{,}317 \frac{Btu}{kW-hr}} \times 100 = 33.07\%$$

$$NO_X \text{ limit utilizing } EFF_1 = 9 \times \left(\frac{33.07}{25} \right) = 11.9 \text{ ppmvd @ 15\% } O_2$$

EFF_2 calculations are not necessary since Rule 4703 emission limits will be no lower than 9 ppmv NO_X and the proposed turbines will be limited to a maximum of 3.6 ppmv NO_X @ 15% O_2 (based on a 3-hour average), therefore compliance is expected.

Section 5.2 limits the CO emissions from stationary gas turbine systems subject to Section 5.1.1 to 200 ppmv CO @ 15% O_2. The proposed turbines will be limited to a maximum of 6 ppmv CO @ 15% O_2, therefore compliance is expected.

Monitoring and recordkeeping:

Sections 6.2 and 6.3 contain the following monitoring, recordkeeping and source testing requirements. These requirements will be included as permit conditions.

- 6.2.1.1 Monitor control system operating parameters. Such as ammonia and exhaust gas flow rates and exhaust gas temperature for selective catalytic reduction (SCR), and humidity, water injection rate, exhaust gas flow rate and temperature for water injection.

- 6.2.1.2 Install, operate, and maintain equipment that continuously measures elapsed time of operation.

VIII. COMPLIANCE (Continued):

- 6.2.1.3 Turbines rated at over 10 MW that operated an average of over 4,000 hours during the past three years are required to install, operate, and maintain in calibration a continuous emissions monitoring system for NO_X. The applicant is proposing a CEMS for NO_X.

- 6.2.2 Maintain records for inspection at any time for a period of two years.

- 6.2.3 Correlate control system operating parameters with NO_X emissions. This requirement applies to the selective catalytic reduction and water injection systems. This information may be used by the APCO to determine compliance when the continuous emissions monitoring system not operating properly.

- 6.2.4 Maintain an operating log that includes, on a daily basis, the actual local start-up and stop time, length and reason for reduced load periods, total hours of operation, type and quantity of fuel used (liquid/gas).

- 6.3 Provide source test information annually regarding the exhaust gas NO_X and CO concentrations.

The facility must demonstrate compliance annually with the NO_X and CO emission limits and determine the demonstrated percent efficiency (EFF) of the stationary gas turbines, using the following test methods:

- Oxides of nitrogen emissions for compliance tests shall be determined by using EPA Method 7E or EPA Method 20.
- Carbon monoxide emissions for compliance tests shall be determined by using EPA Test Methods 10 or 10B.
- Oxygen content of the exhaust gas shall be determined by using EPA Methods 3, 3A, or 20.
- HHV and LHV of gaseous fuels shall be determined by using ASTM D3588-91, ASTM 1826-88, or ASTM 1945-81.

Demonstrated percent efficiency of the stationary gas turbines shall be determined using the facility instrumentation for gas turbine fuel consumption and power output. Power output values used to determine gas turbine efficiency shall be the electrical power output of the gas turbines. Compliance is expected.

Rule 4801 _Sulfur Compounds (12/17/92)_

Per Section 3.1, a person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge: 0.2 % by volume calculated as SO_2 on a dry basis averaged over 15 consecutive minutes:

VIII. COMPLIANCE (Continued):

C-3929-1-0 and C-3929-2-0

The sulfur of the natural gas fuel is 0.25 gr/100 dscf.

The ratio of the volume of the SO_x exhaust to the entire exhaust for one MMBtu of fuel combusted is:

Volume of SO_x: $V = \frac{n \cdot R \cdot T}{P}$

Where:

- n = number of moles of SO_x produced per MMBtu of fuel.
- Weight of SO_x as SO_2 is 64 lb/(lb-mol)
- $n = \frac{0.00071\ lb}{MMBtu} \times \frac{1\ (lb-mol)}{64\ lb} = 0.000011\ (lb-mol)$
- $R = \frac{0.7302\ ft^3 \cdot atm}{(lb-mol)°R}$
- T = 500 °R
- P = 1 atm

Thus, volume of SO_X per MMBtu is:

$$V = \frac{n \cdot R \cdot T}{P}$$

$$V = \frac{0.000011\ (lb-mol) \cdot \frac{0.7302\ ft^3 \cdot atm}{(lb-mol)\ °R} \cdot 500\ °R}{1\ atm}$$

$$V = 0.004\ ft^3$$

Since the total volume of exhaust per MMBtu is 8,710 scf, the ratio of SO_X volume to exhaust volume is

$$= \frac{0.004}{8{,}710} = 0.00000046 = 0.46\ ppmv = 0.000046\%\ by\ volume$$

46 ppmv ≤ 2000 ppmv, therefore the gas turbine engines are expected to comply with Rule 4801.

VIII. COMPLIANCE (Continued):

C-3929-3-0

The sulfur content of the diesel fuel is 0.05% sulfur by weight.

$$0.05\%\ S \times \frac{7.1\ lb}{gal} \times \frac{64\ lb \cdot SO_2}{32\ lb \cdot S} \times \frac{1\ MMBtu}{9{,}190\ scf} \times \frac{1\ gal}{0.137\ MMBtu} \times \frac{lb \cdot mol}{64\ lb \cdot SO_2} \times \frac{10.73\ psi \cdot ft^3}{lb \cdot mol \cdot {}^\circ R} \times \frac{520\ {}^\circ R}{14.7\ psi} = 33.4\ ppmv$$

Since 33.4 ppmv is ≤ 2000 ppmv, this engine is expected to comply with Rule 4801.

Rule 8010 *Fugitive Dust Administrative Requirements for Control of PM10 (04/25/96)*

The purpose of this Rule is to set forth the definitions, exemptions, requirements, administrative requirements, and fees applicable to all Rules in Regulation VIII.

Rule 8020 *Fugitive Dust Requirements for Control of PM10 From Construction, Demolition, Excavation, and Extraction Activities (04/25/96)*

The purpose of this Rule is to limit fugitive dust emissions from construction, demolition, excavation, and related activities. It requires the use of reasonably available control measures (RACM), as defined in Rule 8010, to maintain visible dust emissions (VDE) under the 40% opacity requirement.

The Henrietta Peaker Project will commit to implementing RACM via the use of dust control measures (e.g., water, approved chemical stabilizers, etc.) during construction to maintain opacity to a level below 40% per Rule 8020 requirements.

California Environmental Quality Act (CEQA)

The California Energy Commission (CEC) is the lead Agency for CEQA. Generally, the District cannot make its final decision on ATCs until CEQA has been satisfied. For power generating projects that qualify for expedited processing (per District policy), the ATCs will be issued if the District's analysis and public notice is completed prior to CEQA approval. If the ATCs are issued prior to CEQA approval, the ATCs will include the following condition:

- The permittee shall not begin actual onsite construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act]

VIII. COMPLIANCE (Continued):

California Health & Safety Code, Section 42301.6 School Notice

As discussed in Section III of this evaluation, this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Health & Safety Code, Section 44300 Air Toxic "Hot Spots"

Section 44300 of the California Health and Safety Code requires submittal of an air toxics "Hot Spot" information and assessment report for sources with criteria pollutant emissions greater than 10 tons per year. However, Section 44344.5 (b) states that a new facility shall not be required to submit such a report if all of the following conditions are met:

1. The facility is subject to a district permit program established pursuant to Section 42300.
2. The district conducts an assessment of the potential emissions or their associated risks, and finds that the emissions will not result in a significant risk.
3. The district issues a permit authorizing construction or operation of the new facility

A health risk screening assessment was performed for the proposed project. The acute and chronic hazard indices are less than 1.0 and the cancer risk is less than one in a million, which are the thresholds of significance for toxic air contaminants. This project qualifies for exemption per the above exemption criteria.

IX. RECOMMENDATION:

Compliance with all applicable prohibitory rules and regulations is expected. Issue the Preliminary Determination of Compliance for the facility subject to the proposed conditions presented in Attachment A.

X. BILLING INFORMATION:

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-3929-1-0	3020-8B-A	46,900 kW	$8,757.00
C-3929-2-0	3020-8B-A	46,900 kW	$8,757.00
C-3929-3-0	3020-10-C	397 hp	$205.00

ATTACHMENT A

PROPOSED CONDITIONS

<u>EQUIPMENT DESCRIPTION, UNIT C-3929-1-0</u>:
46.9 MW NOMINALLY RATED SIMPLE-CYCLE PEAK-DEMAND POWER GENERATING SYSTEM #1 CONSISTING OF A GENERAL ELECTRIC MODEL LM6000 PC SPRINT NATURAL GAS-FIRED COMBUSTION TURBINE GENERATOR WITH WATER SPRAY PREMIXED COMBUSTION SYSTEM, SERVED BY A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM AND AN OXIDATION CATALYST.

- The permittee shall not begin actual onsite construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act] N

- Upon implementation of C-3929-1-0 and C-3929-2-0, emission offsets shall be provided to offset emissions increases in the following amounts: PM10 - Q1: 8,850 lb, Q2: 8,850 lb, Q3: 8,850 lb, and Q4: 8,850 lb and NOx (as NO2) - Q1: 29,055 lb, Q2: 30,210 lb, Q3: 30, 210 lb, and Q4: 29,055 lb. Offsets shall be provided at the appropriate offset ratio specified in Rule 2201 Section 4.2.4. SOx offsets provided to offset PM10 increases shall be at a ratio of 1.4:1 at the appropriate distance ratio. [District Rule 2201] N

- The permittee shall notify the District of the date of initiation of construction no later than 30 days after such date, the date of anticipated startup not more than 60 days nor less than 30 days prior to such date, and the date of actual startup within 15 days after such date. [District Rule 4001] N

- Selective catalytic reduction (SCR) system and oxidation catalyst shall serve the gas turbine engine. Exhaust ducting shall be equipped with a fresh air inlet and blower to be used to lower the exhaust temperature prior to inlet of the SCR system catalyst. Permittee shall submit SCR and oxidation catalyst design details to the District at least 30 days prior to commencement of construction. [District Rule 2201] N

- Permittee shall submit continuous emission monitor design, installation, and operational details to the District at least 30 days prior to commencement of construction. [District Rule 2201] N

- The permittee shall submit to the District information correlating the NOx control system operating parameters to the associated measured NOx output. The information must be sufficient to allow the District to determine compliance with the NOx emission limits of this permit during times that the CEMS is not functioning properly. [District Rule 4703] N

- {271} All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District NSR Rule] N

- {118} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102] N

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] N

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101] N

- Combustion turbine generator (CTG) and generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5% or greater, except for up to three minutes in any hour. [District Rule 2201] N

- The CTG shall be equipped with a continuous monitoring system to measure and record hours of operation and fuel consumption. [District Rules 2201, 4001, and 4703] N

- Operation of the turbine shall not exceed 8,000 hours per calendar year. [District Rule 2201] N

- The CTG shall be equipped with a continuous emission monitor (CEM) for NOx (before and after SCR system), CO, and O2. Continuous emissions monitor(s) shall meet the requirements of 40 CFR part 60, Appendices B and F, and 40 CFR part 75, and District-approved protocol, and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEM(s) cannot be demonstrated during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 2201, 4001, and 4703] N

- The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081] N

- The CTG shall be fired exclusively on natural gas with a sulfur content of no greater than 0.25 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201] N

- During startup or shutdown of any gas turbine engine, combined emissions from the two gas turbine engines (C-3929-1 and C-3929-2) shall not exceed the following: NOx (as NO2) - 15.4 lb, CO - 15.4 lb, and VOC - 1.4 lb in any one hour. [California Environmental Quality Act] N

- Startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmvd emission limits in condition #19. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown of gas turbine engine shall not exceed a time period of one hour each per occurrence. Startup and shutdown events shall not exceed 250 occurrences per calendar year and once per day. [District Rule 2201] N

- Emission rates from this unit, except during startup and shutdown events, shall not exceed any of the following: NOx (as NO2) - 5.9 lb/hr and 3.6 ppmvd @ 15% O2; VOC (as methane) - 0.33 lb/hr and 2.0 ppmvd @ 15% O2; CO - 2.44 lb/hr and 6.0 ppmvd @ 15% O2; PM10 - 3.3 lb/hr; or SOx (as SO2) - 0.33 lb/hr. All emission concentration limits are three-hour rolling averages. [District Rules 2201, 4001, and 4703] N

- Maximum daily emissions from this unit shall not exceed any of the following: NOx (as NO2) - 143.4 lb/day; VOC - 8.3 lb/day; CO - 63.8 lb/day; PM10 - 79.2 lb/day; and SOx (as SO2) - 7.9 lb/day. [District Rule 2201] N

- The ammonia (NH3) emissions shall not exceed 10 ppmvd @ 15% O2 over a 24 hour rolling average. [District Rule 2201] N

- Compliance with ammonia slip limit shall be demonstrated utilizing the following calculation procedure: ammonia slip ppmvd @ 15% O2 = ((a - (b x c/1,000,000)) x (1,000,000 / b) x d, where a = ammonia injection rate (lb/hr) / (17 lb/lb mol), b = dry exhaust flow rate (lb/hr) / (29 lb/lb mol), c = change in measured NOx concentration ppmvd @ 15% O2 across the catalyst and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip. Alternatively, the permittee may utilize a continuous in-stack ammonia monitor, acceptable to the District to monitor compliance. At least 60 days prior to using a NH3 CEM, the permittee shall submit a monitoring plan for District review and approval. [District Rule 4102] N

- Source testing to measure the NOx, CO, and VOC emission limits (lb/hr and ppmvd @ 15% O2) shall be conducted within 60 days of initial operation of the CTG and at least once every twelve months thereafter. [District Rule 1081] N

- Source testing to measure the PM10 emission limit (lb/hr), the natural gas sulfur content limit, and the ammonia emission limit shall be conducted within 60 days of initial operation and at least once every twelve months thereafter. [District Rule 1081] N

- Source testing of startup NOx, CO, VOC, and PM10 mass emission rates shall be conducted for one of the gas turbine engines (C-3929-1 or C-3929-2) upon initial operation and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [District Rule 1081] N

- Source testing to determine the percent efficiency of the turbine shall be within 60 days of initial operation and at least once every twelve months thereafter. [District Rule 4703] N

- Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] N

- The following test methods shall be used PM10: EPA Method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA Method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA Method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 4001, and 4703] N

- Source testing to determine the percent efficiency of the turbine shall be conducted utilizing the procedures in District Rule 4703 (Stationary Gas Turbines). [District Rule 4703] N

- The permittee shall maintain the following records: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 2201 and 4703] N

- The permittee shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling twelve month period), continuous emission monitor measurements, calculated ammonia slip, and calculated NOx mass emission rates (lb/hr and lb/twelve month rolling period). [District Rules 2201 and 4703] N

- Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080] N

- Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080] N

- The permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080] N

- Permittee shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100] N

- The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations. [District Rule 1100] N

- The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080] N

- All records required to be maintained by this permit shall be maintained for a period of two years and shall be made readily available for District inspection upon request. [District Rule 2201] N

- Permittee shall submit an application to comply with Rule 2520 - Federally Mandated Operating Permits within twelve months of commencing operation. [District Rule 2520] N

- Permittee shall submit an application to comply with Rule 2540 - Acid Rain Program. [District Rule 2540] N

EQUIPMENT DESCRIPTION, UNIT C-3929-2-0:
46.9 MW NOMINALLY RATED SIMPLE-CYCLE PEAK-DEMAND POWER GENERATING SYSTEM #2 CONSISTING OF A GENERAL ELECTRIC MODEL LM6000 PC SPRINT NATURAL GAS-FIRED COMBUSTION TURBINE GENERATOR WITH WATER SPRAY PREMIXED COMBUSTION SYSTEM, SERVED BY A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM AND AN OXIDATION CATALYST.

- The permittee shall not begin actual onsite construction of the equipment authorized by this Authority to Construct until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act] N

- Upon implementation of C-3929-1-0 and C-3929-2-0, emission offsets shall be provided to offset emissions increases in the following amounts: PM10 - Q1: 8,850 lb, Q2: 8,850 lb, Q3: 8,850 lb, and Q4: 8,850 lb and NOx (as NO2) - Q1: 29,055 lb, Q2: 30,210 lb, Q3: 30, 210 lb, and Q4: 29,055 lb. Offsets shall be provided at the appropriate offset ratio specified in Rule 2201 Section 4.2.4. SOx offsets provided to offset PM10 increases shall be at a ratio of 1.4:1 at the appropriate distance ratio. [District Rule 2201] N

- The permittee shall notify the District of the date of initiation of construction no later than 30 days after such date, the date of anticipated startup not more than 60 days nor less than 30 days prior to such date, and the date of actual startup within 15 days after such date. [District Rule 4001] N

- Selective catalytic reduction (SCR) system and oxidation catalyst shall serve the gas turbine engine. Exhaust ducting shall be equipped with a fresh air inlet and blower to be used to lower the exhaust temperature prior to inlet of the SCR system catalyst. Permittee shall submit SCR and oxidation catalyst design details to the District at least 30 days prior to commencement of construction. [District Rule 2201] N

- Permittee shall submit continuous emission monitor design, installation, and operational details to the District at least 30 days prior to commencement of construction. [District Rule 2201] N

- The permittee shall submit to the District information correlating the NOx control system operating parameters to the associated measured NOx output. The information must be sufficient to allow the District to determine compliance with the NOx emission limits of this permit during times that the CEMS is not functioning properly. [District Rule 4703] N

- {271} All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District NSR Rule] N

- {118} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102] N

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] N

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101] N

- Combustion turbine generator (CTG) and generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5% or greater, except for up to three minutes in any hour. [District Rule 2201] N

- The CTG shall be equipped with a continuous monitoring system to measure and record hours of operation and fuel consumption. [District Rules 2201, 4001, and 4703] N

- Operation of the turbine shall not exceed 8,000 hours per calendar year. [District Rule 2201] N

- The CTG shall be equipped with a continuous emission monitor (CEM) for NOx (before and after SCR system), CO, and O2. Continuous emissions monitor(s) shall meet the requirements of 40 CFR part 60, Appendices B and F, and 40 CFR part 75, and District-approved protocol, and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEM(s) cannot be demonstrated during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 2201, 4001, and 4703] N

- The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081] N

- The CTG shall be fired exclusively on natural gas with a sulfur content of no greater than 0.25 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201] N

- During startup or shutdown of any gas turbine engine, combined emissions from the two gas turbine engines (C-3929-1 and C-3929-2) shall not exceed the following: NOx (as NO2) - 15.4 lb, CO - 15.4 lb, and VOC - 1.4 lb in any one hour. [California Environmental Quality Act] N

- Startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmvd emission limits in condition #19. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown of gas turbine engine shall not exceed a time period of one hour each per occurrence. Startup and shutdown events shall not exceed 250 occurrences per calendar year and once per day. [District Rule 2201] N

- Emission rates from this unit, except during startup and shutdown events, shall not exceed any of the following: NOx (as NO2) - 5.9 lb/hr and 3.6 ppmvd @ 15% O2; VOC (as methane) - 0.33 lb/hr and 2.0 ppmvd @ 15% O2; CO - 2.44 lb/hr and 6.0 ppmvd @ 15% O2; PM10 - 3.3 lb/hr; or SOx (as SO2) - 0.33 lb/hr. All emission concentration limits are three-hour rolling averages. [District Rules 2201, 4001, and 4703] N

- Maximum daily emissions from this unit shall not exceed any of the following: NOx (as NO2) - 143.4 lb/day; VOC - 8.3 lb/day; CO - 63.8 lb/day; PM10 - 79.2 lb/day; and SOx (as SO2) - 7.9 lb/day. [District Rule 2201] N

- The ammonia (NH3) emissions shall not exceed 10 ppmvd @ 15% O2 over a 24 hour rolling average. [District Rule 2201] N

- Compliance with ammonia slip limit shall be demonstrated utilizing the following calculation procedure: ammonia slip ppmvd @ 15% O2 = ((a - (b x c/1,000,000)) x (1,000,000 / b) x d, where a = ammonia injection rate (lb/hr) / (17 lb/lb mol), b = dry exhaust flow rate (lb/hr) / (29 lb/lb mol), c = change in measured NOx concentration ppmvd @ 15% O2 across the catalyst and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip. Alternatively, the permittee may utilize a continuous in-stack ammonia monitor, acceptable to the District to monitor compliance. At least 60 days prior to using a NH3 CEM, the permittee shall submit a monitoring plan for District review and approval. [District Rule 4102] N

- Source testing to measure the NOx, CO, and VOC emission limits (lb/hr and ppmvd @ 15% O2) shall be conducted within 60 days of initial operation of the CTG and at least once every twelve months thereafter. [District Rule 1081] N

- Source testing to measure the PM10 emission limit (lb/hr), the natural gas sulfur content limit, and the ammonia emission limit shall be conducted within 60 days of initial operation and at least once every twelve months thereafter. [District Rule 1081] N

- Source testing of startup NOx, CO, VOC, and PM10 mass emission rates shall be conducted for one of the gas turbine engines (C-3929-1 or C-3929-2) upon initial operation and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [District Rule 1081] N

- Source testing to determine the percent efficiency of the turbine shall be within 60 days of initial operation and at least once every twelve months thereafter. [District Rule 4703] N

- Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] N

- The following test methods shall be used PM10: EPA Method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA Method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA Method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 4001, and 4703] N

- Source testing to determine the percent efficiency of the turbine shall be conducted utilizing the procedures in District Rule 4703 (Stationary Gas Turbines). [District Rule 4703] N

- The permittee shall maintain the following records: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 2201 and 4703] N

- The permittee shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling twelve month period), continuous emission monitor measurements, calculated ammonia slip, and calculated NOx mass emission rates (lb/hr and lb/twelve month rolling period). [District Rules 2201 and 4703] N

- Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080] N

- Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080] N

- The permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080] N

- Permittee shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100] N

- The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations. [District Rule 1100] N

- The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080] N

- All records required to be maintained by this permit shall be maintained for a period of two years and shall be made readily available for District inspection upon request. [District Rule 2201] N

- Permittee shall submit an application to comply with Rule 2520 - Federally Mandated Operating Permits within twelve months of commencing operation. [District Rule 2520] N

- Permittee shall submit an application to comply with Rule 2540 - Acid Rain Program. [District Rule 2540] N

EQUIPMENT DESCRIPTION, UNIT C-3929-2-0:
382 HP CATERPILLAR MODEL 3306 DIESEL-FIRED EMERGENCY IC ENGINE POWERING A 250 KW GENERATOR.

- {271} All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District NSR Rule] N
- {118} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102] N
- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] N
- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101] N
- {311} The engine shall be equipped with a positive crankcase ventilation (PCV) system or a crankcase emissions control device of at least 90% control efficiency. [District NSR Rule] N
- The exhaust stack shall not be fitted with a rain cap, or any other similar device, that impedes vertical exhaust flow. [District Rule 4102] N
- NOx emissions shall not exceed 5.09 g/hp-hr. [District Rule 2201] N
- PM10 emissions shall not exceed 0.13 g/hp-hr. [District Rule 4102] N
- {1344} The engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 200 hours per year. [District NSR Rule and District Rule 4701] N
- {313} The sulfur content of the diesel fuel used shall not exceed 0.05% by weight. [District NSR Rule] N
- The permittee shall maintain records of hours of emergency and non-emergency operation. Records shall include the date, the number of hours of operation, the purpose of the operation (e.g., load testing, weekly testing, rolling blackout, general area power outage, etc.), and the sulfur content of the diesel fuel used. Such records shall be retained on-site for a period of two years and made available for District inspection upon request. [District Rule 1070] N

ATTACHMENT B

CTG Emissions Data

Table 8.1-14
Criteria Pollutant Emission Rates for the Turbine with SCR and Oxidation Catalyst During Normal Operation (pounds per hour)

CTG Load	Pollutant	Ambient Temperature 15 °F	63 °F	115 °F
100%	VOC	1.17	0.33	0.20
	CO	6.25	2.44	0.80
	NO_x	6.21	5.90	5.30
	SO_2	0.32	0.30	0.27
	PM_{10}	3.3	3.3	3.2
60%	VOC	0.72	0.15	0.14
	CO	4.02	1.64	0.59
	NO_x	4.28	4.10	3.78
	SO_2	0.22	0.21	0.19
	PM_{10}	3.2	3.2	3.2

Table 8.1-15
Criteria Pollutant Emission Rates for the HPP Turbine During Startup and Shutdown

Pollutant	Startup & Shutdown (Total lb/hr)[a]
NO_x	7.7
CO	7.7
SO_2	0.33
PM_{10}	3.14

[a] Total emissions (per turbine) during an hour assuming both a startup and shutdown averaged into the hourly period.

ATTACHMENT C

SJVAPCD BACT GUIDELINE 3.4.8 & 3.1.2

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.4.8*

Last Update: June 14, 2001

Emission Unit: **Gas Fired Turbine - < 50 MW, Uniform Load, Without Heat Recovery, Serving an Electrical Generator**

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	6.25 ppmv @15% O2 (PUC-regulated natural gas, LPG, or Non-PUC-regulated gas with ≤ 0.75 grams S/100 dscf).	1. 90% control efficiency (SCONOx system, or equal). 2. 70 % control efficiency (Oxidation catalyst or equal).	
NOx	5 ppmv @ 15% O2 (Selective Catalytic Oxidation (SCR), or equal).	1. 2.5 ppmv @ 15% O2 (SCONOx system, or equal). 2. 3.0 ppmv (Dry Low-NOx combustors and SCR, or equal)	
PM10	Air inlet cooler/filter, lube oil vent coalescer (or equal) and either PUC-regulated natural gas, LPG, or non-PUC-regulated gas with ≤ 0.75 grams S/100 dscf.		
SOx	PUC-regulated natural gas, LPG, or Non-PUC-regulated gas with ≤ 0.75 grams S/100 dscf.		
CO	6.0 ppmvd @ 15% O2 (Oxidation catalyst and either PUC-regulated natural gas, LPG, or non-PUC-regulated gas with ≤ 0.75 grams S/100 dscf, or equal).	90% control efficiency (SCONOx system, or equal).	

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.4.8A

Emission Unit: Natural gas fired , Pratt & Whitney Model FT-8 Twin-PAC turbine powering an electrical generator.

Equipment Rating: 49.3 MW

References: ATC #: C-3811-1-0
Project #: C-1010207

Facility: CalPeak Power LC

Location: Mendota, CA

Date of Determination: May 12, 2001

Pollutant	BACT Requirements
NO_x	3.0 ppmvd @ 15% O2, 3-hour average (Dry Low-NOx combustors and SCR with PUC-regulated natural gas).
VOC	2.0 ppmv @ 15% O2 (Oxidation Catalyst)
PM_{10}	0.0066 lb/MMBtu (PUC-regulated natural gas, air inlet cooler/filter and lube oil coalescer).
SO_x	PUC-regulated fuel.
CO	BACT NOT TRIGGERED

BACT Status:

X Achieved in practice (SOx, VOC & PM10)   ___ Small Emitter   ___ T-BACT

X Technologically feasible BACT (NOx)

___ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

___ Contained in EPA approved SIP

X The following technologically feasible options were not cost effective:

___ Alternate Basic Equipment

___ The following alternate basic equipment was not cost effective:

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.4.8B

Emission Unit: Natural gas fired , GE LM6000 turbine powering an electrical generator.

Equipment Rating: 47.5 MW

References: ATC #: C-603-11-0
Project #: C-1010451

Facility: Hanford LP

Location: Hanford, CA

Date of Determination: June 14, 2001

Pollutant	BACT Requirements
NO_x	3.4 ppmvd @ 15% O2, 3-hour average (Water-spray pre-mixed combustion system and SCR with PUC-regulated natural gas).
VOC	2.0 ppmv @ 15% O2 (Oxidation Catalyst)
PM_{10}	0.0066 lb/MMBtu (PUC-regulated natural gas, air inlet cooler/filter and lube oil coalescer).
SO_x	PUC-regulated fuel.
CO	6.0 ppmvd @ 15% O2 (Oxidation catalyst and PUC-regulated natural gas).

BACT Status: X Achieved in practice (CO) ___ Small Emitter ___ T-BACT

___ Technologically feasible BACT

___ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

___ Contained in EPA approved SIP

X The following technologically feasible options were not cost effective:
1) SCONOx - CO

___ Alternate Basic Equipment

___ The following alternate basic equipment was not cost effective:

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.1.2*

Last Update: June 30, 2001

Emission Unit: Emergency Diesel I.C. Engine - ≥ 175 hp and < 400 hp

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Positive crankcase ventilation		
SO_x	Low-sulfur diesel fuel (500 ppmw sulfur or less) or Very Low-sulfur diesel fuel (15 ppmw sulfur or less), where available.		
NO_x	Certified NO_x emissions of 6.9 g/bhp-hr or less.		
PM_{10}	0.1 grams/bhp-hr (if TBACT is triggered) 0.4 grams/bhp-hr (if TBACT is not triggered)		

1. Any engine model included in the ARB or EPA diesel engine certification lists and identified as having a PM10 emission rate of 0.149 grams/bhp-hr or less, based on ISO 8178 test procedure, shall be deemed to meet the 0.1 grams/bhp-hr requirement.
2. A site-specific Health Risk Analysis is used to determine if TBACT is triggered. (Clarification added 05/07/01)

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.1.2A

Emission Unit: Diesel I.C. Engine Driving Emergency Generator

Equipment Rating: $\geq$ 117 hp and < 400 hp

Facility: N/A

References: ATC #: SCAQMD BACT
Project #:

Location: N/A

Date of Determination: July 27, 1995

Pollutant	BACT Requirements
NO_x	Certified NO_x emissions of 10.0 g/bhp-hr
VOC	Positive crankcase ventilation
PM_{10}	Low-sulfur diesel fuel (0.05% by weight sulfur or less) and positive crankcase ventilation or crankcase control device
SO_x	Low-sulfur diesel fuel (0.05% by weight sulfur or less)
CO	BACT NOT TRIGGERED

BACT Status:

_X_ Achieved in practice — Small Emitter — T-BACT

__ Technologically feasible BACT

__ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

__ Contained in EPA approved SIP

__ The following technologically feasible options were not cost effective:

__ Alternate Basic Equipment

__ The following alternate basic equipment was not cost effective:

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.1.2B

Emission Unit: Diesel I.C. Engine Driving Emergency Generator

Equipment Rating: $\geq$ 175 hp and < 400 hp

References: SJVUAPCD TBACT based on ARB Determination for PM Control measures and EPA NOx emission standards

Facility: N/A

Location: N/A

Date of Determination: March 5, 2001

Pollutant	BACT Requirements
NO_x	6.9 gram/bhp-hr
VOC	BACT NOT TRIGGERED
PM_{10}	0.1 grams/bhp-hr (if TBACT is triggered) 0.4 grams/bhp-hr (if TBACT is not triggered)
SO_x	Very Low-sulfur diesel fuel (15 ppmw sulfur or less), where available
CO	BACT NOT TRIGGERED

BACT Status: X Achieved in practice — Small Emitter X T-BACT

___ Technologically feasible BACT

___ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

___ Contained in EPA approved SIP

___ The following technologically feasible options were not cost effective:

___ Alternate Basic Equipment

___ The following alternate basic equipment was not cost effective:

1. Any engine model included in the ARB or EPA diesel engine certification lists and identified as having a PM10 emission rate of 0.149 grams/bhp-hr or less, based on ISO 8178 test procedure, shall be deemed to meet the 0.1 grams/bhp-hr requirement.
2. A site-specific Health Risk Analysis is used to determine if TBACT is triggered. (Clarification added 05/07/01)

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.1.2C

Emission Unit: Diesel I.C. Engine Driving Emergency Generator

Equipment Rating: $\geq$ 175 hp and < 400 hp

Facility: N/A

References: EPA compression ignition engine performance standard 40 CFR Part 89.

Location: N/A

Date of Determination: June 30, 2001

Pollutant	BACT Requirements
NO_x	6.9 gram/bhp-hr
VOC	BACT NOT TRIGGERED
PM_{10}	BACT NOT TRIGGERED
SO_x	BACT NOT TRIGGERED
CO	BACT NOT TRIGGERED

BACT Status: X Achieved in practice — Small Emitter — T-BACT

___ Technologically feasible BACT

___ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

___ Contained in EPA approved SIP

___ The following technologically feasible options were not cost effective:

___ Alternate Basic Equipment

___ The following alternate basic equipment was not cost effective:

ATTACHMENT D

TOP DOWN BACT ANALYSIS
_(C-3929-1-0 & C-3929-2-0)_

1. BACT Applicability:

Pursuant to Sections 4.1.1 and 4.1.2, BACT shall be applied to a new, relocated, or modified emissions unit if the new or relocated unit has a Potential to Emit (PE) exceeding two pounds in any one day or the modified emissions unit results in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2 lb/day for NO_X, CO, VOC, PM_{10}, or SO_X. For CO emissions, the CO Post-project Stationary Source Potential to Emit (SSPE2) must also exceed 200,000 lb/year to trigger BACT.

As seen in Section VII.D of this evaluation, the applicant is proposing to install new emissions units with PEs greater than 2 lb/day for NO_X, CO, VOC, PM_{10}, and SO_X. BACT is triggered for NO_X, VOC, PM_{10}, and SO_X criteria pollutants since the PEs are greater than 2 lbs/day, but BACT is not triggered for CO emissions since the SSPE2 for CO is not greater than 200,000 lbs/year, as demonstrated in Section VII.E.2 of this document.

2. BACT Guidance:

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule. The District BACT Clearinghouse recently included a new BACT Guideline (3.4.8) applicable to the turbine installations [Simple Cycle Gas Fired Turbines less than 50 MW, Powering an Electrical Generation Operation]. (See Attachment C)

3. Top-Down BACT Analysis:

A. NO_X Top-Down BACT Analysis for Permits (C-3929-1-0 & -2-0)

According to BACT guideline 3.4.8 (Simple Cycle Gas Fired Turbines < 50 MW Powering an Electrical Generation Operation), the following are possible controls for NO_X emissions from similar operations.

Step 1 - <u>Identify All Possible Control Technologies</u>

Based on the previously cited BACT Guideline, general control for NO_X emissions from turbines include the following options:

1. Selective Catalytic Reduction (SCR) systems: consist of injecting ammonia upstream of a catalyst bed. The ideal operating temperature for a conventional SCR catalyst is 600 – 750 °F (titanium oxide). High temperature zeolite SCR catalysts have been developed that permit continuous SCR operation at temperatures as high as 1,050 °F. High temperature catalysts must be used when the SCR system needs to be placed upstream of the Heat Recovery Steam Generators (HRSG) or on a simple cycle turbine without heat recovery.

3. Top-Down BACT Analysis (Continued):

2. SCONO$_X$™: employs a precious metal catalyst and a NO$_X$ absorption/regeneration process step to convert CO and NO$_X$ into CO_2, H_2O, and N_2. The principle advantage of the SCONO$_X$™ technology over SCR is the elimination of ammonia emissions and the simultaneous reduction of CO, VOC, and NO$_X$. SCONO$_X$™ has a maximum operating temperature of ≈ 700 °F

3. Catalytic Combustors (Xonon™ technologies): are flameless processes that allow fuel oxidation to take place at temperatures well below the normal lean flammability limits of the air-fuel mixture. For this reason, the use of catalysts in gas turbine combustion to replace part of the thermal reaction zone allows stable combustion to occur at peak temperatures that are as much as 1,800 °F lower than those of conventional combustors.

4. Dry Low NO$_X$ (DLN) Combustors: operate in a pre-mixed mode, where air and fuel are mixed before entering the combustor. An important advantage of the DLN combustor is that the amount of NO$_X$ formed does not increase with an increase in residence time. This means that DLN systems can be designed with long residence times to achieve low CO and low VOC emissions, while maintaining low NO$_X$ levels.

5. Water/Steam Injection: has been used for the past 25 years to control NO$_X$ emissions from gas turbines. Manufacturers typically guarantee water injected combustors to 42 ppmv when firing natural gas. The maximum allowable water injection rate is determined by the CO and VOC limits on the unit (as water injection has a quenching effect that increases emissions of "products of incomplete combustion") and the rapid wear caused by direct water impingement on the combustor liner.

NO$_X$ Emissions Control Technologies

a. SCONO$_X$™
b. Catalytic Combustors (Xonon™ technologies)
c. Selective Catalytic Reduction (SCR) systems
d. Dry Low NO$_X$ (DLN) Combustors
e. Water/Steam Injection

3. Top-Down BACT Analysis (Continued):

Step 2 - Eliminate Technologically Infeasible Options

The Xonon™ catalytic combustors are considered technologically infeasible for this installation because the combustors are not commercially available for any turbine type at this time, according to Chuck Solt, regulatory affairs director of Catalytica Combustion Systems. Only since October of 1998 has this Xonon technology been placed on a turbine installation. Genxon Power Systems installed a 1.55 MW natural gas fired Kawasaki MIA-13A combustion gas turbine to produce electricity for the city of Santa Clara. To date, this has been the only installation that is equipped with the Xonon technology, and the technology has not been applied to larger sized turbine installations. The Xonon system has been performing as designed, providing 2.5 ppmv NO_X emissions from the turbine for over 7,400 hours of operation, but this is the only turbine manufacturer that has had an industry installation. GWF Energy could install Kawasaki turbines at their facility, but to provide the amount of energy needed by the power plant (93.8 MW), they would have to install 60 turbines, instead of the one turbine they have proposed. Since one Kawasaki turbine is not large enough to supply the power output needed by GWF Energy, the District will not require the installation of extra turbines in order to utilize a specific control technology.

All remaining control options listed in step 1 are technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The following options are ranked based on their emission factor:

1. $SCONO_X$™ - $\leq$ 2.5 ppmv
2. Selective Catalytic Reduction - $\leq$ 5[1] ppmv
3. Dry Low NO_X burner - $\leq$ 25[2] ppmv
4. Water Injection - $\leq$ 42 ppmv

Step 4 - Cost Effective Analysis

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

District Policy establishes annual cost thresholds for imposed control based upon the amount of pollutants abated by the controls. If the cost of control is at or below the threshold, it is considered a cost effective control. If the cost exceeds the threshold, it is not cost effective and the control is not required. Per District BACT Policy, the maximum cost limit for NO_X reduction is $9,700 per ton of NO_X reduced.

[1] Selective Catalytic Reduction (SCR) systems are capable of achieving emission levels less than 5 ppmv NO_X, but achieving such emissions has not been fully demonstrated on a consistent basis.
[2] It has generally been noted that Turbine manufacturers commonly guarantee NO_X emissions of 25 ppmv @ 15% O_2.

3. Top-Down BACT Analysis (Continued):

The industry standard for turbines of this class and category of source was determined to be 25 ppmv NO_X @ 15% O_2.[3] The proposed annual emissions from a gas turbine using industry standard values can be calculated as:

NO_X (annual):

$$\frac{0.0921 \text{ lb}}{\text{MMBtu}} \bigg| \frac{3{,}676{,}800 \text{ MMBtu}}{\text{year}} = 338{,}633 \text{ lb } NO_X/\text{year}$$

(25 ppmv @ 15% O_2 = 0.0921 lb/MMBtu)

PE_{NOx} = *338,663 lb NO_X/year = 169.3 tons NO_X/year*

The proposed annual emissions from a gas turbine equipped the $SCONO_X$ control technology with NO_X emissions of 2.5 ppmv @ 15% O_2 can be calculated as:

NO_X (annual):

$$\frac{0.0092 \text{ lb}}{\text{MMBtu}} \bigg| \frac{3{,}676{,}800 \text{ MMBtu}}{\text{year}} = 33{,}827 \text{ lb } NO_X/\text{year}$$

(2.5 ppmv @ 15% O_2 = 0.0092 lb/MMBtu)

PE_{NOx} = *33,826 lb NO_X/year = 16.9 tons NO_X/year*

1. NO_X Cost Effectiveness Analysis:
$SCONO_X$ Systems (by Goal Line Environmental Technologies)

The District conducted research attempting to first, determine whether or not the control technology would be feasible for this type of installation, because the outlet temperature of the turbine exhaust was at approximately 700 °F. Published throughout the company's website, stated that the ideal operating parameters for the $SCONO_X$ system was between 300 °F to 700 °F, and therefore raised the question on whether or not the $SCONO_X$ system would operate properly for this simple cycle installation. On a recent BACT analysis, the District was able to contact a Mr. Greg Gilbert of Goal Line Environmental Technologies (GLET) from the company's Sacramento office and briefly discuss with him the scope of the turbine installation project for a similar simple cycle turbine installation. Based upon that conversation, Mr. Gilbert stated that a facility would be able to install $SCONO_X$ on a simple cycle installation, with the use of exhaust cooling technologies. Therefore, the control technology is feasible for this installation.

[3] Based upon the fact that there are only a few existing turbine installations within this class and category of source that operate with emissions of 5 ppmv NO_X, the District will assume that the Industry Standard will be 25 ppmv NO_X @ 15% O_2, pursuant to a survey of turbine manufacturers stating that the majority of all turbines sold, are equipped with Dry Low NO_X technology and guaranteed emissions of 25 ppmv.

3. Top-Down BACT Analysis (Continued):

The District conducted more research to determine the appropriate cost information regarding the $SCONO_X$ control technology. Based upon a prior quote from a Mr. Richard Davis of Goal Line Environmental Technologies, the installation of a $SCONO_X$ system (including the exhaust cooling devices) for a 50 MW turbine was approximately \$4.0 - \$4.5 million. The District will assume the lower cost of \$4.0 million dollars as the conservative installation cost for a $SCONO_X$ system.

Description of Cost	Cost Factor	Cost	Source
Direct Capital Costs (DC):			
Purchase Equipment Costs (PE):			
(A) Basic Equipment: $SCONO_X$ System		4,000,000	GoalLine
(B) Instrumentation: included in base price		0	OAQPS
Taxes and Freight:	0.08 A*B	320,000	OAQPS
PE Total:		**4,320,000**	
Direct Installation Costs (DI): Assume Modular SCR w/ simple installation			
Foundation and Supports:	0.08 PE	345,600	OAQPS
Handling and Erection:	0.14 PE	604,800	OAQPS
Electrical:	0.04 PE	172,800	OAQPS
Piping:	0.02 PE	86,400	OAQPS
Insulation:	0.01 PE	43,200	OAQPS
Painting:	0.01 PE	43,200	OAQPS
DI Total:		1,301,400	
Site Preparation and Buildings			
DC Total = PE + DI:		5,621,400	
Indirect Costs (IC):			
Engineering:	0.10 PE	432,000	OAQPS
Construction and Field Expenses:	0.05 PE	216,000	OAQPS
Contractor Fees:	0.10 PE	432,000	OAQPS
Start-up:	0.02 PE	86,400	OAQPS
Performance Testing:	0.01 PE	43,200	OAQPS
Contingencies:	0.03 PE	129,600	OAQPS
IC Total:		1,339,200	
Total Capital Investments (TCI = DC + IC):		6,960,600	
Direct Annual Costs (DAC): Assume $SCONO_X$ requires 0.5 hrs/shift			
Operating Costs (O): 3 shifts per 24 hr/day; 8,000 hours/year (≈ 1,000 shifts/year)			
Operator: 0.50 hr/shift	\$25/hr	12,500	OAQPS
Supervisor:	15% operator	1,875	OAQPS
Maintenance Costs (M):			
Labor: 0.5 hr/shift	\$25/hr	12,500	OAQPS
Material:	100% labor	12,500	OAQPS
Utility Costs (U):			
Performance loss:	0.6%		
Electricity Cost:	\$0.08/kWh	180,096	Variable per GoalLine

3. Top-Down BACT Analysis (Continued):

Catalyst Replace:		374,054[4]	GoalLine
Catalyst Washing:	Variable	36,000	GoalLine
Catalyst Dispose: (Precious Metal Recovery = 1/3 replace cost)		-124,685	GoalLine
H_2 carrier stream: 93 lb steam/hr/MW (@ \$0.008/lb)	Variable	279,149	GoalLine
H_2 reforming: 14 ft^3 CH_4/hr/MW (@ \$0.004/ft^3)	Variable	21,011	GoalLine
Total DAC:		805,000	
Indirect Annual Costs (IAC):			
Overhead:	60% O & M	23,625	OAQPS
Administrative:	0.02 TCI	139,212	OAQPS
Insurance:	0.01 TCI	69,606	OAQPS
Property Tax:	0.01 TCI	69,606	OAQPS
Annualized Total Capital Investment: interest rate (%) 10 Period (years): 10	0.1627 TCI	1,132,490	District Policy
Total IAC:		1,434,539	
Total Annual Cost (DAC + IAC):		**2,239,539**	

District BACT policy requires the use of a Multi-Pollutant Cost Effectiveness Threshold (MCET) for a BACT option controlling more than one pollutant. The installation of a $SCONO_X$ system will control NO_X, CO, and VOC emissions, but since BACT is not triggered for CO emissions, CO emissions reductions need not be included in the threshold. The MCET is calculated as follows:

$$MCET\ (\$/yr) = (E_{NOx} * T_{NOx}) + (E_{VOC} * T_{VOC})$$

Where: E_{NOx} = tons-NO_X controlled/yr
E_{VOC} = tons-VOC controlled/yr
T_{NOx} = District's cost effectiveness threshold for NO_X
= \$9,700/ton-NO_X
T_{VOC} = District's cost effectiveness threshold for VOCs
= \$5,000/ton-VOCs

To determine E_{VOC}, the District has to establish what Industry Standard is for VOC emissions. As detailed above, turbines with NO_X emissions of 25 ppmv (as determined from a survey of various turbine manufacturers) were deemed as the industry standard for this class and category of source. These turbines were commonly equipped with Dry Low NO_X (DLN) combustor technology to achieve NO_X emission levels of 25 ppmv. Most turbine manufacturers that sold turbines equipped with DLN technology also guaranteed UHC (Total Hydrocarbons) emissions of 25 ppmv. Available AP-42 and ARB data indicate that Non-Methane Hydrocarbons (NMHC) are approximately 25% of total hydrocarbons. ($\Rightarrow$ 25 ppmv * 0.25 = 6.25 ppmv VOC). Therefore, since there were no VOC limitations required by District Rule 4703, the District will consider the Industry Standard for this class and category of source to be 6.25 ppmv VOC @ 15%O_2.

[4] See Appendix I

3. Top-Down BACT Analysis (Continued):

Therefore, the proposed VOC emissions from the gas turbine using industry standard values can be calculated as:

VOC (annual):

$$\frac{0.008\ \text{lb}}{\text{MMBtu}} \left| \frac{3{,}676{,}800\ \text{MMBtu}}{\text{year}} \right. = 29{,}414\ \text{lb VOC/year}$$

(6.25 ppmv @ 15% O_2 = 0.008 lb/MMBtu)

PE_{VOC} = *29,414 lb VOC/year = 14.7 tons VOC/year*

The District will assume a 90% VOC control efficiency for the installation of a $SCONO_X$ system.[5] The industry standard turbine VOC emissions using a $SCONO_X$ system is:

VOC (annual):

$$\frac{29{,}414\ \text{lb VOC}}{\text{year}} \left| \frac{(1-90\%)}{1} \right. = 2{,}941\ \text{lb VOC/year}$$

PE_{VOC} = *2,941 lb VOC/year = 1.5 tons VOC/year*

Calculating for the MCET derives the following:

E_{NOx} = 169.3 tpy – 16.9 tpy = 152.4 tpy
E_{VOC} = 14.7 tpy – 1.5 tpy = 13.2 tpy

MCET (\$/yr) = (152.4 ∗ \$9,700) + (13.2 ∗ \$5,000) = \$1,554,280/year

The cost of utilizing a $SCONO_X$ system (\$2,239,539/year) is more than the MCET of \$1,5442,280/year. Therefore, this control technology will be removed from consideration.

2. NO_X Cost Effectiveness Analysis:
Turbine equipped with SCR System (5 ppmv NO_X @ 15% O_2)

The applicant is proposing to utilize water injection and a Selective Catalytic Reduction system with NO_X emissions of less than 5 ppmv @ 15% O_2. Since this control technology is the most effective NO_X control technology listed in Step 3, a cost effectiveness analysis is not required.

[5] Per Richard Davis, GLET Representative, the control efficiencies for CO and VOC emissions are "greater than 90%." The District will assume a 90% control efficiency to remain conservative.

3. Top-Down BACT Analysis (Continued):

Step 5 - Select BACT

BACT for the emission unit is determined to be the use of water injection and a Selective Catalytic Reduction system with emissions of less than or equal to 5 ppmv @ 15% O_2. The facility has proposed to use water injection and a Selective Catalytic Reduction system with emissions of less than or equal to 3.6 ppmv @ 15% O_2; therefore, BACT is satisfied.

B. VOC Top-Down BACT Analysis for Permits (C-3929-1-0 & -2-0)

According to BACT guideline 3.4.8 (Simple Cycle Gas Fired Turbines < 50 MW Powering an Electrical Generation Operation), the following are possible controls for VOC emissions from similar operations.

Step 1 - Identify All Possible Control Technologies

General control for VOC emissions include the following options:

1. SCONO$_X$™: employs a precious metal catalyst and a NO_X absorption/regeneration process step to convert CO and NO_X into CO_2, H_2O, and N_2. The principle advantage of the SCONO$_X$™ technology over SCR is the elimination of ammonia emissions and the simultaneous reduction of CO, VOC, and NO_X. SCONO$_X$™ has a maximum operating temperature of ≈ 700 °F

2. Oxidation Catalysts: utilizes the use of a catalyst bed (platinum based) at elevated temperatures in the range of 500-900 degree F in the exhaust stack to create an intermediate chemical reaction to disassociate the CO & VOC molecules and reduce the CO & VOC emissions.

3. PUC quality natural gas.

VOC Emissions Control Technologies

a. SCONO$_X$™
b. CO/VOC Oxidation Catalysts
c. PUC quality natural gas

Step 2 - Eliminate Technologically Infeasible Options

All control options listed in step 1 are technologically feasible.

3. Top-Down BACT Analysis (Continued):

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

In order to determine the control efficiency of a given control method, the industry standard must first be determined. The industry standard is typically established as the industrywide average baseline emission rate for the device in question.

As detailed in the NO_X Top-Down BACT Analysis, the industry standard for VOC emissions was determined based upon information from various turbine manufacturers, therefore the District will consider the value of 6.25 ppmv (0.008 lb/MMBtu) as industry standard for this class and category of source.

Therefore, the proposed emissions from the gas turbines using industry standard values can be calculated as:

VOC (annual):

$$\frac{0.008\ \text{lb}}{\text{MMBtu}} \times \frac{3{,}676{,}800\ \text{MMBtu}}{\text{year}} = 29{,}414\ \text{lb VOC/year}$$

(6.25 ppmv @ 15% O_2 = 0.008 lb/MMBtu)

PE_{VOC} = 29,414 lb VOC/year = 14.7 tons VOC/year

As discussed in the NO_X Top-Down BACT section of this evaluation, the District will assume a 90% VOC control efficiency for the installation of a $SCONO_X$ system. The industry standard turbine VOC emissions using a $SCONO_X$ system is:

VOC (annual):

$$\frac{29{,}414\ \text{lb VOC}}{\text{year}} \times \frac{(1-90\%)}{1} = 2{,}941\ \text{lb VOC/year}$$

PE_{VOC} = 2,941 lb VOC/year = 1.5 tons VOC/year

The District will assume a 71% VOC control efficiency (as stated on BACT guideline 3.4.4) for the installation of an oxidation catalyst. The industry standard turbine VOC emissions using an oxidation catalyst is:

VOC (annual):

$$\frac{29{,}414\ \text{lb VOC}}{\text{year}} \times \frac{(1-71\%)}{1} = 8{,}530\ \text{lb VOC/year}$$

PE_{VOC} = 8,530 lb VOC/year = 4.3 tons VOC/year

3. Top-Down BACT Analysis (Continued):

Control Method	Industry Standard Emissions		Controlled Emissions		Overall Control efficiency
	lb/year	ton/year	lb/year	ton/year	
a. $SCONO_X$	29,414	14.71	2,941	1.47	90%
b. CO/VOC Oxidation Catalyst	29,414	14.71	8,530	4.27	71%
c. Natural gas	29,414	14.71	29,414	14.71	0%

VOC Emission Control Technology Rankings

Rank	Control Efficiency
#1. $SCONO_X$ System	90%
#2. CO/VOC Oxidation Catalyst	71%
#3. Natural gas	0%

Step 4 - Cost Effectiveness Analysis

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

District Policy establishes annual cost thresholds for imposed control based upon the amount of pollutants abated by the controls. If the cost of control is at or below the threshold, it is considered a cost effective control. If the cost exceeds the threshold, it is not cost effective and the control is not required. Per District BACT Policy, the maximum cost limit for VOC reduction is $5,000 per ton of VOC reduced.

1. VOC Cost Effectiveness Analysis:
$SCONO_X$ System

As demonstrated in the NO_X Top-Down BACT analysis, the $SCONO_X$ technology is not a cost effective technology. Therefore, this control technology will be removed from consideration.

2. VOC Cost Effectiveness Analysis:
Oxidation Catalyst

The applicant is proposing to utilize an oxidation catalyst to control VOC emissions. Since this control technology is the most effective VOC control technology listed in Step 3, a cost effectiveness analysis is not required.

Step 5 - Select BACT

The applicant has proposed to utilize option #2 (Oxidation Catalyst) as the VOC control technology. Therefore BACT for the emission unit is determined to be a turbine equipped with an oxidation catalyst.

3. Top-Down BACT Analysis (Continued):

C. PM_{10} Top-Down BACT Analysis for Permits (C-3929-1-0 & -2-0)

According to BACT guideline 3.4.8 (Simple Cycle Gas Fired Turbines < 50 MW Powering an Electrical Generation Operation), the following are possible controls for PM_{10} emissions from similar operations.

Step 1 - Identify All Possible Control Technologies

General control for PM_{10} emissions include the following options:

1. Air inlet filter, lube oil vent coalescer (or equivalent), and PUC regulated natural gas fuel (1.0 gr-S/100 dscf) – specified as achieved-in-practice BACT in District Clearinghouse BACT Guideline 3.4.2.

2. PUC regulated natural gas fuel (1.0 gr-S/100 dscf) – specified as achieved in practice BACT in the California Air Resources Board's September 1999 Guidance for Power Plant Siting and Best Available Control Technology document (for turbines ≥ 50 MW).

Step 2 - Eliminate Technologically Infeasible Options

All of the listed controls are considered technologically feasible for this application.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. Air inlet cooler/filter, lube oil vent coalescer (or equivalent), and PUC regulated natural gas fuel (1.0 gr-S/100 dscf).

2. PUC regulated natural gas fuel (1.0 gr-S/100 dscf).

Step 4 - Cost Effectiveness Analysis

The applicant is proposing to use an air inlet cooler/filter, lube oil vent coalescer (or equivalent), and PUC regulated natural gas fuel (1.0 gr-S/100 dscf). This is the highest ranking technologically feasible option, therefore a cost effective analysis will not be necessary.

Step 5 - Select BACT

The applicant has proposed to utilize option #1 as the PM_{10} control technology (Air inlet cooler/filter, lube oil vent coalescer (or equivalent), and PUC regulated natural gas fuel (1.0 gr-S/100 dscf). Therefore, BACT for this class of source is satisfied.

3. Top-Down BACT Analysis (Continued):

D. SO_X Top-Down BACT Analysis for Permits (C-3929-1-0 & -2-0)

According to BACT guideline 3.4.8 (Simple Cycle Gas Fired Turbines < 50 MW Powering an Electrical Generation Operation), the following are possible controls for PM_{10} emissions from similar operations.

Step 1 - <u>Identify All Possible Control Technologies</u>

General control for SO_X emissions include the following options:

1. PUC regulated natural gas fuel (1.0 gr-S/100 dscf) – specified as achieved in practice BACT in the California Air Resources Board's September 1999 <u>Guidance for Power Plant Siting and Best Available Control Technology</u> document (for turbines ≥ 50 MW).

Step 2 - <u>Eliminate Technologically Infeasible Options</u>

All of the listed controls are considered technologically feasible for this application.

Step 3 - <u>Rank Remaining Control Technologies by Control Effectiveness</u>

1. PUC regulated natural gas fuel (1.0 gr-S/100 dscf).

Step 4 - <u>Cost Effectiveness Analysis</u>

The facility has proposed to use utility grade natural gas with a sulfur content of less than or equal to 0.25 grains per 100 dscf. Since this is the most effective control option, a cost effectiveness analysis is not required.

Step 5 - <u>Select BACT</u>

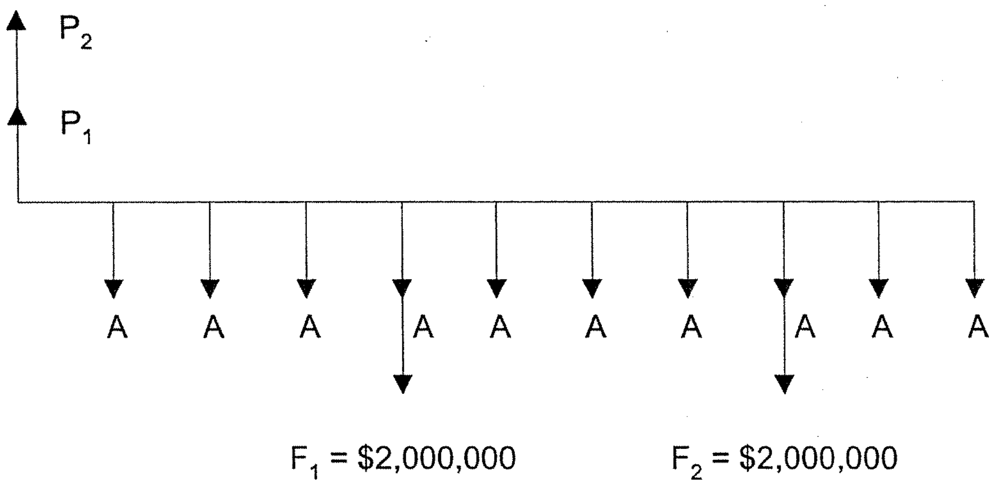
The applicant has proposed to use PUC quality natural gas with a sulfur content of less than or equal to 0.25 grains per 100 dscf as the SO_X control technology. Therefore, BACT for this class of source is satisfied.

APPENDIX I

CALCULATION OF ANNUAL COST FOR $SCONO_X$ CATALYST REPLACEMENT

Calculation of an Equivalent Annual Cost of the $SCONO_X$ catalyst replacement:

According to Goal Line Environmental Technologies, the $SCONO_X$ catalyst has a life span of approximately three to five years. Therefore, it is assumed that, on average, the catalyst must be replaced two times during the ten year life span. Information from the BACT determination performed for Southern region project #990210 (the most recent revision of guideline 3.4.2, which was approved in Q1, 2000) indicates that the replacement cost of a $SCONO_X$ catalyst is approximately 50% of the original system cost. Therefore, the applicant must purchase a new catalyst bed at $4,000,000 × 0.5 = $2,000,000 every four years. These future costs must be converted to an equivalent annual cost over the ten year life span, as illustrated below:



Step 1:
Each future cost (F_1, F_2) will be converted to a present worth value (P_1, P_2) assuming an interest rate of 10% and a 10 year life span using the following single payment present worth equation:

$$P = F \times \left[\frac{1}{(1+i)^n}\right]$$

where:

P = present worth
F = future cost
i = interest rate
n = life span

$$P_1 = \$2{,}000{,}000 \times \left[\frac{1}{(1+0.1)^4}\right] = \$1{,}366{,}027$$

$$P_2 = \$2{,}000{,}000 \times \left[\frac{1}{(1+0.1)^8}\right] = \$933{,}015$$

Step 2:
The total present worth value (P_1 + P_2) will be converted to an equivalent annual cost (A) assuming an interest rate of 10% and a 10 year life span using the following capital recovery equation:

$$A = P \times \left[\frac{i \times (1+i)^n}{(1+i)^n - 1}\right]$$

where:

P	=	present worth
A	=	equivalent annual cost
i	=	interest rate
n	=	life span

$$A = (\$1{,}366{,}027 + \$933{,}015) \times \left[\frac{0.1 \times (1+0.1)^{10}}{(1+0.1)^{10} - 1}\right] = \$374{,}054/\mathit{year}$$

ATTACHMENT E

TOP DOWN BACT ANALYSIS (C-3929-3-0)

1. BACT Applicability:

Pursuant to Sections 4.1.1 and 4.1.2, BACT shall be applied to a new, relocated, or modified emissions unit if the new or relocated unit has a Potential to Emit (PE) exceeding two pounds in any one day or the modified emissions unit results in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2 lb/day for NO_X, CO, VOC, PM_{10}, or SO_X. For CO emissions, the CO Post-project Stationary Source Potential to Emit (SSPE2) must also exceed 200,000 lb/year to trigger BACT.

As seen in Section VII.D of this evaluation, the applicant is proposing to install a new emissions unit with PEs greater than 2 lb/day for NO_X, CO, VOC, PM_{10}, and SO_X. BACT is triggered for NO_X, VOC, PM_{10}, and SO_X criteria pollutants since the PEs are greater than 2 lbs/day, but BACT is not triggered for CO emissions since the SSPE2 for CO is not greater than 200,000 lbs/year, as demonstrated in Section VII.E.2 of this document.

2. BACT Guidance:

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule. BACT Guideline 3.1.2, which appears in Attachment C of this report, covers diesel-fired emergency IC engines greater than or equal to 175 hp and less than 400 hp.

3. Top-Down BACT Analysis:

A. NO_X Top-Down BACT Analysis for Permit (C-3929-3-0):

Oxides of nitrogen (NO_X) are generated from the high temperature combustion of the diesel fuel. A majority of the NO_X emissions are formed from the high temperature reaction of nitrogen and oxygen in the inlet air. The rest of the NO_X emissions are formed from the reaction of fuel-bound nitrogen with oxygen in the inlet air.

Step 1 - Identify All Possible NO_X Control Technologies

The SJVAPCD BACT Clearinghouse identifies achieved-in-practice BACT for this engine as certified NO_X emissions of 6.9 g/hp-hr or less. No technologically feasible alternatives are listed.

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options listed.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Certified NO_X emissions of 6.9 g/hp-hr or less.

3. Top-Down BACT Analysis (Continued):

Step 4 - Cost Effectiveness Analysis

The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVAPCD BACT policy, the cost effectiveness analysis is not required.

Step 5 - Select BACT

Therefore, BACT for NO_X emissions is certified NO_X emissions of less than 6.9 g/hp·hr. The proposed IC engine is certified with NO_X emissions of 5.09 g/hp·hr, therefore BACT is satisfied

B. VOC Top-Down BACT Analysis for Permit (C-3929-3-0):

Volatile organic compounds result from the incomplete combustion of diesel fuel and are emitted from the crankcase of the engine as a result of piston ring blow-by.

Step 1 - Identify All Possible VOC Control Technologies

The SJVAPCD BACT Clearinghouse identifies achieved-in-practice BACT for this engine as positive crankcase ventilation (PCV).

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. PCV

Step 4 - Cost Effectiveness Analysis

Since the only control technology alternative in the ranking list from Step 3 has been achieved in practice, a cost effectiveness analysis is not required.

Step 5 - Select BACT

BACT for VOC emissions for this engine is a PCV system.

C. PM_{10} Top-Down BACT Analysis for Permit (C-3929-3-0):

Particulate matter (PM_{10}) emissions occur from the reaction of various elements in the diesel fuel including fuel sulfur.

3. **Top-Down BACT Analysis (Continued):**

Step 1 - Identify All Possible PM_{10} Control Technologies

The SJVUAPCD BACT Clearinghouse identifies achieved-in-practice BACT for this engine as: 0.1 grams/bhp-hr (if TBACT is triggered) and 0.4 grams/bhp-hr (if TBACT is not triggered). In this case, TBACT is not triggered.

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

PM_{10} emissions of 0.1 grams/bhp-hr (if TBACT is triggered) and 0.4 grams/bhp-hr (if TBACT is not triggered).

Step 4 - Cost Effectiveness Analysis

The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVAPCD BACT policy, the cost effectiveness analysis is not required.

Step 5 - Select BACT

BACT for PM_{10} emissions for this engine is PM_{10} emissions of less than or equal to 0.4 g/hp·hr.

D. **SO_X Top-Down BACT Analysis for Permit (C-3929-3-0):**

Oxides of sulfur (SO_X) emissions occur from the combustion of the sulfur which is present in the diesel fuel.

Step 1 - Identify All Possible SO_X Control Technologies

The SJVAPCD BACT Clearinghouse Guideline identifies achieved-in-practice BACT for this engine as low-sulfur fuel (0.05% by weight) or very low-sulfur fuel (0.0015% by weight) where available.

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

low-sulfur fuel or very low-sulfur fuel

3. Top-Down BACT Analysis (Continued):

Step 4 - Cost Effectiveness Analysis

The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVAPCD BACT policy, the cost effectiveness analysis is not required.

Step 5 - Select BACT

BACT for SO_X emissions for this engine is the use of fuel with a sulfur content of 0.05% or 0.0015% where available.

ATTACHMENT F

Ambient Air Quality Modeling Summary Sheet

San Joaquin Valley Unified
Air Pollution Control District

MEMORANDUM

DATE: September 4, 2001

TO: Errol Villegas, AQE—Permit Services

FROM: Brian Clerico, AQS—Technical Services

SUBJECT: Ambient Air Quality Analysis and RMR Modeling Results for GWF Energy (C-3929)

As per your request, Technical Service performed a RMR and Ambient Air Quality Analysis on a 93.8 MW peaking power plant powered by two GE model LM-6000 PC Sprint simple-cycle natural gas fired turbines (1-0 and 2-0) each equipped with water injection, a selective catalytic reduction system, and an oxidation catalyst. Also in the proposal is a 397 hp emergency-fired diesel ICE (3-0) powering a 250 kW generator.

RMR Modeling

1995 Ventura County Emission Factors for turbine natural gas combustion were used to speciate and quantify the emissions. The emissions also include 6.25 lb/hr and 50,005 lb/ year of ammonia from the SCR system. Pollutant dispersion was determined from ISCST3 using the stack parameters provided by the engineer and building downwash data supplied by the applicant. The closest receptor is a work site at 1126m. To calculate chronic and cancer risks, the maximum annual X/Q from the entire receptor grid was used because this maximum value occurs at ~2200m from the fence-line, which is beyond the given receptor. By coincidence, each device has its maximum annual X/Q at the same point on the receptor grid. To calculate acute risks, the largest 1-hr X/Q for the turbines at 1000m from the fence-line was used.

Device	Natural Gas Turbine 1-0	Natural Gas Turbine 2-0	Emergency Diesel ICE	Project Total
Acute Index	**0.02**	**0.02**	N/A	**0.04**
Chronic Index	**0.00**	**0.00**	N/A	**0.00**
Cancer Risk (per million)	**0.0**	**0.0**	**0.1**	**0.1**
TBACT Required?	**No**	**No**	**No**	

AAQA

For the Ambient Air Quality Analysis, the engineer supplied the emission rates for each criteria pollutant on an hourly and annual basis. Background concentrations for the pollutants were drawn from EPA data for Hanford (2000 data for NO_x, PM_{10}) and Fresno County (2000 data for CO, 1997 for SO_x). Pollutant dispersion was determined from ISCST3 using the stack parameters provided by the engineer and building downwash data supplied by the applicant.

The ozone-limiting method was used to determine the maximum 1-hour NO_2 concentration. The results from the AAQA are as follows:

AAQA*

	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	**Pass**	X	**Pass**	X	X
NO_x	**Pass*** **	X	X	X	**Pass**
SO_x	**Pass**	**Pass**	X	**Pass**	**Pass**
PM_{10}	X	X	X	**Pass****	**Pass****

* See the attached PSD spreadsheet for pollutant concentrations.
** The PM_{10} emissions for this project are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).
*** As determined by the Ozone-Limiting Method.
X = Not a designated averaging time for this pollutant.

Conclusion

The AAQA indicates that the emissions from the proposed equipment will not have an adverse impact on the State and National AAQS.

The acute and chronic indices are not above 1.0, and the cancer risk is not above 1.0 per million; therefore, in accordance with the District's RMR policy, **the project is approved for permitting without TBACT.**

RO Time: 8.0 hours

ATTACHMENT G

Interpollutant Offset Ratio Analysis

sierra research
1801 J Street
Sacramento, CA 95814
(916) 444-6666
Fax: (916) 444-8373

August 8, 2001

Memo To: Doug Wheeler
GWF Power Systems Company

From: David Deckman

Subject: Interpollutant Offset Ratio Analysis for GWF Henrietta Project

As you requested, attached is an analysis of the interpollutant offset ratio for using sulfur oxides (SOx) Emission Reduction Credits to offset emissions of respirable particulate matter (PM_{10}). GWF Energy LLC is proposing to use SOx ERCs, which were generated from the shutdown of a facility in Hanford, to offset PM_{10} from the proposed Henrietta Peaker Plant (HPP). The distance between the source of the ERCs and the proposed power plant project is 16.2 miles. Our analysis indicates that the appropriate interpollutant ratio is 1.4 to 1.0, and that the overall offset ratio, including the adjustment for distance between the proposed project and the source of the ERCs, would be 1.9 to 1.0. This analysis is consistent with those approved by the San Joaquin Valley Unified Air Pollution Control District for other projects.

Please be aware that Section 4.2.5.3 of SJVUAPCD Rule 2201 (New and Modified Stationary Source Review) allows the use of interpollutant offsets only if the project will not cause violations of the ambient air quality standards. Because ambient PM_{10} concentrations in the San Joaquin Valley currently exceed the state and federal standards, the SJVUAPCD is accepting a demonstration that the project would not cause PM_{10} ambient concentrations in excess of the significance criteria in Title 40 Code of Federal Regulations Part 51.165(b)(2). These thresholds are 5 micrograms per cubic meter ($\mu g/m^3$) and 1.0 $\mu g/m^3$ for the 24-hour and annual averaging periods, respectively. The air quality impact analysis and modeling will be prepared and submitted as part of the Application for Certification for this project.

If you have any questions regarding this analysis, please feel free to contact us.

attachment

INTERPOLLUTANT OFFSET RATIO ANALYSIS
FOR THE
GWF ENERGY LLC HENRIETTA PEAKER PLANT

GWF Energy LLC (GWF) proposes to use sulfur oxides (SOx) Emission Reduction Credits (ERCs) to offset emissions of respirable particulate matter (PM_{10}) from its proposed Henrietta Peaker Plant in Kings County, California. The SOx ERCs will supplement PM_{10} ERCs from Certificate No. C-366-4. GWF also owns SOx ERC Certificate Nos. N-414-5 and N-415-5. The two SOx ERC certificates were issued by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for emission reductions that were originally generated by the shutdown of a facility located at 525 West Third Street in Hanford, California. SJVUAPCD Rule 2201, Section 4.2.5.3 provides:

> *Interpollutant offsets may be approved by the APCO on a case-by-case basis, provided that the applicant demonstrates to the satisfaction of the APCO, in accordance with the provisions of Section 4.3.2 of this rule, that the emission increases from the new or modified source will not cause or contribute to a violation of an ambient air quality standard. In such cases, the APCO shall, based on an air quality analysis, impose offset ratios equal to or greater than the requirements, of this rule.*

GWF will provide a demonstration that the emission increases associated with the project will not cause or contribute to a violation of an ambient air quality standard. This analysis does not address those impacts.

This analysis provides a technical rationale for an appropriate SOx-to-PM_{10} interpollutant ratio, as well as the overall offset ratio to reflect the distance between the source providing the offsets and the proposed project.

Interpollutant Ratio

To develop an interpollutant offset ratio for SOx and PM_{10}, this analysis uses (1) a speciated linear rollback analysis using ambient monitoring data from Kings County, in which both the proposed GWF project and the ERC source are located; (2) emission inventory data in Kings County; and (3) the results of Chemical Mass Balance (CMB) modeling at a location in Kings County. The approach is based on a simple box model that ignores transport and deposition; assumes that the box is the size of Kings County; and assumes that the ambient pollutant concentrations in the box (Kings County) can be represented by the values reported for the South Irwin Street monitoring station in Hanford and the Patterson Avenue and Van Dorsten Avenue monitoring stations in Corcoran. These are the only monitoring stations in Kings County that have the data required for this analysis. The interpollutant ratio calculations described below are shown in Attachment 1.

The actual, annual average nitrate, sulfate, chloride, and total PM_{10} ambient air measurements were used to partially speciate the PM_{10}. The ambient monitoring data were reported by the Air Resources Board (ARB) for monitoring stations located on South Irwin Street in Hanford and on Patterson Avenue and Van Dorsten Avenue in Corcoran for 1997 and 1998, the most recent years for which the speciated PM_{10} were available. According to ARB staff, speciation of the PM_{10} samples was discontinued at these monitoring stations at the end of 1998.

The unspeciated balance of the PM_{10} (after subtracting the ammonium sulfate, ammonium nitrate, and ammonium chloride from total PM_{10}) is split between direct-combustion-related PM_{10} (fuel combustion and mobile sources) and other direct PM_{10} sources. The contribution from direct-combustion-related PM_{10} is based on Chemical Mass Balance (CMB) modeling performed for the District's PM_{10} Attainment Demonstration Plan. CMB modeling was conducted by the ARB for several locations within the San Joaquin Valley for annual average conditions in support of the District's attainment plan. Annual analyses were performed for locations in Bakersfield, Corcoran, Fresno, and Visalia. The nearest modeled site to the proposed GWF project is Corcoran. The CMB modeling evaluated the contribution of specific source categories. The "mobile" category represents the contribution from mobile and other combustion sources, such as those proposed for the GWF project. In this case, the CMB modeling for the Corcoran location found that the mobile category contributed 5.39 micrograms per cubic meter ($\mu g/m^3$) out of the total annual average PM_{10} concentration of 59 $\mu g/m^3$ for 1993. A table from the attainment plan showing these values is attached (see Attachment 2). Thus, the direct-combustion contribution was assumed to be 9.1 percent (i.e., 5.39/59).

Next, since direct PM_{10} emissions from combustion sources (gas turbines) are being offset, it was determined how many $\mu g/m^3$ of ambient PM_{10} are associated with 1 ton/year of direct combustion PM_{10} emissions by dividing the annual average direct-combustion PM_{10} concentration by the total annual PM_{10} emissions in Kings County. A similar calculation was performed for sulfur dioxide by dividing the annual average sulfate concentration by the annual SO_2 emissions in Kings County. The inventory data were obtained from the ARB website (http://www.arb.ca.gov/app/emsinv/emssumcat.php). The daily values from this inventory were multiplied by 365 to compute the annual values. Total PM_{10} and SOx inventories were calculated for the years considered in this analysis. Inventory data were available from the ARB website for 1996 and 1998, but not for 1997. The 1997 inventory was computed by interpolating between 1996 and 1997. The inventory data for Kings County are shown in Attachment 3. The ratio of the $\mu g/m^3$ per ton/year values indicates the number of tons of sulfur dioxide emissions that it takes to create the same number of $\mu g/m^3$ of PM_{10} that would be created by 1 ton/year of direct-combustion PM_{10} emissions. As shown in Attachment 1, this calculation results in interpollutant offset ratios of 1.17 to 1 and 1.64 to 1 for the two years evaluated, or an average of 1.4 to 1. The results were relatively consistent between the three monitoring stations for each year, and differ slightly between the two calendar years of data on which these analyses were based.

Offset Ratio

Rule 2201 does not indicate specifically how the interpollutant ratio (described above) and the distance ratio (pursuant to Section 4.2.4 of Rule 2201) should be applied. Leonard Scandura of the District's Southern Region office provided a description of how the District computes the overall offset ratio. The methodology provided by Mr. Scandura addresses sources of NOx offsets within 15 miles of the new source and more than 15 miles from the new source. Because the ERC source in this case is more than 15 miles from the GWF facility and is providing SOx ERCs, this description has been modified to address only this case. The methodology provided by Mr. Scandura is as follows (with revisions to reflect the distance relationship, transfer of SOx ERCs, and a 1.4 to 1 interpollutant offset ratio):

> *Rule 2201 includes provisions for including distance offset ratios and interpollutant offset ratios to determine the quantity of offsets required. These two offset ratios are applied independently to determine the quantity of offset required.*
>
> *The distance ratio specifies the excess amount of offsets required due to the distance between the increase in emissions and the location at which the emission reductions occurred. For example, if the distance offset ratio is 1.5:1, 100% of the fraction of the emission increase to be offset at this distance is required plus an additional 50% to account for the distance between the increase in emissions and the location of the emissions reductions.*
>
> *The interpollutant offset ratio specifies excess amount of offsets required when the emission increases and the offsets being provided are not the same pollutant. Specifically, the interpollutant offset ratio quantifies the relationship between the pollutant being emitted and the emission reductions being provided. In this case [the analysis described in this report], the interpollutant offset ratio is 1.4:1, i.e., 100% of the emission increase is required to be offset plus an additional 40% to account for the relationship between the pollutant being emitted and the emissions reduction.*
>
> *When both the distance and interpollutant offset ratios apply, the overall offset quantity required is equal to the sum of the amount being emitted and the excess amount(s) required due to the distance offset ratio plus the excess amount due to the interpollutant offset ratio. The computation of the resulting overall SOx for PM_{10} offset ratio is as follows:*
>
> *SOx req'd ton/year = PM_{10} ton/year + PM_{10} ton/year to be offset by SOx ERCs >15 miles away * 0.5 + PM_{10} ton/year to be offset by SOx reductions * 0.4*
>
> *SOx req'd ton/year =PM_{10} ton/year + PM_{10} ton/year (0.5) + PM_{10} ton/year (0.4)*
>
> *SOx req'd ton/year = PM_{10} ton/year (1 + 0.5 + 0.4)*

Thus, the combined distance and interpollutant ratio is:

$SOx/PM10 = 1 + 0.5 + 0.4$

Using this methodology, the overall distance and interpollutant offset ratio is as follows:

$SOx/PM_{10} = 1 + 0.5 + 0.4 = 1.9$

ATTACHMENT 1

INTERPOLLUTANT OFFSET RATIO CALCULATIONS

GWF - Henrietta Peaker Plant
PM10 Interpollutant Offset Ratio Analysis

07-Aug-01

1997 Annual Average Concentrations (AAM)

Station	Total PM10 ug/m3	PM10 Nitrate ug/m3	PM10 Sulfate ug/m3	PM10 Chloride ug/m3
Hanford - So Irwin St	46.5	5.42	1.79	0.046
Corcoran - Patterson	48.1	4.89	1.66	0.061
Corcoran - VanDorsten	44.8	5.24	1.62	0.052
Ion Form		NO3	SO4	Cl
Ion Molecular Weight		62.005	96.062	35.453
Combined Form		NH4NO3	(NH4)2SO4	NH4Cl
Combined Molecular Wt		80.043	132.139	53.492

Direct Combustion PM10 fraction of total ambient PM10 (source apportionment): 9.1%

Station	Total PM10 ug/m3	PM10 NH4NO3 ug/m3	PM10 (NH4)2SO4 ug/m3	PM10 NH4Cl ug/m3	PM10 Direct Combustion ug/m3	PM10 Other ug/m3
Hanford - So Irwin St	46.5	7.00	2.46	0.07	4.23	32.74
Corcoran - Patterson	48.1	6.31	2.28	0.09	4.38	35.03
Corcoran - VanDorsten	44.8	6.76	2.23	0.08	4.08	31.65

1997 Annual Emissions (tons/year) - Kings County

Total PM10	NOx	SOx	Combustion PM10	Other Direct PM10
13,291	9,769	529	588	12,704

		Hanford So Irwin St	Corcoran Patterson	Corcoran VanDorsten	Average
Direct Combustion PM10:					
	588 tons/yr =	4.23	4.38	4.08	
	1 ton/yr =	0.00720	0.00745	0.00694	
SO2 -> Sulfates:					
	529 tons/yr =	2.46	2.28	2.23	
	1 ton/yr =	0.00465	0.00431	0.00421	
SO2:PM10 ratio =		1.55	1.73	1.65	1.64

GWF - Henrietta Peaker Plant
PM10 Interpollutant Offset Ratio Analysis

07-Aug-01

1998 Annual Average Concentrations (AAM)

Station	Total PM10 ug/m3	PM10 Nitrate ug/m3	PM10 Sulfate ug/m3	PM10 Chloride ug/m3
Hanford - So Irwin St	38.9	3.33	2.00	0.028
Corcoran - Patterson	38.2	4.08	1.86	0.031
Corcoran - VanDorsten	29.0	1.30	1.74	0.027
Ion Form		NO3	SO4	Cl
Ion Molecular Weight		62.005	96.062	35.453
Combined Form		NH4NO3	(NH4)2SO4	NH4Cl
Combined Molecular Wt		80.043	132.139	53.492

Direct Combustion PM10 fraction of total ambient PM10 (source apportionment): 9.1%

Station	Total PM10 ug/m3	PM10 NH4NO3 ug/m3	PM10 (NH4)2SO4 ug/m3	PM10 NH4Cl ug/m3	PM10 Direct Combustion ug/m3	PM10 Other ug/m3
Hanford - So Irwin St	38.9	4.30	2.75	0.04	3.54	28.27
Corcoran - Patterson	38.2	5.27	2.56	0.05	3.48	26.85
Corcoran - VanDorsten	29.0	1.68	2.39	0.04	2.64	22.25

1998 Annual Emissions (tons/year) - Kings County

Total PM10	NOx	SOx	Combustion PM10	Other Direct PM10
13,363	9,815	533	569	12,793

		Hanford So Irwin St	Corcoran Patterson	Corcoran VanDorsten	Average
Direct Combustion PM10:					
	569 tons/yr =	3.54	3.48	2.64	
	1 ton/yr =	0.00622	0.00611	0.00463	
SO2 -> Sulfates:					
	533 tons/yr =	2.75	2.56	2.39	
	1 ton/yr =	0.00516	0.00480	0.004491	
SO2:PM10 ratio =		1.20	1.27	1.03	1.17

ATTACHMENT 2

CMB MODELING RESULTS FOR CORCORAN

CORCORAN	TOTAL	Geologic	Construction	Mobile	Organic Carbon	Vegetative Burning	Ammonium Nitrate	Associated Water	Ammonium Sulfate	Unassigned	Marine
CMB Annual	59.00	32.44	0.35	5.39	0.00	0.70	7.41	2.00	2.32	8.09	0.30
CMB Percents		54.98%	0.59%	9.13%	0.00%	1.19%	12.56%	3.39%	3.93%	13.71%	0.52%
Adjusted Concentrations	52.00	28.59	0.31	4.75	0.00	0.62	6.53	1.76	2.04	7.13	0.27
Natural Background %		5%	0%	0%	0%	0%	0%	0%	0%	10%	100%
Natural Background Value	2.41	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.27
Local Contribution (Adjusted Concentration - Background)	49.59	27.16	0.31	4.75	0.00	0.62	6.53	1.76	2.04	6.42	0.00
Ammonia Emission Estimate (%)							15%				
Ammonia Emission Estimate (ug/m3)	0.98						0.98				
Local Contribution (Without Ammonia)	48.61	27.16	0.31	4.75	0.00	0.62	5.55	1.76	2.04	6.42	0.00
Base Year 1993 Emission Inventory PM10	457.80	378.22	18.45	16.54		36.82				457.80	
ROG	538.87				538.87						
NOx	578.14						578.14	578.14			
SOx	34.88								34.88		
Future Year Emission Inventory 2001 PM	435.27	340.93	14.80	9.98		56.05				435.27	
ROG	387.58				387.58						
NOx	456.87						456.87	456.87			
SOx	33.70								33.70		
Ef/Eb Ratio for Local Rollback Projection	0.81	0.90	0.80	0.60	0.72	1.52	0.79	0.79	0.97	0.95	1.00
Projected Local	42.39	24.48	0.25	2.86	0.00	0.94	4.39	1.39	1.97	6.10	0.00
Natural Background	2.41	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.27
Ammonia Emission Estimate	0.98						0.98				
2001 Projected Annual (Result)	45.78	25.91	0.25	2.86	0.00	0.94	5.37	1.39	1.97	6.81	0.27
Future Year Emission Inventory 2006 PM	446.21	346.57	16.26	9.71		58.28				446.21	
ROG	328.21				328.21						
NOx	402.95						402.95	402.95			
SOx	35.15								35.15		
Ef/Eb Ratio for Local Rollback Projection	0.75	0.92	0.88	0.59	0.61	1.58	0.70	0.70	1.01	0.97	1.00
Projected Local	42.48	25.03	0.27	2.79	0.00	0.98	3.87	1.23	2.06	6.25	0.00
Natural Background	2.41	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.27
Ammonia Emission Estimate	0.98						0.98				
2006 Projected Annual (Result)	45.87	26.46	0.27	2.79	0.00	0.98	4.85	1.23	2.06	6.97	0.27

ATTACHMENT 3

EMISSIONS INVENTORY
FOR
KINGS COUNTY

1997 EMISSION INVENTORY FOR KINGS COUNTY

CATEGORY	SUBCATEGORY	EMISSIONS (TONS PER DAY) TOG	ROG	CO	NOX	SOX	PM	PM10
FUEL COMBUSTION	ELECTRIC UTILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL COMBUSTION	COGENERATION	0.02	0.00	0.07	0.08	0.19	0.02	0.01
FUEL COMBUSTION	OIL AND GAS PRODUCTION (COMBUSTION)	0.21	0.02	0.08	0.54	0.01	0.01	0.01
FUEL COMBUSTION	PETROLEUM REFINING (COMBUSTION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL COMBUSTION	MANUFACTURING AND INDUSTRIAL	0.04	0.01	0.63	5.24	0.22	0.11	0.09
FUEL COMBUSTION	FOOD AND AGRICULTURAL PROCESSING	0.21	0.18	1.11	3.68	0.33	0.39	0.37
FUEL COMBUSTION	SERVICE AND COMMERCIAL	0.03	0.02	0.30	1.32	0.03	0.04	0.04
FUEL COMBUSTION	OTHER (FUEL COMBUSTION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	SEWAGE TREATMENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	LANDFILLS	0.03	0.02	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	INCINERATORS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	SOIL REMEDIATION	0.02	0.01	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	OTHER (WASTE DISPOSAL)	2.18	1.06	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	LAUNDERING	0.02	0.00	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	DEGREASING	0.31	0.28	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	COATINGS AND RELATED PROCESS SOLVENTS	0.42	0.39	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	PRINTING	0.03	0.03	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	ADHESIVES AND SEALANTS	0.06	0.05	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	OTHER (CLEANING AND SURFACE COATINGS)	0.02	0.00	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	OIL AND GAS PRODUCTION	0.73	0.41	0.00	0.01	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	PETROLEUM REFINING	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	PETROLEUM MARKETING	0.18	0.17	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	CHEMICAL	0.15	0.13	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	FOOD AND AGRICULTURE	1.24	0.75	0.00	0.00	0.00	1.78	0.98
INDUSTRIAL PROCESSES	MINERAL PROCESSES	0.00	0.00	0.00	0.00	0.00	0.13	0.08
INDUSTRIAL PROCESSES	METAL PROCESSES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	WOOD AND PAPER	0.00	0.00	0.00	0.00	0.00	0.01	0.01
INDUSTRIAL PROCESSES	GLASS AND RELATED PRODUCTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	ELECTRONICS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	OTHER (INDUSTRIAL PROCESSES)	0.00	0.00	0.00	0.00	0.00	0.01	0.01
SOLVENT EVAPORATION	CONSUMER PRODUCTS	1.20	0.99	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.44	0.42	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	PESTICIDES/FERTILIZERS	2.65	2.65	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	ASPHALT PAVING / ROOFING	0.08	0.07	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	REFRIGERANTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	OTHER (SOLVENT EVAPORATION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS PROCESSES	RESIDENTIAL FUEL COMBUSTION	0.31	0.13	1.77	0.09	0.00	0.30	0.28
MISCELLANEOUS PROCESSES	FARMING OPERATIONS	93.93	7.51	0.00	0.00	0.00	27.84	12.66
MISCELLANEOUS PROCESSES	CONSTRUCTION AND DEMOLITION	0.00	0.00	0.00	0.00	0.00	1.80	0.88
MISCELLANEOUS PROCESSES	PAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00	4.18	1.91
MISCELLANEOUS PROCESSES	UNPAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00	12.90	7.67
MISCELLANEOUS PROCESSES	FUGITIVE WINDBLOWN DUST	0.00	0.00	0.00	0.00	0.00	17.37	7.91
MISCELLANEOUS PROCESSES	FIRES	0.01	0.00	0.05	0.00	0.00	0.01	0.01
MISCELLANEOUS PROCESSES	WASTE BURNING AND DISPOSAL	2.94	1.68	18.64	0.18	0.00	2.70	2.65
MISCELLANEOUS PROCESSES	UTILITY EQUIPMENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS PROCESSES	COOKING	0.02	0.02	0.00	0.00	0.00	0.07	0.05

1997 EMISSION INVENTORY FOR KINGS COUNTY

CATEGORY	SUBCATEGORY	EMISSIONS (TONS PER DAY) TOG	ROG	CO	NOX	SOX	PM	PM10
MISCELLANEOUS PROCESSES	OTHER (MISCELLANEOUS PROCESSES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT DUTY PASSENGER (LDA)	3.93	3.58	30.85	2.47	0.03	0.08	0.08
ON-ROAD MOTOR VEHICLES	LIGHT AND MEDIUM DUTY TRUCKS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 1 (LDT1)	1.31	1.20	12.95	0.92	0.01	0.02	0.02
ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 2 (LDT2)	0.95	0.85	9.90	1.22	0.01	0.05	0.05
ON-ROAD MOTOR VEHICLES	MEDIUM DUTY TRUCKS (MDV)	0.99	0.90	10.39	0.91	0.01	0.03	0.03
ON-ROAD MOTOR VEHICLES	HEAVY DUTY GAS TRUCKS (ALL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.61	0.56	9.41	0.40	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.03	0.02	0.30	0.05	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.45	0.41	7.86	0.25	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.21	0.19	3.86	0.09	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY DIESEL TRUCKS (ALL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.00	0.00	0.01	0.03	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.00	0.00	0.01	0.06	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.04	0.03	0.23	0.65	0.02	0.03	0.03
ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.30	0.26	1.27	2.49	0.08	0.13	0.13
ON-ROAD MOTOR VEHICLES	MOTORCYCLES (MCY)	0.11	0.10	0.42	0.02	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY DIESEL URBAN BUSES (UB)	0.01	0.01	0.03	0.11	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY GAS URBAN BUSES (UB)	0.00	0.00	0.10	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	SCHOOL BUSES (SB)	0.03	0.02	0.57	0.10	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MOTOR HOMES (MH)	0.03	0.03	0.48	0.07	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	OTHER (ON-ROAD MOTOR VEHICLES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	AIRCRAFT	3.84	3.42	7.88	0.96	0.00	0.21	0.21
OTHER MOBILE SOURCES	TRAINS	0.01	0.01	0.03	0.24	0.00	0.00	0.00
OTHER MOBILE SOURCES	SHIPS AND COMMERCIAL BOATS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	RECREATIONAL BOATS	0.05	0.05	0.16	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	OFF-ROAD RECREATIONAL VEHICLES	0.12	0.11	0.71	0.01	0.00	0.00	0.00
OTHER MOBILE SOURCES	OFF-ROAD EQUIPMENT	0.36	0.31	3.36	0.90	0.09	0.06	0.06
OTHER MOBILE SOURCES	FARM EQUIPMENT	0.56	0.50	3.32	3.74	0.44	0.24	0.24
OTHER MOBILE SOURCES	FUEL STORAGE AND HANDLING	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	OTHER (OTHER MOBILE SOURCES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	GEOGENIC SOURCES	0.01	0.01	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	WILDFIRES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	WINDBLOWN DUST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	OTHER (NATURAL SOURCES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALL SOURCES		121.33	29.49	126.67	26.77	1.45	70.47	36.42

PM10 - FUEL COMBUSTION	0.78
PM10 - MOBILE SOURCES	0.83
PM10 - ALL SOURCES	36.42

1998 EMISSION INVENTORY FOR KINGS COUNTY

CATEGORY	SUBCATEGORY	EMISSIONS (TONS PER DAY) TOG	ROG	CO	NOX	SOX	PM	PM10
FUEL COMBUSTION	ELECTRIC UTILITIES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL COMBUSTION	COGENERATION	0.02	0.00	0.06	0.07	0.19	0.02	0.01
FUEL COMBUSTION	OIL AND GAS PRODUCTION (COMBUSTION)	0.24	0.02	0.09	0.63	0.01	0.01	0.01
FUEL COMBUSTION	PETROLEUM REFINING (COMBUSTION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FUEL COMBUSTION	MANUFACTURING AND INDUSTRIAL	0.03	0.02	0.64	5.38	0.22	0.10	0.06
FUEL COMBUSTION	FOOD AND AGRICULTURAL PROCESSING	0.21	0.18	1.08	3.67	0.33	0.39	0.36
FUEL COMBUSTION	SERVICE AND COMMERCIAL	0.02	0.02	0.42	1.72	0.03	0.03	0.03
FUEL COMBUSTION	OTHER (FUEL COMBUSTION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	SEWAGE TREATMENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	LANDFILLS	0.06	0.04	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	INCINERATORS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	SOIL REMEDIATION	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WASTE DISPOSAL	OTHER (WASTE DISPOSAL)	2.11	1.01	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	LAUNDERING	0.02	0.00	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	DEGREASING	0.32	0.29	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	COATINGS AND RELATED PROCESS SOLVENTS	0.38	0.36	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	PRINTING	0.03	0.03	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	ADHESIVES AND SEALANTS	0.05	0.04	0.00	0.00	0.00	0.00	0.00
CLEANING AND SURFACE COATINGS	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	OIL AND GAS PRODUCTION	0.71	0.40	0.00	0.01	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	PETROLEUM REFINING	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	PETROLEUM MARKETING	0.17	0.17	0.00	0.00	0.00	0.00	0.00
PETROLEUM PRODUCTION AND MARKETING	OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	CHEMICAL	0.14	0.12	0.00	0.00	0.00	1.76	1.01
INDUSTRIAL PROCESSES	FOOD AND AGRICULTURE	1.16	0.94	0.00	0.00	0.00	0.13	0.09
INDUSTRIAL PROCESSES	MINERAL PROCESSES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	METAL PROCESSES	0.00	0.00	0.00	0.00	0.00	0.01	0.01
INDUSTRIAL PROCESSES	WOOD AND PAPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	GLASS AND RELATED PRODUCTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	ELECTRONICS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INDUSTRIAL PROCESSES	OTHER (INDUSTRIAL PROCESSES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	CONSUMER PRODUCTS	1.19	1.00	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.45	0.43	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	PESTICIDES/FERTILIZERS	2.20	2.20	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	ASPHALT PAVING / ROOFING	0.08	0.07	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	REFRIGERANTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLVENT EVAPORATION	OTHER (SOLVENT EVAPORATION)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS PROCESSES	RESIDENTIAL FUEL COMBUSTION	0.31	0.13	1.75	0.09	0.00	0.29	0.27
MISCELLANEOUS PROCESSES	FARMING OPERATIONS	93.93	7.51	0.00	0.00	0.00	27.84	12.66
MISCELLANEOUS PROCESSES	CONSTRUCTION AND DEMOLITION	0.00	0.00	0.00	0.00	0.00	1.85	0.91
MISCELLANEOUS PROCESSES	PAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00	4.26	1.95
MISCELLANEOUS PROCESSES	UNPAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00	12.85	7.64
MISCELLANEOUS PROCESSES	FUGITIVE WINDBLOWN DUST	0.00	0.00	0.00	0.00	0.00	17.37	7.91
MISCELLANEOUS PROCESSES	FIRES	0.01	0.00	0.05	0.00	0.00	0.01	0.01
MISCELLANEOUS PROCESSES	WASTE BURNING AND DISPOSAL	3.09	1.76	19.67	0.18	0.00	2.86	2.81
MISCELLANEOUS PROCESSES	UTILITY EQUIPMENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MISCELLANEOUS PROCESSES	COOKING	0.02	0.02	0.00	0.00	0.00	0.07	0.05

1998 EMISSION INVENTORY FOR KINGS COUNTY

CATEGORY	SUBCATEGORY	EMISSIONS (TONS PER DAY) TOG	ROG	CO	NOX	SOX	PM	PM10
MISCELLANEOUS PROCESSES	OTHER (MISCELLANEOUS PROCESSES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT DUTY PASSENGER (LDA)	3.71	3.37	29.09	2.37	0.03	0.08	0.08
ON-ROAD MOTOR VEHICLES	LIGHT AND MEDIUM DUTY TRUCKS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 1 (LDT1)	1.25	1.14	12.30	0.88	0.01	0.02	0.02
ON-ROAD MOTOR VEHICLES	LIGHT DUTY TRUCKS - 2 (LDT2)	0.94	0.83	9.56	1.22	0.01	0.05	0.05
ON-ROAD MOTOR VEHICLES	MEDIUM DUTY TRUCKS (MDV)	0.97	0.87	9.98	0.92	0.01	0.03	0.03
ON-ROAD MOTOR VEHICLES	HEAVY DUTY GAS TRUCKS (ALL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.55	0.50	8.39	0.38	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.02	0.02	0.27	0.04	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.40	0.36	7.02	0.23	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.18	0.16	3.31	0.08	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY DIESEL TRUCKS (ALL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.00	0.00	0.01	0.03	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.00	0.00	0.01	0.06	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.04	0.03	0.22	0.62	0.02	0.03	0.03
ON-ROAD MOTOR VEHICLES	HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.26	0.23	1.11	2.25	0.07	0.11	0.11
ON-ROAD MOTOR VEHICLES	MOTORCYCLES (MCY)	0.08	0.08	0.34	0.01	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY DIESEL URBAN BUSES (UB)	0.01	0.01	0.03	0.11	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	HEAVY DUTY GAS URBAN BUSES (UB)	0.00	0.00	0.10	0.00	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	SCHOOL BUSES (SB)	0.02	0.02	0.50	0.10	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	MOTOR HOMES (MH)	0.03	0.02	0.46	0.06	0.00	0.00	0.00
ON-ROAD MOTOR VEHICLES	OTHER (ON-ROAD MOTOR VEHICLES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	AIRCRAFT	3.84	3.42	7.88	0.96	0.00	0.21	0.21
OTHER MOBILE SOURCES	TRAINS	0.01	0.01	0.03	0.23	0.00	0.00	0.00
OTHER MOBILE SOURCES	SHIPS AND COMMERCIAL BOATS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	RECREATIONAL BOATS	0.05	0.05	0.16	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	OFF-ROAD RECREATIONAL VEHICLES	0.12	0.11	0.68	0.01	0.00	0.00	0.00
OTHER MOBILE SOURCES	OFF-ROAD EQUIPMENT	0.35	0.30	3.34	0.90	0.09	0.06	0.06
OTHER MOBILE SOURCES	FARM EQUIPMENT	0.55	0.49	3.28	3.68	0.44	0.23	0.23
OTHER MOBILE SOURCES	FUEL STORAGE AND HANDLING	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER MOBILE SOURCES	OTHER (OTHER MOBILE SOURCES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	GEOGENIC SOURCES	0.01	0.01	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	WILDFIRES	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	WINDBLOWN DUST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NATURAL SOURCES	OTHER (NATURAL SOURCES)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALL SOURCES		120.34	28.79	121.83	26.89	1.46	70.67	36.61

PM10 - FUEL COMBUSTION	0.74
PM10 - MOBILE SOURCES	0.82
PM10 - ALL SOURCES	36.61

Attachment 2.1-7

Revised Condition of Certification AQ-C3

Directions: Replace existing condition of certification AQ-C3 in Appendix K5 with the following:

AQ-C3 Construction equipment rated greater than 100 brake horsepower output shall have diesel exhaust controlled by use of a catalyzed diesel particulate filters.

Attachment 2.1-8

E-Mail from SJVAPCD Regarding

Cumulative Impact Sources

Dave Warner
<dave.warner@valleyair.org>
09/14/01 09:54 AM

To: "'Vicki_Hoffman@urscorp.com'" <Vicki_Hoffman@urscorp.com>
cc:
Subject: RE:

Vicki, there are no significant sources of NOx, CO, or PM-10 that are permitted and not yet operational, nor are there any significant sources of NOx, CO, or PM-10 proposed but not yet permitted, within a 6 mile radius of GWF's Henrietta project.

We used your 5-ton level as the significance level.

Let me know if you need further information.

-----Original Message-----
From: Vicki_Hoffman@urscorp.com
[SMTP:Vicki_Hoffman@urscorp.com]
Sent: Thursday, September 13, 2001 2:35 PM
To: Dave.Warner@valleyair.org
Subject:

Dave,

I just wanted to send you a quick email regarding the request
that
we made
for new and pending sources within a six-mile radius of the
proposed
Henrietta Peaker Project. The identified sources will be used to
analyze
cumulative air quality impacts within the project vicinity.
Source
identification are as summarized below.

Sources within 6 miles of the proposed project (see Figure
8.8-1
of
Application for Certification);
Sources which have been permitted, but are not yet
operational;
Sources which have submitted applications where permits are
pending;
Sources emitting only VOCs do not need to be included; and
Sources with criteria emission (except VOCs) with annual
emission
greater than 5 TPY.

I appreciate your assistance.

Vicki Hoffman

Senior Environmental Scientist
URS Corporation

Alternatives

Technical Staff: Bob Eller
Technical Senior: Paul Richins
Project Manager: Bob Eller

2.2 Alternatives

Siting Regulations and Information

Appendix B (b) (1) (D): A description of how the site and related facilities were selected and the consideration given to engineering constraints, site geology, environmental impacts, water, waste and fuel constraints, electric transmission constraints, and any other factors considered by the applicant.

Information Required to Make AFC Conform with Regulations

Please describe the consideration given to engineering constraints, site geology, environmental impacts, water, waste and fuel constraints.

RESPONSE 8

A number of constraints were considered in selecting the project site and facilities. These are summarized below:

Engineering Constraints

- Site must interconnect with a major substation on North Path 15 that has adequate capacity
- Site must be configured such that it can be developed on a fast-track schedule that conforms with GWF's existing power purchase agreement with the California Department of Water Resources
- Site must minimize the need for project linears (gas, water, electrical interconnection)
- Site must have adequate size (approximately 7 acres) to accommodate the plant equipment
- Site must be located in Kings County, where GWF has an existing operating facility
- Equipment must conform with SJVAPCD BACT requirements and be classified as a minor source under federal PSD regulations
- Site land use designation must be consistent with a power plant

Site Geology

- Site must be relatively flat to minimize the need for extensive grading
- Site must capable of avoiding or mitigating any potentially significant geological hazards

Environmental Impacts

- Site must be located in SJVAPCD jurisdiction, where GWF owns existing emission reduction credits
- Site configuration must avoid or mitigate any potentially significant environmental impacts

Water

- Site must be in close proximity to a viable, economic source of water
- Water supply must be sufficient to meet the needs of the project
- Any wastewater discharge should be configured to streamline or eliminate any required permits

Waste

- Plant should minimize the generation of waste

Fuel

- Site must use natural gas as the primary fuel
- Natural gas supply must be in close proximity to the site
- Natural gas supply must be of sufficient quantity to meet the needs of the project

Siting Regulations and Information

Appendix B (f) (1): A discussion of the range of reasonable alternatives to the project, or to the location of the project, including the no project alternative, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and an evaluation of the comparative merits of the alternatives. In accordance with Public Resources Code section 25540.6(b), a discussion of the applicant's site selection criteria, any alternative sites considered for the project, and the reasons why the applicant chose the proposed site.

Information Required to Make AFC Conform with Regulations

Please provide a discussion of the range of reasonable alternatives that lessen or avoid the identified environmental impacts of the project.

RESPONSE 9

New Table 5-1 provides a comparative summary of the engineering and economic merits of each alternative site. New Table 5-2 provides a comparative summary of the environmental merits of each alternative site.

Siting Regulations and Information

Appendix B (f) (2): An evaluation of the comparative engineering, economic, and environmental merits of the alternatives discussed in subsection (f)(1).

Information Required to Make AFC Conform with Regulations

Please evaluate the comparative engineering, economic, and environmental merits of the alternatives.

RESPONSE 10

See Response 9.

New Tables for

Section 5.0 (Alternatives)

Table 5-1
Overall Comparative Analysis of Engineering Constraints

Project Site	Electric Transmission	Natural gas	Water	Transportation	Parcel Size/Location	Relative Cost of Construction	Environmental
Henrietta Peaker Project Preferred Site (Olivera 1)	550 foot interconnection	2.2 mile pipeline required to adequate supply interconnection	Virtual onsite connection (16 feet) to existing water supply line with sufficient capacity	Easy access to site	20 acres – more than adequate, provides room for future expansion; Kings County location	Total cost of project minimized primarily by reduced project linear features	No significant impacts with mitigation – See Table 5-2
Olivera 2	2 mile interconnection	2 mile pipeline required to adequate supply interconnection	2 mile connection to existing water supply line with sufficient capacity	Easy access to site	20 acres – more than adequate, provides room for future expansion; Kings County location	Cost higher relative to Olivera 1 primarily because of additional 4 miles of linears	Greater potential impacts than Olivera 1 in areas of biological, cultural and paleontologic resources and air quality due to construction of additional 4 miles of linears – See Table 5-2
Hanford Energy Park Peaker	15 mile interconnection	13 mile pipeline required to adequate supply interconnection	Onsite groundwater well with sufficient capacity	Easy access to site	7 acres – barely adequate, no room for expansion; Kings County location	Cost substantially higher than either Olivera 1 or 2 primarily because of additional 26 miles of linears	Greater potential impacts than Olivera 1 or 2 in areas of biological, cultural and paleontologic resources and air quality due to construction of additional 26 miles of linears – See Table 5-2

Table 5-2
Comparative Summary of Key Environmental Impact Areas

Project Site	Biological Resources	Cultural and Paleontologic Resources	Geological Hazards	Agriculture and Soils	Land Use	Air Quality	Water Resources	Waste
Henrietta Peaker Project Preferred Site (Olivera 1)	2.3 miles of linear components – mitigated to insignificance with funds for compensation acreage	2.3 miles of linear components – mitigated to insignificance by avoidance of any potentially significant resources	Site characteristics suitable for construction – no significant geologic hazards that can not be mitigated through engineering design	20 acre parcel currently in agricultural production – would convert approximately 7 acres to industrial use	Zoned AX – power plant is a conforming and compatible use; Land under Williamson Act contract	Project is a minor source under PSD; 2.3 miles of linears minimizes construction-related emissions	Virtual onsite water connection to adequate water supply; near-zero wastewater discharge design to minimize wastewater impacts	No significant generation of hazardous or nonhazardous waste; Phase I site assessment shows no significant contamination expected
Olivera 2	4.3 miles of linear components – increased biological resources impacts, greater compensation acreage required	4.3 miles of linear components – increased potential for disturbance of cultural and paleontologic resources	Site characteristics suitable for construction – no significant geologic hazards that can not be mitigated through engineering design	20 acre parcel currently in agricultural production – would convert approximately 7 acres to industrial use	Zoned AX – power plant is a conforming and compatible use; Land under Williamson Act contract	Project is a minor source under PSD; Greater construction emissions associated with construction of 4.3 miles of linears	2 mile water connection to adequate water supply; near-zero wastewater discharge design to minimize wastewater impacts	No significant generation of hazardous or nonhazardous waste; No Phase I site assessment available – expected results similar to Oliver 1
Hanford Energy Park Peaker	17.2 miles of linear components – significantly greater potential impacts to biological resources, significantly greater compensation acreage required	17.2 miles of linear components – significantly increased potential for disturbance of cultural and paleontologic resources	Site characteristics suitable for construction – no significant geologic hazards that can not be mitigated through engineering design	7 acres remaining on parcel that is currently undeveloped land.	Zoned Industrial - power plant is a conforming and compatible use; No Williamson Act contract	Project is a major source subject to PSD review – could significantly lengthen permitting; Greater construction emissions associated with construction of 17.2 miles of linears	Onsite groundwater well with sufficient capacity; existing wastewater discharge to City of Hanford POTW available	No significant generation of hazardous or nonhazardous waste; Phase I site assessment shows no significant contamination expected

Biological Resources

Technical Staff: Tom Scofield, Natasha Nelson
Technical Senior: Jim Brownell
Project Manager: Bob Eller

2.3 Biological Resources

Siting Regulations and Information

Appendix B (g) (13) (A): A regional overview and discussion of biological resources, with particular attention to sensitive biological resources near the project, and a map at a scale of 1:100,000 (or some other suitable scale) showing their location in relation to the project.

Information Required to Make AFC Conform with Regulations

On a regional scale, provide a general description of the biological resources, especially sensitive species.

RESPONSE 11

Attachment 2.3-1 provides a revised version of Section 8.2.1.1 (Regional Setting) from the AFC. The revised Section 8.2.1.1 presents a general description of the biological resources in the vicinity of the HPP and specific information about sensitive species in this area.

Attachment 2.3-2 provides a regional-scale description of the potential sensitive biological resources in the vicinity of the HPP.

Attachment 2.3-3 contains the revised Section 8.2.1.3 (Wildlife) from the AFC. The "Biologically Sensitive Areas" portion of Section 8.2.1.3 has been revised to incorporate a discussion of the wastewater treatment pond area at Naval Air Station (NAS) Lemoore.

Attachment 2.3-4 provides a revised Table 8.2-1 (Special Status Species with Potential to Occur in the Vicinity of the HPP Site) from the AFC. Three species have been added to the table. Among the species of animals supported by the NAS Lemoore treatment pond area are several federally listed birds. A list of these birds has been requested and will be supplied during discovery.

Siting Regulations and Information

Appendix B (g) (13) (B): A discussion and detailed maps at a scale of 1:6,000, of the biological resources at the site of the proposed project and related facilities, and in areas adjacent to them, out to a mile from the site and 1000 feet from the outer edge of linear facility corridors. Include a list of the species actually observed and those with a potential to occur. The discussion and maps shall address the distribution of community types, denning or nesting sites, population concentrations, migration corridors, breeding habitats, and the presence of sensitive biological resources.

Information Required to Make AFC Conform with Regulations

Please provide a 1:6,000 scale map of the HPP and its surrounding areas that shows the location of sensitive species (e.g., blunt-nosed leopard lizard and San Joaquin kit fox) and/or their habitat.

RESPONSE 12

No sensitive species were identified within the survey area. Attachment 2.3-5 is a 1:6,000 scale map of the HPP site and its surrounding areas. Because no sensitive species were identified within the survey area, this map does not show the location of any sensitive species or habitat. Attachment 2.3-6 contains the revised Section 8.2.2.1 (Survey Methodology) from the AFC. The revised portion of this section describes the procedures that would have been followed if sensitive species had been encountered during the biological survey described in the AFC.

Siting Regulations and Information

Appendix B (g) (13) (C): A description of all studies and surveys used to provide biological information about the project site, including seasonal surveys and copies of the California Department of Fish and Game's Natural Diversity Data Base Survey Forms, "California Native Plant Species Field Survey Forms", and "California Natural Community Field Survey Forms", completed by the applicant. Include the dates and duration of the studies, methods used to complete the studies, and the names and qualifications of individuals conducting the studies.

Information Required to Make AFC Conform with Regulations

Provide the qualifications (resume) for Christine O'Rourke. Provide the CNDDB database forms.

RESPONSE 13

The resume of Christine O'Rourke is provided in Attachment 2.3-7. Attachment 2.3-8 provides the California Natural Diversity Data Base (CNDDB) forms for the following quads: Burrel, Guernsey, Hanford, Laton, Lemoore, Riverdale, Stratford, and Vanguard.

Siting Regulations and Information

Appendix B (g) (13) (E) (iii): Any educational programs proposed to enhance employee awareness in order to protect biological resources.

Information Required to Make AFC Conform with Regulations

The applicant has provided some language in the Draft BRMIMP that states field personnel will be regularly communicated with in order to meet the terms of the BRMIMP. The applicant needs to specify if an employee awareness program will be developed to protect biological resources.

RESPONSE 14

A description of the Sensitive Species Awareness Training Program is provided as Attachment 2.3-9.

SB 28 Sher Requirements and Information

§25552(e)(3) (All): [r]esult in compliance with all applicable federal, state, and local laws, ordinances, and standards;

Information Required to Make AFC Conform with Regulations

The applicant has assumed that the project qualifies to be permitted under the existing Kern Water Bank Habitat Conservation Plan (KWBHCP). Although the Kern Water Bank Authority's Master Permit will allow the incidental take of listed species by third persons for projects with minor impacts, the coverage is limited to specific areas, the closest of which is Kettleman Hills, Kings County. In addition, third party permitting requires prior approval of the USFWS. For staff to have assurance that the application could be permitted for incidental take, provide a letter from USFWS stating their approval of Henrietta Peaker Project to gain permit coverage under this plan. If incidental take cannot be permitted by Kern Water Bank Authority, then provide a letter from USFWS which states an application for a Section 7 or Section 10(a) permit has been accepted as complete. The application must request a "no effect" or "may affect, not likely to adversely affect" for all listed species (Note: only informal consultations can be completed within a 4-month process). Include the name and phone number of any agency contacts, the cover letter sent to the USFWS, and a copy of the Biological Assessment.

RESPONSE 15

A letter from the USFWS indicating that the HPP may participate in the KWBHCP is included in Attachment 2.3-10. This participation will provide the HPP with coverage under the Kern Water Bank Authority's Master Permit and a separate Section 7 or Section 10a process will not be required. The USFWS contact for the Henrietta project is Brian Peterson (916-414-6655).

Attachment 2.3-1

Revised Section 8.2.1.1 (Regional Setting) from AFC

Attachment 2.3-1

Revised Section 8.2.1.1 (Regional Setting) from AFC

8.2.1.1 Regional Setting

The HPP site is located in California in the central San Joaquin Valley, one mile south of Naval Air Station (NAS) Lemoore (Figure 8.2-1) in an agricultural area in northern Kings County. The San Joaquin Valley comprises roughly the southern two-thirds of the major north-northwest-oriented structural trough and is sometimes referred to as the Central Valley. The Central Valley is located between the Sierra Nevada Mountains on the east and the Coast Ranges on the west. The general project area is bounded on the west by the ridges that constitute the Diablo Range and on the east by the flood plain of the San Joaquin River.

The general project region has a Mediterranean climate, with hot, dry summers and cool, moist winters. Summer high temperatures often exceed 100 degrees Fahrenheit (ºF), with an average of 110 days per year over 90ºF. Winter temperatures in the San Joaquin Valley are mild, with an average of 16 days per year with frost (Twisselmann, 1967). Rainfall in the Central Valley averages 7 to 8 inches per year. Winter fog, called "tule fog," sometimes forms during the months of November, December, and January, supplementing the annual precipitation. On average, approximately 90 percent of the rainfall occurs between November 1 and April 1 (Twisselmann, 1967). The region periodically experiences drought cycles, the most recent of which occurred during the mid and late 1980s.

Habitats of this region include vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, orchards, and oak savannah. The site lies approximately 2 miles west of a riparian corridor, likely a tributary to Kings River. The growth of agriculture in the Central Valley has converted much of the historical native grassland, woodland, and wetland to farmland. The region supports a mosaic of pastures, dairies, alfalfa fields, hay, row crops, orchards, annual grasslands, and landscape tree communities. Principal land uses in the region are row and field crops, pastures, and vineyards. These land uses remain prevalent in the county even though housing and industrial land uses are becoming more common.

The project site and surrounding properties are currently used for growing cotton. Cotton is cultivated on approximately 90 to 95 percent of the site. The site has been previously used for harvesting cotton for at least 30 years. Before that time, the site was not developed or utilized. Much of the surrounding land is also used for agricultural purposes. The land uses within a one-mile radius of the HPP site are agricultural with the following exceptions: the PG&E Henrietta electrical substation (immediately to the north of the HPP site), the closed New Star agricultural shipping facility (south of the site), and the NAS Lemoore wastewater treatment pond area (northeast of the site).

Biological surveys on the project site and surrounding buffer areas were conducted by a wildlife biologist and a botanist. The project site is on intensive agricultural land and has no habitat features that would be of value to any sensitive species. There is no sensitive wildlife or plant resources at the site. Had any potential or known dens, burrows, or evidence of sensitive species been found, they would have been marked in the field with flags and mapped on a site map.

The wildlife species that use the agricultural habitat on the project site tend to occur across all habitat types rather than only a single habitat. Wildlife species that would use the patchwork of changing crops and ruderal vegetation, including the HPP site, are described in Section 8.2.1.3 (see Attachment 2.3-3 in this Supplement). These species are likely to occur widely and be relatively common because the habitat is highly disturbed.

Attachment 2.3-2

Sensitive Biological

Resource Species Accounts

Attachment 2.3-2. Sensitive Biological Resource Species Accounts

Vulpes macrotis mutica (San Joaquin kit fox)

Status: Federal -Endangered
State -Threatened
Other -None

(The following species account was taken from the Pleasant Valley Draft Habitat Conservation Plan, 1994.)

The San Joaquin kit fox is one of the eight recognized subspecies kit fox. It resembles a small lanky dog in appearance, with disproportionately large ears containing an abundance of large, white inner guard hairs. The San Joaquin kit fox is the largest subspecies of kit fox, with adults weighing 4.5 to 5 pounds (2-2.3 kg). Total length is about 32 inches, including up to a 12-inch black-tipped tail. Coloration ranges from light buff to grayish along the back and tail, gray, rust, or yellowish along the sides, and white on the belly (O'Farrell 1983).

San Joaquin kit foxes are generally nocturnal and are opportunistic carnivores. They feed on rodents, lagomorphs, birds, reptiles and insects, as well as on carrion such as road kills. Studies indicate that the primary food items may vary geographically and seasonally (Kakiba-Russell et al. 1991).

Dens are typically excavated in loose soil (O'Farrell 1983), but also occur in harder clay soils in the northern portion of their range. Dens are not found in saturated soils or in areas subjected to periodic flooding (Kakiba-Russell et al. 1991). Individual animals may utilize from 3 to 24 separate dens (Morrell 1972). Number of den entrances may range from 1 to 36 (O'Farrell 1983), and may extend into several tunnels and chambers reaching depths of up to 10 feet (O'Farrell 1987). Most dens are vacant at any given time. During times when dens are unoccupied kit fox, they may be occupied by other burrowing animals such as badger, ground squirrels, skunks, and burrowing owls (Kakiba-Russell et al. 1991). Although occupied dens may show freshly excavated soil, scats, and prey remains (O'Farrell 1987), sign may also be inconspicuous or absent (Hall 1983). Typical den entrances are characteristically higher than wide, and are small enough to prevent access by large carnivores such as coyotes. Den entrance hole dimensions are generally about 8 to 10 inches in height and less than 8 inches in width (O'Farrell 1987), but may be as small as 4 inches in width. Burrows of other animals, particularly California ground squirrels (*Spermophilus beecheyi*), are opportunistically enlarged and utilized as den sites by San Joaquin kit foxes (Balestreri 1981). Most dens are found in areas with slope angles of less than 40 degrees, and natal and pupping dens are found more frequently on gentle slopes or in flat terrain. Man-made structures such as culverts and pipes may also be used as dens (O'Farrell 1983).

Individual San Joaquin kit foxes have an average home range of 1 to 2 square miles (Knapp 1978; Morrell 1972). Courtship and mating occur in December and January. Pups are typically born in February and March, and begin to disperse at around five months of age (Morrell 1972; O'Farrell 1983). About 75% percent of kit fox pups die before the age of eight months (O'Farrell 1984).

San Joaquin kit foxes occur in Valley Saltbush Scrub, Valley Sink Scrub, Interior Coast Range Saltbush Scrub, Upper Sonoran Sub-shrub Scrub, Non-native Grassland, and Valley Sacaton Grassland. In general, kit fox are not found in densely wooded areas, wetland areas, or areas subject to frequent periodic flooding. Habitats altered by agricultural and urban developments are unsuitable for long-term kit fox inhabitance (Kakiba-Russell et al. 1991).

The San Joaquin kit fox was historically distributed over a large portion of central California, extending roughly from southeastern Contra Costa County south along the eastern flanks of the Interior Coast Range to the southern San Joaquin Valley, including major portions of western Kern County and Tulare County. San Joaquin kit fox were also distributed through adjacent valleys, foothills, and plains, including portions of San Luis Obispo County, Monterey County, and the Santa Clara Valley on the western side of the Interior Coast Range (Morrell 1975).

Habitat conversion for agricultural and a variety of urban uses has been the principal cause of kit fox population declines, and the reason for both state and federal listing of this species. O'Farrell (1983) estimated that approximately 42 percent of suitable kit fox habitat was lost as a result of such developments. Since that estimate was made, substantial additional habitat loss has occurred. Mortality of kit foxes has been documented from attacks by coyotes, road kills, conversion of habitat, shooting, drowning, entombment, pneumonia, and starvation (Morrell 1975; Knapp 1978; O'Farrell et al. 1986; Berry et al. 1987). Additionally, the use of certain rodenticides has resulted in secondary mortality, since kit foxes are vulnerable to poisoning through consumption of poisoned rodents (USFWS 1985b).

Dipodomys nitratoides nitratoides **(Tipton kangaroo rat)**

Status: Federal -Endangered
State -Endangered
Other -None

(The following species account was taken from Endangered Species Recovery Program *Listed Species Accounts.*)

The Tipton kangaroo rat is one of three subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*). Tipton kangaroo rats are visually similar to other kangaroo rats; they have a tawny yellow head and back with a white belly and a white stripe on the elongated hind legs that continues down the sides of the otherwise black tail. Other characteristics include: a large head, compared to other rodents, with large dorsally-placed eyes and small rounded ears; small forelegs with strong claws; and a long, tufted tail.

Tipton kangaroo rats eat mostly seeds, but will supplement their diet with green, herbaceous vegetation and insects when available. Most aspects of food and foraging of Tipton kangaroo rats are identical to those of Fresno kangaroo rats, *Dipodomys nitratoides exilis*

Little specific information is available on the reproduction of Tipton kangaroo rat. In general, this aspect of their biology is similar to that of the Fresno kangaroo rat. Reproduction occurs in the winter months with most females giving birth to only one litter of two young. Some females born early in the year may breed when about 12 weeks old.

Tipton kangaroo rats inhabit arid-land vegetative communities with level or nearly level terrain located within the floor of the Tulare Basin in the southern San Joaquin Valley. Many of the presently inhabited areas have one or more species of woody shrubs, such as saltbush, iodine bush, goldenbush, and honey mesquite, sparsely scattered throughout and a ground cover dominated by introduced and native grasses and forbs. Burrows are commonly located in slightly elevated mounds, the berms of roads, canal embankments, railroad beds, and bases of shrubs and fences where wind-blown soils accumulate above the level of surrounding terrain. Soft soils, such as fine sands and sandy loams, and powdery soils of finer texture and of higher salinity generally support higher densities of Tipton kangaroo rats than other soil types. Terrain not subject to flooding is essential to sustain a population of Tipton kangaroo rats. The placement of burrows on elevated grounds in flood-prone areas is important, but depending on the extent and duration of the flooding, those burrows and populations may still be adversely affected.

Historically, Tipton kangaroo rats were distributed south of the Kings River on the north and eastward and southward along the edge of the San Joaquin Valley floor in Tulare and Kern counties to the foothills of the Tehachapi Mountains. The westward edge of their ranges were the marshes and open water of Kern and Buena Vista lakes and the sloughs and channels of the Kern River alluvial fan.

Current distribution is not completely known-occurrences of the Tipton kangaroo rats are limited to scattered, isolated clusters west of Tipton, Pixley, and Earlimart and in areas in southern Kern County. Cultivation and urbanization has reduced much of the area historically inhabited. However, in recent years, Tipton kangaroo rats have reinhabited several hundred acres that were formerly in crop production but were retired and allowed to go fallow due to drainage problems, or lack of water, or were acquired by state or federal government as wildlife habitat.

Branchinecta longiantenna **(longhorn fairy shrimp)**

Status: Federal -Endangered
State -None
Other -None

(The following species account was taken from Federal Register Final Listing Document 59 FR 48136 48153.)

The longhorn fairy shrimp, a member of the family branchinectidae, was described from specimens collected at Souza Ranch in the Kellogg Creek watershed, about 35 kilometers (22 miles) southeast of the City of Concord, Contra Costa County (Eng et al. 1990). It ranges in size from 12.1 to 20.8 mm (0.5 to 0.8 inches). This species differs from other branchinectids in that a portion of the distal segment of its antennae is flattened in the antero-posterior plane rather than the latero-medial plane.

The longhorn fairy shrimp inhabits clear to turbid grass-bottomed vernal pools in grasslands and clear-water pools in sandstone depressions. This species is known only from four disjunct populations along the eastern margin of the central coast range from Concord, Contra Costa County south to Soda Lake in San Luis Obispo County: the Kellogg Creek watershed, the Altamont Pass area, the western and northern boundaries of Soda Lake on the Carrizo Plain (Eng et al. 1990), and Kesterson National Wildlife Refuge in the Central Valley (Dennis Woolington, U.S. Fish and Wildlife Service, in litt. 1993). All vernal pools inhabited by this species are filled by winter and spring rains and may remain inundated until June. The longhorn fairy shrimp has been observed from late December until late April. The water is grassland pools inhabited by this species has very low conductivity, TDS, and alkalinity (Eng et al. 1990).

***Branchinecta lynchi* (vernal pool fairy shrimp)**

Status: Federal -Endangered
State - None
Other -None

(The following species account was taken from Federal Register Final Listing Document 59 FR 48136 48153.)

The vernal pool fairy shrimp), a member of the family Branchinectidae, was described from specimens collected at Souza Ranch in the Kellogg Creek watershed, Contra Costa County, California (Eng et al. 1990). It ranges in size from 10.9 to 25.0 mm

(0.4 to 1.0 inches). This species most resembles the Colorado fairy shrimp Branchinecta coloradensis). There are several differences in the antennae of the males of the two species, including the basal segment outgrowth below and posterior to the pulvillus, which is ridge-like in the vernal pool fairy shrimp but is cylindrical and often much larger in the Colorado fairy shrimp. The shorter brood pouch of the vernal pool fairy shrimp is pyriform, whereas the longer one in the Colorado fairy shrimp is fusiform (Eng et al. 1990).

Although the vernal pool fairy shrimp has a relatively wide range, the majority of known populations inhabit vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands, but one population occurs in sandstone rock outcrops and another population in alkaline vernal pools. The vernal pool fairy shrimp has been collected from early December to early May. The water in pools inhabited by this species has low TDS, conductivity, alkalinity, and chloride (Collie and Lathrop 1976). This species has a sporadic distribution within vernal pool complexes (Jones and Stokes, 1992, 1993; County of Sacramento 1990; Patton 1984; Stromberg 1993; Sugnet and Associates 1993b) wherein the majority of pools in a given complex typically are not inhabited by the species. Simovich et al. (1992) reported that the vernal pool fairy shrimp typically is found at low population densities. Only rarely does the vernal pool fairy shrimp co-occur with other fairy shrimp species, but where it does, the vernal pool fairy shrimp is never the numerically dominant one (Eng et al. 1990).

Although it can mature quickly, allowing populations to persist in short-lived shallow pools, it also persists later into the spring where pools are longer lasting (Simovich et al. 1992). Sugnet and Associates (1993b) listed 178 records for the species out of 3092 "discrete locations" containing potential habitat in their report. These 178 records represent the 32 known populations of the vernal pool fairy shrimp, which extend from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles in San Benito County (Eng et al. 1990; M. Fugate, pers. comm., 1991; Sugnet & Associates 1993b). Five of these populations are believed to be comprised of a single inhabited pool. Four additional, disjunct populations exist; one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one near the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County. Three of these four isolated populations contain only a single known pool occupied by the vernal pool fairy shrimp.

Lepidurus packardi **(vernal pool tadpole shrimp)**

Status: Federal - None
State - Threatened
Other -None

(The following species account was taken from Federal Register Final Listing Document 59 FR 48136 48153.)

The vernal pool tadpole shrimp, a member of the family Triopsidae, was described by Eugene Simon in 1866 (Longhurst 1955a). Longhurst (1955a) placed the name in synonymy with Lepidurus apus. Subsequently, Lynch (1972) examined the taxa and determined that Lepidurus packardi is a valid species. The Service accepts Lynch's taxonomic treatment of the genus Lepidurus, which maintains L. packardi as a species.

Vernal pool tadpole shrimp adults reach a length of 50 millimeters (2 inches). They have about 35 pairs of legs and two long cercopods. This species superficially resembles the ricefield tadpole shrimp (Triops longicaudatus). However, Lepidurus possess a flat paddle-shaped supra-anal plate that is entirely lacking in members of the genus Triops (Pennak 1989; R. Brusca in litt., 1992; M. Simovich in litt., 1992; J. King in litt., 1992). The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south through the Central Valley to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County.

The vernal pool tadpole shrimp inhabits vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 square feet) in the Mather Air Force Base area of Sacramento County, to the 36 hectare (89 acre) Olcott Lake at Jepson Prairie. The pools at Jepson Prairie and Vina Plains have a very low conductivity, TDS, and alkalinity (Barclay and Knight 1984; Eng et al. 1990). These pools are located most commonly in grass bottomed swales of grasslands in old alluvial soils underlain by hardpan or in mud-bottomed pools containing highly turbid water.

The life history of the vernal pool tadpole shrimp is linked to the phenology of the vernal pool habitat. After winter rainwater fills the pools, the populations are reestablished from diapaused eggs that lie dormant in the dry pool sediments (Ahl 1991; Lanway 1974). Ahl (1991) found that eggs in one pool hatched within three weeks of inundation and saturated to sexually reproductive adults in another three to four weeks. Simovich et al. (1992) reported sexually mature adults occurred in another pool three to four weeks after the pools had been filled. A female surviving to large size may lay up to six clutches of eggs, totaling about 861 eggs in her lifetime (Ahl 1991). The eggs are sticky and readily adhere to plant matter and sediment particles (Simovich et al. 1992). A portion of the eggs hatch immediately and the rest enter diapause and remain in the soil to hatch during later rainy seasons (Ahl 1991). The vernal pool tadpole shrimp matures slowly and is a long-lived species (Ahl 1991; Alexander 1976). Adults are often present and reproductive until the pools dry up in the spring (Ahl 1991; Simovich et al. 1992).

***Buteo swainsoni (*Swainson's hawk)**

Status: Federal -None

State - Threatened; CNDDB Special Animal

Other - Protected under the Migratory Bird Treaty Act of 1918

Swainson's hawks are large (body length averages 21 inches), slim-winged, long-tailed hawks that frequent open country. Their plumage is extremely variable. Although this species is about the same size as a red-tailed hawk, the Swainson's hawk can be most easily distinguished by its relatively long, narrow, pointed wings (the wingspan is approximately 52 inches). Swainson's hawks are very buoyant in flight (Dunne *et al.* 1988) and rocks back and forth similar to the rocking flight of turkey vultures and northern harriers. The sexes are similar in appearance; however, females are slightly larger than males.

Swainson's hawks are long-distance migrators. After leaving nesting grounds in northwestern Canada, the western U.S., and Mexico, most populations migrate to wintering grounds in South America. Currently, They are summer breeders in California with approximately 80 percent of the pairs nesting in the southern Sacramento and northern San Joaquin valleys. These birds return to California between late February and early April, breed during spring and summer, and depart on their fall migration from late August through mid-October.

Swainson's hawks nest throughout most of the Central Valley, although nesting habitat is fragmented and unevenly distributed. More than 85 percent of the known nests in the Central Valley are within riparian systems in Sacramento, Yolo, and San Joaquin counties. The riparian areas are generally adjacent to and within easy flying distance of alfalfa or hay fields. These open fields and pastures are the primary foraging areas.

During the breeding season, Swainson's hawks eat mainly vertebrates (small rodents, birds, and reptiles), whereas during migration, vast numbers of insects are consumed (Palmer 1988). Occasionally during the fall, large flocks of migrating Swainson's hawks gather in agricultural fields in the Central Valley to forage on grasshoppers and other large insects that are easily captured in recently plowed or mowed fields (Beedy and Granholm 1985; Ehrlich *et al.* 1988).

The Swainson's hawk was historically (ca. 1900) regarded as one of the most common raptor species in the state, so much so that they were often not given special mention in field notes. The breeding population has declined by an estimated 91 percent in California since the turn of the century (Bloom 1980). There had been no documented Swainson's hawk nests in the Central Valley portion of Kern County for several decades until the spring 1991, five adult Swainson's hawks built two nests in oak-savanna habitat between Caliente and Arvin. The 1989 population estimate was 430 pairs for the Central Valley and 550 pairs statewide.

Swainson's hawks rely on pasturelands and alfalfa fields for their principal foraging habitat. The dramatic population decline from historic levels has been attributed to loss of native nesting and foraging habitat, and more recently from the conversion of agriculture to urban uses and the loss of existing (and suitable) nest sites in agricultural, woodland, and riparian areas. The replacement of alfalfa and pastureland with incompatible agricultural uses such as rice and orchards further reduces the available foraging habitat. In addition, pesticides, shooting (Tyler 1916), disturbance at the nest site, and other disturbances on wintering areas may have contributed to their decline. The loss of nesting habitat within riparian areas has been accelerated by flood control practices and bank stabilization programs; Smith (1977) estimated that in 1850 over 770,000 acres of riparian habitat were present in the Sacramento Valley alone. Today less than 12,000 acres of riparian habitat remain. A 98 percent decrease in riparian vegetation has been documented within the Central Valley (Katibah 1983).

***Athene cunicularia (*burrowing owl)**

Status: Federal - Protected under the Migratory Bird Treaty Act of 1918.
State - Species of Special Concern; CNDDB Special Animal

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

Adult burrowing owls are sandy colored over the head, back, and wings, with barring on the breast and belly. During summer months females usually appear darker than males (Farrand 1983). Juveniles are smaller, and buffy below. Burrowing owls are medium-sized (body length averages 9.5 inches), yellow-eyed owls with disproportionately long legs. The tail is very short; the head is rounded and lacks car tufts. The long, exposed lower legs, and the characteristic "bowing" behavior that the bird displays when approached or otherwise disturbed, quickly distinguish this owl from all other small owls (Farrand 1983). During the nesting season, the burrowing owl often perches on a low post or at the entrance to a burrow. Calls are often synchronized with bowing behavior. When approached or flushed, both sexes commonly give a sharp 'chatter' call. A rasping call, similar to a rattlesnake's rattle, may be given from inside the burrow when the bird is disturbed (Farrand 1983).

Burrowing owls breed in midwestern and western North America, and also in south-central Florida. They winter throughout their breeding range and south to Central America. Several breeding populations exist in the Central Valley. Burrowing owls often wander outside their breeding range in the winter.

These owls use burrows throughout the year and although there is evidence that they will dig their own burrows (Thomsen 1971), they more commonly use old burrows dug by mammals.

Resident burrowing owls begin pair formation as early as December, and migratory birds begin upon their arrival in the breeding area, usually in March and April. Six to eleven eggs are laid during late March to early May. Incubation lasts about four weeks. The young emerge from the burrow at about two weeks of age and are able to fly well at about six weeks (Zarn 1974). Nests are generally located in bare, level ground in abandoned mammal burrows (Verner and Boss 1980). Nest chambers in the southern San Joaquin Valley are usually 2 feet or more beneath the surface at the end of a burrow that may be from 5 to 18 feet in length JHA 1992).

Burrowing owls inhabit dry, open grasslands, rolling hills, desert floors, prairies, savannas, agricultural land, and other areas of open, bare ground. This species prefers lower elevation habitats (Verner and Boss 1980). These owls will also inhabit open areas near human habitation, such as airports, golf courses, shoulders of roads, railroad embankments, and the banks of irrigation ditches and reservoirs.

Burrowing owls forage during any time of the day or night in areas adjacent to burrows and nest sites. Zarn (1974), Marti (1969, 1974), and Thomsen (1971) have thoroughly studied the food habits of this species and agree that they feed primarily on insects and other arthropods, small birds, and mammals. They will take whatever prey species are most abundant in their area, including a wide variety of mice species, other rodents, frogs, toads, crayfish, birds, or reptiles. In the southern San Joaquin Valley, some of their major invertebrate prey include large beetles *(Eleodes* spp.), grasshoppers, crickets, centipedes, and scorpions (Small 1974).

Burrowing owls were formerly a common, even locally abundant, permanent resident throughout much of California. A decline noticeable in the Fresno area by the early

1900's (Miller 1903, Tyler 1913) and statewide by the l940’s (Grinnell and Miller 1944) has continued through to the present (Remsen 1978). In recent years, burrowing owl numbers have been declining throughout California. For example, Remsen (1978) reported that there had been an estimated 70 percent reduction in suitable habitat in Tulare County between 1968 and 1978.

Conversion of grasslands and pasturelands to agriculture, increasing urban development, and destruction of ground squirrel colonies (which reduce prey availability and potential nesting sites) have been the main factors causing the decline of burrowing owl populations (Zarn 1974). Assimilation of poisons applied to ground squirrel colonies has probably also taken a toll (Remsen 1978). The propensity for nesting in roadside banks makes burrowing owls particularly vulnerable to roadside shooting, being hit by cars, mad maintenance operations, and general harassment. Burrowing owls are usually tolerant of human activity, but are vulnerable to predation by domestic cats and dogs.

***Lanius ludovicianus* (loggerhead shrike)**

Status: Federal - Protected under the Migratory Bird Treaty Act of 1918.
State - Species of Special Concern

(The following species account was taken from the Pleasant Valley Draft Habitat Conservation Plan, 1994.)

The loggerhead shrike is a robin-sized bird (length - 9 inches) with a raptor-like, hooked bill. Dorsal coloration is bluish-gray, and ventral coloration is whitish, with very faint barring, juveniles are more brownish. Most distinctive is the black eye mask, and in flight, the white wing patches on the contrasting dark wings. Distinguished from the northern mockingbird, which it resembles in flight, by darker wing and smaller white wing patches; also, the mockingbird lacks conspicuous eye patch and hooked bill, and has slower wing beats.

This shrike occurs over most of the U.S., Mexico, and central Canada. In California, the shrike occurs as a resident over most of the state, being absent front high mountain regions. Habitat consists of open areas such as savannas and deserts, where bushes, small trees, or other perch sites are available. Also called the "butcher bird," the loggerhead shrike is an impressive predator that characteristically impales its prey on thorns, barbed wire, or other sharp projections. Lacking talons, the shrike impales its prey to facilitate feeding, or to store it for future consumption. Diet includes a variety of insects and spiders, small reptiles, rodents, and small birds (Bent 1958).

The primary threat to the loggerhead shrike in the San Joaquin Valley is the loss of suitable habitat through conversion to agriculture, urbanization, and petroleum development.

***Gambelia sila* (blunt-nosed leopard lizard)**

Status: Federal -Endangered
State-Endangered
Other –None

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994*.)

The blunt-nosed leopard lizard is a relatively robust lizard with a large head and blunt snout. It was historically distributed over the San Joaquin Valley adjacent lower foothills, plains, and valleys (Montanucci 1965). Adult snout-vent length is approximately 3.5 to 5 inches (USFWS 1985a), and total length may reach up to 13 inches. Coloration consists of a light grayish, tan, or brown background with a conspicuous pattern of dark overlaying spots and/or pale crossbars. During the spring courtship season both sexes may develop reddish markings on the sides, tail, and ventral surfaces. Juveniles usually show a similar, but more yellowish pattern. Approximately two to three eggs are laid in excavated chambers at the end of rodent burrows. Hatchlings emerge in early August (USFWS 1985a).

Blunt-nosed leopard lizards are active during the day. Peak daily activity usually occurs when air temperatures are between 75 and 95 degrees Fahrenheit. Most annual activity occurs between the months of April and early October. Animals overwinter underground in rodent burrows (USFWS 1985a). Food consists primarily of insects such as grasshoppers, although smaller lizards may also be consumed Leopard lizards occur on sparsely vegetated plains, lower canyon slopes, on valley floors, and in washes. Associated vegetation may include a variety of grasses, saltbush, golden bush, iodine bush, and seepweed (*Suaeda fruticosa*) (USFWS 1985a). Results of systematic inventories for blunt-nosed leopard lizards on federal lands in the San Joaquin Valley have demonstrated that this species has an affinity for open habitats and wash systerns with relatively level topography (Chesemore 1980;Jones 1980; O'Farrell 1980; O'Farrell et al. 1981).

Population densities of blunt-nosed leopard lizards are highly variable. Chesemore (1980), in a study of two sites near Taft (Kern County), estimated densities of between 0.1 and 0.5 lizards per acre. Densities of blunt-nosed leopard lizards at Pixley National Wildlife Refuge (Tulare County) ranged from 0.12 to 4.14 lizards per acre (Uptain et al. 1985).

Habitat loss is the principal reason for both state and federal listing of this species as endangered. Much of the historical habitat of this lizard has been converted to agricultural production. Other factors contributing to the endangerment of this species include petroleum development, livestock grazing, and pesticide application (USFWS 1985a).

***Ambystoma tigrinum californiense (*California tiger salamander)**

Status: Federal - Species of Concern
State - Species of Special Concern
Other - None

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

The California tiger salamander is a relatively large, stocky black salamander with large cream-colored spots and cream-colored bands n the lower sides. It grows to 6.5 in (16 cm) in snout-vent length (its total length can be up to about 10 inches) (Stebbins 1985). Tiger salamanders are carnivorous, feeding on earthworms, fish, insects, amphipods, and a wide variety of invertebrate and vertebrate larvae.

Adult tiger salamanders spend most of their time underground, occupying burrows dug by ground squirrels, gophers, and badgers. They emerge only for brief periods to feed and breed. Although aestivation sites may be as far as 3,000 ft (1,000 m) from the breeding ponds, they are usually much closer. There is considerable site fidelity among tiger salamanders, as they tend to we the same ponds and burrows throughout their adult lives. They emerge from their burrow sites after the onset of winter rains and begin their above-ground activity after their breeding ponds, often temporary rain pools, have begun to form. Migration to breeding ponds usually takes place during rainfall, and often at night (Stebbins 1985). The larvae begin to transform in late spring, and by July most have left the ponds in search of suitable aestivation sites.

California tiger salamanders are found in the Central Valley from Yolo County to Kern County, and in coastal areas from the San Francisco Bay Area to Santa Barbara County. Most records are reported from elevations below 1,000 ft (300 in). They inhabit temporary and permanent ponds such as vernal pools, small lakes and stock ponds where predators are absent (e.g., fish, bullfrogs), yet which hold water for several months, long enough for the salamander larvae to transform. Streams are rarely used as breeding habitat.

The California tiger salamander has experienced direct loss of habitat from agricultural conversion and urbanization, and much of its remaining habitat has been degraded by alteration of breeding ponds and destruction of burrows. Work with allozymes and mitochondrial DNA indicates that populations *of A. t. californiense* are genetically isolated, so efforts to preserve the genetic integrity of the species must focus on protection at the population level (Stanley 1993).

***Taxidea taxus* American badger**

Status: Federal - None
State - Species of special concern
Other - None

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

American badgers are low, squat animals with conspicuous silver-tipped pelage dorsally and a short, black-tipped tail. The most striking visual feature of this species is its striped face, consisting of two median white stripe proceeding from the tip of its nose to the back of its head. This stripe is flanked by alternating white and dark stripes giving way to bright, white-outlined ears. The badger's wide flattened body is supported by short but powerful legs. The front feet are fitted with noticeably long claws that are especially well-suited for digging out the burrows of the rodents on which it feeds.

Historically, badgers are thought to have been fairly widespread in the open grassland habitats of the lower San Joaquin Valley. Their modern San Joaquin Valley distribution is essentially restricted to the limited, often isolated and remote tracts of native grassland and shrubland habitats. Cultivated lands have been reported to provide little usable habitat for this species, and badgers are believed to be declining throughout California (Williams 1986).

Badgers are solitary animals. They usually forage for burrowing prey such as gophers, ground squirrels, marmots, and kangaroo rats, although they are known to take a variety of nesting mammals, reptiles, and birds.

Badger densities are variable and some reports have suggested that there is little difference between the home range requirements of males and females. Other reports have shown that a seasonal difference in the home range of individual animals *exists (Sargeant and* Warner 1972; *Messick and* Homocker 1981).

In California, badgers range throughout the state except for the humid coastal forests of northwestern California in Del Norte County, and the northwestern portion of Humboldt County (Williams 1986). Badger populations have declined dramatically within California over the past century (Grinnell et al. 1937). Grinnell et al. (1937) noted that badgers were reduced in numbers throughout California, but were still numerous within the San Joaquin Valley. Badgers now survive in low numbers in the San Joaquin Valley on the periphery of the valley and adjacent lowlands to the west in eastern Monterey, San Benito, and San Luis Obispo counties (Williams 1986).

The principal cause of the decline in American badger populations is the conversion of native grassland habitats to modem agricultural uses. Although no specific estimates are available, American badgers doubtless have suffered a similar reduction in suitable habitat as have other wildlife species resident on the valley floor. Deliberate killing, as well as direct and secondary mortality from rodent poisoning, have also contributed to their decline.

***Perognathus inornatus (*San Joaquin pocket mouse)**

Status: Federal - None
State - Species of special concern
Other - None

The San Joaquin pocket mouse inhabits open grasslands or scrub areas on fine textured soils in the San Joaquin and Salinas valleys, often sharing habitat with kangaroo rats (*Dipodomys* sp.). They forage for plant seed as well as eating green vegetation and insects. Seeds are carried in cheek pouches and stored in burrows for later consumption (CDFG 1990). These small pocket mice (10-20 grams) are very sensitive to cold temperatures and will go into torpor at temperatures below 50^{o} F (pers. Obs).

***Onychomys torridus tularensis* (Tulare grasshopper mouse)**

Status: Federal - None
State - Species of special concern
Other - None

The Tulare grasshopper mouse, a subspecies of the southern grasshopper mouse, fits the general description of the genus *Onychomys* by having a stout body with a short, club-like tail. They are sharply bicolored with the head and upperparts pale brown to gray or pinkish-cinnamon and the underparts white. The tail is usually bicolored with a white tip. The young and subadults are gray in color. The feet of the southern grasshopper mouse have five tubercles (knob-like fleshy bumps) on the sole of each forefoot and four on the hindfeet.

The grasshopper mouse is primarily a carnivore, with a particular appetite for small mammals and insects; it will also eat other invertebrates and seeds. Specific information on the reproduction and mating system of the Tulare grasshopper mouse is unknown. For the southern grasshopper mouse, which lives in burrows, breeding is seasonal with the young born from May through July. Captive populations of this species breed throughout the year and gestation is between 27 and 32 days. In the wild, up to 3 litters per year may be produced. The adult males are highly territorial and frequently vocalize at night. They emit a high-pitched call, lasting several seconds, while standing on their hind legs with head raised and mouth open.

Typically, Tulare grasshopper mice inhabit arid shrubland communities in hot, arid grassland and shrubland associations. These include blue oak woodlands at 450 m (1476 feet); upper Sonoran subshrub scrub habitat; alkali sink and mesquite associations on Valley Floor; and grasslands associations on the sloping margins of the San Joaquin Valley and Carrizo Plain region. Specific habitat requirements are unknown.

Like most of the other sensitive species of the San Joaquin Valley, habitat reduction, fragmentation, and degradation are the principle causes of the decline of the Tulare grasshopper mouse. Use of insecticides may have contributed to the extirpation of this species from fragmented habitat on the Valley floor by reducing their main food source and from both direct and indirect poisoning.

Historically, the Tulare grasshopper mouse ranged from western Merced and eastern San Benito counties east to Madera County and south to the Tehachapi Mountains. Currently, they are known to occur in these areas: along the western margin of the Tulare Basin, including western Kern County; Carrizo Plain Natural Area; along the Cuyama Valley side of the Caliente Mountains, San Luis Obispo County; and the Ciervo-Panoche Region, in Fresno and San Benito counties.

Caulanthus californicus **(California jewelflower)**

Family: Brassicaceae

Status: Federal -Endangered
State-Endangered
CNPS -List lB

Flowering Period: February -April

Habitat: Dry plains and slopes in native valley grasslands

Range: Fresno, Kings, Kern, San Luis Obispo, Tulare, and Santa Barbara counties

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

The California jewelflower is an annual reaching a height of 6 to 15 inches. Foliage is gray-green, with heart-shaped clasping stem leaves and wavy margined strap-shaped basal leaves. Unopened flowers appear deep maroon in color. Open flowers are white to greenish-yellow. Suitable habitat for this species is non-alkaline to slightly alkaline sandy loam soils of relatively undisturbed grassland communities below an elevation of 3,000 feet.

Historically, the range of the species included the upper San Joaquin and adjacent valleys from Coalinga in the northwest to the Cuyama Valley in the southwest. Of 55 historical locations, approximately twenty extant populations remain (Skinner and Pavlik 1994). Recently, extant populations have been found on the Carrizo Plain in San Luis Obispo County, and in the Kreyenhagen Hills of Fresno County. An attempt has been made to establish an artificial population at the Paine Wildflower Preserve, Kern County.

***Cirsium crassicaule (*slough thistle)**

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

Family: Asteraceae

Status. Federal - Category 2
State - None
CNPS - list 1B

Flowering Period: May - August

Habitat: Shallow water, stream banks and wet places

Range: Kings, Kern and San Joaquin counties

This biennial species, which appears to grow as an annual, is distinguished from the weedy *Cirsium* species by the presence of pinnate spines on the phyllaries. The slough thistle is a tall robust annual that ranges from 3 to 6 feet in height. The lower stem is typically unbranched while the upper portion is commonly much branched, supporting several paniculately disposed heads. Herbage is prominently hoary-tomentose to sometimes glabrescent on the upper surfaces. Individual leaves are lanceolate in overall shape with sinuate-pinnatifid margin. Individual lobes are often spine tipped. Flowers are whitish to pinkish.

Slough thistle is found in low-lying, seasonally to permanently wet habitats on the valley floor. The population locations in Kern and Kings counties indicate that this plant can tolerate disturbed habitats. The northern populations of this species (in San Joaquin County) tends to be disjunct, which suggests possible dissemination by water or equipment. A single extant population is known to occur at the Kern National Wildlife Refuge.

Delpinium recurvatum (**recurved larkspur)**

(The following species account was taken from *the Pleasant Valley Draft Habitat Conservation Plan, 1994.*)

Family: Ranunculaceae

Status: Federal - None
State - None

CNPS - List IB

Flowering Period: April - May

Habitat: Alkaline valley grasslands, inner coastal hills

Range: Contra Costa, Colusa, Fresno, Kings, Kern, Merced, San Luis Obispo, Solano, and Tulare counties

This very showy species is characterized by strongly bicolored flowers with a spur that is recurved at maturity. It has erect reddish to purple stems that range from 8 to 24 inches in height. Stems are slightly hairy below and glabrous in the inflorescence. Leaves are several, 0.6 to 1.2 inches long, paimatifid into fewparted divisions, and hairy beneath. The inflorescence supports 15-24 flowers that have light blue sepals and cream to white petals.

Recured larkspur grows in subalkaline soils supporting shrubby or grassland habitats of the western Central Valley from Contra Costa County to Kern County. Co-occurring species include saltbush, brome gram, and wild oars.

Much of the original habitat of recurved larkspur has been lost to agriculture. Many of the historic populations have either been extirpated or lack modern field confirmations. Most extant populations occur in the lower foothills of the western San Joaquin Valley, and are usually found on north-facing slopes.

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Attachment 2.3-3

Revised Section 8.2.1.3 (Wildlife)

from AFC

Attachment 2.3-3

Revised Section 8.2.1.3 (Wildlife) from AFC

8.2.1.3 Wildlife

General Wildlife. The ruderal vegetation near the project site could provide marginal habitat for a variety of birds, mammals, and reptiles. Bird species include the red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*), and western meadowlark (*Sturnella neglecta*). Mammals occupying this habitat type include the black-tailed hare (*Lepus californicus*), desert cottontail (*sylvilagus audubonii*), kangaroo rat (*Dipodomys* spp.), deer mouse (*Peromyscus maniculatus*), kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), bobcat (*Felis rufus*), and American badger (*Taxidae taxus*). Amphibians and reptiles include the western toad (*Bufo boreus*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus Tigris*), and gopher snake (*Pituophis melanoleucus*).

Economically Important Species. One gamebird species, the mourning dove (*Zenaida macroura*), potentially occurs at the proposed HPP site. This species has some recreational value to hunters, but has no important economic value. No species of economic importance occur in the HPP area.

Biologically Sensitive Areas. The HPP project lies outside of any biologically sensitive area. However, the Naval Air Station (NAS) Lemoore wastewater treatment pond area is approximately 0.5 miles east of the HPP site (Figure 8.2-3). The treatment pond area supports over 124 species of animals, including several federally listed birds. A list of these birds has been requested and will be supplied during discovery. Construction and operation of the HPP will have no significant impact on these sensitive bird species or other wildlife in the NAS Lemoore wastewater treatment pond area.

Attachment 2.3-4

Revised Table 8.2-1

(Special Status Species with Potential to

Occur in the Vicinity of the HPP Site)

Table 8.2-1
Special-Status Species with Potential to Occur in the Vicinity of the HPP Site

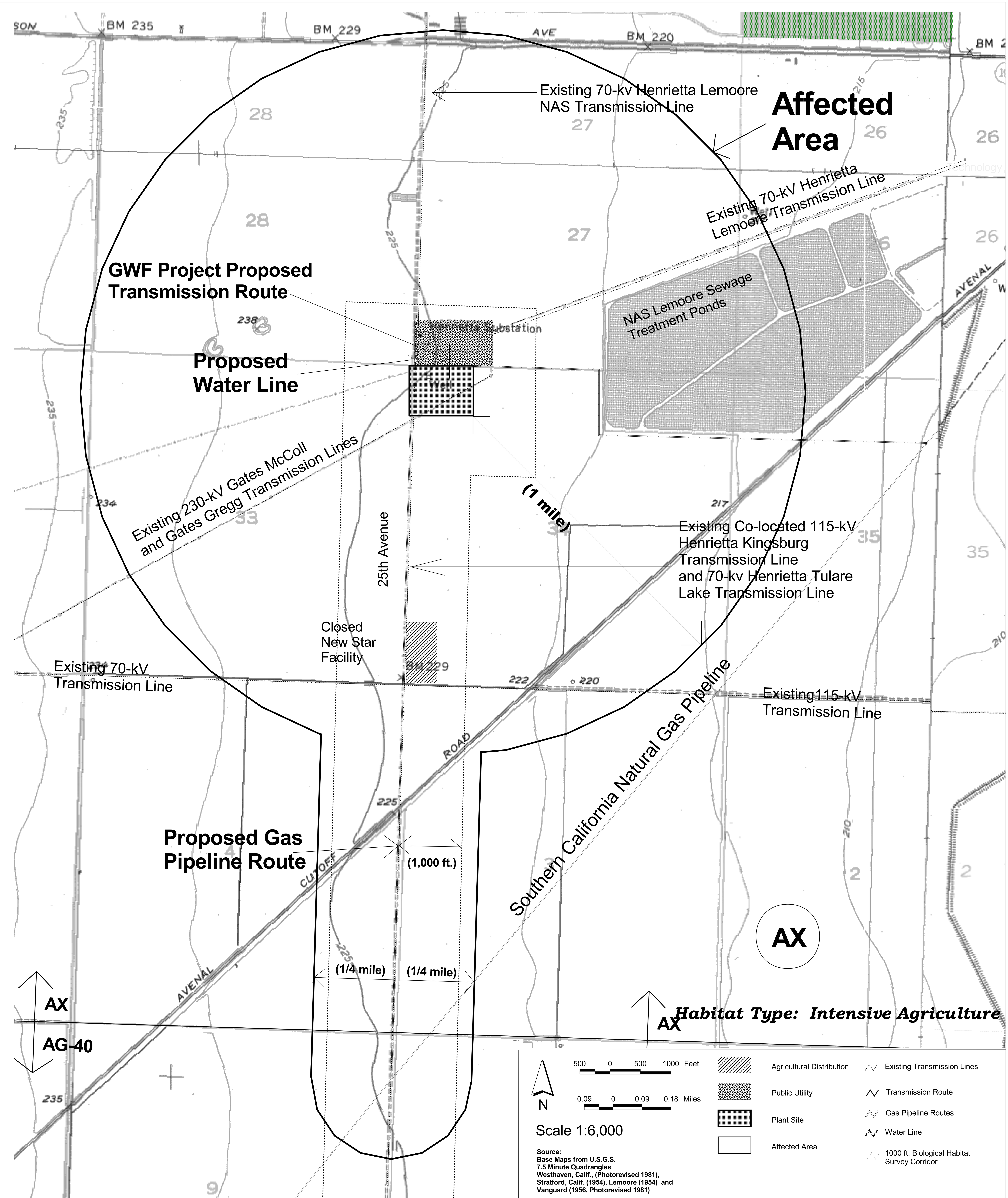
Species	Status Federal/State/ CNPS	Habitat
Desmocerus californicus dimorphus Valley elderberyy longhorn beetle	T/-/-	Associated with blue elderberry
Branchinecta longiantenna Longhorn fairy shrimp	-/E/-	Intermittent wetlands, vernal pools
Branchinecta lynchi Vernal pool fairy shrimp	-/E/-	Intermittent wetlands, vernal pools
Lepidurus packardi Vernal pool tadpole shrimp	-/T/-	Intermittent wetlands, vernal pools
Ambystoma californiense California tiger salamander	-/CSC/-	Intermittent wetlands, vernal pools
Gambelia sila Blunt-nosed leopard lizard	E/E/-	Open saltbush scrub and grassland habitats, roads, and open washes
Thamnophis gigas Giant garter snake	T/T/-	Freshwater marsh, low-gradient streams, adapted to drainage canals and irrigation ditches
Athene cunicularia Burrowing owl	-/CSC/-	Valley grasslands and open saltbush scrub
Lanius ludovicianus Loggerhead shrike	-/CSC/-	Valley grasslands and saltbush scrub
Buteo swainsoni Swainson's hawk	-/T/-	Open grassland or cropland with scattered trees
Dipodomys nitratoides nitratoides Tipton kangaroo rat	E/E/-	Western and southern side of the San Joaquin Valley, saltbush scrub, and other alluvial plain and low foothill habitats
Dipodomys nitratoides exilis Fresno kangaroo rat	E/E/-	Alkali sink, open grassland
Onychomys torridus tularensis Tulare grasshopper mouse	-/CSC/-	Scrub and grassland habitats on the west side of the San Joaquin Valley
Perognathus inornatus San Joaquin pocket mouse	-/CSC/-	Open habitats in the San Joaquin Valley
Taxidae taxus American badger	-/CSC/-	Grassland and scrub habitats of the San Joaquin Valley and surrounding foothills
Vulpes macrotis mutica San Joaquin kit fox	E/T/-	Grassland and scrub habitats of the San Joaquin Valley and surrounding foothills
Cirsium crassicaule Slough thistle	FSC/-/1B	Wet areas
Delphinium recurvatum Recurved larkspur	FSC/CSC/1B	Alkali sink, frequently with spiny saltbush
Caulanthus californicus California jewelflower	E/-/4	Open, sparsely vegetated areas in saltbush scrub and grassland

E	=	Endangered
T	=	Threatened
FSC	=	Federal Species of Concern
CSC	=	California Species of Concern
CNPS	=	California Native Plant Society
1B	=	Rare or endangered in California and elsewhere
4	=	Plants of limited distribution

Attachment 2.3-5

1:6,000 Scale Map of HPP Site and its

Surrounding Areas



URS

GWF Henrietta Peaker Project

Project No. 51-00167032.00

Biological Habitat

Figure 8.2-4

Attachment 2.3-6

Revised Section 8.2.2.1 (Survey Methodology)

from AFC

Attachment 2.3-6

Revised Section 8.2.2.1 (Survey Methodology) from AFC

8.2.2.1 Survey Methodology

Surveys at the HPP site were conducted by William J. Vanherweg and Christine O'Rourke on April 20 and May 22, 2001. The surveys were conducted primarily for listed plant and animal species, following methodologies approved by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) (CDFG, 1990). Surveys were performed concurrently for other special-status plant and wildlife species with potential to occur in the area. This section provides a discussion of the survey methodology used during the field review of the project site and the natural gas pipeline and transmission line corridors.

The HPP site and natural gas pipeline and transmission line corridors were surveyed by walking 50-foot-wide transects in suitable species habitat. An additional buffer zone (1,000 feet on either side of the corridors and around the facility) was also surveyed (Figure 8.2-2). Mr. Vanherweg and Ms. O'Rourke compiled a list of all animal and vascular plant species observed in the survey (see Table 8.2-2). As part of the survey, Mr. Vanherweg and Ms. O'Rourke searched for evidence of San Joaquin kit fox potential and known dens, Tipton kangaroo rat burrows, burrowing owl burrows, suitable blunt-nosed leopard lizard habitat, and locations of other sensitive resources. If they had found such evidence, they would have marked the locations in the field with terminal wire pin flags and mapped the location on a site map. However, no such evidence was identified.

The San Joaquin kit fox dens were classified according to the following USFWS kit fox den definitions (USFWS, 1989):

- *Known Den:* Any existing natural den or man-made structure for which conclusive evidence or strong circumstantial evidence can show that the den is used or has been used at any time in the past by a San Joaquin kit fox.

- *Potential Den:* Any natural den or burrow within the range of the species that has entrances of appropriate dimensions (4 to 12 inches in diameter) to accommodate San Joaquin kit foxes, but for which there is little to no evidence of kit fox use.

- *Pupping Den:* Any known San Joaquin kit fox den (as defined above) used by kit foxes to whelp and/or rear their pups.

- *Atypical Den:* Any known San Joaquin kit fox den that has been established in, or in association with, a man-made structure.

Attachment 2.3-7

Resume of Christine O’Rourke

CHRISTINE K. O'ROURKE

Associate Biologist

Ms. O'Rourke is an ecologist with extensive experience in field and laboratory techniques. She has performed research at field sites throughout the deserts of California and Arizona. Her responsibilities on ESA projects include conducting threatened and endangered species surveys and habitat assessments, evaluating the impacts of biological resources at individual sites where development has been proposed, writing CEQA/NEPA documents, and monitoring biological resources during project construction.

EDUCATION

B.S., Evolution and Ecology with English Minor, University of California-Davis
Biology / English and American Studies coursework, University of East Anglia, Norwich, England
Wetland Delineation Certification Training, U.S. Army Corps of Engineers

PROFESSIONAL EXPERIENCE

- Performed preliminary analysis of regulatory and other environmental issues associated with construction of a power line through Humboldt, Trinity, and Shasta Counties, identified potential special status species occurring in project area and at proposed power plant location at Humboldt Bay, identified potential regulatory (Section 316 of the Clean Water Act, National Pollutant Discharge Elimination System requirements, and state and regional water quality plans) and biological issues with thermal and stormwater discharge into adjacent waters.

- Surveyed Monterey Airport property and surrounding areas for *Piperia yadonii.*

- Performed USFWS protocol level surveys for California red-legged frog (*Rana aurora draytonii*) within multiple flood control channels for Alameda County Flood Control District Zone 7.

- Conducted surveys and habitat assessments throughout the San Joaquin Valley for pipeline and power line expansion projects. Species studied include San Joaquin kit fox (*Vulpes macrotis mutica*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides),* American badger (*Taxidea taxus*), Loggerhead shrike (*Lanius ludovicianus*), and Burrowing owl (*Athene cunicularia*).

- Conducted rare plant surveys along power lines in Bakersfield. Species surveyed include *Eriastrum hooveri*, *Stylocline citroleum, Delphinium gypsophilum ssp.. parviflorum*, and *Eschscholzia lemmonii ssp. kernensis.*

- Performed biological assessment and impact analysis for construction of two fiber optic network projects: Metromedia Fiber Network Services (San Francisco Bay Area, Los Angeles Basin Region, Sacramento and San Diego), and Sigma Networks (San Francisco Bay Area, Los Angeles Basin Region). Responsibilities also include writing Biology section of CEQA documents and supplemental requests to the CPUC for variances from the original documents.

PROFESSIONAL EXPERIENCE (CONTINUED)

- Biological monitor for fiber optic cable installation on three large-scale projects: Level (3) Communications (Central Valley); AT&T Fiber Optic Replacement Project (Dunnigan to Manchester [Mendocino County]); Metromedia Fiber Network Services (San Francisco Bay Area). Responsible for crew supervision and training, worker education, construction monitoring, resolving compliance and non-compliance issues, and conducting pre-construction biological surveys.

- Research Assistant, Leitner Biological Consulting. Performed field studies of Mohave ground squirrel (*Spermophilus mojavensis*), set and checked live traps, handled small mammals, assisted with passive integrated transponder (PIT) tag marking, identified and sampled woody shrubs and herbaceous vegetation on study site.

- Laboratory/Research Assistant, Chesson Lab, UC Davis. Participated in field sampling at Chihuahuan Desert research site, designed and executed lab experiments on desert winter annual plant species, identified plant seedlings, collected and compiled data, performed independent research tasks and prepared reports, and organized and maintained lab facility.

PROFESSIONAL AFFILIATIONS

The Wildlife Society
California Native Plant Society – East Bay Chapter

Attachment 2.3-8

CNDDB Forms

Selected EOs by Quad, Scientific Name

<<< Scientific Name	Common Name	Federal Status	State Status	General Habitat	Micro Habitat
Quad: BURREL (3611948)					
BUTEO SWAINSONI (NESTING)	SWAINSON'S HAWK	None	Threatened	BREEDS IN STANDS WITH FEW TREES IN JUNIPER-SAGE FLATS, RIPARIAN AREAS AND IN OAK SAVANNAH.	REQUIRES ADJACENT SUITABLE FORAGING AREAS SUCH AS GRASSLANDS, OR ALFALFA OR GRAIN FIELDS SUPPORTING RODENT POPULATIONS.
SCAPHIOPUS HAMMONDII	WESTERN SPADEFOOT	None	None	OCCURS PRIMARILY IN GRASSLAND HABITATS, BUT CAN BE FOUND IN VALLEY-FOOTHILL HARDWOOD WOODLANDS.	VERNAL POOLS ARE ESSENTIAL FOR BREEDING AND EGG-LAYING.
THAMNOPHIS GIGAS	GIANT GARTER SNAKE	Threatened	Threatened	PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.	THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.
Quad: GUERNSEY (3611926)					
BUTEO SWAINSONI (NESTING)	SWAINSON'S HAWK	None	Threatened	BREEDS IN STANDS WITH FEW TREES IN JUNIPER-SAGE FLATS, RIPARIAN AREAS AND IN OAK SAVANNAH.	REQUIRES ADJACENT SUITABLE FORAGING AREAS SUCH AS GRASSLANDS, OR ALFALFA OR GRAIN FIELDS SUPPORTING RODENT POPULATIONS.
CLEMMYS MARMORATA	WESTERN POND TURTLE	None	None	A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES WITH AQUATIC VEGETATION.	NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT FOR EGG-LAYING.
DIPODOMYS NITRATOIDES NITRATOIDES	TIPTON KANGAROO RAT	Endangered	Endangered	SALTBRUSH SCRUB AND SINK SCRUB COMMUNITIES IN THE TULARE LAKE BASIN OF THE SOUTHERN SAN JOAQUIN VALLEY.	NEEDS SOFT FRIABLE SOILS WHICH ESCAPE SEASONAL FLOODING. DIGS BURROWS IN ELEVATED SOIL MOUNDS AT BASES OF SHRUBS.
GAMBELIA SILA	BLUNT-NOSED LEOPARD LIZARD	Endangered	Endangered	RESIDENT OF SPARSELY VEGETATED ALKALI AND DESERT SCRUB HABITATS, IN AREAS OF LOW TOPOGRAPHIC RELIEF.	SEEKSCOVER IN MAMMAL BURROWS, UNDER SHRUBS OR STRUCTURES SUCH AS FENCE POSTS; THEY DO NOT EXCAVATE THEIR OWN

<<< Scientific Name	Common Name	Federal Status	State Status	General Habitat	Micro Habitat
Quad GUERNSEY (3611926) (cont.)					
GAMBELIA SILA (cont.)					BURROWS.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.
Quad HANFORD (3611936)					
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.
Quad LATON (3611946)					
ATRIPLEX DEPRESSA	BRITTLESCALE	None	None	CHENOPOD SCRUB, MEADOWS, PLAYAS, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.	USUALLY IN ALKALI SCALDS OR ALK. CLAY IN MEADOWS OR ANNUAL GRASSLND; RARELY ASSOC W/RIPARIAN, MARSHES, OR V.P'S. 1-320M.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.
Quad LEMOORE (3611937)					
DIPODOMYS NITRATOIDES NITRATOIDES	TIPTON KANGAROO RAT	Endangered	Endangered	SALTBRUSH SCRUB AND SINK SCRUB COMMUNITIES IN THE TULARE LAKE BASIN OF THE SOUTHERN SAN JOAQUIN VALLEY.	NEEDS SOFT FRIABLE SOILS WHICH ESCAPE SEASONAL FLOODING. DIGS BURROWS IN ELEVATED SOIL MOUNDS AT BASES OF SHRUBS.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.

Selected EOs by Quad, Scientific Name

<<< Scientific Name	Common Name	Federal Status	State Status	General Habitat	Micro Habitat
Quad RIVERDALE (3611947)					
BUTEO SWAINSONI (NESTING)	SWAINSON'S HAWK	None	Threatened	BREEDS IN STANDS WITH FEW TREES IN JUNIPER-SAGE FLATS, RIPARIAN AREAS AND IN OAK SAVANNAH.	REQUIRES ADJACENT SUITABLE FORAGING AREAS SUCH AS GRASSLANDS, OR ALFALFA OR GRAIN FIELDS SUPPORTING RODENT POPULATIONS.
DESMOCERUS CALIFORNICUS DIMORPHUS	VALLEY ELDERBERRY LONGHORN BEETLE	Threatened	None	OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).	PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.
LEPIDIUM JAREDII SSP ALBUM	PANOCHE PEPPER-GRASS	None	None	VALLEY AND FOOTHILL GRASSLAND.	ALKALI BOTTOMS, SLOPES, WASHES, ALLUVIAL FANS; CLAY AND GYPSUM-RICH SOILS. 65-910M.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.
Quad STRATFORD (3611927)					
CLEMMYS MARMORATA	WESTERN POND TURTLE	None	None	A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES WITH AQUATIC VEGETATION.	NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT FOR EGG-LAYING.
DIPODOMYS NITRATOIDES NITRATOIDES	TIPTON KANGAROO RAT	Endangered	Endangered	SALTBRUSH SCRUB AND SINK SCRUB COMMUNITIES IN THE TULARE LAKE BASIN OF THE SOUTHERN SAN JOAQUIN VALLEY.	NEEDS SOFT FRIABLE SOILS WHICH ESCAPE SEASONAL FLOODING. DIGS BURROWS IN ELEVATED SOIL MOUNDS AT BASES OF SHRUBS.
VALLEY SINK SCRUB	VALLEY SINK SCRUB	None	None	None for this Element	None for this Element
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.

Selected EOs by Quad, Scientific Name

Quad
VANGUARD (3611938)

<<< Scientific Name	Common Name	Federal Status	State Status	General Habitat	Micro Habitat
DIPODOMYS NITRATOIDES EXILIS	FRESNO KANGAROO RAT	Endangered	Endangered	ALKALI SINK-OPEN GRASSLAND HABITATS IN WESTERN FRESNO COUNTY.	BARE ALKALINE CLAY-BASED SOILS SUBJECT TO SEASONAL INUNDATION, WITH MORE FRIABLE SOIL MOUNDS AROUND SHRUBS & GRASSES.
SCAPHIOPUS HAMMONDII	WESTERN SPADEFOOT	None	None	OCCURS PRIMARILY IN GRASSLAND HABITATS, BUT CAN BE FOUND IN VALLEY-FOOTHILL HARDWOOD WOODLANDS.	VERNAL POOLS ARE ESSENTIAL FOR BREEDING AND EGG-LAYING.
VULPES MACROTIS MUTICA	SAN JOAQUIN KIT FOX	Endangered	Threatened	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.

Attachment 2.3-9

Sensitive Species Awareness Education Program

HENRIETTA PEAKER PROJECT'S SENSITIVE SPECIES AWARENESS EDUCATION PROGRAM

The Henrietta Peaker Project's Sensitive Species Awareness Education Program will consist of tail-gate sessions designed to inform personnel about applicable laws and regulations, worker responsibilities during construction and operation, and summaries of the natural histories of the sensitive species that will be impacted by the Henrietta Peaker Project. The specific content of the sessions are describe below.

INTRODUCTION

The Henrietta Peaker Project is committed to build and operate this facility in compliance with federal and state environmental laws and regulations. We have been issued federal and state permits that mandate mitigation measures designed to minimize our project's impacts on sensitive species and their habitats. Following these measures is everyone's responsibility.

The following federal and state laws will be discussed:

- Migratory Bird Treaty Act
- Federal Endangered Species Act
- California Endangered Species Act
- California Department of Fish and Game Code

The Henrietta Peaker Project was designed to avoid impacts that would be in violation of these laws, which is the case with the Migratory Bird Treaty Act, or seek permits to lawfully allow take when impacts cannot be avoided. The Henrietta Peaker Project has agreed to compensate for sensitive habitats that will be permanently or temporarily disturbed and minimize impacts to individual animals that inhabit the project area. The minimization measures listed below are the most important elements of our program and everyone working on the Henrietta Peaker Project must comply with those measures for our project to be successful.

WORKER RESPONSIBILITIES

- Travel on designated roads: Do not travel cross-country in your vehicle at any time. Stay on marked project roads and access routes.
- Obey posted speed limits: This will help to maintain air quality and protect sensitive plants and wildlife.
- Stay in the designated work area: The boundaries of the construction area will be clearly marked. Do not go outside this area or disturb anything located beyond the boundaries.
- Do not enter avoidance areas: Avoidance areas are marked by metal stakes and flagging. Protection of sensitive resources is often as simple as avoiding them. For example, we protect sensitive plants and wildlife near the work area by setting up

avoidance areas around them. No one may enter avoidance areas: doing so will be grounds for disciplinary action which can include immediate dismissal and may result in civil and/or criminal penalties.

- Keep a trash container in every vehicle used in the work area and empty it daily at the recycling bins.
- Do not feed wildlife: Feeding wildlife can be harmful to you and the animals.
- If you encounter wildlife that you feel may be harmful, back away slowly and call your supervisor and the Designated Biologist who will determine the appropriate action.
- Report any injured or dead animals to your supervisor or the Designated Biologist.
- Do not pick wildflowers.
- Do not bring pets to the work area: For the safety of your pets and wildlife, leave your pets at home.
- Do not bring firearms to the work area and do not hunt: Firearms and hunting are prohibited.
- Smoke only in designated areas: Designated smoking areas will be identified, well away from flammable materials. Be sure to completely extinguish all smoking materials and dispose of cigarette butts in the receptacles provided.
- Do not build fires.
- Never park a vehicle where a catalytic converter could ignite dry vegetation.
- Keep your construction vehicles and equipment in good operating condition and make sure that emissions control systems are not disabled.
- Do not use or transfer hazardous materials near open water or drainage channels**,** only in designated areas.
- Never allow dirt or debris to block stream flows or drainage channels.

SENSITIVE SPECIES

The following species occur or have a potential to occur in the project area:

Listed Animals

San Joaquin kit fox

Tipton kangaroo rat

Swainson's hawk

Other Sensitive Species

Loggerhead shrike

White-tailed kite

Burrowing owl

The training session will include photographs and other important information about the sensitive animals that workers may encounter while working on the Henrietta Peaker Project and they will be told that it is important that they report sightings of these animals to their supervisors or the Designated Biologist.

The attached form will be signed by each employee to verify that he or she has received the awareness training.

Certificate of Completion

I certify that I have received training at the educational session prior to beginning work on this project. During that session, I was provided information about the biology, habitat needs, status under the federal and state Endangered Species Acts, and measures being taken for the protection of the threatened and endangered species that occur in the project area. I also received instruction about the need to protect other sensitive plant and animal resources in the project area.

I, the undersigned individual, have read and understand the measures and agree to comply with all provisions of the program. I am aware that I may incur civil and/or criminal penalties if I do not conform to the required measures.

Furthermore, I agree to participate in the Endangered Species Monitoring Program and will record all personal sightings of the species of concern in the project area.

____

Name (Please print)

____

Signature

____

Date of Session

Instructions: Fill out this form and give to the class instructor.

Henrietta Peaker Project Emergency Contact

If you see an emergency involving wildlife or habitats in the project area, please contact your supervisor.

Attachment 2.3-10

Letter from U.S. Fish and Wildlife Service

(USFWS)

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:

1-1-01-CP-3220

October 4, 2001

Mr. D. W. Wheeler
Vice President
GWF Power Systems
4300 Railroad Avenue
Pittsburg, California 94565

Subject: Endangered Species Conservation Requirements for the Proposed Henrietta Peaker Power Project, Kings County, California

Dear Mr. Wheeler:

We are responding to your submittal of August 28, 2001, and subsequent conversations with David Stein of URS Consultants, concerning conservation requirements for the proposed Henrietta Peaker Power Project (HPP) in Kings County, California. Your proposed project has the potential to result in take of San Joaquin kit foxes (*Vulpes macrotis mutica*, "kit fox"). This listed species is protected under the Federal Endangered Species Act of 1973, as amended (Act).

Section 9 of the Act and its implementing regulations prohibit the "take" of federally listed fish and wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any listed wildlife species. "Harm" in this definition includes significant habitat modification or degradation where it actually kills or injures wildlife, by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR § 17.3).

The proposed facility will be a 91.4-net-megawatt (MW) simple cycle natural gas-fired power plant, to be located on the eastern side of 25th Avenue, one mile south of State Route 198, and 10 miles southwest of Lemoore, Kings County, California. The project will consist of the power plant, a 70-kilovolt (kV) switchyard, approximately 550 feet of new 70-kV transmission line, and 2.2 miles of new 16-inch natural gas pipeline. Additionally there will be a 16.5 foot water interconnection pipeline from the site property boundary. The California Energy Commission (CEC) has told us that GWF Power Systems will require CEC approval to hook up any customers to the power plant steam line. The U.S. Fish and Wildlife Service expects to be included in the CEC review process for any customer hookups, and therefore will not require GWF to address the likely effects of potential customer hookups at this time.

Based on the Biological Resources section of your Application for Small Power Plant Exemption to the California Energy Commission prepared by Bill VanHerweg and URS Corporation, and conversations between Mr. David Stein and Brian Peterson of this office, the Service believes that take of the species mentioned above will be minimized to the maximum extent possible. Your power plant will be built on fallow farmland and the plant will occupy a 7 acre portion of a 20-acre parcel. The laydown area for construction of the plant will also be within the 20-acre parcel, and will temporarily occupy 5 acres. The gas pipeline route will be installed along 25th Avenue, which is an unimproved farm access road. It will tie into the Southern California Gas Line (SoCalGas) 800 approximately one mile south of the Avenal Cutoff and go north within an HPP easement, pass beneath the Avenal cutoff, and proceed north in an existing SoCalGas easement, then turn east to enter the HPP site. The transmission line is located entirely on the Henrietta Peaker Project site and the adjacent Pacific Gas and Electric site. We require compensation at a ratio of 1:1 for permanent development, and 0.2:1 for temporary impacts that occur on agricultural land in the range of the San Joaquin kit fox. Therefore 9.3 acres of compensation acreage will be required to offset the effects of your project.

We think your project is appropriate for participation in the Kern Water Bank (KWB) Compensation Bank, and we authorize the KWB to extend incidental take authority to you and your entire project under their Master Permit. While your project is not within the normal service area for the KWB Compensation Bank, you can be covered as the Service retained the right to add additional projects to the KWB coverage, if the species and impacts are similar to those normally covered by the KWB. You will need to buy 10 acres of compensation credits habitat for the project as the KWB only sells credits in whole acre increments. Please arrange with Cheryl Harding at KWB for acquisition of the required credits and for inclusion under the Master Permit. Once you have provided the funds, a Certificate of Inclusion will be issued to you by KWB, which provides you with the incidental take authority you need to conduct work in an area with endangered species habitat.

If for any reason your project is not started within two years of the date of this letter, this approval is no longer valid. In that case, we may require another biological survey, and will require that the project conform with our requirements as they exist at that time. In any case, you must contact us immediately if any of the following occur:

> (1) the project design changes; (2) the amount or extent of incidental take is exceeded; (3) new information reveals effects to listed species or critical habitat in a manner or to an extent not considered in this letter; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease and we must be contacted immediately.

Thank you for your interest in conserving threatened and endangered species. Please contact Brian Peterson or Peter Cross at (916) 414-6600, if you have any questions regarding this letter.

Sincerely,

Lori Rinek

Vicki L. Campbell
Acting Chief, Conservation Planning Division

cc: Mike Mulligan, CDFG, Fresno
Bob Eller, Project Manager HEP, CEC, Sacramento
Tom Schofield, Biologist, CEC, Sacramento
Natasha Nelson, Biologist, CEC, Sacramento
David Stein, URS, Oakland
John Grattan, Grattan and Galati, Sacramento
Bill VanHerweg, Buena Vista Biological, Bakersfield
Cheryl Harding, Kern Water Bank Authority, Bakersfield
Mark Wolfe, Adams, Broadwell, Joseph & Cardozo, South San Francisco

Cultural Resources

Technical Staff: Paul Shattuck
Technical Senior: Dale Edwards
Project Manager: Bob Eller

2.4 Cultural Resources

Siting Regulations and Information

Appendix B (g) (2) (E): In the discussion on mitigation and monitoring prepared pursuant to subsection (g)(1), a discussion of any educational programs proposed to enhance awareness of potential impacts to archeological resources by employees and contractors, measures proposed for mitigation of impacts to known cultural resources, and a set of contingency measures for mitigation of potential impacts to previously unknown cultural resources.

Information Required to Make AFC Conform with Regulations

Please provide a plan for cultural resources education and training of construction and supervisory personnel for this project.

RESPONSE 16

A briefing will be conducted before construction begins to discuss the potential cultural resources in the project area, basic identification of cultural resources, and the protocol to follow in the event of a discovery. Attachment 2.4-1 provides a cultural resource education handout that will be given to all construction crew and construction supervisors involved in the Henrietta Peaker Project. This handout is the plan for the cultural resources education and training to be provided to construction and supervisory personnel.

Attachment 2.4-1

Cultural Resources Education Program for

Construction Crew and Supervisors

Attachment 2.4-1

Cultural Resources Education Program for

Construction Crew and Supervisors

GWF Henrietta Peaker Project

Kings County, California

This training manual outlines the cultural resources education program for the Henrietta Peaker Project (HPP) construction in Kings County, California.

A pre-construction/excavation cultural resource training briefing will be given to appropriate construction personnel. This training will be given by the project Cultural Resources Specialist (CRS) or other cultural resources personnel approved by the CEC. It is anticipated that construction personnel brought onto the HPP project after initial excavation commencement, including construction supervisors, project managers, and any other workers who operate—or will operate—ground moving equipment, or working on-site in any other capacity, will be given this handout. The cultural resources training will be at two week intervals (if new personnel who have not previously received in-person cultural resources training for the HPP are brought on to the project during the intervening period) thereafter until ground disturbance is concluded at the site. All personnel will be required to sign a form that indicates they have received the handout and understand all provisions set forth in that document.

Cultural Resources Information

The material by-products of human activity are called cultural resources. Cultural resources encompass the range of physical objects, sites and structures that are either the direct result of intentional or inadvertent human actions. For example, the foundations of a building are the remnants of an intentional human activity - the building of a structure. The scraps of bone left behind in a firepit are also cultural resources, but they were in all likelihood left behind as an unintentional act. Both are cultural resources and both, when properly studied, can contribute to our understanding of past human activity.

An archaeologist is a researcher who seeks to learn about past human activities by studying what was left behind. The role of an archaeologist is not unlike that of a detective. By studying the full range of cultural resources in an archaeological site, the archaeologist can begin to piece together a story of past activity at a particular location.

Unlike the historian, who relies primarily on a written record of events, the archaeologist must rely, in part, on the physical evidence itself. This is not always a disadvantage for the archaeologist. For example, the historical accounts of the famous Pony Express mail route established in the 1860s describe the strict prohibition of alcohol at Pony Express stations. Many historical accounts assumed this prohibition of alcohol at the stations to be factually correct. A "Boy Scout" portrayal of those who worked for the Pony Express was not uncommon. When two of the stations were excavated by archaeologists 100 years later, the researchers discovered that the most common artifact were glass containers that held whisky and wine! In this case the archaeologist was able to correct and add to the historical record.

Why Is Any of This Important?

Most people are interested in the past. Each year millions of tourists visit museums, historical sites and archaeological sites with an honest desire to learn more about our past. Human curiosity with the past is not just a recent phenomenon. Many prehistoric archaeological sites contain artifacts dating from even earlier cultures. Apparently, these earlier objects were viewed as curiosities worth saving. Perhaps it's as simple as "…understanding who we were, helps us understand who we are." However, like many other resources found on our planet, cultural resources are non-renewable. Put more bluntly, once these resources are destroyed, they are lost forever. Not only will the physical objects be lost, but also a fragment of our collective history will be gone.

Potential Types of Cultural Resources in the Project Area

Native Americans may have been in the project area 10,000 years ago or more. Surface surveys have been completed for all the project areas. While no prehistoric archaeological sites were located within the project area, a few prehistoric sites that were settlements or temporary camps have been previously documented within a few miles of the project APE. Finds related to these or other Native American sites also might be discovered during the HPP construction. Artifacts could include flint arrowheads, blades or grinding tools such as pestles or mortars. Features such as hearths, living surfaces, or food preparation areas might also appear. Beads have also been found at many Native American archaeological sites in the region. Subsurface construction activity or grading could also uncover burials related to both the historic and prehistoric periods.

While no standing historic sites have been found within the project APE it is possible that artifacts from the historic period could be found below the surface. Bottles, cans, machinery, tools, or various other artifacts intended for trash 50 years ago, may now have the potential to contribute to our understanding of local and regional history. Although not anticipated, buried structural remains might also be found within the APE. Some of these might be remnants from unrecorded historical buildings, or even more mundane structures such as wells or privies.

Laws and Regulations That Protect Cultural Resources

In the United States, these fragile and nonrenewable cultural resources have been legally recognized on the federal, state, and in some cases, local levels. Such resources, if found to be significant, are protected by laws and regulations to ensure that truly important resources are preserved or studied before they are destroyed. As early as 1906, the Federal Government formally recognized the importance of some cultural resources with passage of the 1906 Antiquities Act. In 1966, Congress passed the National Historic Preservation Act, which required all Federal agencies to assess the effects of any agency-sponsored undertaking on cultural resources.

On the California State level, consideration of significance as an "…important archaeological resource" is measured by cultural resource provisions considered under California Environmental Quality Act (CEQA). Section 15064.5 of CEQA assigns special importance to human remains and California Public Resources Code Section 5097.98 and Section 7050.5© of the Health and Safety Code specify procedures to be used when Native American remains are discovered.

California Public Resources Code Section 5097.99 states, in summary, that

- "…No person shall obtain or possess any Native American artifacts or human remains which are taken from a Native American grave or cairn…except as otherwise provided by law…"
- "…Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains which are taken from a Native American grave or cairn…except as otherwise provided by law…is guilty of a felony which is punishable by imprisonment in the state prison."
- "…Any person who removes, without authority of law, any Native American artifacts or human remains from a Native American grave or cairn with an intent to sell or dissect or with malice or wantonness is guilty of a felony which is punishable by imprisonment in the state prison."

IMPORTANT: The unauthorized disturbance or collection of cultural resources can result in penalties of up to $100,000 and 5 years imprisonment.

Procedures in the Event of a Discovery

The workforce members should always contact the appropriate person when cultural resources are discovered. If you encounter any cultural resources during construction, STOP WORK in the immediate vicinity of the find and report the find to your supervisor immediately. Your supervisor will then notify the Project Engineer and CRS. Do not resume work until you have been instructed to do so by your supervisor or the CRS.

The construction crew and other project personnel have a vital role in the cultural resources monitoring process and should always be alert for these resources. More often than not, the heavy equipment operators make the first discoveries of cultural finds in undisturbed strata, so it is extremely important that those involved in such activities be aware of the proper procedures to follow in the event of discovery. Key items to look for when in the field are:

1. <u>All soil and deposit changes, such as color or type</u>. A soil color change can indicate a former living surface like a floor, an historical trash deposit, a hearth or food preparation area, building foundations, historical farm or cultivation area, and other activities. Subsurface soil changes or inclusions, such as rocks embedded into a sandy or silty deposit, can indicate areas prepared for structural foundations, or can be the remnants of a campsite fireplace.
2. <u>Presence of charcoal particles in soil</u>. Charcoal, as larger chucks, small flecks, or in thick, black horizontal deposits, might indicate the presence of a hearth or cooking area.
3. <u>Any buried objects or structures</u>. Common prehistoric artifacts include stones used for processing acorns and other plant materials, chipped stone artifacts made of obsidian or chert, and shell beads. Historical cultural resources include bottles, tools, pieces of clothing, coins, dishes, bricks, and numerous glass, metal, and ceramic artifacts. Buried structural remains might include brick wall remains, concrete foundations, or any other features that were once part of a standing structure.

In the event that cultural resources are uncovered during construction the following procedures must be followed:

- Excavation work or any other earth-moving activities within 100 feet must halt/relocate
- The site or area foreman must be notified of the suspected find(s)
- If the finds do not appear to be human remains/burial(s) the CRS will be immediately contacted

Cultural Resource Recovery and Mitigation Methods

Various sequences of events could occur upon the discovery of cultural resources. The excavation may proceed with no restrictions if the resources are assessed as insignificant by a qualified archaeologist. Sometimes, the excavation may proceed with caution and enhanced recordation of the cultural resources, or excavations may proceed if there will be no further damage the find. In the last two cases, the excavation will not be backfilled until enhanced recordation of the find is completed. Finally, the excavation might be halted or redirected in the immediate area until agency consultation is complete and proper mitigation plans have been arranged. Ask the CRS or your supervisor when there is any doubt about whether the work can proceed.

In certain cases, the CRS or a cultural resource monitor (CRM) might need to view a trench or profile in order to assess the finds or make more thorough recordation. Coordinate these activities with the cultural resources personnel. Do not continue excavations until the CRS/CRM has given permission to proceed. Cultural resources might need to be sampled, or other cultural resources team members might still be in the trench.

Human Remains

There is always the potential for encountering human skeletal remains. If the finds do appear to be human remains/burial(s):

1. All excavation activities within 100 feet will immediately stop and the area will be protected with flagging or by posting a monitor or construction worker to assure no additional disturbance occurs; if the find occurs at the end of the work day, the area must be secured by plating, or covering with other impervious material to preclude vandalism.
2. The CRS/CRM, if not present, must be contacted immediately to determine if the remains are potentially human; if potentially human the CRS/CRM will

immediately notify the Project Owner or his designated representative who will contact the County Coroner first and then the CPM.

3. The Coroner will have two working days to examine the remains after being properly notified.
4. Work will not continue in that area until the Project Owner, and/or CRS has been properly notified by the Coroner as to whether or not the remains are considered prehistoric (not a crime scene).
5. If the Coroner determines that the remains are not subject to his or her authority and if the Coroner recognizes the remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she will contact by telephone within 24 hours the Native American Heritage Commission.
6. Under typical circumstances, the Most Likely Descendent(s) (MLD) of the discovered remains will then be contacted by the NAHC. The MLD has 24 hours to make recommendations to the project owner regarding treatment and disposition of the identified remains

KINGS COUNTY CORONER: (559) 582-3211

<u>Summary – Your Responsibilities</u>

- When operating in the designated construction areas, all crewmembers should always keep an eye open for these resources. This vigilance should occur even in areas that look previously disturbed.
- If suspicious finds do appear during construction, immediately halt the excavation activities in the immediate vicinity of the discovery.
- Contact the CRS/CRM to verify that the finds are in fact significant cultural resources.

- If the CRS or CRM cannot be immediately located, then contact the construction supervisor. Only the CRS or qualified monitors are authorized to identify the resources and to assess whether the resource is significant.
- Cultural resources and human remains are protected under state and Federal law. The unauthorized removal or intentional disturbance of these resources can result in a fine and imprisonment.

Key Contacts

CRS	**Brian Hatoff**	**510-874-3195** **510-682-3343 (cell)**
Alt. CRS	**Bryon Bass**	**510-874-3235** **415-225-6590 (cell)**

Land Use

Technical Staff: Mark R. Hamblin
Technical Senior: Eileen Allen
Project Manager: Bob Eller

2.5 Land Use

Siting Regulations and Information

Appendix B (g) (1): ...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Information Required to Make AFC Conform with Regulations

Discuss the direct and cumulative impacts of the loss of farmland of statewide importance farmland, including the potential for this project to induce agricultural land conversion, and overall urban growth on surrounding parcels. We suggest using the California Department of Conservation's Agricultural Land and Site Assessment Model (LESA) to characterize the loss of farmland of statewide importance. Contact Eric Vink at the Dept. of Conservation at (916) 324-0859. Discuss measures for mitigating the loss of farmland of statewide importance.

RESPONSE 17

GWF proposes to contribute funds to the American Farmland Trust for the procurement of conservation lands on a 1:1 basis within Kings County, if possible, or otherwise within areas that are in close proximity to the County. With this mitigation there are no direct or cumulative impacts from the HPP.

SB 28 Sher Requirements and Information

§25552(e)(1) (All): [a]ssure that the thermal powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation;

Information Required to Make AFC Conform with Regulations

Discuss the direct and cumulative impacts of the loss of farmland of statewide importance, including the potential for this project to induce agricultural land conversion, and overall urban growth on surrounding parcels. We suggest using the California Department of Conservation's Agricultural Land and Site Assessment Model (LESA) to characterize the loss of farmland of statewide importance. Contact Molly Penberth at the Dept. of Conservation at (916) 324-0859. Discuss measures for mitigating the impact of the loss of farmland of statewide importance. The response to App.B item (g)(1) will meet this requirement.

RESPONSE 18

See Response 17.

Project Overview

Technical Staff: Bob Eller
Technical Senior: Paul Richins
Project Manager: Bob Eller

2.6 Project Overview

SB 28 Sher Requirements and Information

§25552(e)(5)(A) (Project Overview): [t]hat the thermal powerplant will cease to operate and the permit will terminate within three years.

Information Required to Make AFC Conform with Regulations

Applicant requests waiver of requirement. Pending legislation may also waive requirement.

RESPONSE 19

GWF Energy LLC has entered into a contract with California Department of Water Resources to meet the State's critical electricity needs. The contract requires that power from the project be supplied for a 10-year period. Accordingly, GWF Energy LLC has requested that the 3-year limitation be waived. This waiver would be consistent with both the spirit and the intent of the Governor's executive orders. It is our understanding that CEC legal staff have proposed that the granting of this waiver be placed on the agenda for the October 17, 2001, business meeting of the California Energy Commission.

Public Health

Technical Staff: Alvin Greenberg
Technical Senior: Mike Ringer
Project Manager: Bob Eller

2.7 Public Health

Siting Regulations and Information

Appendix B (g) (1): ...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Information Required to Make AFC Conform with Regulations

Public health impacts due to pre-construction site preparation and construction equipment diesel exhaust must be provided as well as proposed mitigation.

RESPONSE 20

An analysis of long-term health risks associated with particulate matter from diesel-fueled construction equipment was performed. This analysis included additional mitigation for construction equipment beyond that described in Condition of Certification AQ-C3 in Appendix K5 of the AFC. Revised Condition of Certification AQ-C3 (see Attachment 2.1-7) involves the use of catalyzed diesel particulate (soot) filters on construction equipment rated at 100 brake-horsepower (bhp) or greater. Documentation from the U.S. Environmental Protection Agency (June 2, 2000, 65 Federal Register, 35429) and the California Air Resources Board (www.arb.gov/diesel/ss/Eval_Index.htm) indicates that the 90% control that results from these diesel particulate filters is a typical level of particulate control.

The estimated particulate matter (PM) emissions from the construction equipment described in the AFC were reduced by 90% for equipment rated at 100 bhp or greater. Revised Condition of Certification AQ-C3 under air quality has been added to provide for this mitigation. The resulting diesel PM emissions were incorporated into the ISCST3 dispersion modeling source files used in the AFC for the estimation of construction equipment PM impacts. The ISCST3 modeling for the meteorological data year of 1968 resulted in a maximum construction equipment PM impact of 1.88 $\mu g/m^3$ at the south fence line. The nearest residence (which is closer than the nearest nonresidential sensitive receptor) is located approximately 1.5 miles to the north. This residence had an estimated construction equipment PM impact of 0.01139 $\mu g/m^3$ (UTM 239000 east, 4016500 north). Documentation for these calculations can be found in Attachments 2.1-4 and 2.1-5.

Increased lifetime cancer risk and chronic noncancer health impacts were estimated using the California Office of Environmental Health Hazard Assessment (OEHHA) diesel exhaust particulate matter cancer unit risk factor of 3.0×10^{-4} $[\mu g/m^3]^{-1}$ and chronic reference exposure level of 5 $\mu g/m^3$. The cancer unit risk factor assumes a 70-year exposure period. Construction is scheduled to occur over a 5-month period (two 10-hour shifts per day). Therefore, for the purposes of assessing a worst-case lifetime cancer risk, the exposure period was adjusted to a continuous 5-month period. The resulting estimated cancer risk is 3.36 in one million at the south fence line location, and 0.020 in one million at the nearest residence. The estimated chronic noncancer hazard index was calculated as 0.376 at the south fence line location and 0.0023 at the nearest residence, assuming no adjustment to the exposure period. Although the construction period will be only 5 months, as chronic RELs are established from procedures that assume less than 70-year exposures, no exposure adjustment was made for the chronic HI calculation. This is expected to result in a conservative chronic HI estimate.

SB 28 Sher Requirements and Information

§25552(e)(1) (All): [a]ssure that the thermal power plant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation;

Information Required to Make AFC Conform with Regulations

Public health impacts due to pre-construction site preparation and construction equipment diesel exhaust must be provided as well as proposed mitigation.

RESPONSE 21

See Response 20.

SB 28 Sher Requirements and Information

§25552(e)(2) (All): [a]ssure protection of public health and safety; Sec. 8.6.2.7

Information Required to Make AFC Conform with Regulations

See above.

RESPONSE 22

See Response 20.

Socioeconomics

Technical Staff: James Adams
Technical Senior: Dale Edwards
Project Manager: Bob Eller

2.8 Socioeconomics

Siting Regulations and Information

Appendix B (g) (7) (A) (iii): Existing and projected unemployment rates;

Information Required to Make AFC Conform with Regulations

Please provide *projected unemployment rates*.

RESPONSE 23

Projected unemployment rates by county in California are not available from the California Employment Development Department, the Kings County Regional Planning Agency, or the California Department of Finance (Funakoshi, 2001; Highfill, 2001; Palada, 2001); however, the unemployment rate for the State of California as a whole is expected to increase to 5.0 percent in 2001, and 5.7 percent in 2002 (CDF, 2001).

Siting Regulations and Information

Appendix B (g) (7) (A) (iv): Availability of skilled workers by craft required for construction and operation of the project;

Information Required to Make AFC Conform with Regulations

Please provide the availability of skilled workers by craft required for construction and operation of the project.

RESPONSE 24

The California Employment Development Department does not categorize the available civilian labor force in Kings, Kern, or Fresno Counties by type of occupation. However, total construction employment in Kings, Kern, and Fresno Counties was over 25,000 in 1999.[1] Using the respective unemployment rates for each county, an estimated 3,911 construction workers are unemployed in the three counties and therefore could be available to work at the plant. If the number of available construction workers (3,911) is divided evenly among the types of workers needed for the project (including operation and the type of construction workers listed in Table 8.8-13 in the AFC), the estimated number of available workers available for each type is higher than the number of required workers by type.

In addition, Table 8.8-5 in the AFC and new Table 8.8-17 list the local union membership near the project site, from which construction and operation workers would be drawn. The number of workers listed as members of the unions in Table 8.8-17 is higher than the required number of workers for the project.

[1] Includes Mining employment in Kings and Fresno Counties.

References:

California Department of Finance (CDF), 2001. Latest Economic Data. California Forecasts. http://www.dof.ca.gov/HTML/FS_DATA/LatestEconData/Forecasts/California.xls. September 6, 2001.

Funakoshi, Tad, 2001. Telephone communication between Tad Funakoshi, California Employment Development Department, and Katie McKinstry, URS Corporation. August 31, 2001.

Highfill, Sydney, 2001. Telephone communication between Sydney Highfill, Kings County Regional Planning Agency, and Katie McKinstry, URS Corporation. September 12, 2001.

Palada, Cecilia, 2001. Telephone communication between Cecilia Palada, California Department of Finance, and Katie McKinstry, URS Corporation. September 6, 2001.

New Tables for

Section 8.8 (Socioeconomics)

Table 8.8-17
Local Union Membership Near HPP Site

Type of Worker	Number of Workers	Area
Aluminum, Brick, and Glass Workers	200	Central Valley/Fresno
Auto Mechanics, Machinists	1310	From Merced to Bakersfield
Carpenters	1300	Fresno, Tulare, Kings, Madera, Kings, Inyo and Mono counties
General Construction	600	Kings, Inyo and Mono counties
Electrical Workers	620	Fresno, Tulare, Kings, Madera counties
Ironworkers	500	All of Central Valley
Laborers	1125	Fresno, Tulare, Kings, Madera counties
Painters	420	Fresno, Tulare, Kings and Madera counties
Plasterers and Cement Masons	325	Fresno, Tulare, Kings, Madera counties
Plumbers and Steamfitters	600	Fresno, Tulare, Kings and Madera counties
Roofers and Waterproofers	225	Fresno area
Sheet Metal Workers	1,800	Fresno, Tulare, Kings and Madera counties
Teamsters	63	Fresno, Tulare, Kings and Madera counties
TOTAL	9,088	

Soil Resources

Technical Staff: Tony Mediati
Technical Senior: Dick Anderson
Project Manager: Bob Eller

2.9 Soil Resources

Siting Regulations and Information

Appendix B (g) (1): ...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Information Required to Make AFC Conform with Regulations

(1) Please provide information on the intended use of the parcel outside of the 7 acres that are planned for the project.

(2) Please provide an estimate of the current soil erosion and a cumulative impact assessment.

(3) Please provide information on proposed monitoring efforts to ensure success of mitigation measures, if any.

(4) Please discuss any direct, indirect or cumulative impacts associated with the conversion of agricultural land to industrial uses.

(5) Page 8.15-8 it is stated " the loose nature of the soil limits it use for embankments, dikes, and levees." Please describe what soil will be used for berms and drainage or what steps will be taken to make the soil suitable.

RESPONSE 25

(1) It is uncertain what the intended use of the parcel outside of the HPP will be. However, GWF does not intend to remove the remainder of the parcel from agricultural use.

(2) The land in the vicinity of the HPP is currently being used for agricultural purposes. Current wind and water erosion occurs from normal agricultural practices (e.g., rototilling, irrigation). The topographic gradient in the vicinity of the HPP is flat, reducing the probability of a high amount of erosion due to water. According to *Soil Survey of Kings County, California* (Arroues and Anderson, 1986), the susceptibility of the Lethent clay loam to wind erosion is slight and the susceptibility of the soil to water erosion is low. Therefore, the erosion of the soil due to wind and water is estimated to be low.

Cumulative impacts to erosion from the construction of the HPP are expected to be low. During construction, mitigation measures will be implemented (see Response 25(4) below) to minimize erosion impacts from construction.

(3) The mitigation measures include implementing best management practices to minimize soil erosion during construction of the HPP. The mitigation measures and verification/monitoring procedures will be described in the SWPPP for the HPP construction. The construction manager will have the SWPPP onsite and will be responsible for implementing the best management practices. The mitigation will include the use of silt fences, hay bales, dust suppression, and minimizing to the extent practical the area of the site open to erosion at any one time. These measures can be monitored by visual observation, followed by written documentation of the measures taken. As part of the best management practice during construction, and particularly after a rain event, the site and drainages will be inspected for signs of erosion (e.g., excess sediment accumulation in drainage areas). Observations and corrective actions will be documented.

(4) GWF proposes to contribute funds to the American Farmland Trust for the procurement of conservation lands on a 1:1 basis within Kings County, if possible. With this mitigation there are no direct or cumulative impacts from the HPP.

Approximately 13 acres will be affected by the HPP, and approximately seven acres will be permanently affected by the HPP project. The HPP site and proposed natural gas pipeline are not located on prime farmland, but they are located on farmland of state importance. There are 429,172 acres of farmland of state importance in Kings County (Soil Conservation Service, 1998). Only eight acres out of 429,172 acres, or 0.0019 percent, will be permanently converted to industrial use. Therefore, a very small percentage of farmland of statewide importance in Kings County will be permanently converted to industrial use by the HPP.

(5) A stormwater runoff pond will be constructed as part of the HPP. The sides of the runoff pond will be cut on slopes to be specified by the geotechnical report. Topsoil will be spread on the slopes and bottom of the pond, and all surfaces will be seeded, fertilized, mulched, and watered to establish a vegetative cover to protect against erosion. The grass seed will be selected in accordance to the California Department of Transportation (DOT) specifications for that region. All other surfaces around the pond will be treated the same way unless covered with aggregate surfacing, concrete paving, or asphalt paving.

Siting Regulations and Information

Appendix B (g) (15) (C): An assessment of the effects of the proposed project on soil resources and agricultural land uses. This discussion shall include:

Information Required to Make AFC Conform with Regulations

Please provide an assessment of the effects of the proposed site preparation and construction activities (grading, excavation, grubbing, revegetation, berm, cut, fill, trenching, etc..) on soil uses and agricultural lands.

RESPONSE 26

The HPP site and proposed natural gas pipeline will be located on Lethent clay loam soil. In Kings County, there are a total of 50,127 acres of Lethent clay loam (Arroues and

Anderson, 1986). Therefore, the HPP will be permanently affecting only seven acres out of 50,127 acres of Lethent clay loam, or 0.016 percent of the total amount of Lethent clay loam in Kings County.

Impacts to soil uses and agricultural lands from grading, excavation, grubbing, etc., will be minimal. Only 0.016 percent of the total Lethent clay loam in Kings County will be permanently affected by the construction of the HPP site and the proposed natural gas pipeline. In addition, as stated in Response 25(4) above, only 0.0019 percent of the total farmland of state importance in Kings County will be affected by the HPP.

In addition to the seven acres of permanent disturbance, five acres of land will be affected by construction activities. Once construction is complete these areas will be restored to their current use.

Siting Regulations and Information

Appendix B (g) (15) (C) (i): The quantification of accelerated soil loss due to wind and water erosion;

Information Required to Make AFC Conform with Regulations

Please provide the quantification of accelerated soil loss due to wind and water erosion.

RESPONSE 27

As stated in the AFC, the soil loss potential from erosion was not calculated because the construction activities would employ mitigation and sedimentation/erosion controls to minimize soil erosion. Mitigation measures are outlined in the AFC and will be described as best management practices in the SWPPP for the construction of the HPP. The construction manager will have the SWPPP onsite during the construction activities. Verification/monitoring of the BMPs will be conducted as described in Response 25.

Siting Regulations and Information

Appendix B (g) (15) (C) (iii): The effect of power plant emissions on surrounding soil-vegetation systems.

Information Required to Make AFC Conform with Regulations

Please provide an assessment of the effects of the plant's emissions on surrounding soil vegetation systems.

RESPONSE 28

To assess the project's potential impacts on soils and vegetation in the immediate project area, maximum modeled NO_2 and SO_2 concentrations from the proposed combustion sources, as well as estimates of total nitrogen and sulfur deposition from these modeled concentrations, were compared against thresholds for significant impacts to vegetation and ecosystems published by the U.S. Forest Service (USFS, 1992) for Class I Wilderness Areas. The soils and vegetation in the project area are not as sensitive as the ecosystems being protected by these sensitive USFS threshold levels.

For SO_2, the USFS guidance states that maximum SO_2 concentrations below 40 parts per billion by volume (ppbv) and annual average SO_2 concentrations below 8 ppbv will maximize protection of all California plant species. The results of the air dispersion modeling presented in Section 8.1 of the AFC (Table 8.1-19) were 11.7 $\mu g/m^3$ (4.4 ppbv) for a one-hour concentration and less than 0.01 $\mu g/m^3$ (<0.01 ppbv) on an annual average at maximum impact locations. Both of these values are well below the USFS significance levels. As for NO_2, the guidance recommends that annual NO_2 concentrations below 15 ppbv are protective of California plant species. The dispersion modeling results presented in Table 8.1-19 of the AFC show the maximum annual NO_2 concentration due to the project to be 0.02 $\mu g/m^3$ (0.01 ppbv), which is again well below the USFS significance level.

The USFS guidance also presents significance thresholds for impacts to soils due to total nitrogen and sulfur deposition. For the purposes of this assessment, it was assumed that at the locations of maximum modeled NO_2 and SO_2 all of the nitrogen and sulfur in these gases convert to elemental nitrogen and sulfur in the particulate phase and deposit on the ground at these locations. This, of course, is extremely conservative, as this would not physically occur. This calculation was performed by multiplying the maximum modeled airborne concentrations by a deposition velocity factor of 0.02 meters per second, which is consistent with the methodology used by the California Air Pollution Control Officers Association (CAPCOA) for estimating potential health risks due to deposition from sources of toxic PM_{10} emissions (CAPCOA, 1993).

For total sulfur deposition, the USFS guidance states that an annual value of five kilograms per hectare per year (kg/ha-yr) is protective from potential toxic effects. (A hectare is an area of 10,000 square meters.) For total nitrogen deposition, the USFS guidance gives a no-injury value of three kg/ha-yr. The modeled annual SO_2 concentration of less than 0.01 $\mu g/m^3$ and annual NO_2 concentration of 0.02 $\mu g/m^3$ yields total sulfur and nitrogen deposition estimates of <0.03 kg/ha-yr and 0.04 kg/ha-yr, respectively, at the maximum impact locations:

S deposition:

$$<0.01\ \mu g/m^3 \times (32\ g\ S/64\ g\ SO_2) \times 0.02\ m/s \times (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g\ /m^2) = <0.03\ kg/ha\text{-}yr$$

N deposition:

$$0.02\ \mu g/m^3 \times (14\ g\ N/46\ g\ NO_2) \times 0.02\ m/s \times (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g\ /m^2) = 0.04\ kg/ha\text{-}yr$$

With the extremely conservative assumptions employed, both values are below the applicable USFS thresholds. In summary, the maximum modeled airborne concentrations of NO_2 and SO_2 from the combustion sources at the proposed Henrietta Peaker Project results in potential gaseous concentrations and total nitrogen and sulfur deposition values well below levels of concern for California plants and soils in Class I Wilderness Areas, as published by the USFS. The soils and vegetation in the project area are not as sensitive as the ecosystems being protected by these sensitive USFS threshold levels. Thus, the plant's emissions will have an insignificant impact on surrounding soil-vegetation systems.

References:

California Air Pollution Control Offices Association. 1993. Air Toxics “Hot Spots” Program, Revised 1992 Risk Assessment Guidelines.

U.S. Forest Service (USFS). 1992. *Guidelines for evaluating air pollution impacts on Class I wilderness areas in California.* General Technical Report PSW-GTR-136.

SB 28 Sher Requirements and Information

§25552(e)(1) (All): [a]ssure that the thermal powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation;

Information Required to Make AFC Conform with Regulations

For mitigated measures stated, please provide proposed verification measures to ensure that the powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation. If creeks, sloughs or drainages are crossed, please provide a description of the proposed conditions of certification that will ensure the construction of linear facilities will not have a significant adverse effect on the environment.

RESPONSE 29

Creeks, sloughs, or drainages will not be crossed by linear facilities.

SB 28 Sher Requirements and Information

§25552(e)(3) (All): [r]esult in compliance with all applicable federal, state, and local laws, ordinances, and standards;

Information Required to Make AFC Conform with Regulations

If creeks, sloughs or drainages are crossed, please provide information on laws, regulations, ordinances, standards or permits that may be required.

RESPONSE 30

Creeks, sloughs, or drainages will not be crossed.

Traffic and Transportation

Technical Staff: Tamblyn Borton
Technical Senior: Eileen Allen
Project Manager: Bob Eller

2.10 Traffic and Transportation

Siting Regulations and Information

Appendix B (g) (5) (A): A regional transportation setting, on topographic maps (scale of 1:250,000), identifying the project location and major transportation facilities. Include a reference to the transportation element of any applicable local or regional plan.

Information Required to Make AFC Conform with Regulations

This item requires a map at a scale of 1:250,000 rather than the 1:500,000 provided. However, since the map provided does show the major roads in the region, it will be adequate when the key highways (e.g. SR 198) used to access the site are clearly labeled, and the rail line item below is added. Provide clear labels for the railroads in the area which reflect the current ownership, such that the map is consistent with the text references on p 8.10-2 and 8.10-7 (e.g. the Union Pacific line).

RESPONSE 31

Revised Figure 8.10-1 is attached.

Siting Regulations and Information

Appendix B (g) (5) (B): An identification, on topographic maps at a scale of 1:24,000 and a description of existing and planned roads, rail lines, including light rail, bike trails, airports, bus routes serving the project vicinity, pipelines, and canals in the project area affected by or serving the proposed facility. For each road identified, include the following information, where applicable:

Information Required to Make AFC Conform with Regulations

If appropriate, add the Union-Pacific rail line to Fig.10-2, since Fig.10-1 shows it crossing the highway that appears to be SR 198 in the project vicinity.

RESPONSE 32

Revised Figure 8.10-2 is attached.

Siting Regulations and Information

Appendix B (g) (5) (B) (v): Estimated percentage of current traffic flows for passenger vehicles and trucks; and

Information Required to Make AFC Conform with Regulations

Applicant doesn't provide truck traffic percentages for local roadways, as noted on p.8.10-7. Please document the unavailability of this data through a record of conversation with the Kings County Public Works Department staff.

RESPONSE 33

Truck traffic percentages have been provided in the fifth column of Table 8.10-2 in the AFC. Annual average daily truck traffic and traffic counts are not available. (Telephone conversation with Anthony Gomez, Road Superintendent, Kings County Public Works Department, Roads Division, 559-582-3211, extension 2694, June 7, 2001.).

Siting Regulations and Information

Appendix B (g) (5) (B) (vi): An identification of any road features affecting public safety.

Information Required to Make AFC Conform with Regulations

Specify the road features, or lack thereof, that would affect public safety.

RESPONSE 34

There are no road features that would impact public safety.

Siting Regulations and Information

Appendix B (g) (5) (C): A description of any new, planned, or programmed transportation facilities in the project vicinity, including those necessary for construction and operation of the proposed project. Specify the location of such facilities on topographic maps at a scale of 1:24,000.

Information Required to Make AFC Conform with Regulations

Provide a 1:24,000 scale topographic map of new, planned, or programmed transportation facilities.

RESPONSE 35

Planned transportation improvements within 15 miles of the project site are shown on new Figure 8.10-3. The improvements are as follows:

(1) **SR 198 at 19th Ave.** Construction of an interchange, estimated to be completed by 2006.

Note: As explained in Section 8.10.3.2 of the AFC, it is expected that HPP construction traffic will travel along SR 198 at this location. However, the construction period for the interchange will not coincide with construction of the HPP.

(2) **SR 41 at Grangeville Blvd.** Construction of an interchange, estimated to be completed by 2015.

Note: As explained in Section 8.10.3.2 of the AFC, it is expected that HPP construction traffic will travel along SR 41 at this location. However, the construction period for the interchange will not coincide with construction of the HPP.

(3) **18th Avenue from Kansas Ave. to Jackson Ave.** Pavement overlay (rehabilitation) to be completed by 2001.

Note: As explained in Section 8.10.3.2 of the AFC, it is not expected that HPP construction traffic will travel along 18th Ave. to access the HPP site. Also, the pavement rehabilitation will likely be completed before construction of the HPP begins.

(4) **Grangeville Boulevard from SR 41 to 18th Ave.** Pavement overlay (rehabilitation) to be completed by 2002.

Note: As explained in Section 8.10.3.2 of the AFC, it is not expected that HPP construction traffic will travel along Grangeville Blvd. to access the HPP site.

(5) **Jackson Avenue from 11th Ave. to 17th Ave.** Pavement overlay (rehabilitation) to be completed by 2002.

Note: As explained in Section 8.10.3.2 of the AFC, it is not expected that HPP construction traffic will travel along Jackson Ave. to access the HPP site.

(6) **Laurel Avenue from 18th Ave. to 20th Ave.** Pavement overlay (rehabilitation) to be completed by 2001.

Note: As explained in Section 8.10.3.2 of the AFC, it is not expected that HPP construction traffic will travel along Laurel Ave. to access the HPP site. Also, the pavement rehabilitation will likely be completed before construction of the HPP begins.

(7) **Laurel Avenue from Avenal Cutoff Rd. to SR 41.** Pavement overlay (rehabilitation) to be completed by 2002.

Note: As explained in Section 8.10.3.2 of the AFC, it is not expected that HPP construction traffic will travel along Laurel Ave. to access the HPP site.

A Note Concerning Figure 8.10-3: Due to the fact that most of the above-listed transportation improvements are several miles from the HPP site, it was impossible to display the locations of the improvements on a single topographic map at the 1:24,000 scale specified by CEC guidelines. This large scale would require several individual maps to cover a 15-mile radius around the HPP site.

Because of the smaller scale required to display a 15-mile radius around the HPP site on a single map, it was necessary to use a streets and roads base map rather than a topographic base map to display the locations of the transportation improvements. At the required smaller scale, many local roads could not be identified on a topographic base map.

Revised and New Figures for

Section 8.10 (Traffic and Transportation)

Visual Resources

Technical Staff: Eric Knight
Technical Senior: Dale Edwards
Project Manager: Bob Eller

2.11 Visual Resources

Siting Regulations and Information

Appendix B (g) (6) (B): An assessment of the visual quality of those areas that will be impacted by the proposed project.

Information Required to Make AFC Conform with Regulations

Please provide concluding statements on the visual quality of the views from each of the KOPs.

RESPONSE 36

The visual resources section addresses the parameters of vividness, intactness, and unity for each of the selected key observation points (KOPs). Based on FHWA guidelines, the rating system shown in new Table 8.11-2 can be employed to determine overall visual quality. Overall visual quality is determined by averaging the numerical score of the three parameters to obtain the corresponding overall visual quality rating. New Tables 8.11-3 and 8.11-4 apply the methodology to rate the overall visual quality at each of the KOPs before and after construction of the HPP. As shown in these tables, there are no significant changes to visual quality.

Siting Regulations and Information

Appendix B (g) (6) (C): After discussions with staff and community residents who live in close proximity to the proposed project, identify the scenic corridors and any visually sensitive areas potentially affected by the proposed project, including recreational and residential areas. Indicate the approximate number of people using each of these sensitive areas and the estimated number of residences with views of the project. For purposes of this section, a scenic corridor is that area of land with scenic natural beauty, adjacent to and visible from a linear feature, such as a road, or river.

Information Required to Make AFC Conform with Regulations

The AFC states (page 8.11-3) that two-story houses located at NAS Lemoore (the view represented by KOP 2) would have clear views of the project. Please provide an estimate of the number of residences in the area of KOP 2 that would have views of the project. The AFC describes (page 8.11-2) the Lemoore region of the San Joaquin Valley as an expansive flatland, and that in addition to the residences at NAS Lemoore, residences in the vicinity of the project include scattered ranch style homes. Please discuss whether these residences would have views of the project, and estimate their number.

RESPONSE 37

New Table 8.11-5 provides an estimate of the number of residences and traffic volume at each of the KOPs.

It is estimated that there are approximately six ranch style homes within the viewshed that may have views of the site. These homes are more distant than any of the KOPs previously analyzed.

Siting Regulations and Information

Appendix B (g) (6) (D): A description of the dimensions, color, and material of each major visible component of the project.

Information Required to Make AFC Conform with Regulations

The AFC states that the project components will be painted in "neutral" colors, but does not specify the color. The photosimulation of the project (Figure 8.11-11) shows the project painted with a light gray color. Please specify the proposed color for the project structures.

RESPONSE 38

The photosimulation is considered an accurate reflection of the intended color for project structures. The proposed paint color for the project is gull-gray.

New Tables for

Section 8.11 (Visual Resources)

Table 8.11-2
Visual Quality Rating System

Rating	Vividness	Intactness	Unity	Visual Quality
Very high	7	7	7	7
High	6	6	6	6
Moderately high	5	5	5	5
Average	4	4	4	4
Moderately low	3	3	3	3
Low	2	2	2	2
Very low	1	1	1	1

Table 8.11-3
Baseline Visual Quality at Selected Key Observation Points

Base Case	Vividness	Intactness	Unity	Visual Quality	Visual Quality
KOP 1	3	2	2	2.3	Low
KOP 2	3	2	2	2.3	Low
KOP 3	2	2	2	2.0	Low
KOP 4	4	3	3	3.3	Moderately low
KOP 5	2	2	2	2.0	Low

Table 8.11-4
Visual Quality at Selected Key Observation Points Following HPP Construction

Future Case	Vividness	Intactness	Unity	Visual Quality	Visual Quality
KOP 1	3	2	2	2.3	Low
KOP 2	3	2	2	2.3	Low
KOP 3	2	2	2	2.0	Low
KOP 4	4	3	3	3.3	Moderately low
KOP 5	2	2	2	2.0	Low

Visual Quality = (Vividness + Intactness + Unity)/3

Table 8.11-5
Characteristics of Key Observation Points

	Approximate Number of Residences	AADT[1]	Comments
KOP 1	15	11800	SR 98, NAS Lemoore to Avenal Cutoff
KOP 2	15	11800	SR 198, NAS Lemoore to Avenal Cutoff
KOP 3	NA[2]	NA	NA
KOP 4	NA	6900	SR 198, Fresno County to NAS Lemoore
KOP 5	NA	3000	25th Avenue, Avenal Cutoff to SR 198

[1] AADT = Annual average daily traffic (see Tables 8.10-2 and 8.10-4)
[2] NA = not applicable

Water Resources

Technical Staff: Tony Mediati
Technical Senior: Dick Anderson
Project Manager: Bob Eller

2.12 Water Resources

Data Adequacy Issues

Siting Regulations and Information

Appendix B (g) (1): ...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Information Required to Make AFC Conform with Regulations

Please provide additional information on the water source(existing contracts), water supply and availability, chemical characteristics and volume of the discharge water, on-site treatment facilities, drainage, storage facilities and permits. Please provide more information on the disposal of the project wastewater and any mitigation measures or monitoring activities to be undertaken to ensure no adverse environmental impacts result. Please provide a discussion of the indirect and cumulative impacts associated with the operation and maintenance of the project. Please provide information on any monitoring activities needed to ensure that the project will not have adverse impacts on groundwater resources, waste treatment facilities and potential resolution in the event impacts are discovered.

RESPONSE 39

Water Source Supply and Availability

The sources of water for the HPP are the Westlands Water District (WWD) and Kings County. The property on which the HPP is to be built has an existing entitlement of 44 acre-feet of Central Valley Project (CVP) water. This water will be delivered to the HPP site by WWD through its standpipe located adjacent to the site. The WWD is in the San Luis Unit of the CVP. The main water supply features of the San Luis Unit include the Delta-Mendota Canal, the San Luis Dam and Reservoir, the San Luis Canal (SLC), and the Coalinga Canal (WWD, 2001).

The WWD's permanent distribution system consists of a closed, buried pipeline network designed to convey irrigation water to the HPP site from the SLC. Water is distributed through approximately five miles of buried pipe (Lateral 30), varying in diameter from 10 to 96 inches.

Water is supplied to Lateral 30 from the SLC. The SLC, a joint Federal/State facility, is a concrete-lined canal with a capacity ranging from 8,350 to 13,100 cfs. It is the federally built and operated section of the California Aqueduct and extends 102.5 miles from the O'Neill Forebay, near Los Banos, in a southeasterly direction to a point west of Kettleman City. The 138-foot-wide channel is 36 feet deep, 40 feet wide at the bottom, and lined with concrete. San Luis Reservoir serves as the major storage reservoir and O'Neill Forebay acts as an equalizing basin for the upper stage dual-purpose pumping-generating plant. Pumps located at the base of O'Neill Dam take water from the Delta-Mendota Canal through an intake channel (a Federal feature) and discharge it into the O'Neill Forebay. The California Aqueduct (a State feature) flows directly into O'Neill Forebay. The pumping-generating units lift the water from the O'Neill Forebay and discharge it into the main reservoir. Water for irrigation is released into the SLC and flows by gravity to Dos Amigos Pumping Plant where it is lifted more than 100 feet to permit gravity flow to its terminus at Kettleman City (USBR, 2001).

Unlike water agencies with more abundant supplies, the WWD allocates water to its customers even in the wettest years. The WWD's annual contract entitlement from the CVP is 1,150,000 acre-feet. The annual safe yield of the confined underground aquifer adds about another 135,000 to 200,000 acre-feet. Thus, the total water available is about 15 percent (215,000 acre-feet) short of the 1,500,000 acre-feet required to water the entire irrigable area in the District (WWD, 2001).

The surface water supply is allocated to more than 535,000 acres eligible to receive CVP water. The WWD has three separate priority areas of water allocation. During periods of drought, deficiencies are applied as an equal percentage of the contract entitlement of each priority area. The WWD's water supply from 1988-2001 is illustrated in new Figure 8.14-2.

The second source of water for the HPP is Kings County. Kings County is a contractor for water from the State Water Project (SWP). SWP water is extracted from the Sacramento-San Joaquin River Delta at the Clifton Court Forebay, where it enters the California Aqueduct. SWP water is combined with CVP water in the San Luis Canal, the joint Federal/State portion of the California Aqueduct. This section of the Aqueduct passes the HPP site, approximately five miles to the west. Kings County is one of 29 SWP contractors, with access to 4,000 acre-feet of Table A water annually. However, during the current dry year of 2001, SWP contractors are only being allocated 39% of their Table A entitlement. Thus, Kings County is receiving 1,560 acre-feet of SWP water. The HPP will not receive local groundwater, and no groundwater extraction will be required for the HPP water supply. See Attachment 2-12-1 for an explanation of the HPP water allocation and exchange mechanism between Kings County and Tulare Lake Water Storage District. Attachment 2.12-2 provides a history of SWP supply.

Will-serve letters from the water supply sources were included with the AFC.

Chemical Characteristics and Volume of Discharge Water

As illustrated in Figures 8.14-1a and 8.14-1b in the AFC, discharge rates from the HPP are expected to be 0.7 gallons per minute (gpm) for wastewater and 0.95 gpm for water from the oil/water separator. Based upon 8,000 hours of operation, 792,000 gallons of wastewater per year will be generated by the HPP. In addition, approximately 500 gallons of turbine wash water drainage will be generated per event, assuming one event per month, this totals 6000 gallons per year.

Chemical and physical characteristics of the HPP wastewater are shown in new Table 8.14-4, based on annual average conditions.

On-Site Treatment, Drainage, Storage, and Permits

Process wastewater and contact stormwater will be processed through the on-site oil/water separator prior to being sent to the appropriate tanks for off-site disposal. The only other wastewater treatment to occur on-site will consist of water used for domestic and sanitary purposes by HPP employees, which will be discharged to a septic tank and leach field. The septic system proposed is based on two restroom facilities and a maximum of 5 persons on-site at any time. The maximum daily sanitary flow to the septic system will be 350 gallons per day. The septic tank will be 1,500 gallons and will have a drain field of 1,000 square feet. Assuming a percolation rate of 0.5 gallons per square foot yields a drainage field requirement of 700 square feet. Based on the relatively low level of sanitary flow, the presence of clayey soils onsite, and the distance to the nearest domestic supply well, no adverse impacts to local or regional groundwater are expected.

For drainage, see Response 49.

For storage, see Response 49.

For permits, see Responses 40 and 41.

Wastewater Disposal

Stormwater runoff from the immediate plant and equipment area (contact stormwater), including oil from the oil/water separator, and industrial wastewater from the plant itself would be stored in onsite holding tanks and eventually transported offsite via truck for disposal by EnVectra, a waste management company under current contract to GWF. EnVectra will provide waste management services, including the profiling of waste streams, identification of disposal sites, and verification of licenses and permits for transporters and disposal facilities. EnVectra will also arrange for the shipment and disposal of all waste streams from the HPP. EnVectra has identified the Liquid Waste Management, Inc., McKittrick Waste Treatment Site in Kern County (WMU ID# 50152041001) as the disposal point. This facility accepts RCRA, non-RCRA, and nonhazardous waste and is permitted as a Class II landfill. The facility has a capacity of 412 cubic meters (solids equivalent) per day. The slurry material from project wastewater is anticipated to constitute a small fraction of the McKittrick facility's daily capacity.

No adverse impacts to surface waters are anticipated to result from project wastewater disposal, as no discharges to surface water bodies are proposed to occur under the effluent disposal method being proposed at the HPP. The McKittrick waste disposal site is a licensed Class II facility and, as such, must comply with pertinent Regional Water Quality Control Board discharge requirements.

As additional mitigation:

- Mitigation: Process wastewater from the HPP site will be collected in the onsite holding tanks and transported via truck to the McKittrick waste disposal site in Kern County.

  Proposed Verification: CEC shall be notified on an annual basis concerning status of or any changes in the HPP's wastewater disposal plan.

- Mitigation: GWF selected a contractor to haul project wastewater to the offsite disposal location. The contractor must have the appropriate permits from the U.S. Department of Transportation, the necessary equipment, and authorized admittance to the designated disposal facility. Any company not in the possession of these items will be ineligible for use at the HPP.

  Proposed Verification: CEC will receive a copy of the contract conditions for the agreement between the HPP and the selected wastewater hauling company.

Cumulative Impacts

According to the Kings County Planning Department, no proposed industrial or energy-related developments are planned within a two-mile radius of the HPP site (Kings County Planning Department, 2001b). Three projects are currently under review in other areas of Kings County. The first two consist of a church and an assisted living facility in Hanford, approximately 20 miles east of the HPP site. These projects would be served by the City of Hanford's domestic water service. The third project, a dairy expansion in Lemoore, approximately 6.5 miles east of the HPP site, is currently on hold pending release of the latest amendment to the dairy element of the General Plan. If eventually approved, the project would likely draw its water supply either from the City of Lemoore or local groundwater wells. None of the three projects are likely to obtain their water from Kings County or the Westlands Water District, which does not include the sites of these projects, so there would be no cumulative impact from these projects when considered in conjunction with the HPP. Cumulative impacts on local surface water and groundwater quality are not anticipated to occur since the HPP will be disposing of its wastewater at a licensed Class II disposal facility and discharging its non-contact stormwater to an onsite evaporation basin. Appropriate monitoring of the HPP's stormwater discharges will be undertaken to ensure that adverse impacts to local groundwater are prevented.

Monitoring Activities for Groundwater Impacts

The HPP is not expected to have an impact on local and regional groundwater. The HPP would not directly withdraw groundwater from the area. The onsite evaporation/percolation basin would contain non-contact stormwater, and is thus not expected to contain significant concentrations of any constituents of concern. However, a stormwater monitoring program will be established to ensure that stormwater discharges to the basin meet all applicable groundwater quality objectives.

- Mitigation: A biannual stormwater monitoring program will be implemented at the HPP site to assess the quality of stormwater discharges to the evaporation/percolation basin during two storm events, as required by the Regional Board.

  Proposed Verification: CEC will receive copies of this monitoring reporting.

No adverse impacts to groundwater are anticipated to result from project wastewater disposal under the disposal method being proposed at the HPP. The McKittrick waste disposal site is a licensed Class II facility and, as such, must comply with pertinent Regional Water Quality Control Board discharge requirements for any discharges to groundwater.

Siting Regulations and Information

Appendix B (g) (14) (A) (i): Waste Discharge Requirements;

Information Required to Make AFC Conform with Regulations

Please provide Waste Discharge Requirements.

RESPONSE 40

Waste Discharge Requirements (WDRs) are not necessary for the HPP itself since the plant will not be discharging any waste materials to surface water bodies or groundwater. All wastewater from the plant will be hauled offsite to the McKittrick waste disposal site, as described in Response 39. The planned disposal method for noncontact stormwater (evaporation/percolation basin) also does not require WDRs as no pollutants from the site will be discharged to the basin.

Siting Regulations and Information

Appendix B (g) (14) (A) (ii): a National Pollutant Discharge Elimination System Permit.

Information Required to Make AFC Conform with Regulations

Please provide all information required by the Regional Water Quality Control Board in a National Pollutant Discharge Elimination System Permit, or explain why this information is not needed.

RESPONSE 41

The only NPDES permit needed for the HPP is coverage under the California General Permit for Discharges of Storm Water Associated with Construction Activities. A

Notice of Intent (NOI) to comply with the terms of this General Permit was submitted to the State Water Resources Control Board (SWRCB) and confirmation was received on September 7, 2001. The HPP's Waste Discharge Identification number is 5F16S316468. The NOI is attached at Attachment 2.12-3.

In fulfillment of permit requirements, a Stormwater Pollution Prevention Plan (SWPPP), which will incorporate erosion control, spill control prevention, and site revegetation plans will be prepared and maintained at the project site prior to the start of construction activity. A copy of the plan will be submitted to the CEC.

No other NPDES permits are required, since facilities that do not discharge stormwater to designated "waters of the United States" do not require coverage under the General Permit for Discharges of Stormwater Associated with Industrial Activity. Because the noncontact runoff from the HPP would be discharged to an evaporation/percolation basin, the General Permit and associated monitoring and reporting requirements do not apply. No other wastes would be discharged to waters of the United States at the HPP site, so no other NPDES permits are required.

Siting Regulations and Information

Appendix B (g) (14) (B) (i): Ground water bodies and related geologic structures;

Information Required to Make AFC Conform with Regulations

Please provide a hydrostrategraphic map at appropriate scale and the chemical characteristics of ground water bodies and related geologic structures. Please provide a discussion of the direct, indirect and cumulative impacts associated with the construction operation and maintenance of the project in relation to perched water. As well as any mitigation and monitoring plans.

RESPONSE 42

Attachment 2.12-4 provides figures that show groundwater depth contours in the upper, unconfined aquifer and the lower, confined aquifer in the vicinity of the HPP site.

Groundwater quality data for samples taken from a well just to the north of the HPP site on the adjacent property is presented in new Table 8.14-5.

The presence of clay layers within the upper aquifer induces perched water in the area. In the vicinity of the site, perched groundwater has been located between 10 to 20 feet below ground surface in 1997 and has been found as high as 6 feet below ground surface in July 2001. If perched groundwater is encountered during site excavation and grading, any necessary dewatering will be performed. These procedures will be described in full in the SWPPP to be prepared for the project prior to the start of construction. Monitoring of site dewatering activities will be undertaken as part of the monitoring program for construction activities that will be defined in the SWPPP.

Siting Regulations and Information

Appendix B (g) (14) (B) (ii): Surface water bodies

Information Required to Make AFC Conform with Regulations

Please provide required chemical and physical characteristics for the surface water bodies that will either receive stormwater runoff from the site or proposed linear feature and any wastewater (as disposed of by the third party hauler) from the project.

RESPONSE 43

Noncontact stormwater from the HPP site will be directed to the onsite evaporation/percolation basin and will not be discharged to any surface water body. Contact stormwater from the HPP site (from maintenance and plant component and equipment areas) will be collected within holding tanks, from which it will be recycled or transported offsite by EnVectra along with plant wastewater. EnVectra will dispose of this liquid at the Liquid Waste Management's McKittrick Waste Treatment Site in Kern County, a licensed Class II disposal facility. Thus, no contact stormwater or project wastewater will be discharged to any surface water body. The natural gas pipeline interconnect will be buried, so there will not be any opportunity for stormwater runoff to come in contact with it. The pipeline interconnect will not cross any surface water body. Management practices designed to mitigate any potential pollutant loading to stormwater during construction of the pipeline interconnect will be identified in the SWPPP to be prepared for the project prior to the start of construction. Because no stormwater or wastewater will be discharged to surface waters, no chemical or physical characteristics for receiving surface waters are provided.

Siting Regulations and Information

Appendix B (g) (14) (C) (i): Source of the water and the rationale for its selection, and if fresh water is to be used for power plant cooling purposes, a discussion of all other potential sources and an explanation why these sources were not feasible;

Information Required to Make AFC Conform with Regulations

Please provide additional information regarding the alternative water supplies discussed on page 8.14-8; explain why these sources are not feasible. This discussion should include all technical & economic factors (including cost estimates and assumptions) used in the analysis.

RESPONSE 44

Four alternative process water supply alternatives were considered for the HPP. Each was rejected on the grounds described in new Table 8.14-6. Table 8.14-6 provides a comparison of the proposed HPP water supply with three alternative sources that were investigated and notes economic and technical factors in the decision to use Westlands and Kings County water deliveries.

Siting Regulations and Information

Appendix B (g) (14) (C) (ii): The physical and chemical characteristics of the source and discharge water;

Information Required to Make AFC Conform with Regulations

Please provide the physical and chemical characteristics of the discharge water.

RESPONSE 45

See Table 8.14-4 of this section for the chemical characteristics of the facility wastewater.

Siting Regulations and Information

Appendix B (g) (14) (C) (iii): Average and maximum daily and annual water demand and waste water discharge for both the construction and operation phases of the project

Information Required to Make AFC Conform with Regulations

Please provide information on the average and maximum daily water demand and wastewater discharge for construction phases of the project. Please provide information on the wastewater discharge for the operational phases of the project.

RESPONSE 46

Maximum daily water use for HPP construction activities will occur during site grading and excavation, expected to take place over a 3-month period. Most of this water will be used for fugitive dust control. The maximum daily use is expected to be approximately 12,000 gallons, with the daily average estimated at approximately 2,000 gallons.

Additional water will be required for the flushing and commissioning of water treatment systems. It is estimated that this activity will take place over a five-day period, with the peak/average daily water use for this activity estimated at 2,000 gallons. Wastewater from this activity will be discharged to an onsite holding tank for transport offsite, an arrangement that will also be used for (and is fully described in association with) plant wastewater and contact stormwater runoff. Wastewater volumes associated with this activity are expected to be generally equivalent to the water used for the process.

The water-balance diagrams for the HPP are presented in Figures 8.14-1a and 8.14-1b of the AFC. The expected flow rates of the wastewater streams for both average annual ambient temperature (63°F) and maximum daily ambient temperature (98°F) are provided. As illustrated, the primary wastewater discharge for the plant is from the water reverse osmosis treatment and demineralization systems. This wastewater stream will be collected in a storage tank and then processed through the use of a mechanical vapor re-compression unit to separate the concentrated dissolved solids from the wastewater stream. Clean water will be returned to the raw water holding tank and the small amount of concentrated slurry discharge will be stored in a wastewater tank and periodically transported offsite for disposal, as described above. Waste streams from the oil/water separator and turbine wash-water will be collected in separate holding tanks and will also be periodically transported offsite for disposal.

Siting Regulations and Information

Appendix B (g) (14) (C) (iv): A description of all facilities to be used in water conveyance, treatment, and discharge. Include a water mass balance diagram.

Information Required to Make AFC Conform with Regulations

Please provide a description of all facilities to be used in water conveyance, treatment, and discharge

RESPONSE 47

For a description of the facilities to be used to convey HPP process water to the site, see Response 39. For a description of the facilities to be used to convey water through the HPP itself, see below and the mass balance diagrams in Figures 8.14-1a and 8.14-1b in the AFC. For a description of the facilities to be used to convey noncontact stormwater on the site, see Response 48.

The HPP's simple-cycle unit does not include a cooling tower and will therefore have a minimal water demand. The average annual water consumption for the HPP, assuming 8,000 hours of operation, will be appproximately150 acre-feet per year. The HPP average daily flow rate is 148,000 gallons per day. Purified water will be used by the combustion turbine generators (CTG's) for evaporative cooling (for power augmentation), emissions control (water injection for control of nitrogen oxides), and turbine compressor washing.

The treatment process of raw water to create purified water for consumption by each CTG is will be accomplished by the following method:

Raw water from the California Aqueduct will be delivered by the Westlands Water District and will be stored on site in a 300,000-gallon carbon steel internally lined tank (raw water storage tank). This tank will also feed the fire water system and plant service water needs in addition to providing process water used by the CTG's. CTG water will be pumped from the tank to the multi-stage reverse osmosis (RO) system, where the water will be initially pre-filtered to remove suspended solids, and softened to remove hardness for the water. This initial water softening step prevents scale buildup downstream in the RO membranes. The first stage of the RO unit produces nearly pure water known as RO Permeate that contains a total dissolved solids (TDS) concentration of approximately 1 ppm. The by-product of the RO known as RO Reject is water that has an elevated concentration of TDS.

The first stage RO permeate is sent to the Electro-Deionization Unit (EDI) where it is purified so that the TDS is reduced to a less than a measurable amount. The water flows through cells in the EDI that contain a DC electrical potential, which results in the removal of almost all of the remaining ions. The demineralized water (pure water) produced in the EDI is then stored in a 300,000 gallon stainless steel tank for use in the CTG's.

The RO reject from the first stage is sent to a second stage RO unit where the process is again repeated and both RO Permeate and RO Reject streams are produced. The RO Permeate from this second stage unit is sent to the EDI for further purification and then to storage in the "pure water" tank. The RO Reject is sent to a 150,000-gallon stainless steel RO Reject storage tank. EDI wash water needed to maintain the DC cell integrity is also sent to the RO Reject storage tank.

The RO Reject in the storage tank is further processed by using a Mechanical Vapor Re-compression Unit to remove available water that can be reused in the plant as make-up water. RO reject is fed from the storage tank into a vertical vessel or flash tank. A 450 kW mechanical vapor re-compressor reduces the pressure in the vessel causing the RO Reject water to boil. The boiled water vapor is then sent to a heat exchanger where it is condensed back to a liquid and pumped back to the raw water storage tank for reuse. The remaining liquid slurry in the vertical vessel is continually being concentrated and is blown down or transferred to an 8,000 gallon stainless steel wastewater holding tank when the total dissolved solids (TDS) concentration has reached approximately 37,000 mg/L. The concentrated blow-down is stored in the wastewater holding tank until it is trucked off-site for disposal.

Siting Regulations and Information

Appendix B (g) (14) (D) (i): Precipitation and storm runoff patterns;

Information Required to Make AFC Conform with Regulations

Please provide information on stormwater runoff patterns at and around the site.

RESPONSE 48

Elevations on site range from 222.0 feet in the southeastern corner to 225.0 ft in the northwestern corner. The terrain is essentially flat with the steepest grade across the site being approximately 0.14% from the southeastern corner to the northwestern corner. See Attachment 2.12-5 for a diagrammatic description of existing flow patterns. There is an existing ditch along 25th Avenue and along the northern property line approximately 18 inches deep. No major surface water drainages are present on the site. Stormwater runoff currently runs by sheet flow across the site toward the southeast and likely continues off of the HPP site and onto the adjacent property during major storm events. This is most likely a rare occurrence due to both the infrequent nature of rainfall in the area and the extremely level nature of the terrain. In addition, intervening features (cultivated farm fields) likely encourage infiltration by slowing flow velocities in all but the most extreme storm events.

The presence of the drainage ditches along the western and northern (upslope) boundaries of the site means that offsite runoff from upslope areas is prevented from flowing onto the HPP site. Thus, the majority of the stormwater crossing the HPP site is runoff generated by rain falling on the site itself, as opposed to surrounding properties.

Grading during construction of the HPP would alter existing drainage patterns on the site. Surface water runoff would be directed around the construction site to the maximum extent feasible to minimize excess erosion and pollutant loading. It is anticipated that the remainder of the site will continue to be used for agricultural production. See also AFC Appendix H1-2. The stormwater runoff generated from all storms up to and including the 10-year, 10-day event will be captured by the site's drainage system and either routed to the onsite evaporation/percolation basin or to an onsite holding tank for eventual recycling or offsite disposal via truck, depending on the portion of the site it comes from.

Post-construction runoff from the project will be managed with the use of trench drains, shallow ditches, and CHDPE storm piping systems. All of the stormwater runoff will be collected into a large, shallow retention pond to the east of the power block that will rely on percolation and evaporation for drainage. The volume of the pond will be determined based on a 10-year, 10-day storm event (4-inch rainfall) as required by the Kings County Public Works Improvement Standards for Private Retention Basins. A preliminary calculation of the pond's volume has been completed and is included in Attachment 2.12-6. This calculation will be re-evaluated following completion of additional geotechnical study to determine the water table elevation under the pond site. Peak flows for storm pipes and culverts will be calculated using the Rational Method based on a 25-year, 24-hour design storm and will be designed using Manning's Equations.

The area north of the main transformer including the administration building and parking and the switchyard will drain to the north to a series of catch basins along the northern loop road. This area will include the northern loop road that will be super elevated to drain towards the catch basins. The runoff will be collected in the catch basins then carried to the retention basin by HDPE pipes.

The area south of the administration parking and the area within the main loop road that includes the turbines will be crowned in the middle so that runoff will flow to the north to a series of catch basins and to the south to a trench drain. The runoff that will be collected in the catch basins will be carried to the retention basin by HDPE pipes. The runoff collected in the trench drain will be carried to a catch basin south of the turbines and carried to the retention pond by HDPE pipes. The southern portion of the loop road will be super elevated to drain towards the trench drain. The entire area east of the easternmost unit will sheet flow over the super elevated loop road to the east into the retention basin.

Specific design criteria for collection and discharge points, drains, and culverts will be included in the SWPPP to be prepared prior to the start of construction. Best management practices to be put in place prior to and during the construction phase will be identified and shown on the final construction drawings and will be fully detailed in the SWPPP to be prepared prior to the start of construction.

Siting Regulations and Information

Appendix B (g) (14) (D) (ii): Drainage facilities and design criteria;

Information Required to Make AFC Conform with Regulations

Please describe the stormwater collection system (including capacity) proposed for construction and operation. Please include design criteria and calculations and expected peak flow volumes for the various facilities.

RESPONSE 49

For information on the stormwater collection system see Response 48.

Siting Regulations and Information

Appendix B (g) (14) (E) (i): The effects of project demand on the water supply and other users of this source;

Information Required to Make AFC Conform with Regulations

Please provide information regarding the source and current use of the water. Discuss the potential for water curtailment.

RESPONSE 50

For a discussion of the source and current use of the project's water see Response 39. The total of 244 acre-feet of water that will be available to the HPP will provide 94 acre-feet beyond the project's anticipated peak needs. This additional supply is necessary as a cushion to guard against mandated cutbacks in supply to CVP and SWP contractors during dry years such as 2001. With this additional supply the HPP will have adequate water to meet its operational requirements, even during periods of water supply containment.

Although historical CVP and SWP delivery practices indicate that it is unlikely that the HPP would ever be impacted by a water supply curtailment, this cannot be guaranteed. GWF has SWP surface water rights that substantially exceed HPP requirements, and there is a significant margin to ensure the reliability of this supply. This margin allows GWF to assume the remote business risk that this supply would potentially be interrupted due to curtailment. In the unlikely event that water curtailment were to impact the availability of water to the HPP, GWF would either discontinue evaporative cooling or discontinue operation of the plant (if the water supply fell below the level needed for NO_x control). GWF has no plans to develop local groundwater supply for the project as a backup supply.

Siting Regulations and Information

Appendix B (g) (14) (E) (ii): The effects of construction activities and plant operation on water quality;

Information Required to Make AFC Conform with Regulations

Please provide information on the criteria to be used in the selection of the wastewater hauler and the ultimate disposal facility. Please provide information on the potential effects of the project's effluent on the disposal facility. Please clarify if water from the oil-water separator is going to be reused or disposed of offsite.

RESPONSE 51

For a discussion of the criteria to be used in selecting the wastewater hauler and disposal facility, see Response 39.

Water from the oil-water separator will go to a holding tank for recycle within the plant or offsite disposal via the wastewater hauler.

SB 28 Sher Requirements and Information

§25552(e)(1) (All): [a]ssure that the thermal powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation;

Information Required to Make AFC Conform with Regulations

For mitigated measures stated, please provide proposed verification measures to ensure that the powerplant and related facilities will not have a significant adverse effect on the environment as a result of construction or operation. If creeks, sloughs or drainages are crossed, please provide a description of the proposed conditions of certification that will ensure the construction of linear facilities will not have a significant adverse effect on the environment.

RESPONSE 52

Proposed Verification for Mitigation Measures

- Minimizing soil erosion through best management practices

  Verification: See Conditions of Certification Soil and Water 1, and its Verification (submission of Stormwater Pollution Prevention Plan to CEC), and Condition of Certification Soil and Water 2 and its Verification (submission of erosion control plan to CEC).

- Management of contact stormwater

  Verification: The project owner/operator will keep records detailing pick-up for off-site disposal of oil produced from the oil-water separator.

- Spill contingency

  Verification: Prior to initiation of construction, the project owner/operator will make available copies of the spill contingency plan to the CEC.

Note that verifications have been proposed for each of the additional mitigation measures proposed in Response 39.

Surface Water Crossings

No surface water features are to be crossed by either the any of the HPP linear features; therefore, no conditions of certification pertaining to this issue are necessary.

No surface water features are to be crossed by any components of the HPP project.

SB 28 Sher Requirements and Information

§25552(e)(3) (All): [r]esult in compliance with all applicable federal, state, and local laws, ordinances, and standards;

Information Required to Make AFC Conform with Regulations

If creeks, sloughs or drainages are crossed, please provide information on laws, regulations, ordinances, standards or permits that may be required.

RESPONSE 53

No surface water features are to be crossed by any components of the HPP project.

New Tables for

Section 8.14 (Water Resources)

Table 8.14-4
Chemical Characteristics of HPP Wastewater Discharges

Constituent	Concentration (mg/L unless otherwise indicated)
Calcium	2,934.0
Antimony	0.73
Hardness	13,936.5
Alkalinity	10,415.7
Total Dissolved Solids	37,115.0
Specific Conductance	60,147 micromhos/cm
Sulfate	4,841.1
Chloride	8,215.2
Arsenic	0.29
Beryllium	0.147
Boron	29.34
Fluoride	1.47
Chromium	0.88
Copper	0.29
Iron	6.89
Lead	0.147
Selenium	not reported
Magnesium	1,613.7
Manganese	0.734
Turbidity	1,496 (NTU)
Phosphorus- Total	17.60
Phosphorus-Ortho	11.74
Sodium	6,308.1
Zinc	0.73
Bromide	23.47
Nitrite+Nitrate	98.82 (as N)

Table 8.14-5
Local Groundwater Quality Data

Constituent	Total Concentration (ppm)
Aluminum	<0.1
Barium	<0.1
Boron	1.9
Cadmium	<0.01
Calcium	90
Calculated Hardness (CaCO3)	96
Chromium	<0.01
Copper	<0.01
Iron	0.06
Lead	<0.1
Lithium	0.01
Magnesium	5.9
Manganese	0.04
Molybdenum	<0.1
Nickel	<0.1
Phosphorus	0.5
Potassium	1.7
Silica	41
Sodium	570
Strontium	0.22
Vanadium	<0.01
Zinc	<0.01
Bromide	<3.0
Nitrite	<3.0
Chloride	99
Nitrate	<2.4
Sulfate	96
Bicarbonate	400
Carbonate	37
Methyl Orange	440
Phenolphthalein	19
pH	8.5 pH units
Conductivity	1200 mmhos/cm
Total Dissolved Solids	740

Source: Analytical Resources, sampled from Henrietta Well #3, 6/8/01.

Table 8.14-6

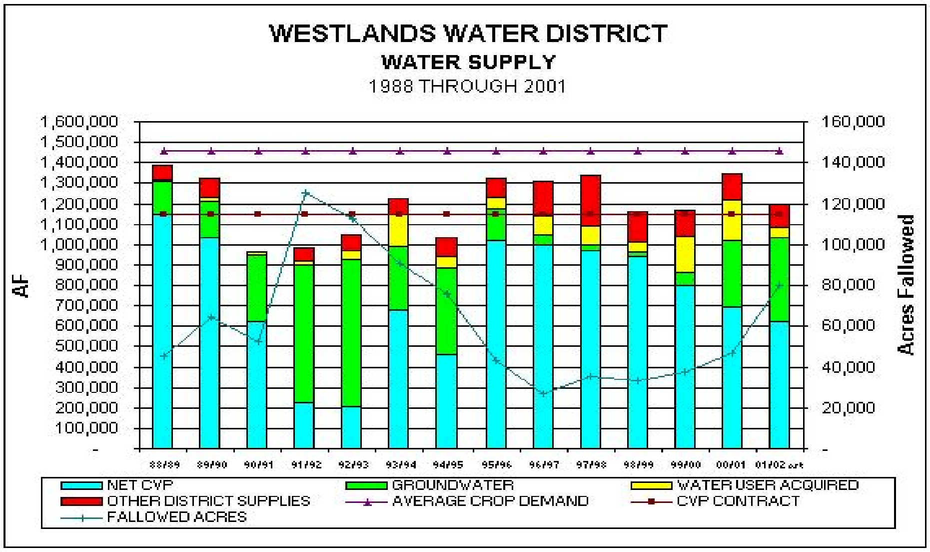
Henrietta Peaker Plant Project - Water Source Alternatives Cost Evaluation

Water Supply Source	Estimated Cost of Supply	Estimated Cost of Water Treatment Equipment	Total Estimated Cost of Supply & Water Equip.	Cost Difference From the Proposed System	System Requirements	Assumptions/Comments
SWP and CVP Surface Water from the California Aqueduct (Proposed)	$0.1 Million	$3.7 Million	$3.8 Million		16.5 feet of 8" underground piping to connect the project site to the existing Westland's Water District Supply line.	Aqueduct water total dissolved solids (TDS) level is approximately 250 ppm resulting in the need for the minimum capacity water processing system and a process waste water stream that is the lowest of the four water sources considered.
On site Drilled Well (Alternative)	$0.6 Million	$5.5 Million	$6.1 Million	$2.3 Million	Drill on-site well to a minimum depth of 600 feet.	On-site well will impact local ground water withdrawal. The TDS of well water is approximately 650 ppm which will require a water treatment system with a greater capacity to process water from the ground water supply source.
NAS Lemoore Effluent Ponds (Alternative)	$1.3 Million	$5.5 Million	$6.8 Million	$3.0 Million	2 miles of underground piping to connect the project site to the local industry discharge ponds.	TDS of water from NAS Lemoore Ponds is approximately 750 ppm. The water also contains suspended solids and BOD, which would require pretreatment prior to use at the HPP. This source of water would require a treatment system with a much greater capacity to process water from the ground water supply source.
Waste Water from Local Industrial Facilities (Alternative)	$4.5 Million	$6.4 Million	$10.9 Million	$6.1 Million	9 miles of underground piping to connect the project site to the NAS Lemoore effluent ponds.	TDS of water from local industry is approximately 1,250 ppm. This water supply alternative contains suspended solids and significant concentrations of BOD, which would require pretreatment prior to use at the HPP. Because of the high TDS the use of this water supply would require water treatment equipment with a much higher design capacity.

New Figures for

Section 8.14 (Water Resources)

Figure 8.14-2



Source: WWD, 2001

Attachment 2.12-1

HPP Water Allocation and Exchange Mechanism

Between Kings County and Tulare Lake Water Storage District

LAW OFFICE OF
MICHAEL N. NORDSTROM

TELEPHONE (559) 992-3118
TELECOPIER (559) 992-3119

1100 WHITLEY AVENUE
CORCORAN, CA 93212

FAX TRANSMISSION COVER PAGE

PLEASE DELIVER

--

TO: Doug Wheeler c/o Joe Morgan (510) 874-3268

FROM: Michael N. Nordstrom

DATE: September 20, 2001

RE: Memo to Doug Wheeler

Total Number of Pages 2 including fax cover sheet)

If you do not receive all of the pages, please call as soon as possible at (559) 992-3118.

Cyndi
(Sender)

MEMORANDUM

To: Doug Wheeler
From: Michael Nordstrom
Date: September 20, 2001
Re: 200 acre foot SWP allocation from County

Dear Doug:

The County of Kings owns 4,000 acre feet of State Water Project (SWP) Table A Entitlement under a contract with the California Department of Water Resources. The County currently utilizes all 4,000 acre feet of this entitlement under an exchange with the Tulare Lake Basin Water Storage District. GWF owns 1,500 acre feet of SWP Table A Entitlement, which it receives from the Tulare Lake Basin Water Storage District. Of this 1,500 acre feet of SWP Entitlement, GWF has at least 200 acre feet that is surplus to its current needs. In order to supply the necessary water to the Henrietta Peaker Project (HPP), GWF will assign 200 acre feet of its Entitlement to the Tulare Lake Basin Water Storage District who will in turn release 200 acre feet of the County's State Water Project Entitlement back to the County. The County will then allocate and assign that 200 acre feet of SWP Entitlement to GWF for use at the HPP site. This arrangement will therefore be water neutral to the Tulare Lake Basin Water Storage District from a water balance standpoint. The Tulare Lake Basin Water Storage District Board of Directors has approved this arrangement as accommodation to GWF. The County Board of Supervisors has also approved this arrangement. Westlands Water District has agreed to wheel the 200 acre feet through its system to the HPP site from the California Aqueduct. The end result will be GWF utilizing 200 acre feet of its already owned SWP entitlement for use at the HPP site.

Attachment 2.12-2

History of SWP Supply

ATTACHMENT 2.12-2
TULARE LAKE BASIN WATER STORAGE DISTRICT
SUMMARY OF STATE WATER PROJECT DELIVERIES
FOR ANGIOLA WATER DISTRICT, 1987 THROUGH 1999

(ALL FIGURES IN ACRE-FEET)

				DELIVERIES						
CALENDAR YEAR	SCHEDULED ENTITLEMENT (1)	APPROVED (%) (2)	APPROVED ENTITLEMENT (A.F.) (3)	REQUESTED TABLE A (4)	TABLE A CARRYOVER (5)	AVAILABLE UNUSED TABLE A (6)	INTERRUPTIBLE WATER (7)	TURNBACK POOL (8)	OTHER WATER (9)	TOTAL STATE PROJECT SUPPLIES (10)
1987	13,863	100.00%	13,863	11,953	0	1,910	0	0	5,201	**19,064**
1988	13,863	100.00%	13,863	10,750	0	1,109	0	0	17	**11,876**
1989	13,863	100.00%	13,863	12,724	2,004	1,004	0	0	0	**15,732**
1990	13,863	50.00%	6,932	6,744	135	183	0	0	0	**7,062**
1991	13,863	0.00%	0	0	5	0	0	0	714	**719**
1992	13,863	45.00%	6,250	5,699	0	0	0	0	0	**5,699**
1993	13,863	100.00%	13,863	2,137	551	11,726	0	0	0	**14,414**
1994	13,863	50.00%	6,932	4,579	0	1	3,117	0	0	**7,697**
1995	13,863	100.00%	13,863	11,825	2,352	0	3,041	0	0	**17,218**
1996	13,863	100.00%	13,863	12,398	2,038	1,465	3,741	18,577	0	**38,219**
1997	13,889	100.00%	13,889	9,243	0	4,646	251	0	0	**14,140**
1998	13,889	100.00%	13,889	5,168	0	8,721	71	0	0	**13,960**
1999	13,770	100.00%	13,770	13,770	0	0	21,365	11,163	0	**46,298**
				106,990	7,085	30,764	31,586	29,740	5,932	**212,097**
								Average Annual Supply		**16,315**
								Percent of Table A		**118.48%**

Attachment 2.12-3

Notice of Intent

Winston H. Hickox
Secretary for Environmental Protection

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5537
Mailing Address: P.O. Box 1977 • Sacramento, California • 95812-1977
FAX (916) 341-5543 • Internet Address: http://www.swrcb.ca.gov

Gray Davis
Governor

RECEIVED
SEP 17 2001
GWF Corporate Office

September 07, 2001

MARK KEHOE
GWF ENERGY LLC
4300 RAILROAD AVE
PITTSBURG, CA 94565

RECEIPT OF YOUR NOTICE OF INTENT

The State Water Resources Control Board (State Water Board) has received and processed your NOTICE OF INTENT TO COMPLY WITH THE TERMS OF THE GENERAL PERMIT TO DISCHARGE STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY. Accordingly, you are required to comply with the permit requirements.

Your WDID identification number is: **5F16S316468** Please use this number in any future communications regarding this permit.

SITE DESCRIPTION

OWNER:	GWF ENERGY LLC
DEVELOPER:	
COUNTY:	KINGS
SITE ADDRESS:	NW 1/4 NW1/4 SEC 34 T19S MDBM LEMOORE, CA 93245
COMMENCEMENT DATE:	1/1/02
EST. COMPLETION DATE:	6/30/02

When construction is complete or ownership has been transferred, dischargers are required to notify the Regional Water Board by submitting a Notice of Termination (NOT). All State and local requirements must be met in accordance with Special Provision No. 7 of the General Permit. I have enclosed a NOT for your future use. If you do not notify the State Water Board that construction activity has been completed you will continue to be invoiced for the annual fee each July.

If you have any questions regarding permit requirements, please contact your Regional Water Board at (559) 445-5116. Please visit the storm water web page at www.swrcb.ca.gov/stormwtr/index.html to obtain storm water related information and forms.

Sincerely,

Storm Water Section
Division of Water Quality

Enclosure

State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812
FAX (916) 341-5463 • Internet Address: http://www.swrcb.ca.gov

Gray Davis
Governor

MAY 1 8 2001

To: Dischargers Enrolled Under the State Board's National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity

MODIFICATIONS TO THE NPDES GENERAL PERMIT FOR DISCHARGES OF STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY (GENERAL PERMIT)

On April 26, 2001, the State Water Resources Control Board adopted Resolution No. 2001-046, modifying the General Construction Storm Water Permit in response to a Judgement and Writ of Mandate issued on September 15, 2000 by the Superior Court, County of Sacramento. This modified language takes effect immediately. Permittees with ongoing construction have until August 1, 2001 to develop a sampling and analysis procedure and to amend their Storm Water Pollution Prevention Plan (SWPPP).

Enclosed is a copy of Resolution No. 2001-046 and the adopted language which modifies Sections A and B of the General Permit.

These documents are also available electronically at: www.swrcb.ca.gov/stormwtr/index.html, under "Newly adopted modifications of the General Permit Water Quality Order No. 99-08-DWQ."

If you have further questions, you may send an email to: **stormwater@dwq.swrcb.ca.gov** or leave a message on the Construction Inquiry Line at 916-341-5537.

Sincerely,

John M Laddy for

Stan Martinson, Chief
Division of Water Quality

Enclosure

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2001 - 046

MODIFICATION OF WATER QUALITY ORDER 99-08-DWQ STATE WATER RESOURCES CONTROL BOARD (SWRCB) NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY

WHEREAS:

1. The SWRCB adopted a statewide general NPDES permit for storm water discharges associated with construction activity (General Permit) on August 19, 1999.

2. The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange Coast Keeper filed a petition for writ of mandate challenging the General Permit in the Superior Court, County of Sacramento.

3. The court directed the SWRCB to modify the provisions of the General Permit to require permittees to implement specific sampling and analytical procedures to determine whether Best Management Practices implemented on a construction site are: (a) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt, and (b) preventing other pollutants, that are known or should be known by permittees to occur on construction sites and that are not visually detectable in storm water discharges, from causing or contributing to exceedances of water quality objectives.

4. A public hearing was held on February 7, 2001 to receive comments on the proposed modification language. All comments and testimony have been considered. The Attachment specifies the changes to the monitoring provisions in the General Permit in response to the written comments submitted and the testimony taken at the hearing.

5. On April 4, 2001 an SWRCB Workshop was held and informal comments were heard from the public. The draft modification language was subsequently changed in response to these comments. This current draft is posted on the Internet web page in a strike-out/underline format.

THEREFORE BE IT RESOLVED THAT:

The SWRCB adopts the modified findings and monitoring provisions in the General Permit (Attachment).

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 26, 2001.

Maureen Marché

Maureen Marché
Clerk to the Board

Attachment

MODIFICATIONS TO WATER QUALITY ORDER 99-08-DWQ
STATE WATER RESOURCES CONTROL BOARD (SWRCB)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION ACTIVITY (GENERAL PERMIT)

MODIFICATIONS TO THE FACT SHEET

The following paragraph is added to BACKGROUND

On August 19, 1999, the State Water Resources Control Board (SWRCB) reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ referred to as "General Permit"). The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange Coast Keeper filed a petition for writ of mandate challenging the General Permit in the Superior Court, County of Sacramento. The Court issued a judgment and writ of mandate on September 15, 2000. The Court directed the SWRCB to modify the provisions of the General Permit to require permittees to implement specific sampling and analytical procedures to determine whether Best Management Practices (BMPs) implemented on a construction site are: (1) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt, and (2) preventing other pollutants, that are known or should be known by permittees to occur on construction sites and that are not visually detectable in storm water discharges, from causing or contributing to exceedances of water quality objectives. The monitoring provisions in the General Permit have been modified pursuant to the court order.

MODIFICATIONS TO THE PERMIT

Finding 15:

The Monitoring Program and Reporting Requirements are modified in compliance with a judgment in the case of *San Francisco BayKeeper, et al. v. State Water Resources Control Board*. The modifications include sampling and analysis requirements for direct discharges of sediment to waters impaired due to sediment and for pollutants that are not visually detectable in runoff that may cause or contribute to an exceedance of water quality objectives.

SECTION A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

1. Objectives

   e. Identify a sampling and analysis strategy and sampling schedule for discharges from construction activity which discharge directly into water bodies listed on Attachment 3. (Clean Water Act Section 303(d) [303(d)] Water Bodies listed for Sedimentation).

f. For all construction activity, identify a sampling and analysis strategy and sampling schedule for discharges that have been discovered through visual monitoring to be potentially contaminated by pollutants not visually detectable in the runoff.

2. Implementation Schedule

d. Existing permittees shall revise their SWPPP in accordance with the sampling and analysis modifications prior to August 1, 2001. For ongoing construction activity involving a change of ownership the new owner shall review the existing SWPPP and amend the sampling and analysis strategy, if required, within 45 days. For construction activity commencing after the date of adoption, the SWPPP shall be developed in accordance with the modification language adopted.

5. Source Identification

b. Pollutant Source and BMP Identification

(7) Show the locations of direct discharge from the construction site into a Section 303(d) list water body. Show the designated sampling locations in the receiving waters, which represent the prevailing conditions of the water bodies upstream of the construction site discharge and immediately downstream from the last point of discharge.

(8) Show the locations designated for sampling the discharge from areas identified in Section A. 5. b. (2), (3), and (4) and Section A. 5. c. (1) and (2). Samples shall be taken should visual monitoring indicate that there has been a breach, malfunction, leakage, or spill from a BMP which could result in the discharge in storm water of pollutants that would not be visually detectable, or if storm water comes into contact with soil amendments or other exposed materials or contamination and is allowed to be discharged. Describe the sampling procedure, location, and rationale for obtaining the uncontaminated sample of storm water.

SECTION B: MONITORING PROGRAM AND REPORTING REQUIREMENTS

7. Monitoring Program for Sedimentation/Siltation

Dischargers of storm water associated with construction activity that directly enters a water body listed in Attachment 3 shall conduct a sampling and analysis program for the pollutants (sedimentation/siltation or turbidity) causing the impairment. The discharger shall monitor for the applicable parameter. If the water body is listed for sedimentation or siltation, samples should be analyzed for Settleable Solids (ml/l) and Total Suspended Solids (mg/l). Alternatively or in addition, samples may be analyzed for suspended sediment concentration according to ASTM D3977-97. If the water body is listed for turbidity, samples should be analyzed for turbidity (NTU). Discharges that flow through tributaries that are not listed in Attachment 3 or that flow into Municipal Separate Storm Sewer Systems (MS4) are not subject to these sampling and analysis requirements. The sampling and analysis parameters and procedures must be designed to determine whether the BMPs installed and maintained prevent discharges of sediment from contributing to impairment in receiving waters.

Samples shall be collected during the first two hours of discharge from rain events which result in a direct discharge to any water body listed in Attachment 3. Samples shall be collected during daylight hours (sunrise to sunset). Dischargers need not collect more than four (4) samples per month. All samples shall be taken in the receiving waters and shall be representative of the prevailing conditions of the water bodies. Samples shall be collected from safely accessible locations upstream of the construction site discharge and immediately downstream from the last point of discharge.

For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specification. All field and/or laboratory analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times until a Notice of Termination has been submitted and approved.

8. <u>Monitoring Program for Pollutants Not Visually Detectable in Storm Water</u>

A sampling and analysis program shall be developed and conducted for pollutants which are not visually detectable in storm water discharges, which are or should be known to occur on the construction site, and which could cause or contribute to an exceedance of water quality objectives in the receiving water. Pollutants that should be considered for inclusion in this sampling and analysis program are those identified in Sections A.5.b. and A.5.c.

Construction materials and compounds that are not stored in water-tight containers under a water-tight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures. The goal of the sampling and analysis is to determine whether the BMPs employed and maintained on site are effective in preventing the potential pollutants from coming in contact with storm water and causing or contributing to an exceedance of water quality objectives in the receiving waters. Examples of construction sites that may require sampling and analysis include: sites that are known to have contaminants spilled or spread on the ground; sites where construction practices include the application of soil amendments, such as gypsum, which can increase the pH of the runoff; or sites having uncovered stockpiles of material exposed to storm water. Visual observations before, during, and after storm events may trigger the requirement to collect samples. Any breach, malfunction, leakage, or spill observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water shall trigger the collection of a sample of discharge. Samples shall be collected at all discharge locations which drain the areas identified by the visual observations and which can be safely accessed. For sites where sampling and analysis is required, personnel trained in water quality sampling procedures shall collect storm water samples. A sufficiently large sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) shall be collected for comparison with the discharge sample. Samples shall be collected during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.

The uncontaminated sample shall be compared to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to, indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and TDS.

For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specification. All field and/or analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times until a Notice of Termination has been submitted and approved.

Attachment 2.12-4

Generalized Depth to Groundwater in Upper Zone and Generalized Depth to Sub-Corcoran Piezometric Groundwater Surface

WESTLANDS WATER DISTRICT
3130 N. FRESNO ST. FRESNO, CALIFORNIA 93703
559.224.1523 Fax 559.241.6277

LOCATION MAP

GENERALIZED DEPTH TO SUB-CORCORAN PIEZOMETRIC GROUNDWATER SURFACE

DECEMBER 2000

DRAWN	P.NGUYEN	APPROVED	
CHECKED			
DATE	1/25/2001	DRAWING No 2001-W-0002	

DWGS\GRNDWATER\DEEP\2000\DLGW00.DWG

NUMBER	DATE	DRAWN	CHECKED	APPROVED
REVISION				

GENERAL LEGEND

- DISTRICT BOUNDARY
- INTERSTATE HIGHWAY
- INTERCHANGE
- STATE HIGHWAY
- PAVED ROAD
- WATERWAY
- BRIDGE
- CHECK
- NOT IN DISTRICT

DWGS\GRNDWATER\DEEP\2000\DUP00.DWG

NUMBER	DATE	DRAWN	CHECKED	APPROVED
REVISION				

WESTLANDS WATER DISTRICT

3130 N. FRESNO ST. FRESNO, CALIFORNIA 93703
559.224.1523 Fax 559.241.6277

LOCATION MAP

GENERALIZED DEPTH TO GROUNDWATER IN UPPER ZONE

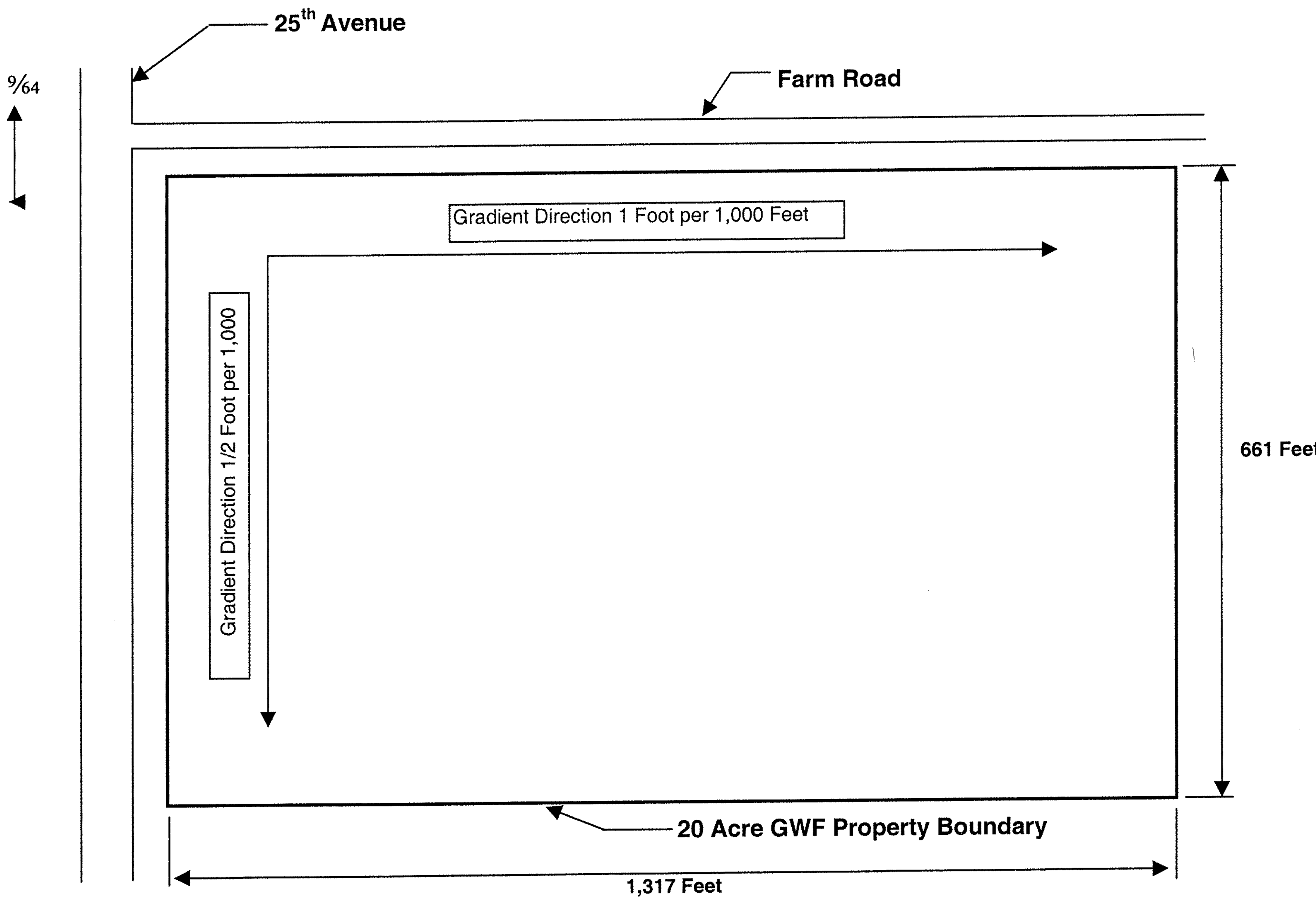
DECEMBER 2000

DRAWN P.NGUYEN	APPROVED
CHECKED	
DATE 1/25/2001	DRAWING No 2001-W-0003

Attachment 2.12-5

Existing Property Gradient

Attachment 2.12-5
Henrietta Peaker Plant Project
Existing Property Gradient



Attachment 2.12-6

Stormwater Drainage Summary, Stormwater Calculations, and Retention Pond Volume

Attachment 2.12-6
Stormwater Drainage Summary
GWF – Henrietta, Kings Co, CA
August 20, 2001

<u>Site Description</u>

The Henrietta site is located in Kings County, CA approximately 10 miles northwest of Lemoore, CA. The property is bounded by 25th Avenue to the west, the PG&E Henrietta Sub-Station to the north, and undeveloped land to the south and east. Elevations on site range from 222.0 feet in the southeastern corner to 225.0 ft in the northwestern corner. The terrain is essentially flat with the steepest grade across the site being 0.14% from the southeastern corner to the northwestern corner. There is an existing ditch along 25th Avenue and along the northern property line approximately 18" deep.

<u>Onsite Drainage</u>

The runoff from the project will be managed with the use of trench drains, shallow ditches, and CHDPE storm piping systems. All of the storm water runoff will be collected into a large, shallow retention pond to the east of the power block that will rely on percolation and evaporation for drainage. The volume of the pond will be determined based on a 10 Year – 10 day storm event (4 inches rainfall – Kings County Public Works Improvement Standards for Private Retention Basins). Peak flows for storm pipes and culverts will be calculated using the Rational Method based on a 25 Yr-24 Hr Storm and will be designed using Mannings Equations.

The area north of the main transformer including the administration building and parking and the switch yard will drain to the north to a series of catch basins along to northern loop road. This area will include the northern loop road that will be super elevated to drain towards the catch basins. The runoff will be collected in the catch basins then carried to the retention basin by HDPE pipes.

The area south of the administration parking and the area within the main loop road that includes the turbines will be crowned in the middle so that runoff will flow to the north to a series of catch basins and to the south to a trench drain. The runoff that will be collected in the catch basins will be carried to the retention basin by HDPE pipes. The runoff collected in the trench drain will be carried to a catch basin south of the turbines and carried to the retention pond by HDPE pipes.

The southern portion of the loop road will be super elevated to drain towards the trench drain.

The entire area east of the eastern most unit will sheet flow over the super elevated loop road to the east into the retention basin.

<u>Offsite Drainage</u>

There is no offsite runoff draining through the property.

Stormwater Drainage Calculations

Objective:

Calculate the stormwater runoff rates for the Site, size the stormwater collection systems (pipes, channels, and culverts), and size the retention basin and check for sediment capacity along with other Best Management Practices.

References:

1. Elements of Urban Stormwater Design, H. Rooney Malcom, PE, NCSU 1995
2. Kings County, California Public Works Improvement Standards Manual
3. Bank and Channel Lining Procedures, New York Department of Transportation, Division of Design and Construction, 1971
4. Hydraulic Design of Highway Culverts, US Department of Transportation, Federal Highway Administration, 1985
5. Multi-Drain Econo-Drain brand Trench Drain Systems

Contents of Calculations

Attachment 2.12-6

RETENTION POND VOLUME

Henrietta

Estimate the volume of the proposed retention basin.

Volume of Water to be Retained

Source: Kings County, CA Public Works Improvement Standards Manual

Volume of Runoff to be Contained (10 yr 10 day storm): Vreq (ft^3) = C A R

C* = Runoff Coef.	0.80
A = Drainage Area (ft^2)	390000
R = Runoff (ft) for 10 yr, 10 day storm	0.400

Vreq = 124800.00 ft^3

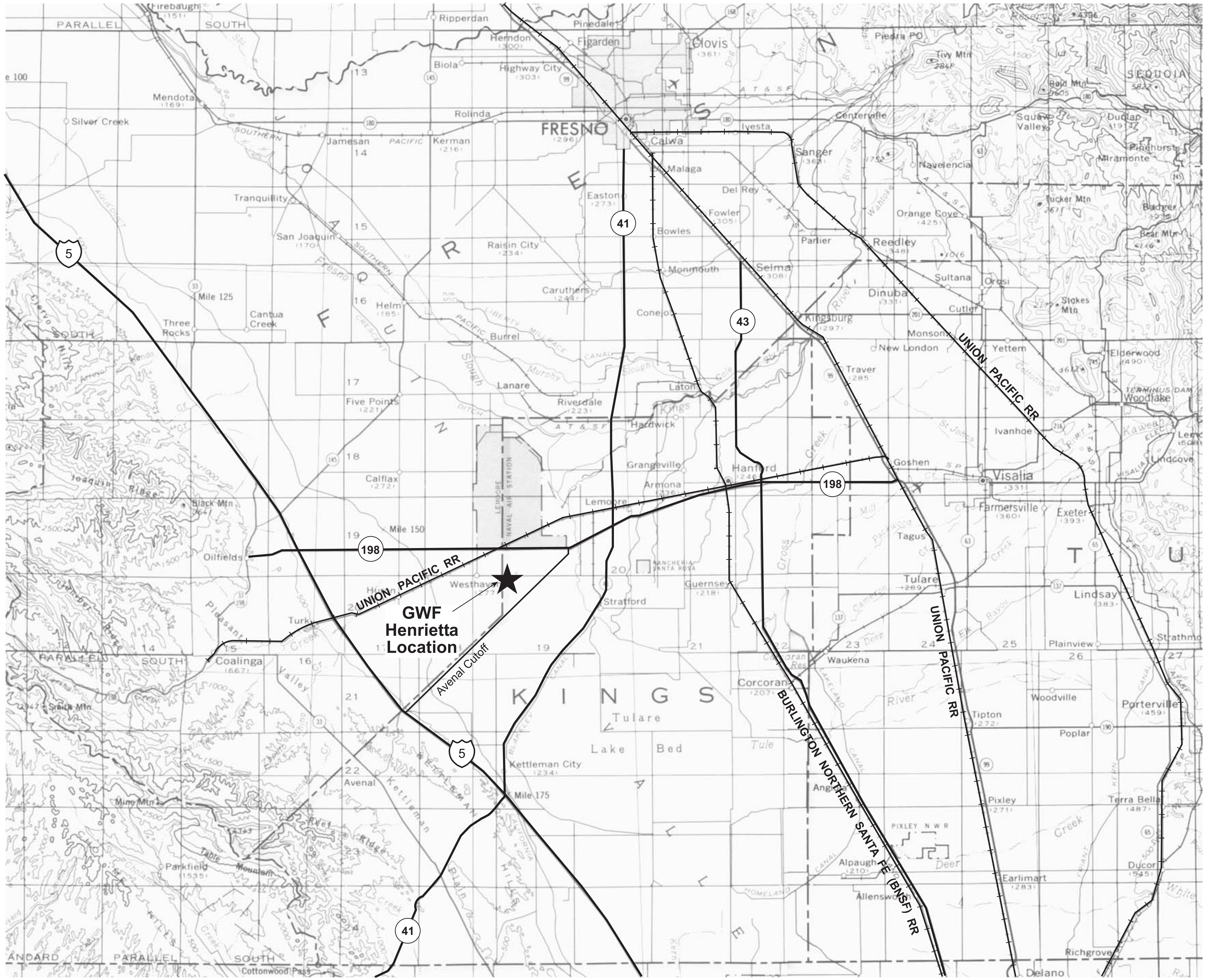
*Estimate

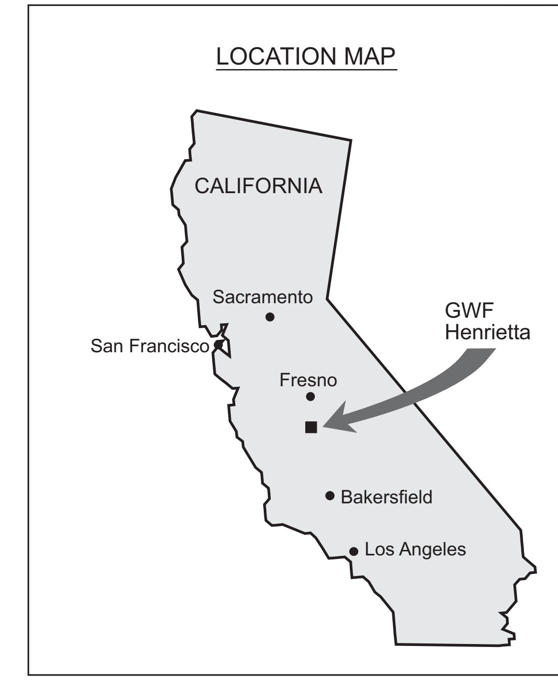
Based on the preliminary geological report, the groundwater in this area is a minimum of 6 ft below surface. Therefore the depth of the pond should not greater than 2.5 ft.

Side slopes shall be no steeper than 3:1

Volume =	124800.00 ft^3	
Depth =	2.5 ft	
Approx. Area =	49920 ft^2	1.1460055 ac

** Bottom of the pond must be at least 6 ft below the top of foundation for the units in order to gravity drain the site. (based on pipe slopes of 0.3% and minimum pipe cover of 30 inches in traffic areas)





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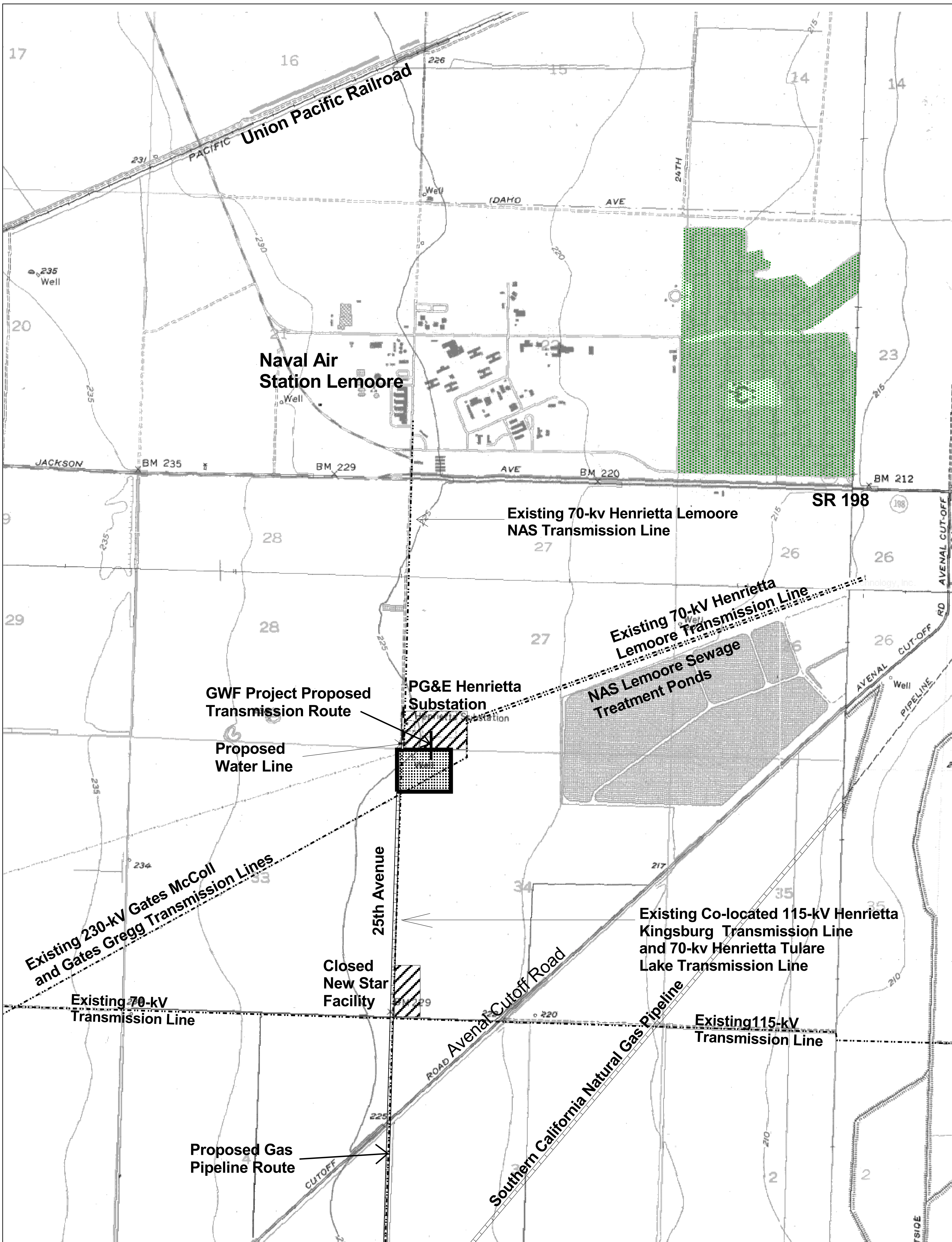
0 4 8

Scale in Miles

Source: USGS 1:500,000 Scale Topographic Map of California-South Half

URS	Project No. 51-00167032.00
	GWF Henrietta Peaker Project
SITE LOCATION MAP	Figure 8.10-1

51-00167032.00-01011/091901/gos



0 0.3 0.6 0.9 1.2 Miles

1000 0 1000 2000 Feet

N

Source: Scale 1:24,000
Base Maps from U.S.G.S. 7.5 Minute Quadrangles Westhaven, Calif., (Photorevised 1981), Stratford, Calif. (1954), Lemoore (1954) and Vanguard (1956, Photorevised 1981)

Existing Transmission Lines

Transmission Route

Gas Pipeline Routes

Plant Site

Developed Industrial

URS	GWF Henrietta Peaker Project	Local Roadways in the Immediate Vicinity of the GWF Henrietta Peaker Project	Figure 8.10-2
	Project No. 51-00167032.00		

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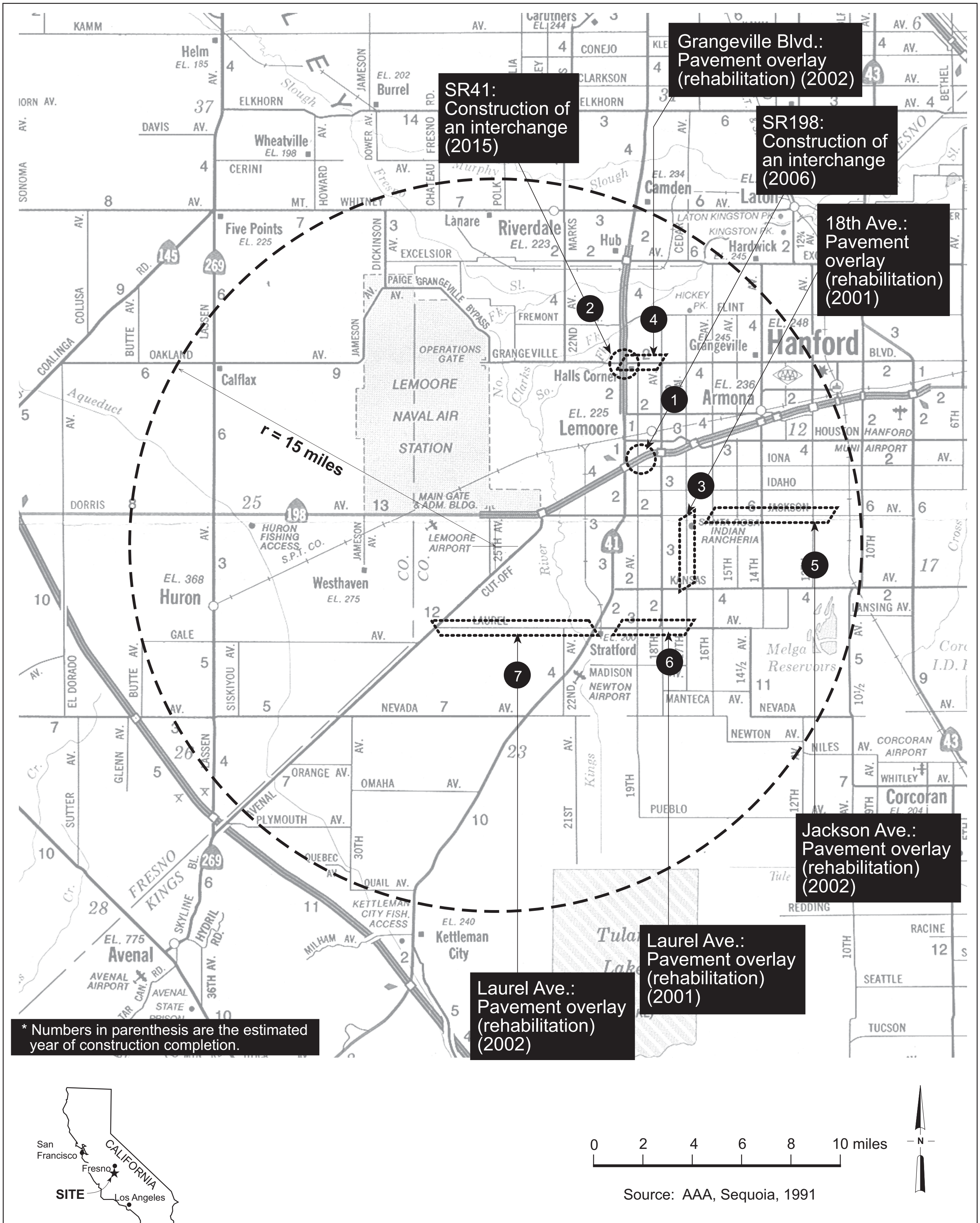

URS	Project No. 51-00167032.00 GWF Henrietta Peaker Project	PLANNED TRANSPORTATION IMPROVEMENTS WITHIN 15 MILES OF THE PROJECT SITE	Figure 8.10-3

51-00167032.00-01019/092801/gos