Appendix G

Section G.1: Air Quality Support Data
Wind Roses (File – Appendix G.1a)
Table of Contents

Plot No.: 1995-1999 Annual
Plot No.: 1995-1999 1st Quarter
Plot No.: 1995-1999 2nd Quarter
Plot No.: 1995-1999 3rd Quarter
Plot No.: 1995-1999 4th Quarter
Plot No.: 1995 Annual
Plot No.: 1995 1st Quarter
Plot No.: 1995 2nd Quarter
Plot No.: 1995 3rd Quarter
Plot No.: 1995 4th Quarter
Plot No.: 1996 Annual
Plot No.: 1996 1st Quarter
Plot No.: 1996 2nd Quarter
Plot No.: 1996 3rd Quarter
Plot No.: 1996 4th Quarter
Plot No.: 1997 Annual
Plot No.: 1997 1st Quarter
Plot No.: 1997 2nd Quarter
Plot No.: 1997 3rd Quarter
Plot No.: 1997 4th Quarter
Plot No.: 1998 Annual
Plot No.: 1998 1st Quarter
Plot No.: 1998 2nd Quarter
Plot No.: 1998 3rd Quarter
Plot No.: 1998 4th Quarter
Plot No.: 1999 Annual
Plot No.: 1999 1st Quarter
Plot No.: 1999 2nd Quarter
Plot No.: 1999 3rd Quarter
Plot No.: 1999 4th Quarter

Appendix G

Section G.1: Air Quality Support Data
Emissions Calculations (File – Appendix G.1b)
Table of Contents

Table G-1: Construction Fugitive Dust - Erosion
Table G-1.1: Construction Worker Travel Fugitive Dust
Table G-1.2: Construction Delivery Truck Fugitive Dust
Table G-1.3: Construction Equipment Fugitive Dust
Table G-1.4: Construction Equipment Monthly Summary
Table G-1.5: Construction Equipment Monthly Fugitive PM_{10} Emissions
Table G-1.6: Fugitive PM_{10} Emissions Monthly Summary
Table G-2: Well Drilling Emissions

Appendix G

Section G.1: Air Quality Support Data
Emissions Calculations (File – Appendix G.1c)
Table of Contents

Table G-3: Construction Equipment Emission Factors
Table G-3.1: Monthly NO_X Construction Emissions Summary
Table G-3.2: Monthly CO Construction Emissions Summary
Table G-3.3: Monthly VOC Construction Emissions Summary
Table G-3.4: Monthly SO_2 Construction Emissions Summary
Table G-3.5: Monthly PM10 Construction Emissions Summary
Table G-3.6: Delivery Truck Daily Emissions
Table G-3.7: Delivery Truck Annual Emissions
Table G-3.8: Worker Travel Daily Emissions
Table G-3.9: Worker Travel Annual Emissions
Table G-3.10: Staffing Schedule and Construction Workforce
Table G-3.11: Truck Deliveries of Equipment/Materials
Table G-4: Well Flow Testing Emissions
Table G-5: Plant Commissioning Emissions
Table G-5.1: Plant Commissioning Schedule
Table G-5.2: Plant Commissioning Scenario #1
Table G-5.3: Plant Commissioning Scenario #2
Table G-5.4: Plant Commissioning Scenario #3a
Table G-5.5: Plant Commissioning Scenario #3b
Table G-5.6: Plant Commissioning Scenario #3c
Table G-6: Noncondensible Gas and Offgassing Emissions
Table G-7: Cooling Tower Drift Emissions
Table G-8: Total Cooling Tower Emissions
Table G-9: Dilution Water Heater Emissions
Table G-10: Filter Cake Handling Emissions
Table G-10.1: Filter Cake Handling Fugitive Emissions
Table G-11: Engine Emissions
Table G-12: Operation and Maintenance Equipment Emissions
Table G-12.1: Operation and Maintenance Equipment Fugitive Emissions
Table G-13: Total Operating Emissions
Table G-14: Well Flow Run Emissions
Table G-15: Steam Vent Tank Emissions
Table G-16: Plant Startup Emissions

Appendix G

Section G.2: Air Quality Support Data
Modeling Protocol (File – Appendix G.2a)
Table of Contents

Modeling Protocol

Addendum #1

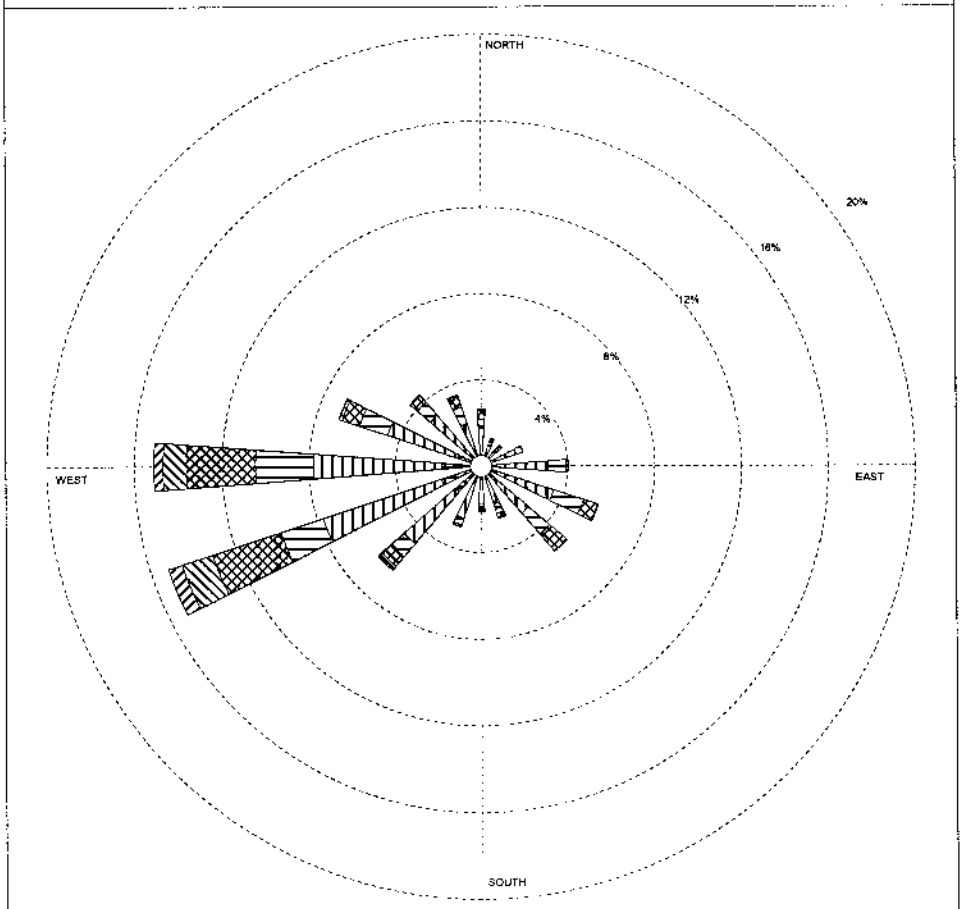
Appendix G

Section G.2: Air Quality Support Data
Modeling Results (File – Appendix G.2b)
Table of Contents

Table G-17: Source Parameters
Table G-17.1: Stack, Building and Fence Line Coordinates in NAD83 & NAD27
Table G-18: Construction Screening Review
Table G-19: Operations Screening Review
Table G-20: Fumigation Review
Table G-21: Construction PM_{10} Impacts
Table G-22: Commissioning PM_{10} Impacts
Table G-23: Operations PM_{10} Impacts
Table G-24: Temporary PM_{10} Impacts
Table G-25: Construction H_2S 1 Hour Impacts
Table G-26: Commissioning H_2S 1 Hour Impacts
Table G-27: Operations H_2S Impacts
Table G-28: Temporary H_2S Impacts
Table G-29: Construction 1 Hour NO_2 Impacts (OLM modeling)
Table G-30: Construction NO_2 Impacts (ISCST modeling)
Table G-31: Operations Short Term NO_2 Impacts
Table G-32: Operations NO_2 Impacts (ISCST modeling)
Table G-33: Temporary NO_2 1 Hour Impacts (OLM modeling)
Table G-34: Construction CO Impacts
Table G-35: Operations & Temporary CO Impacts
Table G-36: Construction SO_2 Impacts
Table G-37: Operations and Temporary SO_2 Impacts
Table G-38: Monthly Lead Impacts
Table G-39: CALPUFF Modeling Impacts
Table G-40: Cumulative Impacts
Table G-41: Leathers H_2S Power Plant Emissions

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

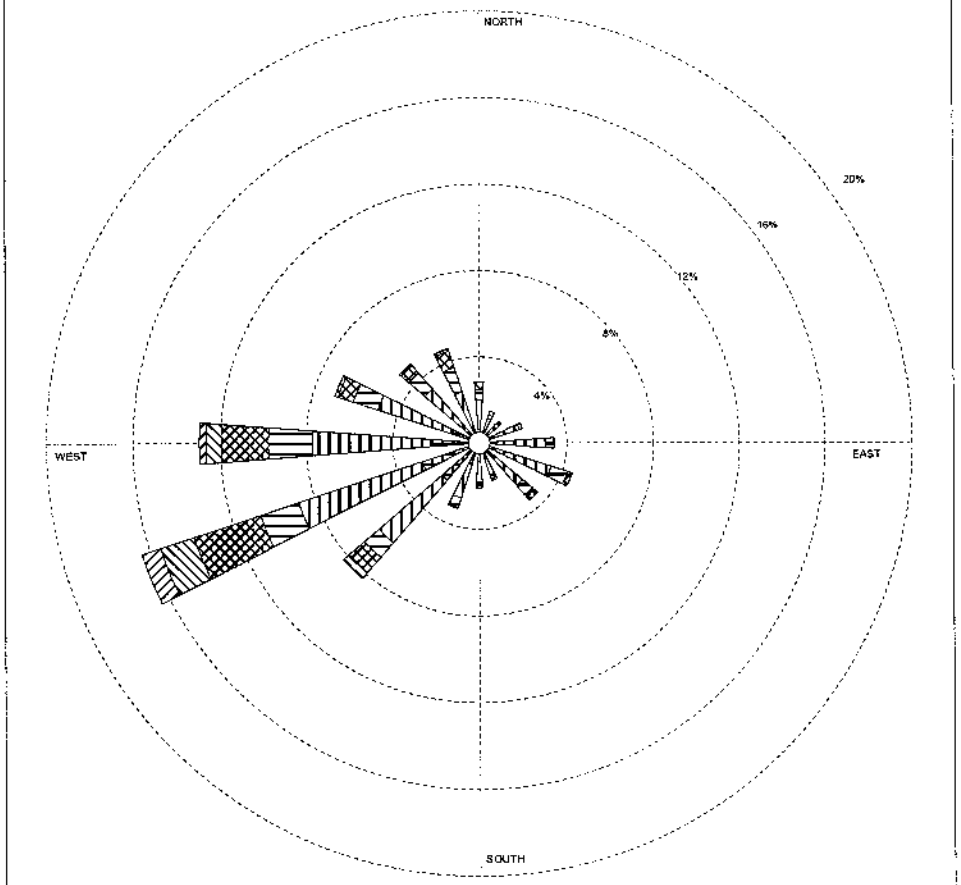


Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80		**4/25/2002**	
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.67 m/s**	CALM WINDS **18.57%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995 1996 1997 1998 1999 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO. **1995 - 1999 Annual**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

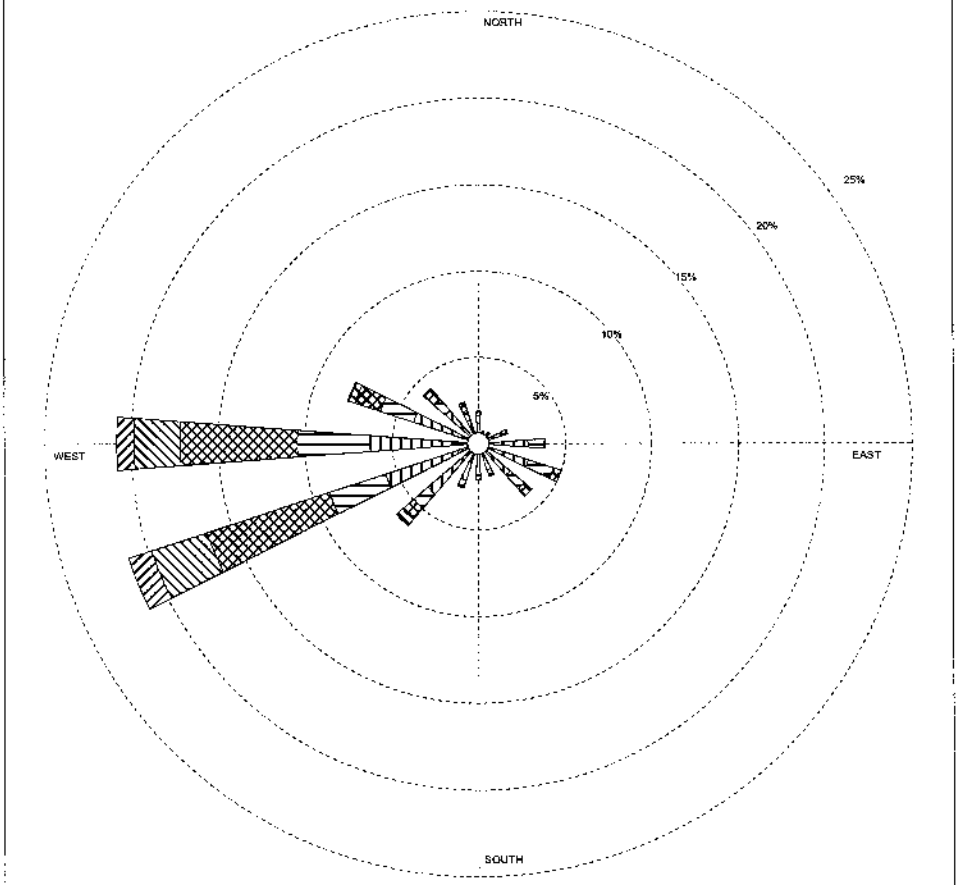
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.47 m/s**	CALM WINDS: **19.59%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1995 1996 1997 1998 1999 Jan 1 - Mar 31 Midnight - 11 PM**	PROJECT/PLOT NO.: **1995 - 1999 1st Quarter**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

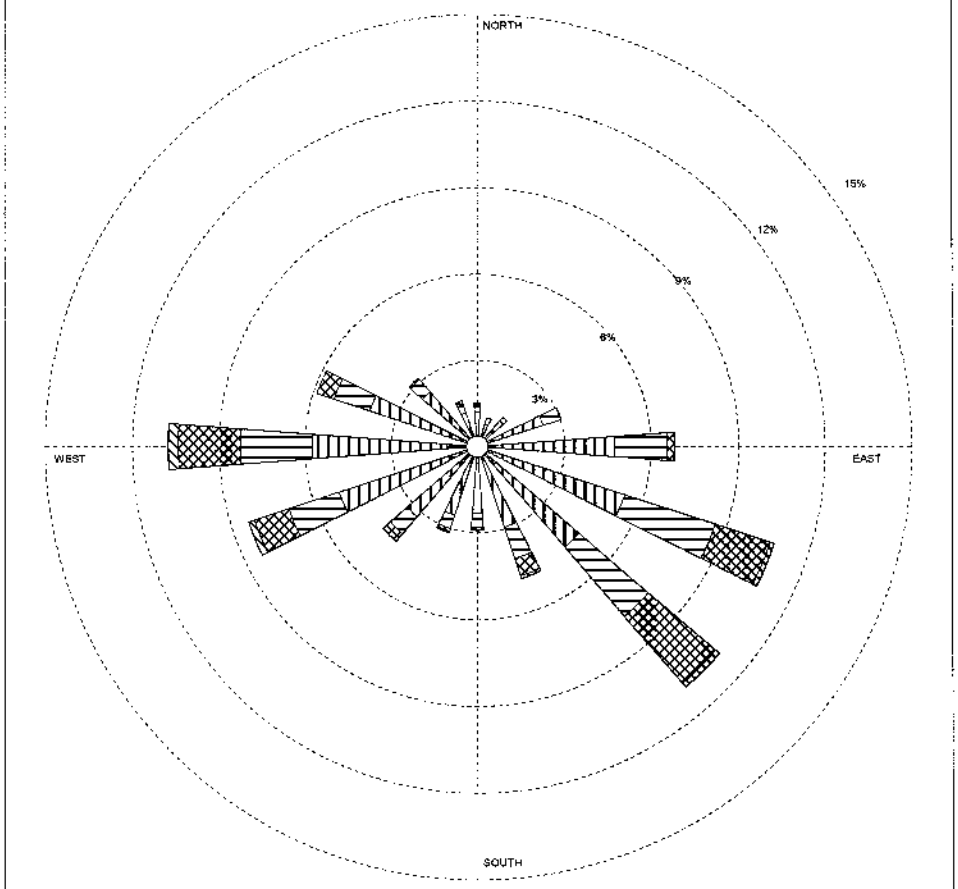


Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **4/25/2002**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **4.59 m/s**	CALM WINDS **11.86%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995 1996 1997 1998 1999** **Apr 1 - Jun 30** **Midnight - 11 PM**	PROJECT/PLOT NO **1995 - 1999 2nd Quarter**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

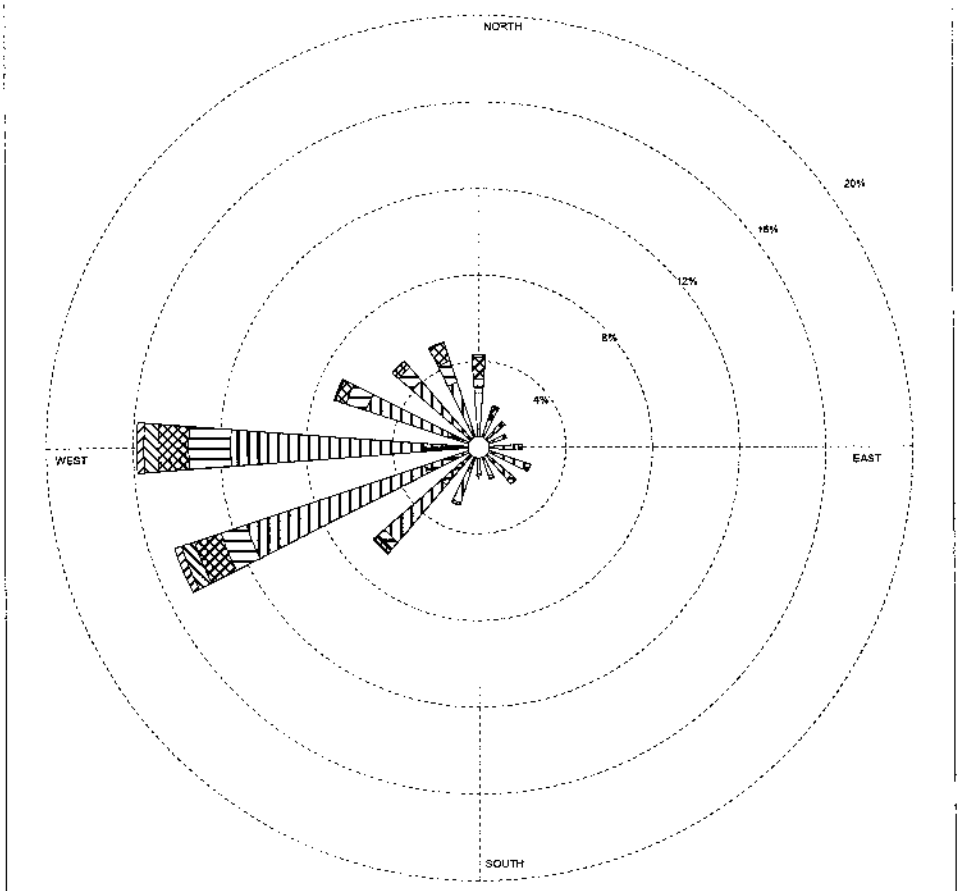
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY	UNIT	COMMENTS
Wind Speed	**m/s**	
AVG WIND SPEED	CALM WINDS	
3.50 m/s	**19.30%**	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	**1995 1996 1997 1998 1999 Jul 1 - Sep 30 Midnight - 11 PM**	**1995 - 1999 3rd Quarter**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

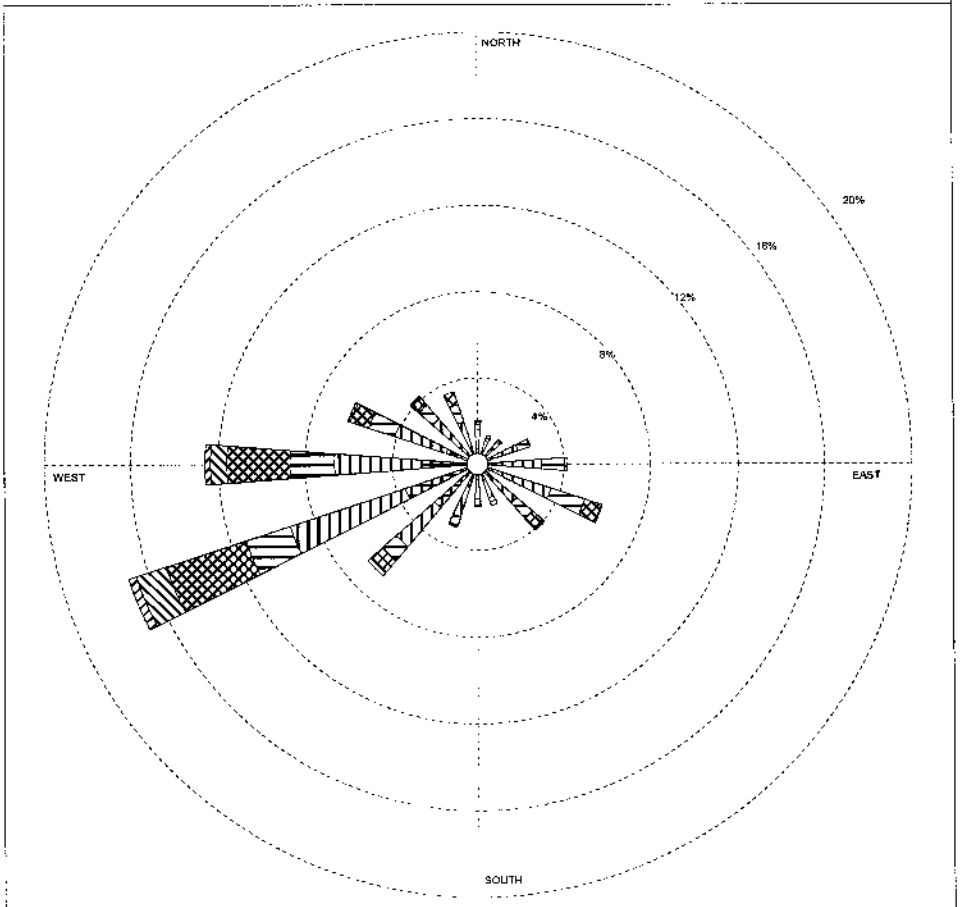
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.03 m/s**	CALM WINDS **23.50%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995 1996 1997 1998 1999 Oct 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO. **1995 - 1999 4th Quarter**

WRPLOT View 7.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

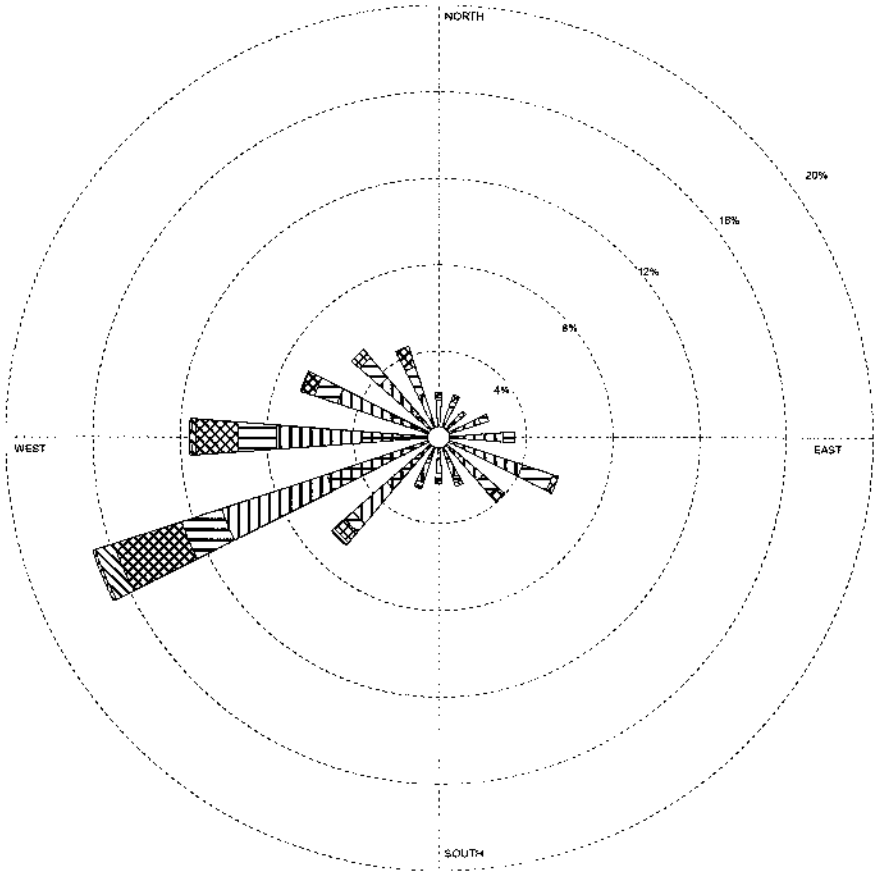
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.57 m/s**	CALM WINDS: **20.53%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1995 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO.: **1995 Annual**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

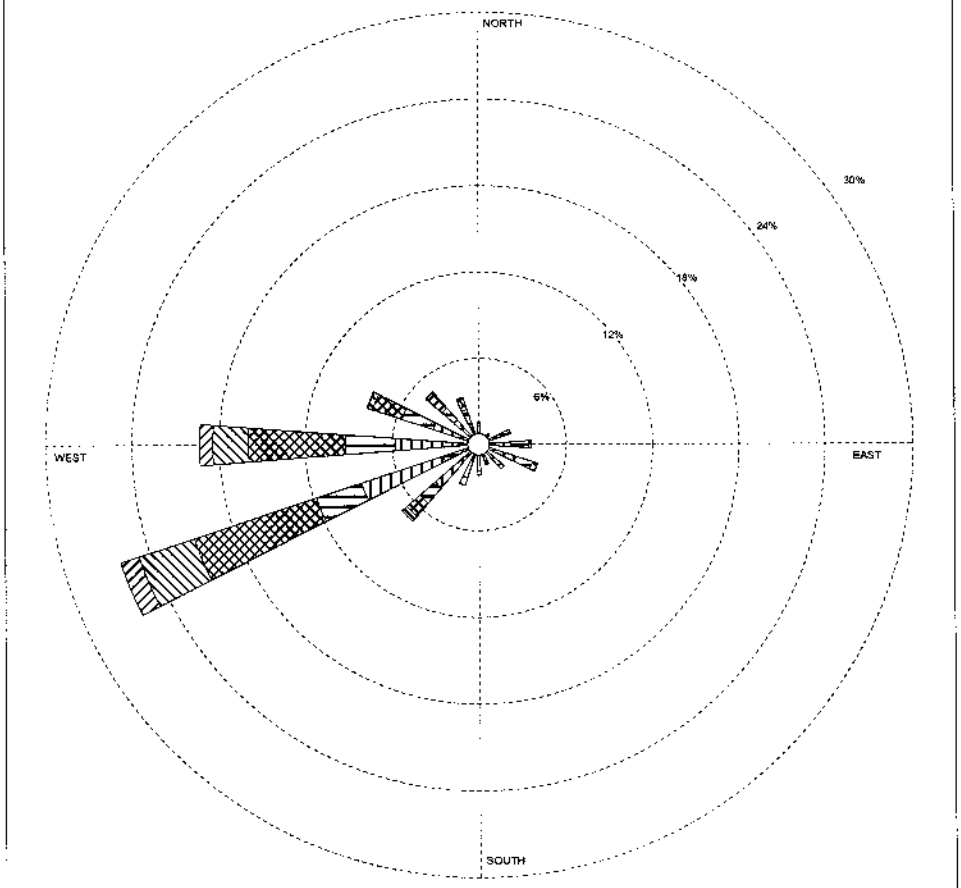


Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **4/25/2002**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.14 m/s**	CALM WINDS **19.77%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1st Quarter of 1995**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-env.com/email.htm

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

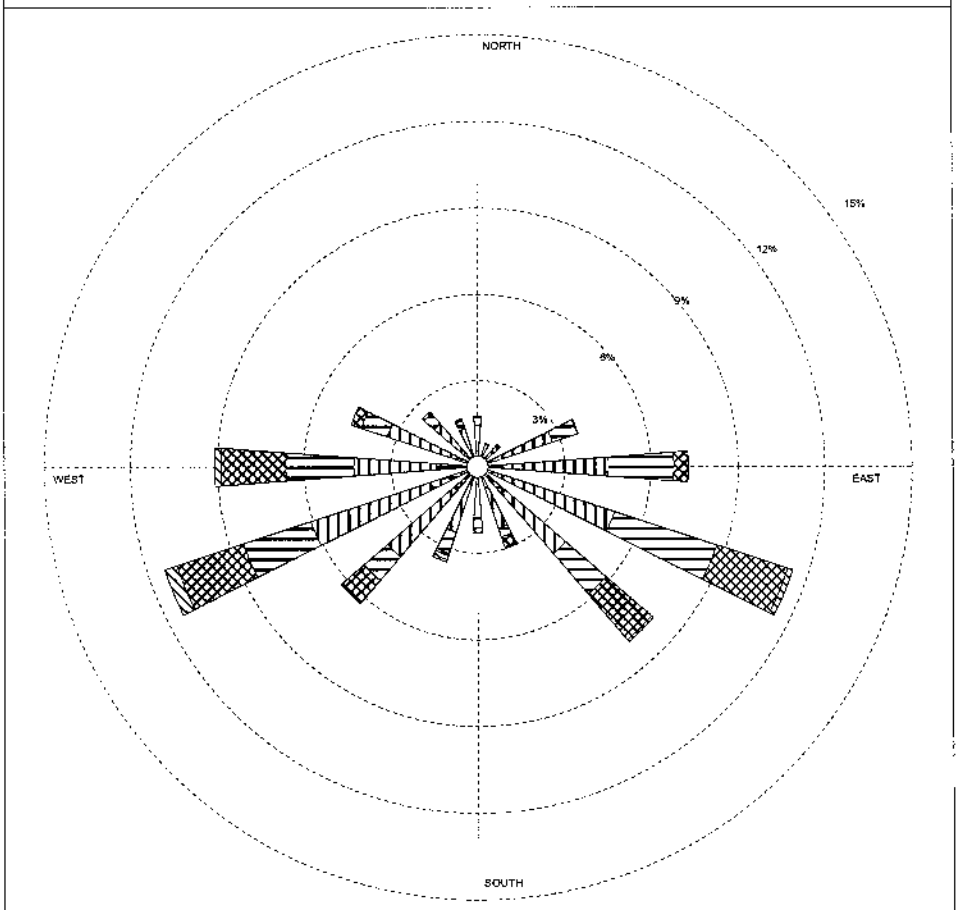


Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80		**4/25/2002**	
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **4.71 m/s**	CALM WINDS **8.61%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995** **Apr 1 - Jun 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **2nd Quarter of 1995**

WRPLOT View 2.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

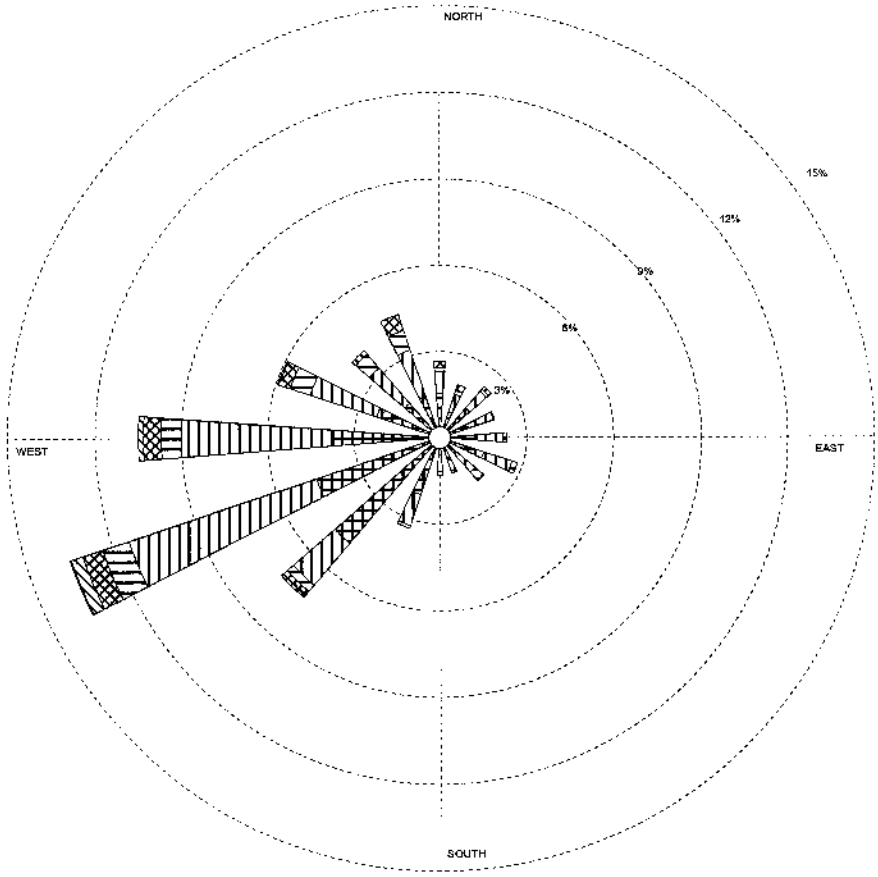
- > 11.05
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.61 m/s**	CALM WINDS **21.42%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1995** **Jul 1 - Sep 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **3rd Quarter of 1995**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

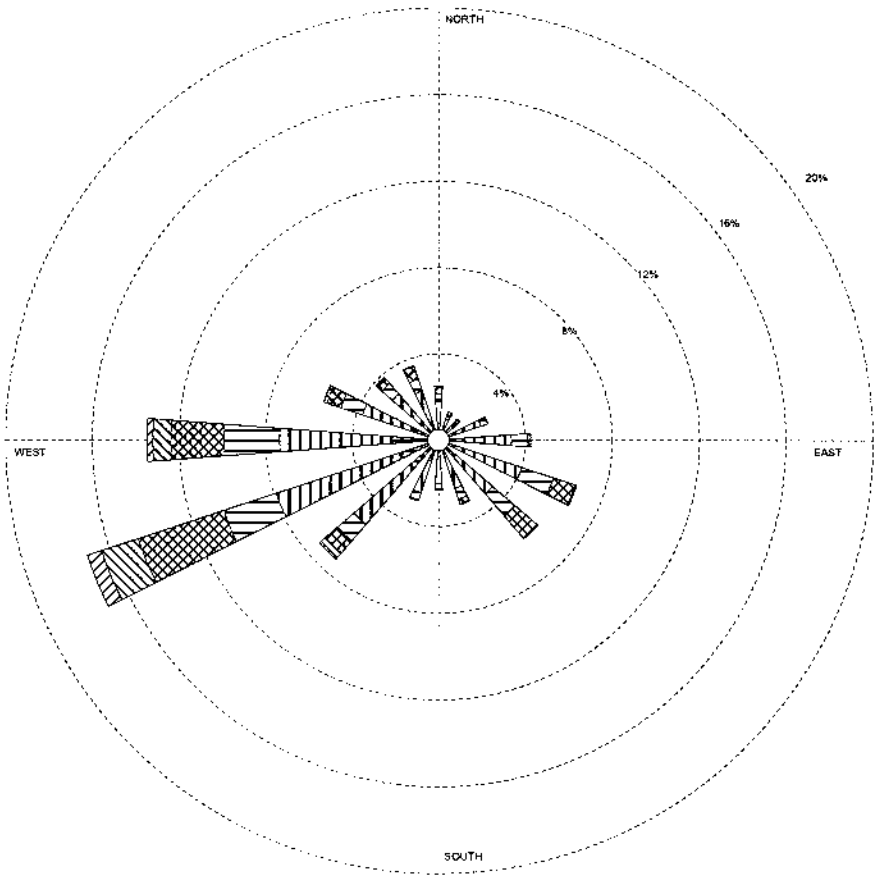
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **2.50 m/s**	CALM WINDS: **32.16%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1995 Oct 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO.: **4th Quarter of 1995**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

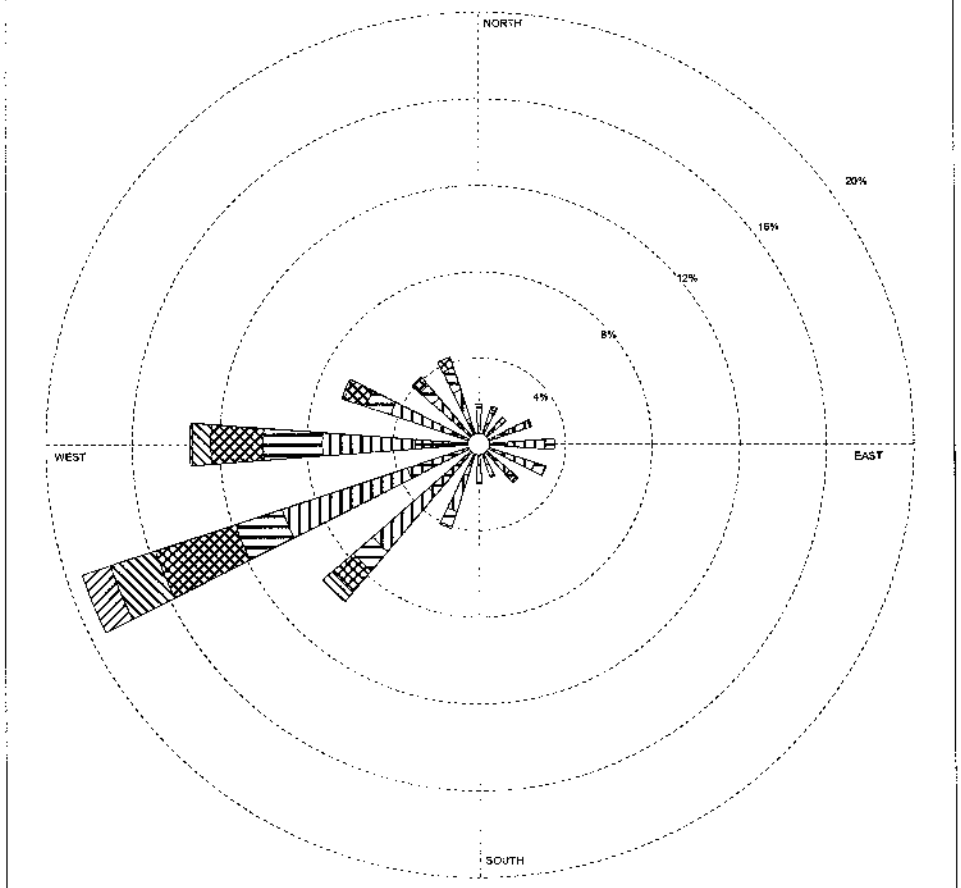
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG WIND SPEED **3.65 m/s**	CALM WINDS **15.99%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1996** **Jan 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1996 Annual**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

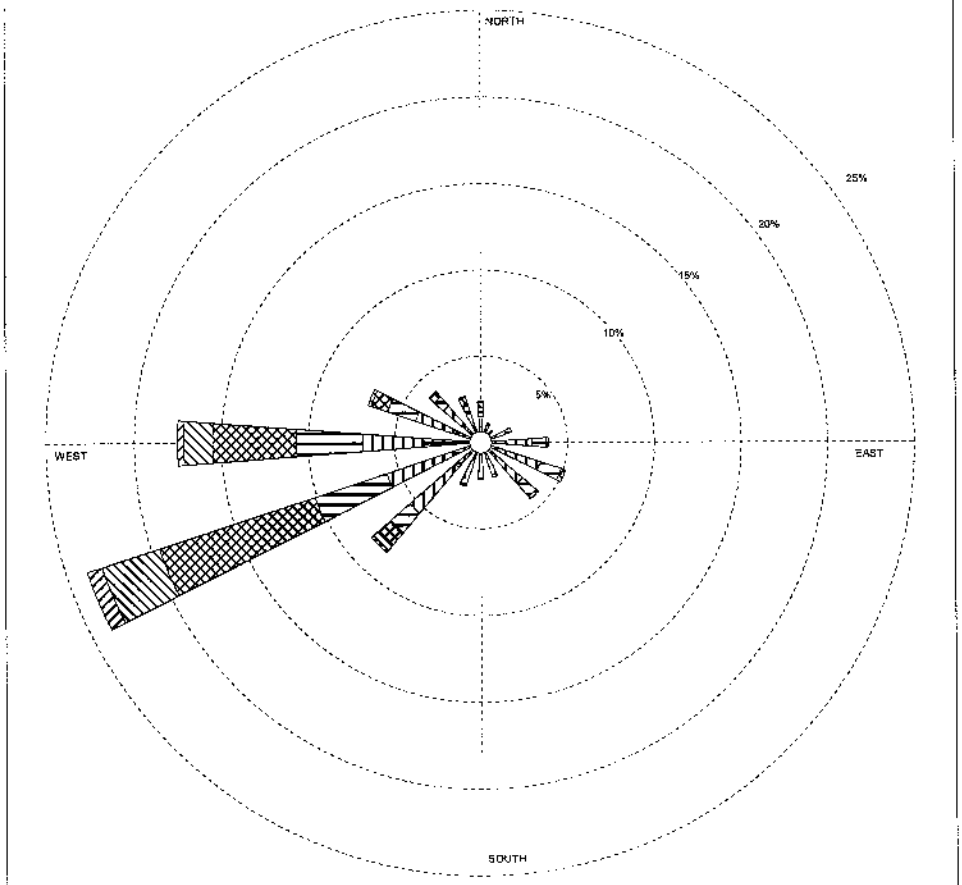


Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80		4/25/2002	
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.53 m/s**	CALM WINDS **17.95%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1996** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1st Quarter of 1996**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

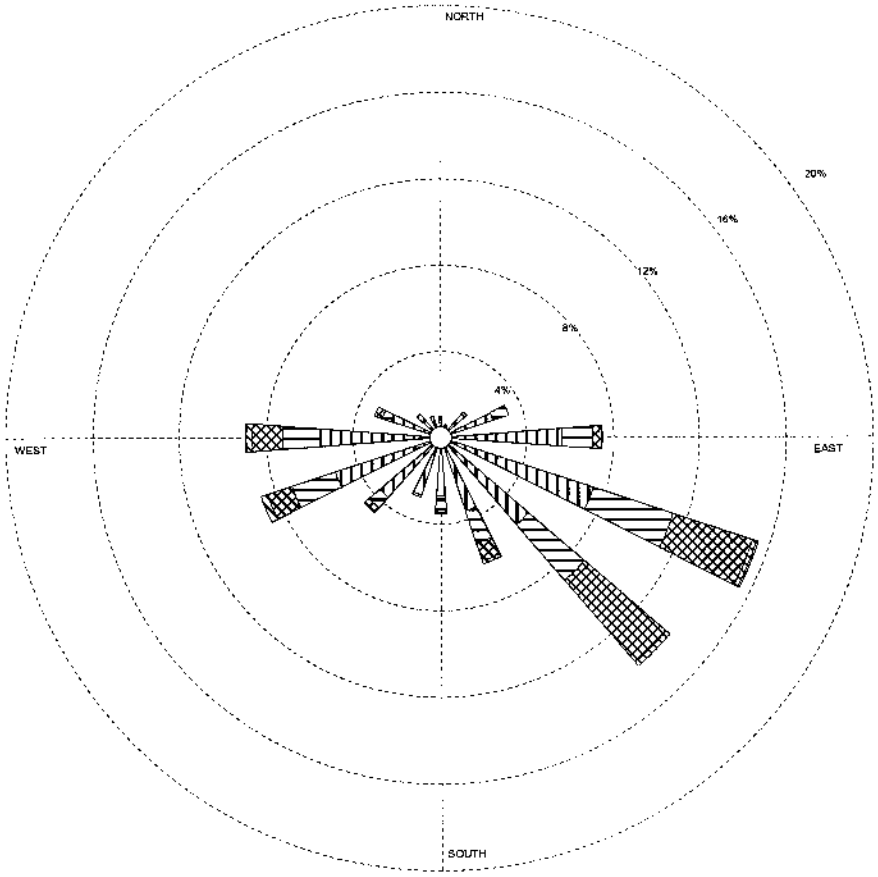
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **4.20 m/s**	CALM WINDS: **9.84%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1996 Apr 1 - Jun 30 Midnight - 11 PM**	PROJECT/PLOT NO.: **2nd Quarter of 1996**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

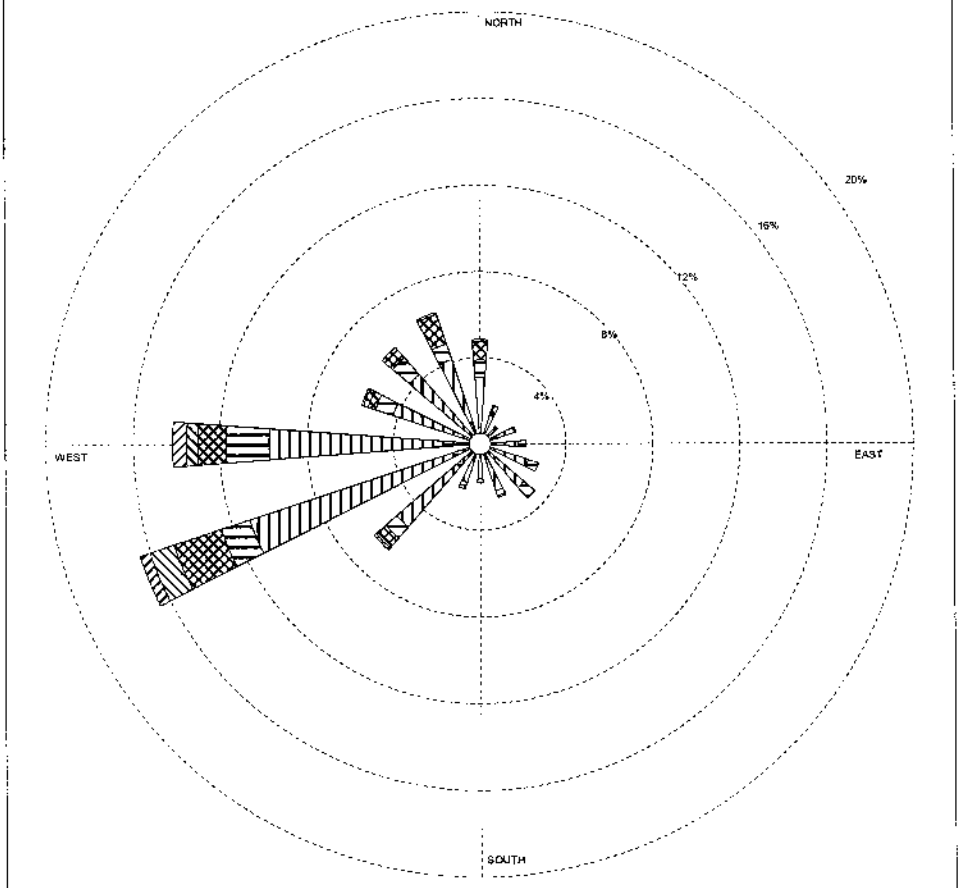
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.50 m/s**	CALM WINDS **16.03%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1996** **Jul 1 - Sep 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **3rd Quarter of 1996**

WRPLOT View 2.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

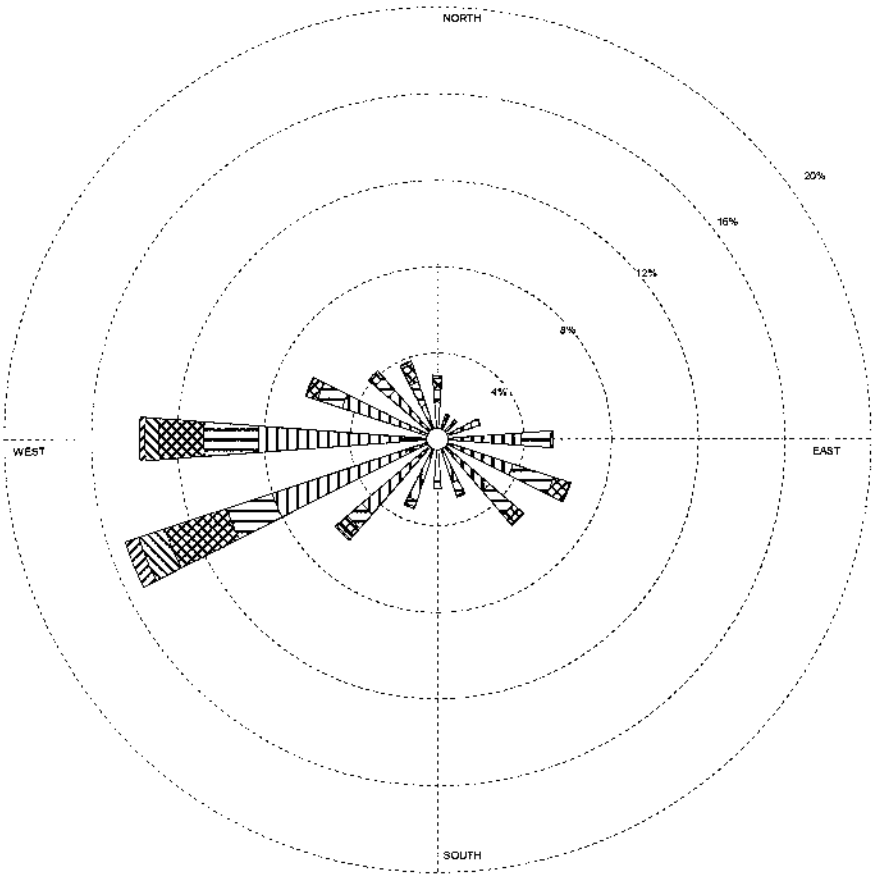
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.33 m/s**	CALM WINDS **20.11%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1996** **Oct 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO **4th Quarter of 1996**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

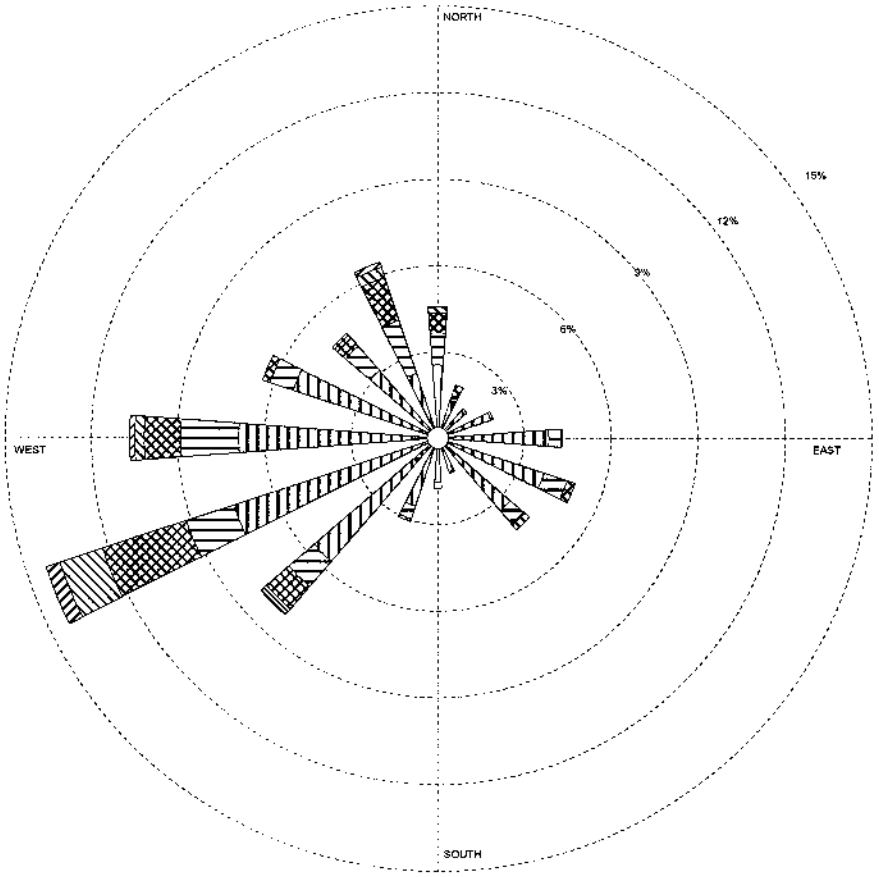
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.59 m/s**	CALM WINDS: **17.31%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1997 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO.: **1997 Annual**

WRPLOT view 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

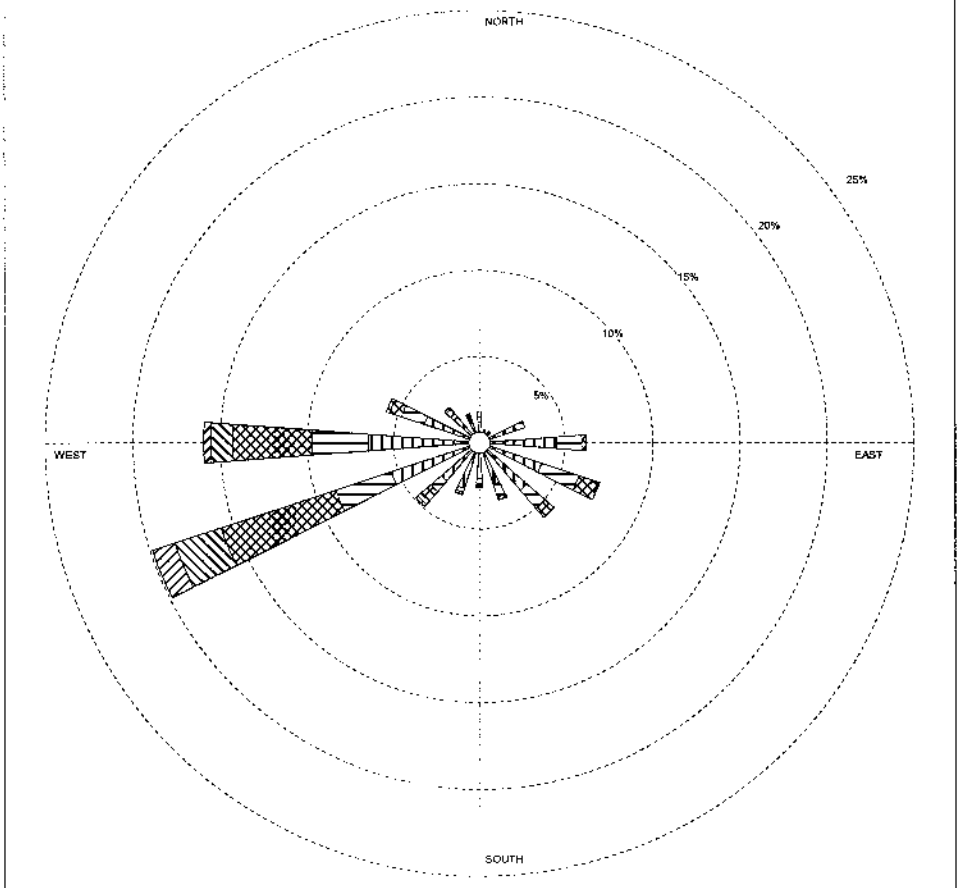


Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **4/25/2002**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.55 m/s**	CALM WINDS **19.77%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1997** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1st Quarter of 1997**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

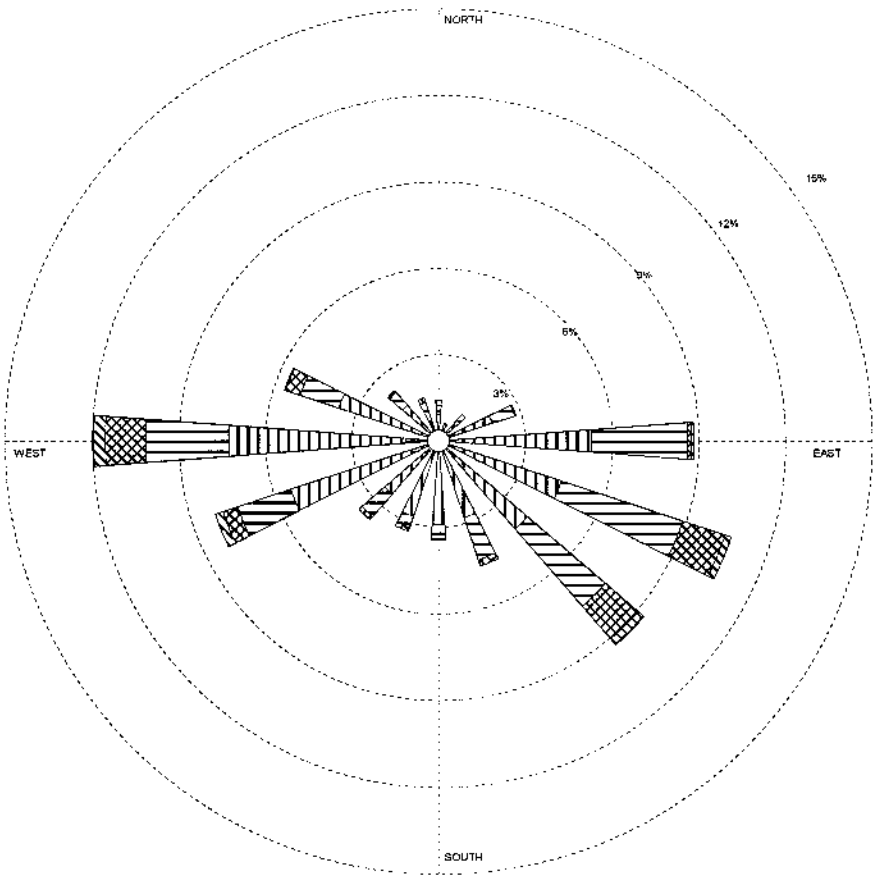
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **4.28 m/s**	CALM WINDS: **14.19%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1997 Apr 1 - Jun 30 Midnight - 11 PM**	PROJECT/PLOT NO.: **2nd Quarter of 1997**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

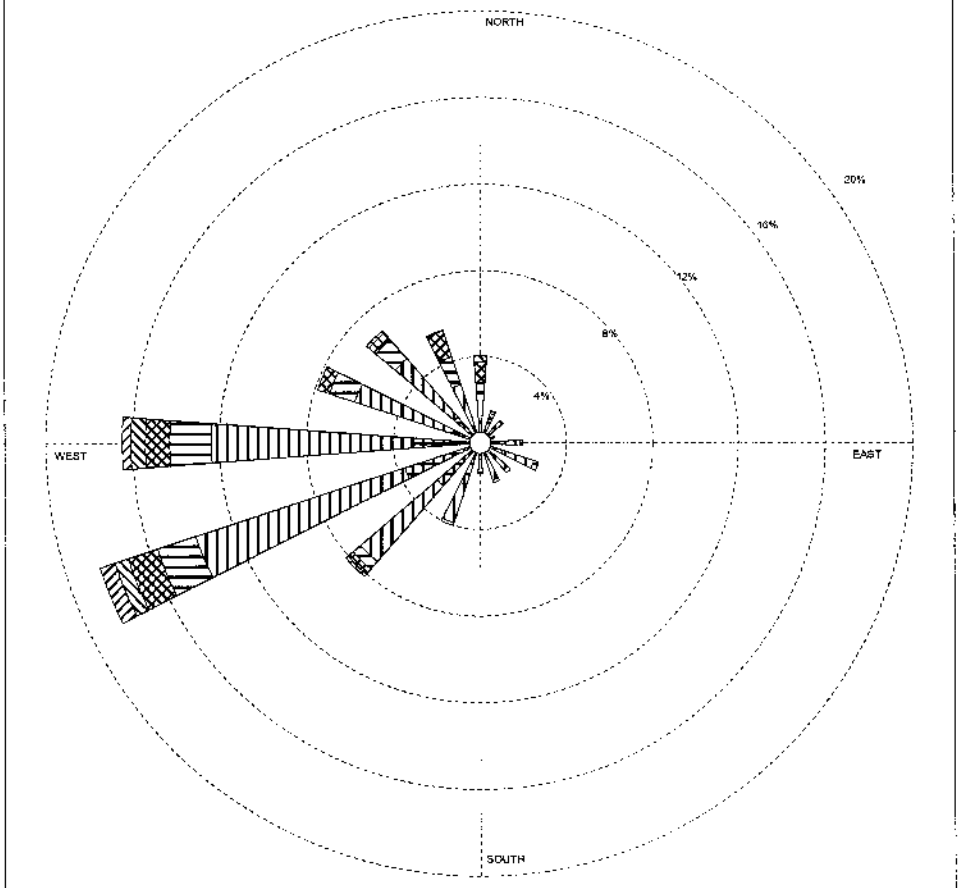


Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **4/25/2002**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.53 m/s**	CALM WINDS **20.52%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1997** **Jul 1 - Sep 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **3rd Quarter of 1997**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

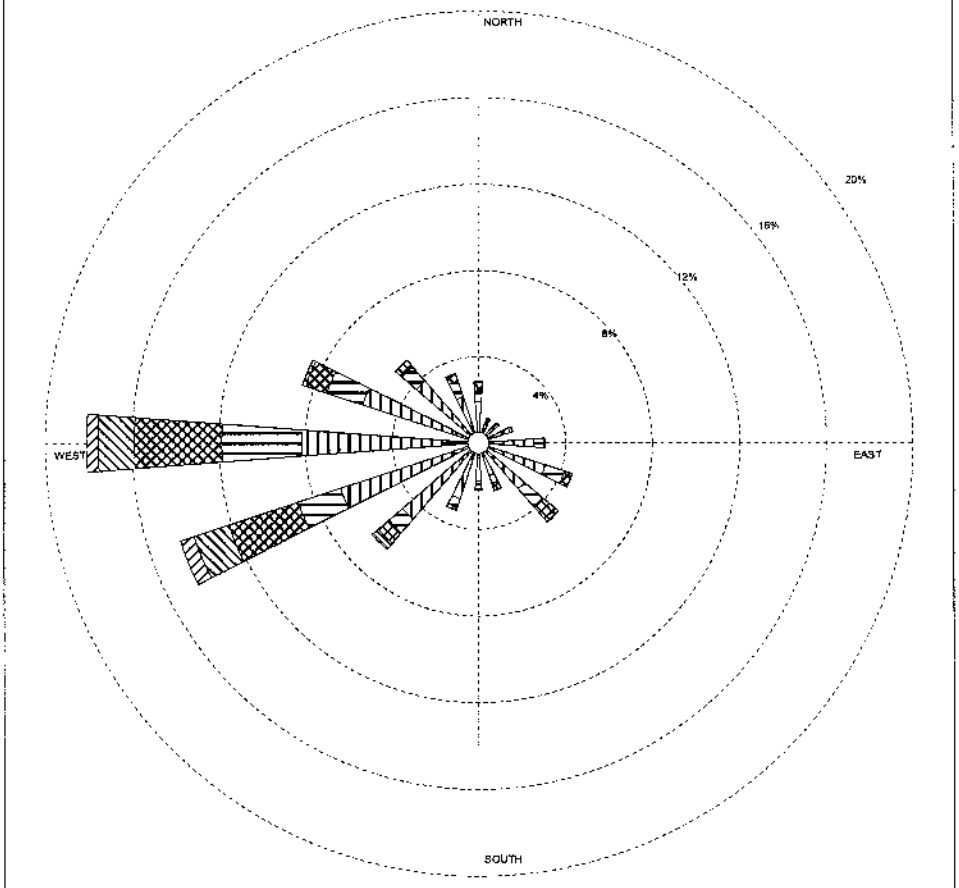
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.00 m/s**	CALM WINDS **14.76%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1997** **Oct 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **4th Quarter of 1997**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

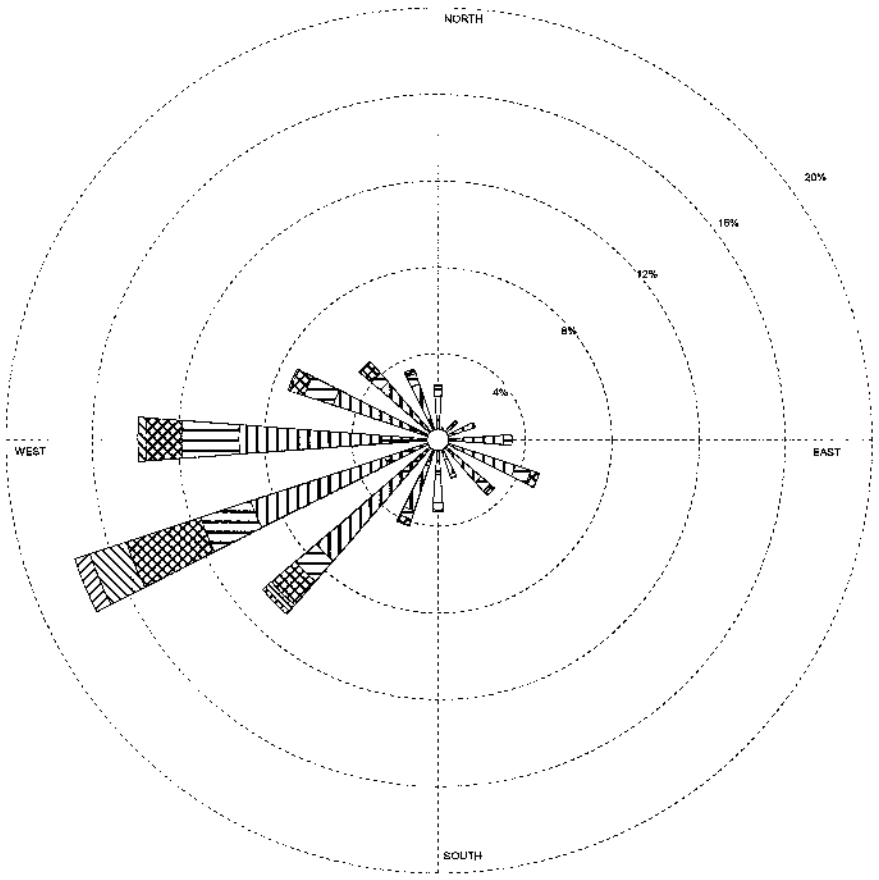
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Spaed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.77 m/s**	CALM WINDS: **18.47%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1998 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO.: **1998 Annual**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

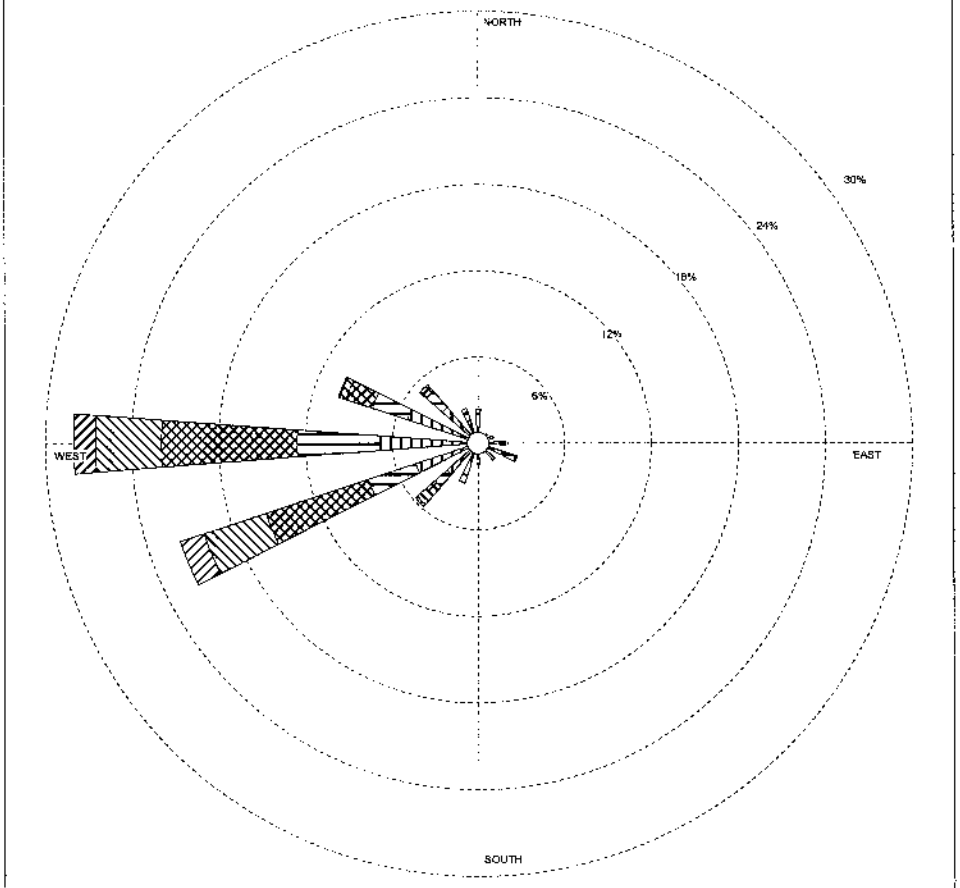
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER		DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**		UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.24 m/s**		CALM WINDS **14.91%**	
ORIENTATION **Direction (blowing from)**		PLOT YEAR-DATE-TIME **1998** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1st Quarter of 1998**

WRPLOT View 2.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

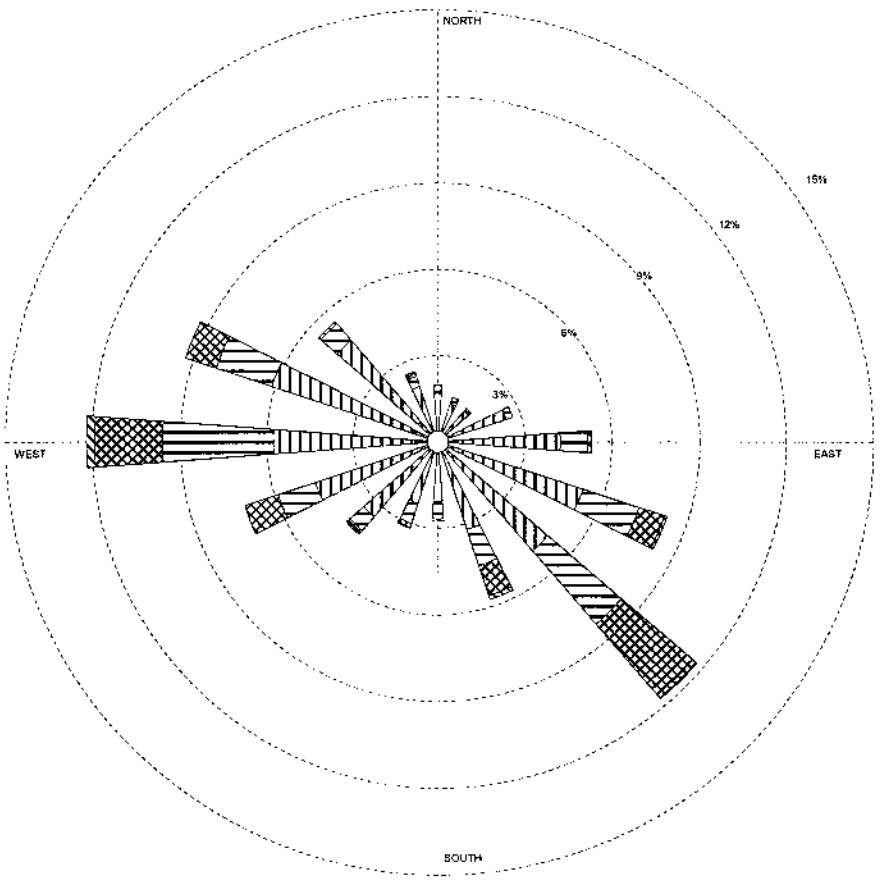
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER		DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**		UNIT **m/s**	COMMENTS
AVG. WIND SPEED **5.01 m/s**		CALM WINDS **9.66%**	
ORIENTATION **Direction (blowing from)**		PLOT YEAR-DATE-TIME **1998** **Apr 1 - Jun 30** **Midnight - 11 PM**	PROJECT/PLOT NO. **2nd Quarter of 1998**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

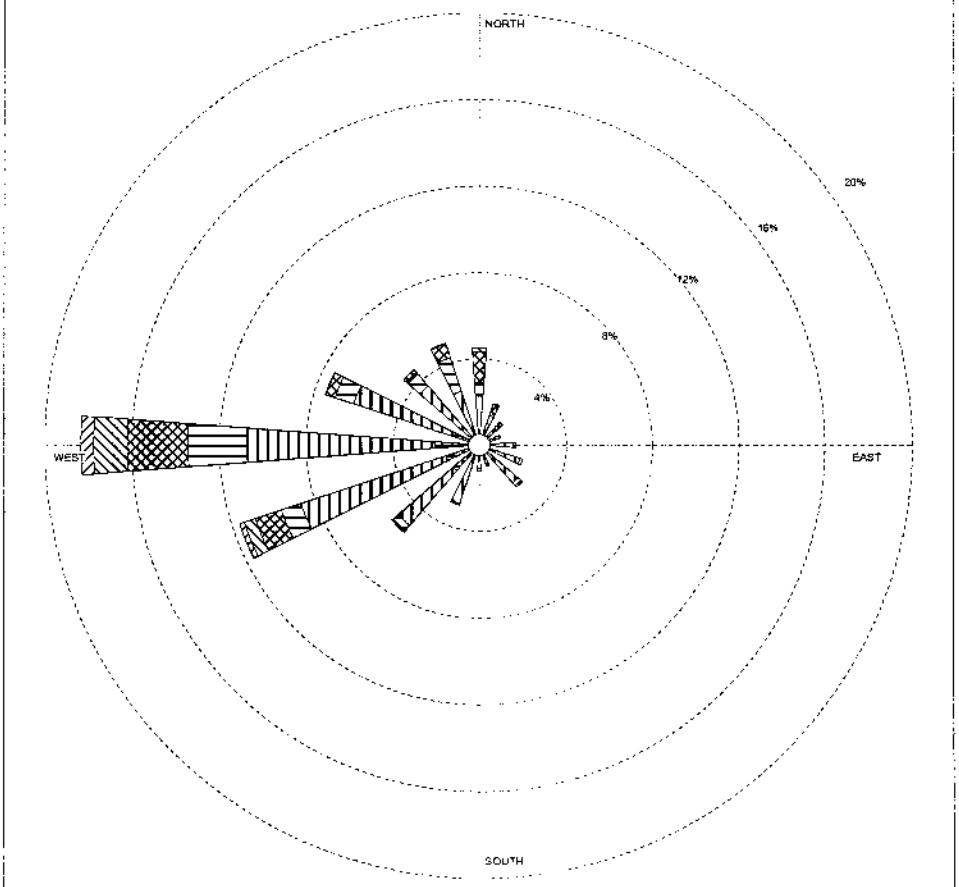
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.35 m/s**	CALM WINDS: **14.18%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1998 Jul 1 - Sep 30 Midnight - 11 PM**	PROJECT/PLOT NO.: **3rd Quarter of 1998**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California

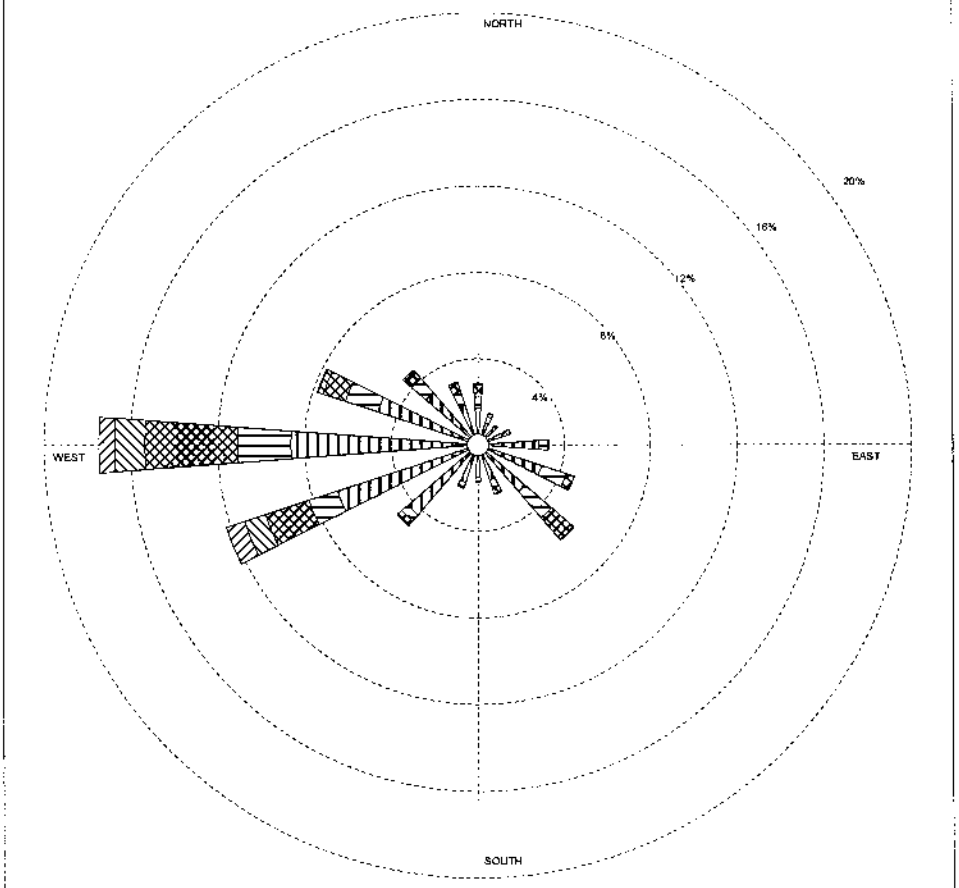


Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **4/25/2002**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.35 m/s**	CALM WINDS **27.04%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1998** **Oct 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **4th Quarter of 1998**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

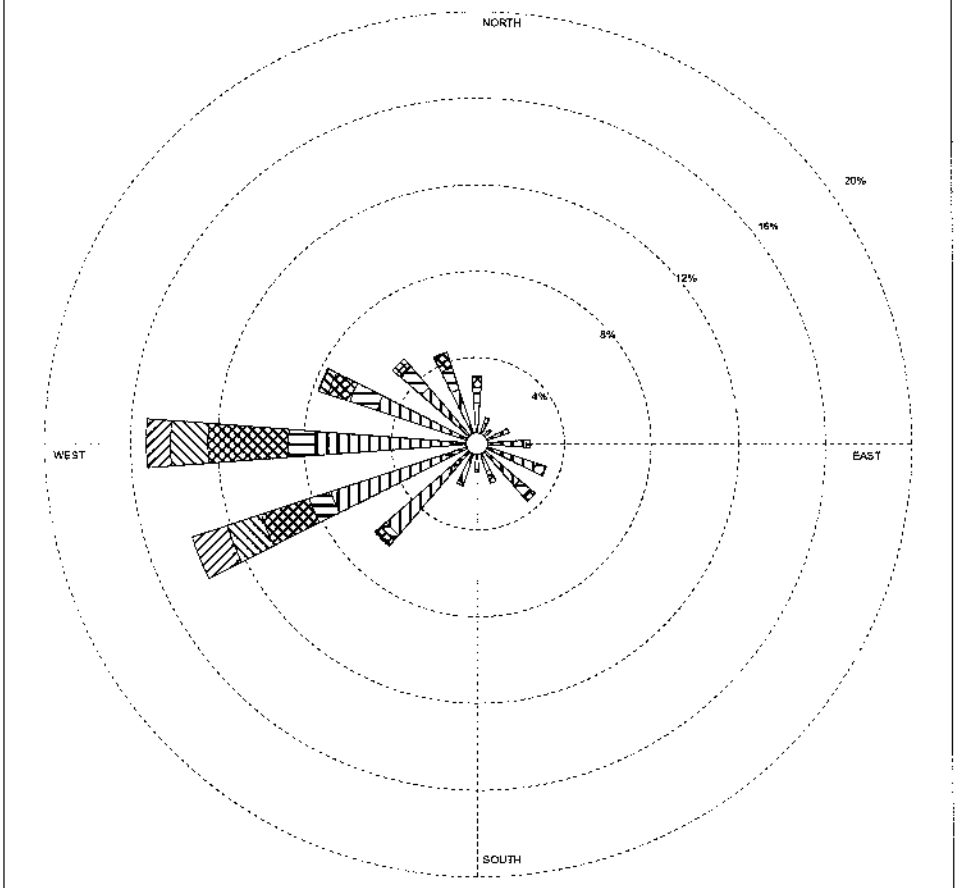
- > 11.08
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.79 m/s**	CALM WINDS: **22.58%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1999 Jan 1 - Dec 31 Midnight - 11 PM**	PROJECT/PLOT NO: **1999 Annual**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

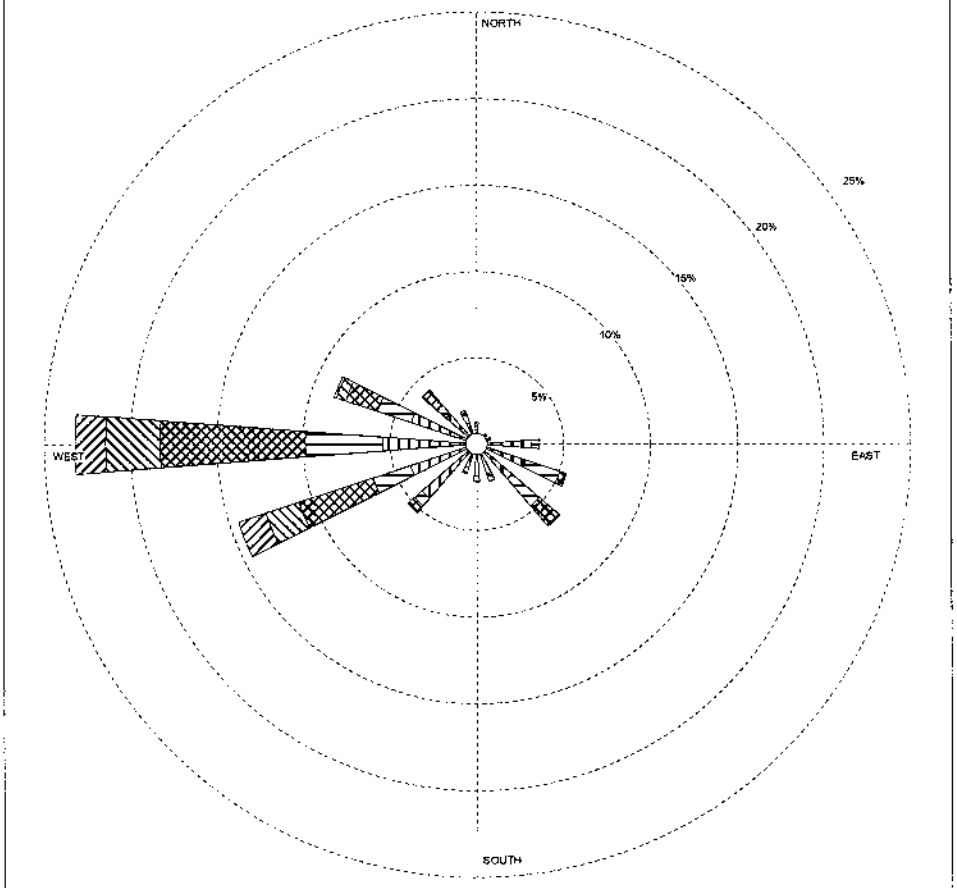
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **3.91 m/s**	CALM WINDS **25.56%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1999** **Jan 1 - Mar 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1st Quarter of 1999**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

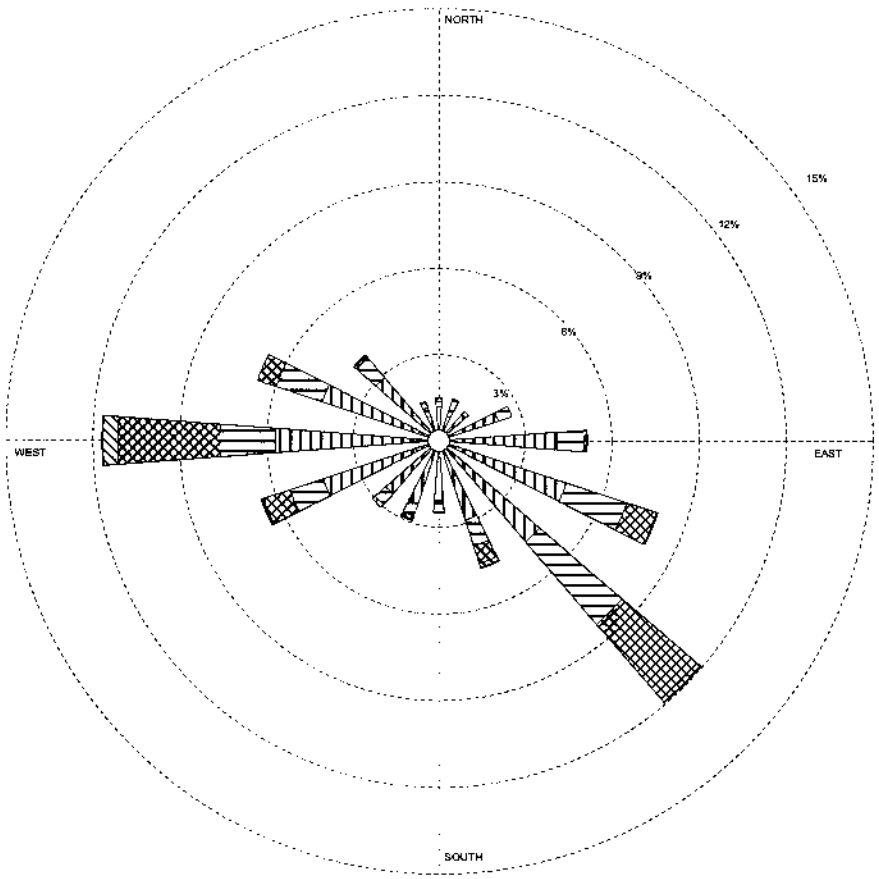
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG WIND SPEED: **4.78 m/s**	CALM WINDS: **16.99%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1999 Apr 1 - Jun 30 Midnight - 11 PM**	PROJECT/PLOT NO.: **2nd Quarter of 1999**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

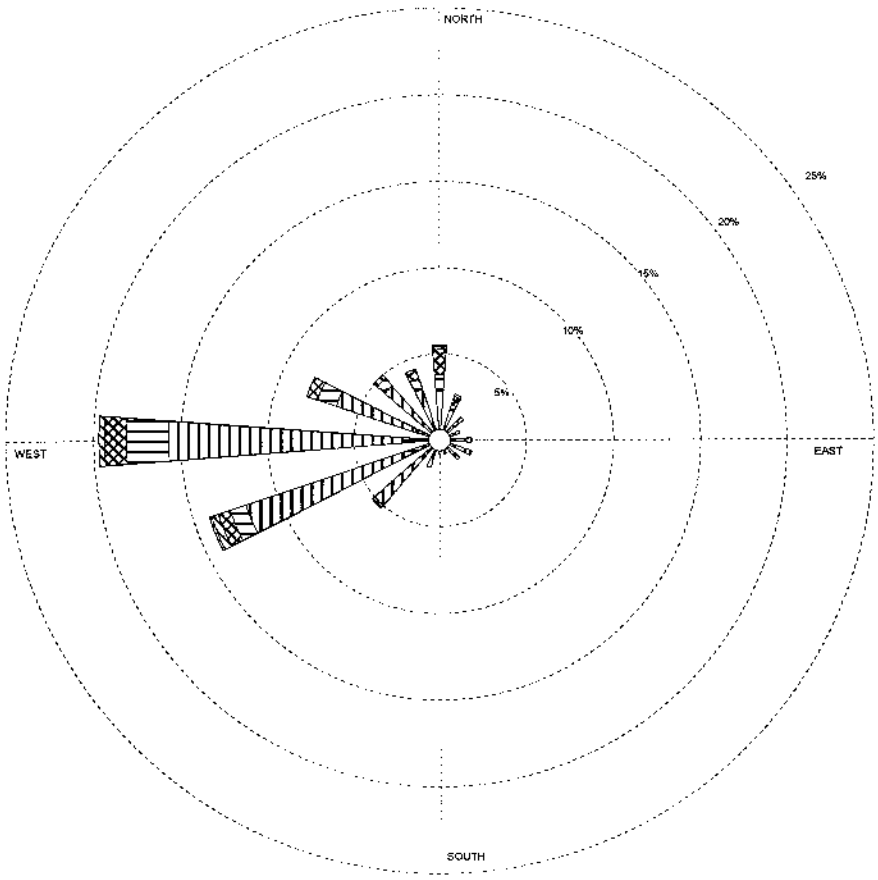
- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE	COMPANY NAME
	4/25/2002	
DISPLAY: **Wind Speed**	UNIT: **m/s**	COMMENTS
AVG. WIND SPEED: **3.50 m/s**	CALM WINDS: **24.37%**	
ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1999 Jul 1 - Sep 30 Midnight - 11 PM**	PROJECT/PLOT NO.: **3rd Quarter of 1999**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

WIND ROSE PLOT

Station WBAN #03144 - Imperial CountyAirport, California



Wind Speed (m/s)

- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER	DATE **4/25/2002**	COMPANY NAME
DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
AVG. WIND SPEED **2.92 m/s**	CALM WINDS **23.41%**	
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1999** **Oct 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO **4th Quarter of 1999**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

TABLE G-1 CONSTRUCTION FUGITIVE DUST - EROSION

MONTH	POWER PLANT (acres)	LAYDOWN AREA (acres)	PARK AREA (acres)	ACCESS ROAD (acres)	WELL PADS (acres)	WELLPAD ACCESS (acres)	PIPELINE ROUTE (acres)	TL ROUTE (acres)	DISTRUBED AREA (acres)	UNCONTROLLED EMISSIONS (tons/month)	CONTROLLED EMISSIONS (lbs/month)	CONTROLLED EMISSIONS (tons/year)
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	4.3	3.0	---	---	---	---	7.3	0.08	32.1	---
4	---	---	4.3	3.0	---	---	---	---	7.3	0.08	32.1	---
5	---	20.9	4.3	3.0	---	---	---	---	28.2	0.31	124.1	---
6	78.6	20.9	4.3	3.0	---	---	7.7	---	114.5	1.26	503.9	---
7	78.6	20.9	4.3	3.0	---	---	7.7	---	114.5	1.26	503.9	---
8	78.6	20.9	4.3	3.0	---	---	7.7	---	114.5	1.26	503.9	---
9	78.6	20.9	4.3	3.0	4.8	---	7.7	---	119.3	1.31	525.1	---
10	78.6	20.9	4.3	3.0	9.6	0.8	7.7	---	124.9	1.37	549.6	---
11	78.6	20.9	4.3	3.0	9.6	0.8	7.7	---	124.9	1.37	549.6	---
12	78.6	20.9	4.3	3.0	9.6	2.3	7.7	---	126.4	1.39	556.3	1.94
13	78.6	20.9	4.3	3.0	9.6	2.3	7.7	---	126.4	1.39	556.3	2.22
14	78.6	20.9	4.3	3.0	9.6	1.5	7.7	---	125.7	1.38	553.0	2.50
15	78.6	20.9	4.3	3.0	14.5	2.6	7.7	---	131.6	1.45	579.0	2.77
16	78.6	20.9	4.3	3.0	14.5	3.3	7.7	---	132.4	1.46	582.4	3.04
17	78.6	20.9	4.3	3.0	14.5	3.3	7.7	---	132.4	1.46	582.4	3.27
18	78.6	20.9	4.3	3.0	14.5	3.3	7.7	92.0	224.4	2.47	987.2	3.51
19	78.6	20.9	4.3	3.0	14.5	5.3	7.7	65.6	199.9	2.20	879.6	3.70
20	78.6	20.9	4.3	3.0	14.5	7.6	7.7	45.9	182.5	2.01	803.0	3.85
21	78.6	20.9	4.3	3.0	14.5	4.6	7.7	58.5	192.1	2.11	845.1	4.01
22	78.6	20.9	4.3	3.0	14.5	1.5	7.7	49.6	180.1	1.98	792.6	4.13
23	78.6	20.9	4.3	3.0	9.6	1.5	3.9	51.7	173.6	1.91	763.8	4.24
24	78.6	20.9	4.3	3.0	4.8	---	3.9	42.9	158.4	1.74	697.1	4.31
25	78.6	20.9	4.3	3.0	4.8	---	3.9	34.9	150.4	1.65	661.9	4.36
26	---	20.9	4.3	3.0	4.8	---	3.9	8.0	44.9	0.49	197.6	4.19

Notes:

Uncontrolled emission factor from MRI, 1996 0.011 tons PM10/ acre-month

80% control efficiency per AP-42 page 13.2.2-11

TABLE G-1.1 CONSTRUCTION WORKER TRAVEL FUGITIVE DUST

Month	Number of Workers	Paved Distance miles	Emission Factor (lb/vmt)	Paved Emissions (lb/day)	Unpaved Distance (miles)	Emission Factor (lb/vmt)	Unpaved Emissions (lb/day)	Total Emissions (lb/day)	Controlled Total (lb/day)	Total Emissions (lb/month)	Controlled Total (tons/year)
1	16	0.5	0.0009	0.007	1.73	0.3222	8.9	8.9	1.8	35.8	---
2	24	0.5	0.0009	0.011	1.73	0.3222	13.4	13.4	2.7	53.7	---
3	33	0.5	0.0009	0.015	1.73	0.3222	18.4	18.4	3.7	73.9	---
4	36	0.5	0.0009	0.016	1.73	0.3222	20.1	20.1	4.0	80.6	---
5	45	0.5	0.0009	0.020	1.73	0.3222	25.1	25.1	5.0	100.8	---
6	98	0.5	0.0009	0.044	1.73	0.3222	54.6	54.7	11.0	219.4	---
7	115	0.5	0.0009	0.052	1.73	0.3222	64.1	64.2	12.9	257.5	---
8	134	0.5	0.0009	0.060	1.73	0.3222	74.7	74.8	15.0	300.0	---
9	282	0.5	0.0009	0.127	1.73	0.3222	157.2	157.3	31.6	631.4	---
10	365	0.5	0.0009	0.164	1.73	0.3222	203.5	203.6	40.9	817.2	---
11	399	0.5	0.0009	0.180	1.73	0.3222	222.4	222.6	44.7	893.3	---
12	409	0.5	0.0009	0.184	1.73	0.3222	228.0	228.2	45.8	915.7	2.190
13	381	0.5	0.0009	0.172	1.73	0.3222	212.4	212.6	42.7	853.0	2.598
14	424	0.5	0.0009	0.191	1.73	0.3222	236.4	236.6	47.5	949.3	3.046
15	480	0.5	0.0009	0.216	1.73	0.3222	267.6	267.8	53.7	1074.7	3.547
16	510	0.5	0.0009	0.230	1.73	0.3222	284.3	284.5	57.1	1141.9	4.077
17	507	0.5	0.0009	0.228	1.73	0.3222	282.6	282.9	56.8	1135.1	4.594
18	509	0.5	0.0009	0.229	1.73	0.3222	283.8	284.0	57.0	1139.6	5.054
19	553	0.5	0.0009	0.249	1.73	0.3222	308.3	308.5	61.9	1238.1	5.545
20	545	0.5	0.0009	0.245	1.73	0.3222	303.8	304.1	61.0	1220.2	6.005
21	546	0.5	0.0009	0.246	1.73	0.3222	304.4	304.6	61.1	1222.5	6.300
22	443	0.5	0.0009	0.199	1.73	0.3222	247.0	247.2	49.6	991.9	6.388
23	380	0.5	0.0009	0.171	1.73	0.3222	211.8	212.0	42.5	850.8	6.366
24	218	0.5	0.0009	0.098	1.73	0.3222	121.5	121.6	24.4	488.1	6.153
25	147	0.5	0.0009	0.066	1.73	0.3222	82.0	82.0	16.5	329.1	5.891
26	61	0.5	0.0009	0.027	1.73	0.3222	34.0	34.0	6.8	136.6	5.484

Note:

Refer to Table G-3.10 for Staffing Schedule and Construction Work Force

TABLE G-1.1 CONSTRUCTION WORKER TRAVEL FUGITIVE DUST (Continued)

Notes:

Paved roads: AP-42 Section 13.2.1 10/01 Draft

E = k(sL/2)^0.65*(W/3)^1.5

k = particle size constant =	0.016	lb/VMT - PM10
sL = silt loading =	0.04	g/m2 (AP-42, page 13.2.1-7, low ADT access roads)
W = auto/pickup truck avg. vehicle weight =	2.4	tons (CARB Area Source Manual, 9/97)
E = auto/pick truck emission factor =	0.0009	lb/VMT - PM10

Unpaved roads: AP-42 Section 13.2.2 10/01 Draft

Public road

E = (k)[(s/12)^0.8]*[(S/30)]/[(M/0.5)^0.2]

k = particle size constant =	1.8	lb/VMT - PM10
s = silt fraction % =	11	AP-42, TABLE 13.2.2-1, mean for dirt roads, percent
S = speed =	10	mph work limit
M = moisture level % =	7.9	Mean moisture for overburden AP-42 Table 11.9-3
E = auto/pick truck emission factor =	0.3222	lb/VMT - PM10

Control efficiency of 80% estimated for unpaved roads, page 13.2.2-11, AP-42

TABLE G-1.2 CONSTRUCTION DELIVERY TRUCK FUGITIVE DUST

Month	Number of Trucks per Month	Number of Trucks per Day	Paved Distance miles	Emission Factor (lb/vmt)	Paved Emissions (lb/day)	Unpaved Distance (miles)	Emission Factor (lb/vmt)	Unpaved Emissions (lb/day)	Total Emissions (lb/day)	Controlled Total (lb/day)	Controlled Total (lb/month)	Controlled Total (tons/year)
1	0	0.0	0.5	0.0193	0.000	2.12	0.3222	0.0	0.0	0.0	0.0	---
2	0	0.0	0.5	0.0193	0.000	2.12	0.3222	0.0	0.0	0.0	0.0	---
3	0	0.0	0.5	0.0193	0.000	2.12	0.3222	0.0	0.0	0.0	0.0	---
4	0	0.0	0.5	0.0193	0.000	2.12	0.3222	0.0	0.0	0.0	0.0	---
5	0	0.0	0.5	0.0193	0.000	2.12	0.3222	0.0	0.0	0.0	0.0	---
6	25	1.3	0.5	0.0193	0.012	2.12	0.3222	0.9	0.9	0.2	3.7	---
7	60	3.0	0.5	0.0193	0.029	2.12	0.3222	2.0	2.1	0.4	8.8	---
8	55	2.8	0.5	0.0193	0.026	2.12	0.3222	1.9	1.9	0.4	8.0	---
9	203	10.2	0.5	0.0193	0.098	2.12	0.3222	6.9	7.0	1.5	29.7	---
10	423	21.2	0.5	0.0193	0.204	2.12	0.3222	14.4	14.7	3.1	61.9	---
11	596	29.8	0.5	0.0193	0.287	2.12	0.3222	20.4	20.6	4.4	87.2	---
12	715	35.8	0.5	0.0193	0.344	2.12	0.3222	24.4	24.8	5.2	104.6	0.1519
13	531	26.6	0.5	0.0193	0.256	2.12	0.3222	18.1	18.4	3.9	77.7	0.1907
14	484	24.2	0.5	0.0193	0.233	2.12	0.3222	16.5	16.8	3.5	70.8	0.2261
15	567	28.4	0.5	0.0193	0.273	2.12	0.3222	19.4	19.6	4.1	82.9	0.2676
16	568	28.4	0.5	0.0193	0.274	2.12	0.3222	19.4	19.7	4.2	83.1	0.3091
17	555	27.8	0.5	0.0193	0.267	2.12	0.3222	19.0	19.2	4.1	81.2	0.3497
18	514	25.7	0.5	0.0193	0.248	2.12	0.3222	17.6	17.8	3.8	75.2	0.3855
19	447	22.4	0.5	0.0193	0.215	2.12	0.3222	15.3	15.5	3.3	65.4	0.4138
20	453	22.7	0.5	0.0193	0.218	2.12	0.3222	15.5	15.7	3.3	66.3	0.4429
21	445	22.3	0.5	0.0193	0.214	2.12	0.3222	15.2	15.4	3.3	65.1	0.4606
22	270	13.5	0.5	0.0193	0.130	2.12	0.3222	9.2	9.4	2.0	39.5	0.4494
23	252	12.6	0.5	0.0193	0.121	2.12	0.3222	8.6	8.7	1.8	36.9	0.4242
24	150	7.5	0.5	0.0193	0.072	2.12	0.3222	5.1	5.2	1.1	21.9	0.3829
25	112	5.6	0.5	0.0193	0.054	2.12	0.3222	3.8	3.9	0.8	16.4	0.3523
26	112	5.6	0.5	0.0193	0.054	2.12	0.3222	3.8	3.9	0.8	16.4	0.3251

Note:

Refer to Table G-3.11 for Truck Deliveries of Equipment / Materials

TABLE G-1.2 CONSTRUCTION DELIVERY TRUCK FUGITIVE DUST (Continued)

Notes:

Paved roads: AP-42 Section 13.2.1 10/01 draft

E = k(sL/2)^0.65*(W/3)^1.5

k = particle size constant =	0.016	lb/VMT - PM10
sL = silt loading =	0.04	g/m2 (AP-42, page 13.2.1-7, low ADT access roads)
W = delivery truck avg. vehicle weight =	18.5	tons (max 27.5 tons; empty 9.5 tons)
E = delivery truck emission factor =	0.0193	lb/VMT - PM10

Unpaved roads: AP-42 Section 13.2.2.2 10/01

Public road (equation 1b)

E = (k)[(s/12)^0.8]*[(S/30)]/[(M/0.5)^0.2]

k = particle size constant =	1.8	lb/VMT - PM10
s = silt fraction % =	11	AP-42, TABLE 13.2.2-1, mean for dirt roads
S = speed =	10	mph work limit
W = moisture level % =	7.9	Mean moisture for overburden AP-42 Table 11.9-3
E = delivery truck emission factor =	0.3222	lb/VMT - PM10

Control efficiency of 80% estimated for unpaved roads, page 13.2.2-11, AP-42

TABLE G-1.3 CONSTRUCTION EQUIPMENT FUGITIVE DUST

7/18/02

Construction Equipment	Emission Source	Usage	Emission Factor	Emission Factor Units	Units per day	Uncontrolled Emission Rate (lb/day)	Controlled Emission Rate* (lb/month)
Car-Sedan	Paved roads		0.0009	lb/vmt	2	0.0018	0.0
	Unpaved roads		0.3222	lb/vmt	9.5	3.0613	12.2
Pickup Truck	Paved roads		0.0009	lb/vmt	2	0.0018	0.0
	Unpaved roads		0.3222	lb/vmt	9.5	3.0613	12.2
Flatbed Truck	Paved roads		0.0193	lb/vmt	0.5	0.0096	0.2
	Unpaved roads		0.3222	lb/vmt	2	0.6445	2.6
Dump Truck	Paved roads		0.0193	lb/vmt	0.5	0.0096	0.2
	Unpaved roads		0.3222	lb/vmt	2	0.6445	2.6
	Unloading		0.1055	lbs/day	1	0.1055	2.1
Concrete Pump	Paved roads		0.0321	lb/vmt	0.5	0.0161	0.3
	Unpaved roads		3.6653	lb/vmt	2	7.3307	29.3
Fuel Truck	Paved roads		0.0193	lb/vmt	0.5	0.0096	0.2
	Unpaved roads		0.3222	lb/vmt	2	0.6445	2.6
Water Truck	Paved roads		0.0087	lb/vmt	4	0.0349	0.7
	Unpaved roads		0.3222	lb/vmt	16	5.1560	20.6
Forklift	Unpaved roads		2.1566	lb/vmt	1.0	2.1566	8.6
Grader	Earth moving		0.2754	lb/vmt	2	0.5508	2.2
Dozer	Earth moving	70%	12.1217	lbs/day	70%	8.4852	33.9
Trencher	Unpaved roads		2.1566	lb/vmt	0.5	1.0783	4.3
	Earth moving	75%	0.7604	lbs/day	75%	0.5703	2.3
Loader	Unpaved roads		2.1566	lb/vmt	0.5	1.0783	4.3
	Earth moving	80%	0.7604	lbs/day	80%	0.6084	2.4
Paving	Unpaved roads		2.7246	lb/vmt	0.5	1.3623	5.4
Vib Roller	Unpaved roads		2.1566	lb/vmt	0.5	1.0783	4.3
Compactor	Unpaved roads		2.1566	lb/vmt	0.5	1.0783	4.3
Crane-230T	Unpaved roads		4.4494	lb/vmt	0.5	2.2247	8.9
Crane-140T	Unpaved roads		4.4494	lb/vmt	0.5	2.2247	8.9
Crane-60T	Unpaved roads		4.2434	lb/vmt	0.5	2.1217	8.5
Crane-45T	Unpaved roads		4.2434	lb/vmt	0.5	2.1217	8.5
Compressors	Unpaved roads		0.3222	lb/vmt	0.5	0.1611	0.6
Manlifts	Unpaved roads		0.3222	lb/vmt	0.5	0.1611	0.6
Welders	Unpaved roads		0.3222	lb/vmt	0.5	0.1611	0.6

Notes:

Paved roads: AP-42 Section 13.2.1 10/01 draft

E = k(sL/2)^0.65*(W/3)^1.5

k = particle size constant = 0.016 lb/VMT - PM10

sL = silt loading = 0.04 g/m2 (AP-42, page 13.2.1-7, low ADT access roads)

W = concrete pump avg. vehicle weight = 26 tons (40 tons max; 12 tons empty) estimated

E = concrete pump emission factor = 0.0321 lb/VMT - PM10

W = water truck avg. vehicle weight = 10.9 tons (15 tons full; 6.7 tons empty) estimated

E = water truck emission rate = 0.0087 lb/VMT - PM10

Unpaved roads: AP-42 Section 13.2.2.2 10/01
On site travel (equation 1b)
E = (k)[(s/12)^0.9][(W/3)^0.45]

k = particle size constant =	1.5	lb/VMT - PM10	
s = silt fraction =	11	(AP-42, Table 13.2.2-1, mean for dirt roads)	
W = concrete pump avg. vehicle weight =	26	tons (40 tons max; 12 tons empty)	
E = concrete pump emission factor =	3.6653	lb/VMT - PM10	
W = forklift/misc avg. vehicle wt =	8	tons estimated (vehicle weight same for trencher, loader, vib roller and compactor).	
E = forklift/misc emission factor =	2.1566	lb/VMT - PM10	(same for trencher, loader, vib roller and compactor).
W = paver avg. vehicle wt =	13.45	tons (AP-800C- Caterpillar Performance Handbook 10-2000 -estimated)	
E = paver emission factor =	2.7246	lb/VMT - PM10	
W = crane 230T/140T. vehicle wt =	40	tons estimated (maximum for highway)	
E = crane 230T/140T emission factor =	4.4494	lb/VMT - PM10	
W = crane 60T/45T. vehicle wt =	36	tons estimated	
E = crane 60T/45T emission factor =	4.2434	lb/VMT - PM10	
W = misc truck avg. vehicle weight =	18.5	tons (max 27.5 tons; empty 9.5 tons)	
E = misc truck emission rate =	3.1449	lb/VMT - PM10	

Truck Unloading: AP-42 Section 3.2.4 1/95
E = k{0.0032[(U/5)^1.3]}/(M/2)^1.4)

k = particle size constant =	0.35	PM10
U = mean wind speed =	6.6	mph annual mean wind speed at Imperial County Airport
M = moisture =	7.9	(AP-42, Table 11.9-3, mean for overburden)
E = emission factor =	0.00023	lb/ton processed
Process rate	449.28	tons/day (52yd3/hr*1.35 tons/yd3*6.4 hours/day)
PM10 emissions per day	0.105	lbs/day

Grading: AP-42 Section 11.9 7/98
E = (.051[(S)^2.0]}(.60)

S = mean vehicle speed (mph) =	3	mph from Caterpillar Performance Handbook 10-2000
E = grading emission factor =	0.275	lb/VMT - PM10

Bulldozing: AP-42 Section 11.9 7/98
E = {(1[(s)^1.5])/(M^1.4)}(.75) Overburden

s = silt fraction =	11	(AP-42, Table 13.2.2-1, mean for dirt roads)
M = moisture =	7.9	(AP-42, Table 11.9-3, mean for overburden)
E = bulldozing emission factor =	1.515	lb/hr - PM10
PM10 emissions per day	12.122	lbs/day

Trenching/Loading: AP-42 Section 11.9 7/98
E = {(0.0021[(D)^0.7])/(M^0.3)}(.75) Dragline Overburden

D = drop height =	3.0	feet-estimated
M = moisture =	7.9	(AP-42, Table 11.9-3, mean for overburden)
E = emission factor =	0.002	lb/yd3 - PM10
Trenching rate	52	yd3/hr (307B- Caterpillar Performance Handbook 10-2000 - estimated)
PM10 emissions per day	0.760	lbs/day

* All with a control efficiency of 80% estimated except paved roads, page 13.2.2-11, AP-42
Refer to Tables G-1.1 and G-1.2 for support of emission factors not listed above

Table G-1.4 Construction Equipment Monthly Summary

Construction Equipment	Average Hours Per Day	Average Units On Site Per Month																				
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pickup truck		7	7	8	8	9	9	10	12	12	16	17	17	17	14	14	14	12	12	7	6	4
Truck		1	1	1	1	2	2	2	2	2	4	3	3	3	5	5	9	9	6	7	6	4
Dump truck		4	4	4	4	2	1															
Concrete pump							1	1	1	1												
Fuel/lube truck		1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1
Water truck		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Forklift		1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1
Grader		2	2	2	2	1												1	1			
Dozer	5.6	2	3	3	3	2								1	1			1	3	2	2	
Trencher	6	1	1	1	2	2	2	2	2	2	1	1	1		2	2	2	2	2			
Loader	6.4	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Paver																			2	2		
Vib roller		1	2	3	3	2	2	2	2	2	2	1	1	1	1	1	1					
Compactor					1	1	1	2	2	1	1	1	1	1								
Crane-230T										1	2	2	2	2	1							
Crane-140T							1	1	1	1	1	1	1	1	1	1	1					
Crane-60T		1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1					
Crane-45T			1	1	2	2	2	2	2	3	3	3	3	3	3	4	3	3	2	2		
Air compressors			1	1	1	2	4	5	6	6	6	6	6	8	6	6	4	4	3	2	2	1
Manlifts						1	1	3	7	9	9	9	9	9	8	6	4	2				
Welders		1	1	1	4	6	8	8	8	8	8	8	6	6	4	2	1					

Table G-1.5 Construction Equipment Monthly Fugitive PM_{10} Emissions (lb/month)

Construction Equipment	Average Hours Per Day	Month of Construction																				
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car		12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Pickup truck		86.0	86.0	98.3	98.3	111	111	123	147	147	197	209	209	209	172	172	172	147	147	86.0	73.7	49.1
Truck		2.8	2.8	2.8	2.8	5.5	5.5	5.5	5.5	5.5	11.1	8.3	8.3	8.3	13.9	13.9	24.9	24.9	16.6	19.4	16.6	11.1
Dump truck		11.1	11.1	11.1	11.1	5.5	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete pump		0.0	0.0	0.0	0.0	0.0	29.6	29.6	29.6	29.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel/lube truck		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	2.8
Water truck		21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
Forklift		8.6	8.6	8.6	8.6	8.6	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	8.6	8.6	8.6	8.6	8.6
Grader		4.4	4.4	4.4	4.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0
Dozer	5.6	67.9	102	102	102	67.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.9	33.9	0.0	0.0	33.9	102	67.9	67.9	0.0
Trencher	6	6.6	6.6	6.6	13.2	13.2	13.2	13.2	13.2	13.2	6.6	6.6	6.6	0.0	13.2	13.2	13.2	13.2	13.2	0.0	0.0	0.0
Loader	6.4	6.7	6.7	13.5	13.5	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	0.0	0.0	0.0
Paver		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	10.9	0.0	0.0
Vib roller		4.3	8.6	12.9	12.9	8.6	8.6	8.6	8.6	8.6	8.6	4.3	4.3	4.3	4.3	4.3	4.3	0.0	0.0	0.0	0.0	0.0
Compactor		0.0	0.0	0.0	4.3	4.3	4.3	8.6	8.6	4.3	4.3	4.3	4.3	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane-270T		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	17.8	17.8	17.8	17.8	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane-140T		0.0	0.0	0.0	0.0	0.0	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	0.0	0.0	0.0	0.0	0.0
Crane-60T		8.5	8.5	8.5	8.5	8.5	8.5	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	8.5	8.5	0.0	0.0	0.0	0.0	0.0
Crane-45T		0.0	8.5	8.5	17.0	17.0	17.0	17.0	17.0	25.5	25.5	25.5	25.5	25.5	25.5	33.9	25.5	25.5	17.0	17.0	0.0	0.0
Air compressors		0.0	0.6	0.6	0.6	1.3	2.6	3.2	3.9	3.9	3.9	3.9	3.9	5.2	3.9	3.9	2.6	2.6	1.9	1.3	1.3	0.6
Manlifts		0.0	0.0	0.0	0.0	0.6	0.6	1.9	4.5	5.8	5.8	5.8	5.8	5.8	5.2	3.9	2.6	1.3	0.0	0.0	0.0	0.0
Welders		0.6	0.6	0.6	2.6	3.9	5.2	5.2	5.2	5.2	5.2	5.2	3.9	3.9	2.6	1.3	0.6	0.0	0.0	0.0	0.0	0.0
TOTAL EMISSIONS (lbs/month)		**244**	**291**	**315**	**336**	**301**	**278**	**302**	**330**	**344**	**371**	**377**	**375**	**407**	**372**	**327**	**326.2**	**305**	**366**	**250**	**207**	**106**

Table G-1.6 Fugitive PM_{10} Emissions Monthly Summary

Activity	Fugitive PM10 Emissions Per Month (lb/month)																				
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Construction Equipment	243.9	291.3	314.6	336.0	300.8	277.7	302.0	329.8	344.1	371.4	376.6	375.4	406.8	372.2	326.8	326.2	305.5	365.5	250.2	207.3	105.9
Delivery Trucks	3.7	8.8	8.0	29.7	61.9	87.2	104.6	77.7	70.8	82.9	83.1	81.2	75.2	65.4	66.3	65.1	39.5	36.9	21.9	16.4	16.4
Worker Travel	219.4	257.5	300.0	631.4	817.2	893.3	915.7	853.0	949.3	1075	1142	1135	1140	1238	1220	1222	991.9	850.8	488.1	329.1	136.6
Erosion	503.9	503.9	503.9	525.1	549.6	549.6	556.3	556.3	553.0	579.0	582.4	582.4	987.2	879.6	803.0	845.1	792.6	763.8	697.1	661.9	197.6
Total (lbs/month)	**971**	**1061**	**1127**	**1522**	**1730**	**1808**	**1879**	**1817**	**1917**	**2108**	**2184**	**2174**	**2609**	**2555**	**2416**	**2459**	**2129**	**2017**	**1457.3**	**1215**	**456.5**
Total (tons/year)	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**10.15**	**10.97**	**11.71**	**12.36**	**12.83**	**13.03**	**13.13**	**12.92**	**12.62**	**11.89**

Notes:

SHORT TERM EMISSIONS

MAX MONTHLY 18	lbs/mo	lbs/day	lbs/hr	gm/sec	
Construction Equipment	406.8	20.3	2.5	0.321	8hr/day
Delivery Trucks	75.2	3.8	0.5	0.059	8hr/day
Worker Travel	1139.6	57.0	7.1	0.898	8hr/day
Erosion	987.2	32.9	1.4	0.173	24hr/day
TOTAL	2608.8	114.0	11.5	1.451	
TOTAL (without erosion)				1.278	

LONG TERM EMISSIONS

MAX ANNUAL MO 12-23	lbs/y	lbs/mo	lbs/day	lbs/hr	gm/sec	
Construction Equipment	4202.2	350.2	17.5	2.2	0.276	8hr/day
Delivery Trucks	848.5	70.7	3.5	0.4	0.056	8hr/day
Worker Travel	12732.9	1061.1	53.1	6.6	0.836	8hr/day
Erosion	8480.8	706.7	23.6	1.0	0.124	24hr/day
TOTAL	26264	2188.7	97.7	10.2	1.292	
TOTAL (without erosion)					1.168	

TOTAL (tons/year) 13.13

TABLE G-2 WELL DRILLING EMISSIONS

Equipment	Fuel	Engine HP	Emission Factor - grams/bhp-hr					Emission Rate - lb/hr				
			NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
#1	Diesel	450	6.550	0.800	0.090	0.1840	0.270	6.49	0.79	0.09	0.18	0.27
#2	Diesel	450	6.550	0.800	0.090	0.1840	0.270	6.49	0.79	0.09	0.18	0.27
#3	Diesel	450	6.550	0.800	0.090	0.1840	0.270	6.49	0.79	0.09	0.18	0.27
#4	Diesel	450	6.550	0.800	0.090	0.1840	0.270	6.49	0.79	0.09	0.18	0.27
						Total (lb/hr) PEAK		**25.97**	**3.17**	**0.36**	**0.73**	**1.070**
						Total (gm/s) PEAK		**3.28**	**0.4000**	**0.0450**	**0.0920**	**0.135**
						Total (tons/well)		**8.42**	**1.03**	**0.12**	**0.24**	**0.347**
						Total (tons in 1 year)		**124.25**	**15.18**	**1.71**	**3.49**	**5.122**
						Total (lbs/hr in 1 year)		**28.37**	**3.46**	**0.39**	**0.80**	**1.169**
						Total (gm/sec)		**3.58**	**0.4369**	**0.0492**	**0.1005**	**0.147**

Notes:

NO2,CO,VOC and PM_{10} emission factors based on Caterpillar documented emission data for 3412DITTA Engines, SO2 based on 0.05% Sulfur fuel

Engine Hp based upon typical drill rig used in the Salton Sea area.

Emissions long term are based upon 900 days of drilling and average fuel use (100% load equals 2284.8 gal/day -actual highest of three wells is 1012 gal/day or 44.3%.

PAD Locations *	East	North	Elevation
PAD I (OB3)	627092	3670738	-205
PAD N (OB1)	628357	3671134	-230
PAD J (OB2)	627897	3670846	-230
PAD C (OB4)	627751	3670183	-228
PAD L (OB5)	628153	3669888	-228
PAD R (OBI2)	630101	3669780	-217
PAD P (OBI3)	630101	3669149	-216
PAD O (OBI1)	629269	3668354	-214
CT Well	628455	3670615	-228
BP Well	627760	3670615	-228

* Taken from USGS Maps (NAD27, NGVD29)

Modeling Scenario (each well one point source)

Rig engines have stack heights of 14 feet and 8 inch diameter

One equivalent stack exhaust based on fire pump exhaust volume and temperature

1 hp equals 5.2 cfm (1506 acfm/ 290 hp)

One engine (450 hp) equals 2340 acfm, total rig (1800 hp) equals 9360 acfm

Rig stack velocity is 112 ft/sec with 8 inch diameter, keep same velocity with new diameter

New equivalent diameter is 1.33 feet for entire rig

Use fire pump exhaust temperature of 855 F

Well Rework/New Well Drilling

Emissions	NO_X	CO	VOC	SO_X	PM_{10}
Total (tons/year) *	6.90	0.84	0.09	0.19	0.285

* Emissions long term are based upon 50 days of drilling and average fuel use

Table G-3 Construction Equipment Emission Factors

Construction Equipment	Fuel	Vehicle Miles Traveled Per Day	Emission Factors - grams/VMT					Emission Rates - lbs/hr				
			NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
Car-Sedan	G	11.5	0.97	10.62	1.29	0.1	0.03	0.0246	0.2690	0.0327	0.0025	0.0008
Pickup truck	G	11.5	1.67	19.88	2.08	0.1	0.04	0.0423	0.5036	0.0527	0.0025	0.0010
Dump T	D	2.5	13.08	2.62	0.49	0.16	0.41	0.0720	0.0144	0.0027	0.0009	0.0023
Fuel Truck	D	2.5	13.08	2.62	0.49	0.16	0.41	0.0720	0.0144	0.0027	0.0009	0.0023
Water Truck	D	20	13.08	2.62	0.49	0.16	0.41	0.5762	0.1154	0.0216	0.0070	0.0181
Flatbed truck	D	2.5	13.08	2.62	0.49	0.16	0.41	0.0720	0.0144	0.0027	0.0009	0.0023

Construction Equipment	Fuel	Usage (%)	Engine HP	Load Factor	Emission Factors - lb/hp-hr					Emission Rates - lbs/hr				
					NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
Concrete Pump	D	30	130	59	0.024	0.010	0.002	0.00040	0.0010	0.55	0.23	0.05	0.01	0.02
Forklift	D	80	83	30	0.031	0.013	0.003	0.00040	0.0015	0.62	0.26	0.06	0.01	0.03
Grader	D	90	157	58	0.021	0.008	0.003	0.00040	0.0010	1.72	0.66	0.25	0.03	0.08
Dozer	D	70	103	59	0.023	0.011	0.002	0.00040	0.0010	0.98	0.47	0.09	0.02	0.04
Trencher	D	75	60	70	0.022	0.020	0.003	0.00040	0.0015	0.69	0.63	0.09	0.01	0.05
Loader	D	80	77	47	0.022	0.015	0.003	0.00040	0.0010	0.64	0.43	0.09	0.01	0.03
Paving	D	85	99	53	0.023	0.007	0.001	0.00040	0.0010	1.03	0.31	0.04	0.02	0.04
Vib Roller	D	60	99	58	0.020	0.007	0.002	0.00040	0.0010	0.69	0.24	0.07	0.01	0.03
Compactor	D	65	99	58	0.020	0.007	0.002	0.00040	0.0010	0.75	0.26	0.07	0.01	0.04
Crane-230T	D	70	450	43	0.023	0.009	0.003	0.00040	0.0015	3.12	1.22	0.41	0.05	0.20
Crane-140T	D	70	270	43	0.023	0.009	0.003	0.00040	0.0015	1.87	0.73	0.24	0.03	0.12
Crane-60T	D	50	175	43	0.023	0.009	0.003	0.00040	0.0015	0.87	0.34	0.11	0.02	0.06
Crane-45T	D	50	150	43	0.023	0.009	0.003	0.00040	0.0015	0.74	0.29	0.10	0.01	0.05
Compressors	D	75	37	48	0.018	0.011	0.002	0.00040	0.0010	0.24	0.15	0.03	0.01	0.01
Manlifts	D	80	43	51	0.031	0.013	0.003	0.00040	0.0015	0.54	0.23	0.05	0.01	0.03
Welders	D	75	35	45	0.018	0.011	0.002	0.00040	0.0010	0.21	0.13	0.02	0.00	0.01

Notes:

1 Emission factors obtained from EMFAC2000 Version 2.02 default scenario for the Salton Sea Air Basin, Calendar year 2002.
Car-sedan based on Class 1 totals; Pickup trucks based on class 2 totals; and Trucks based on class 7 diesel.

2 Emission factors based on SCAQMD CEQA Handbook Table A9-8-B, SO2 based on .05% sulfur fuel.

3 Load factors based on SCAQMD CEQA Handbook Table A9-8-D.

4 Engine Hp ratings based on SCAQMD CEQA Handbook Table A9-8-C except cranes.

5 Mileage based on estimated on site travel distances.

6 Equipment usage factors based on Design Engineer.

Modeling Scenario: Four equivalent emission points

1. Stack emission based on fire pump parameters, 1 hp equals 5.2 cfm (1506 acfm/290 hp), total hp in operation 2554 hp (including load factor) equals 13281 acfm
2. Typical truck stack velocity is 298 ft/sec, typical stack height is 12 feet, stack temperature is 850 F
3. Equivalent stack diameter of 0.49 feet for each emission point.

Table G-3.1Monthly NO_x Construction Emissions Summary

Construction	(lb/hr)																				
Equipment	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car-Sedan	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.000
Pickup	0.296	0.296	0.338	0.338	0.381	0.381	0.423	0.508	0.508	0.677	0.719	0.719	0.719	0.592	0.592	0.592	0.508	0.508	0.296	0.254	0.169
Dump T	0.288	0.288	0.288	0.288	0.144	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fuel Truck	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.072
Water Truck	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576	0.576
Flatbed truck	0.072	0.072	0.072	0.072	0.144	0.144	0.144	0.144	0.144	0.288	0.216	0.216	0.216	0.360	0.360	0.648	0.648	0.432	0.504	0.432	0.288
Concrete Pump	0.000	0.000	0.000	0.000	0.000	0.552	0.552	0.552	0.552	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forklift	0.618	0.618	0.618	0.618	0.618	1.235	1.235	1.235	1.235	1.235	1.235	1.235	1.235	1.235	1.235	1.235	0.618	0.618	0.618	0.618	0.618
Grader	3.442	3.442	3.442	3.442	1.721	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.721	1.721	0.000	0.000	0.000
Dozer	1.957	2.935	2.935	2.935	1.957	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.978	0.978	0.000	0.000	0.978	2.935	1.957	1.957	0.000
Trencher	0.693	0.693	0.693	1.386	1.386	1.386	1.386	1.386	1.386	0.693	0.693	0.693	0.000	1.386	1.386	1.386	1.386	1.386	0.000	0.000	0.000
Loader	0.637	0.637	1.274	1.274	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.000	0.000	0.000
Paving	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.052	2.052	0.000	0.000
Vib Roller	0.689	1.378	2.067	2.067	1.378	1.378	1.378	1.378	1.378	1.378	0.689	0.689	0.689	0.689	0.689	0.689	0.000	0.000	0.000	0.000	0.000
Compactor	0.000	0.000	0.000	0.746	0.746	0.746	1.493	1.493	0.746	0.746	0.746	0.746	0.746	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-230T	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.115	6.231	6.231	6.231	6.231	3.115	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-140T	0.000	0.000	0.000	0.000	0.000	1.869	1.869	1.869	1.869	1.869	1.869	1.869	1.869	1.869	1.869	1.869	0.000	0.000	0.000	0.000	0.000
Crane-60T	0.865	0.865	0.865	0.865	0.865	0.865	1.731	1.731	1.731	1.731	1.731	1.731	1.731	1.731	0.865	0.865	0.000	0.000	0.000	0.000	0.000
Crane-45T	0.000	0.742	0.742	1.484	1.484	1.484	1.484	1.484	2.225	2.225	2.225	2.225	2.225	2.225	2.967	2.225	2.225	1.484	1.484	0.000	0.000
Compressors	0.000	0.240	0.240	0.240	0.480	0.959	1.199	1.439	1.439	1.439	1.439	1.439	1.918	1.439	1.439	0.959	0.959	0.719	0.480	0.480	0.240
Manlifts	0.000	0.000	0.000	0.000	0.544	0.544	1.632	3.807	4.895	4.895	4.895	4.895	4.895	4.351	3.263	2.175	1.088	0.000	0.000	0.000	0.000
Welders	0.213	0.213	0.213	0.851	1.276	1.701	1.701	1.701	1.701	1.701	1.701	1.276	1.276	0.851	0.425	0.213	0.00	0.000	0.000	0.000	0.000
TOTAL (lb/month)	**1671**	**2095**	**2314**	**2765**	**2309**	**2340**	**2806**	**3206**	**3877**	**4227**	**4112**	**4044**	**4178**	**3553**	**2636**	**2278**	**1842**	**2118**	**1301**	**718**	**314**

Short Term Emissions	
Month (lb/month)	**4227**
Daily (lb/day)	**211**
Hourly (lb/hr)	**26.42**
grams/sec	**3.33**

Long Term Emissions	
Annual (lb/year)	**40051**
Annual (tons/year)	**20.0**
Month (lb/month)	**3338**
Daily (lb/day)	**167**
Hourly (lb/hr)	**20.86**
grams/sec	**2.63**

Yearly Period	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26
Yearly Emissions (lb/yr)	**35764**	**38271**	**39729**	**40051**	**39565**	**39098**	**38875**	**37371**	**34883**	**31319**

Note:

Hourly emission rate based on a 20 work day month and an 8 hour work day.

Table G-3.2 Monthly CO Construction Emissions Summary

Construction Equipment	(lb/hr) 6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car-Sedan	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.000
Pickup	3.525	3.525	4.029	4.029	4.532	4.532	5.036	6.043	6.043	8.057	8.561	8.561	8.561	7.050	7.050	7.050	6.043	6.043	3.525	3.021	2.014
Dump T	0.058	0.058	0.058	0.058	0.029	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fuel Truck	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.014
Water Truck	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115
Flatbed truck	0.014	0.014	0.014	0.014	0.029	0.029	0.029	0.029	0.029	0.058	0.043	0.043	0.043	0.072	0.072	0.130	0.130	0.087	0.101	0.087	0.058
Concrete Pump	0.000	0.000	0.000	0.000	0.000	0.230	0.230	0.230	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forklift	0.259	0.259	0.259	0.259	0.259	0.518	0.518	0.518	0.518	0.518	0.518	0.518	0.518	0.518	0.518	0.518	0.259	0.259	0.259	0.259	0.259
Grader	1.311	1.311	1.311	1.311	0.656	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.656	0.656	0.000	0.000	0.000
Dozer	0.936	1.404	1.404	1.404	0.936	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.468	0.468	0.000	0.000	0.468	1.404	0.936	0.936	0.000
Trencher	0.630	0.630	0.630	1.260	1.260	1.260	1.260	1.260	1.260	0.630	0.630	0.630	0.000	1.260	1.260	1.260	1.260	1.260	0.000	0.000	0.000
Loader	0.434	0.434	0.869	0.869	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.000	0.000	0.000
Paving	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.624	0.624	0.000	0.000
Vib Roller	0.241	0.482	0.723	0.723	0.482	0.482	0.482	0.482	0.482	0.482	0.241	0.241	0.241	0.241	0.241	0.241	0.000	0.000	0.000	0.000	0.000
Compactor	0.000	0.000	0.000	0.261	0.261	0.261	0.523	0.523	0.261	0.261	0.261	0.261	0.261	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-230T	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.219	2.438	2.438	2.438	2.438	1.219	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-140T	0.000	0.000	0.000	0.000	0.000	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.000	0.000	0.000	0.000	0.000
Crane-60T	0.339	0.339	0.339	0.339	0.339	0.339	0.677	0.677	0.677	0.677	0.677	0.677	0.677	0.677	0.339	0.339	0.000	0.000	0.000	0.000	0.000
Crane-45T	0.000	0.290	0.290	0.581	0.581	0.581	0.581	0.581	0.871	0.871	0.871	0.871	0.871	0.871	1.161	0.871	0.871	0.581	0.581	0.000	0.000
Compressors	0.000	0.147	0.147	0.147	0.293	0.586	0.733	0.879	0.879	0.879	0.879	0.879	1.172	0.879	0.879	0.586	0.586	0.440	0.293	0.293	0.147
Manlifts	0.000	0.000	0.000	0.000	0.228	0.228	0.684	1.597	2.053	2.053	2.053	2.053	2.053	1.825	1.368	0.912	0.456	0.000	0.000	0.000	0.000
Welders	0.130	0.130	0.130	0.520	0.780	1.040	1.040	1.040	1.040	1.040	1.040	0.780	0.780	0.520	0.260	0.130	0.000	0.000	0.000	0.000	0.000
TOTAL (lb/mon	**1324**	**1508**	**1696**	**1948**	**1839**	**1866**	**2137**	**2468**	**2740**	**3125**	**3164**	**3123**	**3146**	**2749**	**2356**	**2178**	**1852**	**1952**	**1077**	**801**	**417**

Short Term Emissions	
Month (lb/month	**3164**
Daily (lb/day)	**158**
Hourly (lb/hr)	**19.78**
grams/sec	**2.49**

Long Term Emissions	
Annual (lb/year)	**30989**
Annual (tons/yea	**15.5**
Month (lb/month	**2582**
Daily (lb/day)	**129**
Hourly (lb/hr)	**16.14**
grams/sec	**2.04**

Yearly Period	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26
Yearly Emissions (lb/yr)	**26937**	**28759**	**30000**	**30660**	**30891**	**30904**	**30989**	**29930**	**28263**	**25940**

Note:

Hourly emission rate based on a 20 work day month and an 8 hour work day.

Table G-3.3 Monthly VOC Construction Emissions Summary

Construction Equipment	(lb/hr) 6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car-Sedan	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.000
Pickup	0.369	0.369	0.421	0.421	0.474	0.474	0.527	0.632	0.632	0.843	0.896	0.896	0.896	0.738	0.738	0.738	0.632	0.632	0.369	0.316	0.211
Dump T	0.011	0.011	0.011	0.011	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fuel Truck	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.003
Water Truck	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
Flatbed truck	0.003	0.003	0.003	0.003	0.005	0.005	0.005	0.005	0.005	0.011	0.008	0.008	0.008	0.013	0.013	0.024	0.024	0.016	0.019	0.016	0.011
Concrete Pump	0.000	0.000	0.000	0.000	0.000	0.046	0.046	0.046	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forklift	0.060	0.060	0.060	0.060	0.060	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.060	0.060	0.060	0.060	0.060
Grader	0.492	0.492	0.492	0.492	0.246	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.246	0.246	0.000	0.000	0.000
Dozer	0.170	0.255	0.255	0.255	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.085	0.000	0.000	0.085	0.255	0.170	0.170	0.000
Trencher	0.095	0.095	0.095	0.189	0.189	0.189	0.189	0.189	0.189	0.095	0.095	0.095	0.000	0.189	0.189	0.189	0.189	0.189	0.000	0.000	0.000
Loader	0.087	0.087	0.174	0.174	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.000	0.000	0.000
Paving	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.089	0.000	0.000
Vib Roller	0.069	0.138	0.207	0.207	0.138	0.138	0.138	0.138	0.138	0.138	0.069	0.069	0.069	0.069	0.069	0.069	0.000	0.000	0.000	0.000	0.000
Compactor	0.000	0.000	0.000	0.075	0.075	0.075	0.149	0.149	0.075	0.075	0.075	0.075	0.075	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-230T	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.406	0.813	0.813	0.813	0.813	0.406	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-140T	0.000	0.000	0.000	0.000	0.000	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.000	0.000	0.000	0.000	0.000
Crane-60T	0.113	0.113	0.113	0.113	0.113	0.113	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.113	0.113	0.000	0.000	0.000	0.000	0.000
Crane-45T	0.000	0.097	0.097	0.194	0.194	0.194	0.194	0.194	0.290	0.290	0.290	0.290	0.290	0.290	0.387	0.290	0.290	0.194	0.194	0.000	0.000
Compressors	0.000	0.027	0.027	0.027	0.053	0.107	0.133	0.160	0.160	0.160	0.160	0.160	0.213	0.160	0.160	0.107	0.107	0.080	0.053	0.053	0.027
Manlifts	0.000	0.000	0.000	0.000	0.053	0.053	0.158	0.368	0.474	0.474	0.474	0.474	0.474	0.421	0.316	0.211	0.105	0.000	0.000	0.000	0.000
Welders	0.024	0.024	0.024	0.095	0.142	0.189	0.189	0.189	0.189	0.189	0.189	0.142	0.142	0.095	0.047	0.024	0.000	0.000	0.000	0.000	0.000
TOTAL (lb/mon	**248**	**292**	**325**	**379**	**330**	**335**	**394**	**449**	**534**	**611**	**608**	**600**	**608**	**512**	**407**	**364**	**302**	**305**	**162**	**108**	**53**

Short Term Emissions	
Month (lb/month	**611**
Daily (lb/day)	**31**
Hourly (lb/hr)	**3.82**
grams/sec	**0.48**

Long Term Emissions	
Annual (lb/year)	**5766**
Annual (tons/yea	**2.9**
Month (lb/month	**481**
Daily (lb/day)	**24**
Hourly (lb/hr)	**3.00**
grams/sec	**0.38**

Yearly Period	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26
Yearly Emissions (lb/yr)	**5104**	**5465**	**5685**	**5766**	**5751**	**5723**	**5693**	**5462**	**5121**	**4640**

Note:

Hourly emission rate based on a 20 work day month and an 8 hour work day.

Table G-3.4 Monthly SOx Construction Emissions Summary

Construction Equipment	(lb/hr)																				
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car-Sedan	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.000
Pickup	0.018	0.018	0.020	0.020	0.023	0.023	0.025	0.030	0.030	0.041	0.043	0.043	0.043	0.035	0.035	0.035	0.030	0.030	0.018	0.015	0.010
Dump T	0.004	0.004	0.004	0.004	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fuel Truck	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
Water Truck	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Flatbed truck	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.004	0.003	0.003	0.003	0.004	0.004	0.008	0.008	0.005	0.006	0.005	0.004
Concrete Pump	0.000	0.000	0.000	0.000	0.000	0.009	0.009	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forklift	0.008	0.008	0.008	0.008	0.008	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.008	0.008	0.008	0.008	0.008
Grader	0.066	0.066	0.066	0.066	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.033	0.000	0.000	0.000
Dozer	0.034	0.051	0.051	0.051	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.017	0.000	0.000	0.017	0.051	0.034	0.034	0.000
Trencher	0.013	0.013	0.013	0.025	0.025	0.025	0.025	0.025	0.025	0.013	0.013	0.013	0.000	0.025	0.025	0.025	0.025	0.025	0.000	0.000	0.000
Loader	0.012	0.012	0.023	0.023	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.000	0.000	0.000
Paving	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.036	0.000	0.000
Vib Roller	0.014	0.028	0.041	0.041	0.028	0.028	0.028	0.028	0.028	0.028	0.014	0.014	0.014	0.014	0.014	0.014	0.000	0.000	0.000	0.000	0.000
Compactor	0.000	0.000	0.000	0.015	0.015	0.015	0.030	0.030	0.015	0.015	0.015	0.015	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-230T	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.108	0.108	0.108	0.108	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-140T	0.000	0.000	0.000	0.000	0.000	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.000	0.000	0.000	0.000	0.000
Crane-60T	0.015	0.015	0.015	0.015	0.015	0.015	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.015	0.015	0.000	0.000	0.000	0.000	0.000
Crane-45T	0.000	0.013	0.013	0.026	0.026	0.026	0.026	0.026	0.039	0.039	0.039	0.039	0.039	0.039	0.052	0.039	0.039	0.026	0.026	0.000	0.000
Compressors	0.000	0.005	0.005	0.005	0.011	0.021	0.027	0.032	0.032	0.032	0.032	0.032	0.043	0.032	0.032	0.021	0.021	0.016	0.011	0.011	0.005
Manlifts	0.000	0.000	0.000	0.000	0.007	0.007	0.021	0.049	0.063	0.063	0.063	0.063	0.063	0.056	0.042	0.028	0.014	0.000	0.000	0.000	0.000
Welders	0.005	0.005	0.005	0.019	0.028	0.038	0.038	0.038	0.038	0.038	0.038	0.028	0.028	0.019	0.009	0.005	0.000	0.000	0.000	0.000	0.000
TOTAL (lb/month)	**32**	**40**	**44**	**53**	**44**	**45**	**53**	**59**	**70**	**77**	**75**	**73**	**76**	**64**	**48**	**42**	**35**	**40**	**24**	**14**	**6**

Short Term Emissions	
Month (lb/month)	77
Daily (lb/day)	4
Hourly (lb/hr)	0.48
grams/sec	0.06

Long Term Emissions	
Annual (lb/year)	736
Annual (tons/year)	0.4
Month (lb/month)	61
Daily (lb/day)	3
Hourly (lb/hr)	0.38
grams/sec	0.05

Yearly Period	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26
Yearly Emissions (lb/yr)	**664**	**708**	**732**	**736**	**725**	**716**	**711**	**682**	**637**	**573**

Note:

Hourly emission rate based on a 20 work day month and an 8 hour work day.

Table G-3.5 Monthly PM_{10} Construction Emissions Summary

Construction Equipment	(lb/hr)																				
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Car-Sedan	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
Pickup	0.007	0.007	0.008	0.008	0.009	0.009	0.010	0.012	0.012	0.016	0.017	0.017	0.017	0.014	0.014	0.014	0.012	0.012	0.007	0.006	0.004
Dump T	0.009	0.009	0.009	0.009	0.005	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fuel Truck	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.002
Water Truck	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
Flatbed truck	0.002	0.002	0.002	0.002	0.005	0.005	0.005	0.005	0.005	0.009	0.007	0.007	0.007	0.011	0.011	0.020	0.020	0.014	0.016	0.014	0.009
Concrete Pump	0.000	0.000	0.000	0.000	0.000	0.023	0.023	0.023	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Forklift	0.030	0.030	0.030	0.030	0.030	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.030	0.030	0.030	0.030	0.030
Grader	0.164	0.164	0.164	0.164	0.082	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.082	0.082	0.000	0.000	0.000
Dozer	0.085	0.128	0.128	0.128	0.085	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.043	0.000	0.000	0.043	0.128	0.085	0.085	0.000
Trencher	0.047	0.047	0.047	0.095	0.095	0.095	0.095	0.095	0.095	0.047	0.047	0.047	0.000	0.095	0.095	0.095	0.095	0.095	0.000	0.000	0.000
Loader	0.029	0.029	0.058	0.058	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.000	0.000	0.000
Paving	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.089	0.000	0.000
Vib Roller	0.034	0.069	0.103	0.103	0.069	0.069	0.069	0.069	0.069	0.069	0.034	0.034	0.034	0.034	0.034	0.034	0.000	0.000	0.000	0.000	0.000
Compactor	0.000	0.000	0.000	0.037	0.037	0.037	0.075	0.075	0.037	0.037	0.037	0.037	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-230T	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.406	0.406	0.406	0.406	0.203	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Crane-140T	0.000	0.000	0.000	0.000	0.000	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.000	0.000	0.000	0.000	0.000
Crane-60T	0.056	0.056	0.056	0.056	0.056	0.056	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.056	0.056	0.000	0.000	0.000	0.000	0.000
Crane-45T	0.000	0.048	0.048	0.097	0.097	0.097	0.097	0.097	0.145	0.145	0.145	0.145	0.145	0.145	0.194	0.145	0.145	0.097	0.097	0.000	0.000
Compressors	0.000	0.013	0.013	0.013	0.027	0.053	0.067	0.080	0.080	0.080	0.080	0.080	0.107	0.080	0.080	0.053	0.053	0.040	0.027	0.027	0.013
Manlifts	0.000	0.000	0.000	0.000	0.026	0.026	0.079	0.184	0.237	0.237	0.237	0.237	0.237	0.211	0.158	0.105	0.053	0.000	0.000	0.000	0.000
Welders	0.012	0.012	0.012	0.047	0.071	0.095	0.095	0.095	0.095	0.095	0.095	0.071	0.071	0.047	0.024	0.012	0.000	0.000	0.000	0.000	0.000
TOTAL (lb/month)	**80**	**102**	**112**	**139**	**119**	**128**	**153**	**172**	**215**	**238**	**232**	**228**	**232**	**197**	**144**	**123**	**94**	**102**	**60**	**30**	**12**

Short Term Emissions	
Month (lb/month)	238
Daily (lb/day)	12
Hourly (lb/hr)	1.49
grams/sec	0.19

Long Term Emissions	
Annual (lb/year)	2197
Annual (tons/year)	1.1
Month (lb/month)	183
Daily (lb/day)	9
Hourly (lb/hr)	1.14
grams/sec	0.14

Yearly Period	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26
Yearly Emissions (lb/yr)	1918	2070	2165	2197	2181	2156	2130	2037	1894	1691

Note:

Hourly emission rate based on a 20 work day month and an 8 hour work day.

Table G-3.6 - Delivery Truck Daily Emissions

7/18/02

Month	Number of P&T Trucks per Month	Number of Well Trucks per Month	Number of Trips per Day	Haul Distance (miles)	Vehicle Miles Traveled per Day	Emission Factor - lb/vmt					Emission Rate - lbs/day						
						NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}	PM_{10} Idle	PM_{10} Total
6	25	0	2.3	32	73	0.044	0.013	0.0034	0.0004	0.0014	3.20	0.95	0.25	0.03	0.10	0.005	0.11
7	60	0	5.5	32	175	0.044	0.013	0.0034	0.0004	0.0014	7.68	2.27	0.59	0.07	0.24	0.011	0.26
8	55	0	5.0	32	160	0.044	0.013	0.0034	0.0004	0.0014	7.04	2.08	0.54	0.06	0.22	0.011	0.23
9	115	88	16.3	32	522	0.044	0.013	0.0034	0.0004	0.0014	22.98	6.79	1.78	0.21	0.73	0.022	0.75
10	247	176	34.2	32	1094	0.044	0.013	0.0034	0.0004	0.0014	48.14	14.22	3.72	0.44	1.53	0.047	1.58
11	420	176	49.9	32	1597	0.044	0.013	0.0034	0.0004	0.0014	70.28	20.76	5.43	0.64	2.24	0.080	2.32
12	539	176	60.7	32	1943	0.044	0.013	0.0034	0.0004	0.0014	85.51	25.27	6.61	0.78	2.72	0.103	2.82
13	355	176	44.0	32	1408	0.044	0.013	0.0034	0.0004	0.0014	61.96	18.31	4.79	0.56	1.97	0.068	2.04
14	308	176	39.7	32	1271	0.044	0.013	0.0034	0.0004	0.0014	55.94	16.53	4.32	0.51	1.78	0.059	1.84
15	303	264	45.1	32	1445	0.044	0.013	0.0034	0.0004	0.0014	63.56	18.78	4.91	0.58	2.02	0.058	2.08
16	304	264	45.2	32	1448	0.044	0.013	0.0034	0.0004	0.0014	63.69	18.82	4.92	0.58	2.03	0.058	2.08
17	291	264	44.1	32	1410	0.044	0.013	0.0034	0.0004	0.0014	62.03	18.33	4.79	0.56	1.97	0.056	2.03
18	250	264	40.3	32	1290	0.044	0.013	0.0034	0.0004	0.0014	56.78	16.78	4.39	0.52	1.81	0.048	1.85
19	183	264	34.2	32	1096	0.044	0.013	0.0034	0.0004	0.0014	48.20	14.24	3.72	0.44	1.53	0.035	1.57
20	189	264	34.8	32	1113	0.044	0.013	0.0034	0.0004	0.0014	48.97	14.47	3.78	0.45	1.56	0.036	1.59
21	181	264	34.1	32	1090	0.044	0.013	0.0034	0.0004	0.0014	47.95	14.17	3.71	0.44	1.53	0.035	1.56
22	94	176	20.3	32	649	0.044	0.013	0.0034	0.0004	0.0014	28.55	8.44	2.21	0.26	0.91	0.018	0.93
23	76	176	18.6	32	597	0.044	0.013	0.0034	0.0004	0.0014	26.25	7.76	2.03	0.24	0.84	0.015	0.85
24	62	88	11.5	32	368	0.044	0.013	0.0034	0.0004	0.0014	16.20	4.79	1.25	0.15	0.52	0.012	0.53
25	24	88	8.0	32	258	0.044	0.013	0.0034	0.0004	0.0014	11.33	3.35	0.88	0.10	0.36	0.005	0.37
26	24	88	8.0	32	258	0.044	0.013	0.0034	0.0004	0.0014	11.33	3.35	0.88	0.10	0.36	0.005	0.37

Notes:

Emission factors based on EMFAC2000 version 2.02 model output for class 8 heavy-heavy duty diesel trucks.

Distance based on travel to El Centro.

Table G-3.7 - Delivery Truck Annual Emissions

Annual Period	Tons/year						
	NO_X	CO	VOC	SO_X	PM_{10}	PM_{10} Idle Exhaust	PM_{10} Total
6-17	5.520	1.631	0.427	0.050	0.176	0.006	0.181
7-18	6.056	1.789	0.468	0.055	0.193	0.006	0.199
8-19	6.461	1.909	0.499	0.059	0.206	0.006	0.212
9-20	6.881	2.033	0.532	0.063	0.219	0.007	0.226
10-21	***7.130***	***2.107***	***0.551***	***0.065***	***0.227***	***0.007***	***0.234***
11-22	6.934	2.049	0.536	0.063	0.221	0.007	0.227
12-23	6.494	1.919	0.502	0.059	0.207	0.006	0.212
13-24	5.801	1.714	0.448	0.053	0.185	0.005	0.190
14-25	5.295	1.564	0.409	0.048	0.168	0.004	0.173
15-26	4.849	1.433	0.375	0.044	0.154	0.004	0.158

Table G-3.8 - Worker Travel Daily Emissions

Month	Number of P&T Workers	Number of Well Workers	Number of Trips per Day	Average Distance (miles)	Vehicle Miles Traveled per Day	Emission Factor - (lb/vmt)					Emission Rate - (lb/day)				
						NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
1	16	0	32.0	19	608	0.0029	0.034	0.0037	2.2E-05	7.7E-05	1.76	20.67	2.25	0.01	0.05
2	24	0	48.0	19	912	0.0029	0.034	0.0037	2.2E-05	7.7E-05	2.64	31.01	3.37	0.02	0.07
3	33	0	66.0	19	1254	0.0029	0.034	0.0037	2.2E-05	7.7E-05	3.64	42.64	4.64	0.03	0.10
4	36	0	72.0	19	1368	0.0029	0.034	0.0037	2.2E-05	7.7E-05	3.97	46.51	5.06	0.03	0.11
5	45	0	90.0	19	1710	0.0029	0.034	0.0037	2.2E-05	7.7E-05	4.96	58.14	6.33	0.04	0.13
6	98	0	196.0	19	3724	0.0029	0.034	0.0037	2.2E-05	7.7E-05	10.80	126.62	13.78	0.08	0.29
7	115	0	230.0	19	4370	0.0029	0.034	0.0037	2.2E-05	7.7E-05	12.67	148.58	16.17	0.10	0.34
8	134	0	268.0	19	5092	0.0029	0.034	0.0037	2.2E-05	7.7E-05	14.77	173.13	18.84	0.11	0.39
9	258	24	564.0	19	10716	0.0029	0.034	0.0037	2.2E-05	7.7E-05	31.08	364.34	39.65	0.24	0.83
10	317	48	730.0	19	13870	0.0029	0.034	0.0037	2.2E-05	7.7E-05	40.22	471.58	51.32	0.31	1.07
11	351	48	798.0	19	15162	0.0029	0.034	0.0037	2.2E-05	7.7E-05	43.97	515.51	56.10	0.33	1.17
12	361	48	818.0	19	15542	0.0029	0.034	0.0037	2.2E-05	7.7E-05	45.07	528.43	57.51	0.34	1.20
13	333	48	762.0	19	14478	0.0029	0.034	0.0037	2.2E-05	7.7E-05	41.99	492.25	53.57	0.32	1.11
14	376	48	848.0	19	16112	0.0029	0.034	0.0037	2.2E-05	7.7E-05	46.72	547.81	59.61	0.35	1.24
15	408	72	960.0	19	18240	0.0029	0.034	0.0037	2.2E-05	7.7E-05	52.90	620.16	67.49	0.40	1.40
16	438	72	1020.0	19	19380	0.0029	0.034	0.0037	2.2E-05	7.7E-05	56.20	658.92	71.71	0.43	1.49
17	435	72	1014.0	19	19266	0.0029	0.034	0.0037	2.2E-05	7.7E-05	55.87	655.04	71.28	0.42	1.48
18	437	72	1018.0	19	19342	0.0029	0.034	0.0037	2.2E-05	7.7E-05	56.09	657.63	71.57	0.43	1.49
19	481	72	1106.0	19	21014	0.0029	0.034	0.0037	2.2E-05	7.7E-05	60.94	714.48	77.75	0.46	1.62
20	473	72	1090.0	19	20710	0.0029	0.034	0.0037	2.2E-05	7.7E-05	60.06	704.14	76.63	0.46	1.59
21	474	72	1092.0	19	20748	0.0029	0.034	0.0037	2.2E-05	7.7E-05	60.17	705.43	76.77	0.46	1.60
22	395	48	886.0	19	16834	0.0029	0.034	0.0037	2.2E-05	7.7E-05	48.82	572.36	62.29	0.37	1.30
23	332	48	760.0	19	14440	0.0029	0.034	0.0037	2.2E-05	7.7E-05	41.88	490.96	53.43	0.32	1.11
24	194	24	436.0	19	8284	0.0029	0.034	0.0037	2.2E-05	7.7E-05	24.02	281.66	30.65	0.18	0.64
25	123	24	246.0	19	4674	0.0029	0.034	0.0037	2.2E-05	7.7E-05	13.55	158.92	17.29	0.10	0.36
26	37	24	74.0	19	1406	0.0029	0.034	0.0037	2.2E-05	7.7E-05	4.08	47.80	5.20	0.03	0.11

Note:

Emission factors based on EMFAC2000 version 2.02 model output assuming 50% of workers traveling
In Class 1 vehicles and 50% of workers traveling in Class 2 vehicles.
Distance based on travel to Brawley.

Table G-3.9 - Worker Travel Annual Emissions

Annual Period	Emission Rate - (Tons/year)				
	NO_X	CO	VOC	SO_X	PM_{10}
1-12	2.16	25.27	2.75	0.02	0.06
2-13	2.56	29.99	3.26	0.02	0.07
3-14	3.00	35.16	3.83	0.02	0.08
4-15	3.49	40.93	4.45	0.03	0.09
5-16	4.01	47.05	5.12	0.03	0.11
6-17	4.52	53.02	5.77	0.03	0.12
7-18	4.98	58.33	6.35	0.04	0.13
8-19	5.46	63.99	6.96	0.04	0.14
9-20	5.91	69.30	7.54	0.04	0.16
10-21	6.20	72.71	7.91	0.05	0.16
11-22	***6.29***	***73.72***	***8.02***	***0.05***	***0.17***
12-23	6.27	73.48	8.00	0.05	0.17
13-24	6.06	71.01	7.73	0.05	0.16
14-25	5.77	67.67	7.36	0.04	0.15
15-26	5.35	62.67	6.82	0.04	0.14

Table G-3.10 - Staffing Schedule and Construction Work Force

Construction Crews	Months After Reward of Contract																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Civil/Site Crews	-	-	-	-	-	-	-	21	21	21	16	14	-	-	7	11	14	7	-	-	-	-	11	11	11	-
Concrete Crews	-	-	-	-	-	-	-	-	71	104	124	125	77	44	26	6	6	-	-	-	-	-	-	-	-	-
Structural/Building/Architectural Crews	-	-	-	-	-	-	-	-	-	-	-	4	4	31	33	34	18	18	20	24	24	14	9	4	-	-
Underground Mech. And Elec. Utilities Crews	-	-	-	-	-	-	-	-	48	70	72	60	33	31	24	18	4	-	-	-	-	-	-	-	-	-
Mechanical Equipment Crews	-	-	-	-	-	-	-	-	-	-	7	21	48	50	50	55	55	75	75	60	50	40	30	10	-	-
HVAC/Fire Protection & Insulation Crews	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	9	9	30	47	47	41	58	-	-	-
AG. Piping Crews	-	-	-	-	-	-	-	-	-	5	15	21	40	67	82	102	118	118	118	100	75	38	25	15	-	-
AG. Electrical Power and Controls Crews	-	-	-	-	-	-	-	-	-	-	-	-	18	36	58	87	95	85	84	82	72	55	-	-	-	-
Instrument Crews	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	20	20	20	17	10	-	-	-
System Checkout and Start-Up Crews	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9	9	23	36	51	26	13	-
Construction Indirect Crews	-	-	-	-	-	21	38	34	34	34	34	33	36	37	34	36	34	31	27	24	27	21	21	14	9	4
Total Construction Craft	-	-	-	-	-	21	38	55	174	234	268	278	256	296	314	355	353	356	383	366	338	262	215	80	33	4
Construction Staff	-	-	-	-	-	32	32	34	39	38	38	45	49	52	52	52	53	55	54	55	54	51	50	42	30	-
Subtotal Construction Work force	-	-	-	-	-	53	70	89	213	272	306	323	305	348	366	407	406	411	437	421	392	313	265	122	63	4
Engineering Staff (Off-Site & On-Site)	16	24	33	36	45	45	45	45	45	45	45	38	28	28	23	15	13	12	12	12	12	12	12	8	8	3
Power Plant Work force	16	24	33	36	45	98	115	134	258	317	351	361	333	376	389	422	419	423	449	433	404	325	277	130	71	7
Transmission Line Work force	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	16	16	14	32	40	70	70	55	64	52	30
Well Field Work force	-	-	-	-	-	-	-	-	24	48	48	48	48	48	72	72	72	72	72	72	72	48	48	24	24	24
Grand Total Work force	16	24	33	36	45	98	115	134	282	365	399	409	381	424	480	510	507	509	553	545	546	443	380	218	147	61

Table G-3.11 Truck Deliveries of Equipment / Materials

Equipment Delivered	Average Truck Deliveries Per Month																				
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Heavy Hauling Equipment																					
Condenser Equipment	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
Steam Turbine/Generator Equipment	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Main Transformer Equipment	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Other Equipment and Materials																					
Construction Mobilization and Demobilization	25	25	15	-	-	-	-	-	-	-	-	-	-	-				10	20	20	20
Consumables/Suppies & Misc. Construction	-	35	40	45	50	45	45	45	45	45	45	48	48	45	45	35	38	38	38	-	-
Concrete and Rebar	-	-	-	60	184	328	440	200	104	104	81	52	-	-	-	-	-	-	-	-	-
Miscellaneoas Steel/Achitectural	-	-	-	-	-	12	12	25	35	30	30	30	30	20	20	15	-	-	-	-	-
Steam Turbine/Generator Equipment	-	-	-	-	-	-	-	-	-	-	-	-	10	10	20	29	9	9	-	-	-
Mechanical Equipmant	-	-	-	-	-	15	15	35	35	50	50	71	72	44	44	25	15	5	-	-	-
Piping, Supports and Valves	-	-	-	5	8	10	17	40	62	50	55	47	42	31	16	10	10	-	-	-	-
Electrical Equipment and Materials	-	-	-	5	5	10	10	10	20	20	39	39	39	29	20	19	10	10	-	-	-
Power Plant Equipment Usage	25	60	55	115	247	420	539	355	308	299	300	287	246	179	165	133	82	72	58	20	20
Transmission Line Equipment Usage	-	-	-	-	-	-	-	-	-	4	4	4	4	4	24	48	12	4	4	4	4
Well Field Equipment Usage	-	-	-	88	176	176	176	176	176	264	264	264	264	264	264	264	176	176	88	88	88
Grand Total Equipment Usage	25	60	55	203	423	596	715	531	484	567	568	555	514	447	453	445	270	252	150	112	112

Table G-4 Well Flow Testing Emissions

Pollutant	Production Single Well (lbs/hr)	Production Single Well (gm/sec)	Production 10 Wells (lbs/period)	Injection Single Well (lbs/hr)	Injection Single Well (gm/sec)	Injection 5 Wells (lbs/period)	Total 15 wells (tons/year)
PM 10	96.8	12.2	74342	56	7.11	13533	44
H2S	17.7	2.23	13578	14.7	1.86	3536	8.56
Ammonia	70.8	8.93	54374	59.0	7.44	14160	34.3
Arsenic-PM	4.43E-03	5.59E-04	3.40	2.58E-03	3.26E-04	0.62	2.01E-03
Arsenic-NC	1.87E-03	2.36E-04	1.44	1.56E-03	1.97E-04	0.374	9.06E-04
Benzene	0.330	4.16E-02	253	0.275	3.46E-02	65.9	1.60E-01
Beryllium	4.10E-06	5.18E-07	3.15E-03	2.39E-06	3.01E-07	5.74E-04	1.86E-06
Boron	0.131	0.017	101	7.64E-02	9.64E-03	18.3	5.96E-02
Cadmium	5.14E-04	6.48E-05	3.94E-01	2.99E-04	3.77E-05	7.18E-02	2.33E-04
Chromium	1.23E-06	1.55E-07	9.46E-04	7.18E-07	9.05E-08	1.72E-04	5.59E-07
Copper	1.64E-03	2.07E-04	1.26	9.55E-04	1.20E-04	0.23	7.44E-04
Ethylbenzene	1.94E-04	2.45E-05	1.49E-01	1.62E-04	2.04E-05	3.89E-02	9.41E-05
Lead	0.033	4.15E-03	25.3	0.019	2.42E-03	4.6	1.49E-02
Manganese	4.10E-01	5.18E-02	315	0.24	3.01E-02	57	1.86E-01
Mercury	3.52E-05	4.44E-06	2.71E-02	4.11E-05	5.18E-06	9.85E-03	1.85E-05
Nickel	8.24E-06	1.04E-06	6.33E-03	4.80E-06	6.05E-07	1.15E-03	3.74E-06
Selenium	2.04E-06	2.57E-07	1.57E-03	1.19E-06	1.50E-07	2.85E-04	9.26E-07
Toluene	4.54E-03	5.72E-04	3.48	3.78E-03	4.77E-04	0.907	2.20E-03
Xylenes	5.56E-04	7.01E-05	0.427	4.63E-04	5.84E-05	0.111	2.69E-04
Zinc	0.134	1.68E-02	103	0.078	9.81E-03	19	6.06E-02
	(Ci/hr)	(Ci/sec)	(Ci/period)	(Ci/hr)	(Ci/sec)	(Ci/period)	(Ci/year)
Radon	1.35E-03	3.76E-07	1.04	1.13E-03	3.13E-07	0.270	1.31

Notes:

A well could be venting for a total of 96 hours

PTU UTM and stack parameters listed in Table G-17

Only one well will be flow tested at a time

A period is equal to the number of wells drilled during the year

Annual emissions from production wells are based upon 768 hours for 10 wells

Annual emissions from injection wells are based upon 240 hours for 5 wells

4 production wells	96 hours
4 production wells	72 hours
Rest of the wells	48 hours

Modeling Scenario	Production	Injection		Injection PAD Locations	East	North	Elevation
Stack Height	50	37.92	Feet	PAD R (OBI2)	630101	3669781	-217 feet
Stack Diameter	9	6	Feet	PAD P (OBI3)	630101	3669150	-216 feet
Stack Temperature	226.7	226.7	F	PAD O (OBI1)	629269	3668355	-214 feet
Stack Velocity	40	48.7	feet/sec	CT Well	628455	3670616	-228 feet
	At PTU	At Well Pad		BP Well	627760	3670616	-228 feet
	1.2 mlbs/hr	1.0 mlbs/hr					

Taken from USGS Maps (NAD27, NGVD29)

Table G-5 Plant Commissioning Emissions

7/18/02

Pollutant	PTU (lbs/hr)	PTU (lbs/period)	LP Vent Tank (lbs/hr)	SP Vent Tank (lbs/hr)	HP Vent Tanks (lbs/hr)	DWHs (lbs/hr)	Cooling Tower (lbs/hr)	Steamblow (lbs/period)	Total (tons/period)
PM 10	96.8	15682	1.59	1.28	3.96	1.36E-01	3.50	51.6	8.62
H2S	17.7	2864	4.21	13.5	173	0.68	2	1439	17.5
Ammonia	70.8	11470	17.2	68.8	700	16.5	712	5942	113.2
Arsenic-PM	4.43E-03	7.18E-01	7.28E-05	5.85E-05	1.81E-04	6.20E-06	6.94E-06	2.36E-03	3.86E-04
Arsenic-NC	1.87E-03	3.03E-01	0.00	2.00E-03	1.80E-02	0.00	2.00E-03	1.51E-01	1.93E-03
Benzene	3.30E-01	53.4	0.00	3.52E-01	3.17	0.00	0.18	26.6	3.30E-01
Beryllium	4.10E-06	6.65E-04	6.75E-08	5.42E-08	1.81E-04	5.74E-09	6.44E-09	1.37E-03	1.54E-05
Boron	1.31E-01	21.3	2.16E-03	1.74E-03	1.81E-04	1.84E-04	2.06E-04	3.09E-02	1.10E-02
Cadmium	5.14E-04	8.32E-02	8.43E-06	6.78E-06	2.10E-05	1.72E-09	8.04E-07	2.74E-04	4.47E-05
Chromium	1.23E-06	2.00E-04	2.02E-08	1.63E-08	5.03E-08	1.72E-09	1.93E-09	6.56E-07	1.07E-07
Copper	1.64E-03	2.66E-01	2.70E-05	2.17E-05	1.81E-04	2.30E-06	2.58E-06	1.74E-03	1.52E-04
Ethylbenzene	1.94E-04	3.15E-02	0.00	2.08E-04	1.87E-03	0.00	2.08E-04	1.57E-02	2.01E-04
Lead	3.29E-02	5.33	5.40E-04	4.34E-04	1.34E-03	4.60E-05	5.16E-05	1.75E-02	2.86E-03
Manganese	4.10E-01	66.5	6.75E-03	5.42E-03	1.68E-02	5.74E-04	6.44E-04	2.19E-01	3.57E-02
Mercury	3.52E-05	5.71E-03	3.14E-04	3.14E-04	3.16E-04	2.98E-04	2.16E-05	7.14E-03	1.08E-04
Nickel	8.24E-06	1.33E-03	1.35E-07	9.00E-08	3.36E-07	1.15E-08	1.29E-08	4.24E-06	7.16E-07
Selenium	2.04E-06	3.30E-04	3.35E-08	2.70E-08	8.34E-08	2.86E-09	3.20E-09	1.09E-06	1.78E-07
Toluene	4.54E-03	7.35E-01	0.00	4.85E-03	4.36E-02	0.00	4.85E-03	3.66E-01	4.68E-03
Xylenes	5.56E-04	9.01E-02	0.00	5.94E-04	5.34E-03	0.00	5.94E-04	4.49E-02	5.73E-04
Zinc	1.34E-01	21.6	2.16E-03	1.76E-03	5.45E-03	1.87E-04	2.10E-04	7.08E-02	1.16E-02
	(Ci/hr)	(Ci/period)	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/period)	(Ci/period)
Radon	1.35E-03	2.19E-01	0.00E+00	1.44E-03	1.30E-02	0.00E+00	1.44E-02	1.09E-01	4.27

Notes:

A total of 162 hours will be venting at PTU emission rates

A total of 159 equivalent hours will be venting at full Vent Tank emission rates for SP and LP

A total of 87 equivalent hours will be venting at full Vent Tank emission rates for HP

A total of 72 hours will be venting at steam blow locations at 31.5% of full Vent Tank emission rates

A total of 114 hours will be venting at cooling tower

A total of 167 equivalent hours will be venting at full Dilution Water Heater emission rates

The hours are based on adding the cumulative emissions estimated during the total period. Refer to Table G-5.1

Modeling Scenarios

#1 One well venting at the PTU while seven wells are venting at the Vent Tanks, worst case based on screening review

At the Vent Tanks, a factor of 49% of the full emission rate for 1 hour and for the 24 hour a factor of 50.75% (49*18/24+56*6/24)

At the PTU, a factor of 100% for 1 and 24 hour case

At the DWH, a factor of 49% for 1 and 50.75% for the 24 hour case refer to Table G-5.2

#2 All nine wells venting at the Vent Tanks (63% of full flow)

At the DWH, a factor of 63% for 1 and 24 hour case

#3a HP Steam blow, refer to Table G-5.4

#3b SP Steam blow, refer to Table G-5.5

#3c LP Steam blow, refer to Table G-5.6

Table G-5.1 Plant Commissioning Schedule

FACILITY STARTUP	Event Start Time		Event Finish Time			
Event	Date	Time	Date	Time	Emission Location	Emission Rate
No. 1 Well Warmup	12/15/04	0:00	12/15/04	18:00	Production Test Unit	Production Test Unit (Well Startup)
No. 1 Production Line Warmup	12/15/04	18:00	12/16/04	0:00	Vent Tanks (HP, SP, LP)	7.0% of Vent Tanks (HP, SP, LP)
Preheat RPF Vessels	12/16/04	0:00	12/16/04	12:00	Vent Tanks (HP, SP, LP)	7.0% of Vent Tanks (HP, SP, LP)
No. 2 Well Warmup	12/15/04	18:00	12/16/04	12:00	Production Test Unit	Production Test Unit (Well Startup)
No. 2 Production Line Warmup	12/16/04	12:00	12/17/04	6:00	Vent Tanks (HP, SP, LP)	14% of Vent Tanks (HP, SP, LP)
No. 3 Well Warmup	12/16/04	12:00	12/17/04	6:00	Production Test Unit	Production Test Unit (Well Startup)
No. 3 Production Line Warmup	12/17/04	6:00	12/18/04	0:00	Vent Tanks (HP, SP, LP)	21% of Vent Tanks (HP, SP, LP)
No. 4 Well Warmup	12/17/04	6:00	12/18/04	0:00	Production Test Unit	Production Test Unit (Well Startup)
No. 4 Production Line Warmup	12/18/04	0:00	12/18/04	18:00	Vent Tanks (HP, SP, LP)	28% of Vent Tanks (HP, SP, LP)
No. 5 Well Warmup	12/18/04	0:00	12/18/04	18:00	Production Test Unit	Production Test Unit (Well Startup)
No. 5 Production Line Warmup	12/18/04	18:00	12/19/04	12:00	Vent Tanks (HP, SP, LP)	35% of Vent Tanks (HP, SP, LP)
No. 6 Well Warmup	12/18/04	18:00	12/19/04	12:00	Production Test Unit	Production Test Unit (Well Startup)
No. 6 Production Line Warmup	12/19/04	12:00	12/20/04	6:00	Vent Tanks (HP, SP, LP)	42% of Vent Tanks (HP, SP, LP)
No. 7 Well Warmup	12/19/04	12:00	12/20/04	6:00	Production Test Unit	Production Test Unit (Well Startup)
No. 7 Production Line Warmup	12/20/04	6:00	12/21/04	0:00	Vent Tanks (HP, SP, LP)	49% of Vent Tanks (HP, SP, LP)
No. 8 Well Warmup	12/20/04	6:00	12/21/04	0:00	Production Test Unit	Production Test Unit (Well Startup)
No. 8 Production Line Warmup	12/21/04	0:00	12/21/04	18:00	Vent Tanks (HP, SP, LP)	56% of Vent Tanks (HP, SP, LP)
No. 9 Well Warmup	12/21/04	0:00	12/21/04	18:00	Production Test Unit	Production Test Unit (Well Startup)
No. 9 Production Line Warmup	12/21/04	18:00	12/22/04	0:00	Vent Tanks (HP, SP, LP)	63% of Vent Tanks (HP, SP, LP)
HP Steam Blow (First Line)	12/22/04	0:00	12/22/04	12:00	Steam Blow Stack, Vent Tanks (LP, SP, East HP)	Steam Blow Stack (HP), 63% Vent Tank (LP, SP), 31.5% Vent Tank (East HP)
HP Steam Blow (Second Line)	12/22/04	12:00	12/23/04	0:00	Steam Blow Stack, Vent Tanks (LP, SP, West HP)	Steam Blow Stack (HP), 63% Vent Tank (LP, SP), 31.5% Vent Tank (West HP)
SP Steam Blow (First Line then Second Line)	12/23/04	0:00	12/24/04	0:00	Steam Blow Stack, Vent Tanks (LP, SP, West HP, East HP)	Steam Blow Stack (SP), 63% Vent Tank (LP, West HP, East HP), 31.5% Vent Tank (SP)
LP Steam Blow (First Line then Second Line)	12/24/04	0:00	12/25/04	0:00	Steam Blow Stack, Vent Tanks (LP, SP, West HP, East HP)	Steam Blow Stack (LP), 63% Vent Tank (SP, West HP, East HP), 31.5% Vent Tank (LP)
Turbine Preheat, Vacuum Test, and Other Tests	12/25/04	0:00	12/29/04	0:00	Cooling Towers	63% of Vent Tanks (HP, SP, LP)
Turbine Load Test, Etc.	12/29/04	0:00	12/29/04	18:00	Cooling Towers	63% of Vent Tanks (HP, SP, LP)
Turbine Performance Test	12/29/04	18:00	1/1/05	18:00	Normal Operating Condition Emissions	

Notes:

1.) Times are with respect to an assumed commercial operation date of 1/1/05. They are approximate and subject to change when a more definitive startup program is developed.
2.) Only components of facility startup schedule during which time emissions are released are shown. Startup problems may extend some of the durations shown.
3.) Emission rates for each well during Well Warmup and Production Line Warmup are additive during the time they coincide.
4.) Levels are established in the wellhead separators and primary/secondary clarifiers are filled during warmup of wells 2 through 9.
5.) Normal operating condition emissions occur from the start of turbine performance test onward.
6.) Power supply by the IID (via backfeeding through the transmission system) is assumed.
7.) Total flow to the vent tanks increase in increments of 7.0% as each successive well is brought into the system.
8.) Steam blow percentages apply to velocity and constituents for each of the respective vent tanks. Other vent tank properties are unchanged.

Table G-5.2 Plant Commissioning Scenario #1

	Scenario #1																	
	Vent Tank LP				Vent Tank SP				Vent Tanks HP				Dilution Water Heaters				PTU	
	1-Hour		24-Hour		1-Hour		24-Hour		1-Hour		24-Hour		1-Hour		24-Hour		1 & 24-Hour	
Pollutant	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)
PM 10	7.79E-01	9.83E-02	8.07E-01	1.02E-01	6.27E-01	7.91E-02	6.50E-01	8.19E-02	1.94E+00	2.45E-01	2.01E+00	2.53E-01	6.64E-02	8.38E-03	6.88E-02	8.68E-03	96.8	1.22E+01
H2S	2.06E+00	2.60E-01	2.14E+00	2.69E-01	6.62E+00	8.34E-01	6.85E+00	8.64E-01	8.46E+01	1.07E+01	8.76E+01	1.10E+01	3.32E-01	4.19E-02	3.44E-01	4.34E-02	17.7	2.23E+00
Ammonia	8.43E+00	1.06E+00	8.73E+00	1.10E+00	3.37E+01	4.25E+00	3.49E+01	4.40E+00	3.43E+02	4.33E+01	3.55E+02	4.48E+01	8.10E+00	1.02E+00	8.39E+00	1.06E+00	70.8	8.93E+00
Arsenic-PM	3.57E-05	4.50E-06	3.69E-05	4.66E-06	2.87E-05	3.61E-06	2.97E-05	3.74E-06	8.88E-05	1.12E-05	9.20E-05	1.16E-05	3.04E-06	3.83E-07	3.15E-06	3.97E-07	4.43E-03	5.59E-04
Arsenic-NC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.80E-04	1.24E-04	1.02E-03	1.28E-04	8.82E-03	1.11E-03	9.14E-03	1.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03	2.36E-04
Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-01	2.18E-02	1.79E-01	2.25E-02	1.55E+00	1.96E-01	1.61E+00	2.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	4.16E-02
Beryllium	3.31E-08	4.17E-09	3.43E-08	4.32E-09	2.66E-08	3.35E-09	2.75E-08	3.47E-09	8.88E-05	1.12E-05	9.20E-05	1.16E-05	2.81E-09	3.55E-10	2.91E-09	3.67E-10	4.10E-06	5.18E-07
Boron	1.06E-03	1.33E-04	1.10E-03	1.38E-04	8.53E-04	1.08E-04	8.83E-04	1.11E-04	8.88E-05	1.12E-05	9.20E-05	1.16E-05	9.01E-05	1.14E-05	9.33E-05	1.18E-05	1.31E-01	1.65E-02
Cadmium	4.13E-06	5.21E-07	4.28E-06	5.40E-07	3.32E-06	4.19E-07	3.44E-06	4.34E-07	1.03E-05	1.30E-06	1.07E-05	1.34E-06	8.45E-10	1.07E-10	8.75E-10	1.10E-10	5.14E-04	6.48E-05
Chromium	9.90E-09	1.25E-09	1.03E-08	1.29E-09	7.99E-09	1.01E-09	8.27E-09	1.04E-09	2.46E-08	3.11E-09	2.55E-08	3.22E-09	8.45E-10	1.07E-10	8.75E-10	1.10E-10	1.23E-06	1.55E-07
Copper	1.32E-05	1.67E-06	1.37E-05	1.73E-06	1.06E-05	1.34E-06	1.10E-05	1.39E-06	8.88E-05	1.12E-05	9.20E-05	1.16E-05	1.13E-06	1.42E-07	1.17E-06	1.47E-07	1.64E-03	2.07E-04
Ethylbenzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-04	1.29E-05	1.06E-04	1.33E-05	9.16E-04	1.16E-04	9.49E-04	1.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-04	2.45E-05
Lead	2.65E-04	3.34E-05	2.74E-04	3.46E-05	2.13E-04	2.68E-05	2.20E-04	2.78E-05	6.57E-04	8.28E-05	6.80E-04	8.58E-05	2.25E-05	2.84E-06	2.33E-05	2.94E-06	3.29E-02	4.15E-03
Manganese	3.31E-03	4.17E-04	3.43E-03	4.32E-04	2.66E-03	3.35E-04	2.75E-03	3.47E-04	8.23E-03	1.04E-03	8.53E-03	1.08E-03	2.81E-04	3.55E-05	2.91E-04	3.67E-05	4.10E-01	5.18E-02
Mercury	1.54E-04	1.94E-05	1.59E-04	2.01E-05	1.54E-04	1.94E-05	1.59E-04	2.01E-05	1.55E-04	1.95E-05	1.60E-04	2.02E-05	1.46E-04	1.84E-05	1.51E-04	1.91E-05	3.52E-05	4.44E-06
Nickel	6.62E-08	8.34E-09	6.85E-08	8.64E-09	4.41E-08	5.56E-09	4.57E-08	5.76E-09	1.65E-07	2.08E-08	1.71E-07	2.15E-08	5.64E-09	7.11E-10	5.84E-09	7.36E-10	8.24E-06	1.04E-06
Selenium	1.64E-08	2.07E-09	1.70E-08	2.14E-09	1.32E-08	1.67E-09	1.37E-08	1.73E-09	4.09E-08	5.15E-09	4.23E-08	5.34E-09	1.40E-09	1.77E-10	1.45E-09	1.83E-10	2.04E-06	2.57E-07
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.38E-03	3.00E-04	2.46E-03	3.10E-04	2.14E-02	2.69E-03	2.21E-02	2.79E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.54E-03	5.72E-04
Xylenes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-04	3.67E-05	3.01E-04	3.80E-05	2.62E-03	3.30E-04	2.71E-03	3.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-04	7.01E-05
Zinc	1.06E-03	1.33E-04	1.10E-03	1.38E-04	8.62E-04	1.09E-04	8.93E-04	1.13E-04	2.67E-03	3.37E-04	2.77E-03	3.49E-04	9.15E-05	1.15E-05	9.48E-05	1.20E-05	1.34E-01	1.68E-02
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.06E-04	8.90E-05	7.31E-04	9.22E-05	6.37E-03	8.03E-04	6.60E-03	8.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-03	3.76E-07

Modeling Scenario #1

	LP Vent	SP Vent	HP Vent	DWH	PTU	
Stack Height =	60	60	60	45	50	feet
Stack Diameter =	10.00	10.00	10.00	8.00	9.00	feet
Stack Temperature =	246.1	298.9	322.2	213.1	226.7	F
Stack Velocity =	39.9	33.8	39.2	15.6	40	feet/sec

Table G-5.3 Plant Commissioning Scenario #2

	Scenario #2							
	Vent Tank LP		Vent Tank SP		Vent Tanks HP		Dilution Water Heaters	
	1 & 24-Hour		1 & 24-Hour		1 & 24-Hour		1 & 24-Hour	
Pollutant	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)
PM 10	1.002	1.26E-01	8.06E-01	1.02E-01	2.49E+00	3.15E-01	8.54E-02	1.08E-02
H2S	2.65E+00	3.34E-01	8.51E+00	1.07E+00	1.09E+02	1.37E+01	4.27E-01	5.39E-02
Ammonia	1.08E+01	1.37E+00	4.33E+01	5.47E+00	4.41E+02	5.56E+01	1.04E+01	1.31E+00
Arsenic-PM	4.59E-05	5.78E-06	3.69E-05	4.65E-06	1.14E-04	1.44E-05	3.91E-06	4.93E-07
Arsenic-NC	0.00E+00	0.00E+00	1.26E-03	1.59E-04	1.13E-02	1.43E-03	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	2.22E-01	2.80E-02	2.00E+00	2.52E-01	0.00E+00	0.00E+00
Beryllium	4.25E-08	5.36E-09	3.41E-08	4.31E-09	1.14E-04	1.44E-05	3.62E-09	4.56E-10
Boron	1.36E-03	1.72E-04	1.10E-03	1.38E-04	1.14E-04	1.44E-05	1.16E-04	1.46E-05
Cadmium	5.31E-06	6.70E-07	4.27E-06	5.39E-07	1.32E-05	1.67E-06	1.09E-09	1.37E-10
Chromium	1.27E-08	1.60E-09	1.03E-08	1.30E-09	3.17E-08	4.00E-09	1.09E-09	1.37E-10
Copper	1.70E-05	2.15E-06	1.37E-05	1.72E-06	1.14E-04	1.44E-05	1.45E-06	1.83E-07
Ethylbenzene	0.00E+00	0.00E+00	1.31E-04	1.65E-05	1.18E-03	1.49E-04	0.00E+00	0.00E+00
Lead	3.40E-04	4.29E-05	2.73E-04	3.45E-05	8.44E-04	1.06E-04	2.90E-05	3.65E-06
Manganese	4.25E-03	5.36E-04	3.41E-03	4.31E-04	1.06E-02	1.33E-03	3.62E-04	4.56E-05
Mercury	1.98E-04	2.49E-05	1.98E-04	2.49E-05	1.99E-04	2.51E-05	1.88E-04	2.37E-05
Nickel	8.51E-08	1.07E-08	5.67E-08	7.15E-09	2.12E-07	2.67E-08	7.25E-09	9.14E-10
Selenium	2.11E-08	2.66E-09	1.70E-08	2.15E-09	5.25E-08	6.63E-09	1.80E-09	2.27E-10
Toluene	0.00E+00	0.00E+00	3.06E-03	3.85E-04	2.75E-02	3.46E-03	0.00E+00	0.00E+00
Xylenes	0.00E+00	0.00E+00	3.74E-04	4.72E-05	3.36E-03	4.24E-04	0.00E+00	0.00E+00
Zinc	1.36E-03	1.72E-04	1.11E-03	1.40E-04	3.43E-03	4.33E-04	1.18E-04	1.48E-05
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	0.000	0.00E+00	9.07E-04	1.14E-04	8.19E-03	1.03E-03	0.00E+00	0.00E+00

Modeling Scenario #2

	LP Vent	SP Vent	HP Vent	DWH	
Stack Height =	60	60	60	45	feet
Stack Diameter =	10.00	10.00	10.00	8.00	feet
Stack Temperature =	246.1	298.9	322.2	213.1	F
Stack Velocity =	51.3	43.4	50.4	20.1	feet/sec

Table G-5.4 Steam Blow Emissions Scenario #3a

	Scenario #3a									
	LP Vent Tank 1&24-Hour		SP Vent Tank 1&24-Hour		HP Vent Tank 1&24-Hour		Dilution Water Heater 1&24-Hour		HP Steam Blow 1&24-Hour	
Pollutant	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)
PM 10	1.00E+00	1.26E-01	8.06E-01	1.02E-01	1.25E+00	1.57E-01	8.54E-02	1.08E-02	1.25E+00	1.57E-01
H2S	2.65E+00	3.34E-01	8.51E+00	1.07E+00	5.44E+01	6.86E+00	4.27E-01	5.39E-02	5.44E+01	6.86E+00
Ammonia	1.08E+01	1.37E+00	4.33E+01	5.47E+00	2.21E+02	2.78E+01	1.04E+01	1.31E+00	2.21E+02	2.78E+01
Arsenic-PM	4.59E-05	5.78E-06	3.69E-05	4.65E-06	5.71E-05	7.20E-06	3.91E-06	4.93E-07	5.71E-05	7.20E-06
Arsenic-NC	0.00E+00	0.00E+00	1.26E-03	1.59E-04	5.67E-03	7.15E-04	0.00E+00	0.00E+00	5.67E-03	7.15E-04
Benzene	0.00E+00	0.00E+00	2.22E-01	2.80E-02	9.99E-01	1.26E-01	0.00E+00	0.00E+00	9.99E-01	1.26E-01
Beryllium	4.25E-08	5.36E-09	3.41E-08	4.31E-09	5.71E-05	7.20E-06	3.62E-09	4.56E-10	5.71E-05	7.20E-06
Boron	1.36E-03	1.72E-04	1.10E-03	1.38E-04	5.71E-05	7.20E-06	1.16E-04	1.46E-05	5.71E-05	7.20E-06
Cadmium	5.31E-06	6.70E-07	4.27E-06	5.39E-07	6.62E-06	8.34E-07	1.09E-09	1.37E-10	6.62E-06	8.34E-07
Chromium	1.27E-08	1.60E-09	1.03E-08	1.30E-09	1.58E-08	2.00E-09	1.09E-09	1.37E-10	1.58E-08	2.00E-09
Copper	1.70E-05	2.15E-06	1.37E-05	1.72E-06	5.71E-05	7.20E-06	1.45E-06	1.83E-07	5.71E-05	7.20E-06
Ethylbenzene	0.00E+00	0.00E+00	1.31E-04	1.65E-05	5.89E-04	7.43E-05	0.00E+00	0.00E+00	5.89E-04	7.43E-05
Lead	3.40E-04	4.29E-05	2.73E-04	3.45E-05	4.22E-04	5.32E-05	2.90E-05	3.65E-06	4.22E-04	5.32E-05
Manganese	4.25E-03	5.36E-04	3.41E-03	4.31E-04	5.29E-03	6.67E-04	3.62E-04	4.56E-05	5.29E-03	6.67E-04
Mercury	1.98E-04	2.49E-05	1.98E-04	2.49E-05	9.95E-05	1.26E-05	1.88E-04	2.37E-05	9.95E-05	1.26E-05
Nickel	8.51E-08	1.07E-08	5.67E-08	7.15E-09	1.06E-07	1.33E-08	7.25E-09	9.14E-10	1.06E-07	1.33E-08
Selenium	2.11E-08	2.66E-09	1.70E-08	2.15E-09	2.63E-08	3.31E-09	1.80E-09	2.27E-10	2.63E-08	3.31E-09
Toluene	0.00E+00	0.00E+00	3.06E-03	3.85E-04	1.37E-02	1.73E-03	0.00E+00	0.00E+00	1.37E-02	1.73E-03
Xylenes	0.00E+00	0.00E+00	3.74E-04	4.72E-05	1.68E-03	2.12E-04	0.00E+00	0.00E+00	1.68E-03	2.12E-04
Zinc	1.36E-03	1.72E-04	1.11E-03	1.40E-04	1.72E-03	2.17E-04	1.18E-04	1.48E-05	1.72E-03	2.17E-04
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	0.00E+00	0.00E+00	9.07E-04	1.14E-04	4.10E-03	5.16E-04	0.00E+00	0.00E+00	4.10E-03	5.16E-04

Notes:

A total of 24 hours of steam blow is anticipated.

Half the high pressure steam is routed to the steam blow, one HP Vent tank will remain in full operation.

Modeling Scenario #3a

	LP Vent	SP Vent	HP Vent	DWH	HP Steam Blow	
Stack Height =	60	60	60	45	40	feet
Stack Diameter =	10.00	10.00	10.00	8.00	2.50	feet
Stack Temperature =	246.1	298.9	322.2	213.1	322.00	F
Stack Velocity =	51.3	43.4	50.4	20.1	287.00	feet/sec

Table G-5.5 Steam Blow Emissions Scenario #3b

	Scenario #3b									
	LP Vent Tank 1&24-Hour		SP Vent Tank 1&24-Hour		HP Vent Tank 1&24-Hour		Dilution Water Heater 1&24-Hour		SP Steam Blow 1&24-Hour	
Pollutant	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)
PM 10	1.00E+00	1.26E-01	4.03E-01	5.08E-02	2.49E+00	3.15E-01	8.54E-02	1.08E-02	4.03E-01	5.08E-02
H2S	2.65E+00	3.34E-01	4.25E+00	5.36E-01	1.09E+02	1.37E+01	4.27E-01	5.39E-02	4.25E+00	5.36E-01
Ammonia	1.08E+01	1.37E+00	2.17E+01	2.73E+00	4.41E+02	5.56E+01	1.04E+01	1.31E+00	2.17E+01	2.73E+00
Arsenic-PM	4.59E-05	5.78E-06	1.84E-05	2.32E-06	1.14E-04	1.44E-05	3.91E-06	4.93E-07	1.84E-05	2.32E-06
Arsenic-NC	0.00E+00	0.00E+00	6.30E-04	7.95E-05	1.13E-02	1.43E-03	0.00E+00	0.00E+00	6.30E-04	7.95E-05
Benzene	0.00E+00	0.00E+00	1.11E-01	1.40E-02	2.00E+00	2.52E-01	0.00E+00	0.00E+00	1.11E-01	1.40E-02
Beryllium	4.25E-08	5.36E-09	1.71E-08	2.15E-09	1.14E-04	1.44E-05	3.62E-09	4.56E-10	1.71E-08	2.15E-09
Boron	1.36E-03	1.72E-04	5.48E-04	6.91E-05	1.14E-04	1.44E-05	1.16E-04	1.46E-05	5.48E-04	6.91E-05
Cadmium	5.31E-06	6.70E-07	2.14E-06	2.69E-07	1.32E-05	1.67E-06	1.09E-09	1.37E-10	2.14E-06	2.69E-07
Chromium	1.27E-08	1.60E-09	5.13E-09	6.48E-10	3.17E-08	4.00E-09	1.09E-09	1.37E-10	5.13E-09	6.48E-10
Copper	1.70E-05	2.15E-06	6.84E-06	8.62E-07	1.14E-04	1.44E-05	1.45E-06	1.83E-07	6.84E-06	8.62E-07
Ethylbenzene	0.00E+00	0.00E+00	6.55E-05	8.26E-06	1.18E-03	1.49E-04	0.00E+00	0.00E+00	6.55E-05	8.26E-06
Lead	3.40E-04	4.29E-05	1.37E-04	1.72E-05	8.44E-04	1.06E-04	2.90E-05	3.65E-06	1.37E-04	1.72E-05
Manganese	4.25E-03	5.36E-04	1.71E-03	2.15E-04	1.06E-02	1.33E-03	3.62E-04	4.56E-05	1.71E-03	2.15E-04
Mercury	1.98E-04	2.49E-05	9.89E-05	1.25E-05	1.99E-04	2.51E-05	1.88E-04	2.37E-05	9.89E-05	1.25E-05
Nickel	8.51E-08	1.07E-08	2.84E-08	3.58E-09	2.12E-07	2.67E-08	7.25E-09	9.14E-10	2.84E-08	3.58E-09
Selenium	2.11E-08	2.66E-09	8.51E-09	1.07E-09	5.25E-08	6.63E-09	1.80E-09	2.27E-10	8.51E-09	1.07E-09
Toluene	0.00E+00	0.00E+00	1.53E-03	1.93E-04	2.75E-02	3.46E-03	0.00E+00	0.00E+00	1.53E-03	1.93E-04
Xylenes	0.00E+00	0.00E+00	1.87E-04	2.36E-05	3.36E-03	4.24E-04	0.00E+00	0.00E+00	1.87E-04	2.36E-05
Zinc	1.36E-03	1.72E-04	5.54E-04	6.99E-05	3.43E-03	4.33E-04	1.18E-04	1.48E-05	5.54E-04	6.99E-05
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	0.00E+00	0.00E+00	4.54E-04	5.72E-05	8.19E-03	1.03E-03	0.00E+00	0.00E+00	4.54E-04	5.72E-05

Notes:

A total of 24 hours of steam blow is anticipated.

Half the standard pressure steam is routed to the steam blow, the SP Vent tank will be in half load.

Modeling Scenario #3a

	LP Vent	SP Vent	HP Vent	DWH	SP Steam Blow	
Stack Height =	60	60	60	45	40	feet
Stack Diameter =	10.00	10.00	10.00	8.00	2.50	feet
Stack Temperature =	246.1	298.9	322.2	213.1	299.00	F
Stack Velocity =	51.3	21.7	50.4	20.1	194.60	feet/sec

Table G-5.6 Steam Blow Emissions Scenario #3c

	Scenario #3c									
	LP Vent Tank 1&24-Hour		SP Vent Tank 1&24-Hour		HP Vent Tank 1&24-Hour		Dilution Water Heater 1&24-Hour		LP Steam Blow 1&24-Hour	
Pollutant	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)	(lbs/hr)	(gm/sec)
PM 10	5.01E-01	6.32E-02	8.06E-01	1.02E-01	2.49E+00	3.15E-01	8.54E-02	1.08E-02	5.01E-01	6.32E-02
H2S	1.33E+00	1.67E-01	8.51E+00	1.07E+00	1.09E+02	1.37E+01	4.27E-01	5.39E-02	1.33E+00	1.67E-01
Ammonia	5.42E+00	6.83E-01	4.33E+01	5.47E+00	4.41E+02	5.56E+01	1.04E+01	1.31E+00	5.42E+00	6.83E-01
Arsenic-PM	2.29E-05	2.89E-06	3.69E-05	4.65E-06	1.14E-04	1.44E-05	3.91E-06	4.93E-07	2.29E-05	2.89E-06
Arsenic-NC	0.00E+00	0.00E+00	1.26E-03	1.59E-04	1.13E-02	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	2.22E-01	2.80E-02	2.00E+00	2.52E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	2.13E-08	2.68E-09	3.41E-08	4.31E-09	1.14E-04	1.44E-05	3.62E-09	4.56E-10	2.13E-08	2.68E-09
Boron	6.80E-04	8.58E-05	1.10E-03	1.38E-04	1.14E-04	1.44E-05	1.16E-04	1.46E-05	6.80E-04	8.58E-05
Cadmium	2.66E-06	3.35E-07	4.27E-06	5.39E-07	1.32E-05	1.67E-06	1.09E-09	1.37E-10	2.66E-06	3.35E-07
Chromium	6.36E-09	8.02E-10	1.03E-08	1.30E-09	3.17E-08	4.00E-09	1.09E-09	1.37E-10	6.36E-09	8.02E-10
Copper	8.51E-06	1.07E-06	1.37E-05	1.72E-06	1.14E-04	1.44E-05	1.45E-06	1.83E-07	8.51E-06	1.07E-06
Ethylbenzene	0.00E+00	0.00E+00	1.31E-04	1.65E-05	1.18E-03	1.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	1.70E-04	2.15E-05	2.73E-04	3.45E-05	8.44E-04	1.06E-04	2.90E-05	3.65E-06	1.70E-04	2.15E-05
Manganese	2.13E-03	2.68E-04	3.41E-03	4.31E-04	1.06E-02	1.33E-03	3.62E-04	4.56E-05	2.13E-03	2.68E-04
Mercury	9.89E-05	1.25E-05	1.98E-04	2.49E-05	1.99E-04	2.51E-05	1.88E-04	2.37E-05	9.89E-05	1.25E-05
Nickel	4.25E-08	5.36E-09	5.67E-08	7.15E-09	2.12E-07	2.67E-08	7.25E-09	9.14E-10	4.25E-08	5.36E-09
Selenium	1.06E-08	1.33E-09	1.70E-08	2.15E-09	5.25E-08	6.63E-09	1.80E-09	2.27E-10	1.06E-08	1.33E-09
Toluene	0.00E+00	0.00E+00	3.06E-03	3.85E-04	2.75E-02	3.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	0.00E+00	0.00E+00	3.74E-04	4.72E-05	3.36E-03	4.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	6.80E-04	8.58E-05	1.11E-03	1.40E-04	3.43E-03	4.33E-04	1.18E-04	1.48E-05	6.80E-04	8.58E-05
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	0.00E+00	0.00E+00	9.07E-04	1.14E-04	8.19E-03	1.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes:

A total of 24 hours of steam blow is anticipated.

Half the low pressure steam is routed to the steam blow, the LP Vent tank will be in half load.

Modeling Scenario #3c

	LP Vent	SP Vent	HP Vent	DWH	LP Steam Blow	
Stack Height =	60	60	60	45	40	feet
Stack Diameter =	10.00	10.00	10.00	8.00	3.00	feet
Stack Temperature =	246.1	298.9	322.2	213.1	246.00	F
Stack Velocity =	25.7	43.4	50.4	20.1	315.90	feet/sec

TABLE G-6 Noncondensible Gas And Offgassing Emissions

Noncondensible Gas Emissions					
	NCG	Control	Exhaust		
Pollutant	(lbs/hr)	(%)	(lbs/hr)	(gm/sec)	(tons/year)
H2S	153	99.5	0.766	0.0966	3.36
Ammonia	0.12		0.12	0.0151	0.526
Arsenic-NC	0.020	90	2.00E-03	2.52E-04	0.00876
Benzene	3.5	95	0.176	2.22E-02	0.77
Ethylbenzene	2.08E-04		2.08E-04	2.62E-05	9.11E-04
Mercury	2.16E-04	90	2.16E-05	2.72E-06	9.46E-05
Toluene	4.85E-03		4.85E-03	6.12E-04	2.12E-02
Xylenes	5.94E-04		5.94E-04	7.49E-05	2.60E-03
	(Ci/hr)		(Ci/hr)	(Ci/sec)	(Ci/year)
Radon	1.44E-02		1.44E-02	4.00E-06	126.14
Cooling Tower Offgassing Emissions					
	Condensate	Control	Offgas		
Pollutant	(lbs/hr)	(%)	(lbs/hr)	(gm/sec)	(tons/year)
H2S	33.7	95	1.687	0.21	7.4
Ammonia	711.9		712	89.8	2681
Cooling Tower NCG and Offgassing Totals					
			Total		
Pollutant			(lbs/hr)	(gm/sec)	(tons/year)
H2S			2.5	0.31	10.7
Ammonia			712	89.8	2681

Notes:

UTM and stack parameters listed in Table G-17

Ammonia tons per year is based upon an annual averge (612 lbs/hr)

Modeling Scenario

Stack Height	58	Feet	
Stack Diameter	32	Feet	
Stack Velocity	33.1	feet/sec	
Stack Temperature		varies by season	
Summer	96.1	F	
Fall/Spring	80.4	F	range (81.4-80.4)
Winter	72.6	F	range (74.1-72.6)

Values selected upon screening review

Table G-7 Cooling Tower Drift Emissions

Pollutant	Cooling Tower			
	(PPM)	(lbs/hr)	(gm/sec)	(tons/year)
PM 10	4500	3.50	0.44	15.33
Ammonia	1.23	9.57E-04	1.21E-04	4.19E-03
Arsenic-PM	8.95E-03	6.94E-06	8.75E-07	3.04E-05
Beryllium	8.30E-06	6.44E-09	8.12E-10	2.82E-08
Boron	2.66E-01	2.06E-04	2.60E-05	9.02E-04
Cadmium	1.04E-03	8.04E-07	1.01E-07	3.52E-06
Chromium	2.49E-06	1.93E-09	2.44E-10	8.46E-09
Copper	3.33E-03	2.58E-06	3.25E-07	1.13E-05
Lead	6.65E-02	5.16E-05	6.51E-06	2.26E-04
Manganese	8.30E-01	6.44E-04	8.12E-05	2.82E-03
Nickel	1.66E-05	1.29E-08	1.62E-09	5.64E-08
Selenium	4.13E-06	3.20E-09	4.04E-10	1.40E-08
Zinc	2.71E-01	2.10E-04	2.65E-05	9.20E-04

Notes:					
	0.0006	Drift %	Blowdown TDS	4500	ppm
	775.48	CT Factor	Circulation	260000	gpm
			Circulation	129246	kpph

UTM and stack parameters listed in Table G-6 and Table G-17

TABLE G-8 TOTAL COOLING TOWER EMISSIONS

Pollutant	NCG (tons/year)	Offgassing (tons/year)	Drift (tons/year)	TOTAL (tons/year)
PM 10	---	---	15.3	15.3
H2S	3.36	7.39	---	10.7
Ammonia	0.53	2681	4.19E-03	2681.1
Arsenic-NC	0.009	---	---	0.009
Arsenic-PM	---	---	3.04E-05	3.04E-05
Benzene	0.77	---	---	0.77
Beryllium	---	---	2.82E-08	2.82E-08
Boron	---	---	9.02E-04	9.02E-04
Cadmium	---	---	3.52E-06	3.52E-06
Chromium	---	---	8.46E-09	8.46E-09
Copper	---	---	1.13E-05	1.13E-05
Ethylbenzene	2.60E-03	---	---	2.60E-03
Lead	---	---	2.26E-04	2.26E-04
Manganese	---	---	2.82E-03	2.82E-03
Mercury	9.11E-04	---		9.11E-04
Nickel	---	---	5.64E-08	5.64E-08
Selenium	---	---	1.40E-08	1.40E-08
Toluene	2.12E-02	---	---	2.12E-02
Xylenes	2.60E-03	---	---	2.60E-03
Zinc		---	9.20E-04	9.20E-04
	(Ci/year)			(Ci/year)
Radon	126.1	---	---	126.1

Table G-9 Dilution Water Heater Emissions

Pollutant	Total		
	lbs/hr	grams/sec	tons/year
PM 10	1.36E-01	1.71E-02	0.59
H2S	0.6780	0.08550	2.97
Ammonia	16.54	2.09	72.45
Arsenic-PM	6.20E-06	7.82E-07	2.72E-05
Beryllium	5.74E-09	7.24E-10	2.51E-08
Boron	1.84E-04	2.32E-05	8.05E-04
Cadmium	7.18E-07	9.05E-08	3.14E-06
Chromium	1.72E-09	2.17E-10	7.55E-09
Copper	2.30E-06	2.90E-07	1.01E-05
Lead	4.60E-05	5.80E-06	2.01E-04
Manganese	5.74E-04	7.24E-05	2.51E-03
Mercury	2.98E-04	3.76E-05	1.31E-03
Nickel	1.15E-08	1.45E-09	5.04E-08
Selenium	2.86E-09	3.61E-10	1.25E-08
Zinc	1.87E-04	2.36E-05	8.18E-04

Notes:

Two heaters in service

UTM and stack parameters listed in Table G-17

Modeling Scenario

Stack Height		**45**	**Feet**	
Stack Diameter		**8**	**Feet**	
Stack Temperature		**213.1**	**F**	
Stack Velocity	**varies by season**			
	Summer	**31.9**	**feet/sec**	
	Fall/Spring	**30.5**	**feet/sec**	**range (31.9-30.5)**
	Winter	**30.2**	**feet/sec**	**range (31.9-30.2)**
	Values selected upon screening review			

Table G-10 Filter Cake Handling Emissions

Pollutant	Concentration (PPM)	Annual Average (lb/day)	(lbs/hr)	(gm/sec)	(tons/year)
PM10		0.007676	9.60E-04	1.21E-04	1.40E-03
Antimony	10	7.68E-08	9.60E-09	1.21E-09	1.40E-08
Arsenic	300	2.30E-06	2.88E-07	3.63E-08	4.20E-07
Beryllium	10	7.68E-08	9.60E-09	1.21E-09	1.40E-08
Cadmium	0.2	1.54E-09	1.92E-10	2.42E-11	2.80E-10
Chromium	1	7.68E-09	9.60E-10	1.21E-10	1.40E-09
Cobalt	4	3.07E-08	3.84E-09	4.84E-10	5.60E-09
Copper	250	1.92E-06	2.40E-07	3.03E-08	3.50E-07
Lead	30	2.30E-07	2.88E-08	3.63E-09	4.20E-08
Manganese	3500	2.69E-05	3.36E-06	4.24E-07	4.90E-06
Nickel	1.5	1.15E-08	1.44E-09	1.82E-10	2.10E-09
Silver	0.4	3.07E-09	3.84E-10	4.84E-11	5.60E-10
Strontium	6000	4.61E-05	5.76E-06	7.26E-07	8.41E-06
Zinc	130	9.98E-07	1.25E-07	1.57E-08	1.82E-07
	(pCi/gm)		(Ci/hr)	(Ci/sec)	(Ci/year)
Radon			5.42E-06	1.51E-09	4.75E-02
Ra226	10		4.36E-12	1.21E-15	1.27E-08
Ra228	10		4.36E-12	1.21E-15	1.27E-08

Pollutant	Concentration (PPM)	Daily Maxmium (lb/day)	(lbs/hr)	(gm/sec)
PM10		0.051174	6.40E-03	8.07E-04
Antimony	20	1.02E-06	1.28E-07	1.61E-08
Arsenic	600	3.07E-05	3.84E-06	4.84E-07
Beryllium	20	1.02E-06	1.28E-07	1.61E-08
Cadmium	0.4	2.05E-08	2.56E-09	3.23E-10
Chromium	2	1.02E-07	1.28E-08	1.61E-09
Cobalt	8	4.09E-07	5.12E-08	6.45E-09
Copper	500	2.56E-05	3.20E-06	4.03E-07
Lead	60	3.07E-06	3.84E-07	4.84E-08
Manganese	7000	3.58E-04	4.48E-05	5.65E-06
Nickel	3	1.54E-07	1.92E-08	2.42E-09
Silver	0.8	4.09E-08	5.12E-09	6.45E-10
Strontium	12000	6.14E-04	7.68E-05	9.68E-06
Zinc	260	1.33E-05	1.66E-06	2.10E-07
	(pCi/gm)		(Ci/hr)	(Ci/sec)
Radon			1.08E-05	3.01E-09
Ra226	20		5.81E-11	1.61E-14
Ra228	20		5.81E-11	1.61E-14

Notes:

Work period is 8 hours per day.

20 tons per trailer.

6 trailers per day.

45 trailers maximum stored.

Surface area of trailer is 200 square feet.

Total maximum surface area is 9000 square feet or 837 square meters.

Flux ratio is 0.18 pCi/square meter-second per pCi/g.

For daily maximum estimated metals and Norm peak concentrations at 2 times annual average.

Table G-10.1 Filter Cake Handling Fugitive Emissions

Truck Loading: AP-42 Section 13.2.4 (1/95)

E = (0.35)*(.0032)*((u/5)^1.3)/((M/2)^1.4)

u = mean wind speed =	6.6	mph annual mean wind speed at Imperial County Airport
u = mean wind speed =	28.4	mph maximum 24-hour wind speed at Imperial County Airport
M = moisture =	20	Average moisture of filtercake
E = emission factor =	0.00006	lbs per ton - annual average
E = emission factor =	0.00043	lbs per ton - max 24 hour
Silica Filtercake production rate =	120	tons/day
E = emission factor =	0.00768	lbs/day - annual average
E = emission factor =	0.05117	lbs/day - max 24 hour

Silica Filter cake will go from the filterpress to a conveyor which will load a trailer.
Trailer will be tarped and moved to the waiting area prior to being transported for disposal
No other fugitive dust emissions are expected from this operation

Silica Filter Cake Modeling Scenarios:

1. Two volume emission points for conveyor discharges
Stack height 15 feet, to top of trailer 12 feet

2. One area emission point for radon stored in trailers
Stack height (top of trailer) 12 feet

Sulfur Filtercake production rate =	2.5	tons/day			
E = emission factor =	0.00016	lbs/day - annual average	6.66E-06	lbs/hr	2.92E-05 tons/year
E = emission factor =	0.00107	lbs/day - max 24 hour	4.44E-05	lbs/hr	
E = emission factor =	8.40E-07	grams/sec - annual average			
E = emission factor =	5.60E-06	grams/sec - max 24 hour			

Benzene	0.01	ppm	4.44E-13	lbs/hr	2.92E-13	tons/year	5.60E-14 grams/sec
Mercury	11	ppm	4.89E-10	lbs/hr	3.21E-10	tons/year	6.16E-11 grams/sec

Sulfur Filter Cake Modeling Scenario:

One volume emission point for conveyor discharge
Stack height 15 feet, to top of trailer 12 feet

Table G-11 Engine Emissions

				Emission Factor - grams/bhp-hr					Emission Rate - lb/hr				
Equipment	Fuel	Engine HP	Load Factor	NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
EG-480	Diesel	471	100	4.68	0.13	0.04	0.1840	0.0280	4.86	0.13	0.04	0.19	0.02905
EG-4160	Diesel	2847	100	5.46	0.35	0.13	0.1840	0.1030	34.24	2.19	0.82	1.15	0.64591
Fire Pump	Diesel	290	100	5.7	0.3	0.08	0.1840	0.0700	3.64	0.16	0.05	0.12	0.04471
							Total (lb/day) EG480		116.53	3.24	1.00	4.58	0.70
							Total (lb/day) EG4160		821.74	52.68	19.57	27.69	15.50
							Total (lb/day) FP		87.38	3.83	1.23	2.82	1.07
							Total (gm/s) EG480		0.61	0.02	0.01	0.02	0.00
							Total (gm/s) EG4160		4.32	0.28	0.10	0.15	0.08
							Total (gm/s) FP		0.46	0.02	0.01	0.01	0.01
							Total (tons/year) EG480		0.49	0.0135	0.0041	0.0191	0.0029
							Total (tons/year) EG4160		3.42	0.219	0.082	0.115	0.065
							Total (tons/year) FP		0.36	0.0160	0.0051	0.0118	0.0045
							Total (tons/year)		4.27	0.249	0.091	0.146	0.072
							Long term (gm/s) EG480		1.40E-02	3.88E-04	1.19E-04	5.50E-04	8.36E-05
							Long term (gm/s) EG4160		9.86E-02	6.32E-03	2.35E-03	3.32E-03	1.86E-03
							Long term (gm/s) FP		1.05E-02	4.60E-04	1.47E-04	3.38E-04	1.29E-04

Notes:

NO_X,CO,VOC,and PM_{10} emission factors based on manufacturer's data sheets.

SO_X emission factors based on .05% sulfur in the fuel.

Annual Emissions based on 200 hours.

UTM and stack parameters listed in Table G-17.

Table G-12 Operation and Maintenance Equipment Emissions

O&M Equipment	Fuel	Usage Hours/Year	Engine HP	Load Factor	Emission Factors - grams/bhp-hr					Emission Rates - lbs/hr				
					NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
Pickups	G	7280	202	80	0.15	1.34	0.07	0.23	0.01	0.053	0.477	0.025	0.082	0.0036
Dump Trucks	G	912	370	41	5	37.1	1.9	0.184	0.01	1.671	12.397	0.635	0.061	0.0033
Water Truck	G	185	185	41	5	37.1	1.9	0.184	0.01	0.835	6.198	0.317	0.031	0.0017
Forklift	D	156	83	30	5.8	8.5	1.00	0.184	0.16	0.318	0.466	0.055	0.010	0.0088
Boom Truck	G	450	185	51	5	37.1	1.90	0.184	0.01	1.039	7.710	0.395	0.038	0.0021
Crane-50T	D	384	184	43	5.8	8.5	1.00	0.184	0.16	1.011	1.481	0.174	0.032	0.0279
Manlift	D	384	43	51	5.8	8.5	1.00	0.184	0.16	0.280	0.411	0.048	0.009	0.0077
Carry Deck	D	156	43	51	5.8	8.5	1.00	0.184	0.16	0.280	0.411	0.048	0.009	0.0077
									Total (lbs/hr)	**5.488**	**29.551**	**1.698**	**0.272**	**0.0628**
									Total (gm/sec)	**0.692**	**3.727**	**0.214**	**0.034**	**0.0079**

O&M Equipment		Usage Hours/Year			Emission Rates - lbs/day					Emission Rates - tons/year				
					NO_X	CO	VOC	SO_X	PM_{10}	NO_X	CO	VOC	SO_X	PM_{10}
Pickups		7280			0.43	3.82	0.20	0.65	0.03	0.194	1.736	0.091	0.298	0.013
Dump Trucks		912			13.37	99.17	5.08	0.49	0.03	0.762	5.653	0.289	0.028	0.0015
Water Truck		185			6.68	49.59	2.54	0.25	0.01	0.077	0.573	0.029	0.003	0.0002
Forklift		156			2.54	3.73	0.44	0.08	0.07	0.025	0.036	0.004	0.001	0.0007
Boom Truck		450			8.31	61.68	3.16	0.31	0.02	0.234	1.735	0.089	0.009	0.0005
Crane-50T		384			8.09	11.85	1.39	0.26	0.22	0.194	0.284	0.033	0.006	0.0054
Manlift		384			2.24	3.28	0.39	0.07	0.06	0.054	0.079	0.009	0.002	0.0015
Carry Deck		156			2.24	3.28	0.39	0.07	0.06	0.022	0.032	0.004	0.001	0.0006
									Total (tons/year)	**1.56**	**10.13**	**0.55**	**0.35**	**0.0232**
									Total (gm/sec)	**0.0450**	**0.2916**	**0.0158**	**0.0100**	**0.00067**

Total Diesel PM10 (gm/sec)	**0.000234**

Notes:

G means gasoline

D means diesel

Usage factors based on operating experience

Diesel NO_X,CO,VOC,and PM_{10} emission factors based on EPA 420-F-97-014 Emission Standards Reference Guide for Heavy-Duty and Nonroad Engines

Pickup Gasoline NO_X,CO,VOC,and PM_{10} emission factors based on EPA 420-B-00-001, California Certification Exhaust Emission Standards

SO_X emission factors based on .05% sulfur fuel

Load factors based on Table A9-8-D, SCAQMD CEQA Handbook

Modeling Scenario: 5 point sources for truck moving trailers from filter press to storage pad, 12 point sources for rest of OM Equipment spread in equipment area

Each point source used typical truck stack parameters, 12 feet high, temperature 850 F, velocity 298 ft/sec, diameter 4 inches

Table G-12.1 Operation and Maintenance Equipment Fugitive Emissions

Construction Equipment	Emission Source	Emission Factor	EF Units	VMT per day	Uncontrolled Emission Rate (lb/day)	Controlled Emission Rate* (lb/month)	Controlled Emission Rate* (tons/year)
Pickups	Paved roads	0.0009	lb/vmt	15	0.0135	0.4	0.002
	Unpaved roads	0.3222	lb/vmt	11.1	3.5769	21.5	0.129
Dump Trucks	Paved roads	0.0193	lb/vmt	32.4	0.6243	18.7	0.112
Water Truck	Paved roads	0.0087	lb/vmt	3.7	0.0322	1.0	0.006
	Unpaved roads	0.3222	lb/vmt	5	1.6112	9.7	0.058
Forklift	Paved roads	0.0055	lb/vmt	1	0.0055	0.2	0.001
Crane-45T	Paved roads	0.0523	lb/vmt	1	0.0523	1.6	0.009
Boom Truck	Paved roads	0.0055	lb/vmt	1	0.0055	0.2	0.001
Manlifts	Paved roads	0.0055	lb/vmt	1	0.0055	0.2	0.001
Carry Deck	Paved roads	0.0055	lb/vmt	1	0.0055	0.2	0.001
						Total (tons/year)	**0.321**
						(lbs/hr)	**0.074**
						(gm/sec)	**0.009**

Notes:

Paved roads: AP-42 Section 13.2.1 10/01 draft

E = k(sL/2)^0.65*(W/3)^1.5

k = particle size constant =	**0.016**	**lb/VMT - PM10**
sL = silt loading =	**0.04**	**g/m2 (AP-42, page 13.2.1-7, low ADT access roads)**
W = Pickup avg. vehicle weight =	**2.4**	**tons (CARB Area Source Manual, 9/97)**
E = Pick truck emission factor =	**0.0009**	**lb/VMT - PM10**
W = Water truck avg. vehicle weight =	**10.9**	**tons (15 tons full; 6.7 tons empty) estimated**
E = Water truck emission rate =	**0.0087**	**lb/VMT - PM10**
W = Dump truck avg. vehicle weight =	**18.5**	**tons (max 27.5 tons; empty 9.5 tons)**
E = Dump truck emission rate =	**0.0193**	**lb/VMT - PM10**
W = Forklift/ Misc avg. vehicle wt =	**8**	**tons estimated**
E = Forklift/ Misc emission rate =	**0.0055**	**lb/VMT - PM10**
W = Crane 50T vehicle wt =	**36**	**tons estimated**
E = Crane emission rate =	**0.0523**	**lb/VMT - PM10**

Unpaved roads: AP-42 Section 13.2.2 10/01

Public road

E = (k)[(s/12)^0.8]*[(S/30)]/[(M/0.5)^0.2]

k = particle size constant =	**1.8**	**lb/VMT - PM10**
s = silt fraction % =	**11**	**AP-42, TABLE 13.2.2-1, mean for dirt roads, percent**
S = speed =	**10**	**mph work limit**
M = moisture level % =	**7.9**	**Mean moisture for overburden AP-42 Table 11.9-3**
E = Emission factor =	**0.3222**	**lb/VMT - PM10**
E = Controlled Emission factor =	**0.0644**	**lb/VMT - PM10**

*** All upaved roads with a control efficiency of 80% estimated, page 13.2.2-11, AP-42**

TABLE G-13 TOTAL OPERATING EMISSIONS (tons/year)

Pollutant	Cooling Tower	Dilution Water Heaters	Filter Cake Silica	Filter Cake Sulfur	Engines	O&M	Total
NOx	--	--	--	--	4.27	1.56	5.84
CO	--	--	--	--	0.25	10.13	10.38
VOC	--	--	--	--	0.09	0.55	0.64
SO2	--	--	--	--	0.15	0.35	0.49
PM 10	15.33	0.59	1.40E-03	2.92E-05	0.07	0.34	16.34
H2S	10.75	2.97	--	--	--	--	13.72
Ammonia	2681.09	72.45	--	--	--	--	2753.53
Arsenic-NC	0.0088		--	--	--	--	8.76E-03
Arsenic-PM	3.04E-05	2.72E-05	4.20E-07	--	--	--	5.80E-05
Benzene	7.71E-01	--	--	2.92E-13	--	--	0.77
Beryllium	2.82E-08	2.51E-08	1.40E-08	--	--	--	6.74E-08
Boron	9.02E-04	8.05E-04	--	--	--	--	1.71E-03
Cadmium	3.52E-06	3.14E-06	2.80E-10	--	--	--	6.67E-06
Chromium	8.46E-09	7.55E-09	1.40E-09	--	--	--	1.74E-08
Copper	1.13E-05	1.01E-05	3.50E-07	--	--	--	2.17E-05
Ethylbenzene	2.60E-03	--	--	--	--	--	2.60E-03
Lead	2.26E-04	2.01E-04	4.20E-08	--	--	--	4.28E-04
Manganese	2.82E-03	2.51E-03	4.90E-06	--	--	--	5.34E-03
Mercury	9.11E-04	1.31E-03	--	3.21E-10	--	--	2.22E-03
Nickel	5.64E-08	5.04E-08	2.10E-09	--	--	--	1.09E-07
Selenium	1.40E-08	1.25E-08	--	--	--	--	2.65E-08
Toluene	2.12E-02	--	--	--	--	--	2.12E-02
Xylenes	2.60E-03	--	--	--	--	--	2.60E-03
Zinc	9.20E-04	8.18E-04	1.82E-07	--	--	--	1.74E-03
	(Ci/year)	(Ci/year)	(Ci/year)				(Ci/year)
Radon	126.14	--	4.75E-02				126.2
Radium 226	--	--	1.27E-08				1.27E-08
Radium 228	--	--	1.27E-08				1.27E-08

Table G-14 Well Flow Run Emissions

Pollutant	Production Single Well (lbs/hr)	Production Single Well (gm/sec)	Production Multiple Wells (lbs/period)	Injection Single Well (lbs/hr)	Injection Single Well (gm/sec)	Injection Multiple Wells (lbs/period)	Total (tons/year)
PM 10	97	12.2	22458	56	7.10	13515	18.0
H2S	17.7	2.23	4102	14.7	1.86	3536	3.8
Ammonia	70.8	8.93	16426	59.0	7.44	14160	15.3
Arsenic-PM	4.43E-03	5.59E-04	1.028	2.58E-03	3.25E-04	0.619	8.24E-04
Arsenic-NC	1.87E-03	2.36E-04	4.34E-01	1.56E-03	1.97E-04	0.374	4.04E-04
Benzene	0.330	4.16E-02	76.5	0.275	3.46E-02	65.9	7.12E-02
Beryllium	4.10E-06	5.18E-07	9.52E-04	2.39E-06	3.01E-07	5.73E-04	7.63E-07
Boron	0.13	1.65E-02	30.4	0.08	9.63E-03	18.3	2.44E-02
Cadmium	5.14E-04	6.48E-05	1.19E-01	2.99E-04	3.77E-05	7.17E-02	9.54E-05
Chromium	1.23E-06	1.55E-07	2.86E-04	7.17E-07	9.04E-08	1.72E-04	2.29E-07
Copper	1.64E-03	2.07E-04	3.80E-01	9.54E-04	1.20E-04	0.229	3.05E-04
Ethylbenzene	1.94E-04	2.45E-05	4.51E-02	1.62E-04	2.04E-05	3.89E-02	4.20E-05
Lead	0.033	4.15E-03	7.63	0.019	2.41E-03	4.59	6.11E-03
Manganese	0.41	5.18E-02	95.2	0.24	3.01E-02	57.3	7.63E-02
Mercury	3.52E-05	4.44E-06	8.18E-03	5.87E-05	7.41E-06	1.41E-02	1.11E-05
Nickel	8.24E-06	1.04E-06	1.91E-03	4.79E-06	6.05E-07	1.15E-03	1.53E-06
Selenium	2.04E-06	2.57E-07	4.73E-04	1.19E-06	1.50E-07	2.85E-04	3.79E-07
Toluene	4.54E-03	5.72E-04	1.052	3.78E-03	4.77E-04	0.907	9.80E-04
Xylenes	5.56E-04	7.01E-05	1.29E-01	4.63E-04	5.84E-05	0.111	1.20E-04
Zinc	0.13	1.68E-02	31.0	0.08	9.80E-03	18.7	2.48E-02
	(Ci/hr)	(Ci/sec)	(Ci/period)	(Ci/hr)	(Ci/sec)	(Ci/period)	(Ci/year)
Radon	1.35E-03	3.76E-07	0.314	1.13E-03	3.13E-07	0.270	0.58

Notes:

A well could be venting for a total of 48 hours
PTU UTM and stack parameters listed in Table G-17
Only one well will be flow tested at a time
A period is equal to the number of hours the flow is run during the year
Annual emissions from production wells are based upon 232 hours
Annual emissions from injection wells are based upon 54 hours
Production wells 48 hours
Injection wells 18 hours

Modeling Scenario	Production	Injection		Injection PAD Locations	East	North	Elevation
Stack Height	50	37.92	Feet	PAD R (OBI2)	630101	3669781	-217 feet
Stack Diameter	9	6	Feet	PAD P (OBI3)	630101	3669150	-216 feet
Stack Temperature	226.7	226.7	F	PAD O (OBI1)	629269	3668355	-214 feet
Stack Velocity	40	48.7	feet/sec	CT Well	628455	3670616	-228 feet
	At PTU	At Well Pad		BP Well	627760	3670616	-228 feet
	1.2 mlbs/hr	1.0 mlbs/hr		Taken from USGS Maps (NAD27, NGVD29)			

Table G-15 Vent Tanks Emissions

Pollutant	LP Vent Tank (lbs/hr)	LP Vent Tank (grams/sec)	SP Vent Tank (lbs/hr)	SP Vent Tank (grams/sec)	Cooling Tower (lbs/hr)	Cooling Tower (grams/sec)	DWH (lbs/hr)	DWH (grams/sec)	Total (lbs/year)	Total (tons/year)
PM 10	1.59	2.01E-01	1.28E+00	1.61E-01	3.46E+01	4.36E+00	1.34E-01	1.69E-02	1.88E+03	0.940
H2S	4.21E+00	5.31E-01	1.35E+01	1.70E+00	2.06E+00	2.59E-01	6.78E-01	8.55E-02	1.02E+03	0.511
Ammonia	1.72E+01	2.17E+00	6.88E+01	8.68E+00	5.46E+02	6.89E+01	1.65E+01	2.09E+00	3.24E+04	16.2
Arsenic-PM	7.28E-05	9.18E-06	5.85E-05	7.38E-06	6.74E-06	8.50E-07	6.12E-06	7.72E-07	7.21E-03	3.60E-06
Arsenic-NC	0.00	0.00	2.00E-03	2.52E-04	2.00E-03	2.52E-04	0.00E+00	0.00E+00	2.00E-01	1.00E-04
Benzene	0.00	0.00	3.52E-01	4.44E-02	1.76E-01	2.22E-02	0.00E+00	0.00E+00	2.64E+01	1.32E-02
Beryllium	6.75E-08	8.51E-09	5.42E-08	6.84E-09	6.26E-09	7.89E-10	5.68E-09	7.16E-10	6.68E-06	3.34E-09
Boron	2.16E-03	2.72E-04	1.74E-03	2.19E-04	2.00E-04	2.52E-05	1.81E-04	2.29E-05	2.14E-01	1.07E-04
Cadmium	8.43E-06	1.06E-06	6.78E-06	8.55E-07	7.82E-07	9.86E-08	7.10E-07	8.95E-08	8.35E-04	4.18E-07
Chromium	2.02E-08	2.55E-09	1.63E-08	2.06E-09	1.88E-09	2.37E-10	1.70E-09	2.15E-10	2.00E-06	1.00E-09
Copper	2.70E-05	3.41E-06	2.17E-05	2.74E-06	2.50E-06	3.15E-07	2.26E-06	2.85E-07	2.67E-03	1.34E-06
Ethylbenzene	0.00	0.00	2.08E-04	2.62E-05	2.08E-04	2.62E-05	0.00E+00	0.00E+00	2.08E-02	1.04E-05
Lead	5.40E-04	6.81E-05	4.34E-04	5.47E-05	5.00E-05	6.31E-06	4.54E-05	5.73E-06	5.35E-02	2.67E-05
Manganese	6.75E-03	8.51E-04	5.42E-03	6.84E-04	6.26E-04	7.89E-05	5.68E-04	7.16E-05	6.68E-01	3.34E-04
Mercury	3.14E-04	3.96E-05	3.14E-04	3.96E-05	2.12E-05	2.67E-06	2.98E-04	3.76E-05	4.74E-02	2.37E-05
Nickel	1.35E-07	1.70E-08	9.00E-08	1.14E-08	1.25E-08	1.58E-09	1.13E-08	1.43E-09	1.24E-05	6.22E-09
Selenium	3.35E-08	4.22E-09	2.70E-08	3.41E-09	3.10E-09	3.91E-10	2.82E-09	3.56E-10	3.32E-06	1.66E-09
Toluene	0.00	0.00	4.85E-03	6.12E-04	4.84E-03	6.10E-04	0.00E+00	0.00E+00	4.85E-01	2.42E-04
Xylenes	0.00	0.00	5.94E-04	7.49E-05	5.94E-04	7.49E-05	0.00E+00	0.00E+00	5.94E-02	2.97E-05
Zinc	2.16E-03	2.72E-04	1.76E-03	2.22E-04	2.04E-04	2.57E-05	1.84E-04	2.33E-05	2.15E-01	1.08E-04
	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/year)	(Ci/year)
Radon	0.00E+00	0.00E+00	1.44E-03	4.00E-07	1.44E-02	4.00E-06	0.00E+00	0.00E+00	7.92E-01	7.92E-01

Notes:

An annual total of 50 hours @ 100% maximum brine flow

Actual rates will vary

UTM and stack parameters listed in Table G-17

Brine flowrate at 12.8 million pounds per hour

Modeling Scenario

	LP Vent	SP Vent	DWH			Cooling Tower	
Stack Height =	60	60	45	feet	Stack Height =	58	feet
Stack Diameter =	10.00	10.00	8.00	feet	Stack Diameter =	32.00	feet
Stack Temperature =	246.1	298.9	213.1	F	Stack Temperature =	varies by season	
Stack Velocity =	varies by season	varies by season	varies by season		Summer	90.3	F
Summer	81.5	68.9	31.9	feet/sec	Fall/Spring	72.8	F
Fall/Spring	77.3	65.5	30.5	feet/sec	Winter	63.7	F
Winter	76.4	64.7	30.2	feet/sec	Stack Velocity =	33.1	feet/sec

Values selected upon screening review

Table G-16 Plant Startup Emissions

Pollutant	PTU (lbs/hr)	100% LP Vent Tank (lbs/hr)	100% SP Vent Tank (lbs/hr)	100% Cooling Tower (lbs/hr)	100% DWH (lbs/hr)	Total (tons/period)	LP Vent Tank 1-Hour (lbs/hr)	LP Vent Tank 1-Hour (gm/sec)	LP Vent Tank 24-Hour (lbs/hr)	LP Vent Tank 24-Hour (gm/sec)	SP Vent Tank 1-Hour (lbs/hr)	SP Vent Tank 1-Hour (gm/sec)	SP Vent Tank 24-Hour (lbs/hr)	SP Vent Tank 24-Hour (gm/sec)	Cooling Tower 1-Hour (lbs/hr)	Cooling Tower 1-Hour (gm/sec)	Cooling Tower 24-Hour (lbs/hr)	Cooling Tower 24-Hour (gm/sec)	DWH 1-Hour (lbs/hr)	DWH 1-Hour (gm/sec)	DWH 24-Hour (lbs/hr)	DWH 24-Hour (gm/sec)	PTU 1&24-Hour (lbs/hr)	PTU 1&24-Hour (gm/sec)
PM 10	98.8	1.59	1.28	3.46	1.34E-01	2.20	1.11E-01	1.40E-02	2.32E-02	2.92E-03	8.96E-02	1.13E-02	1.87E-02	2.35E-03	3.46E+00	4.36E-01	3.46E+00	4.36E-01	9.37E-03	1.18E-03	2.73E-02	3.45E-03	98.8	12.21
H2S	17.68	4.21	13.5	2.06	6.78E-01	4.18E-01	2.95E-01	3.72E-02	6.14E-02	7.74E-03	9.45E-01	1.19E-01	1.97E-01	2.48E-02	1.44E-01	1.82E-02	4.20E-01	5.30E-02	4.75E-02	5.99E-03	1.36E-01	1.75E-02	17.68	2.23
Ammonia	70.8	17.2	68.8	5.46E+02	16.54	5.15	1.20E+00	1.52E-01	2.51E-01	3.16E-02	4.82E+00	6.07E-01	1.00E+00	1.27E-01	3.82E+01	4.82E+00	1.11E+02	1.41E+01	1.16E+00	1.46E-01	3.38E+00	4.26E-01	70.8	8.93
Arsenic-PM	4.43E-03	7.28E-05	5.85E-05	6.74E-06	6.12E-06	9.98E-05	5.10E-06	6.43E-07	1.06E-06	1.34E-07	4.10E-06	5.16E-07	8.53E-07	1.08E-07	6.74E-06	8.50E-07	6.74E-06	8.50E-07	4.28E-07	5.40E-08	1.25E-06	1.58E-07	4.43E-03	5.59E-04
Arsenic-NC	1.87E-03	0.00	2.00E-03	2.00E-03	0.00	5.51E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-04	1.77E-05	2.92E-05	3.68E-06	1.40E-04	1.77E-05	4.08E-04	5.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03	2.36E-04
Benzene	3.30E-01	0.00	3.52E-01	1.76E-01	0.00	8.59E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.46E-02	3.11E-03	5.13E-03	6.47E-04	1.23E-02	1.55E-03	3.59E-02	4.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	4.16E-02
Beryllium	4.10E-06	6.75E-08	5.42E-08	6.44E-09	5.68E-09	9.24E-08	4.73E-09	5.96E-10	9.84E-10	1.24E-10	3.79E-09	4.78E-10	7.90E-10	9.97E-11	6.44E-09	8.12E-10	6.44E-09	8.12E-10	3.96E-10	5.01E-11	1.16E-09	1.46E-10	4.10E-06	5.18E-07
Boron	1.31E-01	2.16E-03	1.74E-03	2.06E-04	1.81E-04	2.96E-03	1.51E-04	1.91E-05	3.15E-05	3.97E-06	1.22E-04	1.54E-05	2.54E-05	3.20E-06	2.06E-04	2.60E-05	2.06E-04	2.60E-05	1.27E-05	1.60E-06	3.70E-05	4.67E-06	1.31E-01	1.65E-02
Cadmium	5.14E-04	8.43E-06	6.78E-06	8.04E-07	7.10E-07	1.16E-05	5.90E-07	7.44E-08	1.23E-07	1.55E-08	4.75E-07	5.99E-08	9.89E-08	1.25E-08	8.04E-07	1.01E-07	8.04E-07	1.01E-07	4.97E-08	6.27E-09	1.45E-07	1.83E-08	5.14E-04	6.48E-05
Chromium	1.23E-06	2.02E-08	1.63E-08	1.93E-09	1.70E-09	2.77E-08	1.41E-09	1.78E-10	2.95E-10	3.72E-11	1.14E-09	1.44E-10	2.38E-10	3.00E-11	1.93E-09	2.44E-10	1.93E-09	2.44E-10	1.19E-10	1.50E-11	3.47E-10	4.38E-11	1.23E-06	1.55E-07
Copper	1.64E-03	2.70E-05	2.17E-05	2.58E-06	2.26E-06	3.69E-05	1.89E-06	2.38E-07	3.94E-07	4.97E-08	1.52E-06	1.92E-07	3.16E-07	3.99E-08	2.58E-06	3.25E-07	2.58E-06	3.25E-07	1.58E-07	2.00E-08	4.61E-07	5.82E-08	1.64E-03	2.07E-04
Ethylbenzene	1.94E-04	0.00	2.08E-04	2.08E-04	0.00	5.72E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-05	1.84E-06	3.03E-06	3.83E-07	1.46E-05	1.84E-06	4.25E-05	5.36E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-04	2.45E-05
Lead	3.29E-02	5.40E-04	4.34E-04	5.16E-05	4.54E-05	7.41E-04	3.78E-05	4.77E-06	7.88E-06	9.93E-07	3.04E-05	3.83E-06	6.33E-06	7.98E-07	5.16E-05	6.51E-06	5.16E-05	6.51E-06	3.18E-06	4.01E-07	9.27E-06	1.17E-06	3.29E-02	4.15E-03
Manganese	4.10E-01	6.75E-03	5.42E-03	6.44E-04	5.68E-04	9.24E-03	4.73E-04	5.96E-05	9.84E-05	1.24E-05	3.79E-04	4.78E-05	7.90E-05	9.97E-06	6.44E-04	8.12E-05	6.44E-04	8.12E-05	3.96E-05	5.01E-06	1.16E-04	1.46E-05	4.10E-01	5.18E-02
Mercury	3.52E-05	3.14E-04	3.14E-04	2.16E-05	2.98E-04	2.92E-06	2.20E-05	2.77E-06	4.58E-06	5.77E-07	2.20E-05	2.77E-06	4.58E-06	5.77E-07	1.51E-06	1.91E-07	4.41E-06	5.56E-07	2.09E-05	2.63E-06	6.08E-05	7.67E-06	3.52E-05	4.44E-06
Nickel	8.24E-06	1.35E-07	9.00E-08	1.62E-09	1.13E-08	1.86E-07	9.45E-09	1.19E-09	1.97E-09	2.48E-10	6.30E-09	7.95E-10	1.31E-09	1.66E-10	1.62E-09	2.05E-10	1.62E-09	2.05E-10	7.94E-10	1.00E-10	2.32E-09	2.92E-10	8.24E-06	1.04E-06
Selenium	2.04E-06	3.35E-08	2.70E-08	4.04E-10	2.82E-09	4.59E-08	2.35E-09	2.96E-10	4.88E-10	6.16E-11	1.88E-09	2.38E-10	3.94E-10	4.97E-11	4.04E-10	5.09E-11	4.04E-10	5.09E-11	1.97E-10	2.49E-11	5.76E-10	7.26E-11	2.04E-06	2.57E-07
Toluene	4.54E-03	0.00	4.85E-03	4.85E-03	0.00	1.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-04	4.28E-05	7.07E-05	8.92E-06	3.40E-04	4.28E-05	9.90E-04	1.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.54E-03	5.72E-04
Xylenes	5.56E-04	0.00	5.94E-04	5.94E-04	0.00	1.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.16E-05	5.24E-06	8.66E-06	1.09E-06	4.16E-05	5.24E-06	1.21E-04	1.53E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-04	7.01E-05
Zinc	1.34E-01	2.16E-03	1.76E-03	2.10E-04	1.84E-04	3.01E-03	1.51E-04	1.91E-05	3.15E-05	3.97E-06	1.23E-04	1.55E-05	2.57E-05	3.24E-06	2.10E-04	2.65E-05	2.10E-04	2.65E-05	1.29E-05	1.63E-06	3.76E-05	4.75E-06	1.34E-01	1.68E-02
	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/hr)	(Ci/period)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)	(Ci/hr)	(Ci/sec)
Radon	1.35E-03	0.00	1.44E-03	1.44E-02	0.00E+00	2.43E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-04	2.80E-08	2.10E-05	5.83E-09	1.01E-03	2.80E-07	2.94E-03	8.17E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-03	3.76E-07

Notes:

A total of 45 hours will be venting at PTU emission rates (1.2 mlb/hr)

A total of 5 hours will be venting at LP and SP Vent Tanks (7% of full flow)

A total of 40 hours will be venting at Cooling Towers and DWHs (emissions range from 7% to 63% of full flow)

A period is one startup per year.

Modeling Scenario

One well venting at the PTU while one well is venting at the other sources

At the PTU, use listed values. For other sources use 7% of listed values for hourly rates except for cooling tower drift

	LP Vent	SP Vent	DWH			Cooling Tower	
Stack Height =	60	60	45	feet	Stack Height =	58	feet
Stack Diameter =	10.00	10.00	8.00	feet	Stack Diameter =	32.00	feet
Stack Temperature =	246.1	298.9	213.1	F	Stack Temperature =	varies by season	
Stack Velocity =	varies by season			feet/sec	Summer	90.3	F
Summer	5.71	4.82	2.23	feet/sec	Fall/Spring	72.5	F
Fall/Spring	5.41	4.59	2.14	feet/sec	Winter	63.7	F
Winter	5.35	4.53	2.11	feet/sec	Stack Velocity =	33.1	feet/sec

Values selected upon screening review

Modeling Protocol

For the:

Salton Sea 6 Project

Prepared for:

CE Obsidian Energy, LLC
7030 Gentry Road
Calipatria, California 92233

Prepared by:

RTP Environmental Associates, Inc.
7752 Fay Avenue Suite C
La Jolla, California 92037

April 2002
Addendum: May 3, 2002

Table of Contents

		Page
1.0	INTRODUCTION	1-1
2.0	PROPOSED PROJECT	2-1
2.1	Project Location	2-1
2.2	Description of the Proposed Project	2-1
2.2.1	Well Field and Pipelines	2-3
2.2.2	Power Plant	2-3
2.2.3	Transmission Lines	2-5
3.0	REGULATORY SETTING	3-1
3.1	CEC Requirements	3-1
3.2	APCD Requirements	3-1
3.3	EPA Requirements	3-2
4.0	EXISTING ENVIRONMENT	4-1
4.1	Area Climate	4-1
4.2	Meteorological Data and Site Representation	4-2
4.3	Preparation of the Meteorological Data Set	4-11
4.4	Existing Air Quality Data	4-14
5.0	PROPOSED MODELS AND ANALYTICAL APPROACH	5-1
5.1	Screening Modeling	5-1
5.2	Refined Modeling	5-1
5.2.1	Receptor Grids	5-2
5.2.2	Model Options	5-3
5.2.3	Building Wake Effects	5-4
5.3	Modeling Emissions Inventory	5-4
5.3.1	Project Sources – Operations	5-4
5.3.2	Project Sources – Startups	5-5
5.3.3	Construction Sources	5-6
5.3.3.1	Site Preparation and Construction Activities	5-6
5.3.3.2	Well Drilling	5-6
5.3.3.3	Well Testing	5-7
5.3.3.4	Well Reworking	5-7
5.3.3.5	Commissioning	5-7
5.4	Modeling Scenarios	5-7
5.4.1	Compliance Review	5-7
5.4.2	Other Assessments	5-8

6.0 MODELING RESULTS 6-1
6.1 Area of Impact Analysis 6-1
6.2 NAAQS and CAAQS Analysis 6-1
6.3 Health Risk Data Development 6-3

ADDENDUM 1 – Offset Identification and Cumulative Modeling Protocol

REFERENCES

FIGURE 1: Topographic Map of Salton Sea 6 Project Site 2-2
FIGURE 2: Available Meteorological Monitoring Stations (Topo Map) 4-3
FIGURE 3: Annual Imperial County Airport Wind Rose for 1995-1999 Combined . 4-5
FIGURE 4: Annual Imperial County Airport Wind Rose for 1995-1999 Spring 4-6
FIGURE 5: Annual Imperial County Airport Wind Rose for 1995-1999 Summer 4-7
FIGURE 6: Annual Imperial County Airport Wind Rose for 1995-1999 Fall 4-8
FIGURE 7: Annual Imperial County Airport Wind Rose for 1995-1999 Winter 4-9

DRAWING 1: Plot Plan 2-4

1.0 INTRODUCTION

CE Obsidian Energy, LLC (Obsidian) is proposing to build and operate a 185-megawatt (MW) geothermal electric power plant in Imperial County, California. The project (Salton Sea 6) will be subject to the site licensing requirements of the California Energy Commission (CEC). The CEC, together with the Imperial County Air Pollution Control District (APCD) will evaluate the project's potential and cumulative air quality impacts, appropriateness of the proposed mitigation measures, and the project conformance with applicable local, state and federal air quality rules and regulations. The purpose of this protocol is to establish the procedures to be used in assessing Salton Sea 6's potential air quality impacts. Both agencies have in place regulations establishing the required review process. The CEC conducts their review through the California Code of Regulations, Title 20, Division 2, Chapters 1, 2, and 5, *Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification Including Additional Provisions of Considering Expedited Applications Under Public Resources Code Section 25550.*

The APCD conducts their review under Rule 207(F), *Air Quality Impact Analysis*, and Rule 207(D.9), *Power Plants*, for procedures regarding CEC projects.

Except for those federal regulations already delegated to the APCD, no other federal regulations are expected to be applicable, mainly because the project will be below the Prevention of Significant Deterioration (PSD) thresholds.

Obsidian is proposing to follow the expedited 6-month siting process issued under the CEC regulations. The purpose of these regulations is to certify as expeditiously as possible, environmentally acceptable sites that demonstrate superiority with respect to environmental protection or efficiency in performance. Geothermal production of electricity has been shown to be an environmentally preferred process and Obsidian intends to demonstrate these aspects.

2.0 PROPOSED PROJECT

2.1 PROJECT LOCATION

The Salton Sea 6 project site is located approximately seven miles northwest of Calipatria, California (Refer to Figure 1). The UTM coordinates of the site are 628000 meters Easting and 3670500 meters Northing (Zone 11). The site elevation is approximately 228 feet below mean sea level. The site is within the Salton Sea Known Geothermal Resource Area (KGRA). The Salton Sea KGRA has been evaluated for full development (1,400 MW) under a Master Environmental Impact Report (MEIR) (December 1981), by the County of Imperial. Since then a total of nine facilities, all owned and operated by CalEnergy, Inc. (CalEnergy) have been constructed, generating approximately 340 MW of electricity. The site is located in the middle of the existing CalEnergy facilities. Land use of the proposed site and surrounding area include:

- The proposed facility will be located near the Salton Sea and Obsidian Butte on land used for agriculture.
- The proposed facility will be located near the Sonny Bono National Wildlife Refuge.
- Existing Geothermal Power Production Units 1 through 5 are located to the southwest of the proposed facility.
- Existing Geothermal Power Production Units Vulcan, Hoch, Elmore and Leathers are located to the east of the proposed facility.
- In addition to existing geothermal activities, the surrounding area is used for agricultural or wildlife management activities.

2.2 DESCRIPTION OF THE PROPOSED PROJECT

The Salton Sea 6 project consists of three major components:

- Well fields, including production and injection wells and associated pipelines.
- Power plant.
- Transmission lines.

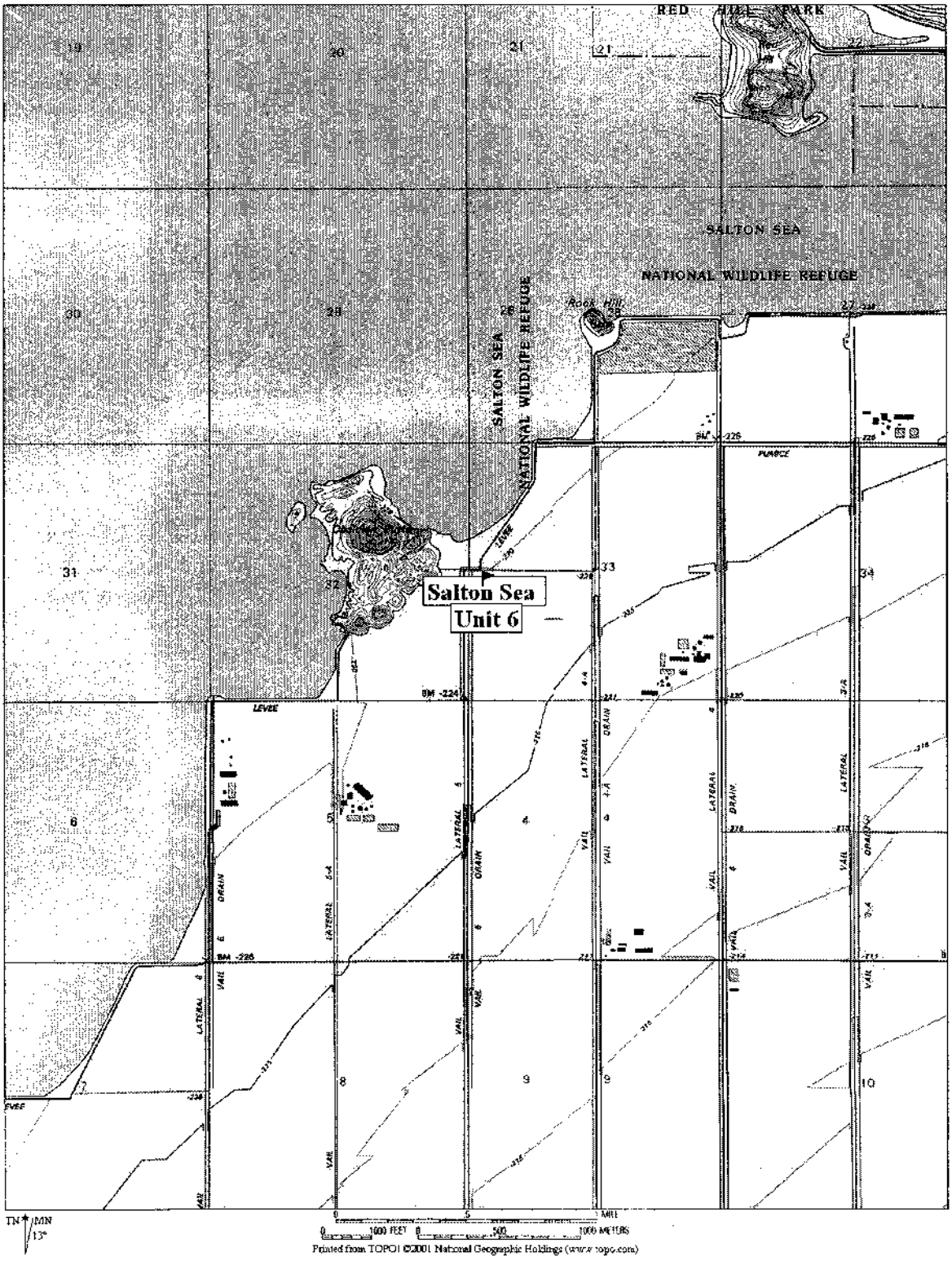


Figure 1: Topographic Map of Salton Sea 6 Project Site

2.2.1 Well Field and Pipelines

Obsidian is proposing the development of eight well pads to support the project. Five of the pads would be used for production. The five pads would contain a total of ten production wells, north and west of the power plant site/location. Seven injection wells would be located on three pads, to the southeast and south. Two additional injection wells would be located at the plant site. Drilling contractors, with equipment permitted under the County or the State Portable Source Program, are anticipated to be used to drill and develop the wells. Drawing 1 shows the location of the proposed well pads, the wells, and the pipeline routing to the power plant.

2.2.2 Power Plant

The Salton Sea KGRA contains hot liquids from deep below the earth's surface that are very high in dissolved salts. The proposed brine handling facilities separate the heat (steam) from the liquids while controlling the precipitation of dissolved salts into an amorphous silica filter cake. Refer to Drawing 1 for the location of the brine handling and electrical generating facilities. The steam is used to generate electricity. Solid material is removed from the spent brine prior to reinjection of the brine into wells designed to recycle the brine and replenish the geothermal resource. Filter cake is produced as a result of the separation of the solid material from the brine. The filter cake is tested and disposed of at an appropriate landfill in accordance with applicable requirements based on its regulatory classification. Non-hazardous filter cake is disposed of at a licensed Class II landfill operated by an affiliate of CalEnergy.

The steam is sent to a condensing geothermal steam turbine that powers an electrical generator. These facilities are expected to operate at base load. The steam becomes a condensate through this process and is pumped to a wet cooling tower for cooling. The cooled condensate is pumped back to the condenser to complete the power generation cycle. Noncondensible (NC) gases, which average approximately 0.3 percent of the total brine stream, are collected in the condenser. These NC gases are mostly carbon dioxide gas. The NC gases are continuously purged from the system and routed first to a LO-CAT System for the control of hydrogen sulfide and then to a newly proposed carbon filter system for the control of benzene. The cleaned NC gases are then sent to the top of the cooling tower for dispersion to the atmosphere. The LO-CAT System is an established

control technology with the ability to control hydrogen sulfide (H2S) emissions by over 99.5 percent. CalEnergy has had experience with the LO-CAT System at the Coso Geothermal Facilities (formerly owned by CalEnergy). The carbon filter system is a newly developed technology that is being proposed for this project to control benzene emissions. The viability of this system has been assessed through a pilot plant study.

2.2.3 Transmission Lines

An electrical transmission line will connect the power plant to the Imperial Irrigation District (IID) electrical grid. The electrical transmission line will be operated and owned by IID. The electricity will be sold to IID under a power purchase agreement.

3.0 REGULATORY SETTING

3.1 CEC REQUIREMENTS

The CEC requires that applicants prepare an Application for Certification (AFC) addressing all of the air quality items listed in *Appendix B: Information Requirements for an Application*. Due to the request for an expedited schedule, the air quality items listed in CCR, Title 20, Section 2022 will also be specifically addressed in the AFC.

3.2 APCD REQUIREMENTS

The APCD requires that applicants undergo a CEC permitting process following Rule 207(D.9), *Power Plant*. In general, the Air Pollution Control Officer, upon receipt of an Application for Certification, will notify appropriate parties and submit a report that specifies BACT for the proposed facility and states whether the facility can likely satisfy APCD regulations and under what conditions. Once the application is received, the Officer will conduct a compliance review to assure the application meets the requirements of the regulations. Certain deadlines are imposed once the application is accepted as complete. The Officer, if appropriate, will issue and submit a determination of compliance to the California Energy Commission and then a permit to operate with concurrence from the California Energy Commission.

The focus of this protocol is the proposed procedures required by Rule 207(F), *Air Quality Impact Analysis,* and also to meet the requirements of the CEC. The intent of the regulation is to determine the air quality impacts associated with constructing and operating a facility. If an analysis is required, then the models used must be the most recent versions or appropriate alternatives. The analysis must demonstrate that the facility can be constructed and operated without causing or making a violation worse, and that good engineering stack height rules apply.

3.3 EPA REQUIREMENTS

As noted earlier, the PSD requirements are not expected to be applicable to the Salton Sea 6 project. For this source to be defined a major source under the US EPA's PSD program, the potential to emit emissions of any criteria pollutant would need to equal or exceed 250 tons per year. The emissions anticipated are expected to be significantly below this threshold. Under Title I, Section 112 of the Clean Air Act, US EPA also regulates hazardous air pollutants (HAP). Geothermal power plants are not subject under this Title at this point because their expected HAP emissions are below threshold levels.

4.0 EXISTING ENVIRONMENT

4.1 AREA CLIMATE

The climate of Imperial County is a desert climate, characterized by low precipitation, hot summers, mild winters, low humidity and strong inversions. Local temperature and precipitation data from the nearest representative local cooperative station, Brawley 2 SW, over a 30-year record, 1961-1990, is used to define climatic normal, means and extremes. The hottest month, July, has an average maximum temperature of 106.5 °F, an average minimum temperature of 74.4 °F, and an average mean temperature of 90.5 °F. The coldest month, January, has an average maximum temperature of 69.3 °F, average minimum temperature of 38.7 °F, and average mean temperature of 54.0 °F. Annual average rainfall is 3.05 inches. The wettest month is December, averaging 0.41 inches; the driest month, June, averages 0.01 inches. Rainfall is highly variable with precipitation from a single heavy storm potentially exceeding the entire annual total rainfall during or following a drought year. Humidity levels have not been recorded at Brawley 2 SW. High winds are occasionally experienced in the Imperial Valley region. Monthly average wind speeds in the region range from 6.6 mph in October to 9.5 mph in July. On an annual basis, winds average 7.8 mph. Winds in the valley are primarily from west to east throughout the year, but have a secondary southeast component in the fall. These patterns are discussed more completely for the site in the following subsection. Solar isolation, again based on regional data, suggests that 90 percent of possible sunshine occurs in the region. The cloudiest periods occur in winter while the sunniest periods are in the summer.

The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over this area. The high-pressure ridge blocks out most mid-latitude storms except in winter when the high is weakest and the farthest south. The coastal mountains on the western edge of the Imperial Valley also have a major influence on climatic conditions by blocking the cool, damp marine air found in the California coastal environs. The flat terrain of the valley floor in the Salton Sea area and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection currents. The combination of subsiding air, protective mountains, and distance from the ocean all combine to

severely limit precipitation. The valley area experiences surface inversions almost every day of the year. Solar heating usually breaks these inversions. Strong, persistent subsidence inversions, caused by the presence of a Pacific high-pressure system, can persist for one or more days, causing air stagnation conditions.

4.2 METEOROLOGICAL DATA AND SITE REPRESENTATION

Meteorological data will be used in the application in two ways. First a long-term record of meteorological data defines the overall climate of a region. These data were discussed previously in Section 4.1. Second, hourly meteorological observations of certain parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. These data must meet criteria established by the US EPA and the following discussion details the proposed data and its applicability to this project.

There are several National Weather Bureau Army Navy sites (WBAN) in the general area of the proposed facility. The closest most representative station relative to the proposed site is the Imperial County Airport site. This WBAN site provides meteorological data that can be readily converted to a site dispersion database that is directly used by atmospheric dispersion models. Other WBAN sites with current data in this area include Palm Springs Thermal, Blythe Airport, Yuma, AZ Airport and the San Diego Airport. As illustrated on Figure 2, the Imperial County site is the closest to the proposed site in the central valley area between the Santa Rosa, Laguna and Chocolate Mountains and to the southeast of the Salton Sea. Clearly none of the other WBAN sites are as representative.

As discussed below, Obsidian proposes to use the five (5) years of meteorological data collected at the Imperial County Airport site approximately 25 miles south from the project site and believes use of this data would satisfy the definition of on-site data (See Figure 2). The Imperial County meteorological data was collected for the years 1995 to 1999. These data are the most recently available from recording stations in the general site vicinity.

Figure 2: Available Meteorological Monitoring Stations

Furthermore, there are no nearby (localized) terrain features between or surrounding the project site and the Imperial County Airport that would limit the use of the airport data set for the proposed project. The same large-scale geographic and topographic features that influence the Imperial County Airport site also influence the proposed project site. Five years of data are proposed to be used since the climatological records at the Airport have missing data. Where appropriate, data have been substituted for missing information based on US EPA accepted data processing procedures (US EPA, 1992)

The Imperial County Airport site is shown in Figure 2. A graphical wind rose was produced using the combined five years of meteorological data and is presented in Figure 3. Figures 4 through 7 provide the quarterly wind roses for the combined period. A five-year wind rose analysis will be provided in the application.

US EPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This requirement and US EPA's guidance on the use of on-site monitoring data are also outlined in the *On-Site Meteorological Program Guidance for Regulatory Modeling Applications* (US EPA, 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected.

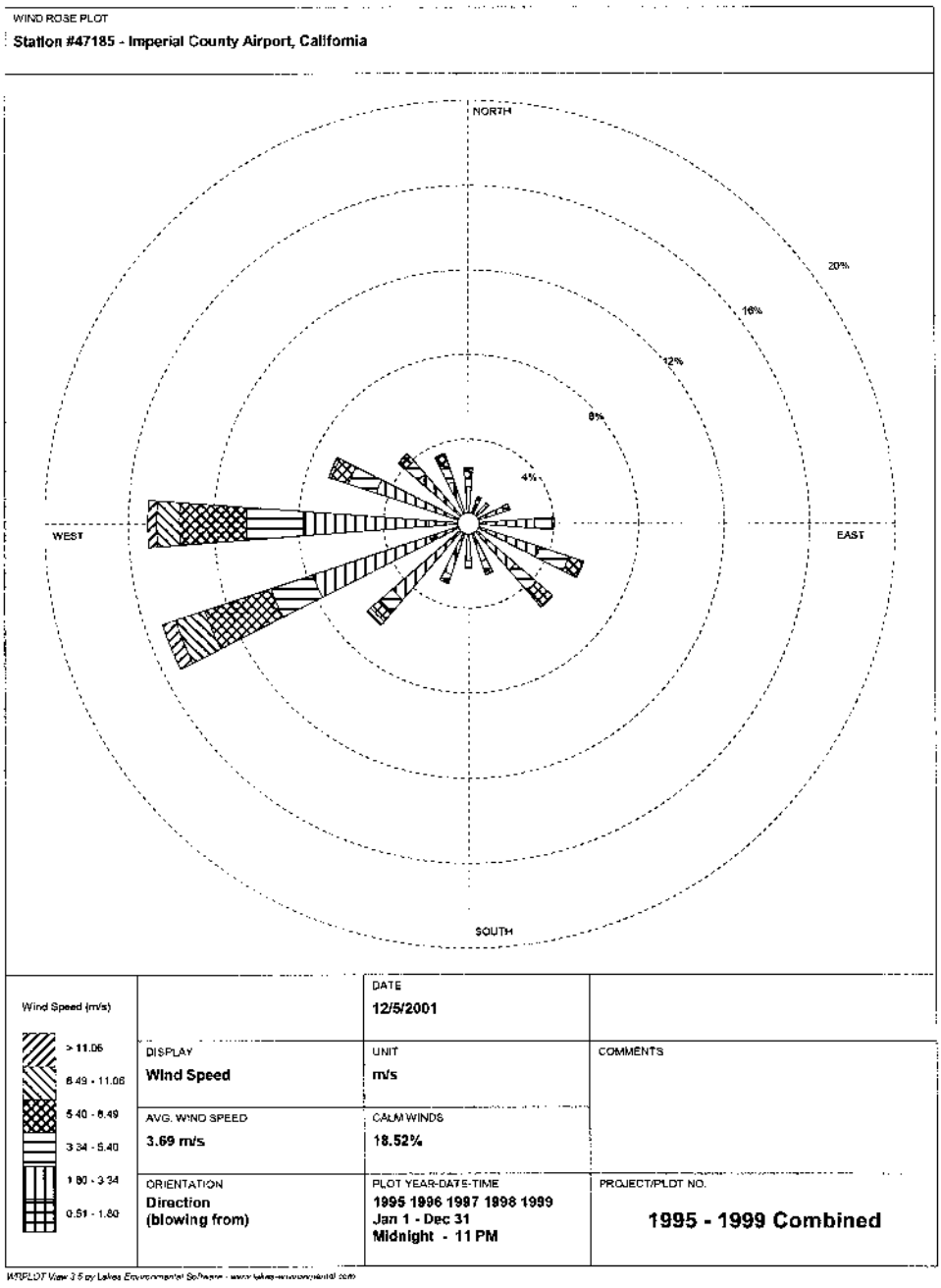


Figure 3: Annual Imperial County Airport Wind Rose for 1995-1999 Combined

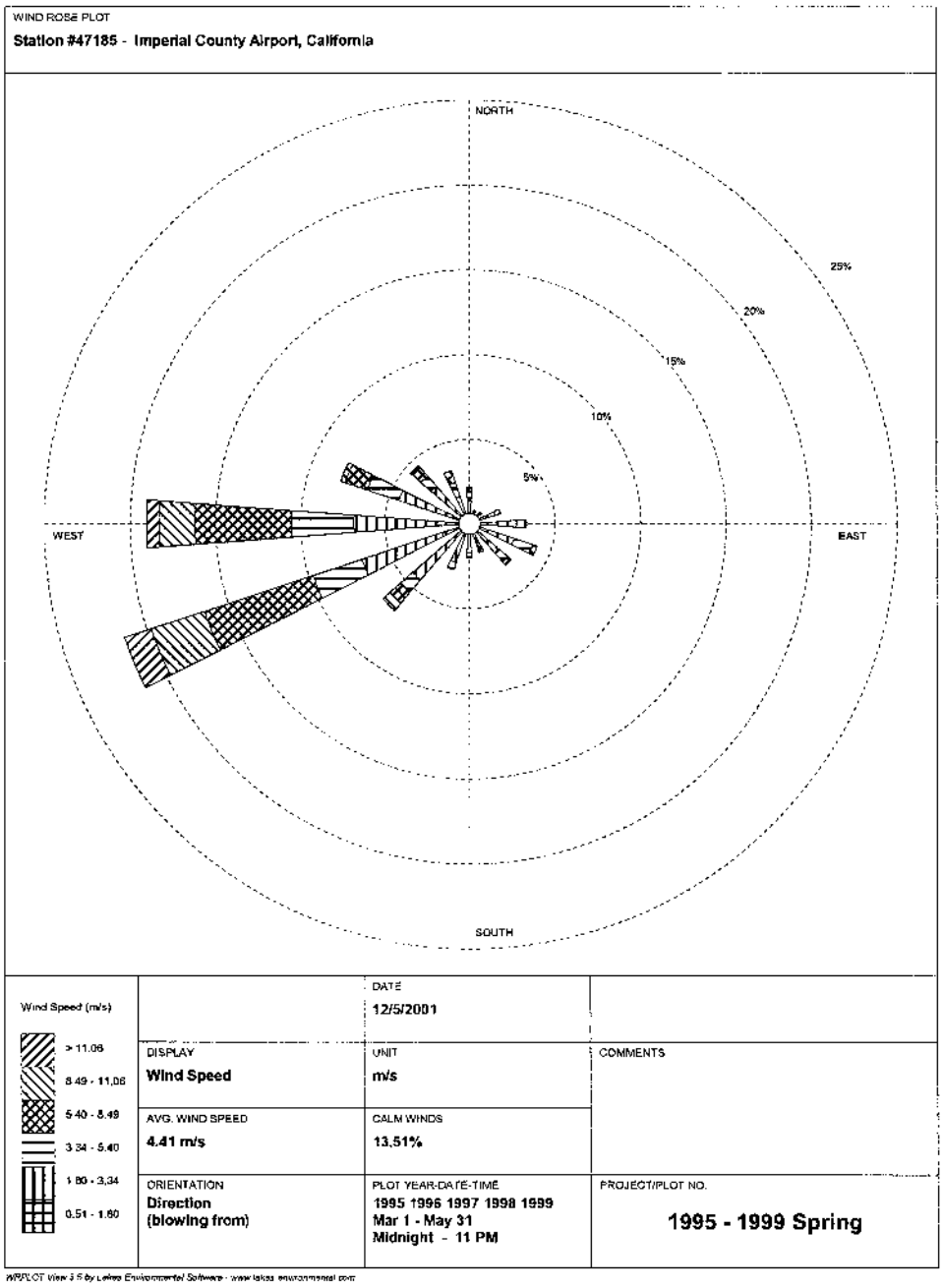


Figure 4: Annual Imperial County Airport Wind Rose for 1995-1999 Spring

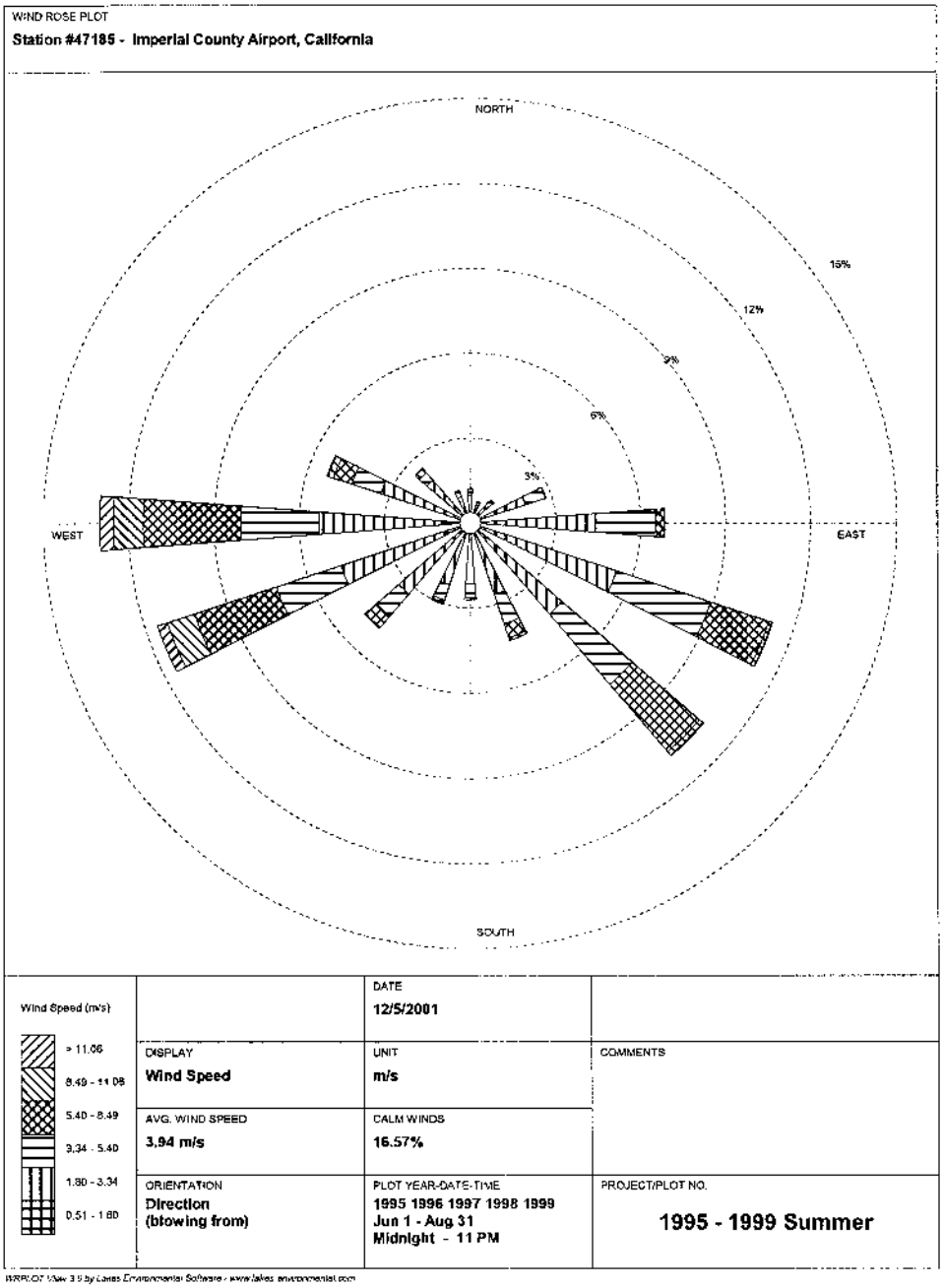


Figure 5: Annual Imperial County Airport Wind Rose for 1995-1999 Summer

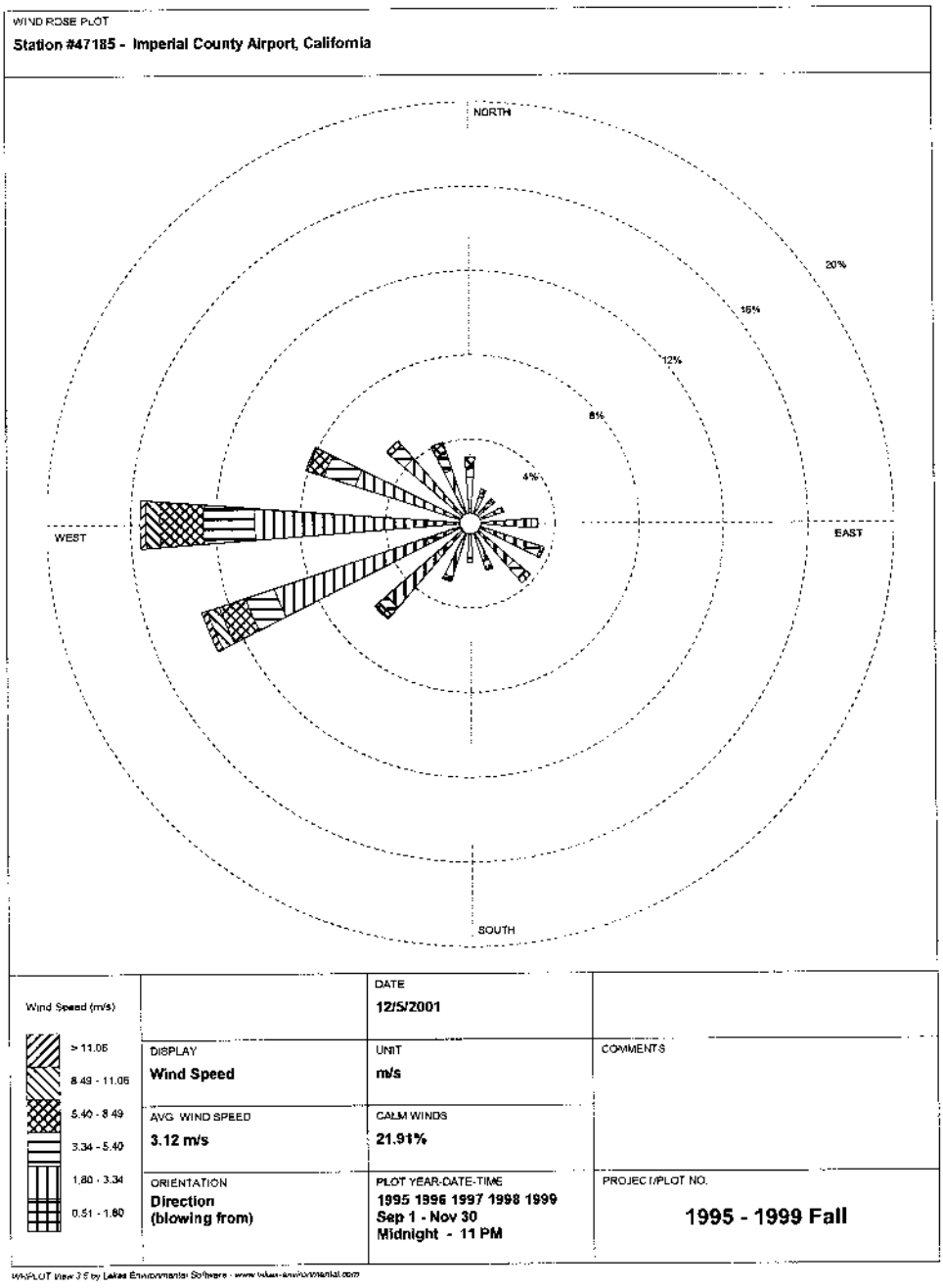


Figure 6: Annual Imperial County Airport Wind Rose for 1995-1999 Fall

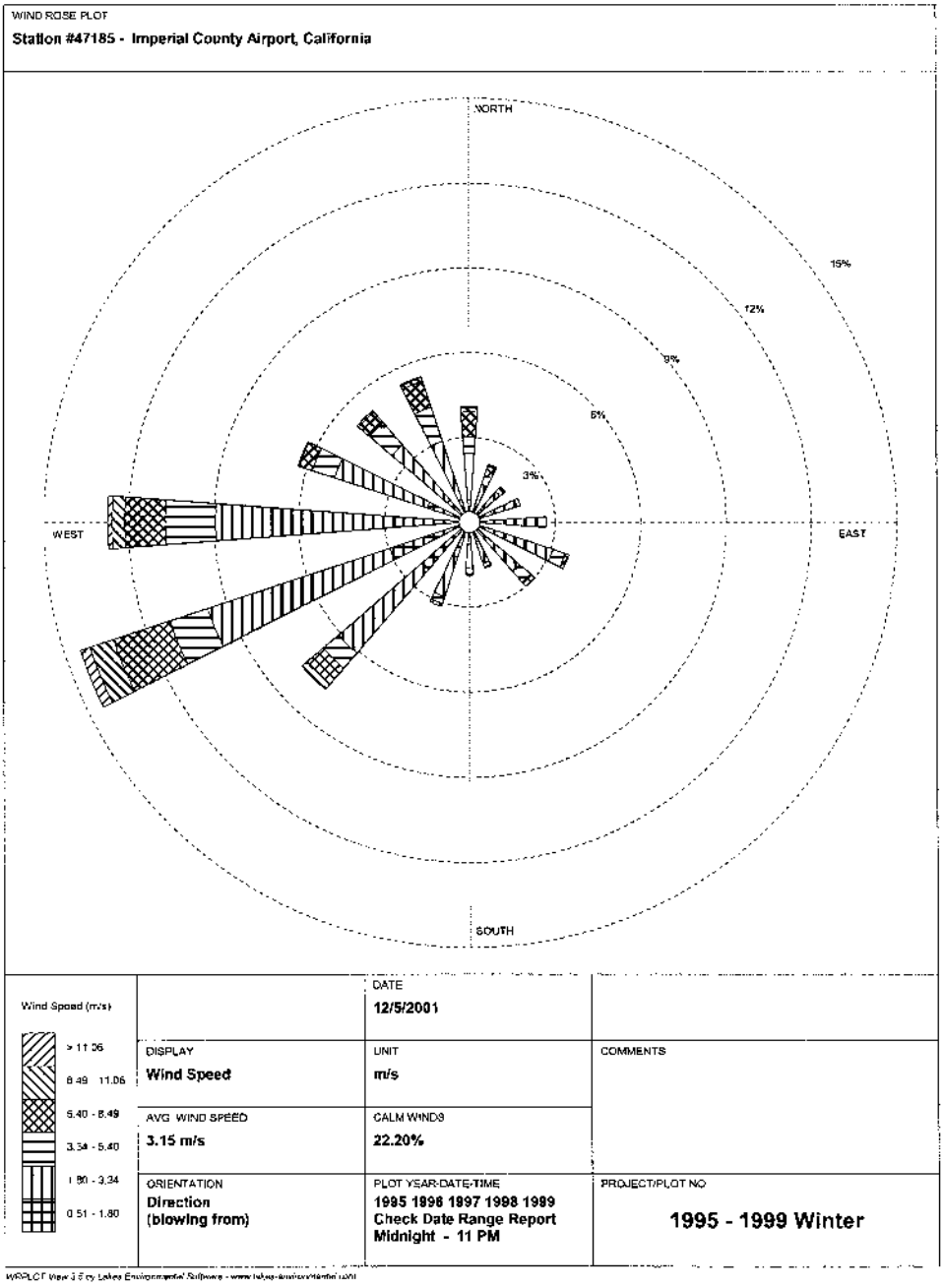


Figure 7: Annual Imperial County Airport Wind Rose for 1995-1999 Winter

Representativeness has been defined in the document "Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the Imperial County Airport and the project site location.

In determining the representativeness of the meteorological data set for use in the dispersion models at the project site, the following considerations were addressed:

- *Aspect ratio of terrain, which is the ratio of the height of terrain to the width of the terrain at its base* - The ratio of terrain heights to base widths is constant for the terrain surrounding the project site and the Imperial County Airport meteorological site.
- *Slope of terrain* - The slope of the terrain in the area of the project site is similar to the slope of terrain in the vicinity of the meteorological site. The surface roughness of the terrain in the area is also similar.
- *Ratio of terrain height to stack/plume height* - Since the terrain at the Imperial County Airport site and the project site are essentially flat and at elevations below mean sea level, terrain effects on plume dispersion would be similar at locations throughout the regional area, and the plume would disperse in an identical manner to the dispersion conditions monitored at the Imperial County Airport site.
- *Correlation of terrain features to prevailing meteorological conditions* - The orientation of terrain in the region, with respect to both the meteorological data and project sites is similar and correlates well with the prevailing wind field in the Imperial Valley Region. Thus, wind flow at the Imperial County Airport site would be similar to that at the project site. No local topographic features exist that would appreciably distort the local wind field. One feature, the Salton Sea, which is located next to the project site, will be accounted for with the use of shoreline fumigation dispersion modeling.

In summary, Obsidian believes that the meteorological data collected at Imperial County Airport

would accurately represent meteorological conditions at the project site. No terrain or other steering mechanisms exist that would have a significant affect on the meteorology at the project site. The surface roughness, height and length of the large-scale terrain features is consistent throughout the area, and plays a large role in the affect on the horizontal and vertical wind patterns. There is no slope aspect in the vicinity of the site that would reasonably affect the wind direction or speed. The mesoscale features at both the project site and the Imperial County Airport site are similar.

4.3 PREPARATION OF THE METEOROLOGICAL DATA SET

Obsidian proposes to use meteorological data collected at Imperial County Airport from 1995 to 1999 in the atmospheric dispersion modeling analyses. The data have been pre-processed for direct use in the Industrial Source Complex-Short-Term, Version 3 Model (ISCST3). Data processing has followed US EPA recommended procedures for substitution of missing data and calm hour processing (US EPA, 1992). Surface data were acquired from the nearest available representative surface weather station at Imperial, California, WBAN ID 03144. As recommended by the US EPA in the *Guideline on Air Quality Models* (GAQM, EPA, 2000), 5 years of meteorological data are used. National Climatic Data Center (NCDC) provided the data. Upper air data for the same time period were taken from the closest NWS representative upper station, Tucson, Arizona. As per NCDC recommendation, surface temperature data from the Palm Springs Thermal Airport monitoring site (WBAN 03104) located in Thermal, California was used in conjunction with the Tucson upper air data to calculate hourly mixing heights. For the Imperial County Airport the data recovery of one of the key parameters, cloud cover, was low for a significant period (7/01/96 – 8/27/96). Cloud cover is used to calculate atmospheric stability, which is an important parameter used by the air quality models for prediction of impacts based on the air pollution emission estimates associated with an existing or proposed facility. Although the annual data recovery value is slightly below the standard criteria of 90 percent, the use of 5 years in this case should provide more than adequate data for developing conservative plant impact evaluations.

The percent of valid data recovery for the necessary meteorological parameters for each year is listed in Table 4-1 below. Missing data were substituted per US EPA recommended procedures, as discussed in the US EPA memorandum, (Lee, R. & Atkinson, D., 1992). Periods with more than

one consecutive missing hour of wind speed or wind direction were set to calm/missing to ensure that worst case predicted impacts were resulting from actual rather than interpolated meteorological conditions. Missing upper air data for periods of one day were interpolated, while periods of more than one day were replaced with Holzworth seasonal averages for this area.

Table 4-1

Meteorological Record Percent Valid Data Recovery

Parameter	*1995*	*1996*	*1997*	*1998*	*1999*
Surface Data: Imperial County Airport					
Wind Speed	93*	96	89	88	91
Wind Direction	93	96	89	88	91
Temperature	99	99	99	99	99
Cloud Cover	99	84	99	99	99
Ceiling Height	99	99	99	99	99
Upper Air Data: Tucson, AZ					
Morning Data	88	81	80	84	74
Evening Data	52	49	43	60	65

*Values in percent

Notes: Seasonal Holzworth Mixing Height Data Used for Substitution of Missing / Data (in meters) are as follows.

Holzworth Mixing Height Data

	Winter	Spring	Summer	Fall
Morning Data	247	260	356	241
Evening Data	1424	2664	3110	2110

The surface data were acquired from NCDC in TD9956 format. This non-standard format is not readily usable by the air quality analysis programs. Therefore, the data sets were reformatted into the CD 144 data format, one of the formats which US EPA's meteorological preprocessor program PCRAMMET will accept. The PCRAMMET program from the US EPA SCRAM bulletin board was then used to process the data and merge the coincident mixing data into data files that can be input into the ISCST3 Air Quality Model.

As stated above, mixing heights from the upper air data recorded in Tucson, Arizona and Holzworth Seasonal Mixing Heights were incorporated into the data set. The Tucson site is considered the most representative for upper air data for the proposed plant site. The upper air data from the San Diego

and Flagstaff monitoring sites are considered less representative because of the Pacific Ocean shoreline location at San Diego and the more mountain like character of the Flagstaff site. Where data are unavailable (missing data), seasonal Holzworth mixing heights for this area were substituted, as per US EPA's recommendation, (GAQM, EPA 2000).

4.4 EXISTING AIR QUALITY DATA

Existing air quality data are available from several monitoring sites in the regional area and have been used to derive background levels for several pollutants. The maximum air quality values over the past 5 years of data available in Imperial County or the Salton Sea Basin are presented below in Table 4-2.

Table 4-2

Proposed Background Air Quality Data

Pollutant	Averaging Period	Year	Level	Location
Ozone	1-hour	1998	0.11 ppm	Niland
Ozone	8-hour	1998	0.10 ppm	Niland
PM10	24-hour	2000	214 ug/m3	Niland
PM10	AAM	2000	48.6 ug/m3	Niland
PM10	AGM	1997	42.1 ug/m3	Niland
Carbon Monoxide	1-hour	1996	12.0 ppm	El Centro
Carbon Monoxide	8-hour	1996	6.75 ppm	El Centro
Nitrogen Dioxide	1-hour	2000	0.124 ppm	Calexico - East
Nitrogen Dioxide	Annual	1999	0.013 ppm	Calexico - East
Sulfur Dioxide	1-hour	1996	0.036 ppm	Calexico - East
Sulfur Dioxide	3-hour	1997	0.026 ppm	Calexico - East
Sulfur Dioxide	24-hour	1997	0.015 ppm	Calexico - East
Sulfur Dioxide	Annual	1998	0.003 ppm	Calexico - East
Lead	Annual	1999	0.02 ug/m3	Calexico - Ethel St.
Hydrogen Sulfide	1-hour	----	24.6 ug/m3	Salton Sea Area

Notes:
AAM – Annual Arithmetic Mean
AGM – Annual Geometric Mean

Background hydrogen sulfide data are not available from the published information. Because Obsidian proposes to offset hydrogen sulfide emissions from the operations, for a "no net increase in emissions", the actual background concentration is not a necessary component in an air quality review. All except two of the Salton Sea facilities currently have hydrogen sulfide controls that normally control hydrogen sulfide emissions to non-detectable levels through the use of bioreactors. The APCD has recommended a background concentration of 24.6 $\mu g/m^3$ based on their assessment of the area.

The current air quality status of the County is listed below.

Pollutant	*CAAQS*	*NAAQS*
Carbon Monoxide	Unclassified/Attainment	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Hydrogen Sulfide	Unclassified/Attainment	---
Ozone	Non attainment	Non attainment
Sulfur Dioxide	Attainment	Attainment
Sulfates	Attainment	---
PM10	Non attainment	Non attainment*
Lead	Attainment	---

* Initially California was to attain PM10 standards in Imperial County by December 31, 1994. Not meeting the standard by that date would have forced US EPA to reclassify the area as a severe non-attainment area, except that California demonstrated to US EPA that the standards would have been met except for emissions emanating from outside the U.S. At the present, the area is officially still a moderate non-attainment area even with US EPA's finding of attainment. For US EPA to "reclassify Imperial County" as attainment, Imperial County must request reclassification to attainment.

5.0 PROPOSED MODELS AND ANALYTICAL APPROACH

This section describes the dispersion models and modeling techniques to be used in performing the air quality analysis for the Salton Sea 6 project. The models proposed for use are:

1. *Building Profile Input Program* (BPIP, Current Version 95086).
2. *Industrial Source Complex – Short Term* (ISCST3, Current Version 02035),
3. *CTSCREEN* (Current Version 94111),
4. *SCREEN3 (Shoreline Fumigation),*
5. *CALPUFF; and*
6. *Ozone Limiting Method* (ISC3_OLM Version 96.113)

These models, along with options for their use and how they will be used, are presented below. The model results will be used for the following:

- Comparison of impacts to significant impact levels,
- Compliance with California and Federal Ambient Air Quality Standards,
- Input data for health risk assessments,
- Assessment of impacts to soil and vegetation,
- Assessment of impacts to visibility, and
- Assessment of any cumulative impacts.

5.1 SCREENING MODELING

The facility is anticipated to be operated at base load, and therefore, an initial load screening analysis will not be conducted to identify which operating conditions cause worst-case ambient air impacts. As a result, the approach will be to provide refined modeling for plant operations. Certain screening analyses will be conducted as described below.

5.2 REFINED MODELING

The purpose of the refined modeling analysis is to demonstrate that air emissions from the Salton Sea 6 project will not cause or contribute to a NAAQS/CAAQS violation; will not cause a significant

health risk impact; and will not negatively impact visibility in a Class I Area under worst-case conditions. The most recent version of US EPA's Industrial Source Complex (ISCST3) Model (Version 02035) is proposed to be used to calculate the worst-case ambient air impacts. For the cooling tower assessment, two ambient operating conditions are proposed to be used to determine short-term worst-case air impacts. Short-term impact analysis would be based on worst-case short-term emissions and ambient conditions. Annual average conditions would be used to calculate the worst-case annual ambient air impact for the cooling tower. Concentrations for each pollutant would be expressed in terms of micrograms per cubic meter ($\mu g/m^3$). The emission rates calculated for each pollutant will be expressed in terms of grams per second (g/s) The Ozone Limiting Method will be used in assessing the 1-hour NO2 impact concentrations following the guidance of the OLM/ARM Work Group (OLM, 1997). The SCREEN3 model will be used to evaluate fumigation impacts following the methodology in US EPA 454/R-92-019, *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised.* Fumigation impact analysis will be limited to evaluating the impacts of the proposed facility during shoreline fumigation events.

A good engineering practice (GEP) stack height analysis will be performed for each emission point with a stack. It is assumed that no stack will be of sufficient height to equal or exceed GEP, thus, the Building Profile Input Program (BPIP) will be used with specific building dimensions to define building downwash effects.

Impacts will be calculated in intermediate and complex terrain using ISCST3. The CTSCREEN model may be used if the modeling with ISCST3 shows potential exceedances of the significance impact levels or the CAAQS/NAAQS occurring in the intermediate or complex terrain. .

A screening mode of the CALPUFF modeling system will be used to estimate potential impacts in the nearby Class I Areas. The modeling analysis will focus on the potential visibility impacts on protected areas.

5.2.1 Receptor Grids

The following receptor grid spacing is proposed for the project:

Along fence line:	30 meter spacing
From fence line to 0.5 km (downwash):	30 meter spacing
From 0.5 km to 1 km:	100 meter spacing
From 1 km to 10 km:	250 meter spacing

For any maximum impacts occurring outside of the 0.5 km radius, a 30-meter grid extending 1,000 meters around the point will be prepared. Digital Elevation Model (DEM) data will be used to define the receptor elevations, where appropriate. There are several areas of complex terrain in the site surroundings. Most elevations out to 10 kilometers will be derived directly from the DEM files. The DEM files currently available from the United States Geological Survey (USGS) for the area have not been updated for some time. Since the initial DEM files were compiled, agricultural and other man made activities have modified the topography in the area to accommodate irrigation systems. The most recent USGS topographic maps of the area provide elevations that correspond to current conditions. Where there are differences of the DEM files to the most recent USGS topographical maps, the elevations of the area of the project may be adjusted to reflect the USGS maps. Therefore, the available DEM file elevations may be manually edited to reflect current elevations in the areas surrounding the proposed project. Also, it is proposed that updated elevations for the Obsidian Butte be used in place of the historical DEM data and the USGS maps. Obsidian Butte has recently been used extensively as a source of stone, and significant elevation changes have occurred since the development of the DEM data and the most recent issue of the USGS maps. The updated elevations for Obsidian Butte have been supplied by a site survey performed by a California Registered Land Surveyor.

5.2.2 Model Options

The ISCST3 model allows the selection of a number of options that affect model output. The regulatory default options will be used, as listed below:

- Final plume rise
- Buoyancy-induced dispersion
- Stack tip downwash
- Rural dispersion coefficients (based on results of Auer procedure discussed below)

- Calms processing on (no calms)
- Default wind profile exponents (based on rural dispersion)
- Default vertical temperature gradients

An analysis was performed to determine whether to use rural or urban dispersion parameters for the modeling analysis for the proposed project. This analysis uses the procedures of Auer (1978) and includes drawing a 3 km radius around the project site. Within this region, land use is classified as either rural or urban. The rural land use classifications include the following:

- A1 – Metropolitan natural (golf courses, campuses, cemeteries, etc.)
- A2 – Agricultural rural
- A3 – Undeveloped, uncultivated wasteland
- A4 – Undeveloped rural
- A5 – Water surfaces (rivers, lakes, etc.)
- R1 – Common residential (single family)
- R4 – Estate residential (large homes)

Over 95 percent of the land use within 3 km of the project site is identified as rural. Therefore, rural dispersion coefficients will be used for the modeling analysis.

5.2.3 Building Wake Effects

The effect of building wakes (i.e., downwash) upon the stack plumes will be evaluated in accordance with US EPA guidance (US EPA, 1985). Direction-specific building data will be generated for stacks below GEP stack height. Appropriate information will be provided in the AFC and other permit applications that describe the input assumptions and output results from the BPIP model.

5.3 MODELING EMISSIONS INVENTORY

5.3.1 Project Sources – Operations

The proposed geothermal facility is designed as a base load plant. Geothermal plants operate at a design capacity or are offline. Operational emissions are anticipated from the following sources:

Cooling Towers:	PM_{10}, Lead, H2S, POC and HAP
Filter Cake Handling:	PM_{10}, Lead, POC and HAP

Operating and Maintenance Equipment:	PM_{10}, SO2, CO, NOx, and VOC
Fire Pump Engine:	PM_{10}, SO2, CO, NOx, and VOC
Emergency Power Generator:	PM_{10}, SO2, CO, NOx, and VOC

Hazardous Air Pollutants (HAP) includes: Antimony, Arsenic, Arsine, Benzene, Beryllium, Cadmium, Chromium, Cobalt, Ethylbenzene, Manganese, Mercury, Nickel, Radium 226, Radium 228, Radon, Selenium, Toluene, and Xylenes. POC means pollutants of concern and includes: Ammonia, Boron, Copper, and Zinc. These pollutants are included because of their potential environmental effects. Most often these sources will be modeled based on anticipated stack parameters and emissions as point sources and the remainder will be modeled as volume or area sources. Preliminary estimated emissions for the Salton Sea 6 project under normal operating conditions are expected to be below the following emissions rates:

NOx:	less than 10 tons/yr
CO:	less than 10 tons/yr
SO2:	less than 2 tons/yr
VOC:	less than 2 tons/yr
PM_{10}:	less than 20 tons/yr
H2S:	less than 18 tons/yr

Approximately 95 percent of the above PM_{10} emissions are from the cooling tower drift. Emissions from cooling towers are not usually counted in assessing regulatory thresholds. Even including these PM_{10} emissions, these rates suggest that the project will not require a Prevention of Significant Deterioration permit because the project is not a major source.

5.3.2 Project Sources –Startups

At times, an individual well will be taken off-line and another well will be added. Before the new well is combined with the others, it is flowed to operating temperatures. The air emissions are vented at the well test unit and include PM_{10}, Lead, H2S, HAP and POC. Emissions from this activity will be based on anticipated hours of operations for this activity.

Less frequently, the entire facility is taken off-line for maintenance or other reasons and later

restarted. These startup emissions are vented at the Emergency Relief Tanks (ERT). These emissions will also be based on the anticipated hours of operation for this activity and engineering design specifications.

5.3.3 Construction Sources

Prior to full facility operation, several construction activities are anticipated with corresponding air pollutant emissions. Construction of the proposed project will be divided into five main phases:

1. Site preparation and construction activities,
2. Well drilling,
3. Well testing,
4. Well reworking and
5. Commissioning.

5.3.3.1 Site Preparation and Construction Activities

Fugitive dust emissions from construction of the project can result from dust entrained during grading of the site; travel on paved and unpaved roads and across the site; soil loading and unloading operations; raw material transfers to and from material stockpiles; and wind erosion of areas being disturbed. Fugitive dust emissions will be calculated using the most appropriate US EPA AP-42 emission factors. Emissions will be modeled as an area source. Combustion emissions will be generated from the heavy equipment used for excavation, grading and construction of on-site structures, the water truck used for controlling dust emissions, miscellaneous diesel-fired equipment, and gasoline-fueled trucks to transport workers and materials. These emissions will be based on current off-road and mobile emission rates and modeled as four equivalent point sources.

5.3.3.2 Well Drilling

The diesel-fired well drilling equipment used by the drilling contractor will generate combustion emissions. This equipment will have state portable equipment air permits or APCD permits prior to use at a well pad. Four to six portable internal combustion engines rated between 400 to 600 brake horsepower are typically used for drilling wells in the Salton Sea area. These engines are equipped with turbochargers and aftercoolers. Emissions will be based on emissions information or data supplied by the manufacturers. These emissions will be modeled as an equivalent point source.

5.3.3.3 Well Testing

The test unit is used to flow test a well. A flow test usually runs for a short period. Air emissions during testing will be estimated at maximum throughput and load for the unit. These emissions will be modeled as a point source because of the short-term nature of this activity. It is expected that only one well will be tested at a time, however, a well may be tested more than once.

5.3.3.4 Well Reworking

During well reworking combustion emissions will be generated by the diesel-fired well drilling equipment used by the drilling contractor. This equipment will have state portable air permits or APCD permits prior to use at the well pad. Emissions from these units and the modeling approach are described above in Section 5.3.3.2.

5.3.3.5 Commissioning

The initial startup of the facility will be assessed and generally follow the emissions and conditions of an entire facility startup (refer to Section 5.3.2). These emissions will be based on engineering design specifications and the anticipated hours of operation for this activity. This period will be modeled based on anticipated stack parameters and emissions and the sources will be treated as point sources.

5.4 MODELING SCENARIOS

5.4.1 Compliance Review

The following activities will be reviewed separately for compliance with state and federal air quality standards:

Construction Activities	
Site preparation and construction activities:	Short term and annual
Well drilling:	Short term and annual
Well testing:	Short term (only)
Commissioning:	Short term (only)
Operations Activities	
Base load operations:	Short term and annual
Temporary Activities	
Plant startup operations:	Short term (only)
Well testing	Short term (only)
Well reworking	Short term (only)

The information developed in the above analyses for the noncriteria pollutants will be used as data input to assess the health risk impacts.

5.4.2 Other Assessments

For impacts to soils, vegetation and other biological resources, a review of the annual emissions of the base loaded operations will be conducted. For any potential cumulative assessment both short term and annual impacts will be addressed, under base loaded operations.

With regard to visibility, the nearest Class I Area, Joshua Tree National Park, is located 58 km from the project site, and the project would be subject to a standard visibility analysis if the project was defined as a major source under the PSD regulations. However, the project emissions are anticipated to be below the major source thresholds of 250 tons per year, so the use of the CALPUFF model in a screening mode is proposed. The CALPUFF modeling analysis will focus on the potential visibility impacts to protected areas in the vicinity of the project, especially Joshua Tree National Park managed by the National Park Service. The modeling will follow screening guidance as provided by the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary

Report. The modeling procedures will also incorporate comments provided by the Federal Land Managers' Air Quality Related Values workgroup (FLAG) Phase I Report (December 2000).

The screening mode of the CALPUFF modeling system requires hourly, single station meteorological data as input, both surface and upper air. Three years of surface data from Daggett/San Bernadino International Airport (1988-1990) are proposed in combination with representative upper air data as discussed previously. The surface data is in SAMSON format.

The PCRAMMET meteorological preprocessor, as recommended by the IWAQM Phase 2 Report, will be used to process the surface and upper air data. PCRAMMET requires complete data sets of the following variables: wind speed, wind direction, temperature, ceiling height, opaque cloud cover or total cloud cover, surface pressure, relative humidity, and precipitation type. The three years of upper air data include twice-daily mixing heights.

PCRAMMET will be run with the dry deposition options, as there is no precipitation data from the Daggett/San Bernadino station. As such, the following domain averaged variables will be required and will be based on values expected in the modeling region:

Minimum Obukhov length = 10 meters
Surface roughness length = 0.26 meters (at measurement and application site)
Noon time albedo = 0.33
Bowen ratio = 7.75 (desert dry conditions)
Fraction of net radiation absorbed by ground = 0.17
Anthropogenic heat flux = 10 W/m^2

CALPUFF also requires domain averaged background ozone (O_3) and ammonia (NH_3) concentrations for the Mesopuff II chemistry algorithm. For O_3, a default CALPUFF background value of 40 ppb will be used. For NH_3, a domain average value of 3.0 ppb will be selected and is based on guidance in the IWAQM Phase 2 Report for arid regions.

A CALPUFF control file will be generated that will include IWAQM recommended defaults for the

model options. This includes rural dispersion coefficients, default wind speed profile exponents, and default vertical potential temperature gradient. Model options will be listed in the CALPUFF model output, which will be included on a compact disk. A brief summary of the options proposed in the modeling analysis are listed below:

Number of X grid cells = 2
Number of Y grid cells = 2
Number of vertical layers = 2
Grid spacing = 210 km
Cell face heights = 0 and 5000 meters
Minimum mixing height = 50 meters
Maximum mixing height = 5000 meters (based on observational data)
Minimum wind speed allowed for non-calm conditions = 0.5 m/s
Vertical distribution used in the near field = Gaussian
Terrain adjustment method = partial plume path adjustment
No puff splitting allowed
Chemical mechanism = Mesopuff II
Dry removal modeled
Dispersion coefficients = PG dispersion coefficients
PG sigma-y and z not adjusted for roughness
Partial plume penetration of elevated inversion allowed
Lateral turbulence not used

The computational grid will extend 50 kilometers beyond the furthest receptor point.

Receptors will be placed in three polar receptor rings surrounding the proposed development. The radius is set equal to the distance from the source to Joshua Tree National Park. The receptors will be spaced at one-degree intervals (360 receptors per receptor ring). The closest receptor ring is placed at a distance where it extends through the portion of the Class I Area located closest to the proposed project. The middle receptor ring is placed at a distance where it extends through the central portion of the Class I Area. The farthest receptor ring is placed at a distance where it extends through the most distant portion of the Class I Area. A single elevation value is assigned to all receptors on a given ring. The selected elevation value will be based on the average elevation of the

arc length that extends into the Class I Area.

Following the IWAQM screening method, the maximum concentration for each pollutant, for each distance averaging time modeled will be selected for comparison with the appropriate AQRV.

6.0 MODELING RESULTS

6.1 AREA OF IMPACT ANALYSIS

Ground level concentrations caused by the project will be compared to ambient air quality impact significance levels defined by US EPA (Table 6-1). If maximum off-property pollutant concentrations for each pollutant are below these levels, then the project will not cause significant air quality impacts, thus it is proposed that no further modeling be conducted.

The maximum results from the AOI analysis will be presented in summary tables.

6.2 NAAQS AND CAAQS ANALYSIS

National Ambient Air Quality Standards/California Ambient Air Quality Standards analyses will be presented in a summary table. For CO, NOx, SO2, and PM_{10}, the highest short term and highest annual concentrations will be reported. For H2S, the maximum 1-hour concentration over the five years will be presented. Background concentrations will be added to yield the total concentration, which will then be compared to the NAAQS and CAAQS.

Table 6-1
Relevant Ambient Air Quality Standards and Significance Levels

Pollutant	Averaging Time	CAAQS [A]	NAAQS [B]	Ambient Impact Significance Levels ($\mu g/m^3$)	PSD Significant Emission Rates* (tpy)	PSD Increments* ($\mu g/m^3$)	
						Class I	Class II
Carbon Monoxide	8-hour	9.0 ppm (10,000 $\mu g/m^3$)	9.0 ppm (10,000 $\mu g/m^3$)	500 [C]	100		
	1-hour	20 ppm (23,000 $\mu g/m^3$)	35 ppm (40,000 $\mu g/m^3$)	2,000 [C]			
Nitrogen Dioxide [D]	Annual		0.053 ppm (100 $\mu g/m^3$)	1 [C]	40	2.5	25
	1-hour	0.25 ppm (470 $\mu g/m^3$)					
Sulfur Dioxide	Annual		0.03 ppm (80 $\mu g/m^3$)	1 [C]	40	2	20
	24-hour	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	5 [C]		5	91
	3-hour		0.5 ppm (1300 $\mu g/m^3$)	25 [C]		25	512
	1-hour	0.25 ppm (655 $\mu g/m^3$)					
PM10	Annual	30 $\mu g/m^3$ [E]	50 $\mu g/m^3$ [F]	1 [C]	15	4	17
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	5 [C]		8	30
Ozone	1-hour	0.09 ppm (180 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	See footnote [G]	40 (of VOCs)		
Hydrogen Sulfide	1-hour	0.03 ppm (42 $\mu g/m^3$)		0.0043 ppm [H] (6 $\mu g/m^3$)			

A California standards for ozone as volatile organic compounds, carbon monoxide, sulfur dioxide (1-hour), nitrogen dioxide, and PM10, are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.

B National standards, other than those for ozone and based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

C Based on US EPA Guidance

D Nitrogen dioxide (NO2) is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all oxides of nitrogen (NOx).

E Annual Geometric Mean

F Annual Arithmetic Mean

G Modeling is required for any net increase of 100 tons per year or more of VOCs subject to PSD.

H Refer to discussion below

* Provided for informational and comparative purposes only.

Blanks = Not applicable
CAAQS = California Ambient Air Quality Standard
NAAQS = National Ambient Air Quality Standard
µg/m3 = micrograms per cubic meter
mm = millimeters
ppm = parts per million by volume, or micromoles of pollutant per mole of gas
PM10 = particulate matter less than 10 micrometers in diameter
tpy = tons per year

An ambient impact significance level has not been developed for hydrogen sulfide by regulatory agencies. To provide a modeling review procedure similar to other pollutants, Obsidian proposes the use of 6 $\mu g/m^3$ as the 1-hour significance level. This level is based upon the World Health Organization odor threshold value of 7 $\mu g/m^3$ or 5 ppb for 30 minutes (WHO, 1981). A power law relationship referenced by Turner (1970) was used to calculate a 1-hour odor threshold value based upon the WHO level. The California Office of Environmental Health Hazard Assessment in 1999 formally adopted 30 ppb (42 $\mu g/m^3$) as the acute reference exposure level and adopted in 2000 a level of 8 ppb (10 $\mu g/m^3$) as the chronic reference exposure level. The proposed significance level is consistent with US EPA's approach with the other criteria pollutants.

6.3 HEALTH RISK DATA DEVELOPMENT

ISCST3 will be used to determine the potential offsite concentrations of constituents emitted by the Salton Sea 6 project with potential carcinogenic, chronic and acute effects. The ISCST3 modeling analysis will be consistent with the modeling approach discussed above for the NAAQS/CAAQS analysis with the exception that each source will be run with unit emissions. The ACE-2588 Model will use the output from the ISCST3 analysis to determine the following:

1. Define the location of the maximum exposed individual (MEI) (i.e., the location where the highest carcinogenic risk is predicted to occur);
2. Define the locations of the predicted maximum chronic non-carcinogenic health risk and the maximum acute health risk; and
3. Identify the highest predicted carcinogenic risk, chronic risk and acute risk at the nearest residence.

REFERENCES

Auer, Jr. A. H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, 17, pp 636-643.

GAQM EPA, 2000. Guideline on Air Quality Models, 2000, Appendix W of 40 CFR, Part 51.

Lee, Russell and Atkinson, Dennis, 1992. Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models, EPA 7/07/92. http//www.e

MEIR, 1981. Salton Sea Known Geothermal Resource Area (KGRA) Master Environmental Impact Report. December 1981.

Nappo, C. J., et al., 1982. Workshop on the Representativeness of Meteorological Observations. *Bull. Am. Met. Soc., Vol. 63, No. 7, pp 761-764.*

OLM, 1997. Use of the Ozone Limiting Method for Estimating Nitrogen Dioxide Concentrations (Draft). Prepared by the OLM/ARM Work Group as Draft for Comment by U.S. Environmental Protection Agency. November 4, 1997.

Turner, Bruce A., 1970. Workbook of Atmospheric Dispersion Estimates, US Department of Health Education and Welfare Public Health Services Publication No. 999-AP-26.

U.S. Environmental Protection Agency (US EPA), 1985. Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) - Revised. EPA-450/4-80-023R.

US EPA, 1987. On-Site Meteorological Program Guidance for Regulatory Modeling Applications, Publication No. EPA-450/4-87-013. U. S. Environmental Protection Agency, Research Triangle Park, N.C. (NTIS No. PB 87-227542).

US EPA, 1992. Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models. Dennis Atkinson and Russell F. Lee, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 7, 1992.

US EPA, 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019.

WHO, 1981. World Health Organization. Hydrogen Sulfide, Environmental Health Criteria, No. 19. Geneva, Switzerland.

ADDENDUM 1

Offset Identification and Cumulative Modeling Protocol

1. Offset Identification

Obsidian is proposing to use the hydrogen sulfide emissions from the J. M. Leathers Power Plant, owned and operated by CalEnergy, as a source of hydrogen sulfide offsets. The Leathers Power Plant has a permitted emission rate of 100 tons per year. Actual noncondensible hydrogen sulfide emissions for the last three years have averaged approximately 71.1 tons per year.

2. Cumulative Modeling Protocol

Only one facility/project has been identified (after consultation with the Imperial County Air Pollution Control District) as a source of cumulative impact. This project, CalEnergy's Mineral Recovery Facility, will emit PM_{10}, sulfuric acid mist and VOC. Utilizing the same modeling parameters used to assess the Salton Sea 6 Project, a cumulative review will be made of the Salton Sea 6 Project and the Mineral Recovery Facility for PM_{10} emissions.

Table G-17 SOURCE PARAMETERS

ALL SOURCES CONTINUOUS

SOURCE ID	SPLIT CONFIG UTM EAST	SPLIT CONFIG UTM NORTH	STACK HEIGHT (FT.)	STACK DIAMETER (FT.)	STACK TEMPERATURE (°F)	STACK VELOCITY (FPS)
CT A	627995	3670620	58	32	Varies	33
CT B	628006	3670608	58	32	Varies	33
CT C	628018	3670597	58	32	Varies	33
CT D	628030	3670585	58	32	Varies	33
CT E	628041	3670573	58	32	Varies	33
CT F	628053	3670562	58	32	Varies	33
CT G	628065	3670550	58	32	Varies	33
CT H	628077	3670539	58	32	Varies	33
CT I	628088	3670527	58	32	Varies	33
CT J	628099	3670515	58	32	Varies	33
CT K	628250	3670605	58	32	Varies	33
CT L	628263	3670594	58	32	Varies	33
CT M	628274	3670582	58	32	Varies	33
CT N	628285	3670571	58	32	Varies	33
CT O	628297	3670559	58	32	Varies	33
CT P	628309	3670547	58	32	Varies	33
CT Q	628321	3670536	58	32	Varies	33
CT R	628332	3670525	58	32	Varies	33
CT S	628344	3670513	58	32	Varies	33
CT T	628356	3670501	58	32	Varies	33
Dilution Water Heater 1	627858	3670778	45	8	213.1	Varies
Dilution Water Heater 2	627858	3670743	45	8	213.1	Varies

ALL SOURCES INTERMITTENT

SOURCE ID	UTM EAST	UTM NORTH	STACK HEIGHT (FT.)	STACK DIAMETER (FT.)	STACK TEMPERATURE (°F)	STACK VELOCITY (FPS)
480 V Diesel Generator	627827	3670540	40	0.67	793	128
4160 V Diesel Generator	627952	3670669	60	1.5	963	160
Diesel Fire Pump	627944	3670617	40	0.5	855	128
Well Test Unit (PTU)	628017	3670789	50	9	226.7	40
Vent Tank (LP)	628005	3670796	60	10	246	39.9
Vent Tank (SP)	628020	3670796	60	10	298	33.8
Vent Tank (HPW)	628035	3670796	60	10	322.2	39.2
Vent Tank (HPE)	628050	3670796	60	10	322.2	39.2
PTU (Well Flow Test Unit)	628081	3670789	50	9	226.7	48.7
BP inj	627680	3670811	37.92	6	226.7	48.7
Steam Blow (HP1)	627848	3670580	40	2.5	322	287
Steam Blow (HP2)	627850	3670580	40	2.5	322	287
Steam Blow (SP1)	627847	3670580	40	2.5	299	195
Steam Blow (SP2)	627851	3670580	40	2.5	299	195
Steam Blow (LP1)	627846	3670580	40	3	246	315.9
Steam Blow (LP2)	627852	3670580	40	3	246	315.9

Table G-17 SOURCE PARAMETERS (Continued)

EQUIPMENT

SOURCE ID	*UTM EAST*	*UTM NORTH*	*EQUIPMENT HEIGHT (FT.)*	*EQUIPMENT DIAMETER (FT.)*
SP Scrubber	627828	3670738	30	6
SP Scrubber	627828	3670725	30	6
LP Scrubber	627838	3670738	30	6
LP Scrubber	627838	3670725	30	6
LP Crystallizer	627840	3670773	55	17
LP Crystallizer	627840	3670749	55	17
LP Crystallizer	627840	3670713	55	17
LP Crystallizer	627840	3670689	55	17
HP Scrubber	627820	3670738	22	6
HP Scrubber	627820	3670725	22	6
AFT A	627858	3670773	60	17
AFT B	627858	3670748	60	17
AFT C	627858	3670713	60	17
AFT D	627858	3670689	60	17
SP Crystallizer	627828	3670773	55	17
SP Crystallizer	627828	3670749	55	17
SP Crystallizer	627828	3670713	55	17
SP Crystallizer	627828	3670689	55	17
Primary Clarifier	627888	3670762	34	130
Primary Clarifier	627888	3670701	34	130
Secondary Clarifier	627938	3670762	32	130
Secondary Clarifier	627938	3670701	32	130
Fire Water Tank	627938	3670610	40	36
Thickener	627870	3670800	10	35
Thickener	627956	3670800	10	35
High Pressure Demister	627839	3670626	22	6
High Pressure Demister	627859	3670626	22	6
Standard Pressure Demister	627839	3670608	30	6
Standard Pressure Demister	627859	3670608	30	6
Low Pressure Demister	627839	3670597	30	6
Low Pressure Demister	627859	3670597	30	6
HCl Tank	627972	3670806	12	8
Flocculant Tank	627972	3670794	12	8
Condensate Storage Tank	627873	3670631	24	26
Dilution Water Heater 1	627858	3670778	45	16
Dilution Water Heater 2	627858	3670743	45	16
Emergency Relief Tank A	627986	3670759	45	17
Emergency Relief Tank B	627986	3670751	45	17
Emergency Relief Tank C	627986	3670710	45	17
Emergency Relief Tank D	627986	3670702	45	17
Vent Tank (LP)	628005	3670796	30	16
Vent Tank (SP)	628020	3670796	30	16
Vent Tank (HPW)	628035	3670796	30	16
Vent Tank (HPE)	628050	3670796	30	16
PTU (Well Flow Test Unit)	628081	3670789	30	14.5

Table G-17 SOURCE PARAMETERS (Continued)

BUILDING LIKE EQUIPMENT

SOURCE ID	*UTM EAST*	*UTM NORTH*	*CORNER*	*BUILDING HEIGHT (FT.)*
HP Separator	627264	3670371	SW	22
(horizontal)	627801	3670771	NW	22
12X48 FEET	627801	3670775	NE	22
	627815	3670775	SE	22
HP Separator	627801	3670746	SW	22
(horizontal)	627801	3670750	NW	22
12X48 FEET	627815	3670750	NE	22
	627815	3670746	SE	22
HP Separator	627801	3670711	SW	22
(horizontal)	627801	3670715	NW	22
12X48 FEET	627815	3670715	NE	22
	627815	3670711	SE	22
HP Separator	627801	3670686	SW	22
(horizontal)	627801	3670690	NW	22
12X48 FEET	627815	3670690	NE	22
	627815	3670686	SE	22
Turbine Pedestal	627838	3670550	SW	30
100X190 FEET	627838	3670577	NW	30
	627915	3670577	NE	30
	627915	3670550	SE	30
H2S Abatement	628038	3670635	SW	35
60X60 FEET	628038	3670653	NW	35
	628056	3670653	NE	35
	628056	3670635	SE	35
Fire Water Pump House	627939	3670619	SW	12
20X30 FEET	627942	3670622	NW	12
	627949	3670616	NE	12
	627946	3670613	SE	12
Filter Press System	627887	3670810	SW	28
40X180 FEET	627887	3670792	NW	28
	627942	3670810	NE	28
	627942	3670792	SE	28

Table G-17 SOURCE PARAMETERS (Concluded)

BUILDINGS

BUILDING ID	*UTM EAST*	*UTM NORTH*	*CORNER*	*BUILDING HEIGHT (FT.)*
Control Building	627775	3670598	SW	16
	627775	3670641	NW	16
	627800	3670641	NE	16
	627800	3670598	SE	16
PDC (by Cooling Tower)	628270	3670621	SW	16
	628274	3670624	NW	16
	628280	3670619	NE	16
	628277	3670615	SE	16
PDC (by NCG skid)	627866	3670600	SW	16
	627866	3670609	NW	16
	627870	3670609	NE	16
	627870	3670600	SE	16
PDC (by Sub Station)	627842	3670537	SW	16
	627842	3670545	NW	16
	627858	3670545	NE	16
	627858	3670537	SE	16
PDC (by Clarifier)	627961	3670678	SW	16
	627961	3670687	NW	16
	627976	3670687	NE	16
	627976	3670678	SE	16
CT-6101A (excludes stacks)	627983	3670619	SW	44
	627995	3670632	NW	44
	628111	3670516	NE	44
	628099	3670503	SE	44
CT-6101B (excludes stacks)	628238	3670603	SW	44
	628251	3670618	NW	44
	628367	3670501	NE	44
	628355	3670489	SE	44
Benzene Abatement	628013	3670638	SW	20
	628013	3670653	NW	20
	628029	3670653	NE	20
	628029	3670638	SE	20
NCG (Ejector # 1) Skid	627874	3670583	SW	20
	627874	3670601	NW	20
	627912	3670601	NE	20
	627912	3670583	SE	20

SSU6 FENCELINE

CORNER ID	*UTM EAST*	*UTM NORTH*
SW	627630	3670455
NW	627631	3670890
NE	628404	3670890
SE	628403	3670454

- **All UTM coordinates are in meters**

Table G-17.1
STACK, BUILDING AND FENCELINE COORDINATES IN NAD83 AND NAD27

ALL SOURCES CONTINUOUS

SOURCE ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
CT A (OX)	627995	3670620	-228	628075	3670425	-230
CT B	628006	3670608	-228	628086	3670413	-230
CT C	628018	3670597	-228	628098	3670402	-230
CT D	628030	3670585	-228	628110	3670390	-230
CT E	628041	3670573	-228	628121	3670378	-230
CT F	628053	3670562	-228	628133	3670367	-230
CT G	628065	3670550	-228	628145	3670355	-230
CT H	628077	3670539	-228	628157	3670344	-230
CT I	628088	3670527	-228	628168	3670332	-230
CT J	628099	3670515	-228	628179	3670320	-230
CT K (OX)	628250	3670605	-228	628330	3670410	-230
CT L	628263	3670594	-228	628343	3670399	-230
CT M	628274	3670582	-228	628354	3670387	-230
CT N	628285	3670571	-228	628365	3670376	-230
CT O	628297	3670559	-228	628377	3670364	-230
CT P	628309	3670547	-228	628389	3670352	-230
CT Q	628321	3670536	-228	628401	3670341	-230
CT R	628332	3670525	-228	628412	3670330	-230
CT S	628344	3670513	-228	628424	3670318	-230
CT T	628356	3670501	-228	628436	3670306	-230
Dilution Water Heater 1	627858	3670778	-228	627938	3670583	-230
Dilution Water Heater 2	627858	3670743	-228	627938	3670548	-230

Table G-17.1
STACK, BUILDING AND FENCELINE COORDINATES IN NAD83 AND NAD27 (Continued)

ALL SOURCES INTERMITTENT

SOURCE ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
480 V Diesel Generator	627827	3670540	-228	627907	3670345	-230
4160 V Diesel Generator	627952	3670669	-228	628032	3670474	-230
Diesel Fire Pump	627944	3670617	-228	628024	3670422	-230
O & M Exhaust 1						
1	628003	3670841	-228	628083	3670646	-230
2	628048	3670848	-228	628128	3670653	-230
3	627959	3670833	-228	628039	3670638	-230
4	627915	3670825	-228	627994	3670630	-230
5	628092	3670856	-228	628172	3670661	-230
O & M Exhaust 2						
1	627774	3670810	-228	627854	3670615	-230
2	627774	3670723	-228	627854	3670528	-230
3	627775	3670636	-228	627855	3670441	-230
4	627775	3670549	-228	627855	3670354	-230
5	627880	3670810	-228	627960	3670615	-230
6	627880	3670724	-228	627960	3670529	-230
7	627882	3670637	-228	627962	3670442	-230
8	627882	3670551	-228	627962	3670356	-230
9	627986	3670811	-228	628066	3670616	-230
10	627986	3670725	-228	628066	3670530	-230
11	627988	3670638	-228	628068	3670443	-230
12	627988	3670552	-228	628068	3670357	-230
High Pressure Steam Blow 1	627848	3670580	-228	627928	3670385	-230
High Pressure Steam Blow 1	627850	3670580	-228	627930	3670385	-230
Standard Pressure Steam Blow 1	627847	3670580	-228	627927	3670385	-230
Standard Pressure Steam Blow 1	627851	3670580	-228	627931	3670385	-230
Low Pressure Steam Blow 1	627846	3670580	-228	627926	3670385	-230
Low Pressure Steam Blow 1	627852	3670580	-228	627932	3670385	-230
Well Drill 1	627012	3670933	-203	627092	3670738	-205
BP Injection Well	627680	3670811	-226	627760	3670616	-228
PAD R (OBI2) Injection Well	630021	3669976	-215	630101	3669781	-217
PAD P (OBI3) Injection Well	630021	3669345	-214	630101	3669150	-216
PAD O (OBI1) Injection Well	629189	3668550	-212	629269	3668355	-214
CT Injection Well	628375	3670811	-226	628455	3670616	-228
Filter Cake 1 12 x 35 ft	627894	3670825	-228	627974.31	3670630	-230
Filter Cake 2 12 x 35 ft	627934	3670825	-228	628013.38	3670629.5	-230
Sulfur Cake 12 x 35 ft	628046	3670663	-228	628125.81	3670468.25	-230
PTU	628081	3670789	-228	628161	3670594	-230
Truck Storage 260x37 m (Radon)	627965	3670835	-228	628045	3670640	-230
Vent Tank (LP)	628005	3670796	-228	628085	3670601	-230
Vent Tank (SP)	628020	3670796	-228	628100	3670601	-230
Vent Tank (HPW)	628035	3670796	-228	628115	3670601	-230
Vent Tank (HPE)	628050	3670796	-228	628130	3670601	-230

Table G-17.1
STACK, BUILDING AND FENCELINE COORDINATES IN NAD83 AND NAD27 (Continued)

EQUIPMENT

SOURCE ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
SP Scrubber 1	627828	3670738	-228	627908	3670543	-230
SP Scrubber 2	627828	3670725	-228	627908	3670530	-230
LP Scrubber 1	627838	3670738	-228	627918	3670543	-230
LP Scrubber 2	627838	3670725	-228	627918	3670530	-230
LP Crystallizer 1	627840	3670773	-228	627920	3670578	-230
LP Crystallizer 2	627840	3670749	-228	627920	3670554	-230
LP Crystallizer 3	627840	3670713	-228	627920	3670518	-230
LP Crystallizer 4	627840	3670689	-228	627920	3670494	-230
HP Scrubber 1	627820	3670738	-228	627900	3670543	-230
HP Scrubber 2	627820	3670725	-228	627900	3670530	-230
AFT A	627858	3670773	-228	627938	3670578	-230
AFT B	627858	3670748	-228	627938	3670553	-230
AFT C	627858	3670713	-228	627938	3670518	-230
AFT D	627858	3670689	-228	627938	3670494	-230
SP Crystallizer 1	627828	3670773	-228	627908	3670578	-230
SP Crystallizer 2	627828	3670749	-228	627908	3670554	-230
SP Crystallizer 3	627828	3670713	-228	627908	3670518	-230
SP Crystallizer 4	627828	3670689	-228	627908	3670494	-230
Primary Clarifier 1	627888	3670762	-228	627968	3670567	-230
Primary Clarifier 2	627888	3670701	-228	627968	3670506	-230
Secondary Clarifier 1	627938	3670762	-228	628018	3670567	-230
Secondary Clarifier 2	627938	3670701	-228	628018	3670506	-230
Fire Water Tank	627938	3670610	-228	628018	3670415	-230
Thickener	627870	3670800	-228	627950	3670605	-230
Thickener	627956	3670800	-228	628036	3670605	-230
High Pressure Demister	627839	3670626	-228	627919	3670431	-230
High Pressure Demister	627859	3670626	-228	627939	3670431	-230
Standard Pressure Demister	627839	3670608	-228	627919	3670413	-230
Standard Pressure Demister	627859	3670608	-228	627939	3670413	-230
Low Pressure Demister	627839	3670597	-228	627919	3670402	-230
Low Pressure Demister	627859	3670597	-228	627939	3670402	-230
HCl Tank	627972	3670806	-228	628052	3670611	-230
Flocculant Tank	627972	3670794	-228	628052	3670599	-230
Condensate Storage Tank	627873	3670631	-228	627953	3670436	-230
Dilution Water Heater 1	627858	3670778	-228	627938	3670583	-230
Dilution Water Heater 2	627858	3670743	-228	627938	3670548	-230
Emergency Relief Tank A	627986	3670759	-228	628066	3670564	-230
Emergency Relief Tank B	627986	3670751	-228	628066	3670556	-230
Emergency Relief Tank C	627986	3670710	-228	628066	3670515	-230
Emergency Relief Tank D	627986	3670702	-228	628066	3670507	-230
Vent Tank (LP)	628005	3670796	-228	628085	3670601	-230
Vent Tank (SP)	628020	3670796	-228	628100	3670601	-230
Vent Tank (HPW)	628035	3670796	-228	625115	3670601	-230
Vent Tank (HPE)	628050	3670796	-228	628130	3670601	-230
PTU (Well Flow Test Unit)	628081	3670789	-228	628161	3670594	-230

Table G-17.1
STACK, BUILDING AND FENCELINE COORDINATES IN NAD83 AND NAD27 (Continued)

BUILDING LIKE EQUIPMENT

SOURCE ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
HP Separator 1	627801	3670771	-228	627881	3670576	-230
(horizontal)	627801	3670775	-228	627881	3670580	-230
12X48 FEET	627815	3670775	-228	627895	3670580	-230
	627815	3670771	-228	627895	3670576	-230
HP Separator 2	627801	3670746	-228	627881	3670551	-230
(horizontal)	627801	3670750	-228	627881	3670555	-230
12X48 FEET	627815	3670750	-228	627895	3670555	-230
	627815	3670746	-228	627895	3670551	-230
HP Separator 3	627801	3670711	-228	627881	3670516	-230
(horizontal)	627801	3670715	-228	627881	3670520	-230
12X48 FEET	627815	3670715	-228	627895	3670520	-230
	627815	3670711	-228	627895	3670516	-230
HP Separator 4	627801	3670686	-228	627881	3670491	-230
(horizontal)	627801	3670690	-228	627881	3670495	-230
12X48 FEET	627815	3670690	-228	627895	3670495	-230
	627815	3670686	-228	627895	3670491	-230
Turbine Pedestal	627838	3670550	-228	627918	3670355	-230
100X190 FEET	627838	3670577	-228	627918	3670382	-230
	627915	3670577	-228	627995	3670382	-230
	627915	3670550	-228	627995	3670355	-230
H2S Abatement	628038	3670635	-228	628118	3670440	-230
60X60 FEET	628038	3670653	-228	628118	3670458	-230
	628056	3670653	-228	628136	3670458	-230
	628056	3670635	-228	628136	3670440	-230
Fire Water Pump House	627939	3670619	-228	628019	3670424	-230
20X30 FEET	627942	3670622	-228	628022	3670427	-230
	627949	3670616	-228	628029	3670421	-230
	627946	3670613	-228	628026	3670418	-230
Filter Press System	627887	3670810	-228	627967	3670615	-230
40X180 FEET	627887	3670792	-228	627967	3670597	-230
	627942	3670810	-228	628022	3670615	-230
	627942	3670792	-228	628022	3670597	-230

Table G-17.1
STACK, BUILDING AND FENCELINE COORDINATES IN NAD83 AND NAD27 (Concluded)

BUILDINGS

BUILDING ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
Control Building	627775	3670598	-228	627855	3670403	-230
	627775	3670641	-228	627855	3670446	-230
	627800	3670641	-228	627880	3670446	-230
	627800	3670598	-228	627880	3670403	-230
PDC (by Cooling Tower)	628270	3670621	-228	628350	3670426	-230
	628274	3670624	-228	628354	3670429	-230
	628280	3670619	-228	628360	3670424	-230
	628277	3670615	-228	628357	3670420	-230
PDC (by NCG skid)	627866	3670600	-228	627946	3670405	-230
	627866	3670609	-228	627946	3670414	-230
	627870	3670609	-228	627950	3670414	-230
	627870	3670600	-228	627950	3670405	-230
PDC (by Sub Station)	627842	3670537	-228	627922	3670342	-230
	627842	3670545	-228	627922	3670350	-230
	627858	3670545	-228	627938	3670350	-230
	627858	3670537	-228	627938	3670342	-230
PDC (by Clarifier)	627961	3670678	-228	628041	3670483	-230
	627961	3670687	-228	628041	3670492	-230
	627976	3670687	-228	628056	3670492	-230
	627976	3670678	-228	628056	3670483	-230
CT-6101A (excludes stacks)	627983	3670619	-228	628063	3670424	-230
	627995	3670632	-228	628075	3670437	-230
	628111	3670516	-228	628191	3670321	-230
	628099	3670503	-228	628179	3670308	-230
CT-6101B (excludes stacks)	628238	3670603	-228	628318	3670408	-230
	628251	3670618	-228	628331	3670423	-230
	628367	3670501	-228	628447	3670306	-230
	628355	3670489	-228	628435	3670294	-230
Benzene Abatement	628013	3670638	-228	628093	3670443	-230
	628013	3670653	-228	628093	3670458	-230
	628029	3670653	-228	628109	3670458	-230
	628029	3670638	-228	628109	3670443	-230
NCG (Ejector # 1) Skid	627874	3670583	-228	627954	3670388	-230
	627874	3670601	-228	627954	3670406	-230
	627912	3670601	-228	627992	3670406	-230
	627912	3670583	-228	627992	3670388	-230

SSU6 FENCELINE

CORNER ID	*NAD83*		*NAVD 88*	*NAD27*		*NGVD 29*
	Easting	*Northing*	*Elevation*	*Easting*	*Northing*	*Elevation*
SW	627630	3670455	-228	627710	3670260	-230
NW	627631	3670890	-228	627711	3670695	-230
NE	628404	3670890	-228	628484	3670695	-230
SE	628403	3670454	-228	628483	3670259	-230

- All UTM coordinates are in METERS.
- All elevations are in FEET.

TABLE G-18 CONSTRUCTION SCREENING REVIEW

Because of the size of the output files, a description of the runs/groupings is given. The output files can be found on the Modeling CD.
The following source and groups were reviewed with actual emissions.

For Particulate Matter- 24 Hour/Annual

Source #	*Source Group*	*Sources Included*	
1	Fugitive Dust		
2	Wind		
3	Combustion Exhaust		
	(4 identical sources)		
4	Wellpad I		
5	Wellpad N		
6	Wellpad J		
7	Wellpad C		
8	Wellpad L		
9	Wellpad R		
10	Wellpad P		
11	Wellpad O		
12	CT Well		
13	BP Well		
14	INJ BP		
15	INJ CT		
16	INJ O		
17	INJ P		
18	INJ R		
19	PTU		
20	Group 1	1-3,5,6,12	plus PTU
21	Group 1a	1-3,5,6,12	plus CT INJ
22	Group 1b	1-3,5,6,12	plus BP INJ
23	Group 2	1-3,6,12,13	plus PTU
24	Group 2a	1-3,6,12,13	plus CT INJ
25	Group 2b	1-3,6,12,13	plus BP INJ
26	Group 3	1-3,4,7,13	plus PTU
27	Group 3a	1-3,4,7,13	plus CT INJ
28	Group 3b	1-3,4,7,13	plus BP INJ
29	Group 4	1-3,4,6,13	plus PTU
30	Group 4a	1-3,4,6,13	plus CT INJ

For Particulate Matter- 24 Hour/Annual (Continued)

Source #	*Source Group*	*Sources Included*	
31	Group 4b	1-3,4,6,13	plus BP INJ
32	Group 5	1-3,7,8,13	plus PTU
33	Group 5a	1-3,7,8,13	plus CT INJ
34	Group 5b	1-3,7,8,13	plus BP INJ
35	Group 6	1-3,9,10,11	plus PTU
36	Group 6a	1-3,9,10,11	plus INJ O
37	Group 6b	1-3,9,10,11	plus INJ P
38	Group 6c	1-3,9,10,11	plus INJ R
39	Group 7	1-3,7,12,13	plus PTU
40	Group 7a	1-3,7,12,13	plus CT INJ
41	Group 7b	1-3,7,12,13	plus BP INJ
42	Group 8	1-3,5,6,13	plus PTU
43	Group 8a	1-3,5,6,13	plus CT INJ
44	Group 8b	1-3,5,6,13	plus BP INJ
45	Group 9	1-3,4,7,8	plus PTU
46	Group 9a	1-3,4,7,8	plus CT INJ
47	Group 9b	1-3,4,7,8	plus BP INJ
48	Group 10	1-6	plus PTU
49	Group 10a	1-6	plus CT INJ
50	Group 10b	1-6	plus BP INJ
51	Group 11	1-4,12,13	plus PTU
52	Group 11a	1-4,12,13	plus CT INJ
53	Group 11b	1-4,12,13	plus BP INJ
54	Group 12	1-3,6,7,13	plus PTU
55	Group 12a	1-3,6,7,13	plus CT INJ
56	Group 12b	1-3,6,7,13	plus BP INJ
57	All Fugitive Dust	1&2	
58	3 High Wells	4,7,8	
59	All Wells	4-13	
60	All Inj	12-18	
61	All Inj+PTU	12-19	

For NOx- 1 Hour

Source #	*Source Group*	*Sources Included*
1	Combustion Exhaust	
2	(4 identical sources)	
3	Wellpad I	
4	Wellpad N	
5	Wellpad J	
6	Wellpad C	
7	Wellpad L	
8	Wellpad R	
9	Wellpad P	
10	Wellpad O	
11	CT Well	
12	BP Well	
13	Group 1	3,5,6,12
14	Group 2	3,6,12,13
15	Group 3	3,4,7,13
16	Group 4	3,4,6,13
17	Group 5	3,7,8,13
18	Group 6	3,4,7,8

For H2S- 1 Hour

Source #	*Source Group*	*Sources Included*
1	INJ BP	
2	INJ CT	
3	INJ O	
4	INJ P	
5	INJ R	
6	PTU	

TABLE G-19 OPERATIONS SCREENING REVIEW

SCREEN3

Cooling Tower

Annual Average		input file					Impact
183 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	ug/m3
CT (1-20)	Point	1.00000	58	81.4	33.1	32	13.69
Annual Average		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
CT (1-20)	Point	1.00000	58	80.4	33.1	32	14.85
Winter		input file					
185 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
CT (1-20)	Point	1.00000	58	74.0	33.1	32	32.47
Winter		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	32.47
CT (1-20)	Point	1.00000	58	72.6	33.1	32	

DW Heaters

Annual Average		input file					Impact
183 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	ug/m3
DW Heater 1&2	Point	1.0	45	213.1	31.9	8	12.63
Annual Average		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
DW Heater 1&2	Point	1.06	45	213.1	30.5	8	14.06
Winter		input file					
185 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
DW Heater 1&2	Point	1.0	45	213.1	31.9	8	12.63
Winter		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
DW Heater 1&2	Point	1.07	45	213.1	30.2	8	14.37

Temporary

BYPASS-Cooling Tower

Annual Average		input file					Impact
183 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	ug/m3
CT (1-20)	Point	1.00000	58	73.4	33.1	32	32.47
Annual Average		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
CT (1-20)	Point	1.00000	58	72.8	33.1	32	32.47
Winter		input file					
185 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
CT (1-20)	Point	1.00000	58	64.7	33.1	32	32.48
Winter		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
CT (1-20)	Point	1.00000	58	63.7	33.1	32	32.48

BYPASS-Vent Tank LP

Annual Average		input file					Impact
183 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	ug/m3
Vent Tank LP	Point	1.0	60	246.1	81.4	10	2.008
Annual Average		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank LP	Point	0.98	60	246.1	77.3	10	2.084
Winter		input file					
185 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank LP	Point	1.0	60	246.1	81.4	10	2.008
Winter		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank LP	Point	0.975	60	246.1	76.4	10	2.104

BYPASS-Vent Tank SP

Annual Average		input file					Impact
183 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	ug/m3
Vent Tank SP	Point	1.0	60	298.9	68.9	10	2.067
Annual Average		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank SP	Point	0.957	60	298.9	65.5	10	2.09
Winter		input file					
185 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank SP	Point	1.0	60	298.9	68.9	10	2.067
Winter		input file					
175 MW		Rate gm/sec	height ft	temp F	velocity fps	diameter ft	
Vent Tank SP	Point	0.947	60	298.9	64.7	10	2.165

SCREENING REVIEW (CONTINUED)

COMMISSIONING

Scenario #1 ISC REVIEW with Actual Rates

VT LP		input file Rate gm/sec	height ft	temp F	velocity fps	diameter ft
VT LPA	Point	0.0371	60	246.1	5.7	10
VT LPB	Point	0.0743	60	246.1	11.4	10
VT LPC	Point	0.111	60	246.1	17.1	10
VT LPD	Point	0.149	60	246.1	22.8	10
VT LPE	Point	0.186	60	246.1	28.5	10
VT LPF	Point	0.223	60	246.1	34.2	10
VT LPG	Point	0.26	60	246.1	39.9	10
VT LPH	Point	0.297	60	246.1	45.6	10
VT LPI	Point	0.334	60	246.1	51.3	10
VT LPJ	Point	0.531	60	246.1	81.5	10
VT SP		input file Rate gm/sec	height ft	temp F	velocity fps	diameter ft
VT SPA	Point	0.119	60	298.9	4.8	10
VT SPB	Point	0.238	60	298.9	9.6	10
VT SPC	Point	0.358	60	298.9	14.5	10
VT SPD	Point	0.477	60	298.9	19.3	10
VT SPE	Point	0.596	60	298.9	24.1	10
VT SPF	Point	0.715	60	298.9	28.9	10
VT SPG	Point	0.834	60	298.9	33.8	10
VT SPH	Point	0.953	60	298.9	38.6	10
VT SPI	Point	1.07	60	298.9	43.4	10
VT SPJ	Point	1.7	60	298.9	68.9	10
VT HP		input file Rate gm/sec	height ft	temp F	velocity fps	diameter ft
VT HPA	Point	0.763	60	322.2	5.6	10
VT HPB	Point	1.53	60	322.2	11.2	10
VT HPC	Point	2.29	60	322.2	16.8	10
VT HPD	Point	3.05	60	322.2	22.4	10
VT HPE	Point	3.82	60	322.2	28	10
VT HPF	Point	4.58	60	322.2	33.6	10
VT HPG	Point	5.35	60	322.2	39.2	10
VT HPH	Point	6.11	60	322.2	44.8	10
VT HPI	Point	6.87	60	322.2	50.4	10
VT HPJ	Point	10.9	60	322.2	80	10

1 HOUR - VT LP

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvtlp95.USF	1-HR	VT(LP)A	4.90521	628300	3670720	95012511
	1-HR	VT(LP)B	1.52863	628484	3670695	95092816
	1-HR	VT(LP)C	1.51379	628180	3670870	95071016
	1-HR	VT(LP)D	1.62716	627130	3670930	95061217
	1-HR	VT(LP)E	1.63565	627130	3670930	95061217
	1-HR	VT(LP)F	1.60007	627100	3670990	95081516
	1-HR	VT(LP)G	1.56306	627100	3670990	95081516
	1-HR	VT(LP)H	1.51232	627100	3670990	95081516
	1-HR	VT(LP)I	1.47472	627100	3670990	95081516
	1-HR	VT(LP)J	1.39529	627130	3670960	95072914
screenvtlp96.USF	1-HR	VT(LP)A	4.70496	627100	3670900	96092501
	1-HR	VT(LP)B	1.68692	627753.75	3670746	96081422
	1-HR	VT(LP)C	1.78902	627753.75	3670746	96081422
	1-HR	VT(LP)D	1.64959	627753.75	3670746	96081422
	1-HR	VT(LP)E	1.46851	627100	3670990	96070917
	1-HR	VT(LP)F	1.51796	627100	3670990	96081423
	1-HR	VT(LP)G	1.58345	627100	3670990	96081423
	1-HR	VT(LP)H	1.6219	627100	3670990	96090919
	1-HR	VT(LP)I	1.68124	627100	3670990	96090919
	1-HR	VT(LP)J	1.74802	627100	3671000	96081422
screenvtlp97.USF	1-HR	VT(LP)A	4.5219	627100	3670960	97060801
	1-HR	VT(LP)B	1.58659	627786.06	3670853	97090113
	1-HR	VT(LP)C	1.57329	628484	3670695	97061310
	1-HR	VT(LP)D	1.61808	627100	3670900	97071716
	1-HR	VT(LP)E	1.6429	627100	3670900	97071716
	1-HR	VT(LP)F	1.60796	627130	3670930	97080823
	1-HR	VT(LP)G	1.68247	627130	3670930	97080823
	1-HR	VT(LP)H	1.7168	627100	3670930	97080823
	1-HR	VT(LP)I	1.71914	627100	3670930	97080823
	1-HR	VT(LP)J	1.59929	627070	3670930	97080823
screenvtlp98.USF	1-HR	VT(LP)A	4.83739	627100	3670960	98071606
	1-HR	VT(LP)B	1.57469	628484	3670695	98062516
	1-HR	VT(LP)C	1.5098	628484	3670695	98052615
	1-HR	VT(LP)D	1.4619	627753.75	3670746	98090314
	1-HR	VT(LP)E	1.40336	628484	3670695	98061612
	1-HR	VT(LP)F	1.37352	628484	3670695	98061612
	1-HR	VT(LP)G	1.33555	628484	3670695	98061612
	1-HR	VT(LP)H	1.3201	628480	3670840	98061614
	1-HR	VT(LP)I	1.30685	628630	3670960	98030614
	1-HR	VT(LP)J	1.43991	627130	3670960	98071813
screenvtlp99.USF	1-HR	VT(LP)A	4.83646	627130	3670930	99082001
	1-HR	VT(LP)B	1.83549	628540	3670750	99012510
	1-HR	VT(LP)C	1.59379	627786.06	3670853	99072111
	1-HR	VT(LP)D	1.4893	628484	3670695	99033020
	1-HR	VT(LP)E	1.43583	627100	3670990	99091713
	1-HR	VT(LP)F	1.49163	628484	3670695	99042813
	1-HR	VT(LP)G	1.52504	628484	3670695	99042813
	1-HR	VT(LP)H	1.55662	628484	3670695	99050317
	1-HR	VT(LP)I	1.56628	628484	3670695	99050317
	1-HR	VT(LP)J	1.33557	628630	3670720	99050317

SCREENING REVIEW (CONTINUED)

1 HOUR - VT SP

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvtsp95.USF	1-HR	VT(SP)A	4.6528	627100	3670930	95082423
	1-HR	VT(SP)B	4.89576	628484	3670695	95061515
	1-HR	VT(SP)C	4.84542	628484	3670695	95061515
	1-HR	VT(SP)D	4.94251	627130	3670930	95061217
	1-HR	VT(SP)E	4.94149	627130	3670930	95061217
	1-HR	VT(SP)F	4.81256	627100	3670990	95081516
	1-HR	VT(SP)G	4.75983	627100	3670990	95081516
	1-HR	VT(SP)H	4.61662	627100	3670990	95081516
	1-HR	VT(SP)I	4.39037	627100	3670990	95081516
	1-HR	VT(SP)J	4.07124	627100	3670990	95072914
screenvtsp96.USF	1-HR	VT(SP)A	4.70496	627130	3670930	96080302
	1-HR	VT(SP)B	5.12487	627753.75	3670746	96090919
	1-HR	VT(SP)C	5.322	627753.75	3670746	96081422
	1-HR	VT(SP)D	4.93411	627753.75	3670746	96081422
	1-HR	VT(SP)E	4.45703	627100	3670990	96070917
	1-HR	VT(SP)F	4.74034	627100	3670990	96081423
	1-HR	VT(SP)G	4.954	627100	3670990	96081423
	1-HR	VT(SP)H	5.06208	627100	3670990	96081423
	1-HR	VT(SP)I	5.12879	627100	3670990	96090919
	1-HR	VT(SP)J	5.29952	627100	3671000	96081422
screenvtsp97.USF	1-HR	VT(SP)A	4.77325	627130	3670930	97090922
	1-HR	VT(SP)B	4.94416	628484	3670695	97061310
	1-HR	VT(SP)C	5.12694	628484	3670695	97061310
	1-HR	VT(SP)D	4.9249	627130	3670930	97082615
	1-HR	VT(SP)E	4.94552	627130	3670930	97082615
	1-HR	VT(SP)F	5.13173	627130	3670930	97080823
	1-HR	VT(SP)G	5.36101	627130	3670930	97080823
	1-HR	VT(SP)H	5.47473	627130	3670930	97080823
	1-HR	VT(SP)I	5.4751	627130	3670930	97080823
	1-HR	VT(SP)J	4.80534	627100	3670930	97080823
screenvtsp98.USF	1-HR	VT(SP)A	4.71285	627100	3670930	98080123
	1-HR	VT(SP)B	5.0026	628484	3670695	98100314
	1-HR	VT(SP)C	4.74026	628484	3670695	98052615
	1-HR	VT(SP)D	4.5018	628484	3670695	98061612
	1-HR	VT(SP)E	4.58289	628484	3670695	98061612
	1-HR	VT(SP)F	4.40827	628484	3670695	98061612
	1-HR	VT(SP)G	4.28179	628484	3670695	98061612
	1-HR	VT(SP)H	4.28533	628600	3670930	98030614
	1-HR	VT(SP)I	4.27717	628600	3670930	98030614
	1-HR	VT(SP)J	4.19485	627130	3670960	98071813
screenvtsp99.USF	1-HR	VT(SP)A	4.64296	627130	3670930	99082305
	1-HR	VT(SP)B	5.84067	628540	3670750	99012510
	1-HR	VT(SP)C	5.0836	627786.06	3670853	99072711
	1-HR	VT(SP)D	4.72329	628484	3670695	99033020
	1-HR	VT(SP)E	4.66257	628484	3670695	99020914
	1-HR	VT(SP)F	4.87396	628484	3670695	99042813
	1-HR	VT(SP)G	4.94694	628484	3670695	99042813
	1-HR	VT(SP)H	5.04614	628484	3670695	99050317
	1-HR	VT(SP)I	5.05501	628484	3670695	99050317
	1-HR	VT(SP)J	4.38698	628660	3670720	99050317

1 HOUR - VT HP

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvthp95.USF	1-HR	A	50.49575	628484	3670695	95062910
	1-HR	B	54.17844	628484	3670695	95061515
	1-HR	C	49.2737	627130	3670960	95072916
	1-HR	D	49.5536	627130	3670930	95071113
	1-HR	E	47.10633	627100	3670990	95081516
	1-HR	F	46.83042	627100	3670990	95081516
	1-HR	G	44.76373	627100	3670990	95081516
	1-HR	H	41.75487	627100	3670990	95081516
	1-HR	I	40.98814	628690	3670870	95062913
	1-HR	J	40.83626	627100	3670990	95072914
	1-HR	VT(HP)A	25.1215	628600	3670930	95012608
	1-HR	VT(HP)B	26.82434	628484	3670695	95061515
	1-HR	VT(HP)C	24.8285	627130	3670960	95072916
	1-HR	VT(HP)D	24.89312	627130	3670930	95061217
	1-HR	VT(HP)E	23.91549	627100	3670990	95081516
	1-HR	VT(HP)F	23.74557	627100	3670990	95081516
	1-HR	VT(HP)G	22.66864	627100	3670990	95081516
	1-HR	VT(HP)H	21.11903	627100	3670990	95081516
	1-HR	VT(HP)I	20.54838	628690	3670870	95062913
	1-HR	VT(HP)J	20.53721	627100	3670990	95072914
	1-HR	VT(HP)A2	25.7087	628484	3670695	95062910
	1-HR	VT(HP)B2	27.3541	628484	3670695	95061515
	1-HR	VT(HP)C2	24.4452	627130	3670960	95072916
	1-HR	VT(HP)D2	24.71526	627130	3670930	95071113
	1-HR	VT(HP)E2	23.19084	627100	3670990	95081516
	1-HR	VT(HP)F2	23.08485	627100	3670990	95081516
	1-HR	VT(HP)G2	22.09509	627100	3670990	95081516
	1-HR	VT(HP)H2	20.69364	628660	3670840	95062913
	1-HR	VT(HP)I2	20.45319	628720	3670870	95062913
	1-HR	VT(HP)J2	20.29905	627100	3670990	95072914

SCREENING REVIEW (CONTINUED)

1 HOUR - VT HP

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvthp96.USF	1-HR	A	51.60023	628484	3670695	96081615
	1-HR	B	51.2796	628484	3670695	96081615
	1-HR	C	47.63381	628484	3670695	96080314
	1-HR	D	44.63514	627100	3670900	96071316
	1-HR	E	47.43029	627100	3670990	96081423
	1-HR	F	49.87397	627100	3670990	96081423
	1-HR	G	50.81731	627100	3670990	96081423
	1-HR	H	51.06084	627100	3671000	96090919
	1-HR	I	51.66936	627100	3671000	96090919
	1-HR	J	50.67075	627100	3671000	96081422
	1-HR	VT(HP)A	25.27594	628484	3670695	96081615
	1-HR	VT(HP)B	25.5959	628484	3670695	96081615
	1-HR	VT(HP)C	24.3684	627753.75	3670746	96081422
	1-HR	VT(HP)D	22.36586	627922.06	3671011.25	96070911
	1-HR	VT(HP)E	24.12781	627100	3670990	96081423
	1-HR	VT(HP)F	25.34672	627100	3670990	96081423
	1-HR	VT(HP)G	25.80137	627100	3670990	96081423
	1-HR	VT(HP)H	26.06993	627100	3671000	96090919
	1-HR	VT(HP)I	26.3933	627100	3670990	96090919
	1-HR	VT(HP)J	26.06827	627100	3671000	96081422
	1-HR	VT(HP)A2	26.32429	628484	3670695	96081615
	1-HR	VT(HP)B2	25.6837	628484	3670695	96081615
	1-HR	VT(HP)C2	24.19994	627752.06	3670786.75	96081422
	1-HR	VT(HP)D2	22.28347	627100	3670900	96071316
	1-HR	VT(HP)E2	23.30249	627100	3670990	96081423
	1-HR	VT(HP)F2	24.52725	627100	3670990	96081423
	1-HR	VT(HP)G2	25.01594	627100	3670990	96081423
	1-HR	VT(HP)H2	24.99092	627100	3671000	96090919
	1-HR	VT(HP)I2	25.30848	627100	3671000	96090919
	1-HR	VT(HP)J2	24.60248	627100	3671000	96081422
File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvthp97.USF	1-HR	A	54.79485	628420	3670870	97010308
	1-HR	B	54.11019	628484	3670695	97061310
	1-HR	C	49.94097	628484	3670695	97022714
	1-HR	D	50.45509	627130	3670930	97082615
	1-HR	E	53.27612	627130	3670930	97080823
	1-HR	F	55.96862	627130	3670930	97080823
	1-HR	G	56.95739	627130	3670930	97080823
	1-HR	H	56.4385	627130	3670930	97080823
	1-HR	I	54.90211	627130	3670930	97080823
	1-HR	J	46.85699	628720	3670660	97061311
	1-HR	VT(HP)A	28.64759	628420	3670870	97010308
	1-HR	VT(HP)B	27.1354	628484	3670695	97061310
	1-HR	VT(HP)C	24.95845	628484	3670695	97022714
	1-HR	VT(HP)D	25.29334	627130	3670930	97082615
	1-HR	VT(HP)E	26.75299	627130	3670930	97080823
	1-HR	VT(HP)F	28.07754	627130	3670930	97080823
	1-HR	VT(HP)G	28.54542	627130	3670930	97080823
	1-HR	VT(HP)H	28.25772	627130	3670930	97080823
	1-HR	VT(HP)I	27.46211	627130	3670930	97080823
	1-HR	VT(HP)J	23.45086	628720	3670660	97061311
	1-HR	VT(HP)A2	28.15133	628480	3670900	97010308
	1-HR	VT(HP)B2	27.11653	628484	3670695	97022714
	1-HR	VT(HP)C2	25.31954	628484	3670695	97021714
	1-HR	VT(HP)D2	25.16175	627130	3670930	97082615
	1-HR	VT(HP)E2	26.52312	627130	3670930	97080823
	1-HR	VT(HP)F2	27.89108	627130	3670930	97080823
	1-HR	VT(HP)G2	28.41197	627130	3670930	97080823
	1-HR	VT(HP)H2	28.18078	627130	3670930	97080823
	1-HR	VT(HP)I2	27.44001	627130	3670930	97080823
	1-HR	VT(HP)J2	23.43822	628750	3670660	97061311

SCREENING REVIEW (CONTINUED)

1 HOUR - VT HP

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvthp98.USF	1-HR	A	50.12984	628484	3670695	98062516
	1-HR	B	52.62331	628484	3670695	98060315
	1-HR	C	49.23608	628484	3670695	98061612
	1-HR	D	49.62241	628484	3670695	98061612
	1-HR	E	46.91661	628484	3670695	98061612
	1-HR	F	44.37337	628540	3670600	98061211
	1-HR	G	44.94582	628630	3670930	98030614
	1-HR	H	44.50115	628630	3670930	98030614
	1-HR	I	44.66568	628720	3670990	98030614
	1-HR	J	41.81871	627100	3670990	98071813
	1-HR	VT(HP)A	25.00551	628484	3670695	98062516
	1-HR	VT(HP)B	26.07423	628484	3670695	98060315
	1-HR	VT(HP)C	24.05178	628484	3670695	98061612
	1-HR	VT(HP)D	24.4765	628484	3670695	98061612
	1-HR	VT(HP)E	23.36647	628484	3670695	98061612
	1-HR	VT(HP)F	22.42244	628570	3670900	98030614
	1-HR	VT(HP)G	22.44941	628630	3670930	98030614
	1-HR	VT(HP)H	22.43418	628660	3670960	98030614
	1-HR	VT(HP)I	22.3522	628720	3670990	98030614
	1-HR	VT(HP)J	20.96576	627130	3670960	98071813
	1-HR	VT(HP)A2	25.12433	628484	3670695	98062516
	1-HR	VT(HP)B2	26.54908	628484	3670695	98060315
	1-HR	VT(HP)C2	25.18431	628484	3670695	98061612
	1-HR	VT(HP)D2	25.14591	628484	3670695	98061612
	1-HR	VT(HP)E2	23.55014	628484	3670695	98061612
	1-HR	VT(HP)F2	22.30305	628600	3670900	98030614
	1-HR	VT(HP)G2	22.49641	628630	3670930	98030614
	1-HR	VT(HP)H2	22.43759	628690	3670960	98030614
	1-HR	VT(HP)I2	22.31349	628720	3670990	98030614
	1-HR	VT(HP)J2	20.86706	627100	3670990	98071813

File	Average	Group	Conc.	East(X)	North(Y)	Time
screenvthp99.USF	1-HR	A	49.20969	628484	3670695	99062519
	1-HR	B	52.729	628484	3670695	99050815
	1-HR	C	53.35577	628484	3670695	99042816
	1-HR	D	49.00226	628484	3670695	99020914
	1-HR	E	50.76484	628484	3670695	99042813
	1-HR	F	51.00306	628484	3670695	99050317
	1-HR	G	51.12279	628484	3670695	99050317
	1-HR	H	49.91027	628484	3670695	99050317
	1-HR	I	47.8021	628484	3670695	99050317
	1-HR	J	45.09801	628690	3670720	99050317
	1-HR	VT(HP)A	24.55909	628484	3670695	99062519
	1-HR	VT(HP)B	26.59032	628484	3670695	99050815
	1-HR	VT(HP)C	25.99083	628484	3670695	99042816
	1-HR	VT(HP)D	24.47291	628484	3670695	99020914
	1-HR	VT(HP)E	25.52628	628484	3670695	99042813
	1-HR	VT(HP)F	25.80719	628484	3670695	99050317
	1-HR	VT(HP)G	26.00397	628484	3670695	99050317
	1-HR	VT(HP)H	25.52342	628484	3670695	99050317
	1-HR	VT(HP)I	24.5787	628484	3670695	99050317
	1-HR	VT(HP)J	22.58487	628690	3670720	99050317
	1-HR	VT(HP)A2	24.65059	628484	3670695	99062519
	1-HR	VT(HP)B2	26.6297	628484	3670695	99042815
	1-HR	VT(HP)C2	27.36495	628484	3670695	99042816
	1-HR	VT(HP)D2	24.5514	628484	3670695	99042816
	1-HR	VT(HP)E2	25.23856	628484	3670695	99042813
	1-HR	VT(HP)F2	25.19587	628484	3670695	99050317
	1-HR	VT(HP)G2	25.11882	628484	3670695	99050317
	1-HR	VT(HP)H2	24.38684	628484	3670695	99050317
	1-HR	VT(HP)I2	23.44855	628570	3670690	99050317
	1-HR	VT(HP)J2	22.55676	628720	3670720	99050317

TABLE G-20 FUMIGATION REVIEW

Operations

SCREEN3	**1 Hour**	**Input file:** **Output file:**						
Source ID	*Source Type*	*Emis. Rate (g/s)*	*Height (ft.)*	*Temp (° F)*	*Velocity (fps)*	*Diameter (ft.)*	*Pollutant ID*	*Inv Distance (m)*
CT Cell	Point	0.145 (a)	58	80.5	33	32	H2S	5224
DW Heater	Point	0.0495 (b)	45	213.1	30.6	8	H2S	3440
EG (480)	Point	0.612	40	793	128	0.67	NOX	N/A (c)
EG (4160)	Point	4.32	60	963	160	1.5	NOX	2708
Fire Pump	Point	0.459	40	855	128	0.5	NOX	N/A (c)

Source ID	*Pollutant ID*	*Model ID*		*Location of ISCST3 Values in SSU6 AFC*
		SCREEN3	*ISCST3*	
CT Cell	H2S	2.17	5.59	Table G-27, Appendix G.2
DW Heater	H2S	1.02	4.84	Table G-27, Appendix G.2
EG (480)	NOx	N/A	229.3	Table G-31, Appendix G.2
EG (4160)	NOx	61.4	198.1	Table G-31, Appendix G.2
Fire Pump	NOx	N/A	223	Table G-31, Appendix G.2

Notes:

ISCST3 concentrations taken from the listed tables

Concentrations are in micrograms per cubic meter.

(a) total modeled emissions for all cells are 0.372 g/sec

(b) total modeled emissions for both units are 0.099 g/sec

(c) less than 2000 meters, so SCREEN3 assumes no fumigation occurs

TABLE G-21 CONSTRUCTION PM10 IMPACTS

24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
PM10 short_95_OTHER.USF	24-HR	ALL	65.98926	628483.5	3670491.5	95122524
	24-HR	ALLEXHST	2.39338	627755.44	3670703.5	95011024
	24-HR	ALLWELLS	4.27179	628000	3669940	95061624
	24-HR	ALLFUGTV	61.69156	628483.69	3670549.75	95121024
	24-HR	WELLPADI	3.52275	627100	3670900	95010524
	24-HR	INJBP	41.48235	627160	3670930	95081124
	24-HR	FUGVDUST	44.86125	628335.31	3670695	95110224
	24-HR	WIND	22.96326	628483.88	3670666	95112224
	24-HR	WELLPADC	2.68532	627580	3670450	95081124
	24-HR	WELLPADL	4.27179	628000	3669940	95061624
PM10 short_96_OTHER.USF	24-HR	ALL	63.06124	628483.69	3670578.75	96110424
	24-HR	ALLEXHST	2.9576	627755.44	3670703.5	96081324
	24-HR	ALLWELLS	4.42529	627047	3670845	96083024
	24-HR	ALLFUGTV	57.55825	628483.62	3670520.5	96110424
	24-HR	WELLPADI	3.58572	627047	3670845	96083024
	24-HR	INJBP	36.89103	627130	3670990	96080124
	24-HR	FUGVDUST	43.39839	628304.62	3670259.25	96100824
	24-HR	WIND	18.76528	628483.81	3670607.75	96010624
	24-HR	WELLPADC	2.27939	627550	3670540	96071424
	24-HR	WELLPADL	4.18964	628030	3670000	96041724
PM10 short_97_OTHER.USF	24-HR	ALL	71.73156	628424.5	3670695	97110624
	24-HR	ALLEXHST	2.42447	628330	3670240	97022424
	24-HR	ALLWELLS	4.09538	627910	3669670	97022424
	24-HR	ALLFUGTV	70.20847	628424.5	3670695	97110624
	24-HR	WELLPADI	3.12123	627070	3670845	97040824
	24-HR	INJBP	33.2242	628420	3670840	97062324
	24-HR	FUGVDUST	55.64186	627710.5	3670492	97011024
	24-HR	WIND	22.34502	628483.69	3670549.75	97110424
	24-HR	WELLPADC	2.29901	627880	3670090	97022424
	24-HR	WELLPADL	4.07797	628030	3669970	97052424
PM10 short_98_OTHER.USF	24-HR	ALL	57.9473	628483.88	3670637	98111324
	24-HR	ALLEXHST	3.10599	627755.44	3670703.5	98022324
	24-HR	ALLWELLS	5.3282	627070	3670845	98082324
	24-HR	ALLFUGTV	55.43135	628483.88	3670637	98111324
	24-HR	WELLPADI	4.11693	626980	3670870	98071924
	24-HR	INJBP	39.82476	628484	3670695	98101524
	24-HR	FUGVDUST	40.34291	628483.88	3670637	98111324
	24-HR	WIND	20.7935	628483.69	3670578.75	98012324
	24-HR	WELLPADC	2.31071	627580	3670540	98071924
	24-HR	WELLPADL	4.65218	628120	3669940	98101524
PM10 short_99_OTHER.USF	24-HR	ALL	48.33649	628008.31	3670695	99011124
	24-HR	ALLEXHST	2.56144	627910	3670210	99021124
	24-HR	ALLWELLS	5.49055	628000	3669970	99033124
	24-HR	ALLFUGTV	47.74699	628305.62	3670695	99011824
	24-HR	WELLPADI	3.25974	626980	3670870	99070724
	24-HR	INJBP	39.96735	628240	3670810	99033124
	24-HR	FUGVDUST	41.02132	628305.62	3670695	99011824
	24-HR	WIND	18.53782	628483.69	3670578.75	99112524
	24-HR	WELLPADC	2.55348	627520	3670570	99072724
	24-HR	WELLPADL	5.49055	628000	3669970	99033124

Concentrations are in micrograms per cubic meter

TABLE G-21 CONSTRUCTION PM10 IMPACTS (Continued)

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
PM10 long_95_OTHER.USF	ANNUAL	ALL	14.94663	628483.62	3670520.5	1 YRS
	ANNUAL	ALLEXHST	0.22597	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.10444	628600	3671230	1 YRS
	ANNUAL	ALLFUGTV	14.64788	628483.62	3670520.5	1 YRS
	ANNUAL	INJWLS	0.04695	627100	3670900	1 YRS
	ANNUAL	PTU	0.28155	627100	3670900	1 YRS
	ANNUAL	FUGVDUST	9.07772	628483.5	3670491.5	1 YRS
	ANNUAL	WIND	5.64337	628483.69	3670549.75	1 YRS
PM10 long_96_OTHER.USF	ANNUAL	ALL	14.03075	628483.5	3670491.5	1 YRS
	ANNUAL	ALLEXHST	0.24296	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.10734	628600	3671230	1 YRS
	ANNUAL	ALLFUGTV	13.72818	628483.5	3670491.5	1 YRS
	ANNUAL	INJWLS	0.05368	627100	3670900	1 YRS
	ANNUAL	PTU	0.2969	629100	3670900	1 YRS
	ANNUAL	FUGVDUST	8.75419	628483.5	3670462.5	1 YRS
	ANNUAL	WIND	5.09796	628483.69	3670549.75	1 YRS
PM10 long_97_OTHER.USF	ANNUAL	ALL	14.15775	628483.5	3670491.5	1 YRS
	ANNUAL	ALLEXHST	0.22402	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.09004	628630	3671230	1 YRS
	ANNUAL	ALLFUGTV	13.86423	628483.5	3670491.5	1 YRS
	ANNUAL	INJWLS	0.05148	627100	3670900	1 YRS
	ANNUAL	PTU	0.29896	627100	3670900	1 YRS
	ANNUAL	FUGVDUST	8.65503	628483.5	3670462.5	1 YRS
	ANNUAL	WIND	5.31614	628483.69	3670549.75	1 YRS
PM10 long_98_OTHER.USF	ANNUAL	ALL	14.8399	628483.5	3670462.5	1 YRS
	ANNUAL	ALLEXHST	0.25119	628483.31	3670375.25	1 YRS
	ANNUAL	ALLWELLS	0.09727	628600	3671170	1 YRS
	ANNUAL	ALLFUGTV	14.49315	628483.5	3670462.5	1 YRS
	ANNUAL	INJWLS	0.04881	629000	3670700	1 YRS
	ANNUAL	PTU	0.32903	629000	3670700	1 YRS
	ANNUAL	FUGVDUST	9.04292	628483.38	3670433.5	1 YRS
	ANNUAL	WIND	5.52234	628483.62	3670520.5	1 YRS
PM10 long_99_OTHER.USF	ANNUAL	ALL	13.55963	628483.5	3670462.5	1 YRS
	ANNUAL	ALLEXHST	0.23699	628157	3670695	1 YRS
	ANNUAL	ALLWELLS	0.08937	628600	3671170	1 YRS
	ANNUAL	ALLFUGTV	13.26474	628483.5	3670462.5	1 YRS
	ANNUAL	INJWLS	0.05085	629000	3670700	1 YRS
	ANNUAL	PTU	0.3198	629000	3670700	1 YRS
	ANNUAL	FUGVDUST	7.73423	628483.38	3670433.5	1 YRS
	ANNUAL	WIND	5.59117	628483.62	3670520.5	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-22 COMMISSIONING PM10 24 HOUR IMPACTS

Scenario #1

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommPM10195.USF	24-HR	ALL	28.01028	627130	3670960	95081124
	24-HR	VTALL	0.96415	627130	3670960	95081124
	24-HR	VTHPALL	0.6481	627130	3670960	95081124
	24-HR	DWHALL	0.32977	627710.88	3670666	95081124
	24-HR	VT1LP	0.17831	627130	3670960	95081124
	24-HR	VT2SP	0.13775	627130	3670960	95081124
	24-HR	VT3HP1	0.32571	627130	3670960	95081124
	24-HR	VT4HP2	0.32238	627130	3670960	95081124
	24-HR	DWH1	0.19518	628127.19	3670695	95050524
	24-HR	DWH2	0.17449	627700	3670660	95081124
	24-HR	PTU	26.92851	627130	3670960	95081124
CommPM10196.USF	24-HR	ALL	25.50511	629000	3670900	96041024
	24-HR	VTALL	0.85463	629000	3670900	96041024
	24-HR	VTHPALL	0.5842	629000	3670900	96041024
	24-HR	DWHALL	0.43938	627755.44	3670703.5	96071424
	24-HR	VT1LP	0.14879	629000	3670900	96041024
	24-HR	VT2SP	0.12164	629000	3670900	96041024
	24-HR	VT3HP1	0.29291	629000	3670900	96041024
	24-HR	VT4HP2	0.29129	629000	3670900	96041024
	24-HR	DWH1	0.26089	627800.19	3670695	96071424
	24-HR	DWH2	0.22454	627755.44	3670703.5	96071424
	24-HR	PTU	24.58878	629000	3670900	96041024
CommPM10197.USF	24-HR	ALL	27.23647	629000	3670900	97062324
	24-HR	VTALL	0.82628	629100	3670800	97100724
	24-HR	VTHPALL	0.56615	629100	3670800	97100724
	24-HR	DWHALL	0.34344	628246.19	3670695	97052424
	24-HR	VT1LP	0.14541	629000	3670800	97100724
	24-HR	VT2SP	0.11828	629000	3670800	97100724
	24-HR	VT3HP1	0.28299	629100	3670800	97100724
	24-HR	VT4HP2	0.28316	629100	3670800	97100724
	24-HR	DWH1	0.21321	628216.38	3670695	97052424
	24-HR	DWH2	0.16504	628305.62	3670695	97052424
	24-HR	PTU	26.4374	629000	3670900	97062324
CommPM10198.USF	24-HR	ALL	29.15822	628999.69	3670691.25	98101524
	24-HR	VTALL	0.89568	629400	3670800	98101524
	24-HR	VTHPALL	0.60713	629400	3670800	98101524
	24-HR	DWHALL	0.34637	627829.88	3670695	98071924
	24-HR	VT1LP	0.15892	629300	3670800	98101524
	24-HR	VT2SP	0.12969	629400	3670800	98101524
	24-HR	VT3HP1	0.30389	629400	3670800	98101524
	24-HR	VT4HP2	0.30344	629500	3670800	98101524
	24-HR	DWH1	0.23624	627829.88	3670695	98071924
	24-HR	DWH2	0.16952	627800.19	3670695	98071924
	24-HR	PTU	28.31409	628999.69	3670691.25	98101524
CommPM10199.USF	24-HR	ALL	33.27938	629000	3670900	99033124
	24-HR	VTALL	1.11107	629000	3671000	99033124
	24-HR	VTHPALL	0.76366	629100	3671000	99033124
	24-HR	DWHALL	0.50087	627755.44	3670703.5	99070624
	24-HR	VT1LP	0.19273	629000	3671000	99033124
	24-HR	VT2SP	0.15833	629000	3671000	99033124
	24-HR	VT3HP1	0.38208	629000	3671000	99033124
	24-HR	VT4HP2	0.38307	629100	3671000	99033124
	24-HR	DWH1	0.28503	627800.19	3670695	99070624
	24-HR	DWH2	0.24192	627755.44	3670703.5	99070624
	24-HR	PTU	32.20156	629000	3670900	99033124

Concentrations are in micrograms per cubic meter

TABLE G-22 COMMISSIONING PM10 24 HOUR IMPACTS (Continued)

Scenario #2

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommPM10295.USF	24-HR	ALL	0.66365	627130	3670960	95081124
	24-HR	VTALL	0.59483	627130	3670960	95081124
	24-HR	VTHPALL	0.29788	627130	3670960	95081124
	24-HR	DWHALL	0.1661	628157	3670695	95050524
	24-HR	VT1LP	0.16943	627130	3670960	95081124
	24-HR	VT2SP	0.12752	627130	3670960	95081124
	24-HR	VT3HP1	0.1497	627130	3670960	95081124
	24-HR	VT4HP2	0.14818	627130	3670960	95081124
	24-HR	DWH1	0.11213	628127.19	3670695	95050524
	24-HR	DWH2	0.08798	627710.88	3670637	95081124
CommPM10296.USF	24-HR	ALL	0.5391	629000	3670900	96041024
	24-HR	VTALL	0.50165	629000	3670900	96041024
	24-HR	VTHPALL	0.2552	629000	3670900	96041024
	24-HR	DWHALL	0.22368	627755.44	3670703.5	96071424
	24-HR	VT1LP	0.13523	629000	3670900	96041024
	24-HR	VT2SP	0.11121	629000	3670900	96041024
	24-HR	VT3HP1	0.12818	629000	3670900	96041024
	24-HR	VT4HP2	0.12702	629000	3670900	96041024
	24-HR	DWH1	0.14088	628157	3670695	96041724
	24-HR	DWH2	0.11165	627755.44	3670703.5	96071424
CommPM10297.USF	24-HR	ALL	0.51938	629100	3670800	97100724
	24-HR	VTALL	0.48018	629100	3670800	97100724
	24-HR	VTHPALL	0.24457	629100	3670800	97100724
	24-HR	DWHALL	0.17486	628246.19	3670695	97052424
	24-HR	VT1LP	0.12901	629100	3670800	97100724
	24-HR	VT2SP	0.10661	629100	3670800	97100724
	24-HR	VT3HP1	0.12253	629100	3670800	97100724
	24-HR	VT4HP2	0.12204	629100	3670800	97100724
	24-HR	DWH1	0.10616	628216.38	3670695	97052424
	24-HR	DWH2	0.08665	628305.62	3670695	97052424
CommPM10298.USF	24-HR	ALL	0.55556	629500	3670800	98101524
	24-HR	VTALL	0.51567	629500	3670800	98101524
	24-HR	VTHPALL	0.26092	629000	3670900	98061624
	24-HR	DWHALL	0.18846	628157	3670695	98040624
	24-HR	VT1LP	0.14071	629400	3670800	98101524
	24-HR	VT2SP	0.11452	629400	3670800	98101524
	24-HR	VT3HP1	0.1306	629500	3670800	98101524
	24-HR	VT4HP2	0.1309	629000	3670900	98061624
	24-HR	DWH1	0.12582	628127.19	3670695	98040624
	24-HR	DWH2	0.08566	628186.69	3670695	98040624
CommPM10299.USF	24-HR	ALL	0.69953	629000	3671000	99033124
	24-HR	VTALL	0.65334	629100	3671000	99033124
	24-HR	VTHPALL	0.34004	629100	3671000	99033124
	24-HR	DWHALL	0.25584	627755.44	3670703.5	99070624
	24-HR	VT1LP	0.17477	629000	3671000	99033124
	24-HR	VT2SP	0.1453	629000	3671000	99033124
	24-HR	VT3HP1	0.16973	629100	3671000	99033124
	24-HR	VT4HP2	0.17032	629100	3671000	99033124
	24-HR	DWH1	0.14133	627800.19	3670695	99070624
	24-HR	DWH2	0.12174	627755.44	3670703.5	99070624

Concentrations are in micrograms per cubic meter

TABLE G-22 COMMISSIONING PM10 24 HOUR IMPACTS (Continued)

Scenario #3a

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommPM103a95.USF	24-HR	ALL	0.90774	627100	3670900	95081124
	24-HR	VTALL	0.4442	627130	3670960	95081124
	24-HR	VTHPALL	0.14724	627130	3670960	95081124
	24-HR	DWHALL	0.1661	628157	3670695	95050524
	24-HR	ALLSTEAM	0.49974	628600	3670570	95061624
	24-HR	VT1LP	0.16943	627130	3670960	95081124
	24-HR	VT2SP	0.12752	627130	3670960	95081124
	24-HR	VT4HP2	0.14724	627130	3670960	95081124
	24-HR	DWH1	0.11213	628127.19	3670695	95050524
	24-HR	DWH2	0.08798	627710.88	3670637	95081124
	24-HR	HPSTEAM1	0.28469	627100	3670900	95081024
	24-HR	HPSTEAM2	0.33365	627000	3670900	95081124
CommPM103a96.USF	24-HR	ALL	0.76302	627100	3670900	96082724
	24-HR	VTALL	0.37266	629000	3670900	96041024
	24-HR	VTHPALL	0.12622	629000	3670900	96041024
	24-HR	DWHALL	0.22368	627755.44	3670703.5	96071424
	24-HR	ALLSTEAM	0.52025	627100	3670900	96080124
	24-HR	VT1LP	0.13523	629000	3670900	96041024
	24-HR	VT2SP	0.11121	629000	3670900	96041024
	24-HR	VT4HP2	0.12622	629000	3670900	96041024
	24-HR	DWH1	0.14088	628157	3670695	96041724
	24-HR	DWH2	0.11165	627755.44	3670703.5	96071424
	24-HR	HPSTEAM1	0.32447	627130	3670930	96081324
	24-HR	HPSTEAM2	0.35398	628630	3670540	96062124
CommPM103a97.USF	24-HR	ALL	0.65945	627100	3670930	97081524
	24-HR	VTALL	0.35688	629100	3670800	97100724
	24-HR	VTHPALL	0.12127	629100	3670800	97100724
	24-HR	DWHALL	0.17486	628246.19	3670695	97052424
	24-HR	ALLSTEAM	0.46986	628630	3670540	97100724
	24-HR	VT1LP	0.12901	629100	3670800	97100724
	24-HR	VT2SP	0.10661	629100	3670800	97100724
	24-HR	VT4HP2	0.12127	629100	3670800	97100724
	24-HR	DWH1	0.10616	628216.38	3670695	97052424
	24-HR	DWH2	0.08665	628305.62	3670695	97052424
	24-HR	HPSTEAM1	0.37307	628600	3670540	97100724
	24-HR	HPSTEAM2	0.37264	628510	3670510	97100624
CommPM103a98.USF	24-HR	ALL	0.69354	629299.75	3670690.75	98101524
	24-HR	VTALL	0.38424	629500	3670800	98101524
	24-HR	VTHPALL	0.13007	629000	3670900	98061624
	24-HR	DWHALL	0.18846	628157	3670695	98040624
	24-HR	ALLSTEAM	0.56152	628810	3670510	98101524
	24-HR	VT1LP	0.14071	629400	3670800	98101524
	24-HR	VT2SP	0.11452	629400	3670800	98101524
	24-HR	VT4HP2	0.13007	629000	3670900	98061624
	24-HR	DWH1	0.12582	628127.19	3670695	98040624
	24-HR	DWH2	0.08566	628186.69	3670695	98040624
	24-HR	HPSTEAM1	0.29914	628483.31	3670375.25	98061224
	24-HR	HPSTEAM2	0.43437	628483.38	3670433.5	98060624
CommPM103a99.USF	24-HR	ALL	0.92528	629000	3670900	99033124
	24-HR	VTALL	0.48358	629000	3671000	99033124
	24-HR	VTHPALL	0.16924	629100	3671000	99033124
	24-HR	DWHALL	0.25584	627755.44	3670703.5	99070624
	24-HR	ALLSTEAM	0.64736	628510	3670630	99033124
	24-HR	VT1LP	0.17477	629000	3671000	99033124
	24-HR	VT2SP	0.1453	629000	3671000	99033124
	24-HR	VT4HP2	0.16924	629100	3671000	99033124
	24-HR	DWH1	0.14133	627800.19	3670695	99070624
	24-HR	DWH2	0.12174	627755.44	3670703.5	99070624
	24-HR	HPSTEAM1	0.40712	628540	3670630	99033124
	24-HR	HPSTEAM2	0.4386	628510	3670570	99030324

Concentrations are in micrograms per cubic meter

TABLE G-22 COMMISSIONING PM10 24 HOUR IMPACTS (Continued)

Scenario #3b

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommPM103b95.USF	24-HR	ALL	0.82891	627130	3670930	95081124
	24-HR	VTALL	0.60188	627130	3670960	95081124
	24-HR	VTHPALL	0.29788	627130	3670960	95081124
	24-HR	DWHALL	0.1661	628157	3670695	95050524
	24-HR	ALLSTEAM	0.30501	628510	3670540	95061624
	24-HR	VT1LP	0.16943	627130	3670960	95081124
	24-HR	VT2SP	0.13479	627130	3670930	95081124
	24-HR	VT3HP1	0.1497	627130	3670960	95081124
	24-HR	VT4HP2	0.14818	627130	3670960	95081124
	24-HR	DWH1	0.11213	628127.19	3670695	95050524
	24-HR	DWH2	0.08798	627710.88	3670637	95081124
	24-HR	SPSTEAM1	0.15864	628510	3670510	95061624
	24-HR	SPSTEAM2	0.17115	628483.69	3670549.75	95061624
CommPM103b96.USF	24-HR	ALL	0.63716	627100	3670900	96082724
	24-HR	VTALL	0.50783	629000	3670900	96041024
	24-HR	VTHPALL	0.2552	629000	3670900	96041024
	24-HR	DWHALL	0.22368	627755.44	3670703.5	96071424
	24-HR	ALLSTEAM	0.32165	628484	3670695	96041724
	24-HR	VT1LP	0.13523	629000	3670900	96041024
	24-HR	VT2SP	0.11834	628720	3670810	96041024
	24-HR	VT3HP1	0.12818	629000	3670900	96041024
	24-HR	VT4HP2	0.12702	629000	3670900	96041024
	24-HR	DWH1	0.14088	628157	3670695	96041724
	24-HR	DWH2	0.11165	627755.44	3670703.5	96071424
	24-HR	SPSTEAM1	0.17999	628484	3670695	96041724
	24-HR	SPSTEAM2	0.22151	628483.62	3670520.5	96062124
CommPM103b97.USF	24-HR	ALL	0.62161	629100	3670800	97100724
	24-HR	VTALL	0.48701	629100	3670800	97100724
	24-HR	VTHPALL	0.24457	629100	3670800	97100724
	24-HR	DWHALL	0.17486	628246.19	3670695	97052424
	24-HR	ALLSTEAM	0.28948	628483.5	3670491.5	97100724
	24-HR	VT1LP	0.12901	629100	3670800	97100724
	24-HR	VT2SP	0.12765	629000	3670900	97062324
	24-HR	VT3HP1	0.12253	629100	3670800	97100724
	24-HR	VT4HP2	0.12204	629100	3670800	97100724
	24-HR	DWH1	0.10616	628216.38	3670695	97052424
	24-HR	DWH2	0.08665	628305.62	3670695	97052424
	24-HR	SPSTEAM1	0.22614	628483.62	3670520.5	97100724
	24-HR	SPSTEAM2	0.21604	628483.5	3670491.5	97100624
CommPM103b98.USF	24-HR	ALL	0.65555	629500	3670800	98101524
	24-HR	VTALL	0.52436	629400	3670800	98101524
	24-HR	VTHPALL	0.26092	629000	3670900	98061624
	24-HR	DWHALL	0.18846	628157	3670695	98040624
	24-HR	ALLSTEAM	0.34739	628570	3670480	98101524
	24-HR	VT1LP	0.14071	629400	3670800	98101524
	24-HR	VT2SP	0.13825	628999.69	3670691.25	98101524
	24-HR	VT3HP1	0.1306	629500	3670800	98101524
	24-HR	VT4HP2	0.1309	629000	3670900	98061624
	24-HR	DWH1	0.12582	628127.19	3670695	98040624
	24-HR	DWH2	0.08566	628186.69	3670695	98040624
	24-HR	SPSTEAM1	0.17675	628483.31	3670375.25	98061224
	24-HR	SPSTEAM2	0.22267	628483.38	3670433.5	98060624
CommPM103b99.USF	24-HR	ALL	0.82599	629100	3671000	99033124
	24-HR	VTALL	0.6561	629000	3671000	99033124
	24-HR	VTHPALL	0.34004	629100	3671000	99033124
	24-HR	DWHALL	0.25584	627755.44	3670703.5	99070624
	24-HR	ALLSTEAM	0.38922	628483.81	3670607.75	99033124
	24-HR	VT1LP	0.17477	629000	3671000	99033124
	24-HR	VT2SP	0.15607	628750	3670870	99033124
	24-HR	VT3HP1	0.16973	629100	3671000	99033124
	24-HR	VT4HP2	0.17032	629100	3671000	99033124
	24-HR	DWH1	0.14133	627800.19	3670695	99070624
	24-HR	DWH2	0.12174	627755.44	3670703.5	99070624
	24-HR	SPSTEAM1	0.24101	628483.81	3670607.75	99033124
	24-HR	SPSTEAM2	0.26004	628483.69	3670549.75	99030324

Concentrations are in micrograms per cubic meter

TABLE G-22 COMMISSIONING PM10 24 HOUR IMPACTS (Continued)

Scenario #3c

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommPM103c95.USF	24-HR	ALL	0.78678	627130	3670960	95081124
	24-HR	VTALL	0.59935	627130	3670960	95081124
	24-HR	VTHPALL	0.29788	627130	3670960	95081124
	24-HR	DWHALL	0.1661	628157	3670695	95050524
	24-HR	ALLSTEAM	0.16547	627100	3670900	95081124
	24-HR	VT1LP	0.17458	627130	3670930	95081124
	24-HR	VT2SP	0.12752	627130	3670960	95081124
	24-HR	VT3HP1	0.1497	627130	3670960	95081124
	24-HR	VT4HP2	0.14818	627130	3670960	95081124
	24-HR	DWH1	0.11213	628127.19	3670695	95050524
	24-HR	DWH2	0.08798	627710.88	3670637	95081124
	24-HR	LPSTEAM1	0.09628	627100	3670900	95081024
	24-HR	LPSTEAM2	0.11384	627000	3670900	95081124
CommPM103c96.USF	24-HR	ALL	0.61011	629000	3670900	96041024
	24-HR	VTALL	0.51023	629000	3670900	96041024
	24-HR	VTHPALL	0.2552	629000	3670900	96041024
	24-HR	DWHALL	0.22368	627755.44	3670703.5	96071424
	24-HR	ALLSTEAM	0.1736	627100	3670900	96080124
	24-HR	VT1LP	0.14629	628720	3670810	96041024
	24-HR	VT2SP	0.11121	629000	3670900	96041024
	24-HR	VT3HP1	0.12818	629000	3670900	96041024
	24-HR	VT4HP2	0.12702	629000	3670900	96041024
	24-HR	DWH1	0.14088	628157	3670695	96041724
	24-HR	DWH2	0.11165	627755.44	3670703.5	96071424
	24-HR	LPSTEAM1	0.10967	627130	3670930	96081324
	24-HR	LPSTEAM2	0.11093	627100	3670900	96080124
CommPM103c97.USF	24-HR	ALL	0.60367	629100	3670800	97100724
	24-HR	VTALL	0.4897	629100	3670800	97100724
	24-HR	VTHPALL	0.24457	629100	3670800	97100724
	24-HR	DWHALL	0.17486	628246.19	3670695	97052424
	24-HR	ALLSTEAM	0.14377	628810	3670690	97062324
	24-HR	VT1LP	0.16067	629000	3670900	97062324
	24-HR	VT2SP	0.10661	629100	3670800	97100724
	24-HR	VT3HP1	0.12253	629100	3670800	97100724
	24-HR	VT4HP2	0.12204	629100	3670800	97100724
	24-HR	DWH1	0.10616	628216.38	3670695	97052424
	24-HR	DWH2	0.08665	628305.62	3670695	97052424
	24-HR	LPSTEAM1	0.11061	628720	3670570	97100724
	24-HR	LPSTEAM2	0.1165	627100	3670930	97081524
CommPM103c98.USF	24-HR	ALL	0.63871	629500	3670800	98101524
	24-HR	VTALL	0.52782	629400	3670800	98101524
	24-HR	VTHPALL	0.26092	629000	3670900	98061624
	24-HR	DWHALL	0.18846	628157	3670695	98040624
	24-HR	ALLSTEAM	0.16459	629000	3670500	98101524
	24-HR	VT1LP	0.16989	628990	3670750	98101524
	24-HR	VT2SP	0.11452	629400	3670800	98101524
	24-HR	VT3HP1	0.1306	629500	3670800	98101524
	24-HR	VT4HP2	0.1309	629000	3670900	98061624
	24-HR	DWH1	0.12582	628127.19	3670695	98040624
	24-HR	DWH2	0.08566	628186.69	3670695	98040624
	24-HR	LPSTEAM1	0.09086	628540	3670630	98061624
	24-HR	LPSTEAM2	0.12682	628483.38	3670433.5	98060624
CommPM103c99.USF	24-HR	ALL	0.8084	629100	3671000	99033124
	24-HR	VTALL	0.65976	629000	3671000	99033124
	24-HR	VTHPALL	0.34004	629100	3671000	99033124
	24-HR	DWHALL	0.25584	627755.44	3670703.5	99070624
	24-HR	ALLSTEAM	0.19108	627100	3670900	99070624
	24-HR	VT1LP	0.18969	628720	3670870	99033124
	24-HR	VT2SP	0.1453	629000	3671000	99033124
	24-HR	VT3HP1	0.16973	629100	3671000	99033124
	24-HR	VT4HP2	0.17032	629100	3671000	99033124
	24-HR	DWH1	0.14133	627800.19	3670695	99070624
	24-HR	DWH2	0.12174	627755.44	3670703.5	99070624
	24-HR	LPSTEAM1	0.11647	628660	3670690	99033124
	24-HR	LPSTEAM2	0.13166	628690	3670630	99030324

Concentrations are in micrograms per cubic meter

TABLE G-23 OPERATIONS PM10 IMPACTS

24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperPM102495.USF	24-HR	ALL	1.87634	627541.25	3670712	95081124
	24-HR	CTALL	1.35159	628630	3670420	95052224
	24-HR	DWHS	0.21282	628157	3670695	95050524
	24-HR	480VDSL	0.12429	627710.12	3670318	95072424
	24-HR	4160VDSL	0.53834	627755.44	3670703.5	95081524
	24-HR	DSLFP	0.43091	628096.5	3670259.5	95101324
	24-HR	FCAKEALL	0.83838	628067.81	3670695	95112224
	24-HR	SULFCAKE	0.0025	628246.19	3670695	95120424
	24-HR	OMEX1ALL	0.04543	628275.88	3670695	95061624
	24-HR	OMEX2ALL	0.46231	628007.31	3670259.5	95101324
	24-HR	OMPAVED	0.21855	628482.12	3670696	95122524
	24-HR	OMUNPAV	1.2793	627675.56	3670705.25	95122324
	24-HR	OMROADS	1.2793	627675.56	3670705.25	95122324
	24-HR	OMALL	0.463	628007.31	3670259.5	95101324
OperPM102496.USF	24-HR	ALL	2.29375	627755.44	3670703.5	96071424
	24-HR	CTALL	1.30619	628600	3670480	96041024
	24-HR	DWHS	0.25611	628157	3670695	96041724
	24-HR	480VDSL	0.1737	627858.69	3670259.75	96010224
	24-HR	4160VDSL	0.83124	627755.44	3670703.5	96071424
	24-HR	DSLFP	0.35757	628096.5	3670259.5	96112724
	24-HR	FCAKEALL	0.67743	627919.12	3670695	96090624
	24-HR	SULFCAKE	0.00242	628097.5	3670695	96102424
	24-HR	OMEX1ALL	0.0433	628216.38	3670695	96041724
	24-HR	OMEX2ALL	0.46231	627755.44	3670703.5	96090324
	24-HR	OMPAVED	0.17199	628484	3670695	96012624
	24-HR	OMUNPAV	1.00171	628420	3670900	96060124
	24-HR	OMROADS	1.02786	628420	3670900	96060124
	24-HR	OMALL	0.46364	627755.44	3670703.5	96090324
OperPM102497.USF	24-HR	ALL	2.10465	628660	3670420	97060524
	24-HR	CTALL	1.85796	628630	3670390	97060524
	24-HR	DWHS	0.1898	628216.38	3670695	97052424
	24-HR	480VDSL	0.13553	627880	3670240	97121124
	24-HR	4160VDSL	0.5543	627753.75	3670746	97080824
	24-HR	DSLFP	0.45626	628096.5	3670259.5	97022424
	24-HR	FCAKEALL	0.8768	628097.5	3670695	97112524
	24-HR	SULFCAKE	0.00317	628246.19	3670695	97092324
	24-HR	OMEX1ALL	0.05363	628246.19	3670695	97062324
	24-HR	OMEX2ALL	0.49433	628066.81	3670259.5	97022024
	24-HR	OMPAVED	0.16456	628482.12	3670696	97110324
	24-HR	OMUNPAV	0.83872	627675.56	3670705.25	97121524
	24-HR	OMROADS	0.8404	627675.56	3670705.25	97121524
	24-HR	OMALL	0.50003	628066.81	3670259.5	97022024

Concentrations are in micrograms per cubic meter

TABLE G-23 OPERATIONS PM10 IMPACTS (Continued)

24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperPM102498.USF	24-HR	ALL	2.12286	628600	3670420	98061624
	24-HR	CTALL	1.9005	628600	3670420	98061624
	24-HR	DWHS	0.2273	628127.19	3670695	98040624
	24-HR	480VDSL	0.12005	627828.88	3670259.75	98051724
	24-HR	4160VDSL	0.62906	627753.75	3670746	98071924
	24-HR	DSLFP	0.48046	628066.81	3670259.5	98121624
	24-HR	FCAKEALL	0.67803	628067.81	3670695	98031924
	24-HR	SULFCAKE	0.0022	628127.19	3670695	98071424
	24-HR	OMEX1ALL	0.0484	628067.81	3670695	98051924
	24-HR	OMEX2ALL	0.50749	628000	3670240	98121624
	24-HR	OMPAVED	0.14944	628482.12	3670696	98032124
	24-HR	OMUNPAV	0.89204	628420	3670960	98011124
	24-HR	OMROADS	0.91276	628420	3670960	98011124
	24-HR	OMALL	0.51151	628000	3670240	98121624
OperPM102499.USF	24-HR	ALL	2.24453	627755.44	3670703.5	99070624
	24-HR	CTALL	1.78143	628570	3670420	99050324
	24-HR	DWHS	0.27581	628216.38	3670695	99033124
	24-HR	480VDSL	0.17787	627850	3670210	99092824
	24-HR	4160VDSL	0.88506	627755.44	3670703.5	99070624
	24-HR	DSLFP	0.38179	627977.62	3670259.75	99092824
	24-HR	FCAKEALL	0.78451	628097.5	3670695	99010724
	24-HR	SULFCAKE	0.00244	628275.88	3670695	99011124
	24-HR	OMEX1ALL	0.05379	628246.19	3670695	99033124
	24-HR	OMEX2ALL	0.45411	627755.44	3670703.5	99082924
	24-HR	OMPAVED	0.1879	628482.12	3670696	99112524
	24-HR	OMUNPAV	0.88967	627675.56	3670705.25	99021324
	24-HR	OMROADS	0.89561	627755.44	3670703.5	99021324
	24-HR	OMALL	0.45832	627755.44	3670703.5	99082924

Concentrations are in micrograms per cubic meter

TABLE G-23 OPERATIONS PM10 IMPACTS (Continued)

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperPM10ann95.USF	ANNUAL	ALL	0.27191	628450	3670810	1 YRS
	ANNUAL	CTALL	0.11617	629100	3670600	1 YRS
	ANNUAL	DWHS	0.01351	628186.69	3670695	1 YRS
	ANNUAL	480VDSL	0.00027	627710.12	3670318	1 YRS
	ANNUAL	4160VDSL	0.00101	628630	3670630	1 YRS
	ANNUAL	DSLFP	0.00091	628483.81	3670607.75	1 YRS
	ANNUAL	FCAKEALL	0.01969	628097.5	3670695	1 YRS
	ANNUAL	SULFCAKE	0.00003	628483.81	3670607.75	1 YRS
	ANNUAL	OMEX1ALL	0.00047	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.00643	628484	3670695	1 YRS
	ANNUAL	OMPAVED	0.04546	628330	3670720	1 YRS
	ANNUAL	OMUNPAV	0.2279	628450	3670900	1 YRS
	ANNUAL	OMROADS	0.24158	628450	3670870	1 YRS
	ANNUAL	OMALL	0.00664	628484	3670695	1 YRS
OperPM10ann96.USF	ANNUAL	ALL	0.27019	627588.81	3670708.5	1 YRS
	ANNUAL	CTALL	0.13345	629000	3670600	1 YRS
	ANNUAL	DWHS	0.01647	628186.69	3670695	1 YRS
	ANNUAL	480VDSL	0.00027	628483.5	3670462.5	1 YRS
	ANNUAL	4160VDSL	0.00109	628484	3670695	1 YRS
	ANNUAL	DSLFP	0.00086	628483.62	3670520.5	1 YRS
	ANNUAL	FCAKEALL	0.01668	628097.5	3670695	1 YRS
	ANNUAL	SULFCAKE	0.00003	628483.69	3670549.75	1 YRS
	ANNUAL	OMEX1ALL	0.0005	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.00565	628484	3670695	1 YRS
	ANNUAL	OMPAVED	0.04567	628305.62	3670695	1 YRS
	ANNUAL	OMUNPAV	0.21413	628450	3670900	1 YRS
	ANNUAL	OMROADS	0.22721	628450	3670840	1 YRS
	ANNUAL	OMALL	0.00586	628484	3670695	1 YRS
OperPM10ann97.USF	ANNUAL	ALL	0.28615	627588.81	3670708.5	1 YRS
	ANNUAL	CTALL	0.12561	629000	3670500	1 YRS
	ANNUAL	DWHS	0.01291	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00027	627710.31	3670376	1 YRS
	ANNUAL	4160VDSL	0.00101	627100	3670900	1 YRS
	ANNUAL	DSLFP	0.00089	628483.62	3670520.5	1 YRS
	ANNUAL	FCAKEALL	0.01555	628067.81	3670695	1 YRS
	ANNUAL	SULFCAKE	0.00003	628483.5	3670491.5	1 YRS
	ANNUAL	OMEX1ALL	0.00045	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.0056	628484	3670695	1 YRS
	ANNUAL	OMPAVED	0.04761	628305.62	3670695	1 YRS
	ANNUAL	OMUNPAV	0.21958	628450	3670900	1 YRS
	ANNUAL	OMROADS	0.23202	628450	3670870	1 YRS
	ANNUAL	OMALL	0.00581	628484	3670695	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-23 OPERATIONS PM10 IMPACTS (Concluded)

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperPM10ann98.USF	ANNUAL	ALL	0.26775	628450	3670840	1 YRS
	ANNUAL	CTALL	0.14264	629000	3670500	1 YRS
	ANNUAL	DWHS	0.01526	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00029	628483.38	3670433.5	1 YRS
	ANNUAL	4160VDSL	0.00119	628630	3670570	1 YRS
	ANNUAL	DSLFP	0.00093	628483.38	3670433.5	1 YRS
	ANNUAL	FCAKEALL	0.0144	628067.81	3670695	1 YRS
	ANNUAL	SULFCAKE	0.00003	628483.5	3670491.5	1 YRS
	ANNUAL	OMEX1ALL	0.00044	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.0052	628484	3670695	1 YRS
	ANNUAL	OMPAVED	0.04594	628305.62	3670695	1 YRS
	ANNUAL	OMUNPAV	0.22991	628450	3670900	1 YRS
	ANNUAL	OMROADS	0.24136	628450	3670870	1 YRS
	ANNUAL	OMALL	0.00544	628484	3670695	1 YRS
OperPM10ann99.USF	ANNUAL	ALL	0.27944	627629.62	3670707	1 YRS
	ANNUAL	CTALL	0.14302	629000	3670500	1 YRS
	ANNUAL	DWHS	0.0136	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00029	628483.38	3670433.5	1 YRS
	ANNUAL	4160VDSL	0.00118	627755.44	3670703.5	1 YRS
	ANNUAL	DSLFP	0.00102	628483.38	3670433.5	1 YRS
	ANNUAL	FCAKEALL	0.01358	628097.5	3670695	1 YRS
	ANNUAL	SULFCAKE	0.00003	628483.5	3670491.5	1 YRS
	ANNUAL	OMEX1ALL	0.0004	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.00524	628484	3670695	1 YRS
	ANNUAL	OMPAVED	0.04668	628482.12	3670696	1 YRS
	ANNUAL	OMUNPAV	0.215	628450	3670870	1 YRS
	ANNUAL	OMROADS	0.22855	628450	3670810	1 YRS
	ANNUAL	OMALL	0.00548	628484	3670695	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-24 TEMPORARY PM10 IMPACTS

24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempPM10V95.USF	24-HR	ALL	54.40411	627100	3670900	95081124
	24-HR	CTALL	16.76768	628750	3670450	95052224
	24-HR	DWHS	0.21033	628157	3670695	95050524
	24-HR	VT1LP	0.15652	627130	3670960	95081124
	24-HR	VT2SP	0.11437	627130	3670960	95081124
	24-HR	VTALL	0.27089	627130	3670960	95081124
	24-HR	WDRILLI	3.52275	627100	3670900	95010524
	24-HR	BPINJ	41.4524	627160	3670930	95081124
	24-HR	VENTING	16.78592	628750	3670450	95052224
TempPM10V96.USF	24-HR	ALL	47.7642	627100	3670900	96072424
	24-HR	CTALL	15.56118	628999.69	3670691.25	96041724
	24-HR	DWHS	0.25312	628157	3670695	96041724
	24-HR	VT1LP	0.12473	629300	3671000	96041024
	24-HR	VT2SP	0.09878	629300	3671000	96041024
	24-HR	VTALL	0.2235	629300	3671000	96041024
	24-HR	WDRILLI	2.88877	627100	3670900	96091224
	24-HR	BPINJ	34.74349	627100	3670900	96070924
	24-HR	VENTING	15.57481	628999.69	3670691.25	96041724
TempPM10V97.USF	24-HR	ALL	40.80627	627100	3670900	97060824
	24-HR	CTALL	19.01229	628720	3670420	97060524
	24-HR	DWHS	0.18758	628216.38	3670695	97052424
	24-HR	VT1LP	0.12074	627070	3670930	97060924
	24-HR	VT2SP	0.09475	629500	3670900	97100724
	24-HR	VTALL	0.21477	629500	3670900	97100724
	24-HR	WDRILLI	2.8843	627100	3670900	97082224
	24-HR	BPINJ	32.13735	628420	3670840	97062324
	24-HR	VENTING	19.03609	628720	3670420	97060524
TempPM10V98.USF	24-HR	ALL	38.69419	628484	3670695	98101524
	24-HR	CTALL	19.15693	629000	3670500	98101524
	24-HR	DWHS	0.22464	628127.19	3670695	98040624
	24-HR	VT1LP	0.13071	629200	3671000	98061624
	24-HR	VT2SP	0.10199	629200	3671000	98061624
	24-HR	VTALL	0.2327	629200	3671000	98061624
	24-HR	WDRILLI	3.46586	627100	3670900	98022224
	24-HR	BPINJ	38.38169	628484	3670695	98101524
	24-HR	VENTING	19.19311	629000	3670500	98101524
TempPM10V99.USF	24-HR	ALL	40.36877	627100	3670990	99070624
	24-HR	CTALL	20.3199	628570	3670420	99050324
	24-HR	DWHS	0.27259	628216.38	3670695	99033124
	24-HR	VT1LP	0.16188	629400	3670800	99042224
	24-HR	VT2SP	0.12884	629400	3670800	99042224
	24-HR	VTALL	0.29072	629400	3670800	99042224
	24-HR	WDRILLI	2.6686	627000	3670900	99032624
	24-HR	BPINJ	38.18999	628300	3670840	99033124
	24-HR	VENTING	20.3272	628570	3670420	99050324

Concentrations are in micrograms per cubic meter

24 HOUR STARTUP

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempPM10SU95.USF	24-HR	ALL	28.20242	627130	3670960	95081124
	24-HR	CTALL	1.696	628750	3670450	95052224
	24-HR	DWHS	0.15471	627829.88	3670695	95091624
	24-HR	VT1LP	0.04761	628484	3670695	95061624
	24-HR	VT2SP	0.03998	628484	3670695	95061624
	24-HR	VTALL	0.08759	628484	3670695	95061624
	24-HR	PTU	26.92851	627130	3670960	95081124
TempPM10SU96.USF	24-HR	ALL	24.97241	629000	3671000	96041724
	24-HR	CTALL	1.57396	628999.69	3670691.25	96041724
	24-HR	DWHS	0.15403	627755.44	3670703.5	96090224
	24-HR	VT1LP	0.04318	628390	3670750	96041724
	24-HR	VT2SP	0.03442	628390	3670750	96041724
	24-HR	VTALL	0.07759	628390	3670750	96041724
	24-HR	PTU	24.58878	629000	3670900	96041024
TempPM10SU97.USF	24-HR	ALL	26.69938	629000	3670900	97062324
	24-HR	CTALL	1.92303	628720	3670420	97060524
	24-HR	DWHS	0.16369	627710.69	3670579	97062624
	24-HR	VT1LP	0.0441	628420	3670720	97062324
	24-HR	VT2SP	0.03478	628420	3670720	97052424
	24-HR	VTALL	0.07807	628420	3670720	97062324
	24-HR	PTU	26.4374	629000	3670900	97062324
TempPM10SU98.USF	24-HR	ALL	28.69307	628999.69	3670691.25	98101524
	24-HR	CTALL	1.93766	629000	3670500	98101524
	24-HR	DWHS	0.20536	627755.44	3670703.5	98022324
	24-HR	VT1LP	0.05075	628483.88	3670666	98101524
	24-HR	VT2SP	0.04075	628483.88	3670666	98101524
	24-HR	VTALL	0.09149	628483.88	3670666	98101524
	24-HR	PTU	28.31409	628999.69	3670691.25	98101524
TempPM10SU99.USF	24-HR	ALL	32.54213	629000	3670900	99033124
	24-HR	CTALL	2.05529	628570	3670420	99050324
	24-HR	DWHS	0.17927	627755.44	3670703.5	99061524
	24-HR	VT1LP	0.05033	628360	3670720	99033124
	24-HR	VT2SP	0.04064	628390	3670720	99033124
	24-HR	VTALL	0.08994	628390	3670720	99033124
	24-HR	PTU	32.20156	629000	3670900	99033124

Concentrations are in micrograms per cubic meter

TABLE G-25 CONSTRUCTION H2S 1 HOUR IMPACTS

File	Average	Group	Conc.	East(X)	North(Y)	Time
H2S short_95_H2S.USF	1-HR	INJBP	35.43653	627139	3670845	95072916
H2S short_96_H2S.USF	1-HR	INJBP	34.07813	627541.25	3670712	96081422
H2S short_97_H2S.USF	1-HR	INJBP	36.02784	627139	3670818.25	97082615
H2S short_98_H2S.USF	1-HR	INJBP	34.86022	627160	3670930	98082315
H2S short_99_H2S.USF	1-HR	INJBP	32.62243	627160	3670930	99061416

Concentrations are in micrograms per cubic meter

TABLE G-26 COMMISSIONING H2S 1 HOUR IMPACTS

Scenario #1

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommH2S195.USF	1-HR	ALL	99.22352	627100	3670990	95081516
	1-HR	VTALL	95.85034	627100	3670990	95081516
	1-HR	VTHPALL	89.52745	627100	3670990	95081516
	1-HR	DWHALL	5.26381	627978.62	3670695	95090816
	1-HR	VT1LP	1.56306	627100	3670990	95081516
	1-HR	VT2SP	4.75983	627100	3670990	95081516
	1-HR	VT3HP1	45.33728	627100	3670990	95081516
	1-HR	VT4HP2	44.19017	627100	3670990	95081516
	1-HR	DWH1	4.446	627859.69	3670695	95080906
	1-HR	DWH2	3.5033	627829.88	3670695	95080906
	1-HR	PTU	3.03903	628300	3670960	95071016
CommH2S196.USF	1-HR	ALL	111.10622	627100	3670990	96081423
	1-HR	VTALL	108.17207	627100	3670990	96081423
	1-HR	VTHPALL	101.63463	627100	3670990	96081423
	1-HR	DWHALL	5.45172	627859.69	3670695	96090415
	1-HR	VT1LP	1.58345	627100	3670990	96081423
	1-HR	VT2SP	4.954	627100	3670990	96081423
	1-HR	VT3HP1	51.60275	627100	3670990	96081423
	1-HR	VT4HP2	50.03188	627100	3670990	96081423
	1-HR	DWH1	4.3782	627859.69	3670695	96070817
	1-HR	DWH2	3.17256	627829.88	3670695	96070817
	1-HR	PTU	3.36111	627752.06	3670786.75	96081422
CommH2S197.USF	1-HR	ALL	124.2818	627130	3670930	97080823
	1-HR	VTALL	120.95824	627130	3670930	97080823
	1-HR	VTHPALL	113.91477	627130	3670930	97080823
	1-HR	DWHALL	5.45229	627859.69	3670695	97080602
	1-HR	VT1LP	1.68247	627130	3670930	97080823
	1-HR	VT2SP	5.36101	627130	3670930	97080823
	1-HR	VT3HP1	57.09084	627130	3670930	97080823
	1-HR	VT4HP2	56.82394	627130	3670930	97080823
	1-HR	DWH1	4.35715	627859.69	3670695	97080602
	1-HR	DWH2	3.36024	627800.19	3670695	97051206
	1-HR	PTU	3.03976	628483.69	3670578.75	97112614
CommH2S198.USF	1-HR	ALL	97.45146	628630	3670930	98030614
	1-HR	VTALL	95.04727	628630	3670930	98030614
	1-HR	VTHPALL	89.89163	628630	3670930	98030614
	1-HR	DWHALL	5.30789	627889.38	3670695	98082313
	1-HR	VT1LP	1.33555	628484	3670695	98061612
	1-HR	VT2SP	4.28179	628484	3670695	98061612
	1-HR	VT3HP1	44.89882	628630	3670930	98030614
	1-HR	VT4HP2	44.99281	628630	3670930	98030614
	1-HR	DWH1	4.33223	627859.69	3670695	98071820
	1-HR	DWH2	3.35717	627755.44	3670703.5	98072916
	1-HR	PTU	3.33227	628484	3670695	98061612
CommH2S199.USF	1-HR	ALL	111.60835	628484	3670695	99050317
	1-HR	VTALL	108.70203	628484	3670695	99050317
	1-HR	VTHPALL	102.24557	628484	3670695	99050317
	1-HR	DWHALL	5.55893	627859.69	3670695	99051216
	1-HR	VT1LP	1.61998	629000	3670800	99012512
	1-HR	VT2SP	5.19172	629000	3670800	99012512
	1-HR	VT3HP1	52.00793	628484	3670695	99050317
	1-HR	VT4HP2	50.23764	628484	3670695	99050317
	1-HR	DWH1	4.43528	627859.69	3670695	99051216
	1-HR	DWH2	3.25612	627755.44	3670703.5	99071023
	1-HR	PTU	2.96645	628484	3670695	99042816

Concentrations are in micrograms per cubic meter

TABLE G-26 COMMISSIONING H2S 1 HOUR IMPACTS (Continued)

Scenario #2

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommH2S295.USF	1-HR	ALL	46.21602	628690	3670870	95062913
	1-HR	VTALL	45.97865	628690	3670870	95062913
	1-HR	VTHPALL	41.02388	628330	3671170	95071016
	1-HR	DWHALL	3.18723	627978.62	3670695	95090816
	1-HR	VT1LP	1.47472	627100	3670990	95081516
	1-HR	VT2SP	4.39037	627100	3670990	95081516
	1-HR	VT3HP1	20.56376	628330	3671200	95071016
	1-HR	VT4HP2	20.52078	628330	3671170	95071016
	1-HR	DWH1	2.57109	627859.69	3670695	95080906
	1-HR	DWH2	1.95725	627829.88	3670695	95080906
CommH2S296.USF	1-HR	ALL	58.58661	627100	3671000	96090919
	1-HR	VTALL	58.28554	627100	3671000	96090919
	1-HR	VTHPALL	51.51894	627100	3671000	96090919
	1-HR	DWHALL	3.2029	627859.69	3670695	96090415
	1-HR	VT1LP	1.68124	627100	3670990	96090919
	1-HR	VT2SP	5.1288	627100	3670990	96090919
	1-HR	VT3HP1	26.31646	627100	3670990	96090919
	1-HR	VT4HP2	25.2348	627100	3671000	96090919
	1-HR	DWH1	2.54835	627859.69	3670695	96090415
	1-HR	DWH2	1.76313	627829.88	3670695	96090415
CommH2S297.USF	1-HR	ALL	62.24306	627130	3670930	97080823
	1-HR	VTALL	61.92624	627130	3670930	97080823
	1-HR	VTHPALL	54.74229	627130	3670930	97080823
	1-HR	DWHALL	3.15815	627859.69	3670695	97072109
	1-HR	VT1LP	1.71914	627100	3670930	97080823
	1-HR	VT2SP	5.4751	627130	3670930	97080823
	1-HR	VT3HP1	27.38216	627130	3670930	97080823
	1-HR	VT4HP2	27.36012	627130	3670930	97080823
	1-HR	DWH1	2.51118	627859.69	3670695	97072109
	1-HR	DWH2	1.75427	627755.44	3670703.5	97080315
CommH2S298.USF	1-HR	ALL	49.92532	628720	3670990	98030614
	1-HR	VTALL	49.77034	628720	3670990	98030614
	1-HR	VTHPALL	44.53565	628720	3670990	98030614
	1-HR	DWHALL	3.06505	627889.38	3670695	98082313
	1-HR	VT1LP	1.30685	628630	3670960	98030614
	1-HR	VT2SP	4.27717	628600	3670930	98030614
	1-HR	VT3HP1	22.28712	628720	3670990	98030614
	1-HR	VT4HP2	22.24853	628720	3670990	98030614
	1-HR	DWH1	2.48576	627859.69	3670695	98071819
	1-HR	DWH2	1.85547	627755.44	3670703.5	98082406
CommH2S298.USF	1-HR	ALL	49.92532	628720	3670990	98030614
	1-HR	VTALL	49.77034	628720	3670990	98030614
	1-HR	VTHPALL	44.53565	628720	3670990	98030614
	1-HR	DWHALL	3.06505	627889.38	3670695	98082313
	1-HR	VT1LP	1.30685	628630	3670960	98030614
	1-HR	VT2SP	4.27717	628600	3670930	98030614
	1-HR	VT3HP1	22.28712	628720	3670990	98030614
	1-HR	VT4HP2	22.24853	628720	3670990	98030614
	1-HR	DWH1	2.48576	627859.69	3670695	98071819
	1-HR	DWH2	1.85547	627755.44	3670703.5	98082406
CommH2S299.USF	1-HR	ALL	55.16844	629500	3670800	99012513
	1-HR	VTALL	54.93447	629500	3670800	99012513
	1-HR	VTHPALL	49.73028	629500	3670800	99012513
	1-HR	DWHALL	3.01819	627859.69	3670695	99051216
	1-HR	VT1LP	1.56628	628484	3670695	99050317
	1-HR	VT2SP	5.05501	628484	3670695	99050317
	1-HR	VT3HP1	24.92043	629500	3670800	99012513
	1-HR	VT4HP2	24.80985	629500	3670800	99012513
	1-HR	DWH1	2.41046	627859.69	3670695	99051216
	1-HR	DWH2	1.76388	627755.44	3670703.5	99072712

Concentrations are in micrograms per cubic meter

TABLE G-26 COMMISSIONING H2S 1 HOUR IMPACTS (Continued)

Scenario #3a

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommH2S3a95.USF	1-HR	ALL	129.20091	627710.5	3670463	95081415
	1-HR	VTALL	25.51984	628690	3670870	95062913
	1-HR	VTHPALL	20.55074	628330	3671170	95071016
	1-HR	DWHALL	3.18723	627978.62	3670695	95090816
	1-HR	ALLSTEAM	129.20084	627710.5	3670463	95081415
	1-HR	VT1LP	1.47472	627100	3670990	95081516
	1-HR	VT2SP	4.39037	627100	3670990	95081516
	1-HR	VT4HP2	20.55074	628330	3671170	95071016
	1-HR	DWH1	2.57109	627859.69	3670695	95080906
	1-HR	DWH2	1.95725	627829.88	3670695	95080906
	1-HR	HPSTEAM1	109.45306	628060	3670210	95033012
	1-HR	HPSTEAM2	129.20084	627710.5	3670463	95081415
CommH2S3a96.USF	1-HR	ALL	136.56087	627710.31	3670405	96070915
	1-HR	VTALL	32.03824	627100	3671000	96090919
	1-HR	VTHPALL	25.27164	627100	3671000	96090919
	1-HR	DWHALL	3.2029	627859.69	3670695	96090415
	1-HR	ALLSTEAM	136.56087	627710.31	3670405	96070915
	1-HR	VT1LP	1.68124	627100	3670990	96090919
	1-HR	VT2SP	5.1288	627100	3670990	96090919
	1-HR	VT4HP2	25.27164	627100	3671000	96090919
	1-HR	DWH1	2.54835	627859.69	3670695	96090415
	1-HR	DWH2	1.76313	627829.88	3670695	96090415
	1-HR	HPSTEAM1	114.95718	628060	3670240	96052412
	1-HR	HPSTEAM2	136.56087	627710.31	3670405	96070915
CommH2S3a97.USF	1-HR	ALL	148.12895	628030	3670210	97042413
	1-HR	VTALL	34.58403	627130	3670930	97080823
	1-HR	VTHPALL	27.40007	627130	3670930	97080823
	1-HR	DWHALL	3.15815	627859.69	3670695	97072109
	1-HR	ALLSTEAM	148.09122	628030	3670210	97042413
	1-HR	VT1LP	1.71914	627100	3670930	97080823
	1-HR	VT2SP	5.4751	627130	3670930	97080823
	1-HR	VT4HP2	27.40007	627130	3670930	97080823
	1-HR	DWH1	2.51118	627859.69	3670695	97072109
	1-HR	DWH2	1.75427	627755.44	3670703.5	97080315
	1-HR	HPSTEAM1	101.96832	627970	3670120	97121009
	1-HR	HPSTEAM2	148.09122	628030	3670210	97042413
CommH2S3a98.USF	1-HR	ALL	136.11523	627710.5	3670492	98090314
	1-HR	VTALL	27.5157	628720	3670990	98030614
	1-HR	VTHPALL	22.28101	628720	3670990	98030614
	1-HR	DWHALL	3.06505	627889.38	3670695	98082313
	1-HR	ALLSTEAM	136.11523	627710.5	3670492	98090314
	1-HR	VT1LP	1.30685	628630	3670960	98030614
	1-HR	VT2SP	4.27717	628600	3670930	98030614
	1-HR	VT4HP2	22.28101	628720	3670990	98030614
	1-HR	DWH1	2.48576	627859.69	3670695	98071819
	1-HR	DWH2	1.85547	627755.44	3670703.5	98082406
	1-HR	HPSTEAM1	116.41776	627710.5	3670492	98071612
	1-HR	HPSTEAM2	136.11523	627710.5	3670492	98090314
CommH2S3a99.USF	1-HR	ALL	126.62373	627710.62	3670521	99081311
	1-HR	VTALL	30.05026	629500	3670800	99012513
	1-HR	VTHPALL	24.84607	629500	3670800	99012513
	1-HR	DWHALL	3.01819	627859.69	3670695	99051216
	1-HR	ALLSTEAM	126.62373	627710.62	3670521	99081311
	1-HR	VT1LP	1.56628	628484	3670695	99050317
	1-HR	VT2SP	5.05501	628484	3670695	99050317
	1-HR	VT4HP2	24.84607	629500	3670800	99012513
	1-HR	DWH1	2.41046	627859.69	3670695	99051216
	1-HR	DWH2	1.76388	627755.44	3670703.5	99072712
	1-HR	HPSTEAM1	126.62373	627710.62	3670521	99081311
	1-HR	HPSTEAM2	113.04577	627710.69	3670579	99081914

Concentrations are in micrograms per cubic meter

TABLE G-26 COMMISSIONING H2S 1 HOUR IMPACTS (Continued)

Scenario #3b

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommH2S3b95.USF	1-HR	ALL	46.32764	628690	3670870	95062913
	1-HR	VTALL	45.24622	627100	3670990	95081516
	1-HR	VTHPALL	41.02388	628330	3671170	95071016
	1-HR	DWHALL	3.18723	627978.62	3670695	95090816
	1-HR	ALLSTEAM	17.87108	628007.31	3670259.5	95061714
	1-HR	VT1LP	1.47472	627100	3670990	95081516
	1-HR	VT2SP	4.98239	627130	3670930	95061217
	1-HR	VT3HP1	20.56376	628330	3671200	95071016
	1-HR	VT4HP2	20.52078	628330	3671170	95071016
	1-HR	DWH1	2.57109	627859.69	3670695	95080906
	1-HR	DWH2	1.95725	627829.88	3670695	95080906
	1-HR	SPSTEAM1	12.98139	628030	3670240	95033012
	1-HR	SPSTEAM2	17.87108	628007.31	3670259.5	95061714
CommH2S3b96.USF	1-HR	ALL	57.15934	627100	3671000	96090919
	1-HR	VTALL	56.84804	627100	3671000	96090919
	1-HR	VTHPALL	51.51894	627100	3671000	96090919
	1-HR	DWHALL	3.2029	627859.69	3670695	96090415
	1-HR	ALLSTEAM	17.45384	627700	3670480	96081422
	1-HR	VT1LP	1.68124	627100	3670990	96090919
	1-HR	VT2SP	4.57693	627753.75	3670746	96081422
	1-HR	VT3HP1	26.31646	627100	3670990	96090919
	1-HR	VT4HP2	25.2348	627100	3671000	96090919
	1-HR	DWH1	2.54835	627859.69	3670695	96090415
	1-HR	DWH2	1.76313	627829.88	3670695	96090415
	1-HR	SPSTEAM1	13.82061	628037	3670259.5	96052412
	1-HR	SPSTEAM2	17.45384	627700	3670480	96081422
CommH2S3b97.USF	1-HR	ALL	61.32887	627130	3670930	97080823
	1-HR	VTALL	61.01123	627130	3670930	97080823
	1-HR	VTHPALL	54.74229	627130	3670930	97080823
	1-HR	DWHALL	3.15815	627859.69	3670695	97072109
	1-HR	ALLSTEAM	28.66412	627947.81	3670259.75	97121009
	1-HR	VT1LP	1.71914	627100	3670930	97080823
	1-HR	VT2SP	4.97553	627130	3670930	97082615
	1-HR	VT3HP1	27.38216	627130	3670930	97080823
	1-HR	VT4HP2	27.36012	627130	3670930	97080823
	1-HR	DWH1	2.51118	627859.69	3670695	97072109
	1-HR	DWH2	1.75427	627755.44	3670703.5	97080315
	1-HR	SPSTEAM1	28.66412	627947.81	3670259.75	97121009
	1-HR	SPSTEAM2	18.70601	628007.31	3670259.5	97042413
CommH2S3b98.USF	1-HR	ALL	50.27767	628720	3670990	98030614
	1-HR	VTALL	48.72698	628720	3670990	98030614
	1-HR	VTHPALL	44.53565	628720	3670990	98030614
	1-HR	DWHALL	3.06505	627889.38	3670695	98082313
	1-HR	ALLSTEAM	18.80999	628007.31	3670259.5	98083116
	1-HR	VT1LP	1.30685	628630	3670960	98030614
	1-HR	VT2SP	4.57566	628484	3670695	98061612
	1-HR	VT3HP1	22.28712	628720	3670990	98030614
	1-HR	VT4HP2	22.24853	628720	3670990	98030614
	1-HR	DWH1	2.48576	627859.69	3670695	98071819
	1-HR	DWH2	1.85547	627755.44	3670703.5	98082406
	1-HR	SPSTEAM1	17.0218	627880	3670240	98120912
	1-HR	SPSTEAM2	18.80999	628007.31	3670259.5	98083116
CommH2S3b99.USF	1-HR	ALL	53.79129	628484	3670695	99050317
	1-HR	VTALL	53.42926	628484	3670695	99050317
	1-HR	VTHPALL	49.73028	629500	3670800	99012513
	1-HR	DWHALL	3.01819	627859.69	3670695	99051216
	1-HR	ALLSTEAM	16.5865	627880	3670180	99120808
	1-HR	VT1LP	1.56628	628484	3670695	99050317
	1-HR	VT2SP	4.63418	628484	3670695	99020914
	1-HR	VT3HP1	24.92043	629500	3670800	99012513
	1-HR	VT4HP2	24.80985	629500	3670800	99012513
	1-HR	DWH1	2.41046	627859.69	3670695	99051216
	1-HR	DWH2	1.76388	627755.44	3670703.5	99072712
	1-HR	SPSTEAM1	16.5865	627880	3670180	99120808
	1-HR	SPSTEAM2	13.46832	628156	3670259.5	99032020

Concentrations are in micrograms per cubic meter

TABLE G-26 COMMISSIONING H2S 1 HOUR IMPACTS (Continued)

Scenario #3c

File	Average	Group	Conc.	East(X)	North(Y)	Time
CommH2S3c95.USF	1-HR	ALL	46.20441	628690	3670870	95062913
	1-HR	VTALL	45.67443	628690	3670870	95062913
	1-HR	VTHPALL	41.02388	628330	3671170	95071016
	1-HR	DWHALL	3.18723	627978.62	3670695	95090816
	1-HR	ALLSTEAM	2.41867	628038	3670695	95071016
	1-HR	VT1LP	1.63849	627130	3670930	95061217
	1-HR	VT2SP	4.39037	627100	3670990	95081516
	1-HR	VT3HP1	20.56376	628330	3671200	95071016
	1-HR	VT4HP2	20.52078	628330	3671170	95071016
	1-HR	DWH1	2.57109	627859.69	3670695	95080906
	1-HR	DWH2	1.95725	627829.88	3670695	95080906
	1-HR	LPSTEAM1	1.22847	627100	3670900	95071511
	1-HR	LPSTEAM2	2.41867	628038	3670695	95071016
CommH2S3c96.USF	1-HR	ALL	58.12966	627100	3671000	96090919
	1-HR	VTALL	57.82584	627100	3671000	96090919
	1-HR	VTHPALL	51.51894	627100	3671000	96090919
	1-HR	DWHALL	3.2029	627859.69	3670695	96090415
	1-HR	ALLSTEAM	2.1581	627670	3670510	96081422
	1-HR	VT1LP	1.50984	627753.75	3670746	96081422
	1-HR	VT2SP	5.1288	627100	3670990	96090919
	1-HR	VT3HP1	26.31646	627100	3670990	96090919
	1-HR	VT4HP2	25.2348	627100	3671000	96090919
	1-HR	DWH1	2.54835	627859.69	3670695	96090415
	1-HR	DWH2	1.76313	627829.88	3670695	96090415
	1-HR	LPSTEAM1	2.13441	627755.44	3670703.5	96070911
	1-HR	LPSTEAM2	2.1581	627670	3670510	96081422
CommH2S3c97.USF	1-HR	ALL	61.97255	627130	3670930	97080823
	1-HR	VTALL	61.65553	627130	3670930	97080823
	1-HR	VTHPALL	54.74229	627130	3670930	97080823
	1-HR	DWHALL	3.15815	627859.69	3670695	97072109
	1-HR	ALLSTEAM	1.56514	628484	3670695	97042315
	1-HR	VT1LP	1.63761	627100	3670900	97071716
	1-HR	VT2SP	5.4751	627130	3670930	97080823
	1-HR	VT3HP1	27.38216	627130	3670930	97080823
	1-HR	VT4HP2	27.36012	627130	3670930	97080823
	1-HR	DWH1	2.51118	627859.69	3670695	97072109
	1-HR	DWH2	1.75427	627755.44	3670703.5	97080315
	1-HR	LPSTEAM1	1.34163	628484	3670695	97061305
	1-HR	LPSTEAM2	1.56514	628484	3670695	97042315
CommH2S3c98.USF	1-HR	ALL	50.01444	628720	3670990	98030614
	1-HR	VTALL	49.46574	628720	3670990	98030614
	1-HR	VTHPALL	44.53565	628720	3670990	98030614
	1-HR	DWHALL	3.06505	627889.38	3670695	98082313
	1-HR	ALLSTEAM	2.59998	627670	3670510	98090314
	1-HR	VT1LP	1.39277	628180	3670960	98081616
	1-HR	VT2SP	4.27717	628600	3670930	98030614
	1-HR	VT3HP1	22.28712	628720	3670990	98030614
	1-HR	VT4HP2	22.24853	628720	3670990	98030614
	1-HR	DWH1	2.48576	627859.69	3670695	98071819
	1-HR	DWH2	1.85547	627755.44	3670703.5	98082406
	1-HR	LPSTEAM1	2.16194	628245.19	3670259.25	98061212
	1-HR	LPSTEAM2	2.59998	627670	3670510	98090314
CommH2S3c99.USF	1-HR	ALL	54.71694	629500	3670800	99012513
	1-HR	VTALL	54.40548	629500	3670800	99012513
	1-HR	VTHPALL	49.73028	629500	3670800	99012513
	1-HR	DWHALL	3.01819	627859.69	3670695	99051216
	1-HR	ALLSTEAM	2.30231	627829.88	3670695	99070813
	1-HR	VT1LP	1.46108	627100	3670990	99091713
	1-HR	VT2SP	5.05501	628484	3670695	99050317
	1-HR	VT3HP1	24.92043	629500	3670800	99012513
	1-HR	VT4HP2	24.80985	629500	3670800	99012513
	1-HR	DWH1	2.41046	627859.69	3670695	99051216
	1-HR	DWH2	1.76388	627755.44	3670703.5	99072712
	1-HR	LPSTEAM1	1.48894	627700	3670570	99072711
	1-HR	LPSTEAM2	2.30231	627829.88	3670695	99070813

Concentrations are in micrograms per cubic meter

TABLE G-27 OPERATIONS H2S IMPACTS

1 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperH2S95.USF	1-HR	ALL	5.78388	627753.75	3670746	95082402
	1-HR	CTALL	5.71876	628483.31	3670404.25	95050417
	1-HR	DWHS	4.34604	627978.62	3670695	95090816
OperH2S96.USF	1-HR	ALL	5.57631	627753.75	3670746	96070703
	1-HR	CTALL	5.4565	628483.31	3670404.25	96101911
	1-HR	DWHS	3.93484	627970	3670720	96090416
OperH2S97.USF	1-HR	ALL	7.51567	628483	3670259	97021224
	1-HR	CTALL	7.51565	628483	3670259	97021224
	1-HR	DWHS	3.75144	627859.69	3670695	97072109
OperH2S98.USF	1-HR	ALL	5.99039	627753.75	3670746	98082823
	1-HR	CTALL	5.48176	628483.31	3670404.25	98060617
	1-HR	DWHS	3.88324	627889.38	3670695	98061913
OperH2S99.USF	1-HR	ALL	6.0262	627755.44	3670703.5	99072711
	1-HR	CTALL	5.9512	628483.31	3670404.25	99050818
	1-HR	DWHS	3.78327	627889.38	3670695	99071216

Concentrations are in micrograms per cubic meter

TABLE G-28 TEMPORARY H2S IMPACTS

1 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempH2SV95.USF	1-HR	ALL	37.10406	627100	3670900	95080316
	1-HR	CTALL	2.52903	628630	3670480	95111004
	1-HR	DWHS	4.34097	627978.62	3670695	95090816
	1-HR	VT1LP	1.39726	627130	3670960	95072914
	1-HR	VT2SP	4.07514	627100	3670990	95072914
	1-HR	VTALL	5.46813	627100	3670990	95072914
	1-HR	BPINJ	34.14574	627130	3670870	95080317
	1-HR	VENTING	6.41374	636500	3662750	95100121
TempH2SV96.USF	1-HR	ALL	35.82856	627130	3670930	96090215
	1-HR	CTALL	4.8401	628483.31	3670404.25	96111501
	1-HR	DWHS	3.93025	627970	3670720	96090416
	1-HR	VT1LP	1.74968	627100	3671000	96081422
	1-HR	VT2SP	5.30306	627100	3671000	96081422
	1-HR	VTALL	7.05274	627100	3671000	96081422
	1-HR	BPINJ	33.35773	627160	3670930	96071416
	1-HR	VENTING	7.84278	627100	3671000	96081422
TempH2SV97.USF	1-HR	ALL	36.12149	627160	3670930	97080717
	1-HR	CTALL	4.44906	628510	3670420	97102319
	1-HR	DWHS	3.74706	627859.69	3670695	97072109
	1-HR	VT1LP	1.60193	627070	3670930	97080823
	1-HR	VT2SP	4.81116	627100	3670930	97080823
	1-HR	VTALL	6.41129	627100	3670930	97080823
	1-HR	BPINJ	33.93008	627160	3670930	97080717
	1-HR	VENTING	7.20818	627070	3670930	97080823
TempH2SV98.USF	1-HR	ALL	37.05184	627160	3670930	98082315
	1-HR	CTALL	3.98137	628510	3670420	98122011
	1-HR	DWHS	3.8787	627889.38	3670695	98061913
	1-HR	VT1LP	1.44194	627130	3670960	98071813
	1-HR	VT2SP	4.4905	628750	3671020	98030614
	1-HR	VTALL	5.83254	628750	3671020	98030614
	1-HR	BPINJ	34.82148	627160	3670930	98082315
	1-HR	VENTING	6.3819	627130	3670960	98071813
TempH2SV99.USF	1-HR	ALL	34.80871	627160	3670930	99061416
	1-HR	CTALL	3.72381	628334.31	3670259.25	99112201
	1-HR	DWHS	3.77886	627889.38	3670695	99071216
	1-HR	VT1LP	1.45636	628484	3670695	99050317
	1-HR	VT2SP	4.62919	628630	3670720	99050317
	1-HR	VTALL	6.07911	628484	3670695	99050317
	1-HR	BPINJ	32.58445	627160	3670930	99061416
	1-HR	VENTING	6.57337	628484	3670695	99050317

Concentrations are in micrograms per cubic meter

TABLE G-28 TEMPORARY H2S IMPACTS (CONT)

1 HOUR STARTUP

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempH2SSU95.USF	1-HR	ALL	19.66674	627160	3670930	95061217
	1-HR	CTALL	0.14684	628483.31	3670404.25	95050417
	1-HR	DWHS	1.52874	627755.44	3670703.5	95091919
	1-HR	VT1LP	1.52613	627753.75	3670746	95080316
	1-HR	VT2SP	4.79246	627130	3670930	95060502
	1-HR	VTALL	6.30484	627130	3670930	95060502
	1-HR	PTU	17.74092	628300	3670960	95071016
TempH2SSU96.USF	1-HR	ALL	22.21903	627752.06	3670786.75	96081422
	1-HR	CTALL	0.09307	627100	3670900	96081304
	1-HR	DWHS	1.48827	627710.88	3670637	96012108
	1-HR	VT1LP	1.53454	627100	3670960	96060424
	1-HR	VT2SP	4.85022	627130	3670960	96060424
	1-HR	VTALL	6.35022	627100	3670960	96060424
	1-HR	PTU	19.62113	627752.06	3670786.75	96081422
TempH2SSU97.USF	1-HR	ALL	19.88785	627160	3670930	97082615
	1-HR	CTALL	0.19987	628483	3670259	97021224
	1-HR	DWHS	1.43822	627859.69	3670695	97100118
	1-HR	VT1LP	1.56674	627755.44	3670703.5	97071716
	1-HR	VT2SP	4.89495	627130	3670930	97051321
	1-HR	VTALL	6.45736	627130	3670930	97051321
	1-HR	PTU	17.74521	628483.69	3670578.75	97112614
TempH2SSU98.USF	1-HR	ALL	21.9208	628484	3670695	98061612
	1-HR	CTALL	0.14466	628483.5	3670462.5	98030613
	1-HR	DWHS	1.51569	627710.38	3670434	98072006
	1-HR	VT1LP	1.81591	627730	3670930	98071906
	1-HR	VT2SP	4.69544	627100	3670930	98080123
	1-HR	VTALL	6.20093	627130	3670930	98090821
	1-HR	PTU	19.45281	628484	3670695	98061612
TempH2SSU99.USF	1-HR	ALL	20.50064	628484	3670695	99042816
	1-HR	CTALL	0.14992	628483.38	3670433.5	99042216
	1-HR	DWHS	1.52047	627888.38	3670259.75	99101707
	1-HR	VT1LP	1.49737	627070	3670930	99052806
	1-HR	VT2SP	4.76757	627130	3670960	99061601
	1-HR	VTALL	6.23259	627100	3670930	99052806
	1-HR	PTU	17.31721	628484	3670695	99042816

Concentrations are in micrograms per cubic meter

TABLE G-29 CONSTRUCTION 1 HOUR NO2 IMPACTS

OLM Modeling

1 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
NOXOLM	1-HR	ALL	244.33	628510	3670360	95040208
1995	1-HR	WELLPADS	205.76	627130	3670870	95112618
	1-HR	EXH	190.98	628300	3670240	95100413
NOXOLM	1-HR	ALL	252.36	627978.63	3670695	96050716
1996	1-HR	WELLPADS	217.20	627100	3670900	96060518
	1-HR	EXH	191.03	627910	3670240	96042111
NOXOLM	1-HR	ALL	266.42	628483.19	3670346.25	97042808
1997	1-HR	WELLPADS	243.66	627100	3670900	97070403
	1-HR	EXH	189.66	628300	3670720	97091015
NOXOLM	1-HR	ALL	268.02	628483.19	3670346.25	98081716
1998	1-HR	WELLPADS	243.00	627100	3670900	98080101
	1-HR	EXH	205.58	627755.44	3670703.5	98071615
NOXOLM	1-HR	ALL	240.20	627100	3670900	99092624
1999	1-HR	WELLPADS	240.20	627100	3670900	99092624
	1-HR	EXH	209.67	627910	3670240	99101710

Concentrations are in micrograms per cubic meter

TABLE G-30 CONSTRUCTION NO2 IMPACTS

ISCST3 MODELING

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time	ARM Conc.
NOx long_95_NOX.USF	ANNUAL	ALL	6.7814	628483	3670259	1 YRS	5.09
	ANNUAL	ALLEXHST	4.11873	628097.5	3670695	1 YRS	3.09
	ANNUAL	ALLWELLS	3.41932	628630	3671230	1 YRS	2.56
	ANNUAL	BPWELL	0.72359	628008.31	3670695	1 YRS	0.54
	ANNUAL	CTWELL	0.75117	628690	3670690	1 YRS	0.56
	ANNUAL	EXHAUST1	2.19059	627710.31	3670405	1 YRS	1.64
	ANNUAL	EXHAUST2	2.13879	627710.88	3670637	1 YRS	1.60
	ANNUAL	EXHAUST3	2.37596	628484	3670695	1 YRS	1.78
	ANNUAL	EXHAUST4	2.03464	628483.31	3670404.25	1 YRS	1.53
	ANNUAL	WELLPADC	0.7709	628484	3670695	1 YRS	0.58
	ANNUAL	WELLPADI	0.95904	627100	3670900	1 YRS	0.72
	ANNUAL	WELLPADJ	1.46324	628150	3670930	1 YRS	1.10
	ANNUAL	WELLPADL	1.41595	628090	3669970	1 YRS	1.06
	ANNUAL	WELLPADN	1.75319	628600	3671230	1 YRS	1.31
	ANNUAL	WELLPADP	0.55387	630340	3669220	1 YRS	0.42
	ANNUAL	WELLPADR	1.44	630370	3669850	1 YRS	1.08
NOx long_96_NOX.USF	ANNUAL	ALL	6.62392	628097.5	3670695	1 YRS	4.97
	ANNUAL	ALLEXHST	4.42854	628097.5	3670695	1 YRS	3.32
	ANNUAL	ALLWELLS	3.74111	627100	3670900	1 YRS	2.81
	ANNUAL	BPWELL	0.76364	628008.31	3670695	1 YRS	0.57
	ANNUAL	CTWELL	0.79158	628690	3670690	1 YRS	0.59
	ANNUAL	EXHAUST1	2.23184	627710.31	3670405	1 YRS	1.67
	ANNUAL	EXHAUST2	2.17543	627710.88	3670637	1 YRS	1.63
	ANNUAL	EXHAUST3	2.37709	628484	3670695	1 YRS	1.78
	ANNUAL	EXHAUST4	1.83637	628483.31	3670404.25	1 YRS	1.38
	ANNUAL	WELLPADC	0.8001	627100	3670900	1 YRS	0.60
	ANNUAL	WELLPADI	0.96751	627100	3670900	1 YRS	0.73
	ANNUAL	WELLPADJ	1.54721	628150	3670930	1 YRS	1.16
	ANNUAL	WELLPADL	1.49529	628060	3669970	1 YRS	1.12
	ANNUAL	WELLPADN	1.86345	628600	3671230	1 YRS	1.40
	ANNUAL	WELLPADP	0.58021	630340	3669220	1 YRS	0.44
	ANNUAL	WELLPADR	1.49345	630370	3669850	1 YRS	1.12
NOx long_97_NOX.USF	ANNUAL	ALL	6.27322	628483	3670259	1 YRS	4.70
	ANNUAL	ALLEXHST	4.08327	628097.5	3670695	1 YRS	3.06
	ANNUAL	ALLWELLS	3.87143	627100	3670900	1 YRS	2.90
	ANNUAL	BPWELL	0.69904	628038	3670695	1 YRS	0.52
	ANNUAL	CTWELL	0.72958	628720	3670690	1 YRS	0.55
	ANNUAL	EXHAUST1	2.55056	627710.31	3670405	1 YRS	1.91
	ANNUAL	EXHAUST2	2.49341	627710.88	3670637	1 YRS	1.87
	ANNUAL	EXHAUST3	2.13509	628483.88	3670637	1 YRS	1.60
	ANNUAL	EXHAUST4	2.14691	628483.31	3670404.25	1 YRS	1.61
	ANNUAL	WELLPADC	0.79129	627520	3670420	1 YRS	0.59
	ANNUAL	WELLPADI	1.10789	627100	3670900	1 YRS	0.83
	ANNUAL	WELLPADJ	1.43006	628120	3670900	1 YRS	1.07
	ANNUAL	WELLPADL	1.37594	628090	3669970	1 YRS	1.03
	ANNUAL	WELLPADN	1.6172	628630	3671230	1 YRS	1.21
	ANNUAL	WELLPADP	0.54142	630340	3669220	1 YRS	0.41
	ANNUAL	WELLPADR	1.40755	630370	3669850	1 YRS	1.06

Concentrations are in micrograms per cubic meter

TABLE G-30 CONSTRUCTION NO2 IMPACTS
ISCST3 MODELING

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time	ARM Conc.
NOx long_98_NOX.USF	ANNUAL	ALL	6.87404	628483	3670259	1 YRS	5.16
	ANNUAL	ALLEXHST	4.57847	628483.31	3670375.25	1 YRS	3.43
	ANNUAL	ALLWELLS	3.17261	628600	3671170	1 YRS	2.38
	ANNUAL	BPWELL	0.77485	628038	3670695	1 YRS	0.58
	ANNUAL	CTWELL	0.88853	628690	3670660	1 YRS	0.67
	ANNUAL	EXHAUST1	1.66825	627710.38	3670434	1 YRS	1.25
	ANNUAL	EXHAUST2	2.01277	627755.44	3670703.5	1 YRS	1.51
	ANNUAL	EXHAUST3	2.58048	628483.81	3670607.75	1 YRS	1.94
	ANNUAL	EXHAUST4	2.57919	628483.31	3670375.25	1 YRS	1.93
	ANNUAL	WELLPADC	0.9199	628483	3670259	1 YRS	0.69
	ANNUAL	WELLPADI	1.00583	627100	3670900	1 YRS	0.75
	ANNUAL	WELLPADJ	1.72046	628150	3670900	1 YRS	1.29
	ANNUAL	WELLPADL	1.66845	628060	3669940	1 YRS	1.25
	ANNUAL	WELLPADN	1.73598	628600	3671170	1 YRS	1.30
	ANNUAL	WELLPADP	0.65286	630340	3669190	1 YRS	0.49
	ANNUAL	WELLPADR	1.70963	630340	3669820	1 YRS	1.28
NOx long_99_NOX.USF	ANNUAL	ALL	6.51789	628157	3670695	1 YRS	4.89
	ANNUAL	ALLEXHST	4.31973	628157	3670695	1 YRS	3.24
	ANNUAL	ALLWELLS	3.0747	630370	3669820	1 YRS	2.31
	ANNUAL	BPWELL	0.6605	628067.81	3670695	1 YRS	0.50
	ANNUAL	CTWELL	0.82489	628720	3670660	1 YRS	0.62
	ANNUAL	EXHAUST1	1.88329	627710.5	3670463	1 YRS	1.41
	ANNUAL	EXHAUST2	2.75792	627755.44	3670703.5	1 YRS	2.07
	ANNUAL	EXHAUST3	2.44293	628157	3670695	1 YRS	1.83
	ANNUAL	EXHAUST4	2.17909	628483.31	3670404.25	1 YRS	1.63
	ANNUAL	WELLPADC	0.94124	628483	3670259	1 YRS	0.71
	ANNUAL	WELLPADI	0.87754	626980	3670870	1 YRS	0.66
	ANNUAL	WELLPADJ	1.65678	628120	3670870	1 YRS	1.24
	ANNUAL	WELLPADL	1.57967	628060	3669910	1 YRS	1.18
	ANNUAL	WELLPADN	1.66325	628600	3671170	1 YRS	1.25
	ANNUAL	WELLPADP	0.61899	630370	3669190	1 YRS	0.46
	ANNUAL	WELLPADR	1.62661	630370	3669820	1 YRS	1.22

Concentrations are in micrograms per cubic meter

TABLE G-31 OPERATIONS SHORT TERM NO2 IMPACTS

OLM Modeling

File	Average	Group	Conc.	East(X)	North(Y)	Time
NO21HRrev	1-HR	ALL	209.08	628096.5	3670259.5	95112618
1995	1-HR	DSLFP	174.32	628096.5	3670259.5	95112618
	1-HR	OMALL	115.52	628484	3670695	95010108
NO21HRrev	1-HR	ALL	202.94	628066.81	3670259.5	96090909
1996	1-HR	DSLFP	170.88	628066.81	3670259.5	96090909
	1-HR	OMALL	125.46	628360	3670720	96022508
NO21HRrev	1-HR	ALL	174.95	628060	3670240	97102018
1997	1-HR	DSLFP	153.10	628060	3670240	97102018
	1-HR	OMALL	111.3	627130	3670960	97011108
NO21HRrev	1-HR	ALL	197.46	628150	3670240	98091809
1998	1-HR	DSLFP	144.84	628150	3670240	98091809
	1-HR	OMALL	94.18	628484	3670695	98083109
NO21HRrev	1-HR	ALL	177.46	627977.63	3670259.75	99032408
1999	1-HR	DSLFP	158.93	628096.5	3670259.5	99092407
	1-HR	OMALL	93.56	628305.63	3670695	99080608

OLM Modeling-Screening Review

File	Average	Group	Conc.	East(X)	North(Y)	Time
ENGSNO2	1-HR	ALL	174.37	628096.5	3670259.5	95112618
1995	1-HR	480VDSL	125.36	627858.69	3670259.75	95102211
	1-HR	4160VDSL	109.37			
	1-HR	DSLFP	174.32	628096.5	3670259.5	95112618
ENGSNO2	1-HR	ALL	172.97	627100	3670900	96092324
1996	1-HR	480VDSL	106.60	627880	3670240	96121510
	1-HR	4160VDSL	131.90	627755.44	3670703.5	96042417
	1-HR	DSLFP	170.88	628066.81	3670259	96090909
ENGSNO2	1-HR	ALL	160.29	627710	3670260	97040318
1997	1-HR	480VDSL	125.53	627710	3670260	97070819
	1-HR	4160VDSL	144.31	627755.44	3670703.5	97060718
	1-HR	DSLFP	153.10	628060	3670240	97102018
ENGSNO2	1-HR	ALL	193.97	627710	3670260	98040218
1998	1-HR	480VDSL	126.12	627710	3670260	98040218
	1-HR	4160VDSL	140.91	627753.75	3670746	98071815
	1-HR	DSLFP	144.84	628150	3670240	98091809
ENGSNO2	1-HR	ALL	158.93	628096.5	3670259.5	99092407
1999	1-HR	480VDSL	126.94	627820	3670240	99101619
	1-HR	4160VDSL	119.73	627760.56	3670819	99031717
	1-HR	DSLFP	158.93	628096.5	3670259.5	99092407

Concentrations are in micrograms per cubic meter

TABLE G-31 OPERATIONS SHORT TERM NO2 IMPACTS (Continued)
ISCST3 Modeling

1 & 24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperNOxst95.USF	1-HR	ALL	311.01752	627100	3670900	95032006
	1-HR	480VDSL	144.37247	627710	3670260	95070805
	1-HR	4160VDSL	173.6537	627850	3670720	95080906
	1-HR	DSLFP	220.93613	628037	3670259.5	95021520
	1-HR	OMEX1ALL	61.11702	628424.5	3670695	95010108
	1-HR	OMEX2ALL	109.84692	627100	3670900	95031506
	1-HR	OMALL	122.11068	627100	3670930	95032006
	24-HR	ALL	59.52995	628096.5	3670259.5	95101324
	24-HR	480VDSL	20.78239	627710.12	3670318	95072424
	24-HR	4160VDSL	28.53531	627755.44	3670703.5	95081524
	24-HR	DSLFP	35.06844	628096.5	3670259.5	95101324
	24-HR	OMEX1ALL	23.1676	628275.88	3670695	95061624
	24-HR	OMEX2ALL	24.9191	627755.44	3670703.5	95103024
	24-HR	OMALL	42.77226	628216.38	3670695	95041724
OperNOxst96.USF	1-HR	ALL	304.22372	627100	3670900	96091705
	1-HR	480VDSL	229.25473	627858.69	3670259.75	96042807
	1-HR	4160VDSL	150.07883	627919.12	3670695	96070702
	1-HR	DSLFP	219.9612	628037	3670259.5	96102706
	1-HR	OMEX1ALL	65.48469	628330	3670720	96022508
	1-HR	OMEX2ALL	107.68604	627130	3670960	96022802
	1-HR	OMALL	125.39145	628360	3670720	96022508
	24-HR	ALL	81.2295	627755.44	3670703.5	96071424
	24-HR	480VDSL	29.04535	627858.69	3670259.75	96010224
	24-HR	4160VDSL	44.06087	627755.44	3670703.5	96071424
	24-HR	DSLFP	29.10016	628096.5	3670259.5	96112724
	24-HR	OMEX1ALL	22.81664	628216.38	3670695	96041724
	24-HR	OMEX2ALL	28.61587	627755.44	3670703.5	96071424
	24-HR	OMALL	45.28656	628216.38	3670695	96041724
OperNOxst97.USF	1-HR	ALL	303.72433	627100	3670900	97081203
	1-HR	480VDSL	141.18761	627710	3670260	97040318
	1-HR	4160VDSL	198.10582	627859.69	3670695	97070706
	1-HR	DSLFP	222.94913	628007.31	3670259.5	97021320
	1-HR	OMEX1ALL	91.64651	628335.31	3670695	97123008
	1-HR	OMEX2ALL	112.06875	627130	3670930	97122103
	1-HR	OMALL	165.0959	628365.12	3670695	97123008
	24-HR	ALL	75.10921	628120	3670240	97022424
	24-HR	480VDSL	22.66216	627880	3670240	97121124
	24-HR	4160VDSL	29.38144	627753.75	3670746	97080824
	24-HR	DSLFP	37.13186	628096.5	3670259.5	97022424
	24-HR	OMEX1ALL	27.96415	628246.19	3670695	97062324
	24-HR	OMEX2ALL	25.88371	627755.44	3670703.5	97080824
	24-HR	OMALL	47.15237	628246.19	3670695	97052424

Concentrations are in micrograms per cubic meter

TABLE G-31 OPERATIONS SHORT TERM NO2 IMPACTS (Concluded)
ISCST3 Modeling

1 & 24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperNOxst98.USF	1-HR	ALL	303.25958	627100	3670900	98081501
	1-HR	480VDSL	142.87289	627888.38	3670259.75	98100506
	1-HR	4160VDSL	177.59535	627919.12	3670695	98081201
	1-HR	DSLFP	214.43475	628066.81	3670259.5	98121702
	1-HR	OMEX1ALL	56.21402	628305.62	3670695	98033118
	1-HR	OMEX2ALL	110.55287	627100	3670900	98021006
	1-HR	OMALL	124.23096	627100	3670900	98021006
	24-HR	ALL	70.9305	628066.81	3670259.5	98121624
	24-HR	480VDSL	20.07364	627828.88	3670259.75	98051724
	24-HR	4160VDSL	33.344	627753.75	3670746	98071924
	24-HR	DSLFP	39.10098	628066.81	3670259.5	98121624
	24-HR	OMEX1ALL	25.17057	628246.19	3670695	98032724
	24-HR	OMEX2ALL	30.22396	627721.44	3670707	98022324
	24-HR	OMALL	45.18192	628246.19	3670695	98032724
OperNOxst99.USF	1-HR	ALL	303.94971	627100	3670900	99061602
	1-HR	480VDSL	151.06303	627850	3670030	99101707
	1-HR	4160VDSL	150.07458	627919.12	3670695	99070621
	1-HR	DSLFP	223.03049	628007.31	3670259.5	99122122
	1-HR	OMEX1ALL	57.24955	628365.12	3670695	99072006
	1-HR	OMEX2ALL	107.73409	627100	3670900	99041405
	1-HR	OMALL	121.04214	627100	3670900	99041405
	24-HR	ALL	94.30045	627755.44	3670703.5	99072724
	24-HR	480VDSL	29.74209	627850	3670210	99092824
	24-HR	4160VDSL	46.91383	627755.44	3670703.5	99070624
	24-HR	DSLFP	31.07128	627977.62	3670259.75	99092824
	24-HR	OMEX1ALL	27.98872	628246.19	3670695	99033124
	24-HR	OMEX2ALL	39.55623	627755.44	3670703.5	99082924
	24-HR	OMALL	46.76714	628246.19	3670695	99033124

Concentrations are in micrograms per cubic meter

TABLE G-32 OPERATIONS NOX IMPACTS

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time	ARM Conc
OperNOxann95.USF	ANNUAL	ALL	0.51209	628484	3670695	1 YRS	0.38
	ANNUAL	480VDSL	0.04482	627710.12	3670318	1 YRS	0.03
	ANNUAL	4160VDSL	0.05378	628630	3670630	1 YRS	0.04
	ANNUAL	DSLFP	0.07375	628483.81	3670607.75	1 YRS	0.06
	ANNUAL	OMEX1ALL	0.18322	628246.19	3670695	1 YRS	0.14
	ANNUAL	OMEX2ALL	0.24671	628484	3670695	1 YRS	0.19
	ANNUAL	OMALL	0.35652	628246.19	3670695	1 YRS	0.27
OperNOxann96.USF	ANNUAL	ALL	0.48162	628484	3670695	1 YRS	0.36
	ANNUAL	480VDSL	0.04523	628483.5	3670462.5	1 YRS	0.03
	ANNUAL	4160VDSL	0.05784	628484	3670695	1 YRS	0.04
	ANNUAL	DSLFP	0.06984	628483.62	3670520.5	1 YRS	0.05
	ANNUAL	OMEX1ALL	0.19175	628246.19	3670695	1 YRS	0.14
	ANNUAL	OMEX2ALL	0.22982	628484	3670695	1 YRS	0.17
	ANNUAL	OMALL	0.36194	628246.19	3670695	1 YRS	0.27
OperNOxann97.USF	ANNUAL	ALL	0.44934	628484	3670695	1 YRS	0.34
	ANNUAL	480VDSL	0.04592	627710.31	3670376	1 YRS	0.03
	ANNUAL	4160VDSL	0.05369	627100	3670900	1 YRS	0.04
	ANNUAL	DSLFP	0.07241	628483.62	3670520.5	1 YRS	0.05
	ANNUAL	OMEX1ALL	0.16494	628246.19	3670695	1 YRS	0.12
	ANNUAL	OMEX2ALL	0.22086	628484	3670695	1 YRS	0.17
	ANNUAL	OMALL	0.32509	628484	3670695	1 YRS	0.24
OperNOxann98.USF	ANNUAL	ALL	0.45989	628484	3670695	1 YRS	0.34
	ANNUAL	480VDSL	0.04834	628483.38	3670433.5	1 YRS	0.04
	ANNUAL	4160VDSL	0.06309	628630	3670570	1 YRS	0.05
	ANNUAL	DSLFP	0.07561	628483.38	3670433.5	1 YRS	0.06
	ANNUAL	OMEX1ALL	0.17494	628246.19	3670695	1 YRS	0.13
	ANNUAL	OMEX2ALL	0.21437	628484	3670695	1 YRS	0.16
	ANNUAL	OMALL	0.33565	628484	3670695	1 YRS	0.25
OperNOxann99.USF	ANNUAL	ALL	0.42259	628484	3670695	1 YRS	0.32
	ANNUAL	480VDSL	0.04871	628483.38	3670433.5	1 YRS	0.04
	ANNUAL	4160VDSL	0.06262	627755.44	3670703.5	1 YRS	0.05
	ANNUAL	DSLFP	0.08279	628483.38	3670433.5	1 YRS	0.06
	ANNUAL	OMEX1ALL	0.1461	628275.88	3670695	1 YRS	0.11
	ANNUAL	OMEX2ALL	0.20649	628484	3670695	1 YRS	0.15
	ANNUAL	OMALL	0.32844	628484	3670695	1 YRS	0.25

Concentrations are in micrograms per cubic meter

TABLE G-33 TEMPORARY NO2 1 HOUR IMPACTS

OLM MODELING

File	Average	Group	Conc.	East(X)	North(Y)	Time
NO2WELLI -1995	1-HR	WELLPADI	205.76	627100	3670900	95070621
NO2WELLI -1996	1-HR	WELLPADI	217.20	627100	3670900	96082224
NO2WELLI -1997	1-HR	WELLPADI	236.49	627100	3670900	97072723
NO2WELLI -1998	1-HR	WELLPADI	209.96	627100	3670900	98121921
NO2WELLI -1999	1-HR	WELLPADI	221.95	627100	3670900	99071720

Concentrations are in micrograms per cubic meter

TABLE G-34 CONSTRUCTION CO IMPACTS

1 & 8 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
CO short_95_CO.USF	1-HR	ALL	184.75952	627755.44	3670703.5	95081008
	1-HR	ALLEXHST	184.75952	627755.44	3670703.5	95081008
	1-HR	ALLWELLS	81.6502	627100	3670900	95070621
	1-HR	EXHAUST1	135.36594	628007.31	3670259.5	95041010
	1-HR	EXHAUST2	159.22664	627755.44	3670703.5	95081008
	1-HR	EXHAUST3	132.99788	628484	3670695	95030514
	1-HR	EXHAUST4	131.67545	628483	3670259	95051508
	1-HR	WELLPADC	26.84404	627640	3670450	95092717
	1-HR	WELLPADI	81.6502	627100	3670900	95070621
	1-HR	WELLPADL	37.18113	627900	3669700	95040923
	8-HR	ALL	87.57031	627755.44	3670703.5	95011016
	8-HR	ALLEXHST	87.57031	627755.44	3670703.5	95011016
	8-HR	ALLWELLS	33.40555	627100	3670900	95010508
	8-HR	EXHAUST1	65.52069	627970	3670240	95032516
	8-HR	EXHAUST2	66.76775	627755.44	3670703.5	95011016
	8-HR	EXHAUST3	54.05764	628484	3670695	95011616
	8-HR	EXHAUST4	64.25662	628360	3670210	95032516
	8-HR	WELLPADC	13.13712	627580	3670450	95081116
	8-HR	WELLPADI	31.31336	627100	3670900	95010508
	8-HR	WELLPADL	18.46655	628000	3669940	95051316
CO short_96_CO.USF	1-HR	ALL	191.67993	627755.44	3670703.5	96081309
	1-HR	ALLEXHST	191.67993	627755.44	3670703.5	96081309
	1-HR	ALLWELLS	81.22459	627100	3670900	96082224
	1-HR	EXHAUST1	132.26997	627977.62	3670259.75	96102614
	1-HR	EXHAUST2	159.72066	627755.44	3670703.5	96071315
	1-HR	EXHAUST3	141.71736	628484	3670695	96080409
	1-HR	EXHAUST4	143.07272	628304.62	3670259.25	96040509
	1-HR	WELLPADC	31.7546	627400	3670570	96070906
	1-HR	WELLPADI	81.22459	627100	3670900	96082224
	1-HR	WELLPADL	42.59562	627850	3669700	96040510
	8-HR	ALL	88.49139	627755.44	3670703.5	96081316
	8-HR	ALLEXHST	88.49139	627755.44	3670703.5	96081316
	8-HR	ALLWELLS	25.9733	627047	3670845	96083016
	8-HR	EXHAUST1	57.17836	627977.62	3670259.75	96030616
	8-HR	EXHAUST2	74.26674	627755.44	3670703.5	96081316
	8-HR	EXHAUST3	68.20935	628484	3670695	96012516
	8-HR	EXHAUST4	59.6819	628360	3670240	96030616
	8-HR	WELLPADC	13.63716	627610	3670450	96071416
	8-HR	WELLPADI	24.83127	627047	3670845	96083016
	8-HR	WELLPADL	17.79859	627760	3669700	96042816
CO short_97_CO.USF	1-HR	ALL	192.83495	627100	3670900	97011108
	1-HR	ALLEXHST	187.88232	627755.44	3670703.5	97070808
	1-HR	ALLWELLS	81.22462	627100	3670900	97072723
	1-HR	EXHAUST1	136.76506	627940	3670240	97010614
	1-HR	EXHAUST2	157.48111	627755.44	3670703.5	97033016
	1-HR	EXHAUST3	136.7748	628484	3670695	97111309
	1-HR	EXHAUST4	148.98289	628304.62	3670259.25	97042410
	1-HR	WELLPADC	29.36073	627490	3670660	97051206
	1-HR	WELLPADI	81.22462	627100	3670900	97072723
	1-HR	WELLPADL	43.6607	627850	3669700	97010613
	8-HR	ALL	85.96709	628484	3670695	97010316
	8-HR	ALLEXHST	82.29487	627918.12	3670259.75	97040316
	8-HR	ALLWELLS	26.61826	627070	3670845	97040816
	8-HR	EXHAUST1	69.19534	627970	3670210	97022416
	8-HR	EXHAUST2	54.67826	627755.44	3670703.5	97060816
	8-HR	EXHAUST3	68.1394	628484	3670695	97010316
	8-HR	EXHAUST4	67.70596	628330	3670240	97022416
	8-HR	WELLPADC	14.36147	627550	3670360	97062616
	8-HR	WELLPADI	26.58796	627070	3670845	97040816
	8-HR	WELLPADL	20.51643	627910	3669700	97022516

Concentrations are in micrograms per cubic meter

TABLE G-34 CONSTRUCTION CO IMPACTS (Continued)

1 & 8 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
CO short_98_CO.USF	1-HR	ALL	188.85925	627755.44	3670703.5	98080509
	1-HR	ALLEXHST	188.85925	627755.44	3670703.5	98080509
	1-HR	ALLWELLS	78.90804	627100	3670900	98121921
	1-HR	EXHAUST1	139.28529	627977.62	3670259.75	98030709
	1-HR	EXHAUST2	159.13023	627755.44	3670703.5	98080509
	1-HR	EXHAUST3	137.98885	628484	3670695	98021508
	1-HR	EXHAUST4	138.42308	628300	3670240	98120909
	1-HR	WELLPADC	27.16359	627710	3670260	98120918
	1-HR	WELLPADI	78.90804	627100	3670900	98121921
	1-HR	WELLPADL	42.55675	627820	3669700	98120911
	8-HR	ALL	111.08631	627755.44	3670703.5	98022316
	8-HR	ALLEXHST	111.08631	627755.44	3670703.5	98022316
	8-HR	ALLWELLS	27.13501	627116	3670845	98062516
	8-HR	EXHAUST1	63.10532	627970	3670210	98111916
	8-HR	EXHAUST2	93.53844	627755.44	3670703.5	98022316
	8-HR	EXHAUST3	68.4739	628127.19	3670695	98022316
	8-HR	EXHAUST4	67.49558	628330	3670210	98111916
	8-HR	WELLPADC	13.88018	627610	3670480	98071616
	8-HR	WELLPADI	27.13471	627116	3670845	98062516
	8-HR	WELLPADL	19.12433	628030	3669970	98050724
CO short_99_CO.USF	1-HR	ALL	180.61688	627755.44	3670703.5	99072713
	1-HR	ALLEXHST	180.61688	627755.44	3670703.5	99072713
	1-HR	ALLWELLS	81.96195	627100	3670900	99071720
	1-HR	EXHAUST1	138.46654	627977.62	3670259.75	99032311
	1-HR	EXHAUST2	156.70367	627755.44	3670703.5	99072713
	1-HR	EXHAUST3	133.27763	628484	3670695	99030413
	1-HR	EXHAUST4	141.95782	628334.31	3670259.25	99121108
	1-HR	WELLPADC	27.16235	627640	3670450	99081311
	1-HR	WELLPADI	81.96195	627100	3670900	99071720
	1-HR	WELLPADL	44.32494	627850	3669700	99121111
	8-HR	ALL	104.88545	627755.44	3670703.5	99070616
	8-HR	ALLEXHST	104.88545	627755.44	3670703.5	99070616
	8-HR	ALLWELLS	22.74033	626950	3670870	99072716
	8-HR	EXHAUST1	76.67491	627880	3670180	99120316
	8-HR	EXHAUST2	90.59977	627755.44	3670703.5	99070616
	8-HR	EXHAUST3	78.5193	628157	3670695	99072716
	8-HR	EXHAUST4	70.30177	628270	3670240	99120316
	8-HR	WELLPADC	17.40009	627580	3670480	99070616
	8-HR	WELLPADI	18.64078	627100	3670900	99050808
	8-HR	WELLPADL	20.10469	627970	3669910	99042216

Concentrations are in micrograms per cubic meter

TABLE G-35 OPERATIONS AND TEMPORARY CO IMPACTS

OPERATIONS

1 & 8 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperCO95.USF	1-HR	ALL	2189.80859	628066.81	3670259.5	95092406
	1-HR	480VDSL	4.01035	627710	3670260	95070805
	1-HR	4160VDSL	11.13474	627850	3670720	95080906
	1-HR	DSLFP	9.67498	628037	3670259.5	95021520
	1-HR	OMEX1ALL	1503.97986	628067.81	3670695	95072607
	1-HR	OMEX2ALL	2180.58154	628066.81	3670259.5	95092406
	1-HR	OMALL	2189.80835	628066.81	3670259.5	95092406
	8-HR	ALL	426.41748	628097.5	3670695	95061324
	8-HR	480VDSL	1.33043	627710.12	3670289	95072516
	8-HR	4160VDSL	3.42663	627753.75	3670746	95081424
	8-HR	DSLFP	3.15469	628066.81	3670259.5	95111216
	8-HR	OMEX1ALL	302.76807	628097.5	3670695	95061324
	8-HR	OMEX2ALL	393.31924	628066.81	3670259.5	95021508
	8-HR	OMALL	426.11325	628097.5	3670695	95061324
OperCO96.USF	1-HR	ALL	1982.74304	628066.81	3670259.5	96092623
	1-HR	480VDSL	6.36819	627858.69	3670259.75	96042807
	1-HR	4160VDSL	9.62311	627919.12	3670695	96070702
	1-HR	DSLFP	9.63229	628037	3670259.5	96102706
	1-HR	OMEX1ALL	1539.30444	628008.31	3670695	96092006
	1-HR	OMEX2ALL	1974.15198	628066.81	3670259.5	96092623
	1-HR	OMALL	1982.74255	628066.81	3670259.5	96092623
	8-HR	ALL	561.38733	628097.5	3670695	96021324
	8-HR	480VDSL	1.5195	627850	3670240	96010216
	8-HR	4160VDSL	4.77324	627755.44	3670703.5	96071424
	8-HR	DSLFP	2.78156	628066.81	3670259.5	96033016
	8-HR	OMEX1ALL	352.96085	628067.81	3670695	96040624
	8-HR	OMEX2ALL	436.54272	627948.81	3670695	96102408
	8-HR	OMALL	561.38733	628097.5	3670695	96021324
OperCO97.USF	1-HR	ALL	2129.87598	628066.81	3670259.5	97122402
	1-HR	480VDSL	3.92188	627710	3670260	97040318
	1-HR	4160VDSL	12.70262	627859.69	3670695	97070706
	1-HR	DSLFP	9.76313	628007.31	3670259.5	97021320
	1-HR	OMEX1ALL	1482.53003	628067.81	3670695	97122607
	1-HR	OMEX2ALL	2121.05762	628066.81	3670259.5	97122402
	1-HR	OMALL	2129.87573	628066.81	3670259.5	97122402
	8-HR	ALL	557.13684	627948.81	3670695	97021924
	8-HR	480VDSL	1.42652	627880	3670240	97121116
	8-HR	4160VDSL	3.54526	627752.06	3670786.75	97080824
	8-HR	DSLFP	3.15401	628037	3670259.5	97030408
	8-HR	OMEX1ALL	361.77991	628067.81	3670695	97041808
	8-HR	OMEX2ALL	542.07678	627948.81	3670695	97021924
	8-HR	OMALL	555.68976	627948.81	3670695	97021924

Concentrations are in micrograms per cubic meter

TABLE G-35 OPERATIONS AND TEMPORARY CO IMPACTS (Continued)

OPERATIONS

1 & 8 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperCO98.USF	1-HR	ALL	2108.18945	628066.81	3670259.5	98012904
	1-HR	480VDSL	3.96869	627888.38	3670259.75	98100506
	1-HR	4160VDSL	11.38748	627919.12	3670695	98081201
	1-HR	DSLFP	9.39028	628066.81	3670259.5	98121702
	1-HR	OMEX1ALL	1533.60364	628008.31	3670695	98101403
	1-HR	OMEX2ALL	2099.40771	628066.81	3670259.5	98012904
	1-HR	OMALL	2108.18896	628066.81	3670259.5	98012904
	8-HR	ALL	549.59198	628008.31	3670695	98121908
	8-HR	480VDSL	1.5334	627828.88	3670259.75	98051716
	8-HR	4160VDSL	3.9455	627753.75	3670746	98071816
	8-HR	DSLFP	3.36614	628126.19	3670259.5	98091208
	8-HR	OMEX1ALL	363.6218	628067.81	3670695	98121908
	8-HR	OMEX2ALL	399.00684	627948.81	3670695	98101008
	8-HR	OMALL	549.24316	628008.31	3670695	98121908
OperCO99.USF	1-HR	ALL	1974.52686	628066.81	3670259.5	99083104
	1-HR	480VDSL	4.1962	627850	3670030	99101707
	1-HR	4160VDSL	9.62284	627919.12	3670695	99070621
	1-HR	DSLFP	9.7667	628007.31	3670259.5	99122122
	1-HR	OMEX1ALL	1527.52795	628008.31	3670695	99121923
	1-HR	OMEX2ALL	1965.94702	628066.81	3670259.5	99083104
	1-HR	OMALL	1974.52637	628066.81	3670259.5	99083104
	8-HR	ALL	529.33984	628127.19	3670695	99122516
	8-HR	480VDSL	1.92739	627888.38	3670259.75	99120316
	8-HR	4160VDSL	6.64316	627755.44	3670703.5	99072716
	8-HR	DSLFP	2.58702	628037	3670259.5	99120116
	8-HR	OMEX1ALL	371.60577	628097.5	3670695	99100208
	8-HR	OMEX2ALL	466.81027	628066.81	3670259.5	99120516
	8-HR	OMALL	529.3363	628127.19	3670695	99122516

TEMPORARY

1 & 8 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempCO95.USF	1-HR	WDRILLI	81.6502	627100	3670900	95070621
	8-HR	WDRILLI	31.31336	627100	3670900	95010508
TempCO96.USF	1-HR	WDRILLI	81.22459	627100	3670900	96082224
	8-HR	WDRILLI	24.83127	627047	3670845	96083016
TempCO97.USF	1-HR	WDRILLI	81.22462	627100	3670900	97072723
	8-HR	WDRILLI	26.58796	627070	3670845	97040816
TempCO98.USF	1-HR	WDRILLI	78.90804	627100	3670900	98121921
	8-HR	WDRILLI	27.13471	627116	3670845	98062516
TempCO99.USF	1-HR	WDRILLI	81.96195	627100	3670900	99071720
	8-HR	WDRILLI	18.64078	627100	3670900	99050808

Concentrations are in micrograms per cubic meter

TABLE G-36 CONSTRUCTION SO2 IMPACTS

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
SO2 long_95_SO2.USF	ANNUAL	ALL	0.15216	628483	3670259	1 YRS
	ANNUAL	ALLEXHST	0.07574	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.09591	628630	3671230	1 YRS
	ANNUAL	EXHAUST1	0.04028	627710.31	3670405	1 YRS
	ANNUAL	EXHAUST2	0.03933	627710.88	3670637	1 YRS
	ANNUAL	EXHAUST3	0.04369	628484	3670695	1 YRS
	ANNUAL	EXHAUST4	0.03742	628483.31	3670404.25	1 YRS
	ANNUAL	WELLPADN	0.04916	628600	3671230	1 YRS
	ANNUAL	WELLPADJ	0.04103	628150	3670930	1 YRS
	ANNUAL	WELLPADL	0.0397	628090	3669970	1 YRS
	ANNUAL	WELLPADI	0.02689	627100	3670900	1 YRS
	ANNUAL	WELLPADC	0.02162	628484	3670695	1 YRS
	ANNUAL	WELLPADR	0.04038	630370	3669850	1 YRS
	ANNUAL	WELLPADP	0.01556	630340	3669220	1 YRS
	ANNUAL	CTWELL	0.02114	628690	3670690	1 YRS
	ANNUAL	BPWELL	0.02036	628008.31	3670695	1 YRS
SO2 long_96_SO2.USF	ANNUAL	ALL	0.14612	628484	3670695	1 YRS
	ANNUAL	ALLEXHST	0.08144	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.10497	627100	3670900	1 YRS
	ANNUAL	EXHAUST1	0.04104	627710.31	3670405	1 YRS
	ANNUAL	EXHAUST2	0.04	627710.88	3670637	1 YRS
	ANNUAL	EXHAUST3	0.04371	628484	3670695	1 YRS
	ANNUAL	EXHAUST4	0.03377	628483.31	3670404.25	1 YRS
	ANNUAL	WELLPADN	0.05225	628600	3671230	1 YRS
	ANNUAL	WELLPADJ	0.04339	628150	3670930	1 YRS
	ANNUAL	WELLPADL	0.04193	628060	3669970	1 YRS
	ANNUAL	WELLPADI	0.02713	627100	3670900	1 YRS
	ANNUAL	WELLPADC	0.02244	627100	3670900	1 YRS
	ANNUAL	WELLPADR	0.04188	630370	3669850	1 YRS
	ANNUAL	WELLPADP	0.0163	630340	3669220	1 YRS
	ANNUAL	CTWELL	0.02228	628690	3670690	1 YRS
	ANNUAL	BPWELL	0.02149	628008.31	3670695	1 YRS
SO2 long_97_SO2.USF	ANNUAL	ALL	0.14094	628483	3670259	1 YRS
	ANNUAL	ALLEXHST	0.07509	628097.5	3670695	1 YRS
	ANNUAL	ALLWELLS	0.10862	627100	3670900	1 YRS
	ANNUAL	EXHAUST1	0.0469	627710.31	3670405	1 YRS
	ANNUAL	EXHAUST2	0.04585	627710.88	3670637	1 YRS
	ANNUAL	EXHAUST3	0.03926	628483.88	3670637	1 YRS
	ANNUAL	EXHAUST4	0.03948	628483.31	3670404.25	1 YRS
	ANNUAL	WELLPADN	0.04535	628630	3671230	1 YRS
	ANNUAL	WELLPADJ	0.0401	628120	3670900	1 YRS
	ANNUAL	WELLPADL	0.03858	628090	3669970	1 YRS
	ANNUAL	WELLPADI	0.03107	627100	3670900	1 YRS
	ANNUAL	WELLPADC	0.02219	627520	3670420	1 YRS
	ANNUAL	WELLPADR	0.03947	630370	3669850	1 YRS
	ANNUAL	WELLPADP	0.01521	630340	3669220	1 YRS
	ANNUAL	CTWELL	0.02053	628720	3670690	1 YRS
	ANNUAL	BPWELL	0.01967	628038	3670695	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-36 CONSTRUCTION SO2 IMPACTS (Continued)

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
SO2 long_98_SO2.USF	ANNUAL	ALL	0.15593	628483	3670259	1 YRS
	ANNUAL	ALLEXHST	0.08419	628483.31	3670375.25	1 YRS
	ANNUAL	ALLWELLS	0.08899	628600	3671170	1 YRS
	ANNUAL	EXHAUST1	0.03068	627710.38	3670434	1 YRS
	ANNUAL	EXHAUST2	0.03701	627755.44	3670703.5	1 YRS
	ANNUAL	EXHAUST3	0.04745	628483.81	3670607.75	1 YRS
	ANNUAL	EXHAUST4	0.04743	628483.31	3670375.25	1 YRS
	ANNUAL	WELLPADN	0.04868	628600	3671170	1 YRS
	ANNUAL	WELLPADJ	0.04824	628150	3670900	1 YRS
	ANNUAL	WELLPADL	0.04679	628060	3669940	1 YRS
	ANNUAL	WELLPADI	0.0282	627100	3670900	1 YRS
	ANNUAL	WELLPADC	0.0258	628483	3670259	1 YRS
	ANNUAL	WELLPADR	0.04794	630340	3669820	1 YRS
	ANNUAL	WELLPADP	0.01834	630340	3669190	1 YRS
	ANNUAL	CTWELL	0.025	628690	3670660	1 YRS
	ANNUAL	BPWELL	0.0218	628038	3670695	1 YRS
SO2 long_99_SO2.USF	ANNUAL	ALL	0.14164	628483	3670259	1 YRS
	ANNUAL	ALLEXHST	0.07944	628157	3670695	1 YRS
	ANNUAL	ALLWELLS	0.08625	630370	3669820	1 YRS
	ANNUAL	EXHAUST1	0.03463	627710.5	3670463	1 YRS
	ANNUAL	EXHAUST2	0.05072	627755.44	3670703.5	1 YRS
	ANNUAL	EXHAUST3	0.04492	628157	3670695	1 YRS
	ANNUAL	EXHAUST4	0.04007	628483.31	3670404.25	1 YRS
	ANNUAL	WELLPADN	0.04664	628600	3671170	1 YRS
	ANNUAL	WELLPADJ	0.04646	628120	3670870	1 YRS
	ANNUAL	WELLPADL	0.0443	628060	3669910	1 YRS
	ANNUAL	WELLPADI	0.02459	626980	3670870	1 YRS
	ANNUAL	WELLPADC	0.02639	628483	3670259	1 YRS
	ANNUAL	WELLPADR	0.04561	630370	3669820	1 YRS
	ANNUAL	WELLPADP	0.01739	630370	3669190	1 YRS
	ANNUAL	CTWELL	0.02321	628720	3670660	1 YRS
	ANNUAL	BPWELL	0.01859	628067.81	3670695	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-36 CONSTRUCTION SO2 IMPACTS (Continued)

SHORT TERM (1, 3, 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
SO2 short_95_SO2 13.USF	1-HR	ALL	18.77955	627100	3670900	95070621
	1-HR	ALLEXHST	4.47094	627755.44	3670703.5	95081008
	1-HR	ALLWELLS	18.77955	627100	3670900	95070621
	1-HR	EXHAUST1	3.27568	628007.31	3670259.5	95041010
	1-HR	EXHAUST2	3.85308	627755.44	3670703.5	95081008
	1-HR	EXHAUST3	3.21838	628484	3670695	95030514
	1-HR	EXHAUST4	3.18638	628483	3670259	95051508
	1-HR	WELLPADC	6.17413	627640	3670450	95092717
	1-HR	WELLPADI	18.77955	627100	3670900	95070621
	1-HR	WELLPADL	8.55166	627900	3669700	95040923
	3-HR	ALL	11.95247	627100	3670900	95010506
	3-HR	ALLEXHST	3.1984	628484	3670695	95030515
	3-HR	ALLWELLS	11.95247	627100	3670900	95010506
	3-HR	EXHAUST1	2.51471	627970	3670240	95032515
	3-HR	EXHAUST2	2.39607	627755.44	3670703.5	95031009
	3-HR	EXHAUST3	2.8089	628484	3670695	95030515
	3-HR	EXHAUST4	2.39209	628360	3670180	95032515
	3-HR	WELLPADC	4.17928	627880	3670120	95032515
	3-HR	WELLPADI	11.95247	627100	3670900	95010506
	3-HR	WELLPADL	5.80928	628000	3669940	95061618
	24-HR	ALL	3.98515	628510	3671230	95050524
	24-HR	ALLEXHST	0.77058	627755.44	3670703.5	95011024
	24-HR	ALLWELLS	3.98391	628510	3671230	95050524
	24-HR	EXHAUST1	0.66801	627970	3670240	95032524
	24-HR	EXHAUST2	0.58753	627755.44	3670703.5	95011024
	24-HR	EXHAUST3	0.5451	628484	3670695	95030524
	24-HR	EXHAUST4	0.65537	628360	3670210	95032524
	24-HR	WELLPADI	2.40069	627100	3670900	95010524
	24-HR	WELLPADJ	3.08661	628090	3670900	95061624
	24-HR	WELLPADN	3.15708	628510	3671230	95050524
SO2 short_96_SO2 13.USF	1-HR	ALL	18.68166	627100	3670900	96082224
	1-HR	ALLEXHST	4.63841	627755.44	3670703.5	96081309
	1-HR	ALLWELLS	18.68166	627100	3670900	96082224
	1-HR	EXHAUST1	3.20076	627977.62	3670259.75	96102614
	1-HR	EXHAUST2	3.86504	627755.44	3670703.5	96071315
	1-HR	EXHAUST3	3.42938	628484	3670695	96080409
	1-HR	EXHAUST4	3.46218	628304.62	3670259.25	96040509
	1-HR	WELLPADC	7.30356	627400	3670570	96070906
	1-HR	WELLPADI	18.68166	627100	3670900	96082224
	1-HR	WELLPADL	9.79699	627850	3669700	96040510
	3-HR	ALL	9.0005	627047	3670845	96080312
	3-HR	ALLEXHST	2.57699	628510	3670360	96091315
	3-HR	ALLWELLS	9.00037	627047	3670845	96080312
	3-HR	EXHAUST1	2.42052	628000	3670210	96112915
	3-HR	EXHAUST2	1.97574	627859.69	3670695	96083015
	3-HR	EXHAUST3	2.0001	628510	3670600	96091315
	3-HR	EXHAUST4	2.3789	628360	3670240	96112915
	3-HR	WELLPADC	4.78516	628000	3670240	96022118
	3-HR	WELLPADI	8.73095	627047	3670845	96080312
	3-HR	WELLPADL	6.16868	627760	3669670	96042812
	24-HR	ALL	5.06068	628540	3671230	96041724
	24-HR	ALLEXHST	0.95223	627755.44	3670703.5	96081324
	24-HR	ALLWELLS	5.05332	628540	3671230	96041724
	24-HR	EXHAUST1	0.52482	627940	3670180	96112724
	24-HR	EXHAUST2	0.79886	627755.44	3670703.5	96081324
	24-HR	EXHAUST3	0.60535	628484	3670695	96041724
	24-HR	EXHAUST4	0.5806	628300	3670240	96112724
	24-HR	WELLPADI	2.4436	627047	3670845	96083024
	24-HR	WELLPADJ	2.86292	628120	3670960	96041724
	24-HR	WELLPADN	4.02602	628540	3671230	96041724

Concentrations are in micrograms per cubic meter

TABLE G-36 CONSTRUCTION SO2 IMPACTS (Continued)

SHORT TERM (1, 3, 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
SO2 short_97_SO2 13.USF	1-HR	ALL	18.68166	627100	3670900	97072723
	1-HR	ALLEXHST	4.54651	627755.44	3670703.5	97070808
	1-HR	ALLWELLS	18.68166	627100	3670900	97072723
	1-HR	EXHAUST1	3.30954	627940	3670240	97010614
	1-HR	EXHAUST2	3.81084	627755.44	3670703.5	97033016
	1-HR	EXHAUST3	3.30977	628484	3670695	97111309
	1-HR	EXHAUST4	3.6052	628304.62	3670259.25	97042410
	1-HR	WELLPADC	6.75297	627490	3670660	97051206
	1-HR	WELLPADI	18.68166	627100	3670900	97072723
	1-HR	WELLPADL	10.04196	627850	3669700	97010613
	3-HR	ALL	11.38715	627116	3670845	97073012
	3-HR	ALLEXHST	3.05279	628304.62	3670259.25	97010615
	3-HR	ALLWELLS	11.38715	627116	3670845	97073012
	3-HR	EXHAUST1	2.47404	627970	3670240	97022515
	3-HR	EXHAUST2	2.47079	627755.44	3670703.5	97060815
	3-HR	EXHAUST3	2.06527	628270	3670720	97040815
	3-HR	EXHAUST4	2.64387	628300	3670240	97010615
	3-HR	WELLPADC	4.9824	627910	3670180	97040121
	3-HR	WELLPADI	11.38715	627116	3670845	97073012
	3-HR	WELLPADL	8.45862	627900	3669700	97021303
	24-HR	ALL	4.34149	628600	3671230	97052424
	24-HR	ALLEXHST	0.78059	628330	3670240	97022424
	24-HR	ALLWELLS	4.33564	628600	3671230	97052424
	24-HR	EXHAUST1	0.70724	627970	3670210	97022424
	24-HR	EXHAUST2	0.46037	627755.44	3670703.5	97060824
	24-HR	EXHAUST3	0.52516	628484	3670695	97010324
	24-HR	EXHAUST4	0.71548	628330	3670240	97022424
	24-HR	WELLPADI	2.12706	627070	3670845	97040824
	24-HR	WELLPADJ	2.82734	628150	3670930	97062324
	24-HR	WELLPADN	3.6237	628600	3671230	97052424
SO2 short_98_SO2 13.USF	1-HR	ALL	18.14885	627100	3670900	98121921
	1-HR	ALLEXHST	4.57015	627755.44	3670703.5	98080509
	1-HR	ALLWELLS	18.14885	627100	3670900	98121921
	1-HR	EXHAUST1	3.37053	627977.62	3670259.75	98030709
	1-HR	EXHAUST2	3.85075	627755.44	3670703.5	98080509
	1-HR	EXHAUST3	3.33915	628484	3670695	98021508
	1-HR	EXHAUST4	3.34966	628300	3670240	98120909
	1-HR	WELLPADC	6.24763	627710	3670260	98120918
	1-HR	WELLPADI	18.14885	627100	3670900	98121921
	1-HR	WELLPADL	9.78805	627820	3669700	98120911
	3-HR	ALL	8.60008	627116	3670845	98062515
	3-HR	ALLEXHST	3.76145	627755.44	3670703.5	98022315
	3-HR	ALLWELLS	8.60008	627116	3670845	98062515
	3-HR	EXHAUST1	2.7629	628007.31	3670259.5	98021715
	3-HR	EXHAUST2	3.27852	627755.44	3670703.5	98022315
	3-HR	EXHAUST3	2.33639	628483.81	3670607.75	98102515
	3-HR	EXHAUST4	2.3459	628390	3670240	98021715
	3-HR	WELLPADC	4.58572	627610	3670450	98071612
	3-HR	WELLPADI	8.60008	627116	3670845	98062515
	3-HR	WELLPADL	6.74421	628000	3669700	98021715
	24-HR	ALL	4.28383	628540	3671230	98040624
	24-HR	ALLEXHST	1.00001	627755.44	3670703.5	98022324
	24-HR	ALLWELLS	4.27213	628540	3671230	98040624
	24-HR	EXHAUST1	0.51821	628007.31	3670259.5	98021724
	24-HR	EXHAUST2	0.84557	627755.44	3670703.5	98022324
	24-HR	EXHAUST3	0.74112	628484	3670695	98032924
	24-HR	EXHAUST4	0.60352	628483.5	3670462.5	98032924
	24-HR	WELLPADI	2.80561	626980	3670870	98071924
	24-HR	WELLPADJ	3.26501	628120	3670870	98101524
	24-HR	WELLPADN	3.53952	628600	3671170	98101524

Concentrations are in micrograms per cubic meter

TABLE G-36 CONSTRUCTION SO2 IMPACTS (Concluded)

SHORT TERM (1, 3, 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
SO2 short_99_SO2 13.USF	1-HR	ALL	18.85125	627100	3670900	99071720
	1-HR	ALLEXHST	4.3707	627755.44	3670703.5	99072713
	1-HR	ALLWELLS	18.85125	627100	3670900	99071720
	1-HR	EXHAUST1	3.35071	627977.62	3670259.75	99032311
	1-HR	EXHAUST2	3.79203	627755.44	3670703.5	99072713
	1-HR	EXHAUST3	3.22515	628484	3670695	99030413
	1-HR	EXHAUST4	3.4352	628334.31	3670259.25	99121108
	1-HR	WELLPADC	6.24734	627640	3670450	99081311
	1-HR	WELLPADI	18.85125	627100	3670900	99071720
	1-HR	WELLPADL	10.19474	627850	3669700	99121111
	3-HR	ALL	8.93493	627100	3670900	99071721
	3-HR	ALLEXHST	3.38058	628300	3670210	99010815
	3-HR	ALLWELLS	8.93493	627100	3670900	99071721
	3-HR	EXHAUST1	2.17064	627918.12	3670259.75	99010815
	3-HR	EXHAUST2	2.32972	627800.19	3670695	99081915
	3-HR	EXHAUST3	2.24549	628483.88	3670637	99031115
	3-HR	EXHAUST4	2.55245	628300	3670210	99010815
	3-HR	WELLPADC	5.23541	628000	3670210	99060221
	3-HR	WELLPADI	8.75337	627100	3670900	99071721
	3-HR	WELLPADL	6.64761	628030	3669700	99042418
	24-HR	ALL	5.52499	628570	3671230	99033124
	24-HR	ALLEXHST	0.82468	627910	3670210	99021124
	24-HR	ALLWELLS	5.52467	628570	3671230	99033124
	24-HR	EXHAUST1	0.59037	627880	3670180	99120324
	24-HR	EXHAUST2	0.71634	627755.44	3670703.5	99070624
	24-HR	EXHAUST3	0.72601	628157	3670695	99072724
	24-HR	EXHAUST4	0.56126	628483.31	3670404.25	99031124
	24-HR	WELLPADI	2.22145	626980	3670870	99070724
	24-HR	WELLPADJ	3.75367	628090	3670930	99033124
	24-HR	WELLPADN	4.69763	628570	3671230	99033124

Concentrations are in micrograms per cubic meter

TABLE G-37 OPERATIONS AND TEMPORARY SO2 IMPACTS
OPERATIONS

SHORT TERM (1, 3 & 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperSO2st95.USF	1-HR	ALL	50.74653	628066.81	3670259.5	95092406
	1-HR	480VDSL	5.68526	627710	3670260	95070805
	1-HR	4160VDSL	5.86885	627850	3670720	95080906
	1-HR	DSLFP	7.12387	628037	3670259.5	95021520
	1-HR	OMEX1ALL	7.44782	628067.81	3670695	95072607
	1-HR	OMEX2ALL	50.70077	628066.81	3670259.5	95092406
	1-HR	OMALL	50.74646	628066.81	3670259.5	95092406
	3-HR	ALL	21.56495	628066.81	3670259.5	95041209
	3-HR	480VDSL	3.40433	627858.69	3670259.75	95102212
	3-HR	4160VDSL	2.67215	627760.56	3670819	95011012
	3-HR	DSLFP	3.45678	628066.81	3670259.5	95111212
	3-HR	OMEX1ALL	3.23009	628097.5	3670695	95092424
	3-HR	OMEX2ALL	21.37035	628066.81	3670259.5	95041209
	3-HR	OMALL	21.56308	628066.81	3670259.5	95041209
	24-HR	ALL	5.25952	628007.31	3670259.5	95101324
	24-HR	480VDSL	0.81839	627710.12	3670318	95072424
	24-HR	4160VDSL	0.96439	627755.44	3670703.5	95081524
	24-HR	DSLFP	1.13075	628096.5	3670259.5	95101324
	24-HR	OMEX1ALL	0.83538	628275.88	3670695	95061624
	24-HR	OMEX2ALL	5.07705	628007.31	3670259.5	95101324
	24-HR	OMALL	5.08985	628007.31	3670259.5	95101324
OperSO2st96.USF	1-HR	ALL	45.94386	628066.81	3670259.5	96092623
	1-HR	480VDSL	9.02784	627858.69	3670259.75	96042807
	1-HR	4160VDSL	5.07211	627919.12	3670695	96070702
	1-HR	DSLFP	7.09243	628037	3670259.5	96102706
	1-HR	OMEX1ALL	7.62275	628008.31	3670695	96092006
	1-HR	OMEX2ALL	45.90107	628066.81	3670259.5	96092623
	1-HR	OMALL	45.94361	628066.81	3670259.5	96092623
	3-HR	ALL	15.31462	628066.81	3670259.5	96092624
	3-HR	480VDSL	3.56848	627858.69	3670259.75	96010215
	3-HR	4160VDSL	4.02503	627753.75	3670746	96090321
	3-HR	DSLFP	3.67389	628066.81	3670259.5	96102118
	3-HR	OMEX1ALL	3.34679	628067.81	3670695	96022003
	3-HR	OMEX2ALL	15.30036	628066.81	3670259.5	96092624
	3-HR	OMALL	15.31454	628066.81	3670259.5	96092624
	24-HR	ALL	6.42226	627755.44	3670703.5	96090324
	24-HR	480VDSL	1.14378	627858.69	3670259.75	96010224
	24-HR	4160VDSL	1.48909	627755.44	3670703.5	96071424
	24-HR	DSLFP	0.93831	628096.5	3670259.5	96112724
	24-HR	OMEX1ALL	0.79606	628216.38	3670695	96041724
	24-HR	OMEX2ALL	5.08129	627755.44	3670703.5	96090324
	24-HR	OMALL	5.10561	627755.44	3670703.5	96090324

Concentrations are in micrograms per cubic meter

TABLE G-37 OPERATIONS AND TEMPORARY SO2 IMPACTS (Continued)
OPERATIONS

SHORT TERM (1, 3 & 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperSO2st97.USF	1-HR	ALL	49.36068	628066.81	3670259.5	97122402
	1-HR	480VDSL	5.55984	627710	3670260	97040318
	1-HR	4160VDSL	6.69524	627859.69	3670695	97070706
	1-HR	DSLFP	7.18877	628007.31	3670259.5	97021320
	1-HR	OMEX1ALL	7.3416	628067.81	3670695	97122607
	1-HR	OMEX2ALL	49.31677	628066.81	3670259.5	97122402
	1-HR	OMALL	49.36044	628066.81	3670259.5	97122402
	3-HR	ALL	18.43421	627130	3670930	97081203
	3-HR	480VDSL	4.50307	627880	3670240	97010712
	3-HR	4160VDSL	4.28314	627752.06	3670786.75	97080821
	3-HR	DSLFP	3.4464	628126.19	3670259.5	97030106
	3-HR	OMEX1ALL	3.58102	628067.81	3670695	97041803
	3-HR	OMEX2ALL	17.92755	628066.81	3670259.5	97022006
	3-HR	OMALL	17.94197	628066.81	3670259.5	97022006
	24-HR	ALL	6.26379	628066.81	3670259.5	97022024
	24-HR	480VDSL	0.89242	627880	3670240	97121124
	24-HR	4160VDSL	0.99298	627753.75	3670746	97080824
	24-HR	DSLFP	1.19728	628096.5	3670259.5	97022424
	24-HR	OMEX1ALL	0.98616	628246.19	3670695	97062324
	24-HR	OMEX2ALL	5.44257	628066.81	3670259.5	97022024
	24-HR	OMALL	5.54742	628066.81	3670259.5	97022024
OperSO2st98.USF	1-HR	ALL	48.85712	628066.81	3670259.5	98012904
	1-HR	480VDSL	5.6262	627888.38	3670259.75	98100506
	1-HR	4160VDSL	6.00206	627919.12	3670695	98081201
	1-HR	DSLFP	6.91424	628066.81	3670259.5	98121702
	1-HR	OMEX1ALL	7.59452	628008.31	3670695	98101403
	1-HR	OMEX2ALL	48.81339	628066.81	3670259.5	98012904
	1-HR	OMALL	48.85687	628066.81	3670259.5	98012904
	3-HR	ALL	18.58778	627948.81	3670695	98101006
	3-HR	480VDSL	3.25816	627828.88	3670259.75	98051715
	3-HR	4160VDSL	3.12175	627721.44	3670707	98022315
	3-HR	DSLFP	4.84286	628126.19	3670259.5	98091209
	3-HR	OMEX1ALL	3.28522	628067.81	3670695	98051903
	3-HR	OMEX2ALL	18.55464	627948.81	3670695	98101006
	3-HR	OMALL	18.55464	627948.81	3670695	98101006
	24-HR	ALL	6.0703	628000	3670240	98121624
	24-HR	480VDSL	0.79048	627828.88	3670259.75	98051724
	24-HR	4160VDSL	1.1269	627753.75	3670746	98071924
	24-HR	DSLFP	1.26077	628066.81	3670259.5	98121624
	24-HR	OMEX1ALL	0.89	628067.81	3670695	98051924
	24-HR	OMEX2ALL	5.56824	628000	3670240	98121624
	24-HR	OMALL	5.64211	628000	3670240	98121624

Concentrations are in micrograms per cubic meter

TABLE G-37 OPERATIONS AND TEMPORARY SO2 IMPACTS (Continued)
OPERATIONS

SHORT TERM (1, 3 & 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperSO2st99.USF	1-HR	ALL	45.75304	628066.81	3670259.5	99083104
	1-HR	480VDSL	5.94872	627850	3670030	99101707
	1-HR	4160VDSL	5.07196	627919.12	3670695	99070621
	1-HR	DSLFP	7.1914	628007.31	3670259.5	99122122
	1-HR	OMEX1ALL	7.56444	628008.31	3670695	99121923
	1-HR	OMEX2ALL	45.71029	628066.81	3670259.5	99083104
	1-HR	OMALL	45.75278	628066.81	3670259.5	99083104
	3-HR	ALL	16.36407	628066.81	3670259.5	99112912
	3-HR	480VDSL	3.52901	627828.88	3670259.75	99121412
	3-HR	4160VDSL	3.95478	627755.44	3670703.5	99072712
	3-HR	DSLFP	3.40334	628096.5	3670259.5	99021021
	3-HR	OMEX1ALL	2.92002	628067.81	3670695	99030506
	3-HR	OMEX2ALL	15.6316	628066.81	3670259.5	99112912
	3-HR	OMALL	16.08097	628066.81	3670259.5	99112912
	24-HR	ALL	6.72651	627755.44	3670703.5	99072724
	24-HR	480VDSL	1.17122	627850	3670210	99092824
	24-HR	4160VDSL	1.58551	627755.44	3670703.5	99070624
	24-HR	DSLFP	1.00186	627977.62	3670259.75	99092824
	24-HR	OMEX1ALL	0.98905	628246.19	3670695	99033124
	24-HR	OMEX2ALL	4.99115	627755.44	3670703.5	99082924
	24-HR	OMALL	5.06851	627755.44	3670703.5	99082924

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperSO2ann95.USF	ANNUAL	ALL	0.10484	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00176	627710.12	3670318	1 YRS
	ANNUAL	4160VDSL	0.00181	628630	3670630	1 YRS
	ANNUAL	DSLFP	0.00237	628483.81	3670607.75	1 YRS
	ANNUAL	OMEX1ALL	0.00867	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.09546	628484	3670695	1 YRS
	ANNUAL	OMALL	0.09928	628484	3670695	1 YRS
OperSO2ann96.USF	ANNUAL	ALL	0.09283	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00178	628483.5	3670462.5	1 YRS
	ANNUAL	4160VDSL	0.00194	628484	3670695	1 YRS
	ANNUAL	DSLFP	0.00225	628483.62	3670520.5	1 YRS
	ANNUAL	OMEX1ALL	0.00912	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.08391	628484	3670695	1 YRS
	ANNUAL	OMALL	0.08774	628484	3670695	1 YRS
OperSO2ann97.USF	ANNUAL	ALL	0.09123	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.0018	627710.31	3670376	1 YRS
	ANNUAL	4160VDSL	0.0018	627100	3670900	1 YRS
	ANNUAL	DSLFP	0.00233	628483.62	3670520.5	1 YRS
	ANNUAL	OMEX1ALL	0.00835	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.08311	628484	3670695	1 YRS
	ANNUAL	OMALL	0.08695	628484	3670695	1 YRS
OperSO2ann98.USF	ANNUAL	ALL	0.08595	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.0019	628483.38	3670433.5	1 YRS
	ANNUAL	4160VDSL	0.00212	628630	3670570	1 YRS
	ANNUAL	DSLFP	0.00243	628483.38	3670433.5	1 YRS
	ANNUAL	OMEX1ALL	0.008	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.0772	628484	3670695	1 YRS
	ANNUAL	OMALL	0.08168	628484	3670695	1 YRS
OperSO2ann99.USF	ANNUAL	ALL	0.08554	628484	3670695	1 YRS
	ANNUAL	480VDSL	0.00191	628483.38	3670433.5	1 YRS
	ANNUAL	4160VDSL	0.0021	627755.44	3670703.5	1 YRS
	ANNUAL	DSLFP	0.00267	628483.38	3670433.5	1 YRS
	ANNUAL	OMEX1ALL	0.00731	628097.5	3670695	1 YRS
	ANNUAL	OMEX2ALL	0.07781	628484	3670695	1 YRS
	ANNUAL	OMALL	0.0823	628484	3670695	1 YRS

Concentrations are in micrograms per cubic meter

TABLE G-37 OPERATIONS AND TEMPORARY SO2 IMPACTS (Concluded)
TEMPORARY

SHORT TERM (1, 3 & 24 HOUR)

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempSO295.USF	1-HR	WDRILLI	18.77955	627100	3670900	95070621
	3-HR	WDRILLI	11.95247	627100	3670900	95010506
	24-HR	WDRILLI	2.40069	627100	3670900	95010524
TempSO296.USF	1-HR	WDRILLI	18.68166	627100	3670900	96082224
	3-HR	WDRILLI	8.73095	627047	3670845	96080312
	24-HR	WDRILLI	2.4436	627047	3670845	96083024
TempSO297.USF	1-HR	WDRILLI	18.68166	627100	3670900	97072723
	3-HR	WDRILLI	11.38715	627116	3670845	97073012
	24-HR	WDRILLI	2.12706	627070	3670845	97040824
TempSO298.USF	1-HR	WDRILLI	18.14885	627100	3670900	98121921
	3-HR	WDRILLI	8.60008	627116	3670845	98062515
	24-HR	WDRILLI	2.80561	626980	3670870	98071924
TempSO299.USF	1-HR	WDRILLI	18.85125	627100	3670900	99071720
	3-HR	WDRILLI	8.75337	627100	3670900	99071721
	24-HR	WDRILLI	2.22145	626980	3670870	99070724

Concentrations are in micrograms per cubic meter

TABLE G-38 MONTHLY LEAD IMPACTS

CONSTRUCTION

File	Average	Group	Conc.	East(X)	North(Y)	Time
lead_95_LEAD.USF	MONTH	INJBP	0.0039	627100	3670900	95083124
lead_96_LEAD.USF	MONTH	INJBP	0.0049	627100	3670900	96073124
lead_97_LEAD.USF	MONTH	INJBP	0.0043	627100	3670900	97083124
lead_98_LEAD.USF	MONTH	INJBP	0.0037	628484	3670695	98053124
lead_99_LEAD.USF	MONTH	INJBP	0.0030	628484	3670695	99043024

OPERATIONS

File	Average	Group	Conc.	East(X)	North(Y)	Time
OperLead95.USF	MONTH	ALL	0.00004	627100	3670900	95083124
	MONTH	CTALL	0.00004	627100	3670900	95083124
	MONTH	DWHS	0.00001	628246.19	3670695	95053124
	MONTH	FCAKEALL	0.00003	628067.81	3670695	95113024
OperLead96.USF	MONTH	ALL	0.00005	627100	3670900	96073124
	MONTH	CTALL	0.00004	627100	3670900	96073124
	MONTH	DWHS	0.00002	628157	3670695	96053124
	MONTH	FCAKEALL	0.00002	628097.5	3670695	96022924
OperLead97.USF	MONTH	ALL	0.00005	629000	3670600	97063024
	MONTH	CTALL	0.00004	629100	3670600	97063024
	MONTH	DWHS	0.00001	628484	3670695	97063024
	MONTH	FCAKEALL	0.00003	628067.81	3670695	97113024
OperLead98.USF	MONTH	ALL	0.00006	628690	3670390	98063024
	MONTH	CTALL	0.00005	628690	3670390	98063024
	MONTH	DWHS	0.00001	628484	3670695	98053124
	MONTH	FCAKEALL	0.00003	628038	3670695	98013124
OperLead99.USF	MONTH	ALL	0.00005	628600	3670420	99043024
	MONTH	CTALL	0.00004	628600	3670420	99043024
	MONTH	DWHS	0.00001	627755.44	3670703.5	99073124
	MONTH	FCAKEALL	0.00002	628067.81	3670695	99013124

TABLE G-38 MONTHLY LEAD IMPACTS(CONT)

TEMPORARY

File	Average	Group	Conc.	East(X)	North(Y)	Time
TempLead95.USF	MONTH	ALL	0.00385	627100	3670900	95083124
	MONTH	CTALL	0.00001	629000	3670500	95053124
	MONTH	DWHS	0.00001	628246.19	3670695	95053124
	MONTH	VT1LP	0.00001	627100	3670900	95083124
	MONTH	VT2SP	0.00001	627100	3670930	95083124
	MONTH	VTALL	0.00002	627100	3670900	95083124
	MONTH	BPINJ	0.00382	627100	3670900	95083124
	MONTH	VENTING	0.00004	627100	3670900	95083124
TempLead96.USF	MONTH	ALL	0.00484	627100	3670900	96073124
	MONTH	CTALL	0.00001	627100	3670900	96073124
	MONTH	DWHS	0.00001	628157	3670695	96053124
	MONTH	VT1LP	0.00002	627100	3670900	96073124
	MONTH	VT2SP	0.00001	627100	3670930	96073124
	MONTH	VTALL	0.00003	627100	3670900	96073124
	MONTH	BPINJ	0.0048	627100	3670900	96073124
	MONTH	VENTING	0.00004	627100	3670900	96073124
TempLead97.USF	MONTH	ALL	0.00425	627100	3670900	97083124
	MONTH	CTALL	0.00001	629000	3670500	97063024
	MONTH	DWHS	0.00001	628484	3670695	97063024
	MONTH	VT1LP	0.00001	627100	3670900	97083124
	MONTH	VT2SP	0.00001	627100	3670900	97083124
	MONTH	VTALL	0.00003	627100	3670900	97083124
	MONTH	BPINJ	0.00421	627100	3670900	97083124
	MONTH	VENTING	0.00004	627100	3670900	97083124
TempLead98.USF	MONTH	ALL	0.0036	628484	3670695	98053124
	MONTH	CTALL	0.00001	629000	3670500	98053124
	MONTH	DWHS	0.00001	628484	3670695	98053124
	MONTH	VT1LP	0.00001	629400	3670800	98053124
	MONTH	VT2SP	0.00001	629400	3670800	98053124
	MONTH	VTALL	0.00002	629400	3670800	98053124
	MONTH	BPINJ	0.00358	628484	3670695	98053124
	MONTH	VENTING	0.00003	629200	3670800	98053124
TempLead99.USF	MONTH	ALL	0.00291	628484	3670695	99043024
	MONTH	CTALL	0.00001	628630	3670420	99043024
	MONTH	DWHS	0.00001	627755.44	3670703.5	99073124
	MONTH	VT1LP	0.00001	629300	3670800	99043024
	MONTH	VT2SP	0.00001	629400	3670800	99043024
	MONTH	VTALL	0.00002	629300	3670800	99043024
	MONTH	BPINJ	0.00289	628484	3670695	99043024
	MONTH	VENTING	0.00003	629200	3670800	99043024

Concentrations are in micrograms per cubic meter

TABLE G-39 CALPUFF MODELING IMPACTS

Due to the sheer size of the binary concentration/flux files generated by CALPUFF and POSTUTIL, they are not included here. They can be readily generated by re-executing the EXTRA-LARGE versions of the CALPUFF programs (CALPUFFX and CALPOSTX)

500M.ZIP - Contains INPUT/LIST files for Joshua Tree at 500 meter elevation

JOS1PUFF.INP JOS1PUFF.LST >CALPUFFX run to generate binary files
JOS1UTIL.INP JOS1UTIL.LST >POSTUTIL run to combine wet and dry flux files
JOS1SO2.INP JOS1SO2.LST >CALPOSTX run to calculate SO2 concentrations
JOS1NOX.INP JOS1NOX.LST >CALPOSTX run to calculate NOx concentrations
JOS1PM10.INP JOS1PM10.LST >CALPOSTX run to calculate PM10 concentrations
JOS1SDEP.INP JOS1SDEP.LST >CALPOSTX run to calculate S deposition rates
JOS1NDEP.INP JOS1NDEP.LST >CALPOSTX run to calculate N deposition rates
JOS1VIS6.INP JOS1VIS6.LST >CALPOSTX run to Method 6 visibility impairment

1250M.ZIP - Contains INPUT/LIST files for Joshua Tree at 1250 meter elevation

JOS2PUFF.INP JOS2PUFF.LST >CALPUFFX run to generate binary files
JOS2UTIL.INP JOS2UTIL.LST >POSTUTIL run to combine wet and dry flux files
JOS2SO2.INP JOS2SO2.LST >CALPOSTX run to calculate SO2 concentrations
JOS2NOX.INP JOS2NOX.LST >CALPOSTX run to calculate NOx concentrations
JOS2PM10.INP JOS2PM10.LST >CALPOSTX run to calculate PM10 concentrations
JOS2SDEP.INP JOS2SDEP.LST >CALPOSTX run to calculate S deposition rates
JOS2NDEP.INP JOS2NDEP.LST >CALPOSTX run to calculate N deposition rates
JOS2VIS6.INP JOS2VIS6.LST >CALPOSTX run to Method 6 visibility impairment

TABLE G-40 CUMULATIVE IMPACTS

24 HOUR

File	Average	Group	Conc.	East(X)	North(Y)	Time
CumuPM102495.USF	24-HR	ALL	2.08717	627541.25	3670712	95081124
	24-HR	SSU6ALL	2.04987	627541.25	3670712	95081124
	24-HR	MINREC	1.01575	629300	3669900	95122524
CumuPM102496.USF	24-HR	ALL	2.63183	627755.44	3670703.5	96071424
	24-HR	SSU6ALL	2.60898	627755.44	3670703.5	96071424
	24-HR	MINREC	1.30016	629300	3669900	96110624
CumuPM102497.USF	24-HR	ALL	2.18487	627755.44	3670703.5	97080824
	24-HR	SSU6ALL	2.16577	627755.44	3670703.5	97080824
	24-HR	MINREC	1.2741	629300	3669900	97082024
CumuPM102498.USF	24-HR	ALL	2.15951	627753.75	3670746	98071924
	24-HR	SSU6ALL	2.14907	628600	3670420	98061624
	24-HR	MINREC	1.38934	629300	3669900	98052424
CumuPM102499.USF	24-HR	ALL	2.63907	627755.44	3670703.5	99070624
	24-HR	SSU6ALL	2.58994	627755.44	3670703.5	99070624
	24-HR	MINREC	1.26495	629300	3670000	99122524

ANNUAL

File	Average	Group	Conc.	East(X)	North(Y)	Time
CumuPM10ann95.USF	ANNUAL	ALL	0.32548	629300	3670000	1 YRS
	ANNUAL	SSU6ALL	0.27191	628450	3670810	1 YRS
	ANNUAL	MINREC	0.24933	629300	3670000	1 YRS
CumuPM10ann96.USF	ANNUAL	ALL	0.30356	629300	3670000	1 YRS
	ANNUAL	SSU6ALL	0.27019	627588.81	3670708.5	1 YRS
	ANNUAL	MINREC	0.22752	629300	3670000	1 YRS
CumuPM10ann97.USF	ANNUAL	ALL	0.29926	629300	3669900	1 YRS
	ANNUAL	SSU6ALL	0.28615	627588.81	3670708.5	1 YRS
	ANNUAL	MINREC	0.22695	629300	3669900	1 YRS
CumuPM10ann98.USF	ANNUAL	ALL	0.37747	629300	3669900	1 YRS
	ANNUAL	SSU6ALL	0.26775	628450	3670840	1 YRS
	ANNUAL	MINREC	0.30378	629300	3669900	1 YRS
CumuPM10ann99.USF	ANNUAL	ALL	0.37674	629300	3669900	1 YRS
	ANNUAL	SSU6ALL	0.27944	627629.62	3670707	1 YRS
	ANNUAL	MINREC	0.30687	629300	3669900	1 YRS

Concentrations are in micrograms per cubic meter

Table G-41 Leathers H2S Power Plant Emissions

1999		2000		2001	
Month / Year	Emissions (lb/hr)	Month / Year	Emissions (lb/hr)	Month / Year	Emissions (lb/hr)
Jan-99	19.6	Jan-00	12.3	Jan-01	22.1
Feb-99	11.9	Feb-00	14.2	Feb-01	21.9
Mar-99	15.5	Mar-00	19.5	Mar-01	17
Apr-99	11.8	Apr-00	17.6	Apr-01	14.8
May-99	11.1	May-00	17.1	May-01	17.7
Jun-99	14.3	Jun-00	17.3	Jun-01	18.6
Jul-99	19.7	Jul-00	19.4	Jul-01	18.5
Aug-99	15.2	Aug-00	20	Aug-01	18.1
Sep-99	11.3	Sep-00	20.5	Sep-01	14.4
Oct-99	18.1	Oct-00	19.2	Oct-01	11.4
Nov-99	13	Nov-00	19.2	Nov-01	11.6
Dec-99	12.4	Dec-00	20.5	Dec-01	7.9

*Actual Emissions reported to the APCD on a monthly basis
Units are in pounds per hour

Total (lb/hr)	584.7
Average (lb/hr)	16.2
Actual emissions (TPY)	71.1
Emissions available at 90% control (TPY)	64.0
Offsets available at 1.2 ratio (TPY)	53.4

Press Release

California Air Resources Board Precertifies Soil-Sement®

The California Air Resources Board (ARB) has granted Precertification to Soil-Sement®, a dust suppressant and erosion control product for unpaved roads and a range of surfaces and substrates to prevent fugitive dust emissions as well as provide erosion control that results in sediment delivery reduction and soil stabilization. Soil-Sement® was reviewed by the Internationally Recognized California ARB Equipment and Process Precertification Program, a voluntary program by which manufacturers of products that have a beneficial impact on air quality can have their product performance claims independently verified by ARB scientists.

The Precertification process for Soil-Sement® consisted of a lengthy and detailed statistical data validation of a previous dust control efficiency study conducted on Soil-Sement® by the Desert Research Institute and detailed instrumental analysis of Soil-Sement® conducted by Tri-State Laboratories in which Soil-Sement® was compared to over 100,000 other compounds in a computer search. The California ARB found Soil-Sement® effective in reducing PM_{10} (particulate material 10 microns and smaller) emissions and does not contain polycyclic organic matter nor contain detectable levels of ozone depleting compounds or compounds contributing to global warming. The California ARB issued Executive Order G-096-029-035 verifying the following performance claim on Soil-Sement®:

"When topically applied as a dust suppressant in accordance with manufacturers instructions, including a total target concentration of 0.28 gallons of concentrate per square yard of treated surface applied in multiple passes in a single day, Soil-Sement® reduced PM_{10} emissions by approximately 84 percent after 339 days and 6,780 vehicles (predominantly light-duty) passes on an unpaved roadway consisting of a silty, sandy loam.

Pre-Certified by the California Air Resources Board

Soil-Sement® does not contain detectable levels of polycyclic organic matter which includes polynuclear aromatic hydrocarbons as defined by the Federal Clean Act section 112 (b); nor does Soil-Sement® contain detectable levels of fluorinated or brominated compounds that could be expected to contribute to ozone depletion or global warming."

For complete information on the California ARB Precertification of Soil-Sement®, visit their web site. This thorough review by the California ARB, independently confirms the effectiveness of Soil-Sement® and further provides evidence that it's the best choice for your dust control requirements.

Contact Midwest Industrial Supply, Inc. for complete details.

1-800-321-0699

Midwest Industrial Supply, Inc.
P.O. Box 8431 ■ Canton, Ohio 44711 USA
(330) 456-3121 ■ Fax (330) 456-3247
website: www.midwestind.com

California Environmental Protection Agency

Air Resources Board

EQUIPMENT AND PROCESS PRECERTIFICATION PROGRAM

EVALUATION OF THE AIR QUALITY PERFORMANCE CLAIMS FOR PENNZOIL-QUAKER STATE COMPANY PENNZSUPPRESS® D Dust Suppressant

AUGUST 2000

Equipment:	**PennzSuppress D®**
Applicant:	**Pennzoil-Quaker State Company** 700 Milam Street P.O. Box 2967 Houston, Texas 77252-2967
Applicant Contact:	Mr. Colin Kimball
Title:	Product Manager
Phone Number:	(713) 546-6126
E-mail:	colinkimball@pennzoil.com
Website:	www.pennzsuppress.com
Application Number:	09059701
Executive Order Number:	G-096-029-031
Executive Order Date:	August 15, 2000
Air Resources Board Contact:	Mr.Todd Sterling
Phone Number:	(916) 445-1034
E-mail:	tsterlin@arb.ca.gov
ARB Website:	www.arb.ca.gov
Precertification Website	www.arb.ca.gov/eqpr/eqpr.htm

ABSTRACT

The purpose of this report is to document the California Air Resources Board's (ARB's) evaluation and verification of the air quality-related claims made by the Pennzoil-Quaker State Company concerning its PennzSuppress D®, a dust suppressant.

In an effort to make progress towards attaining healthy air quality in California, regulations restrict PM_{10} emissions from a broad spectrum of activities. PM_{10} emissions are formed as products of combustion or indirectly as fugitive dust. The reduction of PM_{10} emissions from all sources is part of California's clean air strategy to achieve and maintain healthy air quality in California.

As part of its Equipment and Process Precertification (Equipment Precertification) Program application package, the Pennzoil-Quaker State Company requested that the ARB evaluate its proposed performance claim with respect to the fact that PennzSuppress D® reduces PM_{10} emissions from unpaved roads.

Upon successful completion of the requirements associated with the ARB's Equipment Precertification Program, a report is issued with two companion documents—an Executive Order and a certificate. These documents serve as official records that the ARB has independently verified the applicant's performance claims. Executive Orders earned under the ARB's Equipment Precertification Program are valid for three years from the date issued, presuming the holder complies with: 1) the terms and conditions identified in this report and 2) the general requirements discussed in the Equipment Precertification Program Guidelines and Criteria.

After review of the documents discussed throughout this report, the ARB recommends that a Precertification certificate be issued for the Pennzoil-Quaker State Company PennzSuppress D® dust suppressant.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
AIR RESOURCES BOARD

EQUIPMENT AND PROCESS
PRECERTIFICATION PROGRAM

EVALUATION OF THE AIR QUALITY PERFORMANCE CLAIMS FOR PENNZOIL-QUAKER STATE COMPANY PENNZSUPPRESS® D DUST SUPPRESSANT

August 2000

Table of Contents

Contents		Page
I.	INTRODUCTION	1
II.	GENERAL INFORMATION	1
	A. Equipment Precertification Program Background	1
	B. Relationship to Air Quality	2
	1. PM_{10} Emissions	2
	2. Control of PM_{10} Emissions	3
	C. Health and Environmental Impacts	4
	D. Manufacture/Ownership Rights	5
III.	SUMMARY OF SCOPE	5
IV.	STATEMENT OF CLAIMS	5
V.	DESCRIPTION OF TECHNOLOGY	5
	A. Product Composition	5
	B. Mechanism of Action	5
	C. Appropriate Uses	6
	D. Application Procedures	6
VI.	TECHNICAL EVALUATION	8
	A. Description of Field Testing	8
	B. Description of Test Results	8
	C. Site Visit	9
VII.	EVALUATION OF CLAIMS	10
VIII.	QUALITY MANAGMENT	10
	A. Practices and Standards	10
	B. Other Certifications/Approvals	11
	C. User Manuals/Application Procedures	12
	D. Operator Requirements	12
	E. Warranties	12
IX.	ENVIRONMENTAL AND ECONOMIC BENEFITS	13
X.	RECOMMENDATIONS	13
XI.	PRECERTIFICATION CONDITIONS	13

APPENDICES

Appendix A – Materials Available for Evaluation
Appendix B – MRI Testing Site Layout
Appendix C – MRI Testing Equipment Layout
Appendix D – ARB Control Efficiency Evaluation
Appendix E – MRI Control Efficiency Evaluation
Appendix F – PennzSuppress D® Recommended Practices
Appendix G – PennzSuppress D® Letters of Approval

I. INTRODUCTION

This report discusses the PennzSuppress® D dust suppressant manufactured by the Pennzoil-Quaker State Company, the performance claim to be verified by the Air Resources Board (ARB), the emissions testing results, and the findings and recommendations of the ARB staff concerning this technology.

This report is organized into several sections. The next section, General Information, provides background information on the ARB's Equipment and Process Precertification (Precertification) Program. The subsequent sections, Summary of Scope, Statement of Claims, and Description of Technology, discuss the breadth of our evaluation, the performance claim for PennzSuppress® D, and a detailed description of PennzSuppress® D.

The following two sections, Technical Evaluation and Evaluation of Claims, present detailed information on our technical review and assessment of PennzSuppress® D. The sections entitled: Quality Management and Environmental and Economic Benefits provide supporting information on the Pennzoil-Quaker State Company's procedures to produce a dust suppressant that meets the company's claim and a brief assessment of the potential environmental and economic impacts of the technology.

Finally, the remaining sections: Recommendations and Precertification Conditions discuss the ARB staff's determination of the performance of PennzSuppress® D relative to the company's claim. These sections also provide some guidance with respect to the specific conditions that must be met for the certificate to remain valid for three years.

Appendix A contains a listing of the information that we relied upon to conduct our evaluation. Appendices B through G contain some of the detailed information that supports the evaluation in this report.

II. GENERAL INFORMATION

Under the regulations established for the program, equipment or processes eligible for Precertification must: 1) have an air quality benefit; 2) be commonly-used or have the potential to be commonly-used in the near future (market ready); and 3) not pose a significant potential hazard to public health and safety and the environment. Furthermore, to be eligible, applicants for the program must demonstrate that they have sufficient control over the manufacture of the equipment or process to ensure that they can consistently and reliably produce equipment which performs at least as well as that considered in this evaluation.

A. Equipment Precertification Program Background

The Equipment Precertification Program is a voluntary statewide program for manufacturers of commonly-used equipment or processes. A precondition for entry into the program is that the equipment has an air quality benefit. On June 14, 1996, the ARB adopted section 91400 of the California Code of Regulations which incorporates the Criteria for Equipment and Process Precertification (Criteria). The regulation and Criteria were approved by the California Office of Administrative Law on October 31, 1996 and became effective

on November 30, 1996.

Under the Equipment Precertification Program, manufacturers request that the ARB conduct an independent third-party verification of performance claims which focus on the air quality benefits of its equipment or process. If the claims are verified, the manufacturer is free to refer to the results of the ARB staff's evaluation in its marketing literature. Upon successful completion of the verification process, the ARB staff notify air pollution control and air quality management districts (Districts) in California of its determination. As a result of the ARB's notification, Districts have an advance opportunity to become familiar with the performance of the equipment or process.

On October 20, 1997, the ARB received a request from Pennzoil-Quaker State Company that the ARB staff determine if PennzSuppress® D was eligible for the Equipment Precertification program. After receiving confirmation from ARB staff that PennzSuppress® D was eligible for the program, Pennzoil-Quaker State Company submitted a Precertification application package. As part of our review of the application package, we evaluated formulation information, the results of emissions testing programs, and other information concerning the performance of PennzSuppress® D to determine whether the claim was verifiable.

B. Relationship to Air Quality

1. PM_{10} Emissions

PM_{10} emissions can adversely affect therespiratory system and can cause decreased visibility. In an effort to make progress toward attaining healthful air quality in California, regulations restrict PM_{10} emissions from a broad spectrum of activities. PM_{10} emissions are formed as products of combustion or as fugitive dust. Fugitive dust is any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of human activity. The primary chemical constituents of fugitive dust are oxides of silicon, aluminum, and iron, and some calcium compounds. Some examples of fugitive dust sources are agricultural operations, construction activities, dry lakebeds, and unpaved roads.

Unpaved roads are any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by one of the following: concrete, asphaltic concrete, recycled asphalt, asphalt, or other materials with equivalent performance. Fugitive dust emissions from unpaved roads are caused primarily by movement of vehicles, equipment, and spillage from haul loads. Emissions from unpaved roads can also be caused when mud from a wet unstabilized road surface sticks to vehicle tires or undercarriages, is tracked onto paved roads, and upon drying generates fugitive dust when subjected to vehicle traffic.

As a vehicle traverses an unpaved road, the force of its wheels on the road surface pulverizes the surface material. Particles are lifted and dropped from the rolling wheels by the wind-shearing action generated from the passing vehicle. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The wind shear lifts particles that are smaller than 425 microns (sand size and smaller) from the road surface to generate dust.

Soil type does not appear to have a measurable influence on the effectiveness of chemical dust suppressants. In fact, the 1987 United States Environmental Protection Agency (U.S. EPA) report used to develop emissions factors for unpaved roads indicated that it did not appear possible to develop a meaningful expression that related the control performance of chemical suppressants to the amount of silt (a parameter used to classify soils) present on the road surface.

2. Control of PM_{10} Emissions from Unpaved Roads

The measures available to suppress PM_{10} emissions from unpaved roads include reduction of vehicular trips, speed control, surface modification, and surface treatment. The reduction of vehicular trips is accomplished by restricting access (such as bussing of employees) or redirecting vehicle traffic. Speed control involves limiting vehicle speeds to no greater than 15 miles per hour through the use of employee training, the posting of signs, installation of speed bumps, and other speed control measures. Surface modification is the covering of unpaved roads with materials such as asphalt, concrete, recycled road base, or gravel. Surface treatment includes frequent watering, application of hygroscopic materials (such as chloride salts and wood pulp by-products), and application of chemical stabilizers.

Eleven air quality management plans have been prepared by Districts for areas within their jurisdiction that did not attain the National Ambient Air Quality Standard for PM_{10}. Many of these plans have included the development of rules governing a number of sources of fugitive dust, including unpaved roads. For example, South Coast Air Quality Management District (SCAQMD) Rule 403 requires the implementation of best available fugitive dust control measures for unpaved roads during active operations within the South Coast Air Basin. Rule 403 also requires large operations to implement specific control actions or, alternatively, submit a fugitive dust emission control plan for all sources, including unpaved roads. Dust suppressants are referred to in many District rules as "dust palliatives". For the purposes of this evaluation, the two terms were considered to be interchangeable.

Districts in California do not require that an air quality permit be obtained prior to the application of a dust suppressant. However, most Districts require that chemical stabilizers used as dust suppressants be non-toxic. In order to be effective, a non-toxic chemical stabilizer must be of sufficient concentration and application frequency to maintain a stabilized surface. A stabilized unpaved road surface is defined by the SCAQMD as one in which any fugitive dust plume emanating from vehicular traffic does not exceed 20 percent opacity.

Most Districts disallow the use of chemical stabilizers that are prohibited from use by the Regional Water Quality Boards, the ARB, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule, or regulation. The Districts also stipulate that a chemical stabilizer should meet any specifications, criteria, or tests required by any federal, state, or local water agency.

The reduction of PM_{10} emissions from unpaved roads is part of California's

clean air strategy to achieve and maintain healthful air quality in California. Because the use of PennzSuppress® D reduces fugitive dust emissions from unpaved roads, the ARB evaluated PennzSuppress® D as air pollution control equipment.

C. Health and Environmental Impacts

As part of our evaluation, ARB staff consulted with other governmental agencies to conduct a cursory review of the potential health and environmental impacts associated with PennzSuppress® D.

Based on our review of the Material Safety Data Sheet (MSDS) for PennzSuppress® D, we determined that PennzSuppress® D would not likely present health impacts significantly different from those associated with asphalt or concrete road paving materials which are currently in wide use throughout California.

As mentioned earlier in this report, local air Districts in California do not require that an air quality permit be obtained prior to the application of a dust suppressant. However, air Districts do require that a chemical dust suppressant meet any specifications, criteria, or tests required by any federal, state, or local water agency.

A regional water quality control board (board) requires a report of waste discharge if the application of the dust suppressant threatens water quality. Therefore, the appropriate regional board should be contacted to obtain a determination of the acceptability of using PennzSuppress® D as a dust suppressant for the application in question. The State of California Water Resources Control Board indicated in a memorandum to the ARB dated April 12, 2000, that it did not oppose ARB's performance precertification of PennzSuppress® D.

The concentrated form of PennzSuppress® D was subjected to the U.S. EPA's Toxicity Characteristics Leaching Procedure (TCLP) which is one of the tests used to assess whether a substance should be handled as a hazardous waste. The results of the "inorganics", "volatiles", and "semi-volatiles" TCLP tests did not show any detectable levels of regulated chemicals.

The California Department of Toxic Substance Control (DTSC) and its four regional offices regulate the management of hazardous waste in California. After reviewing the PennzSuppress® D TCLP results, Material Safety Data Sheets, and other product information, the DTSC indicated that it would not expect the product to be regulated as a hazardous waste. The DTSC indicated that it does not have any concerns with ARB's precertification of PennzSuppress® D for air-related claims.

PennzSuppress® D contains hydrocarbons that are primarily C-25 and higher. The results of two laboratory analyses submitted to the ARB by Pennzoil-Quaker State Company showed no detectable levels of reactive volatile organic compounds (VOCs) in PennzSuppress® D. Therefore, it is reasonable to expect that the use of PennzSuppress® D will not significantly contribute to existing levels of VOCs.

Please note that Pennzoil-Quaker State

Company, its distributors, and/or applicators of PennzSuppress® D are required to meet all applicable federal, state, and local laws, rules and regulations with respect to the manufacture, transport, sale, storage, application, and disposal of PennzSuppress® D.

D. Manufacture/Ownership Rights

The recommendations in this report are contingent upon Pennzoil-Quaker State Company having the legal rights to produce and/or market PennzSuppress® D. Pennzoil-Quaker State Company documented its ownership of these rights in a letter to the ARB, dated April 6, 1998.

III. SUMMARY OF SCOPE

Pennzoil-Quaker State Company claims that when unpaved roads are treated with PennzSuppress® D, emissions of fugitive dust are reduced, specifically particulate matter that is less than 10 microns in size. In addition, Pennzoil-Quaker State Company claims that PennzSuppress® D reduced emissions by approximately 85 percent after 7,000 vehicle passes on an engineered unpaved road. Generally, the control of fugitive dust emissions involves using surface modification, surface treatment, speed control, or reduction of vehicular trips.

IV. STATEMENT OF CLAIMS

The following is the claim verified by ARB staff concerning the Pennzoil-Quaker State Company's PennzSuppress® D. The verification of this claim is predicated on the presumption that PennzSuppress® D is manufactured, transported, sold, stored, applied, and disposed of in accordance with manufacturer's instructions.

When topically applied as a dust suppressant in accordance with the manufacturer's instructions, including a target concentration of 0.15 gallons of concentrate per square yard of treated surface, PennzSuppress® D reduced PM_{10} emissions by approximately 85 percent after 7,000 vehicle (predominantly light-duty) passes on an engineered unpaved road consisting of a well-graded aggregate.

V. DESCRIPTION OF TECHNOLOGY

A. Product Composition

The undiluted form of PennzSuppress® D was evaluated for this report. PennzSuppress® D is a patented product composed primarily of a petroleum resin (2600 VIS RESIN) that contains C-25 and higher hydrocarbons. The Material Safety Data Sheet (MSDS) for PennzSuppress® D states that it is composed of 30 to 60 percent of petroleum resins, 20 to 40 percent water, 15 to 35 percent emulsifiers, 1 to 5 percent surfactants, and 5 to 15 percent vacuum residuum. The petroleum resin is produced from the vacuum tower bottoms of the refining process for highly parafinnic Pennsylvania Grade (Penn Grade) crude oil.

B. Mechanism of Action

PennzSuppress® D relies upon its high carbon-index resin to agglomerate a road's soil particles, and increase the cohesion among the aggregate particles. The agglomeration potential and the increase in cohesion hold the aggregate, including the dust particles, in place. The agglomeration of finer dust particles into larger masses increases the particle size and weight of dust-prone particles, thereby reducing the amount of dust

generated by the passing of a vehicle. As weathering occurs on a road treated with PennzSuppress® D, the resin in the road becomes harder and starts to take on the appearance of asphalt.

Because C-20 and higher compounds are not soluble in water, PennzSuppress® D does not dissolve and wash away when exposed to rain. Because of its low solubility in water, PennzSuppress® D is not influenced by moisture in the atmosphere, and thus can be used in both arid and humid environments.

C. Appropriate Uses

PennzSuppress® D is used as a fugitive dust suppressant, as a soil-compacting agent, and to control silt runoff. It is applied primarily to soils on roads, parking lots, parks, fields, offhighway motor vehicle parks, and other similar high dust areas. It can also be use to reduce windblown dust from ore and coal storage piles and to control dust mites in orchards and vineyards. However, this Precertification only evaluates the effectiveness of suppressing fugitive dust emissions from engineered unpaved roads consisting of well-graded aggregate. In this evaluation, the term "engineered unpaved road" means a purpose-built road, as opposed to a path or a trail.

Well-graded aggregate is an engineering term that defines road material with a wide range in grain sizes. PennzSuppress® D is not recommended on aggregates that have low abrasion resistance (i.e., those that will crush and form new dust under the weight of vehicles.) Also, it is not recommended that the product be applied when the ambient temperature is below 45 degrees Fahrenheit.

PennzSuppress® D is sold in the United States via either select distributors, or directly by PennzSuppress® D representatives. Pennzoil Product Company trains its distributors and representatives about the product and its application. The distributors or representatives assist customers in determining whether PennzSuppress® D would be effective for certain applications, and if so, what application rate would be suitable. Distributors, in some cases, may also provide equipment and operators to apply PennzSuppress® D.

D. Application Procedures

This section summarizes the PennzSuppress® D manufacturer's instructions contained in the document entitled PennzSuppress® D Recommended Practices for Reducing the Generation of Airborne Particulate Matter from Unpaved Roads. This document is available at www.pennzsuppress.com and in Appendix F of this report.

PennzSuppress® D is delivered to distributors in rail cars, tanker trailers, or in 55 gallon drums. During shipping and storage, PennzSuppress® D should not be allowed to freeze or boil. PennzSuppress® D should be applied at temperatures above 45 degrees Fahrenheit. Prior to removing PennzSuppress® D from its storage vessel, it should be thoroughly mixed.

Pennzoil-Quaker State Company recommends a target concentration rate of 0.15 gallons of concentrate per square yard of unpaved road surface to achieve optimal dust control. This is the same

concentration rate that was achieved in the emissions testing results that were reviewed as part of this evaluation. The thickness of the PennzSuppress® D coating and the depth of its penetration into soil are controlled by varying the water-to-concentrate ratio, as well as the total volume of the diluted product per area.

PennzSuppress® D is applied using a liquid application truck with a pressurized spray bar (typically operated at 20 to 30 psi) designed to apply the product evenly over the roadbed surface. For some situations, heavy equipment may also be needed to condition the roadbed before and after application. This equipment can include a milling/reclaiming machine, a motor grader with blade attachments, a pneumatic rubber-wheel roller, or a vibratory steel drum roller.

Some soil types are best treated with a one-time heavy application of PennzSuppress® D, while others may require several light applications. For example, for some very dry unpaved road surfaces in arid environments, a series of pre-treatments of water or very dilute applications of PennzSuppress® D may be required to "pre-wet" the soil to allow for enhanced penetration. If these series of pre-wetting applications are not applied, a very dry unpaved road in an arid environment may exhibit "beading up", and thus, no penetration of the PennzSuppress® D into the soil matrix. In general, the depth of penetration of PennzSuppress® D ranges from in excess of 15 millimeters in moderately permeable aggregates to in excess of 8 millimeters in low permeability aggregates.

Initial preparation of the unpaved road is essential to allow for even and effective treatment with PennzSuppress® D. The road should be free of imperfections such as potholes, wash-boarding, aggregate loss, rutting, etc. Improper drainage should be corrected by constructing a crown/slope on the road, cutting ditches along the length of the road and/or constructing drainage beneath the road surface. Roadways should be crowned to allow rainfall to readily drain into ditches. If the area to be treated is hard and compacted, the surface should be scarified to a depth of one to two inches. All open drains should be covered prior to application.

Typically, PennzSuppress® D is applied in at least two consecutive treatments to achieve the target concentration of no less than 0.15 gallon of concentrate per square yard (0.68 liters per square meter) of unpaved road surface. The second application is required within 7 to 10 days of the first application. Pennzoil-Quaker State Company recommends that the road should be rolled after each application. Because PennzSuppress® D penetrates soil and sets up rapidly, roads may be opened up to traffic immediately after treatment without any concern about product residue adhering to vehicles. In warm summer months, PennzSuppress® D cures in less than an hour. Cure times increase as temperatures decrease.

The frequency of treatments of PennzSuppress® D will depend on the soil conditions and amount of vehicle traffic. The common industry practice is to retreat with a dust suppressant approximately every 4 to 6 weeks, depending on the nature and amount of vehicle traffic. The control efficiency claim

that is verified in this report assumes that PennzSuppress® D is re-applied every 28 days. It is reasonable to assume that after repeated treatments of PennzSuppress® D, the amount of product required to achieve dust suppression will, to a point, likely decrease over time.

VI. TECHNICAL EVALUATION

A. Description of Field Testing

Pennzoil contracted with Midwest Research Institute (MRI) to evaluate the effectiveness of PennzSuppress® D in controlling fugitive dust emissions from unpaved roads. MRI conducted a series of sampling runs on Linda Vista Road in July 1997. Linda Vista is a public unpaved road in Tucson, Arizona.

Traffic during the 28-day sampling period primarily consisted of light duty vehicles traveling between 30 and 35 miles per hour. In addition, deliveries to a nearby dam construction project resulted in approximately 5 passes per day by relatively heavy vehicles (cement mixers.) Segregated treated, untreated, and buffer test sections of the unpaved road were created. The buffer section was used to control track-on of material from untreated sections onto the treated sections. Figure 1 in Appendix B displays a layout of the test site.

Figure 1 of Appendix C illustrates the testing equipment setup that was used by MRI to quantify particulate emissions from the segregated untreated (uncontrolled) and treated (controlled) portions of the test road. This setup provides simultaneous measurement of particulate concentrations at various points over the effective height of the plume generated by passing vehicles. The sampling equipment consisted of a high-volume cyclone operated at 40 cubic feet per minute (cfm) placed downwind of the test area at heights of 1.3, 2.7, 4.1, and 6.0 meters. In addition, high-volume cyclones followed by a 3-stage cascade impactor were operated at 20 cfm and placed upwind (to determine background concentrations) and downwind of the test area at heights of 1.3 and 4.1 meters. The aerodynamic particle sizes measured by this equipment included 15, 10.2, 4.2, and 2.1 microns.

The setup included meteorological instrumentation that monitored wind direction. The deployment of the particulate samplers and the meteorological equipment is consistent with that used to develop U.S. EPA's AP-42 emissions factor equations for paved and unpaved roads. In addition, vehicle passes, vehicle speed, and vehicle weights were monitored.

During the test program, several parameters were monitored at the test site that were not used directly in conducting this evaluation. These included precipitation, wind speed, temperature, barometric pressure, and soil silt content.

B. Description of Test Results

Prior to testing, three passes of PennzSuppress® D were applied to the unpaved road. Each pass was applied at a rate of 0.025 gallon per square yard of unpaved road, using a dilution rate of nine parts water to one part of concentrate. Seven days later, the same application rate of PennzSuppress® D was applied to the same portion of the unpaved road that had been treated a week earlier. The total ground inventory of PennzSuppress®

D after these two treatments was 0.15 gallons of concentrate per square yard of road. Vehicle traffic was not allowed on the road until after the second application.

MRI completed a total of six PM_{10} sampling runs—four treated runs from a portion of the road treated with PennzSuppress® D and two untreated runs from a portion of the road that was not treated with PennzSuppress® D. (MRI invalidated a seventh run because of poor wind conditions.) The duration of the sampling periods ranged from 204 minutes to 280 minutes for the treated runs and 38 to 44 minutes for the untreated runs.

As shown in Table D-1 of Appendix D, treated testing runs were conducted at 11, 12, 26, and 28 days after the second application of PennzSuppress® D. During the four treated runs, traffic counts ranged from 392 to 439 vehicles per day with cumulative vehicle traffic totaling 7,000 vehicle passes over the 28-day period. The two untreated testing runs were conducted on the untreated portion of the road. Vehicle passes for these runs were 51 and 63.

After the completion of the "12th day" test, approximately 100 vehicles (approximately one-fourth of which was 18-wheel trucks) detoured from a nearby interstate highway and caused some damage to the testing site buffer area. MRI hypothesized that this event increased the rate at which fugitive dust control efficiency decreased for PennzSuppress® D.

MRI determined, through laboratory analysis of the sampler filters, the airborne PM_{10} concentrations for the treated and untreated road surfaces. Using this information, MRI derived emission factors (expressed in grams per vehicle mile traveled), to calculate the control efficiency of PennzSuppress® D. Using a simpler approach (expressed in micrograms per cubic meter), ARB staff calculated the control efficiency for each of the four runs by comparing dust emission measurements from the roads treated with PennzSuppress® D to the untreated roads. Using this approach and the MRI raw data, the ARB staff obtained results that were consistent with those obtained by MRI.

Although the ARB staff confirmed the control efficiencies calculated by MRI, the ARB evaluation concluded that the average PM_{10} control efficiency of PennzSuppress® D cannot be estimated with statistical confidence due to the limitations in the test design, particularly in the small number of both treated and untreated runs. In addition, our evaluation suggests that the cumulative number of vehicle passes appears to heavily influence the control efficiency of PennzSuppress® D. A detailed explanation of the ARB staff's evaluation is provided in Appendix D of this report. Appendix E contains detailed information about the approach used by MRI to calculate the control efficiency.

C. Site Visit

As part of our evaluation, we contacted current users of PennzSuppress® D. These users indicated that they have been pleased with the performance of PennzSuppress® D as a dust suppressant on unpaved roads. One customer included the California Department of Transportation in Southern California where PennzSuppress® D was used to reduce PM_{10} emissions from on

unpaved road surfaces associated with the construction of a large freeway project. ARB staff also visited a winery and vineyard in Central California where PennzSuppress® D was applied to reduce PM_{10} emissions and the associated dust mites that affect grape quantity and quality.

VII. EVALUATION OF CLAIMS

This section presents additional information relating to the claim verified by the ARB as part of this evaluation report. Our verification of this claim is based on our evaluation of the information listed in Appendix A. As stated earlier, the ARB's evaluation and recommendations presented in this report are predicated on the expectation that PennzSuppress® D is manufactured, transported, sold, stored, applied and disposed of in accordance with manufacturer's instructions.
The claim language is precise because it directly correlates with the supporting documentation included with the application package. Below the claim are supporting comments, which may be used to interpret the significance of the claim verified in this report. To assist the reader, the claim is displayed in bold text.

When topically applied as a dust suppressant in accordance with the manufacturer's instructions, including a target concentration of 0.15 gallons of concentrate per square yard of treated surface, PennzSuppress® D reduced PM_{10} emissions by approximately 85 percent after 7,000 vehicle (predominantly light-duty) passes on an engineered unpaved road consisting of a well-graded aggregate.

The MRI results suggest that the cumulative number of vehicle passes appears to heavily influence the control efficiency of PennzSuppress® D. Over the 28-day test period, the control efficiency ranged from approximately 85 to 99 percent. The highest control efficiency of PennzSuppress® D was obtained early in the test schedule, after the fewest vehicles passes had occurred. The minimum instantaneous control efficiency suggested by the results of the test program was obtained 28 days after treatment and after 7,000 vehicle passes.

In recognition of the design limitations of the MRI study, the ARB-verified PennzSuppress® D control efficiency is based on the minimum instantaneous control efficiency that was suggested by the results of the Linda Vista test program. Specifically, the Linda Vista test results suggest that 85 percent control efficiency was obtained after 7000 vehicle passes.

VIII. QUALITY MANAGEMENT

A. Practices and Standards

PennzSuppress® D is manufactured exclusively by Pennzoil-Quaker State Company at their ISO 9002-certified manufacturing facility in Mundy's Corner, Pennsylvania and Alameda, California. Pennzoil-Quaker State Company's quality management practices and standards for PennzSuppress® D are described in detail in the Pennzoil-Quaker State Company Specialty Plant Quality System Manual.

Each ingredient used in the manufacturing of PennzSuppress® D is obtained from a source-specific vendor. Incoming ingredients are shipped with a Certificate

of Analysis (CA) that describes the chemical and physical characteristics of the specific shipment. To ensure consistent quality, each incoming ingredient is analyzed at the manufacturing facility for a variety of parameters, including pH, API Gravity, and viscosity. The results of the analyses are compared to the CA in order to confirm ingredient purity. If an ingredient does not meet Pennzoil-Quaker State Company's specifications, it is shipped back to the vendor. Once an ingredient has been qualified, it is received by the facility and placed in storage for use in the blending of PennzSuppress® D.

During the blending of PennzSuppress® D, each ingredient is added to the blending tank in a specific sequence and quantity. The precise quantity of each ingredient is metered into the blending tank in the proper sequence and mixed for a specified period of time. Each instrument used in weighing and metering ingredients is calibrated in accordance with ISO 9002 standards.

Once a blend has been completed, samples of the finished product are collected from the blending tank and analyzed for percent solids, specific gravity, and API Gravity. Another portion of the sample is diluted with water to the typical application dilution of four parts water to one part concentrate and examined. The diluted sample is held for 24 hours and the thickness of a cuff, which commonly develops as a slightly dense emulsion, is measured. The characteristics of the emulsion are also examined under a microscope and qualitatively compared to standards developed by Pennzoil-Quaker State Company for PennzSuppress® D.

Data sheets from each blend are retained in a workbook at each facility and entered into a computer database for future reference. The data sheet records the specific quantity of each ingredient, blending times, blending duration, temperature, and other quality assurance measurements. The data sheets and quality assurance measurements are reviewed, and once it is determined that the blend meets PennzSuppress® D specifications, it is released for sale.

After evaluating the quality management program provided by Pennzoil-Quaker State Company, the ARB staff has determined that sufficiently comprehensive measures are used in the manufacturing process of PennzSuppress® D to ensure that ingredient quality, manufacturing process consistency, and finished product quality are achieved and maintained.

B. Other Certifications/Approvals

Environmental and transportation agencies for the states of Arkansas, Missouri, Nevada, Pennsylvania, Virginia, Texas, Connecticut, and California have granted approval for use of PennzSuppress® D as a dust suppressant. Product safety and performance information was reviewed to varying degrees by each state. Many of the states also approved PennzSuppress® D for use as a dust suppressant by their own agencies. However, none of the states included the evaluation of a performance claim as part of their review. (Appendix G contains copies of these letters of approval).

C. User Manuals/Application Instructions

The recommended practices for use and application of PennzSuppress® D are contained in the document entitled *PennzSuppress® D Recommended Practices for Reducing the Generation of Airborne Particulate Matter from Unpaved Roads* (Appendix F). This document, available at www.pennzsuppress.com, is provided to distributors, applicators, and users of PennzSuppress® D. The document provides a description of unpaved roads that are appropriate candidates for PennzSuppress® D; instructions for preparation of the road surface prior to application of PennzSuppress® D; and instructions for the reapplication of PennzSuppress® D for maintenance treatments of unpaved roads. In addition, the website includes the instructions for transport, storage, mixing, and application as well as the Material Safety Data Sheet (MSDS) for PennzSuppress® D.

The application information provides guidance in determining specific parameters that enable effective use of PennzSuppress® D. Distributors or sales representatives assist customers in determining these application parameters. The principal application parameters include the dilution rate, application rate, number and frequency of applications, and whether special surface preparation may be required. Determination of these parameters is influenced by soil porosity, anticipated traffic, and other variables.

D. Operator Requirements

PennzSuppress® D is sold in the United States either via select distributors, or directly by PennzSuppress® D sales representatives. Pennzoil-Quaker State Company trains their distributors and representatives about the product and its application. This arrangement is designed to ensure both accurate representation of the product, as well as its appropriate application. The distributors or representatives assist customers in determining whether PennzSuppress® D will be effective for a certain application, and if so, what dilution rate and application rate is suitable. Distributors in some cases may also provide equipment and operators to apply PennzSuppress® D.

Specific heavy equipment is required to apply PennzSuppress® D in order to achieve optimal dust suppression. PennzSuppress® D should be applied using a liquid application truck with a pressurized spray bar (20 to 30 psi) designed to apply the product evenly over the roadbed surface. For some situations, heavy equipment may also be needed to condition the roadbed before and after application. This equipment might include a milling/reclaiming machine, a motor grader with blade attachments, or a pneumatic rubber-wheel roller and vibratory steel drum roller. In any case, the distributor will either provide the equipment and operators to apply PennzSuppress® D, or recommend the proper methods and equipment to be used. It is assumed that customers that choose to apply PennzSuppress® D themselves will be properly trained in operating any necessary heavy equipment.

E. Warranties

Pennzoil-Quaker State Company warrants that PennzSuppress® D is free of

manufacturing defects and Pennzoil-Quaker State Company will replace any PennzSuppress® D product that does not meet manufacturing specifications when delivered from a Pennzoil-Quaker State Company facility.

IX. ENVIRONMENTAL AND ECONOMIC BENEFITS

As part of our review, we evaluated the potential air quality impacts of PennzSuppress® D. The use of PennzSuppress® D as a dust suppressant in accordance with manufacturer's instructions will likely result in a significant reduction of PM_{10} emissions from unpaved roads without contributing to existing levels of VOCs. It should also be noted that under certain conditions, PM_{10} emissions reductions resulting from the use of PennzSuppress® D as a dust suppressant on unpaved roads may be eligible for emission reduction credits. However, individual Districts in California should be consulted to determine the eligibility for any emission reduction credits.

X. RECOMMENDATIONS

After evaluating the information discussed in this report, the ARB staff recommends that PennzSuppress® D be certified under its Precertification Program. Specifically, we have independently verified the claim of Pennzoil-Quaker State Company concerning its PennzSuppress® D as presented in the claims section of the report.

By accepting Precertification under the ARB's program, Pennzoil-Quaker State Company assumes, for the duration of the three-year Precertification period, responsibility for maintaining the quality of the manufactured equipment and materials at a level equal to or better than was provided to obtain this Precertification. Precertification under the ARB's program is also contingent on the recipient agreeing to be subject to quality monitoring by the ARB, as provided by law.

The ARB makes no express or implied warranties as to the performance of the manufacturer's product or equipment. Nor does the ARB warrant that the manufacturer's product or equipment is free from any defects in workmanship or material caused by negligence, misuse, accident, or other causes. The ARB staff believes, however that Pennzoil-Quaker State Company's PennzSuppress® D will achieve the performance levels presented in the claims section of this report. Our determination is based on our evaluation of the data submitted by Pennzoil-Quaker State Company, as well as the other information identified in this report. Our recommendations are predicated on the expectation that transportation, storage, and application are performed in accordance with the manufacturer's instructions contained in the document entitled PennzSuppress® D Recommended Practices for Reducing the Generation of Airborne Particulate Matter from Unpaved Roads.

XI. PRECERTIFICATION CONDITIONS

The recommendations in this report are conditional upon PennzSuppress® D being manufactured, transported, sold, stored, applied and disposed of in accordance with manufacturer's instructions contained in the document entitled *PennzSuppress® D Recommended Practices for Reducing the Generation of Airborne Particulate*

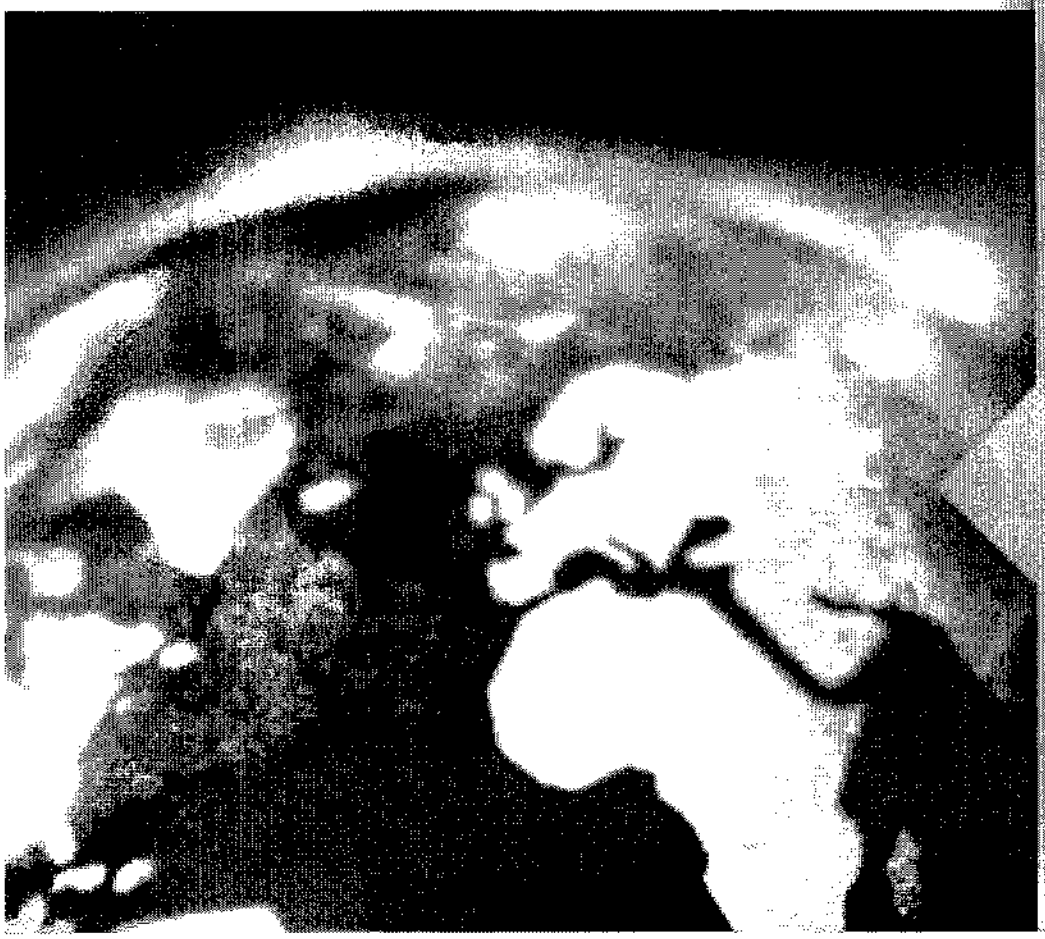
Matter from Unpaved Roads. A copy of this document must be provided to each distributor, applicator, and user of PennzSuppress® D, prior to its application on an unpaved road. In order for the Precertification to remain valid, Pennzoil-Quaker State Company must retain the manufacturing rights for PennzSuppress® D.

KNOCK OUT HYDROGEN SULFIDE WITH

LO-CAT®

H_2S

COMPLETE PACKAGED SYSTEMS FOR COST-EFFECTIVE HYDROGEN SULFIDE REMOVAL



GP Gas Technology Products LLC

A Member of the Merichem Family of Companies

LO-CAT®

COST-EFFECTIVE, ENVIRONMENTALLY FRIENDLY WAY TO REMOVE H_2S FROM ANY GAS STREAM

While we enjoy the fresh scent of pine forests and spring flowers, not all nature's smells are pleasant. The odor of hydrogen sulfide gas is downright offensive. But hydrogen sulfide is more than just a bad smell. It can be bad for the environment. It can be bad for the bottom line. It can be deadly.

Hydrogen sulfide is primarily a nuisance odor for wastewater treatment plants and facilities with reverse osmosis systems. But it's a nuisance that can't be ignored as residential areas encroach on once-remote plants and environmental regulations mandate odor control.

For other industries, it's more than just a bad smell. Hydrogen sulfide can be a natural component of any source of energy – natural gas, oil, geothermal steam, biogas, synthesis gas, etc. When burned, hydrogen sulfide (H_2S) forms sulfur dioxide (SO_2) – a precursor to acid rain – bringing with it the legacy of dying trees, crumbling structures, acidic surface waters... and not just in our own backyard. SO_2 is itself the subject of regulatory concern.

Even beyond the environmental problems, hydrogen sulfide is a headache for industry. H_2S becomes highly corrosive when, combined with water, it forms sulfuric acid and literally eats away at metal.

Hydrogen sulfide is a deadly poison – immediate loss of consciousness and death in as little as 30 minutes results from exposure to 500 parts per million of H_2S in air.

It's more than just a bad smell.

Gas Technology Products' **LO-CAT**® process is a cost-effective, environmentally friendly way to remove hydrogen sulfide from any gas stream.

THE LO-CAT® SOLUTION

Prompted by strict air pollution regulations and a greater concern over hazardous wastes, today's improving technology makes hydrogen sulfide removal more economical than ever.

The LO-CAT* process is a patented, wet scrubbing, liquid redox system that uses a chelated iron solution to convert H_2S to innocuous, elemental sulfur. It does not use any toxic chemicals and does not produce any hazardous waste byproducts. The environmentally safe catalyst is readily available and since it's continuously regenerated in the process, less catalyst is used, more money is saved. This state-of-the-art technology is listed by the Environmental Protection Agency as maximum achievable control technology (MACT).

The LO-CAT technology is applicable to all types of gas streams including air, natural gas, CO_2, amine acid gas, biogas, landfill gas, refinery fuel gas, etc. The liquid catalyst adapts easily to variations in flow and concentration. Flexible operation allows 100% turndown in gas flow and H_2S concentrations. Units require minimal operator attention.

LO-CAT units can be designed for better than 99.9% H_2S removal efficiency.

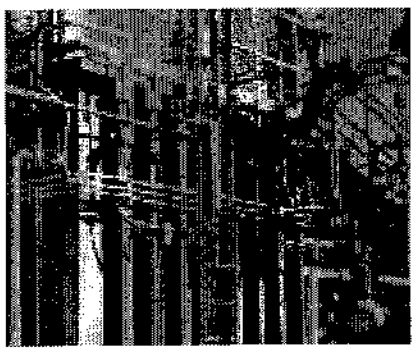
LO-CAT. Reliable. Efficient. Economical.

LO-CAT® TOTAL PACKAGE

From engineering and design, to training and startup, through process warranties and service, we provide a Total Package. We will build to your specifications and meet your tight schedules. We provide optional turnkey projects and installation supervision.

We guarantee H_2S removal efficiency, removal capacity and chemical consumption rate. We also guarantee the continued availability of system catalyst.

We provide on-going technical service, analytical service, trouble-shooting assistance, operator training and refresher courses, annual user's seminar, technical information exchange and patent grant back program.

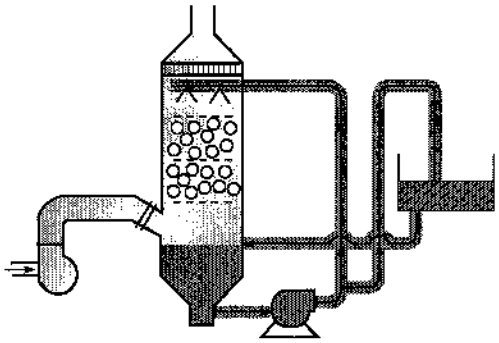


* LO-CAT and LO-CAT II are registered trademarks of Gas Technology Products.

The differences between the LO-CAT process and the LO-CAT II Process are in design. For certain applications the advanced mechanical design of LO-CAT II is appropriate.

LO-CAT®

HOW THE SYSTEM WORKS

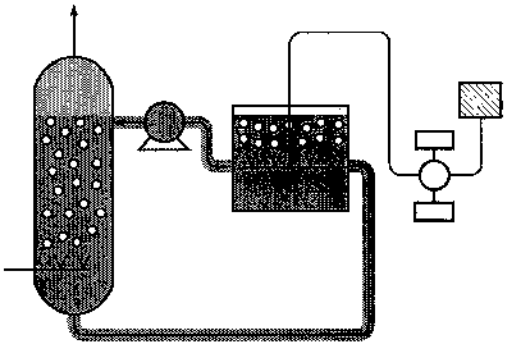


AEROBIC

The aerobic design is used where odor control is the primary concern. Typically, the air stream is discharged to atmosphere once the H_2S is removed.

Hydrogen sulfide laden air enters the absorber vessel where it comes in contact with the LO-CAT catalyst solution. The almost-instantaneous chemical reaction produces solid sulfur, which is filtered out of the catalyst solution. Oxygen present in the air stream continually regenerates the catalyst, which is used over and over again.

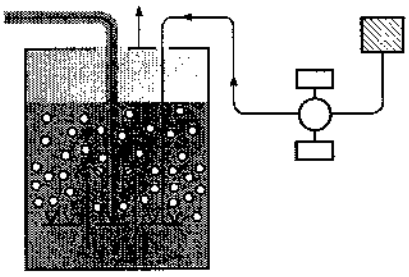
Air stream flowrate and H_2S concentration determine the size of the absorber. Units can be designed to handle air flow rates from a few hundred to several hundred thousand scfm and H_2S concentrations from 50 ppmv to several thousand.



ANAEROBIC

Designed to remove H_2S from anaerobic gas streams or when product recovery is desired, this LO-CAT design feature separates the absorber and oxidizer vessels. H_2S removal and conversion to solid sulfur takes place in the absorber. Reduced catalyst solution is circulated to the oxidizer and regenerated by contact with air.

Various types of sulfur handling equipment are used to remove the solid sulfur from the LO-CAT system, depending on the amount of sulfur produced. For units producing less than 1,000 lbs of sulfur per day, a bag filter system is used, which produces a 30 wt% sulfur cake. For larger units, a settler/belt filter system is used, which produces a 60 wt% sulfur cake. If desired, the belt filter cake can be melted, producing molten sulfur.



AUTOCIRCULATION

This patented system offers cost-effective treatment of anaerobic, non-explosive gas streams. Once the H_2S is removed, the sweet gas stream along with the oxidizing air is discharged to the atmosphere rather than recovered. Since the chemical reactions all occur in a single vessel, the Autocirculation process needs no catalyst circulation pumps and uses very low concentrations of catalyst.

This technology is very effective for treating effluent from amine acid gas extraction processes in natural gas production plants and the non-condensible gases released from geothermal power production.

LO-CAT®

STATE-OF-THE-ART IN REDOX CHEMISTRY TECHNOLOGY

The basic chemistry is the same for all three system configurations. H_2S is converted to innocuous, elemental sulfur using an environmentally safe, chelated iron catalyst. The iron catalyst is held in solution by organic chelating agents that wrap around the iron ion in a claw-like fashion, preventing precipitation of either iron sulfide (FeS) or iron hydroxide ($Fe(OH_3)$). The LO-CAT process is based on reduction-oxidation (Redox) chemistry. Two different Redox reactions take place – one in the absorber section, which converts the H_2S to elemental sulfur, and one in the oxidizer section , which regenerates the catalyst.

ABSORBER REACTIONS

$H_2S\ (g) + H_2O\ (liq) \longleftrightarrow H_2S\ (liq)$

$H_2S\ (liq) \longleftrightarrow HS^- + H^+$

$HS^- + 2Fe^{+++} \longrightarrow S^\circ (solid) + 2Fe^{++} + H^+$

In the absorber, H_2S is absorbed into the slightly alkaline, aqueous LO-CAT solution. The H_2S ionizes to bisulfide, which is oxidized to sulfur by reducing the iron ion from the ferric to the ferrous state. The reduced iron ions are then transferred from the absorber to the oxidizer.

OXIDIZER REACTIONS

$\frac{1}{2}\ O_2(g) + H_2O(liq) \longleftrightarrow \frac{1}{2}\ O_2(liq)$

$\frac{1}{2}\ O_2(liq) + 2Fe^{++} + H_2O \rightarrow 2Fe^{+++} + 2OH^-$

In the oxidizer, atmospheric oxygen is absorbed into the LO-CAT solution. The ferrous iron is reoxidized to ferric iron, regenerating the catalyst. The regenerated catalyst is ready for use in the absorber section.

OVERALL REACTIONS

$H_2S\ (g) + \frac{1}{2}\ O_2(g) \longrightarrow H_2O + S^\circ$

The overall reaction is an isothermal, low operating cost method of carrying out a modified Claus reaction. The chemical additions required to maintain the above reactions are caustic for maintaining the pH, replacement of chelated iron lost in the sulfur removal process, and replacement of degraded chelating agents.

SIDE REACTIONS

Thiosulfate Formation

$2HS^- + 2KOH + 3/2O_2 \longrightarrow K_2S_2O_3 + 2H_2O$

As with any chemical process, side reactions can occur during the LO-CAT process. For example, thiosulfate formation increases greatly when oxygen is present in the sour gas. This occurs when the sour gas being treated is an air stream or when the sour gas has been contaminated with air. Thiosulfate does have some benefits in the process in that it stabilizes the chelating agents, reducing degradation and thereby reducing chemical costs. On the other hand, too much thiosulfate requires the addition of caustic to maintain pH. Blowdown may be required to avoid salt buildup in the system.

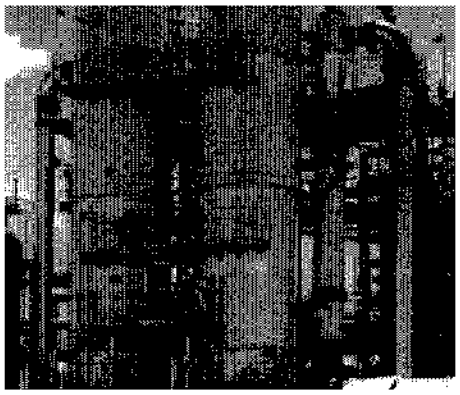
Biocarbonate Formation

$CO_2(g) + H_2O(liq) \longleftrightarrow H_2CO_3(liq)$

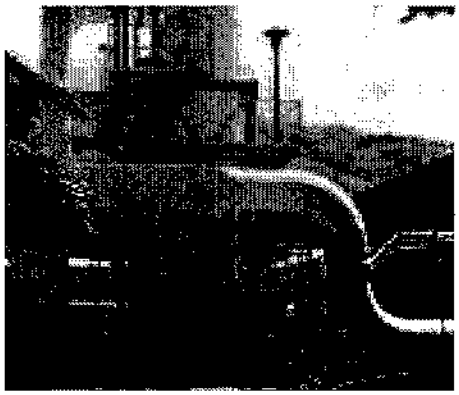
$KOH + H_2CO_3 \longleftrightarrow KHCO_3 + H_2O$

Biocarbonate formation depends on the amount of carbon dioxide absorbed from the sour gas, which depends on the CO_2 partial pressure and the pH of the solution. There are no benefits to biocarbonate formation. Caustic must be added to maintain pH and some of the CO_2 is lost.

LO-CAT®
APPLICATIONS



Anaerobic



Aerobic

Autocirculation

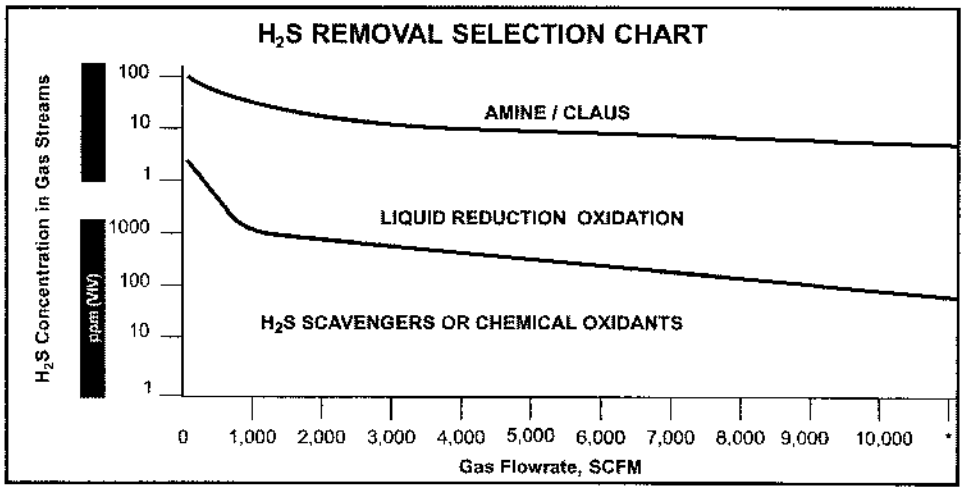
LO-CAT® systems have proved themselves in several industries, including oil and gas production, biogas from anaerobic digesters, coke oven gas desulfurization, CO_2 purification, geothermal steam production, oil refining, odor control for municipal wastewater treatment, landfill gas, ventilation air treatment, and others.

Anaerobic Processes include LO-CAT® units for natural gas, refinery fuel gas, sour water stripper gas, synthetic gas from coal gasification, steel mill/coke oven gas, sewage plant digester gas, claus tail gas, CO_2 production, and EOR.

Aerobic Processes include LO-CAT® units for manufacturing process vents, sewage plants, wastewater treatment, and process effluent.

Autocirculation Processes include LO-CAT® units for amine acid gas, chemical plants, and geothermal non-condensible gases.

As you can see on the chart below – liquid reduction oxidation fits between amine/claus and H_2S scavengers or chemical oxidants.



* Our general range is between 150 lbs of sulfur per day up to 20 long tons per day.

Gas Technology Products have solid, liquid and regenerable catalyst systems to custom tailor sulfur removal solutions up to 30+ tons per day.

LO-CAT®

LICENSEES OF THE LO-CAT® HYDROGEN SULFIDE OXIDATION PROCESS

OIL & GAS PRODUCTIONS

AGIP, SpA, Italy (AAG)* (2 units)
Alberta Nat'l Gas (AAG), Canada
Amoco Prod. Co. (EOR)*(3 units)
Amoco Oil & Gas Well Prod.
Arco Oil & Gas (EOR) Plains, TX
Atco Gas Services Ltd., Canada (AAG)
Chemco, Mech. (NG)
Chevron Pet. Tech (AAG)
Chevron U.S.A. (EOR)
Corporven, S.A. (AAG)
Exxon Company (AAG) (2 units)
Exxon U.S.A. Inc. (AAG)
Hewitt Oil Co. (NG)
Hungarian Nat'l Oil (NG)
INA Naftaplin, Croatia (AAG)
Kuwait Petroleum (ship unloading-loading vapors)
Lagoven, S.A. (NG)
Marathon Oil (NG)
Mobil Oil Canada (EOR)
Ellwood (Stretford conversion)
Mobil Oil Baskerfield (WHGC)*
Oil & Natural Gas Commission of India (AAG) (3 units)
Petroleum Authority of Thailand - PPT (NG)
Pinnacle Gas Treating (2 units) (AAG)
Rigel Oil & Gas, Canada (AAG)
Samson Resources Co.(AAG) (2 units)
Shell Oil Co.
Tejas Gas Corp. (AAG)
Tri-link Resources Canada (AAG)
Undisclosed, Tunisia (AAG)
Union Pacific Resources Co. (Steam flood oil prod.)
Western Gas (2 units) (AAG)

BIOGAS APPLICATIONS

FROM ANAEROBIC DIGESTERS

Boston Harbor
City of Los Angeles/Hyperion
Ellesmere Port, England
Port Adelaide, Australia
Red Star Yeast
South West Water, Hayle, England
Thames Water, Hogsmill, England
Thames Water-Wargraave, England
Wessex Water, Berryhill, England

COKE OVEN GAS DESULFURIZATION

Geneva Steel, Utah
Inland Steel (Pilot Plant)

CO_2 PURIFICATION

Consorgas S.r.L. (2 units), Italy
Praxair
- Argentina
- China
- Mexico
- Thailand (3 units)
- U.S. (2 units)

Mitsui Toatsu Chemicals, Japan

GEOTHERMAL STEAM PROD.

California Energy Navy I & II
California Energy Navy II Expansion
Himpurna California Energy Inc., Indonesia
CE Cebu Geothermal Power, Philippines
Visayas Geothermal Power Co., Philippines
UMPA, Utah Municipal Power

OIL REFINERY

Cochin Refinery, India (AAG)
Daelim Ind. Co. Ltd., Korea (AAG)
HPCL, India (AAG) (2 units)
Irish Refining, Ireland (FG)*
Koch Refining
Mobil Altona Refinery, Australia
Pennzoil Products (FG)
Petromin Lubricating Oil Refinery Co. (AAG), Saudi Arabia
Star Enterprises (Texaco) (Asphalt)
U.S. Oil & Refining (FG)
Witco Oil (FG)
Wyoming Refining (FG)

MUNICIPAL WWTP ODOR CONTROL

City of Cappelle, Holland
City & Country of Honolulu, HI (3 units)
- Honouliuli WWTP
- Kailua WWTP
- Sand Island WWTP

City of Riyadh, Saudi Arabia
City of Winnipeg, Canada (2 units)
Fort Kam, Hawaii
Yorkshire Water, Rawcliffe, England

VENTILATION AIR APPLICATIONS

Martin County, Florida (RO)*
Red Star Yeast
Santa Barbara Water District Business Park
Shanks & McEwan, Stewartby, England
Town of Jupiter, Florida (RO)
Westvaco Polychemicals
Zincor, So. Africa

OTHERS

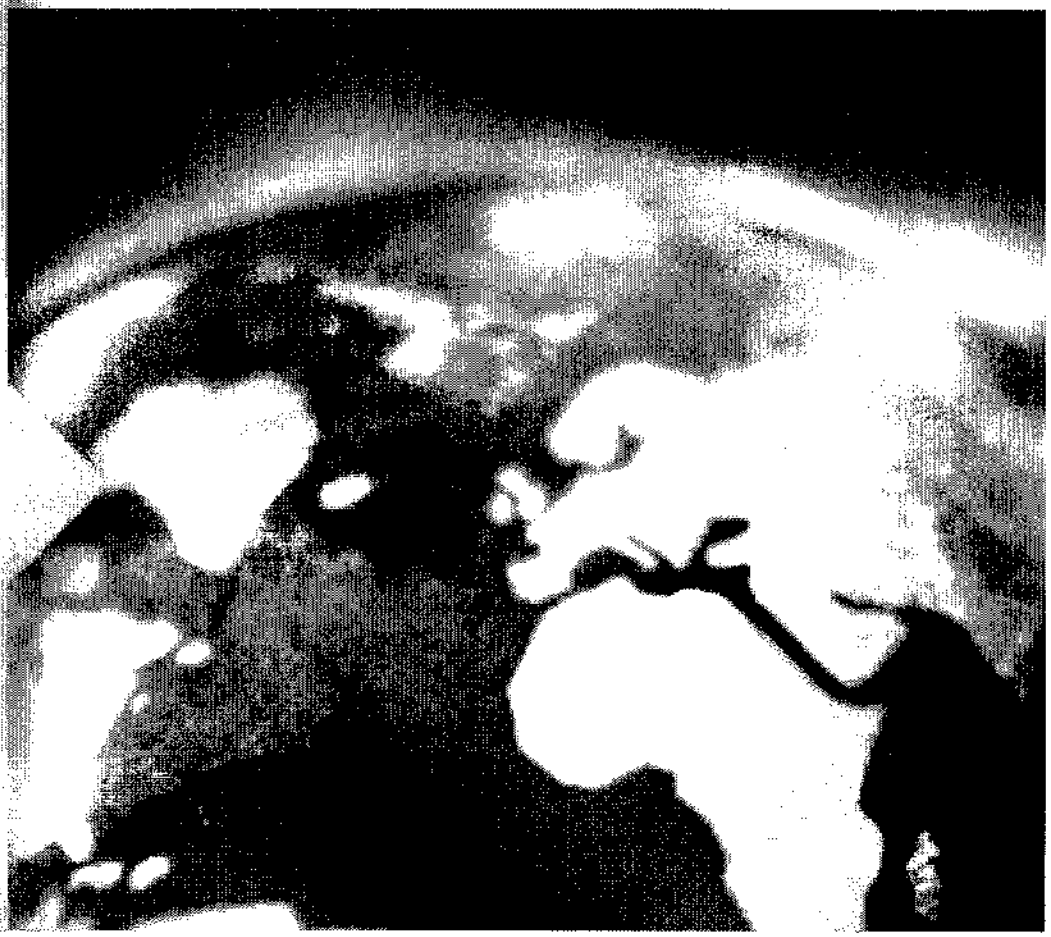
BHP, Australia (hot briquetted iron)
ESD-Elektrochmelzwerk Delfzijl B.V., Netherlands (silicon carbide smelting)
Kronos International, Inc., Germany (TiO_2 production)
Louisiana Pigment, LA (TiO_2 production)
Lubrizol, France (lube oil additives) (2 units)
Orinoco Iron, Venezuela (hot briquetted iron)
Praxair, Canada (H_2S bottling)
Schumann/Sasol, Germany (wax hydrogenation)
Texasgulf (phosphoric acid)
Viskase, Illinois (Viscose production)
WMX, Florida (landfill gas)

REFERENCES

***AAG - Amine Acid Gas**
***EOR - Enhanced Oil Recovery**
***FG - Fuel Gas**
***RO - Reverse Osmosis**
***NG - Natural Gas**
***WHGC - Well Head Gas Casing**

Gas Technology Products LLC
A Member of the Merichem Family of Companies
1501 East Woodfield Road
Schaumburg, IL 60173
Phone: 847-706-6900
Fax: 847-706-6955
www.gtp-merichem.com

MERICHEM
CHEMICALS & REFINERY SERVICES LLC



Effectiveness Demonstration of Fugitive Dust Control Methods for Public Unpaved Roads and Unpaved Shoulders on Unpaved Roads

Final Report

DRI Document N. 685-5200.1F1

December 31, 1996

PREPARED BY:

Dr. John G. Watson
Dr. Judith C. Chow
Dr. John A. Gillies
Dr. C. Fred Rogers
Mr. David DuBois
Mr. Jerry Derby
Dr. Hans Moosmuller

Desert Research Institute
PO Box 60220
Reno, Nevada 89506

PREPARED FOR:

California Regional Particulate Air Quality Study (CRPAQS)
c/o Technical Support Division
California Air Resources Board
2020 L Street
Sacramento, CA 95814

UNDER SPONSORSHIP BY:

CRPAQS

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)
1999 Tuolumne Street, Suite #200
Fresno, CA 93721

Western States Petroleum Association (WSPA)
505 N. Brand Blvd., Suite 1400
Glendale, CA 91203

EXECUTIVE SUMMARY

Experimental Approach

Experiments were conducted from July 1995 to August 1996 in order to determine the efficiencies of different suppressant materials on unpaved public roads and unpaved shoulders along paved roads. The objectives of these experiments were:

- To review published studies of dust emissions rates and dust suppression, and based on this experience, choose the field measurement and data analysis approaches most promising for the quantification of PM_{10} emission rates and suppressant effectiveness.

- To apply those approaches in order to determine which unpaved road stabilizing substance and practices have a high potential to reduce PM_{10} emissions from public unpaved roads and unpaved shoulders of public paved roads.

- To demonstrate the amount by which contributions to ambient PM_{10} concentrations are reduced by applying these methods and to establish the long-term efficiencies of the suppressant applications.

- To determine the practicality and costs of applying these control measures to reduce fugitive dust emissions in the San Joaquin Valley.

For unpaved roads, the PM_{10} sampling plan involved upwind and downwind measurements that eliminated the most objectionable assumptions associated with previous studies. PM_{10} emission rates were estimated by a profile method including of two overhead samplers to allow a more full characterization of past plumes. Net PM_{10} emissions from suppressant test sections were obtained by subtracting the upwind profile form the downwind source profile, and by combining the resulting PM_{10} mass concentrations with meteorological data. Concurrently, a program of detailed soil surface measurements tracked the mechanical properties of the treated surfaces. The PM_{10} emissions were combined with detailed records of the vehicle traffic in order to provide: 1) the emissions rates as PM_{10} mass produced per vehicle-kilometer traveled for each of the suppressant test sections; 2) the efficiencies of the different suppressants in reducing PM_{10} emissions.

For the unpaved shoulder study, a different approach was required because the dust plumes were much more localized and short-lived. In addition to upwind and downwind PM_{10} sampling, fast response observations from light scattering and turbulence sensors were used to characterize the dust events. The full compliment of surface measurements was also performed in order to characterize the mechanical properties of the shoulder surfaces. This broad approach gave: 1) two measures of PM_{10} emissions, one which summed all emissions over several hours, and one which responded to and measured each dust plume created by one vehicle; 2) a three-dimensional measurement of the turbulence caused by each passing vehicle, because this air motion initiates the dust plumes; and 3) the mechanical behavior of the suppressant measurements.

For both the unpaved road and unpaved shoulder test sites, the PM_{10} emission rates, surface properties, and suppressant efficiencies were measured over a period of about one year, so that the effects of weather and aging could be evaluated.

In an initial survey, more than 60 specific suppressant products were identified. These fell into categories of: 1) salts; 2) asphalt or petroleum emulsions; 3) emulsions of other materials; 4) polymers; 5) surfactants; 6) bitumens; 7) adhesives; 8) solid materials; fibers and mulches; 9) hydroseed vegetation; and 10) miscellaneous products.

Four suppressant products were applied to one-third mile test sections of Fields Road, near Merced, California: 1) "Non-Hazardous Crude-Oil-Containing Materials"; 2) "EMC Squared", a biocatalyst product; 3) "Soil-Sement" polymer emulsion mixture; and 4) "Coherex PM" petroleum emulsion and polymer mixture. Three suppressants were applied to one-half mile test sections of unpaved shoulders along Bellevue Road, a suburban thoroughfare near Merced: 1) "Enduraseal" organic emulsion; 2) "Hydroshield" endosperm hydrate; and 3) "DSS-40" acrylic co-polymer.

Conclusions were drawn with respect to: 1) efficiency and durability of each suppressant; 2) fugitive dust emissions rates; and 3) zones of influence of fugitive dust emissions.

Suppressant Efficiency

Suppressant efficiency is defined as the percent reduction in emission achieved on the suppressant-treated test section, as compared to a nearby untreated test section.

- "Soil-Sement" and "Non-Hazardous Crude-Oil-Containing Materials" were effective suppressants , even after vehicular use including about 100 vehicles passes per day during the intensive study periods, and the effects of an unusually wet winter. The efficiencies of "Soil-Sement" and "Non-Hazardous Crude-Oil-Containing Materials" exceeded 80%, on average, during the final measurements period, 12 months after application.

- "Coherex PM's" average efficiency was 73% after three months, and 49% after 12 months.

- "EMC Squared's" average efficiency was 33% immediately after application; after 3 and 12 months' aging, it seemed completely ineffective.

- The major properties that define low-emitting, well-suppressed surfaces are: 1) surface silt loading; and 2) the strength and flexibility of suppressant material as a surface layer or cover.

- Silt loading is the best indicator of suppressant efficiency. Loading of less than 20 grams of loose silt per square meter of surface area (g/m^2) are associated with efficiencies that exceed 90%. Silt loadings that exceed 200 g/m^2 are no different from untreated sections in terms of efficiency.

- None of the shoulder suppressants was effective for any appreciable period. The suppressants applied to Bellevue Road shoulder test sections broke down quickly under the effects of ordinary vehicle traffic such as daily mail deliveries to residences, and random shoulder traffic such as temporary passenger car pullovers. It appeared that these activities caused major deterioration in suppressant efficiencies even without winter weather.

Emission Rates

Emission rates are defined as the total mass of PM10 particulate matter emitted by one vehicle traveling one mile (or kilometer) on the unpaved road, or along the road bordered by the unpaved shoulders. The rate is measured for a certain vehicle speed or range of speeds.

- Emission rates estimated from the untreated and suppressant-treated unpaved road sections ranged from zero to 2.9 pounds of PM_{10} per vehicle-mile-traveled (VMT) (zero to 800 grams per vehicle kilometer-traveled [VKT] for a vehicle speed of 25 mph (40 km/h) and from zero to 5.0 pounds of PM_{10} per VMT (1.4 kilograms per VKT) for a vehicle speed of 35 mph (55km/h).

- Unpaved road emission rates from this study are similar to, but as variable as, those found in other studies. A study conducted on unpaved agricultural roads by the University of California at Davis found emission factors ranging from about 0.1 to about 5 pounds of PM_{10} per VMT at 25 mph. The U.S. EPA "AP-42" Empirical Dust Emission Model underpredicts by as much as a factor of three when applied to the unpaved road conditions pertinent to this study.

- Silt loading, rather than silt content, in the emission rate equation improves the emission rate estimate.

- PM_{10} emission rates from unpaved shoulders are estimated to be 0.03 ± 0.015 pounds per VMT (8 ± 4 grams per VKT) for large vehicles (trucks, semis, vehicles with trailers) traveling from 50 to 60 mph.

- It is doubtful that fugitive dust emission rates from roads and shoulders can ever be estimated by better than a factor of two or three. There will always be large uncertainties in these estimates owing to: 1) problems of natural variability, such as varying wind directions and speeds; and 2) problems involved in using a limited number of samplers to accurately sample turbulent, particle-laden plumes.

Zone of Influence

The "Zone of Influence" is defined in two ways. First, it is the distance from a source at which PM_{10} concentrations have fallen off 10% of their values close to the source. Second, it can also be defined from the receptor's perspective, as the distance at which the source's emissions result in a measured 1 $\mu g/m^3$ increment above the ambient background. The findings concerning the zone of influence of the unpaved road PM_{10} emissions are as follows:

- PM_{10} concentrations decrease exponentially with distance downwind.

- PM_{10} concentrations decrease by 90% from near-road concentrations within 50 meters (165 feet) downwind of the road.

- Extrapolating to 1 $\mu g/m^3$ shows downwind distances of about 150 meters. This is the effective zone of influence for detecting emissions from a single source. Ambient concentrations usually result from the superimposed contributions of many individual sources.

EPA/600/2-87/102
November 1987

PB88-139936

EVALUATION OF THE EFFECTIVENESS OF CHEMICAL DUST SUPPRESSANTS ON UNPAVED ROADS

By

G. E. Muleeki and C. Cowherd,.
Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

Funded By:

LTV Steel Company, Inc.
Penalty Credit Project 5200-868236

EPA Project Officer:

Robert C. McCrlllia
Air and Energy Engineering Research Laboratory
Research Triangle Park, North Carolina 27711

AIR AND ENERGY ENGINEERING RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. **ENVIRONMENTAL PROTECTION AGENCY**
RESEARCH TRIANGLE PARK, NC 27711

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA/600/2-87/102	2.	3. RECIPIENT'S ACCESSION NO. PB88 139936/AS
4. TITLE AND SUBTITLE Evaluation of the Effectiveness of Chemical Dust Suppressants on Unpaved Roads		5. REPORT DATE November 1987 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) G. E. Muleski and C. Cowherd, Jr.		8. PERFORMING ORGANIZATION REPORT N 8127-L (MRI)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Midwest Research Institute 425 Volker Boulevard Kansas City, Missouri 64110		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. P.O. 5200-868236*
12. SPONSORING AGENCY NAME AND ADDRESS EPA, Office of Research and Development Air and Energy Engineering Research Laboratory Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERE Project Report; 6/84 - 11/8 14. SPONSORING AGENCY CODE EPA/600/13

15. SUPPLEMENTARY NOTES AEERL project officer is Robert C. McCrillis, Mail Drop 62B, 919/541-2733. (*) LTV Steel Co. (formerly Jones and Laughlin Steel Corp.) penalty credit project.

16. ABSTRACT The report gives results of measurements of the long-term effectiveness of five unpaved-road chemical dust suppressants. Effectiveness at controlling total particulate emissions in three size fractions (<15, <10, and <2.5 micrometers) was determined over several cycles of chemical application, control effectiveness decay, and chemical reapplication. All five chemicals were tested on the same roa with each chemical used on separate abutting road segments. The chemicals were applied in quantities that spanned the range of common practice in the steel industry. Traffic parameters were typical of the steel industry. Over a 30-day period, control effectiveness of each chemical decreased: in some cases by as much as 50% and in others by as little as 10%. Control effectiveness for all chemicals was >95% immediately after chemical application or reapplication. The rate of decay was about the same for all particle size ranges investigated. Road surface silt loading was found to be a reliable indicator of relative effectiveness for some chemicals.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Pollution	Pollution Control	13B
Dust	Stationary Sources	11G
Roads	Dust Suppressants	
Chemical Compounds	Unpaved Roads	07B, 07C
Iron and Steel Industry		11F

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release to Public	Unclassified	93
	20. SECURITY CLASS (This page) Unclassified	22. PRICE

EPA Form 2220-1 (9-73)

SUMMARY AND CONCLUSIONS

The purpose of this study was to obtain data characterizing the average control performance of dust suppressants commonly used by the iron and steel industry to mitigate particulate emissions from unpaved roads. Vehicular traffic on unpaved roads has been estimated to contribute more than half of the suspended particulate emissions from open sources in the industry.

Control efficiency values were determined not only for total particulate (TP), but also for particles less than 15 ∓m in aerodynamic diameter (inhalable particulate, IP), less than 10 ∓m in aerodynamic diameter (PM_{10}), and less than 2.5 ,∓m in aerodynamic diameter (fine particulate, FP). The study focused on PM_{10} control performance of dust suppressants in particular, because this size fraction is anticipated to form the basis of any revised National Ambient Air Quality Standard for particulate matter.

In order to make the control performance test results as useful as possible to the industry, unpaved road vehicular traffic characteristics and dust control techniques used in the industry were surveyed early in the study. Subsequently these results formed the basis for the design of the field testing program so that commonly used suppressants could be evaluated under service conditions representative of typical iron and steel industry unpaved roads.

The exposure profiling method developed by MRI was the technique utilized to measure uncontrolled and controlled emission factors for vehicular traffic on unpaved roads. Exposure profiling of roadway emissions involves direct isokinetic measurement of the total passage of open dust emissions approximately 5 m downwind of the edge of the road by means of simultaneous sampling at four points distributed vertically over the effective height of the dust plume. Downwind particle size distributions were measured using cyclone precollectors followed by parallel slot cascade impactors. Upwind particle size distributions were also determined using impaction. A total of 64 tests of controlled and uncontrolled particulate emissions from vehicular traffic on unpaved roads were conducted at two iron and steel plants.

Five chemical dust suppressants were evaluated during the study:

- Petro Tac, an emulsified asphalt
- Coherex, a petroleum resin
- Soil-Sement, an acrylic cement

- Generic 2 (QS), a generic petroleum resin product developed at the Mellon Institute
- Liquidow , a salt (calcium chloride)

All products, with the exception of Generic, have been used in iron and steel plants. In addition, industry personnel have expressed considerable interest in the use of Generic.

These suppressants were applied under the direction of MRI personnel in quantities that generally span the range of common practice in the industry, manufacturers' recommendations, and previous field evaluations. Control efficiency measurements were made over periods up to 70 days after application, although the main averaging period of interest was approximately 1 month. The latter is representative of time periods between control applications in the industry.

Average control efficiencies over the first 30 days for specific particle size ranges are presented in Figure SC-1. Note that code letters (explained in the text) have been assigned to the various dust suppressants in order to discourage selective citation of test results. It is recommended that the report taken as a whole be used as a basis for decisions regarding dust control programs rather than any one data set taken independently.

All chemicals tested exhibited average control efficiencies of approximately 50% or more over the first 30 days after application. These tests were conducted using application and traffic parameters that may be considered typical in the iron and steel industry. Note that while the control provided by some suppressants showed significant temporal decay, others exhibited a relatively constant level of control over the time period.

Statistical analyses of the data indicate that reapplication results in a significantly higher level of control and that only one suppressant exhibited significant differences in control between the various particle size fractions. Comparisons between the control efficiencies for different chemicals indicate that there were relatively few suppressant/size fraction combinations which could be considered significant at the 5% level.

Comparison of the relative cost-effectiveness reveals only a slight variation between the suppressants other than calcium chloride. In terms of cost-effectiveness, the salt did not compare favorably with the other products; however, this is at least a partial result of the abnormally high precipitation during the field exercise.

Several road surface material properties were discussed as possible indicators of control performance. While reasonably strong relationships between silt loading and control were found for some of the suppressants, the clustered nature of the entire data set precluded development of a reliable performance indicator. However, the data suggest that the industrial paved road emission factor equation may be used to conservatively overestimate emissions from controlled unpaved roads.

S = Soil Sement

G = Generic

X = Coherex

P = Petro Tac

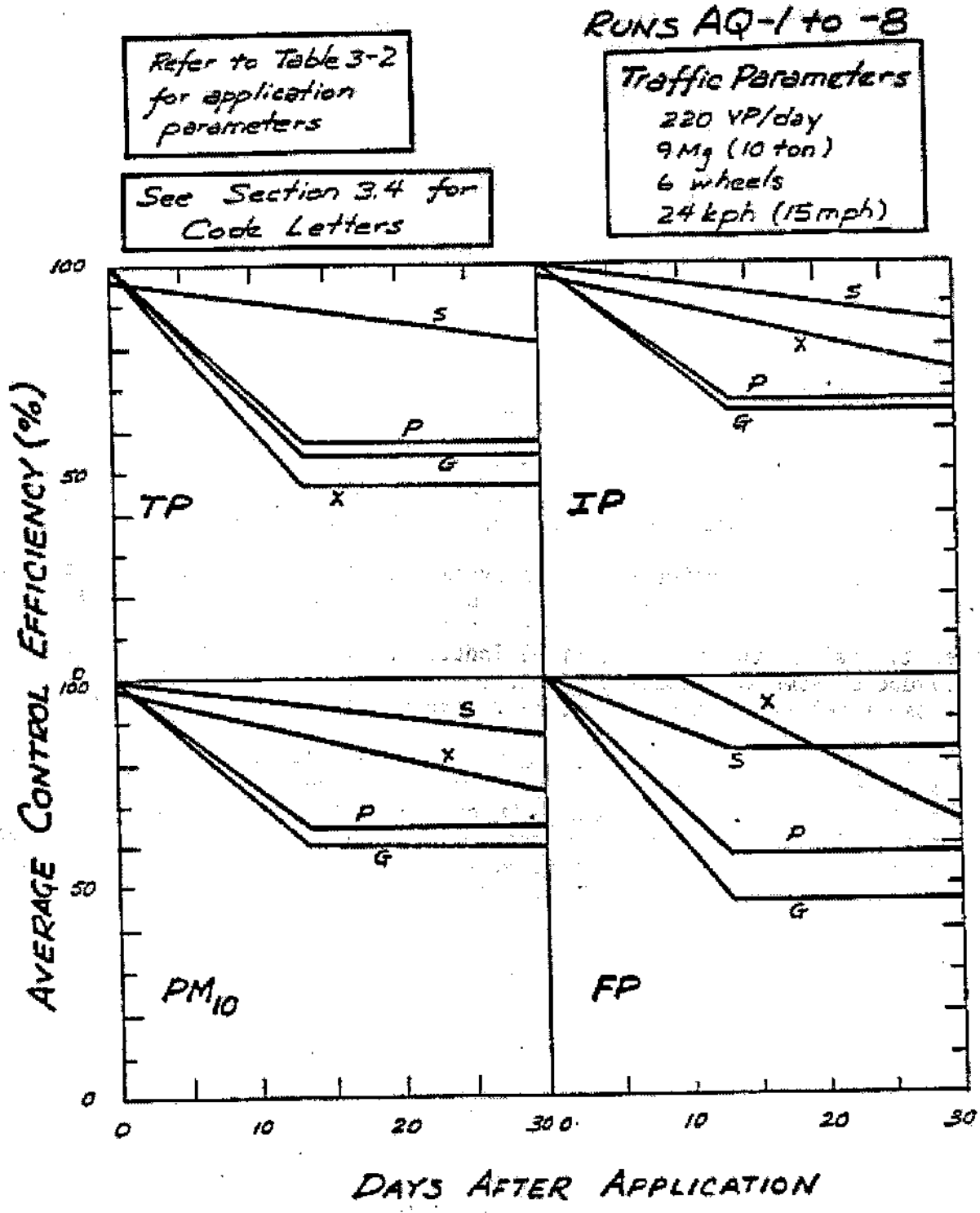


Figure SC-1. Average control efficiency as a function of time over 30 days.

Finally, results of previous tests were combined with data from the present study to develop an average control performance model for petroleum resins. The model was designed to meet typical needs in the iron and steel industry in terms of averaging periods and service environments.