

# Appendix 3. Air Quality

## Air Quality Emission Calculations

The URBEMIS model air quality emission calculations provided by Lodi Gas Storage (LGS) for the construction emissions were reviewed and revised to incorporate three specific changes.

1. The construction emission calculations did not include any vehicle traffic for material delivery (pipe, fuel, backfill material, etc.) or waste export. The URBEMIS model was revised to include one heavy duty vehicle 18-mile round trip during the construction excavation phase. This marginally increased the total exhaust emissions calculated for the construction phase.
2. LGS assumed the URBEMIS default fugitive dust emission category for site grading and used the average conditions emission factor of 10 lbs/day/acre. However, the project is located in a very windy area as is clearly indicated by it being adjacent to a wind power farm. Therefore, the use of the worst-case condition emission factor of 38.2 lbs/day/acre is more appropriate given the windy conditions of the project site area.
3. The fugitive dust mitigation for watering, 2 times per day giving a 38% emission reduction, was added as an assumption in the model.

The revision of these three factors was conducted for the metering station and pipeline construction URBEMIS model runs conducted by the applicant. These two revised URBEMIS model run output files are included below. The PM10 emissions for the other construction activity/phases was adjusted separately by determining the acreage assumed based on the 10 lb/day/acre factor and recalculating by hand using the worst-case condition uncontrolled emission factor of 38.2 lbs/day/acre and reducing the calculated emissions by including the watering control efficiency of 38%.

Project Name: Kirby Hills Pipeline Construction  
 Project Location: Lower Sacramento Valley Air Basin  
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

### Construction Emission Estimates, Summary Report (Pounds per Day, Summer) – 2006

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
Totals (lbs/day, unmitigated)	10.51	74.02	85.09	0.01	155.98	3.11	152.82
Totals (lbs/day, mitigated)	10.51	74.02	85.09	0.01	103.98	3.11	100.87

**Kirby Hills Natural Gas Storage Facility**  
**APPENDIX 3. AIR QUALITY**

Construction Start Month and Year: July, 2006  
 Construction Duration: 1  
 Total Land Use Area to be Developed: 14 acres  
 Maximum Acreage Disturbed Per Day: 4 acres  
 Single Family Units: 0 Multi-Family Units: 0  
 Retail/Office/Institutional/Industrial Square Footage: 0

**Construction Emission Estimates, Unmitigated: Detail Report (Pounds per Day) – 2006**

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
<b>PHASE 1 - DEMOLITION EMISSIONS</b>							
Fugitive Dust	—	—	—	—	0.00	—	0.00
Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>PHASE 2 - SITE GRADING EMISSIONS</b>							
Fugitive Dust	—	—	—	—	152.80	—	152.80
Off-Road Diesel	10.33	73.31	80.32	—	3.09	3.09	0.00
On-Road Diesel	0.03	0.43	0.10	0.01	0.01	0.01	0.00
Worker Trips	0.15	0.28	4.67	0.00	0.03	0.01	0.02
Maximum lbs/day	10.51	74.02	85.09	0.01	155.93	3.11	152.82
<b>PHASE 3 - BUILDING CONSTRUCTION</b>							
Building Construction Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Building Construction Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	—	—	—	—	—	—
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	—	—	—	—	—	—
Asphalt Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day, all phases	10.51	74.02	85.09	0.01	155.93	3.11	152.82

**Phase 3 - Building Construction Assumptions: Phase Turned OFF**

Phase 2 - Site Grading Assumptions  
Start Month/Year for Phase 2: Jul '06  
Phase 2 Duration: 1 months  
On-Road Truck Travel (VMT): 18

**Off-Road Equipment**

No.	Type	Horsepower	Load Factors	Hours Per Day
2	Cranes	190	0.430	8.0
2	Other Equipment	190	0.620	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0
2	Trenchers	82	0.695	8.0

**Construction Emission Estimates, Mitigated: Detail Report (Pounds per Day) – 2006**

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
<b>PHASE 1 - DEMOLITION EMISSIONS</b>							
Fugitive Dust	—	—	—	—	0.00	—	0.00
Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>PHASE 2 - SITE GRADING EMISSIONS</b>							
Fugitive Dust	—	—	—	—	100.85	—	100.85
Off-Road Diesel	10.33	73.31	80.32	—	3.09	3.09	0.00
On-Road Diesel	0.03	0.43	0.10	0.01	0.01	0.01	0.00
Worker Trips	0.15	0.28	4.67	0.00	0.03	0.01	0.02
Maximum lbs/day	10.51	74.02	85.09	0.01	103.98	3.11	100.87
<b>PHASE 3 - BUILDING CONSTRUCTION</b>							
Building Construction Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Building Construction Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	—	—	—	—	—	—
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	—	—	—	—	—	—
Asphalt Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day, all phases	10.51	74.02	85.09	0.01	103.98	3.11	100.87

**Construction-Related Mitigation Measures**

Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily  
 Percent Reduction (ROG 0.0%, NOx 0.0%, CO 0.0%, SO2 0.0%, PM10 34.0%)  
 Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions  
 Start Month/Year for Phase 2: Jul '06  
 Phase 2 Duration: 1 months  
 On-Road Truck Travel (VMT): 18

**Off-Road Equipment**

No.	Type	Horsepower	Load Factors	Hours Per Day
2	Cranes	190	0.430	8.0
2	Other Equipment	190	0.620	8.0
2	Tractor/Loaders/Backhoes	79	0.465	8.0
2	Trenchers	82	0.695	8.0

**Changes made to the default values for Land Use Trip Percentages**

**Changes made to the default values for Construction**

Site Grading Fugitive Dust Emission Rate changed from 10 to 38.2  
 Site Grading Truck Haul Capacity (yds<sup>3</sup>) changed from 20 to 10  
 Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily has been changed from off to on.

Project Name: Kirby Hills Metering Station  
 Project Location: Lower Sacramento Valley Air Basin  
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

**Construction Emission Estimates, Summary Report (Pounds per Day, Summer) – 2006**

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
Totals (lbs/day, unmitigated)	8.25	59.64	64.96	0.01	40.86	2.65	38.21
Totals (lbs/day, mitigated)	8.25	59.64	64.96	0.01	27.87	2.65	25.22

**Area Source Emissions Estimates**

Source	ROG	NOx	CO	SO2	PM10
Totals (lbs/day, unmitigated)	0.00	0.00	0.00	0.00	0.00

File Name: C:\Urbemis\Projects2k2\kirby metering station.urb  
 Project Name: Kirby Hills Metering Station  
 Project Location: Lower Sacramento Valley Air Basin  
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

Construction Start Month and Year: May, 2006  
 Construction Duration: 1.5  
 Total Land Use Area to be Developed: 1 acres  
 Maximum Acreage Disturbed Per Day: 1 acres  
 Single Family Units: 0 Multi-Family Units: 0  
 Retail/Office/Institutional/Industrial Square Footage: 0

**Construction Emission Estimates, Unmitigated: Detail Report (Pounds per Day) – 2006**

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
<b>PHASE 1 - DEMOLITION EMISSIONS</b>							
Fugitive Dust	—	—	—	—	0.00	—	0.00
Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>PHASE 2 - SITE GRADING EMISSIONS</b>							
Fugitive Dust	—	—	—	—	38.20	—	38.20
Off-Road Diesel	8.16	59.10	62.99	—	2.64	2.64	0.00
On-Road Diesel	0.03	0.43	0.10	0.01	0.01	0.01	0.00
Worker Trips	0.06	0.11	1.87	0.00	0.01	0.00	0.01
Maximum lbs/day	8.25	59.64	64.96	0.01	40.86	2.65	38.21
<b>PHASE 3 - BUILDING CONSTRUCTION</b>							
Building Construction Off-Road Diesel	3.23	19.65	27.46	—	0.71	0.71	0.00
Building Construction Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	—	—	—	—	—	—
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	—	—	—	—	—	—
Asphalt Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	3.23	19.65	27.46	0.00	0.71	0.71	0.00
Maximum lbs/day, all phases	8.25	59.64	64.96	0.01	40.86	2.65	38.21

**Phase 1 - Demolition Assumptions: Phase Turned OFF**

**Phase 2 - Site Grading Assumptions**

Start Month/Year for Phase 2: May '06

Phase 2 Duration: 0.2 months

On-Road Truck Travel (VMT): 18

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**Off-Road Equipment**

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No.	Type	Horsepower	Load Factors	Hours Per Day
2	Rollers	114	0.430	8.0
2	Rubber Tired Dozers	352	0.590	8.0
2	Scrapers	313	0.660	8.0

**Phase 3 - Building Construction Assumptions**

Start Month/Year for Phase 3: May '06

Phase 3 Duration: 1.3 months

Start Month/Year for SubPhase Building: May '06

SubPhase Building Duration: 1.3 months

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**Off-Road Equipment**

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No.	Type	Horsepower	Load Factors	Hours Per Day
1	Cranes	190	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Trenchers	82	0.695	8.0

Start Month/Year for SubPhase Architectural Coatings: Jun '06  
 SubPhase Architectural Coatings Duration: 0.1 months  
 SubPhase Asphalt Turned OFF

**Construction Emission Estimates, Mitigated: Detail Report (Pounds per Day) – 2006**

Source	ROG	NOx	CO	SO2	PM10 Total	PM10 Exhaust	PM10 Dust
<b>PHASE 1 - DEMOLITION EMISSIONS</b>							
Fugitive Dust	—	—	—	—	0.00	—	0.00
Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>PHASE 2 - SITE GRADING EMISSIONS</b>							
Fugitive Dust	—	—	—	—	25.21	—	25.21
Off-Road Diesel	8.16	59.10	62.99	—	2.64	2.64	0.00
On-Road Diesel	0.03	0.43	0.10	0.01	0.01	0.01	0.00
Worker Trips	0.06	0.11	1.87	0.00	0.01	0.00	0.01
Maximum lbs/day	8.25	59.64	64.96	0.01	27.87	2.65	25.22
<b>PHASE 3 - BUILDING CONSTRUCTION</b>							
Building Construction Off-Road Diesel	3.23	19.65	27.46	—	0.71	0.71	0.00
Building Construction Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	—	—	—	—	—	—
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	—	—	—	—	—	—
Asphalt Off-Road Diesel	0.00	0.00	0.00	—	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	3.23	19.65	27.46	0.00	0.71	0.71	0.00
Maximum lbs/day, all phases	8.25	59.64	64.96	0.01	27.87	2.65	25.22

**Construction-Related Mitigation Measures**

Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily  
 Percent Reduction(ROG 0.0%, NOx 0.0%, CO 0.0%, SO2 0.0%, PM10 34.0%)  
 Phase 1 - Demolition Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions  
 Start Month/Year for Phase 2: May '06  
 Phase 2 Duration: 0.2 months  
 On-Road Truck Travel (VMT): 18

**Off-Road Equipment**

No.	Type	Horsepower	Load Factors	Hours Per Day
1	Rollers	114	0.430	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Scrapers	313	0.660	8.0

Phase 3 - Building Construction Assumptions  
 Start Month/Year for Phase 3: May '06  
 Phase 3 Duration: 1.3 months  
 Start Month/Year for SubPhase Building: May '06  
 SubPhase Building Duration: 1.3 months

**Off-Road Equipment**

No.	Type	Horsepower	Load Factors	Hours Per Day
1	Cranes	190	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
1	Trenchers	82	0.695	8.0

Start Month/Year for SubPhase Architectural Coatings: Jun '06  
 SubPhase Architectural Coatings Duration: 0.1 months  
 SubPhase Asphalt Turned OFF

**Area Source Emissions Estimates, Unmitigated (Pounds per Day, Summer)**

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0.00	0.00
Hearth - No summer emissions	—	—	—	—	—
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	—	—	—	—
Architectural Coatings	0.00	—	—	—	—
Totals (lbs/day, unmitigated)	0.00	0.00	0.00	0.00	0.00

**Changes made to the default values for Land Use Trip Percentages**

**Changes made to the default values for Construction**

Site Grading Fugitive Dust Emission Rate changed from 10 to 38.2  
 Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily has been changed from off to on.

**Changes made to the default values for Area**