KD Anderson & Associates, Inc.
Transportation Engineers

November 7, 2008

Mr. Bruce Kemp, AICP
Project Manager
North State Resources, Inc.
1321 20th Street
Sacramento, CA 95811

Subject: ***Pleasant Valley Road/Patterson Drive Intersection Project***

Dear Mr. Kemp:

On behalf of KD Anderson & Associates (KDA), I am pleased to submit this letter report presenting air quality analysis data on the Pleasant Valley Road/Patterson Drive Intersection Improvement and Signalization project in El Dorado County.

KDA has been retained by North State Resources (NSR) to assess two aspects of the project's potential impacts on air quality:

- construction-related criteria pollutant emissions, and
- greenhouse gas (GHG) emissions.

This letter report presents the results of our assessment of these two aspects of air quality.

Construction-Related Criteria Pollutant Emissions

KDA prepared estimates of criteria pollutant emissions associated with construction of the Pleasant Valley Road/Patterson Drive project. As noted in Section 4.3.3 of the El Dorado County Air Quality Management District (AQMD) *Guide to Air Quality Assessment*,

> "The District recommends use of the roadway construction emissions model, developed by the Sacramento Metropolitan AQMD, for estimating emissions from construction of roads."

KDA prepared emissions estimates for this letter report using version 6.3 of the Road Construction Emissions Model. This model is available on the Sacramento Metropolitan AQMD website (http://www.airquality.org/ceqa/index.shtml).

Input data used in the Road Construction Emissions Model are from the El Dorado County Department of Transportation, transmitted in your October 27, 2008 E-mail message.

Enclosed with this letter is a copy of the results of the Road Construction Emissions Model analysis. The following is a summary of the results, focusing on the most applicable values:

Reactive Organic Gases (ROG) =	5.1 pounds per day
Nitrogen Oxides (NOx) =	40.6 pounds per day
Inhalable Particulate Matter (PM10) =	22.1 pounds per day
Fine Particulate Matter (PM2.5) =	6.1 pounds per day

Greenhouse Gas Emissions

Greenhouse Gases include a large number of different chemical compounds. To varying degrees, these compounds are considered to result in a change in global climate. For this letter report, two compounds are used as GHG indicators: carbon dioxide (CO_2) and methane (CH_4). This letter report presents a qualitative assessment of the effect of the Pleasant Valley Road/Patterson Drive project on GHG emissions.

Motor vehicle emissions are largely determined by three factors:

- the number of vehicle trips,
- the amount of vehicle miles traveled (VMT), and
- the motor vehicle emission rate (typically expressed in grams per mile).

The project is not expected to result in any change in the number of vehicle trips or VMT. This is indicated by a lack of project-related change in traffic volumes – changes in the number of vehicle trips or the VMT would result in a change in traffic volumes. As noted in the Traffic Report for the Pleasant Valley Road (State Route 49)/Patterson Drive Intersection Project Study Report,

> "Although the lane configurations and traffic control vary between year 2025 'no project' and 'with project' conditions, the projected intersection traffic volumes are the same."

Motor vehicle emission rates are measured as the amount of emissions generated by a single vehicle as it travels. To calculate emissions, this rate is multiplied by the amount of travel. For example, if the emission rate for a vehicle is 400 grams of CO_2 per mile, and the amount of travel in a study area is 1,000 vehicle miles traveled, the amount of CO_2 emissions would be 400,000 grams (400 x 1,000 = 400,000).

An important factor in determining motor vehicle emission rates is the speed of vehicles. In general, the emission rate decreases as the speed of vehicles increases up to approximately 45 miles per hour (mph). This decrease in emission rate is a result of increasing engine efficiency. As the speed of vehicles increases above 45 mph, the emission rate increases. This increase is largely due to increased airflow friction and decreasing engine efficiency. The change in CO_2 and CH_4 emission rates as vehicle speed changes is shown in the two attached graphs.

KDA

The posted speed limit on Pleasant Valley Road is 40 mph. Based on observations at the project site, the unimpeded cruising speed on Pleasant Valley Road is 40 to 45 mph. This speed decreases to zero at the intersection of Pleasant Valley Road & Patterson Drive. In the immediate vicinity of the intersection, the average vehicle speed is less than 5 mph.

As noted in the traffic report for the proposed project, vehicles traveling on Pleasant Valley Road experience a substantial amount of delay at the intersection of Pleasant Valley Road & Patterson Drive, and implementation of the project would reduce average delay at this intersection. Although some vehicles would be stopped with the project while facing a red light, the decrease in average delay would result in an increase in the average vehicle speed in the study area.

To the extent that implementation of the project would reduce average delay at this intersection, and increase average vehicle speed in the study area, it would reduce emission rates for both CO2 and CH4. The reduction in GHG emissions has not been quantified for this letter report. However, by not changing the number of vehicle trips, not changing VMT, and reducing emission rates for CO2 and CH4, the project may be considered to reduce GHG emissions.

Closing

Thank you for the opportunity to provide NSR with air quality analysis services on the Pleasant Valley Road/Patterson Drive project. If you have any questions about this letter report, or would like to discuss this matter, please feel free to call me at 916/205-7032 (cell phone) or write to me at wshijo@kdanderson.com (E-mail).

Sincerely,

KD Anderson & Associates, Inc.

Wayne Shijo
Project Manager

enclosures

KDA

Road Construction Emissions Model, Version 6.3

Emission Estimates for -> Pleasant Valley-Patterson Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	4.3	20.0	36.8	21.6	1.6	20.0	5.6	1.5	4.2	3,023.3
Grading/Excavation	5.1	20.8	40.6	22.1	2.1	20.0	6.1	1.9	4.2	3,460.4
Drainage/Utilities/Sub-Grade	4.5	17.4	33.9	21.8	1.8	20.0	5.8	1.7	4.2	2,794.1
Paving	3.0	9.0	15.7	1.4	1.4	-	1.3	1.3	-	1,225.7
Maximum (pounds/day)	5.1	20.8	40.6	22.1	2.1	20.0	6.1	1.9	4.2	3,460.4
Total (tons/construction project)	0.3	1.3	2.6	1.4	0.1	1.2	12.5	0.3	0.3	211.3

Notes:	
Project Start Year ->	2009
Project Length (months) ->	7
Total Project Area (acres) ->	5
Maximum Area Disturbed/Day (acres) ->	1
Total Soil Imported/Exported (yd^3/day)->	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

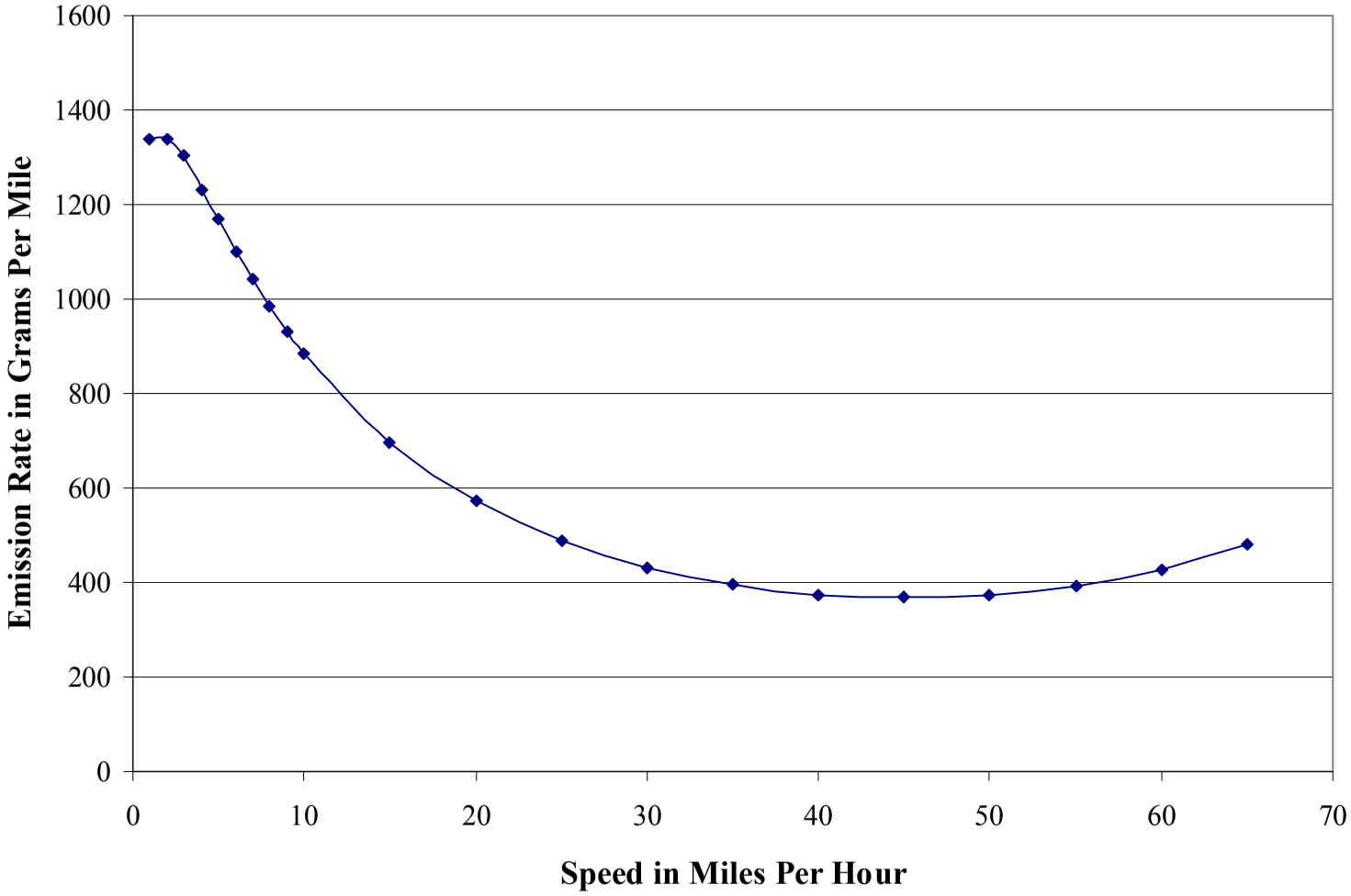
Emission Estimates for -> Pleasant Valley-Patterson Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	2.0	9.1	16.7	9.8	0.7	9.1	2.6	0.7	1.9	1,374.2
Grading/Excavation	2.3	9.5	18.5	10.0	0.9	9.1	2.8	0.9	1.9	1,572.9
Drainage/Utilities/Sub-Grade	2.0	7.9	15.4	9.9	0.8	9.1	2.6	0.8	1.9	1,270.0
Paving	1.4	4.1	7.1	0.6	0.6	-	0.6	0.6	-	557.1
Maximum (kilograms/day)	2.3	9.5	18.5	10.0	0.9	9.1	2.8	0.9	1.9	1,572.9
Total (megagrams/construction project)	0.3	1.2	2.3	1.3	0.1	1.1	11.3	0.2	0.2	191.7

Notes:	
Project Start Year ->	2009
Project Length (months) ->	7
Total Project Area (hectares) ->	2
Maximum Area Disturbed/Day (hectares) ->	0
Total Soil Imported/Exported ($meters^3$/day)->	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

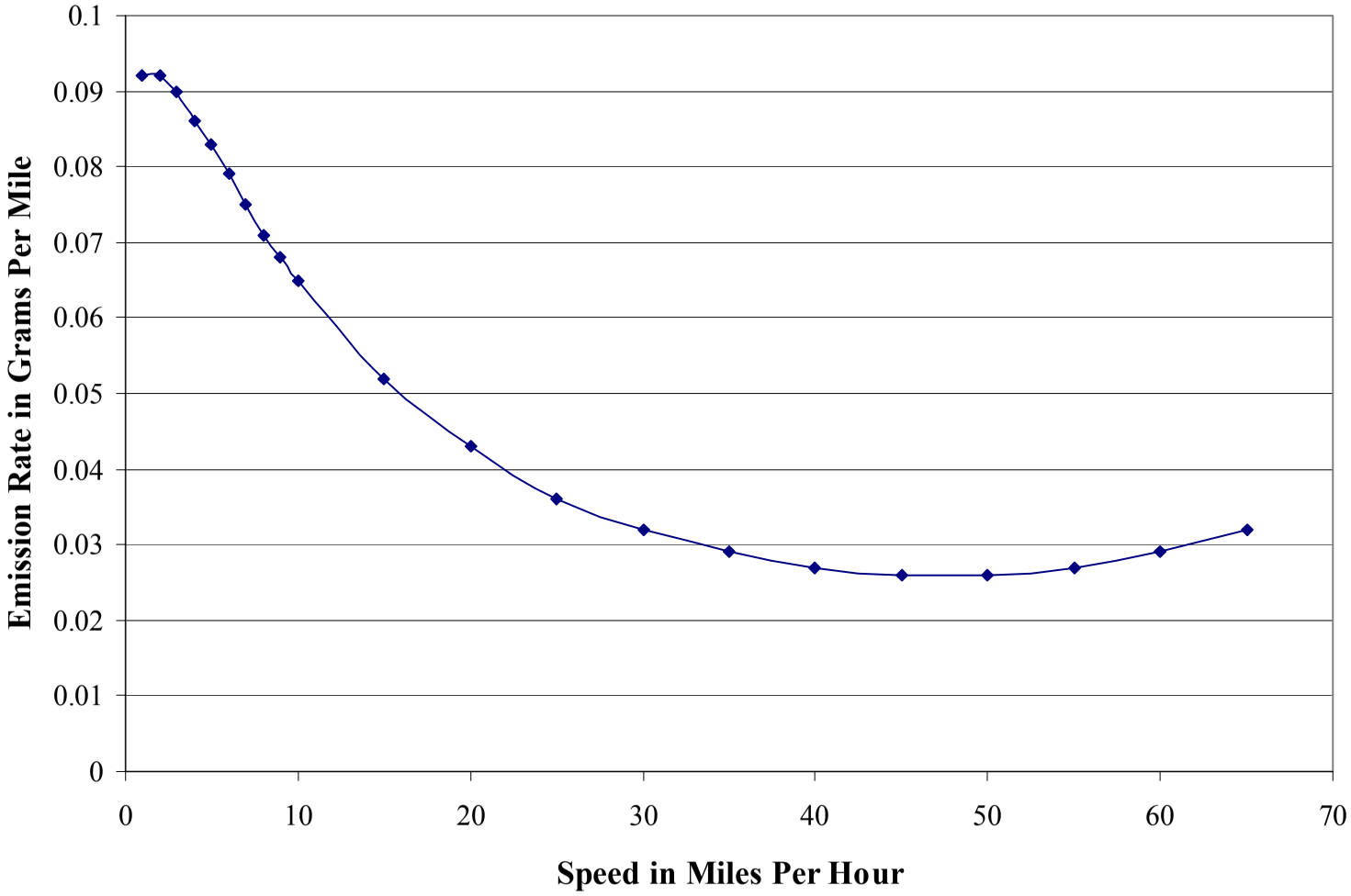
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Carbon Dioxide Motor Vehicle Emission Rates By Speed



Source: EMFAC2007 Rates for El County in the year 2010

Methane Motor Vehicle Emission Rates By Speed



Source: EMFAC2007 Rates for El County in the year 2010