

Justification for Construction Air Quality Thresholds

Addendum to:

***Justification for Air Quality Thresholds of Significance
in the
Sacramento Federal Nonattainment Area***

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Justification for Construction Threshold

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1. Construction and Operational Emissions

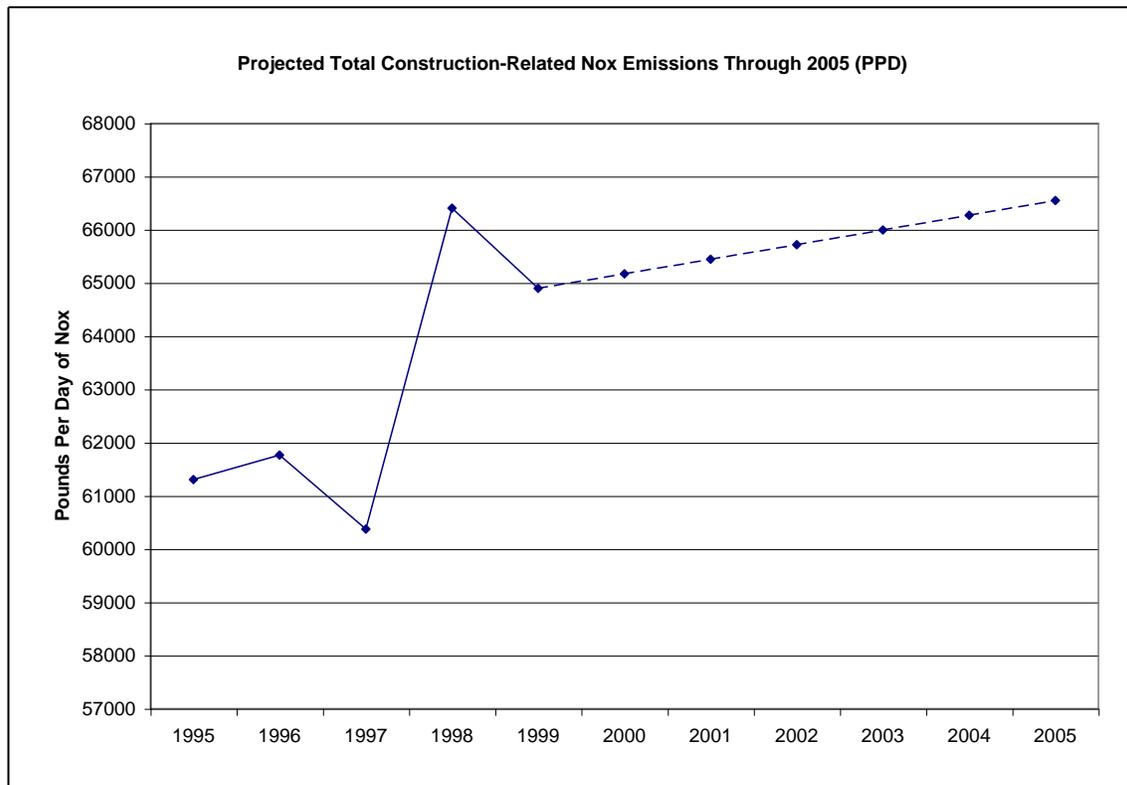
A typical project can be divided into two phases. These phases are sometimes called the construction phase and the operational phase. The construction phase includes all the activity that occurs prior to the physical completion of a project. This includes any clearing and earth moving that might occur on the project site, as well as any actual physical construction of a structure. This applies to anything that is considered to be a “project” under CEQA. This would be standard projects such as housing and commercial developments, as well as projects such as pipeline construction and roadway construction.

The operational phase includes all the activity that is generated as a result of the project during its lifetime. For example, the operational component of a supermarket would include vehicle trips going to and from the facility. Emissions of ozone precursors are generated during both the construction and operational phases of a project. Construction emissions, however, are generated on a one-time basis, whereas operational emissions continue to be generated throughout the life of a project.

As discussed in the Foundation for a Threshold justification paper, reductions in phase 2 long-term operational emissions will be counted toward the TCM/Land Use portion of the SIP. Consequently, the operational threshold is determined by the amount of reductions needed to achieve the one ton commitment from this measure in 2005. Emission reductions from phase 1 construction activities, however, are not considered TCM/Land Use reductions. Instead, these reductions must contribute toward the Mobile Off-Road commitment in the SIP. The commitment for Mobile Off-Road NO_x measures is two tons per day by 2005. This necessitates a separate threshold for construction emissions that is based on achieving this two-ton per day NO_x commitment.

2. Projected Construction Emissions

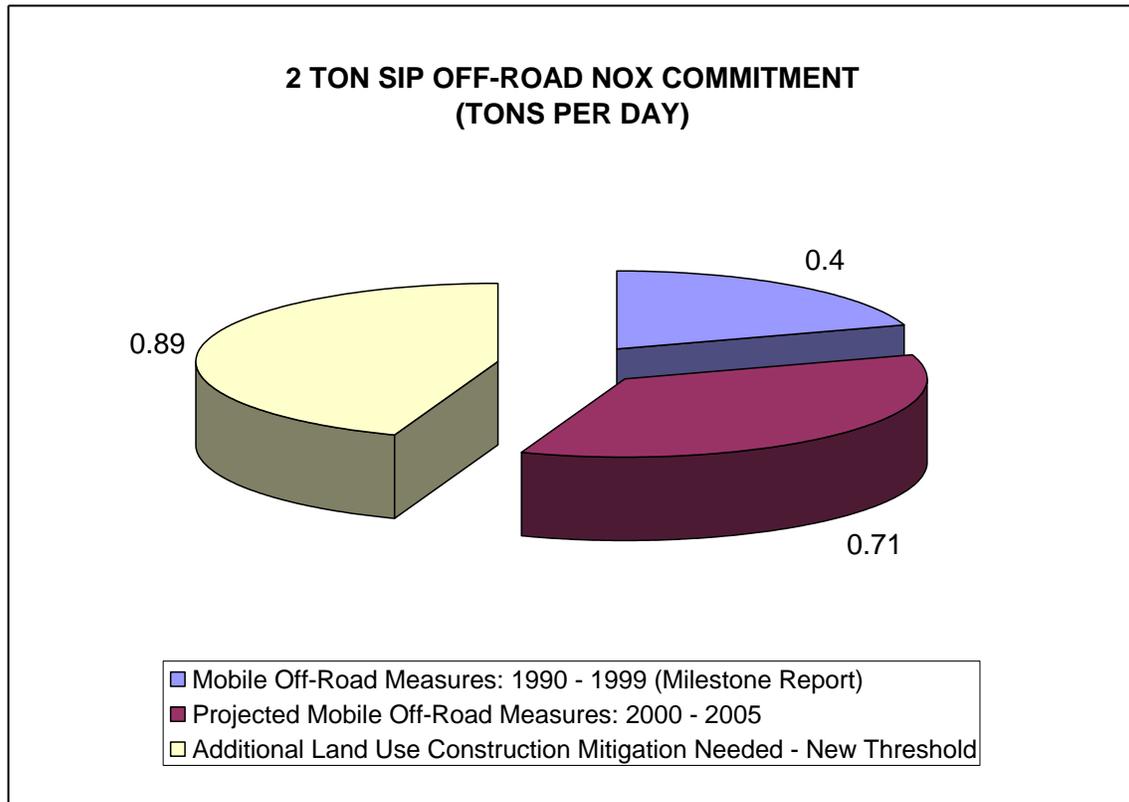
In addition to setting a threshold for project-related operational emissions, a threshold must be set for emissions from construction activities. Construction-related emissions were projected through 2005 based on trends in historical emissions up through 1999. These emissions were estimated using the URBEMIS computer model. Past and projected future NO_x emissions are shown in the graph on the following page:



The graph shows an increase of approximately 0.42 percent each year, ending with a projected annual emission level of 66,548 pounds per day in 2005.

3. Projected NOx Reductions Needed

The SIP commitment for the nonattainment area is two tons per day of NOx from off-road measures by 2005. According to the 1999 Milestone Report, 0.4 tons of this two-ton commitment has already been obtained from either repower or retrofit of agricultural pumps, agricultural equipment, and construction equipment. An additional 0.71 tons is expected to be obtained from these same sources by 2005 using Carl Moyer funds. Combining the emissions reductions achieved through 1999 and those projected to be obtained in the 2000 to 2005 time frame leaves 0.89 tons yet to be realized to meet the two ton commitment by the attainment date of 2005. This 0.89 tons will need to come from construction mitigation. The chart on the following page shows the contribution of each category to the two tons of total reductions.



4. Possible Thresholds

To obtain 0.89 tons of NO_x from construction mitigation, an appropriate emissions threshold must be chosen. Projects exceeding this threshold will be required to mitigate their construction emissions. A low threshold will make a large pool of emissions available for mitigation, whereas a higher threshold will shrink the size of the pool. A low threshold level will also mean that more small projects will be required to mitigate, whereas only larger projects will trip a threshold that is set higher. The table on the following page shows the approximate project size that would be considered significant at various threshold levels.

Trigger Levels – Construction NOx Emissions

Threshold (Lbs./Day)	Residential	Commercial
85	11 sfu	14,000 sf
100	17 sfu	17,000 sf
150	28 sfu	28,000 sf
200	40 sfu	39,000 sf
250	51 sfu	50,000 sf
300	68 sfu	61,000 sf
350	86 sfu	72,000 sf
400	104 sfu	83,000 sf
450	122 sfu	94,000 sf
500	140 sfu	120,000 sf

* sfu = single family unit; sf = gross square feet

Projects other than standard residential and commercial land use projects will also generate NOx from construction activities. These projects include new road construction, road widening, bridge construction and overpass construction. Construction emissions are difficult to estimate for these types of projects, and analysis should be done on a case by case basis using a tool such as the Roadway Construction Emissions Model.

A second component of obtaining the 0.89 tons needed to reach the two-ton per day NOx commitment is mitigation effectiveness. The higher the threshold, the more mitigation will be needed from each significant project. The formula below estimates the mitigation effectiveness needed at various threshold levels to obtain 0.89 tons of NOx reductions in 2005:

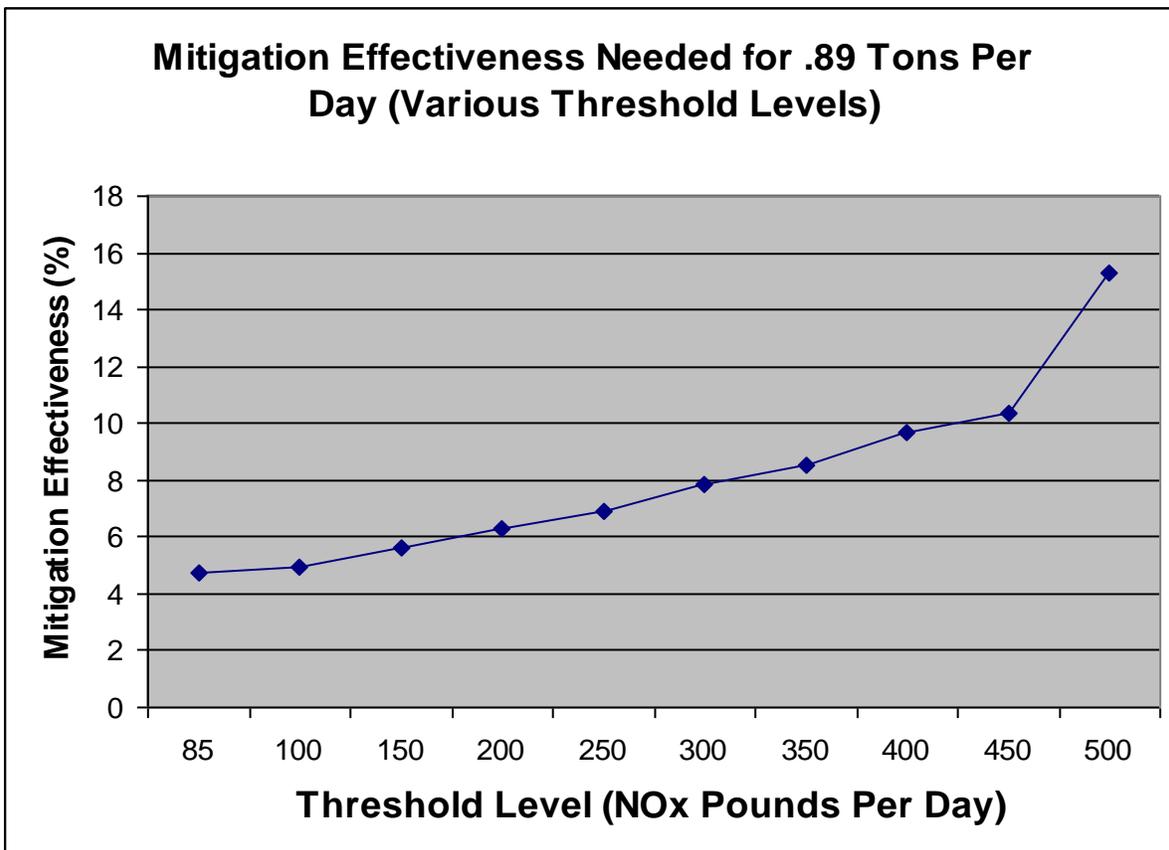
$$E \times M = 0.89$$

Where: *E* = Total emissions above threshold
M = Mitigation effectiveness

Applying this formula to different prospective threshold levels gives the results shown below:

Threshold Level	Tons of NOx Above Threshold	Mitigation Effectiveness Needed for 0.89 Tons (%)
85	18.856	4.72
100	17.995	4.95
150	15.805	5.63
200	14.147	6.29
250	12.954	6.87
300	11.353	7.84
350	10.415	8.55
400	9.171	9.7
450	8.627	10.32
500	5.818	15.3

The threshold options listed on the previous page, along with their corresponding mitigation effectiveness for achieving 0.89 tons are shown in the graph below:



5. Recommended Threshold for Construction NOx

Staff recommends a threshold for construction NOx emissions of:

Recommended NOx Construction Threshold

NOx	85 Lbs./Day
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Retaining the existing threshold, which has been in place administratively for several years, at 85 pounds per day will allow 0.89 tons of NOx from construction activities to be captured with a mitigation effectiveness of 4.7%. This means that a project of about 11 single-family homes will begin to approach the construction threshold and will be evaluated for significant impacts to air quality.

Staff estimate mitigation effectiveness is higher than the 4.7% needed to achieve emission reductions necessary to meet the SIP commitment and attain the federal ozone standard. Higher mitigation effectiveness would allow a higher threshold; however, raising the construction threshold will impede our progress in attaining the stricter state ozone standard. Mitigating 4.7% of construction NOx emissions will achieve the federal standard. Mitigation in excess of 4.7% will help us reach the state standard.

To ensure that the mitigation effectiveness is being met, the districts will need to institute a mitigation monitoring program that will track mitigation at the project site. Achieving this 0.89 tons of NOx will help the nonattainment area to meet the SIP commitment for two tons of NOx overall from off-road measures in order to reach attainment for ozone by 2005.

6. Thresholds for Other Criteria Pollutants

Criteria pollutants other than NOx will be generated during construction activities as well, and a threshold must be set for these pollutants also. Since criteria pollutants except ozone have not been violating standards, and since there is no SIP emission reduction commitments for these pollutants, their threshold will not be based on mass emissions. Instead, the concentration thresholds for criteria pollutants used for the operational phase of a project will also be used for the construction phase (See page 17 of the Foundation for a Threshold document). Projects that cause an exceedance of the state standard for a criteria pollutant will be considered significant. If a project is located in an area whose background level already exceeds the state standard, significance will be determined by whether a project will emit 5% or more of that standard.