C I B O

NOx CONTROL XIV CONFERENCE

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HOW TO MEET NOx REQUIREMENTS ???

INNOVATION - IMAGINATION - IDEAS

INTRODUCTION

If you are an owner or operator of a NOx-emitting source, you will soon, if not already, be impacted by the trickle-down effect of the State Implementation Plan (SIP) in your region. NOx emission requirements resulting from the new SIPs will be stringent, will be expensive, and will cover virtually all sources. The schedule for meeting these requirements will vary from state-to-state, district-to-district and region-to-region. The flexibility afforded by the permit-issuing authorities will differ. Sources covered by the respective regulations will vary. But there is a common thread entwining all owners and operators - YOU WILL BE IMPACTED !!!

ECONOMIC AND TECHNICAL ANALYSIS

Notwithstanding the time frame for meeting the regulations affecting you, now is the time for an economic and technical analysis of your NOx plan. What sources within your sites are affected NOx sources? What are the specific point-source emissions, the gross site emissions? Are they constant or seasonal, temporary or permanent? What is the anticipated life of the source? What technologies are available to control each source and the cost of the installed technology? Can you delay installing controls and, if so, for how long? Can you install partial controls at this time, following up with more complete controls at a later time? Can you change processes, equipment, fuels, operating hours/times?

These are some of the many issues you will be required to evaluate during the economic and technical analysis of your site.

THE PERMIT APPLICATION - INNOVATION, IMAGINATION, IDEAS

The methods you employ to meet your NOx requirements are limited only by the flexibility of regulatory requirements, latitude of the permitting authority, and your innovative thinking. Remember, the purpose of this exercise is to reduce total NOx emissions. If your plan accomplishes that end, there must be a way to sell it.

Market-based approaches can help "internalize" the cost of air pollution control programs by: (1) providing an incentive for companies to achieve reductions in excess of the level required by law, or earlier than required by law; (2) increasing compliance flexibility for regulated entities, i.e., making cost-effective reductions or turning to the market rather than applying technology; (3) creating financial value for additional emission reductions that will encourage industry to find new solutions to reducing its emissions.

Here are some of the methods that must be reviewed during your technical and economic analyses:

BUYING NOx EMISSION REDUCTION CREDITS (ERCs) NOx Emission Reduction Credits are available under several auction trading programs run by private businesses and regulatory authorities. Generally, emission trading allows firms the flexibility to select cost-effective solutions to achieve their emission requirements. Emission Reduction Credits are bought and sold as a commodity. As such, the prices paid will cover a wide range. NOx ERCs have sold for as much as $96,000 per ton, and as low as $250 per ton. Pricing is dependent on supply and demand, geographic locations, attainment status of the source, seasonal requirements, time of use, and other factors. The availability and cost must be evaluated on a case-by-case basis.

CREATING EMISSION REDUCTIONS Credits are created when a firm voluntarily reduces emissions below that level required by law, or emits less than allowed by its permit. The credit can be created by putting on new control devices, modifying the process, curtailing or shutting down emission sources.

Once created, NOx credits can be used immediately, banked for later use or sale, or sold or leased to another entity. Depending upon the trading program, the credit can be used to mitigate current emissions or emissions that occur over a season, a year, a number of years, or in perpetuity.

TRADING FOR EMISSION REDUCTION CREDITS Similar to buying NOx ERCs, one may trade for credits with another source within the same air quality district,

region, area, etc. Trades may be temporary or permanent.

THE MOST LUCRATIVE AND UBIQUITOUS SOURCE - DIESEL ENGINES

Stationary Diesel Engines These provide an enormous category of sources available for the installation of pollution control equipment for the purpose of generating NOx emission reduction credits. There are literally hundreds of thousands of stationary diesel engines of sufficient sizes to warrant consideration for NOx controls. These include stationary diesel generators, pumps and compressors.

Mobile Diesel Engine Sources There are approximately 4.2 million heavy duty diesel vehicles (both highway and nonroad) operating in the United States. These vehicles and equipment emit millions of tons of particulate and ozone-forming pollutants, including NOx, annually. As the country's diesel fleets continue to grow, and as the vehicle miles traveled increase, the contribution from this sector will continue to rise. Because the older diesel engines pollute at a much higher rate than newer ones, retrofit technology is the most practical means to reduce these emissions for the remainder of the engine life of these in-use vehicles.

A general categorization of diesel engines, both mobile and stationary, includes:

Construction Equipment This category includes earth moving equipment, cranes, backhoes, wheeled loaders, bulldozers, and excavators. Collectively, construction equipment, while generally localized, is a major contributor of NOx. For example, in eight NESCAUM states, annual NOx emissions from construction equipment is estimated at 140,310 tons. This is approximately ten percent of the total NOx pollution the NESCAUM region. This is almost as much NOx as the region's fleets of trucks and buses.

Agricultural Equipment This equipment includes tractors, cultivators, material handlers, mobile and stationary diesel generators. This category of emission sources may be less viable for the creation of emission reduction credits, primarily because of the distance between agricultural enterprises of large scale and the proximity to metropolitan ozone areas.

Airport Support Equipment This category includes mobile and stationary diesel generators, air compressors, trucks, forklifts, and other such equipment located at major airports. Do not overlook the military airports in your area as a source of potential emission reduction credits.

Marine Vessels Here, we look at boats, tugs, ferries, construction barges, water shuttles, pleasure craft and other localized harbor craft. Some localized military vessels might also be included. Partial credit may also be obtained from emissions

from ocean-going vessels, at least for that portion of the emissions that occur within the air quality district. Examples of locales where these vehicles contribute to ozone exacerbations include San Francisco, Los Angeles, Boston, Baltimore, New York/New Jersey and other regions where marine vessel activity is prevalent in metropolitan districts.

Locomotives Locomotives are major emitters of NOx pollution, and, when operating in or near many metropolitan areas and air quality districts, are significant contributors to increased ozone conditions. ERCs can be obtained from these sources for the operation of locomotives within those areas or districts.

Transit Buses Urban buses are a prime source for creating NOx ERCs. In metropolitan areas with populations greater than 750,000, more than 42,000 diesel-powered transit buses are targeted for emission control retrofit or engine rebuild. For the most part, emission reductions are directed toward particulate matter (PM), hydrocarbon (HC) and carbon monoxide (CO) emissions. As merging technologies are more fully demonstrated, NOx reductions from urban buses will become a major source of NOx emission reductions.

School Buses Approximately 600,000 diesel-powered school buses nationwide are available for NOx retrofit controls. These are a favored source of NOx and other pollution reduction programs.

Heavy Duty Diesel Trucks (HDDT) This is by far the largest category of mobile source NOx emissions. For example, current inventories estimate that heavy duty engine emissions comprise 33% of all NOx pollution in the Northeast states, with non-road engines emitting 20% of all NOx in the region. In order for those states to achieve air quality goals, significant reductions in heavy-duty diesel truck emissions must be achieved.

An example of the quantity of NOx credits attainable from HDDTs is shown, assuming the following:

- **Engine is of 1980-1991 vintage**
- **Class 8 Heavy Duty Diesel Truck**
- **NOx emissions of 43 grams per mile (10 grams/bhp hr.)**
- **Truck's annual usage is 80,000 miles**
- **NOx reduction is 65%**

The NOx reduction credit would be based on elimination of 4,935 lbs/year - approximately 2.5 tons. For a fleet of 1,000 trucks, this calculates to 2,467 tons/year.

Let us assume further that the average cost of installed control technology per truck is

$10,000. The cost of creating this NOx Emission Reduction Credit is then calculated at $4,000 per ton for the first year only. If the HDDT has a useful life of five more years, the installed cost then becomes $800 per ton over a five year period.

When measured against the market price of NOx ERCs, which may reach prices in excess of $20,000 in some parts of the country, $800-$1,000 per/ton is a real bargain.

GENERAL GUIDELINES FOR USING MOBILE SOURCE NOx ERCs

For emission reductions to qualify as Mobile Source Emission Reduction Credits, some specific fundamental criteria must be met. These include:

- The reductions must not be required by law or regulation. They must be voluntary or in excess of requirements.

- The reductions must be real and quantified with an acceptable degree of certainty.

- If used as stationary source offsets, or when replacing other emission reduction requirements, the mechanism used to obtain Mobile Source Emission Reduction Credits must be enforceable and legally binding.

- The life of the reduction must be reasonably established, and commensurate with the proposed use of the credit.

SUMMARY

Analyze and evaluate your NOx emission sources. Perform technical and economic analyses to determine availability of cost-effective controls and alternative methods of compliance.

Survey the locale for sources of potential NOx emission offsets, both stationary and mobile.

Obtain pricing and availability of NOx Emission Reduction Credits from brokers, agencies, individuals.

Know the regulations and permitting requirements. Know the agency personnel with whom you will be negotiating.

Prepare and present a plan from which to negotiate your NOx emission limits, your alternative methods of compliance, and the strategies you will use to implement the

plan.

Remember, the permitting authority wants to reduce NOx emissions and move toward attainment in its district or state. If your plan is reasonable and meets the general criteria, it should serve as a foundation for meaningful negotiations.