The State of New Jersey
Department of Environmental Protection

State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone and Carbon Monoxide National Ambient Air Quality Standards

Proposal

Meeting the Requirements of the Regional NO_x Cap Program and Transportation Conformity Budgets Related to the Attainment of the Ozone and Carbon Monoxide National Ambient Air Quality Standards

Appendix VI

Description of procedures, and structures, documentation, and web site address for spreadsheet files and database files used to develop Tables 4 and 5 and Figure 2

September 28, 1999

Description of procedures, and structures, documentation, and web site address for spreadsheet files and database files used to develop Tables 4 and 5 and Figure 2

The methods and data sources used to develop the analysis presented in summary form in Tables 4 and 5, and the methods and data sources used to develop Figure 2, are described below.

Development of Tables 4 and 5

First, the list of sources in the EPA spreadsheet, Nj_pt.xls, which was developed from the expansion of the file NJ.zip[1] , dated 5/13/99, was compared with the list of sources included in New Jersey's NO_x Budget Program.[2] The sources in Nj_pt.xls are non-electricity-generating point sources. Thirty-three of these sources are covered by the NO_x Budget Program. These sources, with their names, other identifying fields, and 2007 ozone season budget NO_x emissions (SBNOX) as they appear in Nj_pt.xls are:

PLANTID	PLANT	SIC	POINTID	STACKID	SBNOX	SUBTOTAL
85010	HOFFMAN LAROCHE INC.	2833	034	64205	61.3	
30374	HOFFMAN LAROCHE INC. C/O ENVIR	2834	007	63188	15.9	
55006	MOBIL OIL CORPORATION	2911	001	60992	18.5	
55006	MOBIL OIL CORPORATION	2911	002	60992	18.5	
55006	MOBIL OIL CORPORATION	2911	003	60992	18.5	
55006	MOBIL OIL CORPORATION	2911	004	60992	17.2	
55006	MOBIL OIL CORPORATION	2911	005	60984	4.9	
55006	MOBIL OIL CORPORATION	2911	006	60984	36.9	
55006	MOBIL OIL CORPORATION	2911	270	60971	2.6	
15023	CHEVRON U.S.A., INC.	2911	043	61993	0.4	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	064	60885	51.2	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	123	60882	48.7	
55006	MOBIL OIL CORPORATION	2911	001	60992	39.1	
55006	MOBIL OIL CORPORATION	2911	002	60992	39.1	
55006	MOBIL OIL CORPORATION	2911	003	60992	39.1	
55006	MOBIL OIL CORPORATION	2911	004	60992	34.4	
55006	MOBIL OIL CORPORATION	2911	005	60993	12.2	
55006	MOBIL OIL CORPORATION	2911	006	60993	73.3	
55006	MOBIL OIL CORPORATION	2911	027	60981	0.0	
55006	MOBIL OIL CORPORATION	2911	270	60971	14.0	
15023	CHEVRON U.S.A., INC.	2911	001	61995	22.4	
15023	CHEVRON U.S.A., INC.	2911	043	61996	73.4	
40003	EXXON CORPORATION	2911	007	63593	29.9	
40003	EXXON CORPORATION	2911	014	63593	132.3	
40003	EXXON CORPORATION	2911	015	63593	19.4	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	001	60889	4.1	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	038	60887	15.3	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	039	60887	15.3	
55004	COASTAL EAGLE POINT OIL COMPAN	2911	040	60887	15.3	
40003	EXXON CORPORATION	2911	001	63593	77.1	
10577	COGEN TECHNOLOGIES - NEW JERSE	4911	001	61498	41.7	
10577	COGEN TECHNOLOGIES - NEW JERSE	4911	002	61497	42.2	1033.8

[1]downloaded from **ftp.USEPA.gov/pub/scram001/modeling**center/NO_x_SIPcall/budget/May/

[2]N.J.A.C. 7:27-31, et seq., and amendments proposed in 31 NJR, 2100-2124, August 2, 1999.

The total of the 2007 ozone season budget NO_x emissions for these sources as indicated by the data in Nj_pt.xls, 1034 tons, is also shown,

The records representing these sources were removed from Nj_pt.xls, thus creating a new spreadsheet that included only the non-EGU point sources that are not included in New Jersey's NO_x Budget Program. Then, the uncontrolled emissions that would have existed in the 1995/96 period for each source were determined using fields in USEPA's database, nj_pt.xls, that represent the assumed NO_x control efficiency (field NO_xCE95), the assumed NO_x rule effectiveness (field NO_xRE95), and the estimated 1995 ozone season NO_x emission (field SNO_x95). In order to estimate the uncontrolled 1995 emission, the relationship:

$$E_{NOx\ 95} = E_{NOx\ UNC95} [1 - CE_{95} \times RE_{95}]$$

was rearranged as:

$$E_{NOx\ UNC95} = E_{NOx\ 95} / (1- CE_{95} \times RE_{95})$$

Where:

$E_{NOx\ 95}$ is the controlled NO_x emission in 1995.

$E_{NOx\ UNC95}$ is the uncontrolled NO_x emission in 1995.

CE_{95} is the assumed USEPA control efficiency, and

RE_{95} is the assumed USEPA rule effectiveness.

Then, using database software, the records representing emissions in this new spreadsheet were summed on the SCC field: i.e., emissions were totaled for each group that had a common SCC designation. The resulting file was linked with the descriptions of these SCCs obtained from a 4,376,626 byte file called SIC.dbf, that was obtained from the USEPA.

The SCC description allowed determination of the applicable emissions control level pursuant to New Jersey's NO_x Reasonably Available Control Technology (NO_x RACT) rule for SCC groups representing most of the emissions from these non-EGU point sources. The estimated levels of control, expressed as the ratio of controlled emissions rates to uncontrolled emissions rates, for SCC groups with significant emissions totals, are as shown in Table 4. Table 4 and Table 5 are both derived from the spreadsheet NJpointQuery2a.xls. This, and other spreadsheets mentioned in this Appendix, can be obtained from the Department's NO_x SIP web site.[3]

[3] www.state.nj.us/dep/aqm/noxsip.htm

Once the rate of emissions per the NO_x RACT rule was determined for the SCC groups, an uncontrolled emission rate had to be determined for these groups that could be expressed in the same terms as the rates in the NO_x RACT rule, which is pounds per mmBtu for boilers and grams per horsepower hour for engines.

The uncontrolled emissions rates for boilers were the median rates as calculated from the 1990 New Jersey Emission Inventory database[4] for all facilities that reported fuel use, sorted by SCC group. The calculation of these rates required the conversion of the reported yearly fuel use by type of fuel into mmBtu, and then using the reported yearly NO_x emissions to derive the ratio. A spreadsheet that contains these data, 90efact2.xls, is available from the Department's NO_x SIP web site referenced above. A spreadsheet that summarizes the data in the above-noted spreadsheet, called 90efact2a.xls, is also available from the web site.

The uncontrolled rates for engines were as reported in the most recent AP-42 tables.[5] The AP-42 tables were used for engines because the data in the 1990 emission inventory database for the SCC categories representing these engines was quite varied. For example, for SCC group 20200401, large stationary diesel fuel engines, the mean NO_x emission rate was 132.9 lbs/mmBtu, while the mode and median emission rates were both 3.6 lbs/mmBtu. The AP-42 factor, 10.89 g/hp-hr, is equivalent to 3.2 lbs/mmBtu. New Jersey's NO_x RACT rates for engines are expressed in g/hp-hr. Also, the 1990 New Jersey emissions inventory data for engines include some values that are clearly out of the probable range estimated from the AP-42 data and are likely in error. Therefore, it was judged that the AP-42 factors provided a more reliable comparison of uncontrolled emission rates vs. the degree of control expected through implementation of New Jersey's NO_x RACT.

The estimated 1995 emissions, assuming the levels of control based on analysis of NJ's NO_x RACT rule as discussed above, were then totaled. These factors are shown in Table 5 for the SCC groups with the largest estimated uncontrolled 1995 emissions, which represent 97% of the total of the estimated uncontrolled 1995 emissions. The factors for the other SCC groups are included in the spreadsheet NJpointQuery2a.xls. The estimated 1995 emission with applicable NO_x RACT rates, 17,318 tons, is larger than USEPA's estimate for this subset of sources, which is 14,920 tons. The net growth factor for each SCC group used by USEPA to project emissions to 2007 can also be determined from the USEPA data. This net growth factor represents an average of individual growth factors assigned to each source, which vary by both SCC number and SIC code. The net growth factors were then multiplied by the estimated 1995 emissions to yield projected 2007 values. As shown in Table 5, the projected NJ emissions for 2007, assuming no further

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[4]NJDEP, 1999, New Jersey Department of Environmental Protection, Office of Air Quality Management, Trenton, NJ.

[5] USEPA, from **www.USEPA.gov/ttn/chief/ap42etc.html,** Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel engines, and Chapter 3.3 Gasoline and Diesel Industrial Engines, July 13, 1999.

imposition of NO_x RACT controls beyond those estimated to be in place in 1995, is 19,795 tons. This compares with USEPA's projection of 16,829 tons for this group of sources.

Development of Figure 2

Figure 2 divides up the total emissions from area sources as detailed in the EPA spreadsheet, Nj_ar.xls, into subcategories representing industrial sources, commercial & institutional sources, residential sources, and other types of sources.

The calculations to develop this figure began with the summarization of the estimated emissions by SCC field: i.e., emissions were totaled for each group that had a common SCC designation. Then, to make the SCC values equivalent to those in the SCC reference database, SCC.dbf, the prefix "A" was added to the string of numbers for each value. Then, the data was linked to SCC.dbf, to attach the fields describing each SCC code to each record. This effort resulted in the spreadsheet nj_ar_query_ascc.xls, which is available from the Department's website.[6] These data were then sorted by descriptive categories into the industrial, commercial/institutional, residential, and other subcategories, the emissions for each subcategory totaled, and the pie chart (Figure 2) developed to display the proportions.

[6] www.state.nj.us/dep/aqm/noxsip.htm