

~~These factors were obtained through the Environmental Protection Agency from Economic Projections for Air Quality Control Regions prepared by U.S. Department of Commerce with the exception of the factor for total utilities which was estimated from information obtained from local sources. These factors were applied statewide to both Region No. 130 and Region No. 172.~~

3.2 CONTROL STRATEGY: PARTICULATE MATTER

The two air quality control regions in North Dakota, Region No. 130 and Region No. 172, have both been classified Priority II with respect to particulate matter. The basis for these classifications was measured air quality. Measured air quality for suspended particulate matter obtained during calendar year 1970 by high-volume samplers at two sampling sites in Region No. 130 and at nine sampling sites in Region No. 172 is presented in Table 3. The maximum 24-hour concentration of 378 micrograms per cubic meter shown for the Moorhead sampling site was not considered in determining the classification for Region No. 130 as it apparently occurred during a period of abnormally high wind conditions. The next highest 24-hour concentration measured in Region No. 130 was 313 micrograms per cubic meter which also was measured at the Moorhead sampling site.

For purposes of developing the control strategy for particulate matter, the air quality at the non-urban Foxholm sampling site, located in rural Ward County in Region No. 172, will be used for the background concentrations in both Region No. 130 and Region No. 172. The annual geometric mean was 19 micrograms per cubic meter and the maximum 24-hour concentration was 49 micrograms per cubic meter at the Foxholm sampling site.

In both Region No. 130 and Region No. 172 the measured air quality for suspended particulate matter during 1970 was greater than the national secondary ambient air quality standards. Therefore, reductions of particulate emissions are necessary to improve the air quality for attainment and maintenance of the national secondary standards. The degree of improvement in air quality needed for attainment of the national secondary standards will be calculated by use of the proportional model.

Region No. 130

In Region No. 130, the highest measured air quality occurred at the Moorhead sampling site. The annual geometric mean was 71 micrograms per cubic meter and the maximum 24-hour concentration was 378 micrograms per cubic meter. The degree of improvement of air quality needed for attainment of the national secondary standards in Region No. 130 is as follows:

- (1) Annual geometric mean

$$\frac{71 - 60}{71 - 19} (100) = 21.2 \text{ percent reduction needed.}$$

- (2) Maximum 24-hour concentration

$$\frac{378 - 150}{378 - 49} (100) = 69.4 \text{ percent reduction needed.}$$

Estimated particulate matter emission from point sources and area sources in Region No. 130 for calendar year 1970 are presented in summary form in Table 5. Table 5 also presents allowable emissions for calendar year 1970 which result if existing regulations are applied and also presents estimated emissions achieved for 1975. The emissions achieved for 1975 were determined by applying the economic growth factors discussed in Section 3.1 to the 1970 allowable emissions. The emissions are shown for Cass County, North Dakota; Clay County, Minnesota; the cities of Fargo-West Fargo, North Dakota; and Region No. 130 as a whole.

The application of the North Dakota regulations restricting particulate matter emissions from industrial processes, fuel burning equipment, incinerators, and preventing particulate matter from becoming airborne (Regulation No. 23-25, the North Dakota Air Pollution Control Regulations, R23-25-05) and restricting open burning (Regulation No. 23-25, R23-25-04) to the existing 1970 emissions result in a 90.0 percent reduction of particulate matter emissions in Cass County and a 83.2 percent reduction in the cities of Fargo-West Fargo. The application of similar Minnesota regulations results in a 80.0 percent reduction of particulate matter emissions in Clay County. The overall reduction of particulate matter emissions for Region No. 130 as a whole is 87.5 percent. These reductions are all greater than the needed 69.4 percent reduction.

The emissions achieved in 1975 show a 91.0 percent reduction in Cass County and a 90.5 percent reduction in the cities of Fargo-West Fargo from the existing 1970 emissions. These percent reductions are larger than the 1970 allowable emissions reductions due to the closing down of a lignite coal-fired steam-electric power plant located in the City of Fargo and the conversion from lignite coal to natural gas fuel at several institutional boilers also located in Fargo which offset economic growth. The emissions achieved in 1975 in Clay County show a 79.0 percent reduction from the existing 1970 emissions. The overall emissions achieved in 1975 for Region No. 130 as a whole show an 88.0 percent reduction from the existing 1970 emissions. These estimated 1975 reductions are all greater than the needed 69.4 percent reduction.

Region No. 172

In Region No. 172, the highest measured maximum 24-hour concentration of 324 micrograms per cubic meter occurred at the Wahpeton sampling site and the highest annual geometric mean of 79 micrograms per cubic meter occurred at the Bismarck sampling site. The corresponding maximum 24-hour concentration at the Bismarck sampling site was 211 micrograms per cubic meter. The degree of improvement of air quality needed for attainment of the national secondary standards in Region No. 172 is as follows:

- (1) Annual geometric mean

$$\frac{79 - 60}{79 - 19} (100) = 31.7 \text{ percent reduction needed.}$$

- (2) Maximum 24-hour concentration

$$\frac{324 - 150}{324 - 49} (100) = 62.2 \text{ percent reduction needed.}$$

Particulate matter emissions in the cities of Bismarck-Mandan and from several nearby sources including a lignite coal fuel steam electric power plant, a petroleum refinery, an airport, two asphalt batch plants, and a light weight aggregate manufacturing plant represent the highest concentration of emissions of any urban area in Region No. 172. The degree of improvement needed for attainment of the national secondary standards in the cities of Bismarck-Mandan is as follows:

- (1) Annual geometric mean

$$\frac{79 - 60}{79 - 19} (100) = 31.7 \text{ percent reduction needed.}$$

- (2) Maximum 24-hour concentration

$$\frac{211 - 150}{211 - 49} (100) = 37.7 \text{ percent reduction needed.}$$

Estimated particulate matter emissions from point sources and area sources in Region No. 172 are presented in summary form in Table 7 for the whole region and for the cities of Bismarck-Mandan (including nearby sources). Particulate matter emission data for each county in Region No. 172 is attached in Appendix E. Table 7 also presents allowable emissions for 1970 and emissions achieved in 1975 for Region No. 172 as a whole and for the cities of Bismarck-Mandan (including nearby sources).

The application of the North Dakota regulations restricting particulate matter emissions from industrial processes, fuel burning equipment, incinerators, and preventing particulate matter from becoming airborne and restricting open burning to the existing 1970 emissions result in a 71.1 percent reduction of particulate matter emissions in Region No. 172 as a whole and a 38.1 percent reduction in the cities of Bismarck-Mandan. The 71.1 percent reduction in Region No. 172 as a whole is greater than the 62.2 percent reduction needed and the 38.1 percent reduction in the cities of Bismarck-Mandan is greater than the 37.7 percent reduction needed.

The emissions achieved in 1975 show a 69.0 percent reduction in Region No. 172 as a whole and a 36.4 percent reduction in the cities of Bismarck-Mandan from the existing 1970 emissions. The 69.0 percent reduction in Region No. 172 as a whole is greater than the 62.2 percent reduction needed. The 69.0 percent reduction includes the closing of two older lignite coal fuel steam electric power plants in Region No. 172. The 36.4 percent reduction in the cities of Bismarck-Mandan is not as great as the 37.7 percent reduction needed. However, the 36.4 percent reduction is based upon emissions being reduced only the minimum amount necessary to meet the maximum allowable emissions of the regulations. It is anticipated that emissions will be reduced considerably below the maximum allowable emissions at several sources in the cities of Bismarck-Mandan and that the actual percent reduction will be greater than 37.7 percent reduction needed.

Summary

The application of North Dakota regulations restricting particulate matter emissions and open burning, the closing of several lignite coal steam electric power plants, the converting from lignite coal to natural

gas fuel at several institutional boilers, and the application of the Federal Standards of Performance for New Stationary Sources promulgated by the Environmental Protection Agency should provide sufficient emission reductions necessary for the attainment and maintenance of air quality for suspended particulate matter below the national secondary ambient air quality standards in both Region No. 130 and Region No. 172 in the State of North Dakota.

3.3 CONTROL STRATEGY: SULFUR OXIDES

The two air quality control regions in North Dakota, Region No. 130 and Region No. 172, have both been classified Priority III with respect to sulfur oxides. The basis for these classifications was estimated air quality determined by the Area and Point Models. Air quality data for sulfation obtained during calendar year 1970 at two sampling sites in Region No. 130 and nine sampling sites in Region No. 172 and air quality data for sulfur dioxide from a 24-hour bubbler obtained during calendar year 1971 at one sampling site in Region No. 130 confirm the estimated air quality. The measured sulfation and sulfur dioxide data indicate the existing air quality for sulfur dioxide to be well below the national secondary ambient air quality standards. The estimated and measured data showing existing air quality with respect to sulfur dioxide are presented in Table 4.

Region No. 130

Estimated sulfur dioxide emissions from point sources and area sources in Region No. 130 for calendar year 1970 are presented in summary form in Table 6. Table 6 also presents allowable emissions for calendar year 1970 which result if existing regulations are applied and also presents estimated emissions achieved for 1975. The emissions achieved for 1975 were determined by applying the economic growth factors discussed in Section 3.1 to the 1970 allowable emissions. The emissions are shown for Cass County, North Dakota; Clay County, Minnesota, the cities of Fargo-West Fargo, North Dakota; and Region No. 130 as a whole.

The application of the North Dakota regulations restricting sulfur dioxide emissions from fuel burning installations (Regulation No. 23-25, R23-25-06, Section 6.100) and restricting open burning (Regulation No. 23-25, R23-25-04) to the existing 1970 emissions result in a 0.3 percent reduction of sulfur dioxide emissions in Cass County and a 0.1 percent reduction in the cities of Fargo-West Fargo. The application of similar Minnesota regulations results in a 0.6 percent reduction of sulfur dioxide emissions in Clay County. The overall reduction of sulfur dioxide emissions for Region No. 130 as a whole is 0.4 percent. The small reduction in sulfur dioxide emissions is due to the low sulfur content of the solid, and liquid fuels used in Region No. 130.

The emissions achieved in 1975 show a 93.3 percent reduction in the cities of Fargo-West Fargo and a 76.4 percent reduction in Cass County from the existing 1970 emissions. These large reductions are due to the closing down of a lignite coal-fired steam-electric power plant located in the City of Fargo and the converting from lignite coal