UTAH STATE IMPLEMENTATION PLAN

CONTROL MEASURES FOR AREA AND POINT SOURCES

SECTION IX, PART F

LEAD

IX.F.1 `NONATTAINMENT AREAS

Particulate filters from the air monitoring stations at Salt Lake City, Magna, Bountiful, and Lindon, have been analyzed for lead content for 1977 and 1978. These measurements are shown in Figure IX.F.1.

1977	Salt Lake City	Magna	Bountiful	Lindon
1st quarter	1.81	1.56	1.06	.58
2nd quarter	.88	.59	.32	.19
3rd quarter	.93	.46	.33	.21
4th quarter	2.20	1.28	.85	.40
1978				
1st quarter	1.62	.87	.88	.36
2nd quarter	.82	.19	.24	.21
3rd quarter	1.24	.22	.24	.21
4th quarter	2.15	.56	1.05	.61

FIGURE IX.F.1

As shown, the Salt Lake City station exceeded the National Ambient Air Quality Standards (NAAQS) of 1.5 ug/m^3 quarterly average for lead in the first and fourth quarters of both years. The

Magna station exceeded the NAAQS during the first quarter of 1977.

IX.F.2 LEAD EMISSIONS

Three sources of lead emissions have been identified as possible contributors to the high readings in Salt Lake City and Magna. These sources are: (1) leaded gasoline exhaust, (2) lead dust reentrainment, and (3) emissions from the Kennecott Copper Corporation's Utah Smelter.

Each of these sources has been analyzed to determine its contribution toward excessive readings. The basic equation and guidelines used to calculate lead emissions from vehicle exhausts and lead dust reentrainment were derived from EPA Supplementary Guidelines for Lead Implementation Plans (EPA-450/2-78-938) and (EPA 450/3-78-021) respectively.

Results of these calculations (see Technical Support Document) indicate the following emission rates:

Salt Lake County	1978
Vehicle Exhausts	2.888 g/sec
Lead Dust Reentrainment	2.511 g/sec
TOTAL Vehicle Lead Emissions	5.399 g/sec

This emission factor was converted to an annual concentration value by using the Atmospheric Turbulence and Diffusion Laboratory (ATDL) model with the following results:

1978 1.532 ug/m^3

This value was converted to a quarterly average by application of Larson's Transform yielding a value of 2.54 ug/m^3. Assuming a 1978 background value of 0.30 ug/m^3 and computing the maximum Kennecott impact of 0.1 ug/m^3 using the Valley Model, the total 1978 impact was calculated.

$$1978 = 2.54 + 0.30 + 1.10 = 2.94 \text{ ug/m}^3$$

These results compare favorably with the measured maximum quarterly lead concentration of 2.15 ug/m^3.

IX.F.3 CONTROL STRATEGY

In developing the control strategies necessary to reduce lead concentrations in Salt Lake City the first look was at vehicle emissions and reentrained lead in dust. Using the lead emission factors reduced as

a result of the Federal Motor Vehicle Program which will result in mandatory reduction of leaded gasoline usage, Federally mandated increased fuel economy of new model vehicles, predicted vehicle age mix, vehicle miles traveled, and the same equations used to calculate the 1978 concentrations, the following concentrations are predicted by 1982.

	1982
Vehicle exhausts	1.110 g/sec
Reentrained dust	0.970 g/sec
	2.080 g/sec = .590 ug/m^3

Applying Larson's Transform to this annual concentration procedure a quarterly value of 0.98 ug/m^3 was obtained.

Assuming a 1982 background value of 0.1 and Kennecott concentration of 0.1 the following value was calculated:

$$1982 = 0.98 + 0.1 + 0.1 = 1.18 \text{ ug/m}^3$$

In the first quarter of 1977 a concentration just over the standard was measured at Magna (1.56 ug/m^3). The only significant lead source in the Magna area, other than automobiles, is the Kennecott Copper Corporation's smelter. In October 1977, Kennecott began conversion to a completely new smelting process. This new system included extensive cleaning devices and a 1200 foot smelter stack. The 1200 foot stack was first used on October 2, 1977, when the first continuous smelting vessel was started up, and the new process was on line on May 26, 1978, when the last reverberatory furnace was shut down. Since that time, a reduction of lead concentration has been measured at Magna (see Figure IX.F.1).

The maximum impact of the Kennecott operation was estimated using the Valley Computer Model. The emission estimates are 20 tons per year or 0.58 g/sec. The Valley Model results predict a maximum annual impact of 0.0623 ug/m^3 annual average or 0.10 ug/m^3 quarterly average. Since the smelter lead emissions have been reduced, it is not anticipated that further violations of the standard will occur in the Magna area and no additional control strategies are required or planned.

IX.F.4 REASONABLE FURTHER PROGRESS

The predicted maximum 1982 lead concentration in Salt Lake City using the Federally mandated vehicle program is 1.18 ug/m^3 which is below the NAAQS of 1.5 ug/m^3. This reduction is represented in Figure IX.F.2.

Thus the Federally mandated program to reduce the lead content of gasoline, the prohibition of leaded gasoline in catalyst equipped vehicles, and reduced vehicle consumption of gasoline are sufficient to insure attainment of the lead NAAQS in Utah by 1982. Therefore, control regulations for lead are not required to achieve the NAAQS by December 1982.