Utah State Implementation Plan

SECTION IX
CONTROL STRATEGIES
FOR AREA & POINT SOURCES

Part C
CARBON MONOXIDE

SALT LAKE CITY
OGDEN

December 9, 1993

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IX.C.l Non-Attainment Areas

National Ambient Air Quality Standards (NAAQS) have been established to protect public health and welfare. The health-related standards for carbon monoxide (CO) are nine parts per million over an eight-hour averaging period and 35 parts per million over a one-hour averaging period (not to be exceeded more than once per year). The one-hour standard has not been exceeded anywhere in the state. Measured exceedances of the eight-hour standard have been observed in the cities of Salt Lake, Ogden, Provo, and Bountiful. On March 3, 1978 the EPA designated these cities as non-attainment areas in accordance with the provisions of Section 107 of the Clean Air Act. On December 2, 1983, the EPA redesignated Bountiful as an attainment area for CO based on eight quarters of ambient air data collected by the state which demonstrated attainment.

In response to new siting guidelines published by the EPA, CO monitoring sites were established in Salt Lake City on State Street between 200 and 300 South, on University Avenue in Provo between Center Street and 100 North, and in Ogden, on Washington Blvd. between 2900 and 3000 Street. The data collected at the new sites showed concentrations higher than at the original sites, and were used in determining the design values for Salt Lake and Provo.

On December 19, 1984, the state was officially notified that EPA found substantial inadequacies in this SIP for Provo. Section IX.C.6 was added to this SIP in response to EPA's requirements. It detailed those strategies which were followed to attempt to provide for attainment of the CO standard in Utah County by the mandatory 1987 deadline specified in the Clean Air Act of 1977.

On November 15, 1990, Congress amended the Clean Air Act which resulted in new requirements for this SIP, as well as designation of each of the three counties to various levels based on monitoring data from 1988-1989. Specifically, Ogden and Provo were designated as "moderate" non-attainment areas, and, because Salt Lake did not have any violations of the CO standard during 1988-1989, it was designated as a "not classified" non-attainment area.

As specified in the Clean Air Act, this SIP was modified to include specific requirements for each area. For Salt Lake, all that was required in Section 187 was the submittal of the 1990 base-year emissions inventory and implementation of a basic vehicle inspection and maintenance (I/M) program. For Ogden, the state was required to submit a 1990 base-year emissions inventory, implement a basic I/M program, and implement an oxygenated fuels program. For Ogden, Section 172 requires the submittal of a contingency plan. For Provo, the requirements include the expansion of the nonattainment area boundaries, updating of the emissions inventory to include the 1990 base-year, the development of an oxygenated fuels program, inclusion of vehicle miles travelled (VMT) tracking milestones, the development of an attainment demonstration, and the development of contingency measures which could be implemented if attainment of the standard was not realized or if the VMT tracking milestones were exceeded.

The sections of this SIP dealing with each of these areas was modified to include these new requirements.

IX.C.2 Carbon Monoxide Concentrations and Data Analysis (Salt Lake City and Ogden)

This section was adopted prior to the promulgation of the Clean Air Act Amendments of 1990. Therefore, all references in this section to this SIP, control requirements, and inventories refer to those which were in effect prior to 1990.

A summary of the measured exceedances of the eight-hour standard in Ogden for the years 1980 and 1981 and in Salt Lake for 1982 is shown in Table IX.C.1. High values such as these occur under adverse meteorological conditions (temperature inversions) which exist primarily from November through March.

OGDEN		SALT LAKE CITY
1980	**1981**	**1982**
12	10	12
11		10
10		13
13		10
11		10
		11
		10
		11

(parts per million)

Because atypical meteorological conditions were observed in 1980 and 1981, the state determined that neither year could be considered representative for purposes of SIP planning. It was determined that an average of the second high concentration observed in these two years was appropriate for use as a design value for Ogden in this SIP (see the technical support document). For Salt Lake City, the design value used in this SIP was the second high State Street 8-hour value observed in 1982. The calculated design values for the areas of concern are as follows:

Salt Lake City 12.1 ppm

Ogden	10.5 ppm

The following necessary reductions in carbon monoxide were calculated for each area:

Salt Lake City	26%
Ogden	11%

IX.C.3 Carbon Monoxide Emissions (Salt Lake City and Ogden)

a. Prior to 1990

The most significant source of carbon monoxide emissions in the Wasatch Front is highway motor vehicles. However, annual emissions inventories reveal that space heating and industrial sources contribute measurable amounts to the total inventory.

Table IX.C.2 shows the 1980 annual carbon monoxide emissions inventory for Salt Lake and Weber Counties.

SOURCE CATEGORY	SALT LAKE COUNTY (t/y)	WEBER COUNTY (t/y)
Highway Vehicles	309500	66900
Off-Highway Vehicles	8532	2172
Other Transportation	5346	1955
Process Industries	304	1005
Space Heating	15659	3654
Electric Power Generation	471	47
Forest Fires	1908	1259
TOTAL	341720	76992

Emissions of carbon monoxide and associated peak measured ambient levels tend to be concentrated in the urban cores of Salt Lake City and Ogden. Table IX.C.3 shows typical winter daily inventories for these cities.

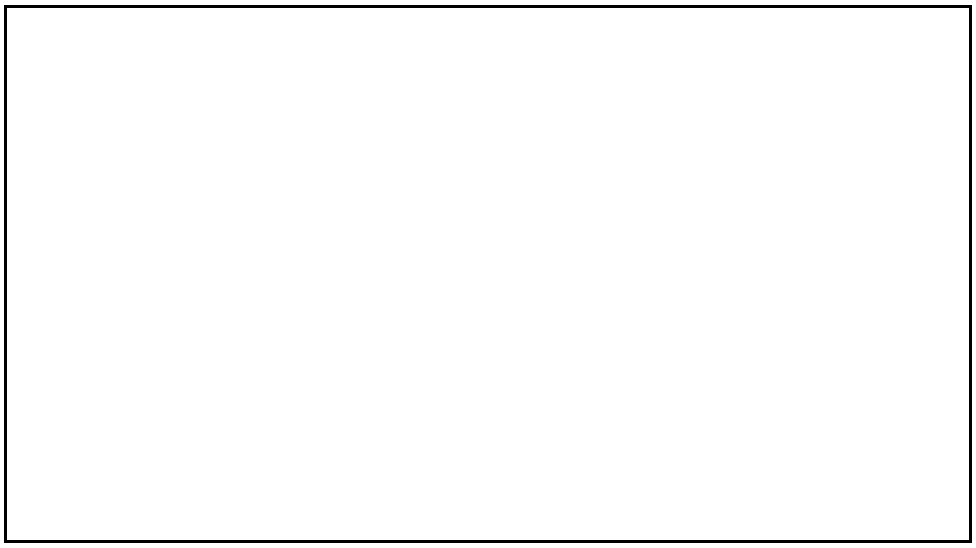
	SALT LAKE CITY (1982) (t/d)	OGDEN (1980) (t/d)
Highway Vehicles	316.88	107.2
Space Heating	27.5	11.0
Other Sources	10.6	6.4
TOTAL	354.98	124.6

b. Required by 1990 Clean Air Act Amendments

Table IX.C.4 is a summary of the 1990 base-year annual inventory for Salt Lake City; Table IX.C.5 shows comparable data for Ogden. Figure IX.C.1 and Figure IX.C.2 summarize the daily and annual emissions inventory for Salt Lake City, respectively. Figure IX.C.3 and Figure IX.C.4 summarize the daily and annual emissions inventory for Ogden, respectively. No major point sources of 100 tons/year of CO were identified in Salt Lake City or Ogden. The complete inventory and the required documentation is contained in the Technical Support Document.

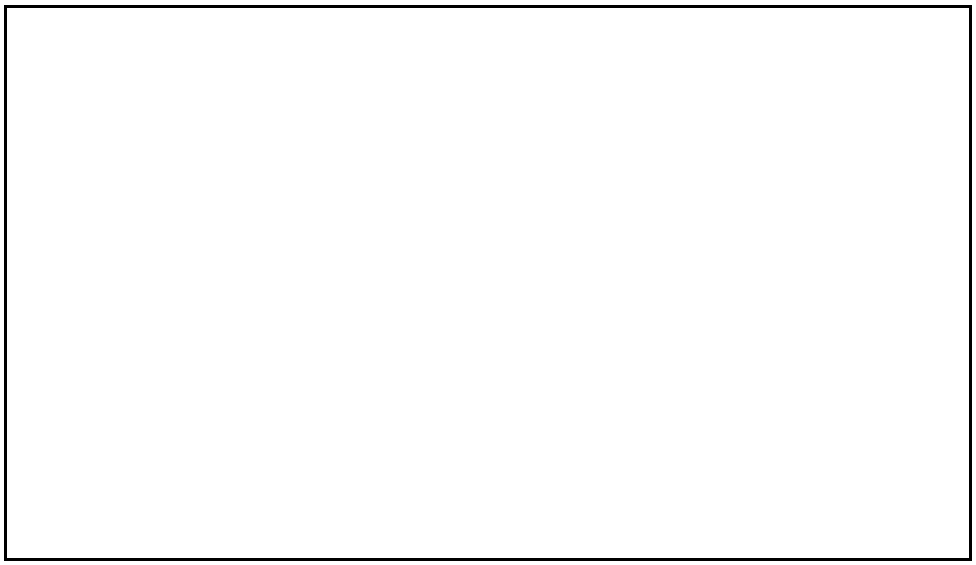
AREA SOURCES		**Tons/Year**	**Tons/Day**
Stationary External Combustion	Orchard Heaters	N/D	N/D
	Woodburning/Fireplaces	2334.48	13.56
	Coal - Residential	13.61	Neg
	Coal - Commercial	1.51	.01
	Coal - Industrial	.07	Neg
	Gas - Residential	28.21	Neg
	Gas - Commercial	Neg	Neg
	Gas - Industrial	21.83	.02
	Oil - Residential	.62	Neg
	Oil - Commercial	.72	Neg
	Oil - Industrial	35.74	.13
Waste Disposal, Treatment, and Recovery	Incineration - Com	48.2	.13
	Incineration - Ind	26.16	.07
Miscellaneous Sources	Forest Fires	N/D	N/D
	Fire-fighting Training	Neg	Neg
	Structural Fires	.2	Neg
	Prescribed Burning/ Slash Burning/ Agricultural Burning	N/D	N/D
	Open Burning/Detonation	N/D	N/D
	Aircraft/Rocket Engine Firing/Testing	19.6	.06
	Charcoal Grilling	N/I	N/I
MOBILE SOURCES			
On-Road	On-Road	63249.42	228.78
Non-Road	Aircraft	1959.58	5.75
	Railroads	68.22	.19
	Misc Non-road Equipment	2285.06	1.92
POINT SOURCES		N/D	N/D
TOTAL CO EMISSIONS - SALT LAKE CITY, UTAH		70093.23	250.62

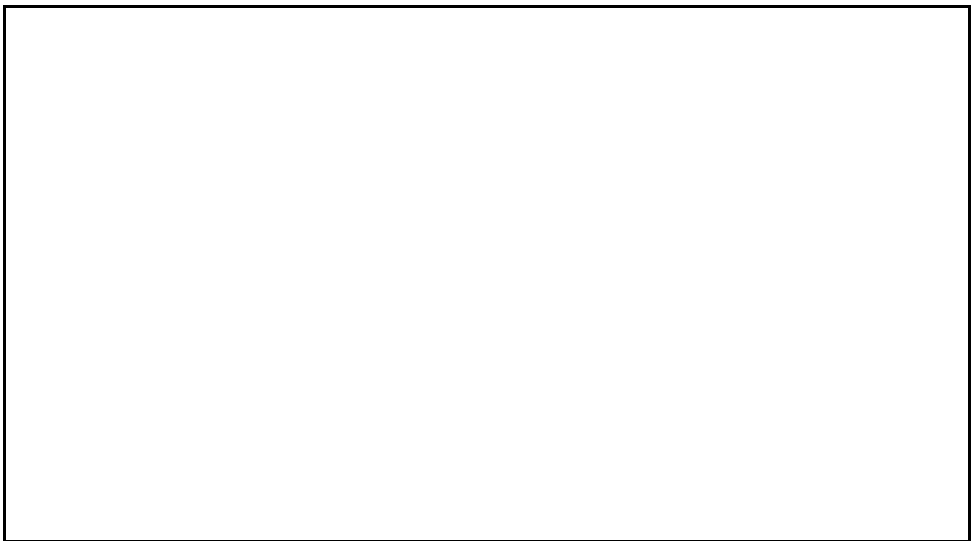
PT/S =Reported as a point source. N/A =Not applicable.
N/I= No info available N/D =Negative declaration. Neg =Negligible amount.
Number may vary slightly from report due to rounding. Numbers may not add due to rounding.



AREA SOURCES		Tons/Year	Tons/Day
Stationary External Combustion	Orchard Heaters	N/D	N/D
	Woodburning/Fireplaces	932.84	5.42
	Coal - Residential	5.44	Neg
	Coal - Commercial	.60	Neg
	Coal - Industrial	28.85	Neg
	Gas - Residential	.26	Neg
	Gas - Commercial	Neg	Neg
	Gas - Industrial	19.98	.04
	Oil - Residential	.25	Neg
	Oil - Commercial	.29	Neg
	Oil - Industrial	14.28	.05
Waste Disposal, Treatment, and Recovery	Incineration - Com	19.26	.05
	Incineration - Ind	14.05	.04
Miscellaneous Sources	Forest Fires	N/D	N/D
	Fire-fighting Training	Neg	Neg
	Structural Fires	.08	Neg
	Prescribed Burning/ Slash Burning/ Agricultural Burning	N/D	N/D
	Open Burning/Detonation	1.69	N/D
	Aircraft/Rocket Engine Firing/Testing	3.21	Neg
	Charcoal Grilling	N/I	N/I
MOBILE			
On-Road	On-Road	22356.48	67.80
Non-Road	Aircraft	321.10	.52
	Railroads	26.46	.07
	Misc Non-road Equipment	361.10	.30
POINT SOURCES		N/D	N/D
TOTAL CO EMISSION OGDEN, UTAH		24106.22	74.29

PT/S =Reported as a point source. N/A = Not applicable.
N/I= No info available N/D =Negative declaration Neg =Negligible amount.
Number may vary slightly from report due to rounding. Numbers may not add due to rounding.





IX.C.4 Control Strategy (Salt Lake City and Ogden)

The following control strategies were predicted to reduce emissions to the extent necessary to attain the National Ambient Air Quality Standards (NAAQS) for carbon monoxide:

- Federal Motor Vehicle Control Program (FMVCP)
- Automobile Inspection/Maintenance (I/M)
- Transportation Control Measures (TCM)

a. Federal Motor Vehicle Control Program

The FMVCP requires vehicle manufacturers to certify that new vehicles meet federal vehicle emission standards. As the older vehicles are replaced by newer vehicles with better controls, a dramatic reduction in vehicle emissions is being observed. In 1983 the "all modes" emission factor for 20 miles/hour was 111.16 grams per vehicle mile; in 1987 it is predicted to be reduced to 86.43 grams per vehicle mile. This represents a 22% reduction in CO emissions per vehicle mile.

b. Automobile Inspection/Maintenance

The EPA determined that under the provisions of Section 172 of the Clean Air Act, an automobile inspection and maintenance program (I/M) was required as Reasonably Available Control Technology (RACT) for CO reduction in Salt Lake County and for ozone reduction in Salt Lake and Davis Counties to demonstrate attainment of the NAAQS. The I/M programs developed by both counties were designed to result in a 25% reduction of CO and a 25% reduction in HC as determined using Mobile2.

On July 21, 1983, the Utah State Legislature amended the State Motor Vehicle Code to include Sections 41-6-163.(5) and (6), Utah Code Annotated 1953, which gave county governments authority to implement I/M programs in counties affected by Section 172 of the Clean Air Act. The Statute requires that this program be in place until the NAAQS are attained in the affected county. This Statute is contained in Section X, Appendix 1.

The Salt Lake County Board of Health adopted an implementation schedule and regulations establishing an I/M program. The program was fully implemented by April 1, 1984, according to the schedule submitted to the EPA in 1983. The current regulations are contained in Section X, Appendix 7.

The Davis County Commission adopted an implementation schedule and a county ordinance establishing an I/M program. The program was fully implemented by April 1, 1984, according to the schedule submitted to the EPA in 1983. The current county ordinance is contained in Section X, Appendix 6.

c. Transportation Control Measures

The application of TCMs in the Salt Lake City and Ogden areas was developed by the Wasatch Front Regional Council (WFRC) in their document "Traffic Control Measures for the Wasatch Front Region" January 1982. The document is incorporated by reference into this State Implementation Plan and a brief summary is provided in Section XI, Appendix 2.

It was determined that the following control strategies were appropriate for Salt Lake and Ogden:

Salt Lake - Transit Improvements, Ridesharing, and Traffic Flow Improvements; and
Ogden - Transit Improvements and Ridesharing.

(1) Salt Lake City

(a) Transit Improvements

The Utah Transit Authority proposes to increase the number of service miles in the Wasatch Front service area from 10.5 million in 1980 to 16 million by 1996. This is contingent upon their obtaining additional funding. This increase in service miles was predicted to result in a 2.1% reduction in region-wide carbon monoxide emissions.

(b) Ridesharing Program

A transportation brokerage was planned and implemented by the Wasatch Front Regional Council, Utah Transit Authority, and the Utah Energy Office which coordinates individual transportation needs. The brokerage concentrates its efforts on commuters. In addition, the program to build park and ride lots will be continued.

Major activities include:

l) Carpool and vanpool promotion and matching services for large firms, including interest-free loans for van purchases.
2) Region-wide carpool promotion and matching.
3) Dissemination of transit schedules.
4) Examination of commuter market needs.

This program was predicted to reduce emissions in Salt Lake City by 0.4%.

(c) Traffic Flow Improvements

The principal traffic flow improvement project was the computerization of traffic signals in Salt Lake City. This involved approximately 168 signals in an eight square mile area. It was estimated that carbon monoxide emissions in Salt Lake City would be reduced by 0.5%, (from 260 to 259 T/D) as a result of this strategy.

(2) Ogden

(a) Transit Improvements

As discussed under Salt Lake City Transit Improvements, region-wide carbon monoxide emissions were expected to be reduced 2.l% as a result of improved transit.

(b) Ridesharing Program

Ogden participates in the transportation brokerage discussed in connection with the Salt Lake City Ridesharing Program. It is estimated that carbon monoxide emissions within Ogden City were reduced by 0.3% as a result of this program.

d. Other Strategies

Other strategies which have not been studied by either Mountainlands Association of Governments (MAG) or WFRC include: (1) control of fleet operations; (2) retrofit programs; (3) extreme cold starts. Comments on these additional strategies are:

(1) Control of Fleet Operations

For several years, Mountain Fuel Supply has conducted studies on the feasibility of converting

motor vehicles to compressed natural gas. The Department of Health participated in these studies and has encouraged fleet owners to convert to compressed natural gas. The use of compressed natural gas results in a reduction of automobile emissions if the system is properly tuned and maintained, and these conversions will continue to be encouraged.

(2) Retrofit Programs

As of this time, EPA has not certified any retrofit devices which reduce emissions in a feasible manner. The Air Quality Board will continue to monitor the EPA efforts in this area.

(3) Extreme Cold Starts

The winters in Utah are comparatively mild; therefore, strategies to control emissions from extreme cold starts are inappropriate for this area.

IX.C.5 Demonstration of Attainment and Reasonable Further Progress (Salt Lake City and Ogden)

a. Salt Lake City

From Section IX.C.3, the Salt Lake City 1982 typical winter weekday inventory of CO was 354.98 tons/day. From Section IX.C.2, the necessary reduction to attain the 9 ppm level was 26%. Therefore the attainment inventory was:

354.98 tons/day (1 - 0.26) = 262.69 tons/day

Table IX.C.6 shows the effective winter weekday emission inventory for downtown Salt Lake City on the date when it was predicted to reach this level. The values are in tons of carbon monoxide per day.

	1982 (t/d)	**Nov 15, 1986 (t/d)**
Highway Vehicles	316.88	247.7
Space Heating	27.5	27.5
Other Sources	10.6	10.6
Total	354.98	285.8

Figure IX.C.5 illustrates reasonable further progress. Table IX.C.4 on page 4, shows that the 1990 daily inventory is 250.62 tons/day, well below the necessary attainment inventory.

b. Ogden

From Section IX.C.3 the 1980 Ogden City typical winter weekday inventory was 124.6 tons/day. From Section IX.C.2 the necessary reduction to attain the 9 ppm level was 11%. Therefore the attainment inventory was:

124.6 tons/day (1 - 0.11) = 110.9 tons/day.

Table IX.C.7 shows the dates on which the effective winter weekday emission inventory for downtown Ogden was predicted to reach this level. The values are in tons per day of carbon monoxide:

	1980 (t/d)	July 1, 1982 (t/d)
Highway Vehicles	107.2	93.5
Space Heating	11.0	11.0
Other Sources	6.4	6.4
Total	124.6	110.9

Figure IX.C.6 illustrates reasonable further progress. Table IX.C.5 on page 6, shows that the 1990 daily inventory is 74.29 tons/day, well below the necessary attainment inventory. As required by the Clean Air Act, revised emissions inventories will be submitted at least every three years, beginning in 1995.