TECHNICAL SUPPORT DOCUMENT
FOR ON-ROAD MOBILE SOURCES:
PM2.5 EMISSIONS INVENTORY
FOR PM2.5 SIP EPISODIC INVENTORY TSD:
2011 January 1-12
2013 December 7-19
2016 February 1-17

August 2017
Utah Division of Air Quality
Planning Branch/Mobile Sources

Abstract

This report discusses the on-road mobile source section of the $PM_{2.5}$ SIP episodic inventory for the domain comprising all 29 counties within the state of Utah.

The on-road mobile source episodic inventories were developed for specific winter episode days based on 24 hour temperatures and relative humidity recorded during wintertime $PM_{2.5}$ episodes: 2011 January 1-12, 2013 December 7-19, 2016 February 1-17.

Local activity travel data inputs were developed and implemented to characterize winter travel conditions for weekday (Monday-Friday) and weekend (Saturday and Sunday) expressed as Vehicle Miles of Travel.

Utah Department of Transportation provided AADT (Average Annual Daily Traffic) VMT from the Highway Performance Management System. Linear regression and curvilinear fit was used to project 1996-2014 AADT VMT to the year 2050. (2015 VMT was not available to use at the time).

Utah Department of Transportation, Division of Systems Planning and Programming/Traffic Statistics provided adjustment factors for monthly, weekday, and weekend day VMT. Factors were provided for six major road types: rural freeway, rural arterial, rural local roads, urban freeway, urban arterial and urban local roads.

Summary on-road emissions table inventories for a representative winter weekday Wednesday are located at the end of the TSD: 2011(1/05/11), 2013 (12/11/13), 2016 (2/10/16).

On-road inventories were calculated using the EPA MOVES2014a (Motor Vehicle Emission Simulator) released October 2015. $PM_{2.5}$ and PM_{10} fugitive paved roads road dust were calculated using AP-42 Chapter 13.2.1, "Introduction to Fugitive Dust Sources, section 13.2.1, "Paved Roads" (published in Federal Register on Feb. 4, 2011).

3.e.ii) ON-ROAD MOBILE SOURCES PM10 EMISSIONS INVENTORIES

LIST OF TABLES

ii. Overview

The purpose of this document is to explain what on-road mobile assumptions where utilized within MOVES2014a (October 2015) and AP-42 Chapter 13.2 (2011) for the Episodic Inventory for the $PM_{2.5}$ SIP. The $PM_{2.5}$ SIP covers the following specific episodes: 2011 January1-12, 2013 December 7-19, and 2016 February 1-17.

UDAQ constructed the "episodic inventory" for on-road mobile sources at the county level for the whole state of Utah covering episode specific daily meteorological and travel conditions. Emissions units cover a specific county in tons per day for 24 hours. Twenty two rural counties that surround the $PM_{2.5}$ non-attainment areas were modeled: Beaver, Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Morgan, Piute, Rich, San Juan, Sanpete, Sevier, Summit, Uintah, Wasatch, Washington, and Wayne. Seven urbanized counties within the $PM_{2.5}$ non-attainment areas were modeled: Box Elder, Cache, Davis, Salt Lake, Tooele, Utah, and Weber. The on-road emissions activities were counted for at the county level and submitted to the Technical Analysis section for regional modeling. The Technical Analysis section applied a $PM_{2.5}$ non-attainment area ArcGIS spatial layer to determine the impact of emissions.

iii. MOVES Modeling Procedure

The discussion below identifies the procedures followed to model the episodic inventories.

1. MOVES Default Database Enhancement for Local Roads

Local Roads

The local road enhancements allow the EPA MOVES2014a model to produce emissions results for roads by funding designation. The MOVES2014a default database combines input parameters for arterial and local roads into a single road category. The enhancement allows for a simplified approach to developing separate arterial and local road conditions. Arterial and local roads have different traffic characteristics: VMT, speed distribution, VMT mix, and funding responsibilities. Modeling road types separately creates an inventory that matches what is being reported at the local level.

Modifications to Local Road Tables

Table Names	Data Columns	Description of Changes
avgspeeddistribution	roadTypeID	Road types rural local(32) and urban local(52) added.
drivescheduleassoc	avgSpeedBinID	
hourvmtfraction	driveScheduleID	
roadtype	hourVMTFraction	
roadtypedist	roadDesc	
zoneroadtype	roadTypeVMTFraction	
	SHOAllocFactor	

2. MOVES2014 Daily Pollutants

(a) Pollutants selected for analysis:

- Ammonia (NH3)
- Benzene
- Carbon Monoxide(CO)
- Chloride
- Methane
- Nitrogen Oxide(NO)
- Oxides of Nitrogen (NOx)
- $PM_{2.5}$ (Elemental Carbon, Organic Carbon, Sulfate Particulate)
- $PM_{2.5}$ & PM_{10} (Primary Exhaust, Brake, & Tire)
- Sulfur Dioxide (SO2)
- Toluene
- Non-methane Hydrocarbons
- Total Energy
- Total Gaseous Hydrocarbons
- Total Organic Gases
- Volatile Organic Compounds
- Xylene

3. MOVES2014 Input Development

(a) County Data Manager Development

MOVES organizes data inputs into databases called County Data Manager (CDM) tables. CDMs were developed for all 29 counties for each episode day: 2011 January1-12, 2013 December 7-19, and 2016 February 1-17. This amounts to 42 MOVES runs for one county to cover all three episode periods.

(1) Average Speed Distribution:
The "Easy Mobile Inventory Tool" (EMIT) created by FHWA was used to create a MOBILE6 speed input file utilizing the Highway Capacity Manual method. This tool is important in trying to estimate speeds. UDOT Division of Systems Planning and Programming provided 2014 lane miles by county for the calculation.

(2) AVFT (Diesel and Gasoline Fractions):
MOVES2014a default AVFT values were used.

(3) Fuel Formulation, Fuel Supply and Fuel Usage Fraction:
MOVES2014a default Fuel parameter values were used.

(4) HourVMTFraction:
MOVES2014a default Hour VMT Fraction values were used.

(5) HPMSvTypeYear (Vehicle Miles of Travel (VMT) by Source Type):
The Utah Department of Transportation (UDOT) provided HPMS VMT data reported as average annual day traffic (AADT) for calendar years 1996-2014. At the time of this modeling exercise in May of 2016 the 2015 VMT was not available. VMT was projected to the year 2050 via linear regression for positive growth and curvilinear fit for negative growth. UDOT provided average VMT daily adjustment factors (2012) to provide winter month and daily activity detail.

(6) I/M Coverage: Cache, Davis, Salt Lake, Utah, and Weber Counties:
UDAQ constructed I/M Program coverages in consultation with the local county health departments in Cache Davis, Salt Lake, Utah, and Weber Counties.

Summary of the I/M Programs for Davis, Salt Lake, Utah, and Weber Counties

Year	Vehicle Type	Beg Model Year	End Model Year	Frequency	I/M Test
2011	Cars & Trucks	1968	1995	Annual	TSI
2011	Cars & Trucks	1996	2005	Annual	OBD
2011	Cars & Trucks	2006	2011	Biennial	OBD
2013	Cars & Trucks	1968	1995	Annual	TSI
2013	Cars & Trucks	1996	2007	Annual	OBD
2013	Cars & Trucks	2008	2011	Biennial	OBD
2016	Cars & Trucks	1968	1995	Annual	TSI
2016	Cars & Trucks	1996	2007	Annual	OBD
2016	Cars & Trucks	2008	2010	Annual	OBD
2016	Cars & Trucks	2011	2014	Biennial	OBD

Summary of the I/M Program for Cache County

Year	Vehicle Type	Beg Model Year	End Model Year	Frequency	I/M Test
2016	Cars & Trucks	1968	1995	Biennial	TSI
2016	Cars & Trucks	1996	2007	Biennial	OBD
2016	Cars & Trucks	2008	2010	Biennial	OBD

Summary of additional I/M Program coverage test procedures

County	Beg Model Year	End Model Year	I/M Test
Salt Lake	1968	1995	ASM (Only calendar Year 2011)
Davis	1990	1995	Gas Cap Pressure Test
Salt Lake	1968	2001	Gas Cap Pressure Test
Weber	1968	2001	Gas Cap Pressure Test

(7) Road Type (Ramp Fractions):
MOVES2014a default Ramp Fractions values were used.

(8) Road Type Distribution:
UDOT Division of Systems Planning and Programming provided 2014 VMT travel fractions for FHWA vehicle classes grouped and adjusted by Gross Vehicle Weight Rating (GVWR) ranges. The travel fractions were obtained by county from automated pneumatic counters that detect axle spacing and "weigh-in motion" (WIM) counters placed on arterial, interstate, and local roads. UDOT 2014 HPMS VMT and Vehicle Mix data were used to construct road type distribution and VMT by sourcetype by year.

(9) Source Type Age Distribution:
MOVES2014a default Age Distribution values were used.

(10) SourceTypeYear (Vehicle Population):
MOVES2014a default Source Type values were used.

(11) ZoneMonthHour (Meteorological Data):
Episode specific meteorological conditions were used. Daily and hourly temperature and relative humidity profiles from representative weather stations (Box Elder, Davis, Cache, Salt Lake, Tooele, Utah, and Weber) were used for the following episodes: 2011 January 1-12, 2013 December 7-19, and 2016 February 1-17. The Salt Lake temperature and relative humidity profiles were utilized for the remaining 22 counties within the state of Utah to provide relative background emissions for on-road/non-road sources.

iv. Fugitive Dust Procedure

1. Fugitive Dust Emissions

(1) Method

PM_{10} and $PM_{2.5}$ fugitive dust emissions from paved roads ("re-entrained road dust") calculated according to Chapter 13 of AP-42 dated January 2011.

The hourly basis equation was used to estimate dust emissions:

= [k(sL)^0.91(W)^1.02][1 - (1.2P/N)]

Inventories of fugitive dust from paved roads are in units of tons per year as requested by UDAQ Technical Analysis Section.

1. Precipitation:
   UDAQ Technical Analysis Section provided precipitation data from MesoWest University of Utah. Number of hours per day with precipitation greater than 0.01 inch were collected for the following counties: Box Elder, Davis, Cache, Salt Lake, Tooele, Utah, and Weber. County specific precipitation data was collected for each of the three $PM_{2.5}$ episodes: 2011 January1-12, 2013 December 7-19, and 2016 February 1-17. The Salt Lake precipitation profiles were utilized for the remaining 22 rural counties within the state of Utah to provide relative background emissions for on-road fugitive dust emissions. County specific fugitive dust emissions estimates were configured for an average weekday (Monday-Friday) and weekend (Saturday and Sunday) using precipitation data for each individual episode.

2. Average Vehicle Weight:
   UDOT Division of Systems Planning and Programming provided average vehicle by road type (2011). In general, average vehicle weight is highest on interstates and lowest on local roads. In rural counties, average vehicle weight is often a factor of three or four times higher than in large urban counties due to the relatively higher percentage of large trucks in rural areas compared to urban areas with large volumes of commuter traffic.

3. Silt Loading Factors
   Default silt loading factors were used.

2. Re-entrained Road Dust Insignificance

(2) 40 CFR 93.102 (b)

1. Conformity Rule addresses the establishment of budgets for pollutants affecting $PM_{2.5}$, and says that budgets for re-entrained road dust are presumed to be unnecessary unless either the agency responsible for SIP development or the Administrator determines otherwise.

2. UDAQ demonstrated that re-entrained road dust to be insignificant in the Salt Lake City, UT nonattainment area.

   i. Speciated data was collected and analized from November 2,2015 and March 1, 2016. The determination relies on a widely used algorithm with assigns percentages to an assemblage of elements commonly found in crustal material (e.g. silicon, aluminum, oxygen). In each case, both the mass and the percentage of crustal material relative to total filter mass are insignificant.
   ii. Filter data was organized into three different groups. One group representing 24-hr $PM_{2.5}$ concentrations below 12 µg/m3 (the value of the 2012 annual standard), another group representing values between 12 and 35 µg/m3, and the third group representing concentrations above the 24-hr standard of 35 µg/m3. This grouping is significant because none of Utah's three nonattainment areas violates the annual standard for $PM_{2.5}$, only the (2006) 24-hr standard.
   iii. On days when the 24-hr standard is exceeded, it is typically because atmospheric conditions are suitable for the rapid formation of secondary particulate matter, typically ammonium nitrate. The data shows that, as the secondary particulate develops, it overwhelms a somewhat constant amount of crustal material, such that the relative percentage of crustal material decreases as overall $PM_{2.5}$ concentrations increase. This is reflected in the data as presented in the three groups.
   iv. EPA Region 8 reviewed the study and concureed with UDAQ's finding that re-entrained road dust to be insignificant in the Salt Lake City, UT nonattainment area.

v. PM2.5 SIP On-road Mobile Sources Inventory 2011 (1/05/11) Winter Weekday Emissions (Tons per Winter Weekday)

Year	FIPS	County	NH3	NOx	Total_PM10*	Total_PM25**	SO2	VOC	VOC Refueling	PM10 Dust	PM25 Dust	Distance
2011	49001	Beaver	0.03	4.38	0.18	0.12	0.01	1.076	0.044	0.18	0.05	701,257
2011	49003	Box Elder	0.11	10.68	0.60	0.38	0.03	4.238	0.162	0.75	0.19	2,632,299
2011	49005	Cache	0.13	5.91	0.64	0.30	0.04	3.798	0.202	0.98	0.25	2,625,677
2011	49007	Carbon	0.04	3.84	0.34	0.18	0.01	1.225	0.065	0.67	0.17	878,488
2011	49009	Daggett	0.00	0.37	0.02	0.02	0.00	0.114	0.006	0.05	0.01	91,242
2011	49011	Davis	0.37	18.11	1.61	0.79	0.09	8.372	0.558	1.63	0.41	7,720,644
2011	49013	Duchesne	0.03	2.74	0.19	0.11	0.01	0.876	0.044	0.46	0.11	693,231
2011	49015	Emery	0.04	5.14	0.36	0.20	0.01	1.307	0.063	0.54	0.13	901,683
2011	49017	Garfield	0.01	0.97	0.06	0.03	0.00	0.372	0.018	0.13	0.03	305,778
2011	49019	Grand	0.04	5.61	0.25	0.16	0.01	1.342	0.058	0.46	0.12	918,162
2011	49021	Iron	0.09	10.80	0.50	0.33	0.02	2.843	0.127	0.75	0.19	2,008,380
2011	49023	Juab	0.05	5.56	0.25	0.16	0.01	1.534	0.066	0.28	0.07	1,079,576
2011	49025	Kane	0.02	1.35	0.09	0.05	0.00	0.476	0.024	0.25	0.06	390,807
2011	49027	Millard	0.06	7.57	0.37	0.25	0.02	1.898	0.082	0.49	0.12	1,283,287
2011	49029	Morgan	0.02	1.60	0.07	0.05	0.00	0.497	0.023	0.12	0.03	368,806
2011	49031	Piute	0.00	0.35	0.03	0.02	0.00	0.104	0.006	0.06	0.01	79,805
2011	49033	Rich	0.01	0.26	0.01	0.00	0.00	0.143	0.007	0.05	0.01	122,928
2011	49035	Salt Lake	1.33	59.44	5.90	2.82	0.34	31.053	1.947	6.35	1.59	26,773,662
2011	49037	San Juan	0.03	3.00	0.20	0.13	0.01	1.037	0.053	0.58	0.15	817,265
2011	49039	Sanpete	0.03	2.00	0.16	0.08	0.01	0.75	0.04	0.37	0.09	605,322
2011	49041	Sevier	0.04	5.13	0.26	0.16	0.01	1.34	0.06	0.44	0.11	912,619
2011	49043	Summit	0.09	9.72	0.47	0.30	0.02	2.89	0.13	0.80	0.20	2,069,001
2011	49045	Tooele	0.11	10.58	0.67	0.39	0.03	3.856	0.164	1.39	0.35	2,416,056
2011	49047	Uintah	0.05	4.50	0.33	0.18	0.01	1.467	0.073	0.73	0.18	1,147,008
2011	49049	Utah	0.54	35.17	3.25	1.69	0.15	14.317	0.823	3.21	0.80	11,625,856
2011	49051	Wasatch	0.04	2.98	0.20	0.12	0.01	1.143	0.057	0.49	0.12	952,232
2011	49053	Washington	0.18	15.14	1.10	0.61	0.05	5.315	0.275	1.25	0.31	4,030,459
2011	49055	Wayne	0.01	0.39	0.03	0.02	0.00	0.162	0.008	0.07	0.02	131,381
2011	49057	Weber	0.25	11.11	1.10	0.51	0.07	5.886	0.374	1.30	0.32	4,951,003

*PM10 tire and brake wear, total exhaust and does not include road dust

**PM2.5 tire and brake wear, sulfate, elemental and organic carbon and does not include road dust

v. PM2.5 SIP On-road Mobile Sources Inventory 2013 (12/11/13) Winter Weekday Emissions (Tons per Winter Weekday)

Year	FIPS	County	NH3	NOx	Total_PM10*	Total_PM25**	SO2	VOC	VOC Refueling	PM10 Dust	PM25 Dust	Distance
2013	49001	Beaver	0.03	3.81	0.16	0.10	0.01	0.982	0.038	0.17	0.04	709,343
2013	49003	Box Elder	0.10	8.51	0.57	0.35	0.03	3.963	0.137	0.73	0.18	2,667,601
2013	49005	Cache	0.11	4.88	0.63	0.28	0.04	3.547	0.163	0.97	0.24	2,650,614
2013	49007	Carbon	0.03	3.19	0.32	0.15	0.01	1.086	0.054	0.65	0.16	877,228
2013	49009	Daggett	0.00	0.30	0.01	0.01	0.00	0.105	0.005	0.05	0.01	87,506
2013	49011	Davis	0.33	14.82	1.54	0.75	0.09	7.85	0.43	1.72	0.43	7,721,171
2013	49013	Duchesne	0.03	2.56	0.19	0.11	0.01	0.817	0.043	0.49	0.12	805,220
2013	49015	Emery	0.03	4.56	0.34	0.20	0.01	1.192	0.058	0.55	0.14	966,624
2013	49017	Garfield	0.01	0.79	0.05	0.03	0.00	0.325	0.015	0.12	0.03	299,517
2013	49019	Grand	0.04	4.78	0.22	0.14	0.01	1.21	0.05	0.44	0.11	918,797
2013	49021	Iron	0.08	9.02	0.44	0.28	0.02	2.5	0.11	0.73	0.18	2,055,615
2013	49023	Juab	0.04	4.40	0.21	0.13	0.01	1.326	0.054	0.26	0.07	1,048,712
2013	49025	Kane	0.02	1.35	0.11	0.05	0.01	0.475	0.025	0.34	0.08	446,995
2013	49027	Millard	0.05	6.73	0.34	0.22	0.02	1.738	0.072	0.47	0.12	1,331,254
2013	49029	Morgan	0.02	1.38	0.06	0.04	0.00	0.451	0.019	0.12	0.03	372,825
2013	49031	Piute	0.00	0.28	0.02	0.01	0.00	0.095	0.005	0.05	0.01	77,848
2013	49033	Rich	0.01	0.23	0.01	0.00	0.00	0.134	0.006	0.05	0.01	133,918
2013	49035	Salt Lake	1.16	49.95	5.41	2.50	0.34	27.735	1.555	6.04	1.51	27,007,575
2013	49037	San Juan	0.03	2.66	0.20	0.11	0.01	0.962	0.048	0.64	0.16	866,254
2013	49039	Sanpete	0.02	1.66	0.15	0.08	0.01	0.667	0.033	0.35	0.09	611,956
2013	49041	Sevier	0.03	4.09	0.21	0.13	0.01	1.162	0.048	0.40	0.10	857,731
2013	49043	Summit	0.08	8.11	0.42	0.26	0.02	2.571	0.109	0.76	0.19	2,075,587
2013	49045	Tooele	0.10	8.70	0.62	0.36	0.03	3.594	0.136	1.29	0.32	2,397,892
2013	49047	Uintah	0.04	3.88	0.31	0.16	0.01	1.325	0.065	0.73	0.18	1,211,184
2013	49049	Utah	0.49	29.71	3.19	1.64	0.15	14.056	0.694	3.26	0.81	12,028,343
2013	49051	Wasatch	0.03	2.48	0.18	0.10	0.01	1.022	0.048	0.48	0.12	962,791
2013	49053	Washington	0.15	12.62	0.99	0.53	0.05	4.721	0.229	1.19	0.30	4,043,425
2013	49055	Wayne	0.01	0.32	0.02	0.02	0.00	0.143	0.007	0.07	0.02	131,850
2013	49057	Weber	0.21	9.00	1.04	0.47	0.06	5.399	0.291	1.23	0.31	4,887,538

*PM10 tire and brake wear, total exhaust and does not include road dust

**PM2.5 tire and brake wear, sulfate, elemental and organic carbon and does not include road dust

v. PM2.5 SIP On-road Mobile Sources Inventory 2016 (2/10/16) Winter Weekday Emissions (Tons per Winter Weekday)

Year	FIPS	County	NH3	NOx	Total_PM10*	Total_PM25**	SO2	VOC	VOC Refueling	PM10 Dust	PM25 Dust	Distance
2016	49001	Beaver	0.03	3.28	0.12	0.07	0.01	0.72	0.04	0.20	0.05	792,428
2016	49003	Box Elder	0.09	6.68	0.41	0.23	0.03	2.82	0.10	0.82	0.21	2,754,562
2016	49005	Cache	0.10	3.38	0.54	0.21	0.04	2.32	0.12	1.12	0.28	2,925,126
2016	49007	Carbon	0.03	2.17	0.24	0.09	0.01	0.70	0.04	0.66	0.17	848,062
2016	49009	Daggett	0.00	0.24	0.01	0.00	0.00	0.07	0.00	0.06	0.02	103,007
2016	49011	Davis	0.29	11.13	1.26	0.49	0.10	5.09	0.36	2.09	0.52	8,556,118
2016	49013	Duchesne	0.02	1.82	0.14	0.07	0.01	0.53	0.04	0.53	0.13	814,505
2016	49015	Emery	0.03	3.34	0.25	0.13	0.01	0.80	0.05	0.57	0.14	955,476
2016	49017	Garfield	0.01	0.55	0.03	0.02	0.00	0.21	0.01	0.13	0.03	300,832
2016	49019	Grand	0.03	3.89	0.17	0.10	0.01	0.86	0.05	0.50	0.13	989,354
2016	49021	Iron	0.08	7.61	0.34	0.20	0.02	1.81	0.10	0.86	0.21	2,261,816
2016	49023	Juab	0.04	3.86	0.17	0.08	0.01	0.97	0.05	0.30	0.07	1,177,572
2016	49025	Kane	0.01	0.90	0.08	0.03	0.00	0.30	0.02	0.32	0.08	447,353
2016	49027	Millard	0.05	5.49	0.25	0.15	0.02	1.25	0.06	0.54	0.13	1,418,462
2016	49029	Morgan	0.01	1.13	0.04	0.02	0.00	0.32	0.02	0.14	0.03	406,973
2016	49031	Piute	0.00	0.21	0.02	0.00	0.00	0.06	0.00	0.06	0.02	80,173
2016	49033	Rich	0.00	0.16	0.01	0.00	0.00	0.09	0.01	0.05	0.01	136,690
2016	49035	Salt Lake	0.99	35.75	4.28	1.58	0.33	17.81	1.21	6.86	1.72	28,577,418
2016	49037	San Juan	0.03	1.85	0.15	0.07	0.01	0.62	0.04	0.66	0.16	870,154
2016	49039	Sanpete	0.02	1.19	0.11	0.05	0.01	0.43	0.03	0.39	0.10	631,045
2016	49041	Sevier	0.03	3.43	0.17	0.09	0.01	0.83	0.04	0.46	0.12	945,643
2016	49043	Summit	0.07	6.46	0.31	0.18	0.02	1.77	0.10	0.91	0.23	2,289,416
2016	49045	Tooele	0.09	7.33	0.52	0.25	0.03	2.38	0.12	1.67	0.42	2,726,400
2016	49047	Uintah	0.04	2.84	0.23	0.10	0.01	0.87	0.06	0.81	0.20	1,261,978
2016	49049	Utah	0.44	22.37	2.44	1.02	0.15	8.46	0.57	3.53	0.88	13,137,013
2016	49051	Wasatch	0.03	1.91	0.14	0.06	0.01	0.68	0.04	0.54	0.14	1,051,654
2016	49053	Washington	0.15	10.18	0.87	0.40	0.05	3.25	0.21	1.49	0.37	4,700,218
2016	49055	Wayne	0.00	0.22	0.02	0.00	0.00	0.09	0.01	0.07	0.02	133,617
2016	49057	Weber	0.18	6.44	0.83	0.31	0.06	3.40	0.22	1.38	0.35	5,183,259

*PM10 tire and brake wear, total exhaust and does not include road dust

**PM2.5 tire and brake wear, sulfate, elemental and organic carbon and does not include road dust

vi. Appendix: Episodic Year Inventories For $PM_{2.5}$ SIP

Files will be furnished upon request:

2011 2013 2016 Episodic TSD\ size: 25 Gig
2011 2013 2016 Episodic TSD\2011 Episode Jan 1-12\ size: 7 Gig
2011 2013 2016 Episodic TSD\2013 Episode Dec 7-19\ size: 8 Gig
2011 2013 2016 Episodic TSD\2016 Episode Feb 1-17\ size: 10 Gig
2011 2013 2016 Episodic TSD\Dust\ size: 20mb
2011 2013 2016 Episodic TSD\Inputs\ size: 116mb

vii. References

The following documents were used as references in creating the on-road mobile source PM2.5 SIP emissions inventories:

1. Federal Register, Friday, February 4, 2011, "Official Release of the January 2011 AP–42 Method for Estimating Re-Entrained Road Dust From Paved Roads", Announcement of Availability, https://www.federalregister.gov/documents/2011/02/04/2011-2422/official-release-of-the-january-2011-ap-42-method-for-estimating-re-entrained-road-dust-from-paved

2. U.S. Environmental Protection Agency, Office of Transportation and Air Quality (OTAQ), Assessment and Standards Division, "MOVES2014a User Guide", EPA-420-B-095, November 2015, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNCY.txt

3. U.S. Environmental Protection Agency, OTAQ, Transportation and Regional Programs Division, "MOVES2014 and 2014a Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity", EPA-420-B-15-093), https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NN9L.txt , November 2015.

4. I/M Programs

a. Davis County Health Department, Environmental Health Services Division, Davis County Testing Center, 20 North 600 West, Kaysville, UT 84037, 801-546-8860.

b. Salt Lake County Health Department, Environmental Health, Air Pollution Control, I/M Tech Center, 788 East Woodoak Lane (5380 South), Murray, UT 84107-6369, 385-468-4837.

c. Utah County Health Department, Utah County Environment Health, Bureau of Air Quality, I/M Tech Center, 3255 North Main Street, Spanish Fork, UT, 84660, 801-851-7600.

d. Weber-Morgan Health Department, Environmental Health, 477 23rd Street, 2nd floor, Ogden, UT 84401, 801-399-7160.

e. Bear River Health Department, 655 East 1300 North. Logan, UT 84341, 801-792-6500

5. MESOWEST UTAH, (met data archive), University of Utah, Department of Atmospheric Sciences, http://mesowest.utah.edu/.

6. Aerovironment, Report on Salt Lake County Road Dust Silt Loading, 1992.

7. Re-entrained Road Dust Insignificance V2 Car Crust 2015-16 Final.xlsx