

## Appendix 4: Transportation Conformity Analysis and Motor Vehicle Emission Budget

LRAPA evaluated mobile source emissions of PM<sub>2.5</sub> and precursors (NO<sub>x</sub>, SO<sub>2</sub>, VOC and NH<sub>3</sub>) for the years 2008, 2015 and 2025 with the assistance of the Oregon Department of Environmental Quality (DEQ). The results of the MOVES2014a model runs are included in the links of the following DEQ-LRAPA transmittal email:

**From:** RISHER Wes [mailto:wes.risher@state.or.us]  
**Sent:** Thursday, November 03, 2016 11:49 AM  
**To:** Merlyn Hough <merlyn@lrpa.org>; Robbye Lanier <robbye@lrpa.org>  
**Cc:** SWAB Christopher <christopher.swab@state.or.us>; BEYER Gary <gary.beyer@state.or.us>; STOCUM Jeffrey <jeffrey.g.stocum@state.or.us>; LAZAREV Svetlana <svetlana.lazarev@state.or.us>  
**Subject:** Rerun of MOVES modeling for Oakridge-Westfir PM2.5 and additional pollutants (NO<sub>x</sub>, SO<sub>2</sub>, VOC and NH<sub>3</sub>), 2008, 2015 and 2025

Merlyn and Robbye,

We have completed the **rerun** of MOVES2014a onroad modeling and emission estimation for Oakridge-Westfir PM<sub>2.5</sub> with the additional pollutants needed (NO<sub>x</sub>, SO<sub>2</sub>, VOC and NH<sub>3</sub>), for the years 2008, 2015 and 2025.

At the links below is an ftp site where you can pull the Excel spreadsheets (Pivot tables), with and without link level data, and the Access databases that has the daily lbs. per day emissions; sizeable files hence the ftp site to provide you a copy. Day 5 is the Weekday and Day 2 is the Weekend. You will likely just need to work with the ResultsWithoutLink but I wanted you to have both sets of results.

[ftp://deqftp2.deq.state.or.us\wrisher\Oakridge\\_rerun\\_ResultByLink\\_PIVOT.xlsx](ftp://deqftp2.deq.state.or.us\wrisher\Oakridge_rerun_ResultByLink_PIVOT.xlsx)

(Linked [here](#))

[ftp://deqftp2.deq.state.or.us\wrisher\Oakridge\\_rerun\\_ResultsByLinkFinalOutput.mdb](ftp://deqftp2.deq.state.or.us\wrisher\Oakridge_rerun_ResultsByLinkFinalOutput.mdb)

(Linked [here](#))

[ftp://deqftp2.deq.state.or.us\wrisher\Oakridge\\_rerun\\_ResultsWithoutLink.accdb](ftp://deqftp2.deq.state.or.us\wrisher\Oakridge_rerun_ResultsWithoutLink.accdb)

(Linked [here](#))

[ftp://deqftp2.deq.state.or.us\wrisher\Oakridge\\_rerun\\_ResultWithoutLink\\_PIVOT.xlsx](ftp://deqftp2.deq.state.or.us\wrisher\Oakridge_rerun_ResultWithoutLink_PIVOT.xlsx)

(Linked [here](#))

Regards,  
Wes Risher

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LRAPA greatly appreciates the assistance of Wesley Risher, Gary Beyer, Jeffrey Stocum and Christopher Swab of the DEQ staff in running of the MOVES2014a model and the compilation of the results.

DEQ ran MOVES2014a for:

1. Four seasons (April, July, September and December);
2. Weekdays and weekend days;
3. Three years: 2008 base year, 2015 attainment year, and 2025 future year;
4. PM<sub>2.5</sub> (exhaust, brakewear and tirewear); and
5. PM<sub>2.5</sub> precursors (NO<sub>x</sub>, SO<sub>2</sub>, VOC and NH<sub>3</sub>).

Mobile source emissions are projected to steadily decrease between 2008 and 2015 as a result of cleaner vehicles and cleaner fuels. EPA has adopted national requirements for progressively more effective pollution control equipment on new cars and trucks and for cleaner gasoline and diesel fuels.

The overall summary table of the results in pounds per day (lb/day) is as follows:

Year	Pollutant Name	April	April	July	July	September	September	December	December
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
2008	Ammonia (NH <sub>3</sub> )	8.2	11.8	10.9	15.7	10.5	13.8	7.7	12.2
2008	Oxides of Nitrogen (NO <sub>x</sub> )	722.2	918.3	905.3	1,184.4	866.9	1,049.6	713.0	970.7
2008	Primary Exhaust PM <sub>2.5</sub> - Total	24.1	30.7	26.6	35.5	26.5	32.4	26.2	34.9
2008	Primary PM <sub>2.5</sub> - Brakewear Particulate	1.0	1.3	1.2	1.6	1.2	1.4	1.0	1.3
2008	Primary PM <sub>2.5</sub> - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6
2008	Sulfur Dioxide (SO <sub>2</sub> )	2.7	3.6	3.7	5.2	3.5	4.5	2.6	3.8
2008	Volatile Organic Compounds	732.2	739.0	756.7	804.8	750.3	759.7	772.7	794.1
	<b>2008 Total</b>	1490.9	1705.3	1704.9	2047.9	1659.4	1862.2	1523.6	1817.7
2015	Ammonia (NH <sub>3</sub> )	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0
2015	Oxides of Nitrogen (NO <sub>x</sub> )	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3
2015	Primary Exhaust PM <sub>2.5</sub> - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.1
2015	Primary PM <sub>2.5</sub> - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4
2015	Primary PM <sub>2.5</sub> - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7
2015	Sulfur Dioxide (SO <sub>2</sub> )	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2
	<b>2015 Total</b>	1072.5	1213.8	1230.7	1461.9	1195.6	1329.6	1094.9	1291.6
2025	Ammonia (NH <sub>3</sub> )	6.1	8.8	8.1	11.8	7.8	10.3	5.7	9.1
2025	Oxides of Nitrogen (NO <sub>x</sub> )	154.8	182.6	183.3	225.6	177.8	203.5	155.0	193.1
2025	Primary Exhaust PM <sub>2.5</sub> - Total	3.6	4.5	4.0	5.3	4.0	4.8	3.9	5.0
2025	Primary PM <sub>2.5</sub> - Brakewear Particulate	1.2	1.5	1.4	1.8	1.4	1.7	1.2	1.6
2025	Primary PM <sub>2.5</sub> - Tirewear Particulate	0.5	0.7	0.7	0.9	0.6	0.8	0.5	0.7
2025	Sulfur Dioxide (SO <sub>2</sub> )	1.0	1.3	1.2	1.7	1.2	1.5	0.9	1.3
2025	Volatile Organic Compounds	170.6	169.5	167.6	175.2	168.2	168.4	182.3	183.2
	<b>2025 Total</b>	337.8	368.9	366.3	422.3	361.0	391.1	349.5	394.0

Secondary particulate is an overall very minor contributor to the Oakridge PM<sub>2.5</sub> air pollution concentrations on worst winter days as summarized in both the 2012 and 2016 Oakridge-Westfir Attainment Plans. For example, as outlined in Table 6 of the 2016 Plan, sulfates

contribute only 1.1% and nitrates contribute only 0.4% on the top 25% high PM<sub>2.5</sub> concentration days. Rather, the major PM<sub>2.5</sub> contributor is organic carbon (88%), primarily from residential wood combustion.

Parameter	Sulfate	Nitrate	OC	EC	Water	NH3	OPP
Percent	1.1	0.4	88.4	7.6	1.4	0.03	1.1
ug/m3	0.43	0.16	34.46	2.95	0.54	0.01	0.44

**Table 1 (from 2016 Plan): Contribution by speciated components, based on results of SANDWICH analysis for the top 25% high concentration winter (October-March) days.**

Each of the precursor groups in Table 6 was determined to be below the EPA Region 10 insignificance threshold of 1.3 ug/m<sup>3</sup>:

- Nitrate + ammonia = 0.16 ug/m<sup>3</sup> + 0.01 ug/m<sup>3</sup> = 0.17 ug/m<sup>3</sup> < 1.3 ug/m<sup>3</sup>.
- Sulfate = 0.43 ug/m<sup>3</sup> < 1.3 ug/m<sup>3</sup>.

In addition to the speciated components in Table 6, VOC contributions were also below the insignificance threshold of 1.3 ug/m<sup>3</sup> based on studies by ODEQ in partnership with Portland State University. Anthropogenic secondary organic aerosols (SOA) were conservatively estimated to contribute 3% (1.17 ug/m<sup>3</sup>) and biogenic 1% to the total measured PM<sub>2.5</sub> mass. Even the conservatively-estimated anthropogenic SOA of 1.17 ug/m<sup>3</sup> was less than the EPA Region 10 insignificance threshold of 1.3 ug/m<sup>3</sup>.

Therefore, the LRAPA emission inventory analysis focused in most detail on the direct PM<sub>2.5</sub> emissions from the significant particulate sources during the winter season in Oakridge-Westfir, notably residential woodburning emissions from woodstoves, fireplaces and pellet stoves.

The Oakridge worst case day emission inventory is based on winter weekend days during December. Therefore, the Motor Vehicle Emission Budget for the Oakridge-Westfir Attainment Plan is as follows:

### **Oakridge-Westfir Motor Vehicle Emission Budget (lb/day)**

Year	Pollutant Name	WCD MVEB
2015	Primary PM <sub>2.5</sub> - Total	22.2