



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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December 16, 2021

Mr. Marc Houyoux
United States Environmental Protection Agency
Emissions Modeling Team
109 TW Alexander Drive, MC C339-02
Durham, NC 27711
emissionsmodeling@epa.gov

RE: Virginia Comments on the BY2016v2 Emissions Inventory and Modeling Data Sets

Dear Mr. Houyoux,

Thank you for allowing states the opportunity to comment on the base year 2016 version 2 (BY2016v2) emissions inventory. In Attachment 1, my staff provides comments on this information, and in Attachment 2, data are presented graphically to help illustrate comments and questions. Attachment 3 provides a relevant permit for one of Virginia's natural gas transmission facilities. I ask that you carefully consider this information before making final edits to the data sets.

In recent months, states and the U.S. Environmental Protection Agency (EPA) have begun a dialogue regarding the role of each organization in the development of emissions inventories and air quality modeling analyses. The efforts are important for Virginia since the results of such work impact whether and how transport regulations apply here in the Commonwealth. The current transport rule development process is limited by court mandated deadlines, and Virginia Department of Environmental Quality (DEQ) understands that such mandates take priority in this regulatory development effort. However, in future efforts where court-ordered deadlines are not applied, DEQ encourages EPA to evaluate whether a process similar to a notice of data availability may be used when developing both the emissions inventory and the air quality modeling analyses. Being able to review the results of air quality analyses prior to the development of a proposed transport federal implementation plan (FIP) or proposed state implementation plan (SIP) would allow Virginia and other stakeholders to provide more meaningful input and may also result in stronger regulations.

EPA has made other types of inventory data requests to states recently, including data requests for review of high priority facilities emitting toxic pollutants. DEQ has, to the best of our ability, responded to these requests in a timely manner and will continue to do so as resources allow. However, DEQ suggests that EPA review the contents of the Air Emissions Reporting Rule (AERR) to ensure that the regulatory requirements in the AERR support the ongoing efforts regarding toxic pollutant risk analyses, environmental justice efforts, and air quality planning mandates for ozone and fine particulate matter (PM_{2.5}). If the AERR needs to be updated to include additional state reporting mandates, sufficient Section 105 grant funds should also be allocated to states to cover this additional work. Without regulatory mandates for reporting, industry participation in voluntary requests for information can be spotty and, when data is supplied, such data can be inconsistent in quality.

As you know, considerable time and effort on the part of state and federal staff must be expended to create these modeling emissions inventories and projections. The utility of these data sets do not stop with the development of transport rules. They can and should be used for all manner of planning activities, depending on timing, circumstances, and regulatory requirements. Indeed, using these emissions inventories in efforts other than transport rules is good common sense since relying on these documented and quality-assured data sets can reduce the burden on state resources for other planning efforts. However, the supplied data needs to be in EPA's federally mandated format for ease of use in ozone attainment planning. Staff from the Mid Atlantic Regional Air Management Association (MARAMA) and DEQ recently spent considerable time applying temporal formats to annual data to develop ozone season tons per day emissions of volatile organic compounds (VOC), nitrogen oxides (NO_x), and carbon monoxide (CO) by county/jurisdiction federal information processing standards (FIPS) code and by source classification code (SCC), as required by EPA's regional offices for ozone planning efforts in the Hampton Roads area. DEQ staff also ran the MOVES model to develop emission estimates for onroad and nonroad sectors at the jurisdiction and SCC levels in the units of ozone season tons per day. DEQ recommends that EPA provide annual and ozone season tons per day values for all ozone planning areas by jurisdiction and SCC for 2016 as well as all projection years so that states may fully rely on this data set in ozone planning efforts.

As noted in the previous paragraphs, the amount of time and amount of effort spent on the compilation of these data sets are significant. These data sets could be useful for 2010 sulfur dioxide (SO₂) National Ambient Air Quality Standards (NAAQS) planning as well as future PM_{2.5} attainment planning and for other Clean Air Act (CAA) requirements. However, EPA's approach to determining what types of retirement or curtailments may be included within projection data is different for transport rules, where EPA has historically relied on the Integrated Planning Model (IPM) to determine which units will retire or will be turned down to zero activity and emissions in any future year, and other types of CAA mandates. In regional haze planning, for a state to retire or reduce the activity (and thus emissions) of a facility or unit in a future year usually requires that the projected change in emissions be federally enforceable. Some planning efforts, like those for the 2010 SO₂ NAAQS, require that certain retirements or other emission reduction activities not only be federally enforceable but also be adopted into a state's SIP. EPA should carefully consider the requirements for each type of planning exercise when developing these large sets of projection data and ensure that the projection data meet the requirements of as many of the upcoming or ongoing planning efforts as possible. EPA should

also review past determinations and, going forward, unify the requirements for retirement and other curtailments as much as possible across planning efforts and programs.

Again, thank you for this opportunity to participate in the emissions inventory and modeling development effort. Please do not hesitate to contact me or to contact the lead staff member noted for each sector with any questions you might have.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas R. Ballou", with a stylized flourish extending to the right.

Thomas R. Ballou
Manager, Air Data Analysis and Planning

Attachments (3)

cc: Ms. Alison Eyth, EPA (via e-mail)
Ms. Serpil Kayin, EPA (via e-mail)

Attachment 1: Comments on the 2016v2 Emissions Inventory by Sector

ONROAD COMMENTS:

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- SMOKE-MOVES spatial resolution is based on representative counties and temporal resolution on fuel month (ozone and non-ozone seasons). The representative county approach results in younger vehicle fleets than those in actual state Department of Motor Vehicle (DMV) data for individual counties, resulting in an under-prediction of emissions. In addition, the fuel month practice suppresses emissions of VOC and other gaseous pollutants in summer months. These effects are illustrated in the presentation provided in Attachment 2.
- The vehicle fleet age distribution in the 2016 base year was affected by the 2009 recession. However, EPA eliminated the impact of the recession in future year age distributions. DEQ supports this approach as a suitable methodology for future year estimates.
- For some states, the platform does not include county-specific variations in the age distributions for certain vehicle types which, due to the use of the representative county approach, effectively results in one age distribution for the entire state. Data in this category include vehicle class 41 (intercity bus) and 43 (school bus) for New Jersey (NJ), Ohio (OH), Texas (TX), Utah (UT), and West Virginia (WV). In addition, the lone age distribution for those states appears to be too smooth and is inconsistent with the data in most other states. The states affected appear to have supplied their own data to replace EPA's interstate highway system or DMV data. Mixing state-supplied data with county-specific data derived from regional efforts, such as Coordinating Research Council (CRC) projects, is a controversial practice because that procedure can favor some states and penalize others, especially in transport or source apportionment modeling.
- The age 30 bin fractions are much too high in some states. The fractions in all 31 bins must sum to one, so high fractions for the age 30 bin lower the fractions in other age bins, making vehicle fleets for the states in question too old and resulting in higher emissions in those states.
- There is no variation in the county-to-county or state-to-state age distributions for combination long-haul trucks (class 62), so there is only one age distribution for the 62 vehicle class for the entire continental United States. Is this appropriate? Is 62 the only vehicle type used to simulate extended idling on interstates?
- Similarly, age distributions for single unit long-haul trucks (vehicle class 53) also show no county or state variations for a great majority of states. However, the platform does show county-to-county variations for some states, e.g., Georgia (GA), Maine (ME),

Maryland (MD), New Hampshire (NH), New York (NY), North Carolina (NC), UT, and Vermont (VT). Reasons for these inconsistencies should be well documented in EPA's technical support document.

- Texas seems to have submitted its own data to replace EPA's regional data. In addition to creating the inconsistency mentioned above, data supplied by TX shows much younger fleets overall for several vehicle types, decreasing onroad emissions in TX as compared to those in other states.
- All five accumulative on-road activities are projected to increase in future years (growth factor greater than one): vehicle miles traveled (VMT), vehicle population (VPOP), hoteling, starts, and on-network idling (ONI). However, growth factors for a few state including GA, NC, OH, and Wisconsin (WI) are much lower than those for other states. Also, counties exist in GA, Illinois (IL), NC, and North Dakota (ND) with negative growth (growth factor less than one). The technical support document should fully describe how the growth factors were developed and what data sources were relied upon in their development.
- Extended idling for long-haul trucks (hotelings) is applied inconsistently among states. In some states, hoteling activity is confined to counties with interstate highways, while in other states such as Missouri (MO), IL, Indiana (IN), NC, and South Carolina (SC), that activity is included for every county, even those without interstates. If hoteling is intended to be specific to trucks traveling across states, that activity should stay close to interstates because truckers are unlikely to make a detour too far off highways to find resting spots.
- Temporal profiles (such as vehicle speed, hoteling hours, engine starts, VMT year-to-month, VMT month-to-week, VMT day-to-hour) were developed in CRC projects several years ago. Those profiles have been in use for the last two rounds of the National Emissions Inventory (NEI) and are now outdated. DEQ suggests looking into traffic count data collected by the Federal Highway Administration for developing updated profiles. Traffic count data is rich and advantageous because it is specific to year and county or grid cell.

NONPOINT

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- Residential, Commercial, and Institutional Stationary Source Fuel Combustion: For these source categories, emissions in the BY2016v2 modeling inventory differ significantly from those emission found in the 2017NEI. DEQ believes that this is the result of the BY2016v2 non-point stationary source fuel combustion emissions having been projected from 2014NEI emission estimates rather than having been back-cast from 2017NEI emission estimates.

- Example 1: The residential fuel combustion (SCC Level One: Stationary Source Fuel Combustion, SCC Level Two: Residential) emissions sector for Fairfax County, Virginia (FIPS 51059) was estimated to have 23.8 tons per year (tpy) of SO₂ in the 2017NEI but was estimated to have 213.7 tpy of SO₂ in the BY2016v2 modeling inventory.
- Example 2: The commercial fuel combustion (SCC Level One: Stationary Source Fuel Combustion, SCC Level Two: Commercial/Institutional) emissions sector for Fairfax County, Virginia (FIPS 51059) was estimated to be 22.1 tpy of SO₂ in the 2017NEI but was estimated to be 123.7 tpy of SO₂ in the 2016 v2 modeling inventory.

Residential, commercial/institutional, and industrial stationary fuel combustion non-point emissions estimates for other pollutants are also affected. DEQ recommends that 2016v2 non-point emission estimates for residential, commercial/institutional, and industrial stationary source fuel combustion for all pollutants in the BY2016v2 modeling inventory be back-cast from estimates contained in the 2017NEI. This approach will also affect projected emissions for future years in these three non-point sectors. DEQ recommends that EPA evaluate future year projections to ensure that these projections reflect reasonable estimates of activity and emissions, including state-supplied sulfur contents within the 2017 NEI.

- Solvent Sources: EPA's BY2016v2 modeling inventory solvent estimates appear to be based on default emission estimates taken from the EPA VCPy solvent estimation model. This model does not seem to account for local controls such as those adopted by Virginia in the Northern Virginia VOC Emissions Control Area (ECA). Virginia's 2014NEI and 2017NEI non-point solvent emission estimates were developed almost entirely in-house using locally collected activity data. Additionally, Virginia's 2014NEI and 2017NEI estimates account for local controls adopted by Virginia. Table 1 shows a comparison of the VOC emissions from the SCC Level One: Solvent Utilization sectors for the jurisdictions in the Northern Virginia ECA estimated in the 2014NEI, the BY2016v2 modeling inventory, and the 2017NEI. The Northern Virginia ECA is one of the areas in Virginia where DEQ has implemented multiple control programs over the years to control VOC emissions from various nonpoint categories. Table 1 also provides the difference between the 2014 NEI and BY2016v2 estimates and the difference between the BY2016v2 and 2017NEI estimates.

Table 1: Northern Virginia ECA SCC Solvent Comparison: 2014NEI, BY2016v2, 2017NEI

FIPS	Pollutant	2014 NEI, tpy	BY2016v2 – 2014 NEI	BY2016v2, tpy	BY2016v2 – 2017NEI	2017 NEI, tpy
51013	VOC	1,336.2	239.6	1,575.7	340.0	1,235.7
51059	VOC	7,030.8	1,828.1	8,858.9	2,576.9	6,282.0
51107	VOC	2,371.6	410.2	2,781.2	572.2	2,209.6
51153	VOC	2,690.7	413.2	3,104.0	659.9	2,444.1
51179	VOC	843.6	147.0	990.7	105.4	885.3
51510	VOC	982.7	173.9	1,156.7	296.5	860.1
51600	VOC	225.8	120.1	345.8	162.0	183.8

FIPS	Pollutant	2014 NEI, tpy	BY2016v2 – 2014 NEI	BY2016v2, tpy	BY2016v2 – 2017NEI	2017 NEI, tpy
51610	VOC	103.3	82.9	186.2	103.1	83.1
51683	VOC	285.4	55.9	341.3	69.0	272.2
51685	VOC	95.0	27.5	122.5	38.2	84.3

Table 1 shows that for the jurisdictions in the Northern Virginia ECA, significant differences exist between the 2014NEI, BY2016v2 inventory, and 2017NEI data sets.

Table 2 provides some SCC Level 2 descriptions for Fairfax County under the Solvent Utilization sector. The table shows that the SCCs between the 2014NEI, BY2016v2 inventory, and the 2017NEI are somewhat inconsistent and that for certain level 2 sectors, significant differences exist in VOC estimates. For example, Virginia submitted degreasing emissions to the 2017NEI. The EPA 2017 Wagonwheel Solvent Tool also appears to estimate degreasing emissions. Table 2 shows that degreasing emissions are absent from the BY2016v2 data. Additionally, Virginia did not provide emissions defined as "paint strippers" for Virginia's 2017NEI submission. However, as shown in Table 2, the category "paint strippers" has significant emissions in the BY2016v2 data.

Table 2: Fairfax County (51059) VOC Emissions from SCC Level 1: Solvent Utilization from the 2014NEI, 2016v2 inventory, and 2017NEI

SCC Level 2	2014NEI, tpy	2016v2- 2014NEI	2016v2, tpy	2016v2- 2017NEI	2017NEI, tpy
Degreasing	388.9	---	Not Listed	---	115.9
Dry Cleaning	Not Listed	17.5	17.5	7.9	9.6
Graphic Arts	102.7	551.5	654.2	589.3	64.9
Miscellaneous Nonindustrial: Commercial	230.5	364.1	594.7	89.3	505.3
Miscellaneous Non-industrial: Consumer and Commercial	4,676.3	611.0	5,287.3	1,005.6	4,281.7
Paint Strippers	not listed	not listed	1,115.3	---	not listed
Surface Coating	1,632.3	-442.4	1,190.0	-114.6	1,304.5

DEQ recommends that EPA back-cast the 2017NEI emissions to 2016 for the BY2016v2 modeling inventory for all SCC Level 1 solvent source categories for all jurisdictions in Virginia. Further, DEQ recommends that this back-casted data be the basis for all projection years for these emission categories.

COMMERCIAL MARINE VESSELS

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- For emissions from SCCs in the commercial marine vessel (CMV) sector, emissions estimates for all criteria air pollutants differ significantly between BY2016v2 information and 2017NEI information. Table 3 provides a comparison of NO_x emissions by CMV SCC for jurisdictions in Virginia. Note that emissions less than 0.005 are rounded down to 0.00 in this chart. While the Virginia-wide totals (equivalent to 5,985.09 tpy in the BY2016v2 inventory and 6,085.93 tpy in the 2017NEI) are similar, large differences exist at the jurisdictional levels. The reasons for these differences are unclear.

Table 3: NO_x Estimates for Virginia Jurisdictions from CMV SCCs, BY2016v2 and 2017NEI

Jurisdiction FIPS	Jurisdiction Name	SCC	BY2016v2 NO_x, tpy	2017NEI NO_x, tpy	2017NEI – BY2016v2
51199	York County	2280002202	23.94	1,201.39	1,177.45
51073	Gloucester County	2280002202	1,218.66	60.64	-1,158.02
51800	Suffolk City	2280002202	189.75	1.48	-188.27
51710	Norfolk City	2280002202	961.85	785.50	-176.35
51181	Surry County	2280002202	6.00	130.10	124.09
51700	Newport News City	2280002202	27.67	146.14	118.47
51095	James City County	2280002202	187.14	72.51	-114.63
51650	Hampton City	2280002202	246.67	137.36	-109.31
51710	Norfolk City	2280002201	282.26	181.88	-100.39
51099	King George County	2280002202	3.32	94.80	91.48
51199	York County	2280002201	5.33	79.08	73.75
51133	Northumberland County	2280002201	92.79	30.92	-61.87
51650	Hampton City	2280002102	58.14	6.73	-51.42
51073	Gloucester County	2280002201	62.61	13.00	-49.61
51001	Accomack County	2280002201	30.57	72.30	41.73
51810	Virginia Beach City	2280002202	452.00	412.59	-39.42
51710	Norfolk City	2280002102	125.08	161.95	36.87
51700	Newport News City	2280002201	20.10	56.25	36.15
51181	Surry County	2280002201	5.34	40.37	35.03
51550	Chesapeake City	2280002202	112.74	83.36	-29.38
51095	James City County	2280002201	98.66	70.35	-28.31
51800	Suffolk City	2280002201	28.44	0.89	-27.55
51115	Mathews County	2280002201	67.10	40.79	-26.31
51650	Hampton City	2280002101	25.69	0.01	-25.68
51131	Northampton County	2280002201	81.34	57.56	-23.77
51153	Prince William County	2280002202	0.04	21.57	21.53
51510	Alexandria City	2280002202	0.12	20.45	20.33
51133	Northumberland County	2280002202	66.91	47.06	-19.85
51059	Fairfax County	2280002202	19.82	0.65	-19.17
51710	Norfolk City	2280002101	18.74	35.90	17.16
51001	Accomack County	2280002202	78.50	93.25	14.74
51193	Westmoreland County	2280002202	23.29	9.42	-13.86
51041	Chesterfield County	2280002201	52.47	38.88	-13.59
51193	Westmoreland County	2280002201	20.02	6.86	-13.16
51700	Newport News City	2280002102	99.59	112.24	12.65
51036	Charles City County	2280002201	7.46	18.16	10.70
51013	Arlington County	2280002202	9.95	0.00	-9.95
51115	Mathews County	2280002202	121.84	112.94	-8.90
51700	Newport News City	2280002101	3.45	12.27	8.82
51041	Chesterfield County	2280002202	13.97	5.30	-8.67
51036	Charles City County	2280002202	2.38	9.83	7.46
51131	Northampton County	2280002202	43.64	36.97	-6.67
51087	Henrico County	2280002201	11.71	16.96	5.25
51149	Prince George County	2280002201	49.59	45.26	-4.33
51013	Arlington County	2280002201	4.06	0.00	-4.06
51550	Chesapeake City	2280002201	39.10	35.09	-4.02
51119	Middlesex County	2280002201	8.59	12.52	3.92
51103	Lancaster County	2280002201	20.39	16.68	-3.71
51093	Isle of Wight County	2280002202	15.10	18.25	3.15
51810	Virginia Beach City	2280002102	252.77	255.80	3.03

Jurisdiction FIPS	Jurisdiction Name	SCC	BY2016v2 NOx, tpy	2017NEI NOx, tpy	2017NEI – BY2016v2
51153	Prince William County	2280002201	0.02	2.38	2.36
51119	Middlesex County	2280002202	46.71	44.43	-2.28
51159	Richmond County	2280002202	4.37	2.47	-1.90
51057	Essex County	2280002202	1.62	2.94	1.32
51093	Isle of Wight County	2280002201	9.56	10.88	1.32
51159	Richmond County	2280002201	2.11	0.88	-1.23
51650	Hampton City	2280002201	118.44	117.62	-0.82
51059	Fairfax County	2280002201	1.57	0.78	-0.79
51810	Virginia Beach City	2280002201	319.66	318.93	-0.73
51510	Alexandria City	2280002201	0.03	0.62	0.59
51099	King George County	2280002201	2.72	2.14	-0.58
51101	King William County	2280002201	0.81	0.26	-0.55
51057	Essex County	2280002201	0.34	0.84	0.50
51087	Henrico County	2280002202	6.60	7.07	0.47
51097	King and Queen County	2280002201	0.15	0.60	0.45
51127	New Kent County	2280002201	0.12	0.46	0.34
51073	Gloucester County	2280002102	16.05	16.37	0.33
51131	Northampton County	2280002102	23.24	23.50	0.26
51107	Loudoun County	2280002202	0.11	0.34	0.23
51149	Prince George County	2280002202	9.42	9.65	0.22
51830	Williamsburg City	2280002202	0.61	0.45	-0.16
51101	King William County	2280002202	0.86	0.72	-0.14
51097	King and Queen County	2280002202	0.02	0.14	0.12
51149	Prince George County	2280002102	2.24	2.35	0.11
51810	Virginia Beach City	2280002101	4.60	4.68	0.08
51127	New Kent County	2280002202	0.08	0.16	0.08
51033	Caroline County	2280002202	0.09	0.02	-0.07
51179	Stafford County	2280002202	1.95	2.00	0.05
51103	Lancaster County	2280002202	10.45	10.41	-0.04
51131	Northampton County	2280002101	1.24	1.27	0.03
51149	Prince George County	2280002101	0.46	0.47	0.01
51033	Caroline County	2280002201	0.01	0.00	-0.01
51830	Williamsburg City	2280002201	0.00	0.00	0.00
51047	Culpeper County	2280002202	0.01	0.01	0.00
51107	Loudoun County	2280002201	0.00	0.00	0.00
51133	Northumberland County	2280002102	0.03	0.03	0.00
51179	Stafford County	2280002201	0.35	0.35	0.00
51003	Albemarle County	2280002201	0.02	0.02	0.00
51175	Southampton County	2280002202	0.01	0.01	0.00
51073	Gloucester County	2280002101	0.02	0.02	0.00
51133	Northumberland County	2280002101	0.01	0.01	0.00
51003	Albemarle County	2280002202	0.01	0.01	0.00
51730	Petersburg City	2280002202	0.00	0.00	0.00
51047	Culpeper County	2280002201	0.00	0.00	0.00
51177	Spotsylvania County	2280002202	0.00	0.00	0.00
51730	Petersburg City	2280002201	0.00	0.00	0.00
51175	Southampton County	2280002201	0.00	0.00	0.00
51800	Suffolk City	2280002102	0.10	---	-0.10
51800	Suffolk City	2280002101	0.59	---	-0.59
51760	Richmond City	2280002202	---	0.43	0.43
51760	Richmond City	2280002201	---	0.13	0.13
51760	Richmond City	2280002102	---	1.00	1.00

Jurisdiction FIPS	Jurisdiction Name	SCC	BY2016v2 NO _x , tpy	2017NEI NO _x , tpy	2017NEI – BY2016v2
51760	Richmond City	2280002101	---	0.01	0.01
51740	Portsmouth City	2280002202	---	426.52	426.52
51740	Portsmouth City	2280002201	---	112.38	112.38
51740	Portsmouth City	2280002102	---	5.72	5.72
51740	Portsmouth City	2280002101	---	1.38	1.38
51735	Poquoson City	2280002202	---	10.83	10.83
51735	Poquoson City	2280002201	---	17.49	17.49
51670	Hopewell City	2280002202	---	0.62	0.62
51670	Hopewell City	2280002201	---	2.85	2.85
51177	Spotsylvania County	2280002201	---	0.00	0.00
51087	Henrico County	2280002102	0.97	---	-0.97
51087	Henrico County	2280002101	0.01	---	-0.01
---	---	TOTALS:	5,985.09	6,085.93	100.84

- Table 4 provides a summary of NO_x emissions from CMV in the mid-Atlantic and Northeastern states. Differences of 200 tpy or more exist between NJ, NY, and WV CMV estimates.

Table 4: CMV NO_x Emissions by States

States FIPS	State Abbreviation	2016v2 NO _x , tpy	2017 NEI NO _x , tpy	2017 NEI – 2016v2
34	NJ	9,060.02	6,753.11	-2,306.92
09	CT	1,733.88	1,636.05	-97.83
33	NH	210.34	153.52	-56.83
50	VT	1.04	5.93	4.89
11	DC	162.09	194.31	32.22
25	MA	4,119.26	4,165.55	46.30
10	DE	1,095.11	1,152.84	57.74
51	VA	5,985.09	6,085.93	100.84
23	ME	2,536.03	2,649.51	113.48
24	MD	3,859.05	3,981.74	122.69
37	NC	3,693.52	3,820.70	127.18
42	PA	1,650.49	1,792.46	141.97
44	NH	1,328.37	1,500.53	172.16
54	WV	1,706.03	2,189.42	483.40
36	NY	4,803.57	7,302.62	2,499.05
---	TOTALS:	41,943.88	43,384.21	1,440.34

- DEQ requests that EPA provide their rationale for the reallocation of CMV emissions to jurisdictions within Virginia between the BY2016v2 and the 2017NEI inventories as shown in Table 3. DEQ also requests that EPA provide their rationale for the state level differences shown in Table 4. If EPA does not update the CMV BY2016v2 inventory to reflect more closely the 2017NEI, DEQ requests that EPA provide a detailed explanation as to why such large differences exist between the two data sets within each data set's documentation.

Important to note is that many of the jurisdictions within Virginia that are impacted by this reallocation of emissions are in the Hampton Roads maintenance area, which will be

submitting a full second maintenance plan for the 1997 ozone NAAQS. This second maintenance plan will contain 2023 and 2032 emissions estimates from the BY2016v2 emissions inventory platform as part of the maintenance demonstration and will rely heavily on these inventories as well as the supporting documentation. Providing a clear understanding of the impact of CMV emissions on each of the Hampton Roads jurisdictions within the data set documentation will facilitate the maintenance plan approval process.

POINT SOURCES, ELECTRICAL GENERATING UNITS

DEQ Staff Contact: Doris McLeod, Doris.McLeod@deq.virginia.gov, 804-659-1990

- The 2023 IPM parsed file (Parsed File EPA v6 Summer 2021 Reference Case 2023.xlsx) and the 2030 IPM parsed file (Parsed File EPA v6 Summer 2021 Reference Case 2030.xlsx) show the coal steam units at Clover (ORIS 7213, Unit ID 1 and Unit ID 2) having no emissions. DEQ has no supporting data to show this facility will be put into cold storage or otherwise retire from service. At this time these units are not listed on the PJM deactivation listing (<https://www.pjm.com/planning/services-requests/gen-deactivations>), and all permits for the facility are active. DEQ recommends that this unit be supplied reasonable levels of activity and emissions in the future years projected as part of the BY2016v2 modeling inventory.
- The 2023 parsed file contains a number of biomass retirements, including Hopewell Power Station (ORIS 10771), Altavista Power Station (10773) and Southampton Power Station (10774). These units are not required to retire until 12/31/2028 per the Virginia Clean Economy Act. DEQ has no supporting data to show these facilities will be retired prior to that date. At this time these units are not included on the PJM deactivation listing, and all permits for the units are active. DEQ recommends that these units be supplied reasonable levels of activity and emissions in the future years projected as part of the BY2016v2 modeling activity until 12/31/2028.
- The 2023 and 2030 parsed files contain a significant number of landfill gas (LFG) retirements. The ORIS codes affected include, but are not limited to 56693 (Virginia Beach Landfill), 56686 (King & Queen Landfill), 54781 (Suffolk Energy Partners), 56681 (Amelia Landfill), and 57018 (Waste Management/MidPenn). These units usually burn other types of fuels, generally distillate fuel oils, which is allowed by federal guidance. This practice of using supplemental fuels is unlikely to stop. These units are often part of LFG collection and control systems required by New Source Performance Standards (NSPS) under 40 CFR Part 60 and Maximum Achievable Control Technology (MACT) standards under 40 CFR Part 63. It is unlikely these units will retire by 2023 because the units are needed to control the LFG. Also, owners and end users may receive tax credits for the consumption of LFG as fuel. DEQ recommends that reasonable activity and emissions be assigned to the LFG units in all future years unless other documentation exists to corroborate the units' retirement.

- The 2023 and 2030 parsed files also contain a number of new LFG plants. Since new municipal solid waste landfills require significant permitting activity and are relatively controversial developments, the likelihood of new landfills being built that could generate enough LFG to power additional LFG (gas to energy) operations is unlikely. DEQ recommends removing all new LFG operations from the projection year estimates.
- The IPM results for 2023 and 2030 include projected emission estimates for units located at the RockTenn Hopewell facility (ORIS 50813) and the RockTenn Covington facility (ORIS 50900). These units are power boilers and recovery furnaces at kraft paper mills. The power boiler units primarily supply steam to the facility operations, combust noncondensable gases to comply with NSPS and MACT requirements, and for some units attached to generators supply power to the facility. The recovery furnaces combust black liquor to recover chemicals and provide steam for the krafting process. The krafting process cannot operate without power boilers and recovery furnaces. At this time, DEQ does not know of any pending retirements for these units. Also, DEQ currently does not know of any fuel switches being contemplated by these facilities. DEQ recommends that emissions for these units in projection years be set equivalent to data supplied by DEQ to EPA in the 2020 emissions inventory for point sources.
- The IPM results for 2023 and 2030 show 12 megawatts (MW) of offshore wind capacity. However, by 2026, Virginia should have more than 2,600 MW of offshore wind capacity in place and operating from the [Coastal Virginia Offshore Wind](https://coastalvawind.com/)¹ project. The Bureau of Ocean Energy Management (BOEM) [announced on July 1, 2021](https://www.boem.gov/renewable-energy/state-activities/CVOW-C), that it will publish a Notice of Intent (NOI) to prepare an environmental impact Statement for this project.² Additionally, another project, the [Kitty Hawk Wind Project](https://www.kittyhawkoffshore.com), will also be supplying power to Virginia.³ BOEM [announced on July 30, 2021](https://www.boem.gov/renewable-energy/state-activities/kitty-hawk-offshore-wind), that it will publish an NOI to prepare an environmental impact statement for this project.⁴ These projects support the [Virginia Clean Economy Act](https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1526), which declares 5,200 MW of offshore wind to be in the public interest.⁵ For the 2030 IPM results, these projects should be included as offshore wind production that feeds Virginia's power grid.

¹ URL: <https://coastalvawind.com/>

² URL: <https://www.boem.gov/renewable-energy/state-activities/CVOW-C>

³ URL: <https://www.kittyhawkoffshore.com>

⁴ URL: <https://www.boem.gov/renewable-energy/state-activities/kitty-hawk-offshore-wind>

⁵ URL: <https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1526>

POINT SOURCES – NON ELECTRICAL GENERATING UNITS

DEQ Staff Contact: Doris McLeod, Doris.McLeod@deq.virginia.gov, 804-659-1990

- Based on a review of the file
ptnonipm_facility_16_17_18_19_21_23_26_32_comp_29sep2021.xlsx (ptnonipm file),
DEQ recommends the following changes to the inventories:
 - SO₂ Emissions:
 - Lhoist North America – Kimballton, Emissions Inventory System (EIS) facility number 4184511: This facility has 2,266 tons per year (tpy) of projected SO₂ emissions in 2021; 972 tpy projected SO₂ emissions in 2023; 1,001 tpy projected SO₂ emissions in 2026; and 1,001 tpy projected SO₂ emissions in 2032. However, the facility is part of a 2010 SO₂ NAAQS nonattainment area. The facility will be subject to a source specific permit that limits emissions so that the area will come into compliance with the 2010 SO₂ NAAQS. Emissions of SO₂ above 500 tpy are highly unlikely. Emissions of SO₂ for 2018, 2019, and 2020 were 499 tpy, 484 tpy, and 356 tpy respectively. DEQ recommends that all future year SO₂ emissions be capped at no more than 500 tpy.
 - Jewell Coke Company, EIS facility number 4034811: This facility has a federally enforceable limitation of 5,086 tpy on the facility wide potential to emit of SO₂. DEQ recommends that any future year projection be capped at that rate.
 - Radford Army Ammunition Plant, EIS facility number 5748611: The 2021 projections for this plant do not reflect the retirement of the coal fired units, which were replaced with natural gas fired boilers. DEQ recommends that the 2021 SO₂ projections for this facility be less than 5 tpy.
 - Huntington Ingalls, EIS facility number 4938811: The 2021 projections for this plant do not reflect the switch to natural gas from residual oil that the facility undertook. DEQ recommends that the 2021 SO₂ projections from this facility be set no higher than 1 tpy.
 - NO_x Emissions:
 - Radford Army Ammunition Plant, EIS facility number 5748611: The 2021 projections for this plant do not reflect the retirement of the coal fired units, which were replaced with natural gas fired boilers equipped with low NO_x burners. DEQ recommends that the 2021 NO_x projections for this facility be set at 101 tpy, the facility's NO_x emissions rate in 2020.

- Huntington Ingalls, EIS facility number 4938811: The 2021 projections for this plant do not reflect the switch to natural gas from residual oil that the facility undertook. DEQ recommends that the 2021 NO_x projections from this facility be set no higher than 40 tpy.
- Based on a review of the file
ptoilgas_facility_16_17_18_19_21_23_26_32_comp_29sep2021.xlsx (ptoilgas file), DEQ recommends the following changes to the inventories:
 - Transco 165, EIS facility number 4005411: This facility received a permit on January 28, 2020, to install two turbines. The permit is included as Attachment 3 to this submission. These turbines are controlled by selective catalytic reduction and oxidation catalyst. The permit requires that ten of the eleven engines located at the site retire. The startup date of the new turbines was January 1, 2021. Based on the limitations in this permit, the two new turbines and the remaining engine will have a combined potential to emit of about 107 tpy of NO_x. Therefore, DEQ recommends that for 2023, 2026, and 2032, the NO_x emissions from this facility be set at 107 tpy.
 - Transco 180, EIS facility number 7667111: This facility has submitted an application, dated November 12, 2021, for the retirement of 14 engines and the replacement of these engines with two new combustion turbines. While this process has not yet completed, the potential to emit of the facility after these changes is expected to be approximately 70 tpy of NO_x. Therefore, DEQ recommends that for 2023, 2026, and 2032, the NO_x emissions from this facility be set at 70 tpy

**Attachment 2: Critical Review of Mobile Source Inventory Data in EPA 2016v1 and
2016v2 Modeling Platforms**

Critical Review of Mobile Source Inventory Data in EPA 2016v1 and 2016v2 Modeling Platforms

Virginia Department of Environmental Quality

December 13, 2021

1

Emission and MOVES Versions (in Chronological Order)

- 2015 – 2016: **2014NEI** in development
- 2018 – 2019: **non-NEI** 2016 platform began (beta version)
- 2018 August: MOVES2014b released (a minor update to MOVES2014a)
- 2018 – 2019: **2017NEI** in development
- 2020: **2016v1 continued, 2016v2 in development**
- 2020 November: MOVES3 released (a major update to MOVES2014b)
- 2021 March: MOVES3.0.1 (a patch to MOVES3)
- 2021 September: MOVES3.0.2 (another patch)
- 2021 – 2022: **2020NEI** in development

Major difference between 2016v1 and 2016v2 is MOVES version (from MOVES2014b to MOVES3)

SMOKE-MOVES

- **SMOKE-MOVES, not MOVES, is the tool used by EPA to process onroad mobile source emissions for National Emission Inventory (NEI) and photochemical modeling for policy making**
- **Resolution for SMOKE-MOVES is representative county **spatially** and two (ozone season and non-ozone season) fuel months **temporally****
- **SMOKE-MOVES is a complicated modeling framework consisting of a suite of pre-processing (for MOVES), MOVES, post-processing (for SMOKE), and SMOKE**
- **Extensive and excessive computation is involved in the process**
- **Currently only EPA's contractors know how to run SMOKE-MOVES correctly**
- **No states have ever done SMOKE-MOVES**
- **Modeling inputs and outputs are all generated by EPA's contractors**
- **Available data posted by EPA represents only SMOKE portion of SMOKE-MOVES**
- **MOVES portion of SMOKE-MOVES is unknown (a black box)**
- **Massive amount of data have been generated but left unanalyzed over the years**
- **Control measures or strategies involving mobile sources by RPO/MJO therefore resort to "across-the-board" cut**

Why Consistency Matters

- **Inconsistencies are the result of ambiguous or insufficient guidelines for data gathering and not because of better local data collected by states**
 - **Vehicle splits: 31/32, 52/53, 61/62 (MOVES design issue)**
 - **Extended idling (changing methodologies over past 5 years)**
 - **Speed profiles and VMT temporal profiles (few sources for suitable data prior to 2014NEI)**
- **Inconsistent emission inventory results propagate into air quality modeling, often amplifying questionable data**
- **Contribution-to-monitor type of air quality modeling that includes inconsistencies unfairly favors some states while targeting other states**
- **Inconsistency must be corrected by either implementing the same methodologies across the board or revising MOVES internal design**

Clear unambiguous guidelines will help alleviate the problems

Representative County Approach

In SMOKE-MOVES, the role which **age distribution plays is not entirely clear (it's one of the factors used in representative county grouping)**

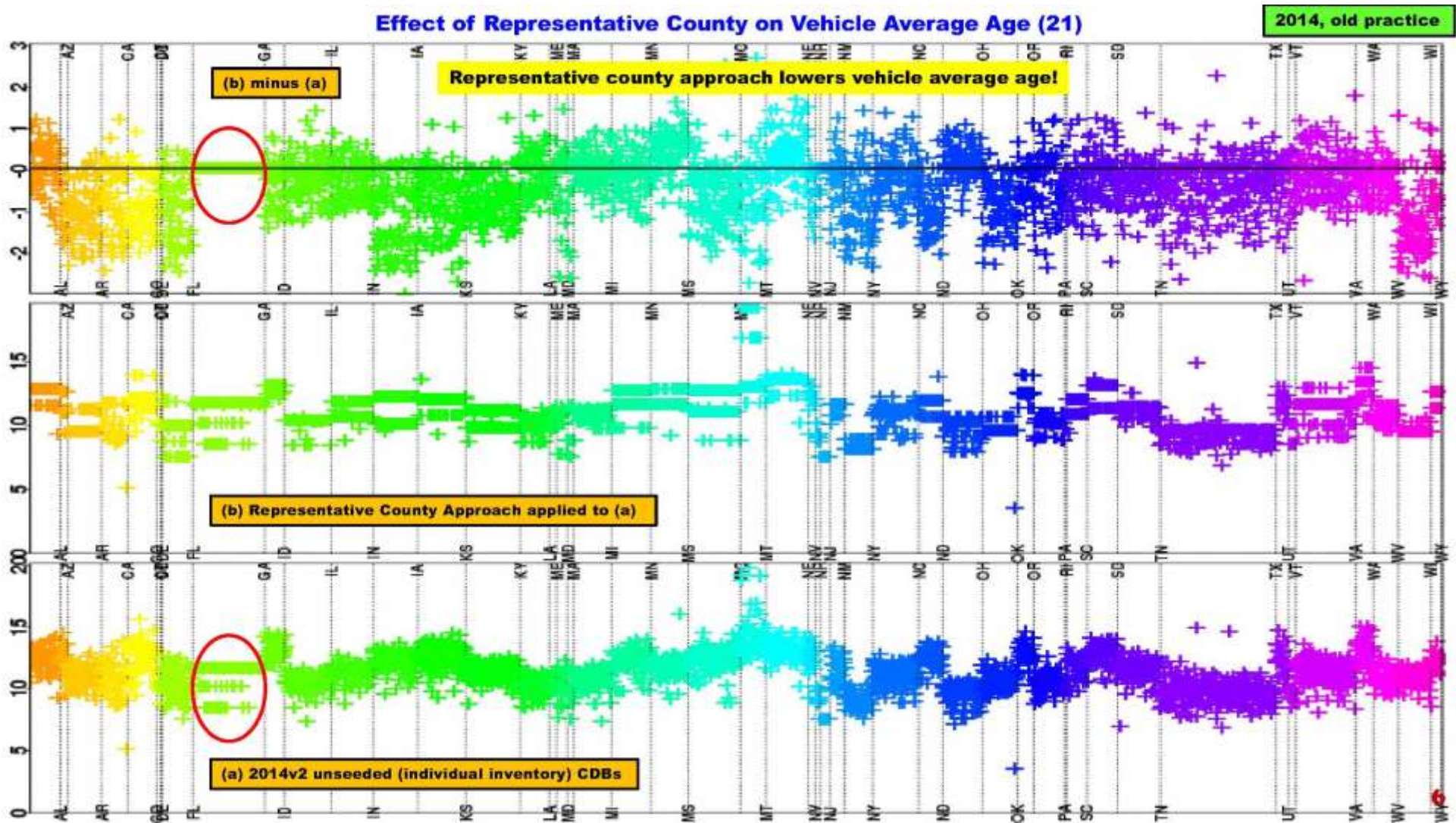
Grouping Criteria:

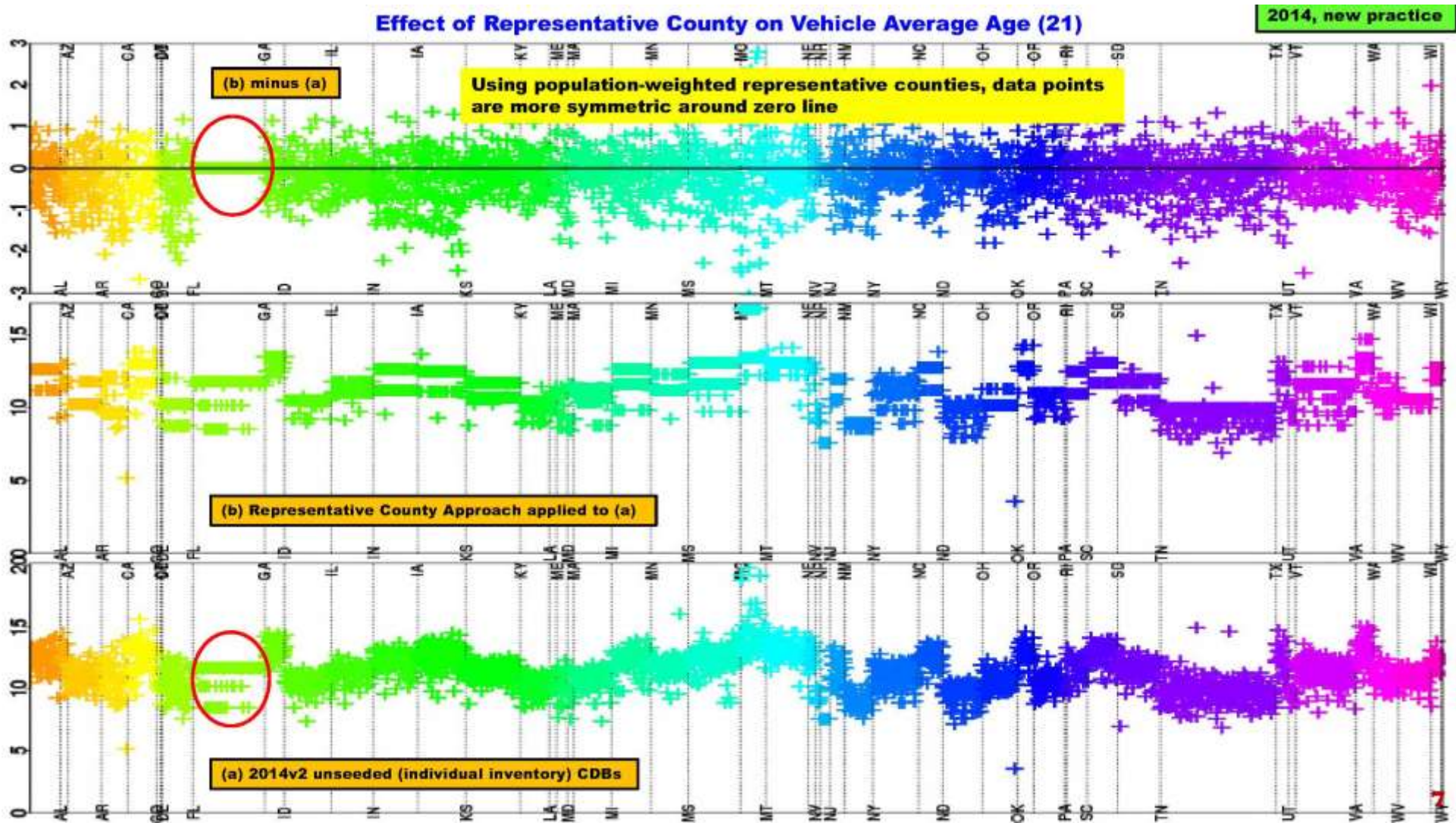
**Fleet age distribution
Fuel properties
Control programs
Others (Extended idling)**

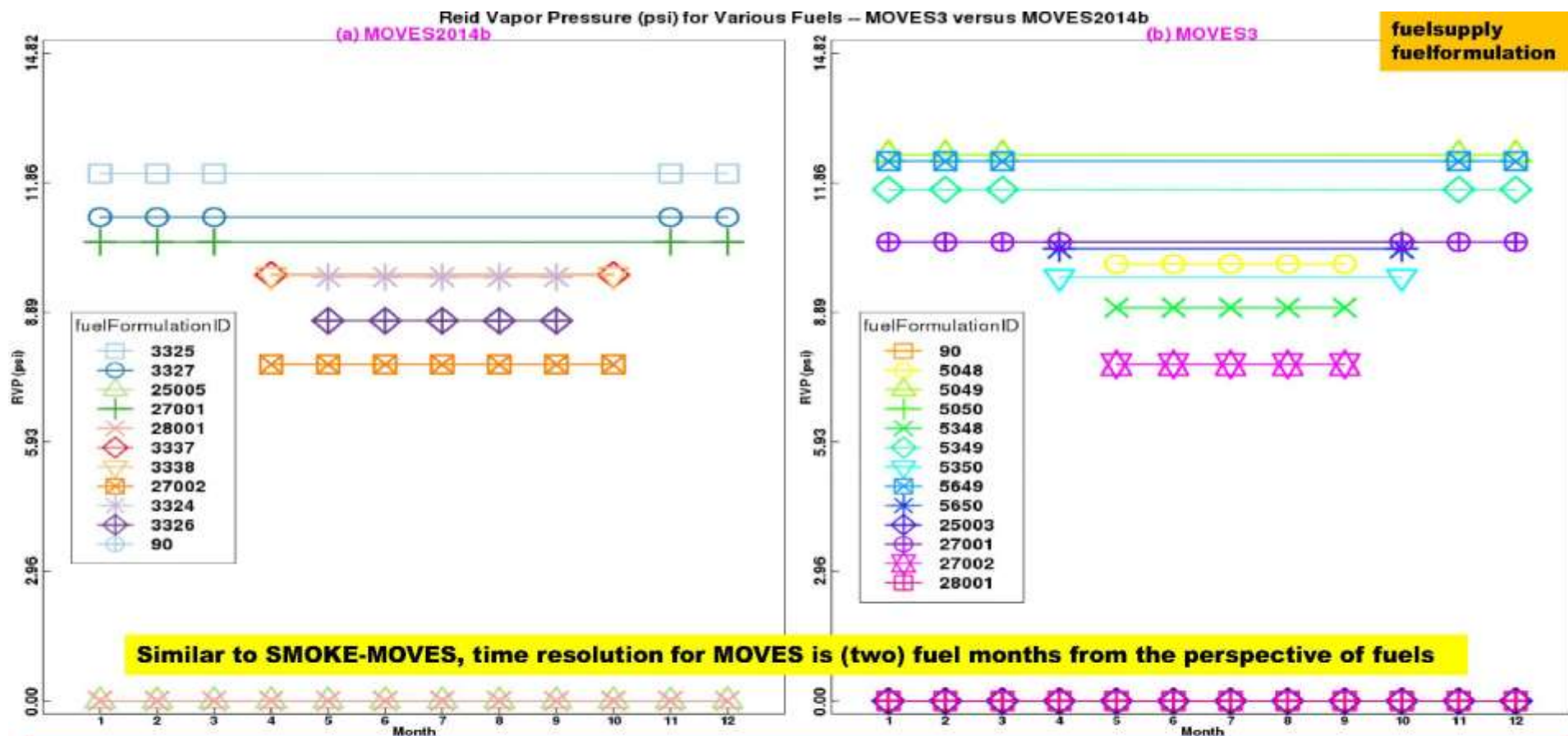
In inventory mode, age distribution is one of the most important parameters affecting onroad emissions. For SMOKE-MOVES, the impact of age distribution is hidden or embedded in emission factor (lookup) tables

Prior to 2014 NEI, the representative county approach had used data properties of the county with the highest VMT to represent a group of inventory counties (“old” practice)

Starting from 2014 NEI, EPA has revised the practice and used “population-weighted” age distributions (“new” practice) to represent a group of counties. No other change was made to representative county approach

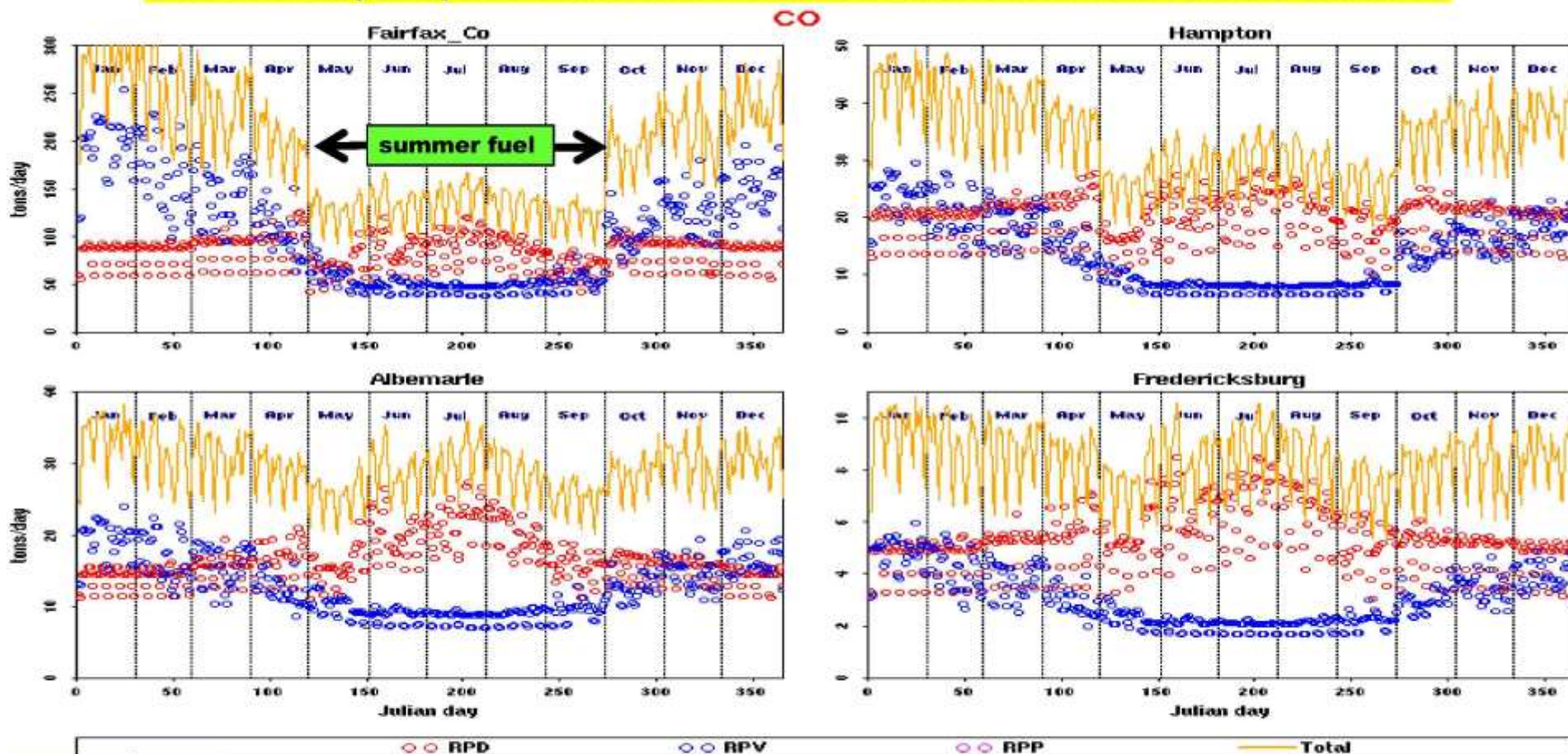






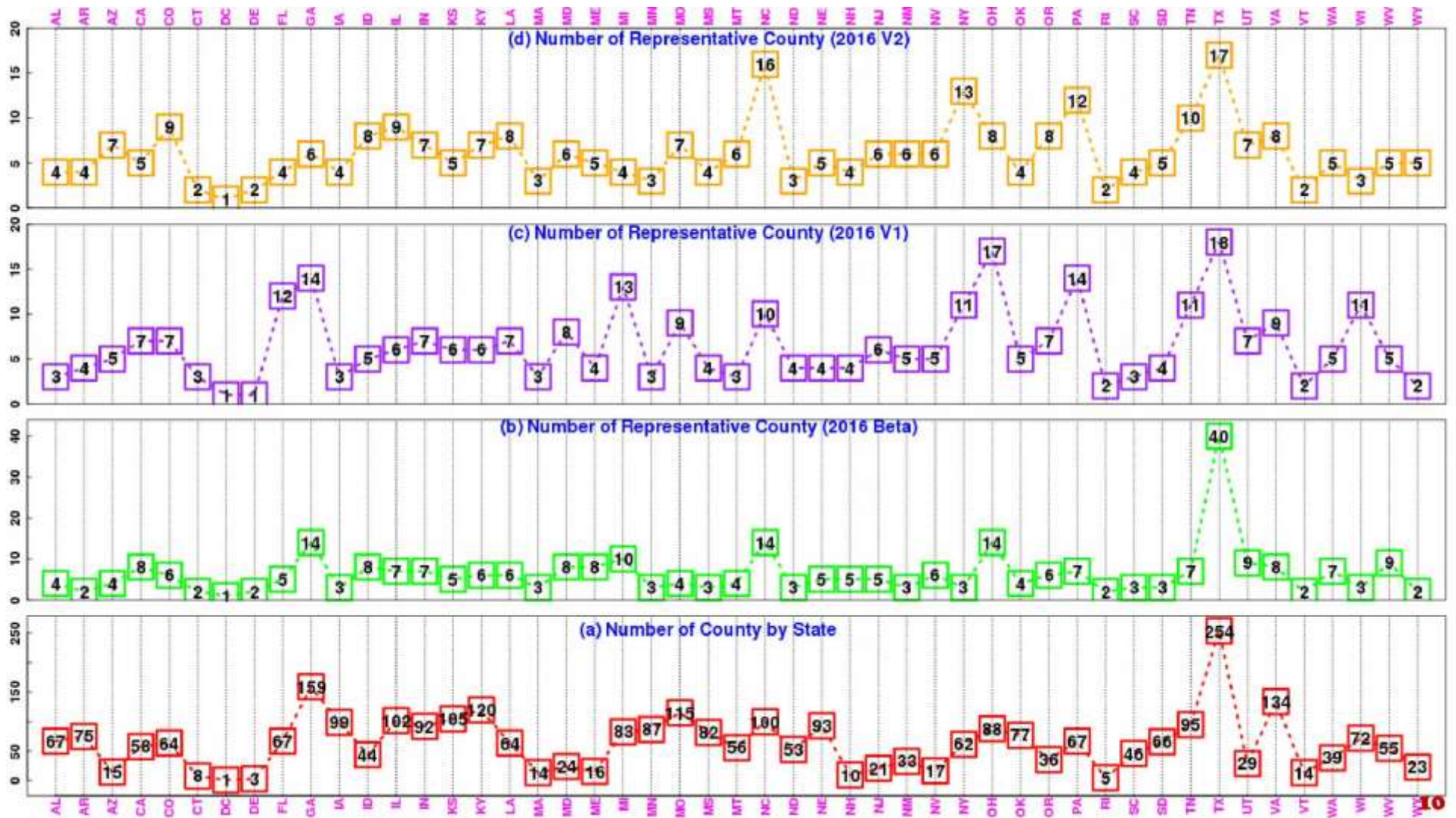
- This figure was made by combining data from fuelsupply and fuelformulation tables. It is for year 2016 and regionID 100000000 only;
- RVP for non-gasoline fuels (diesel, CNG, electricity) is zero;
- Gasoline/ethanol fuels generally are grouped into summer fuels and winter fuels (plus or minus shoulder months);
- RVP for winter fuels > RVP for summer fuels

VA 2011 Daily Temporal Profiles for Vehicular CO Emissions for Four Selected Counties

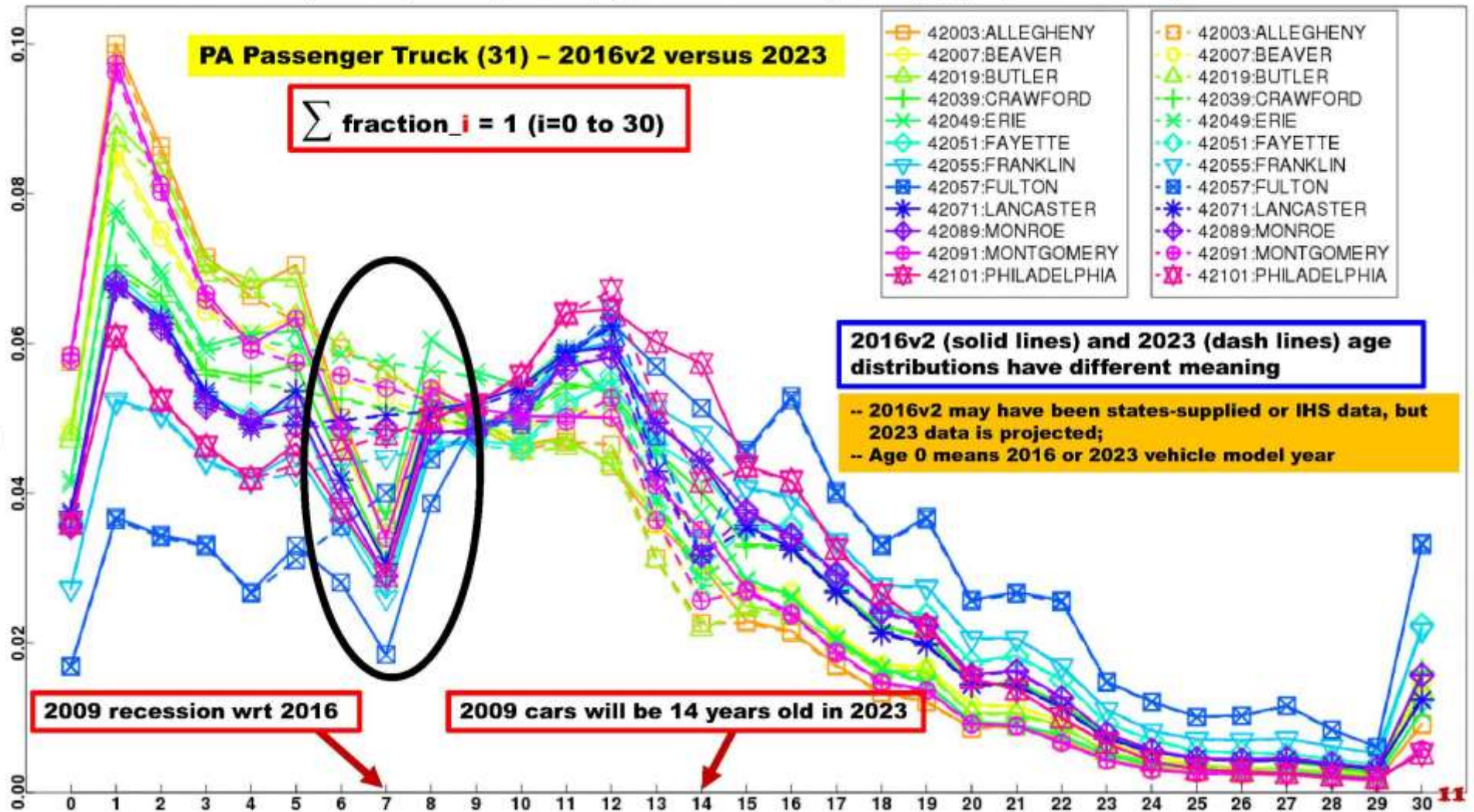


This plot was
made in July 2013

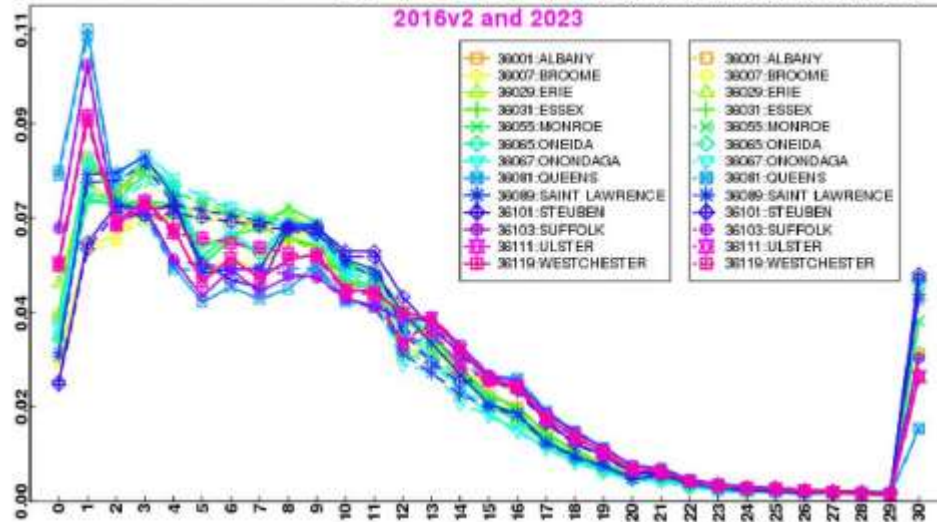
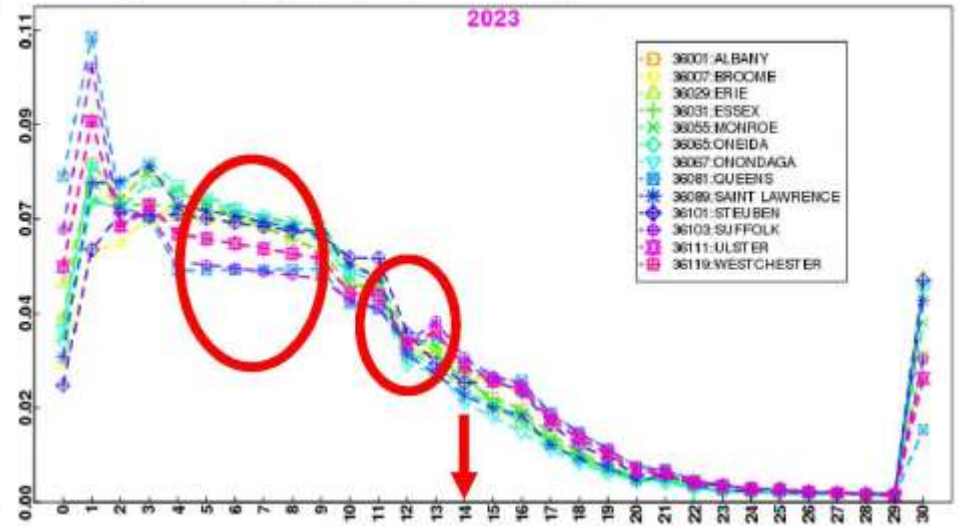
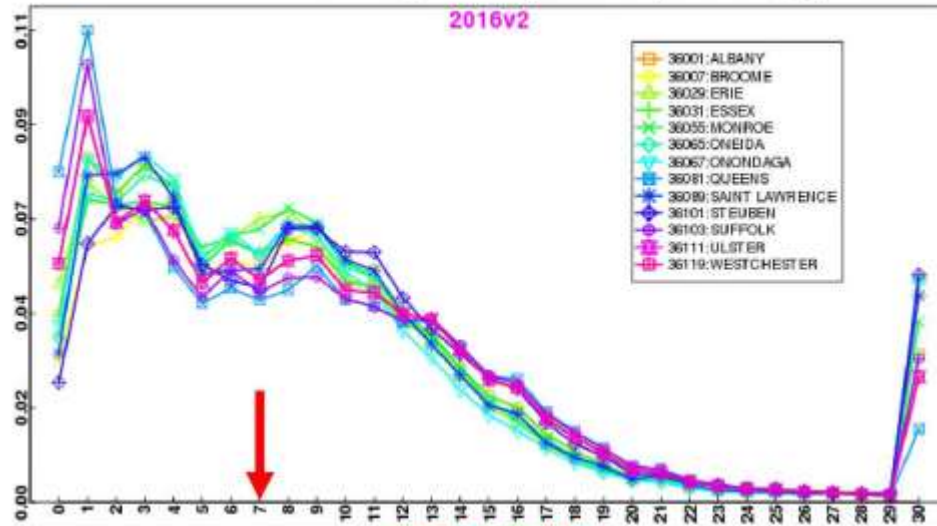
-- Daily profiles by county show diurnal variations. RPP sector (VOCs only) does not contribute to CO;
-- Discontinuity due to two fuel months starts to diminish as county emissions get smaller
(Fairfax → Hampton → Albemarle → Fredericksburg).



2016v2 (solid lines) and 2023 (dash lines) Age Fractions for Passenger Truck (31) by Representative County in PA



2016v2 (solid lines) and 2023 (dash lines) Age Fractions for Passenger Truck (21) by Representative County in NY

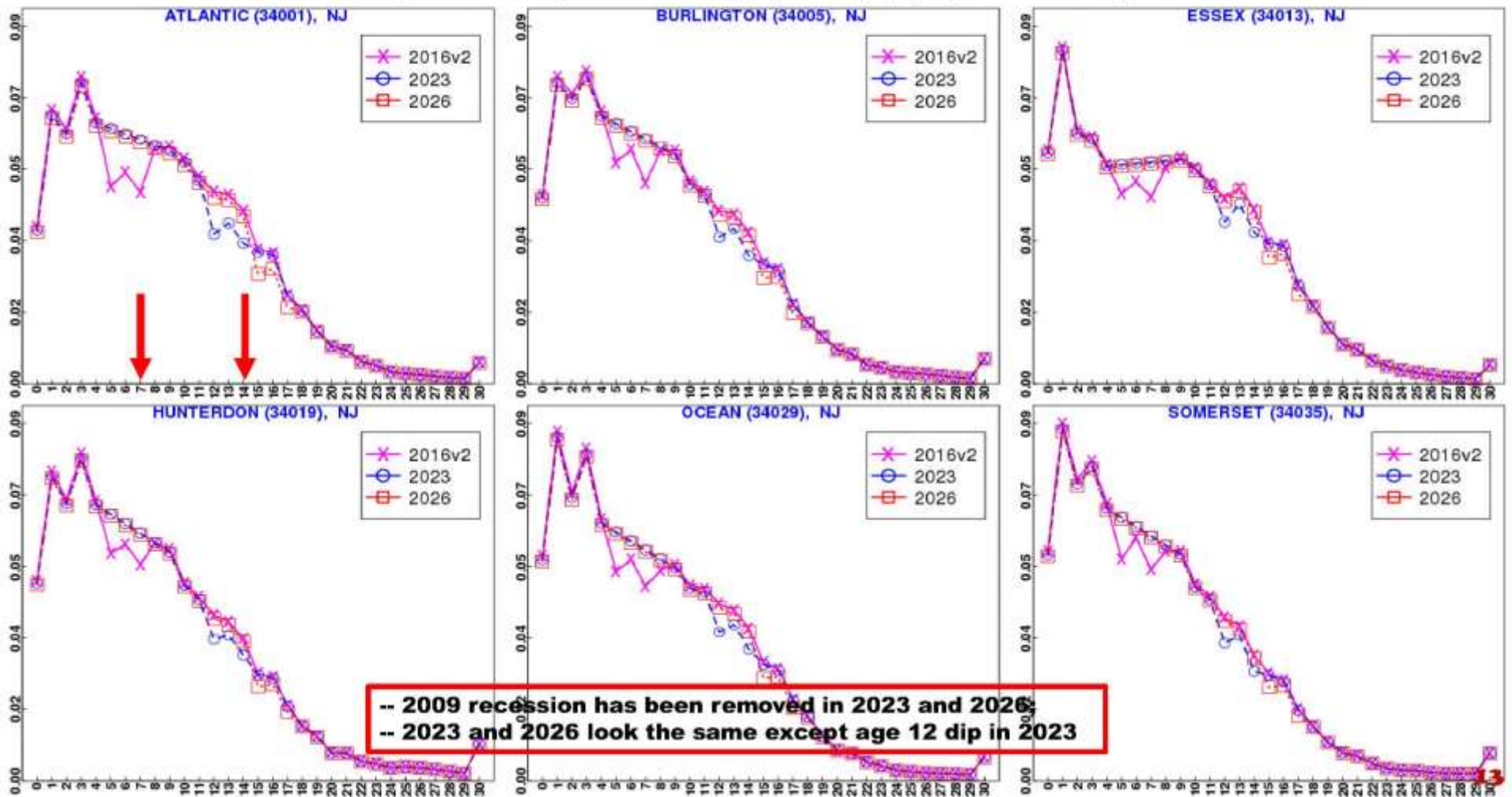


**NY Passenger Car (21) -
2016v2 (upper left) versus 2023 (upper right)**

**Removing the recession in 2023 is obvious,
but there is a dip in age 12 bin**

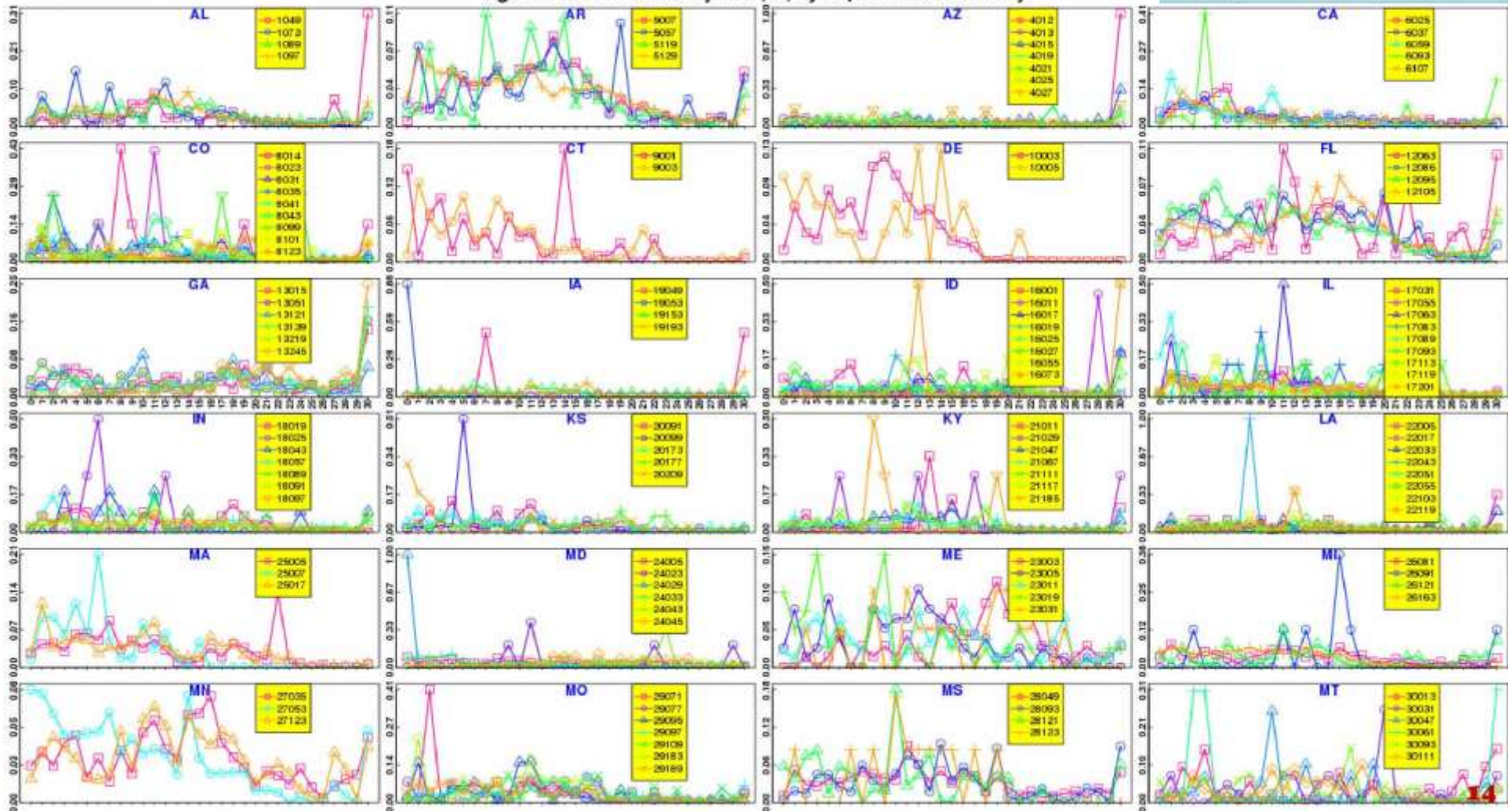
NJ Passenger Car (21) in 2016v2, 2023, and 2026

2016v2, 2023 and 2026 Age Fractions for Passenger Truck (21) by Representative County in NJ



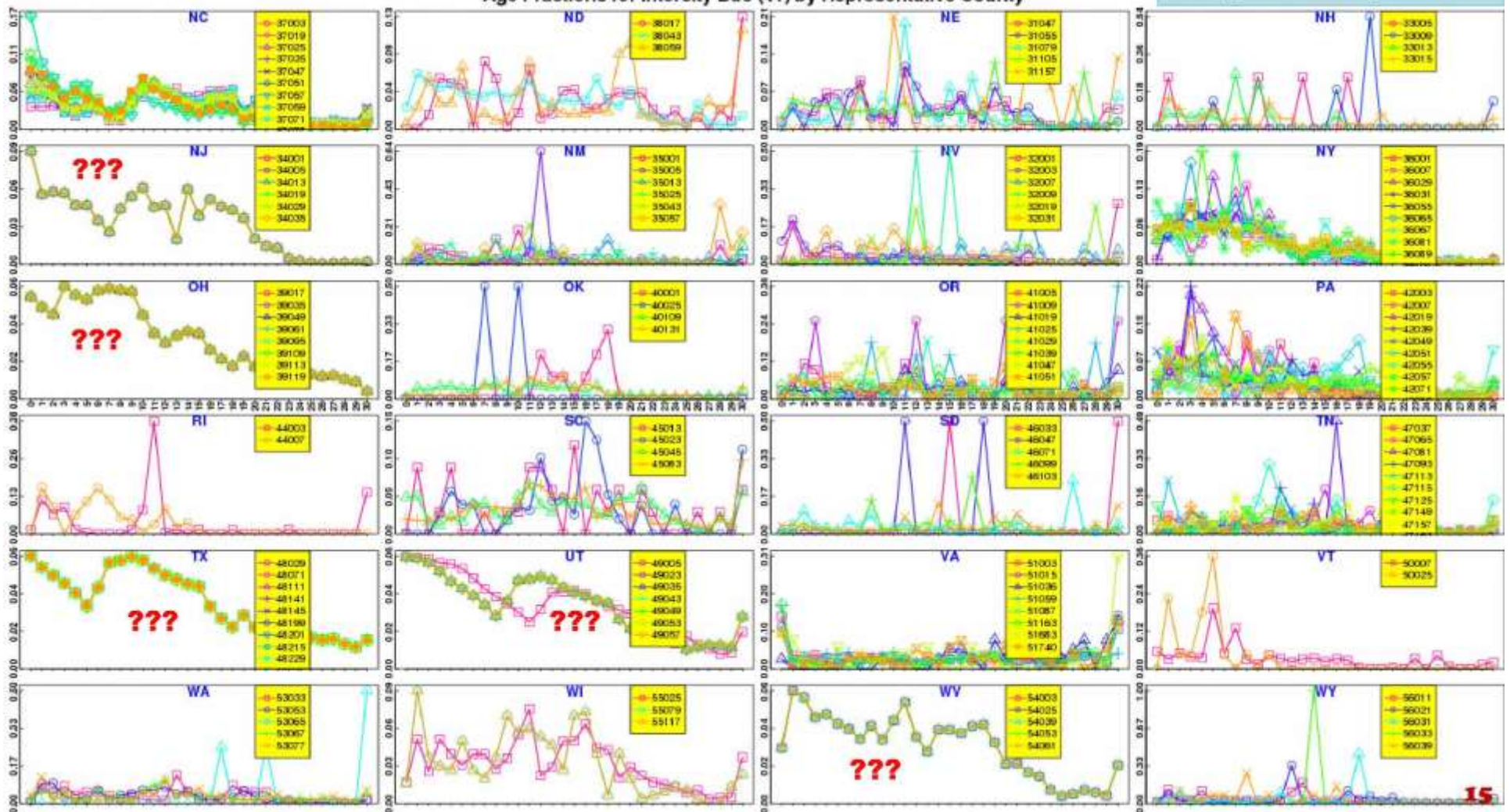
Age Fractions for Intercity Bus (41) by Representative County

2026, 41 fraction, CONUS1



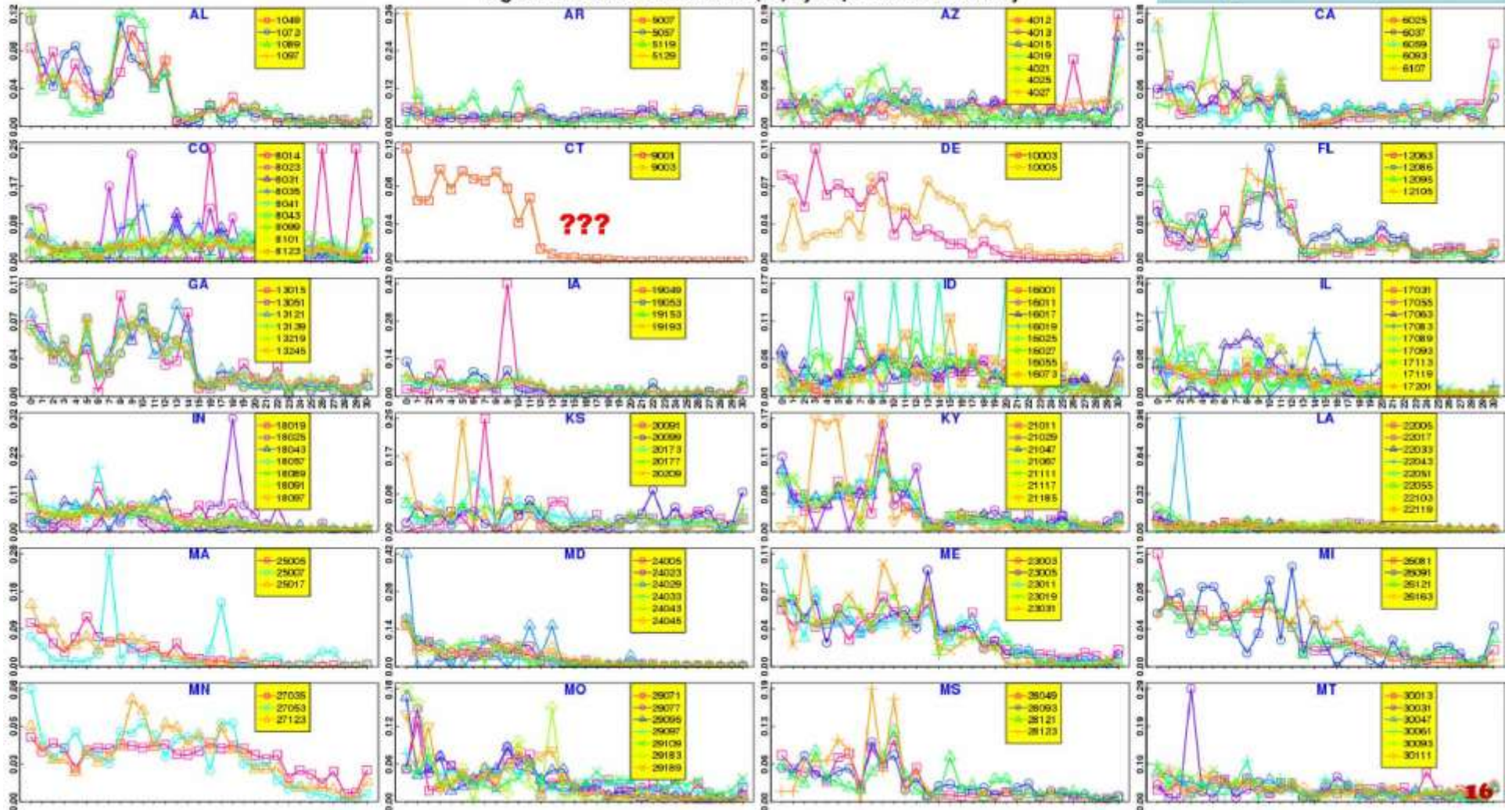
Age Fractions for Intercity Bus (41) by Representative County

2026, 41 fraction, CONUS2



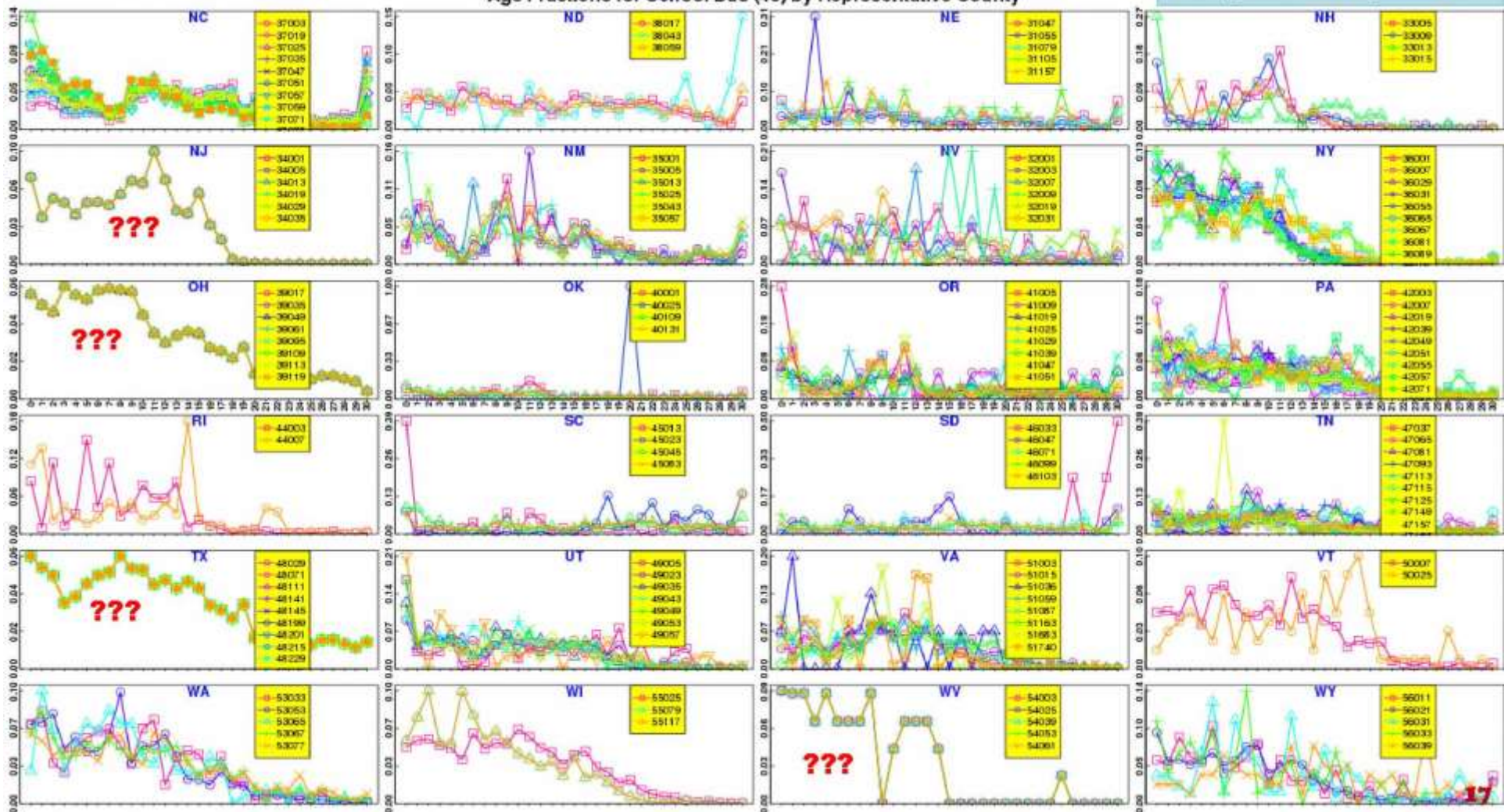
Age Fractions for School Bus (43) by Representative County

2026, 43 fraction, CONUS1



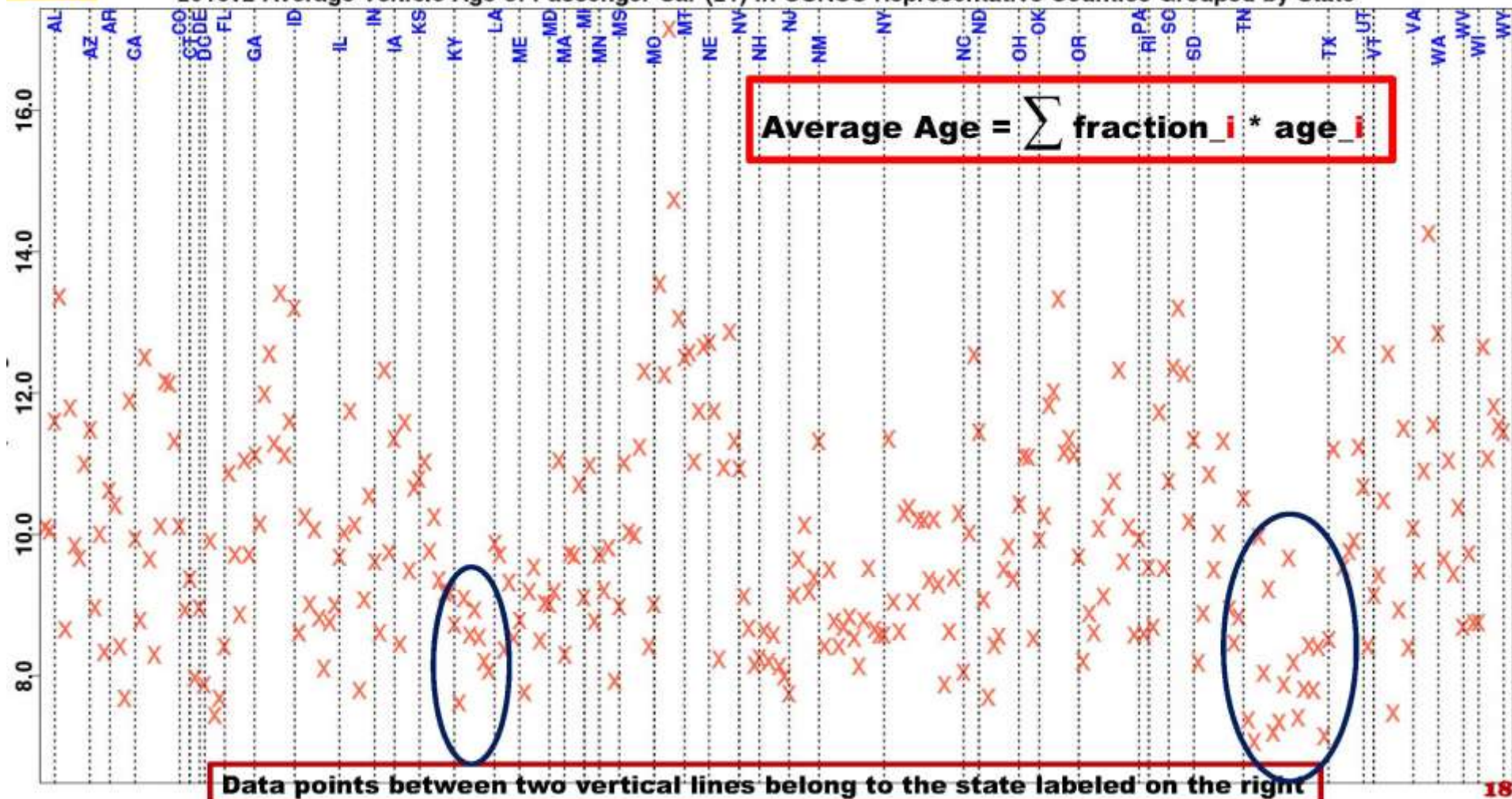
Age Fractions for School Bus (43) by Representative County

2026, 43 fraction, CONUS2



2016

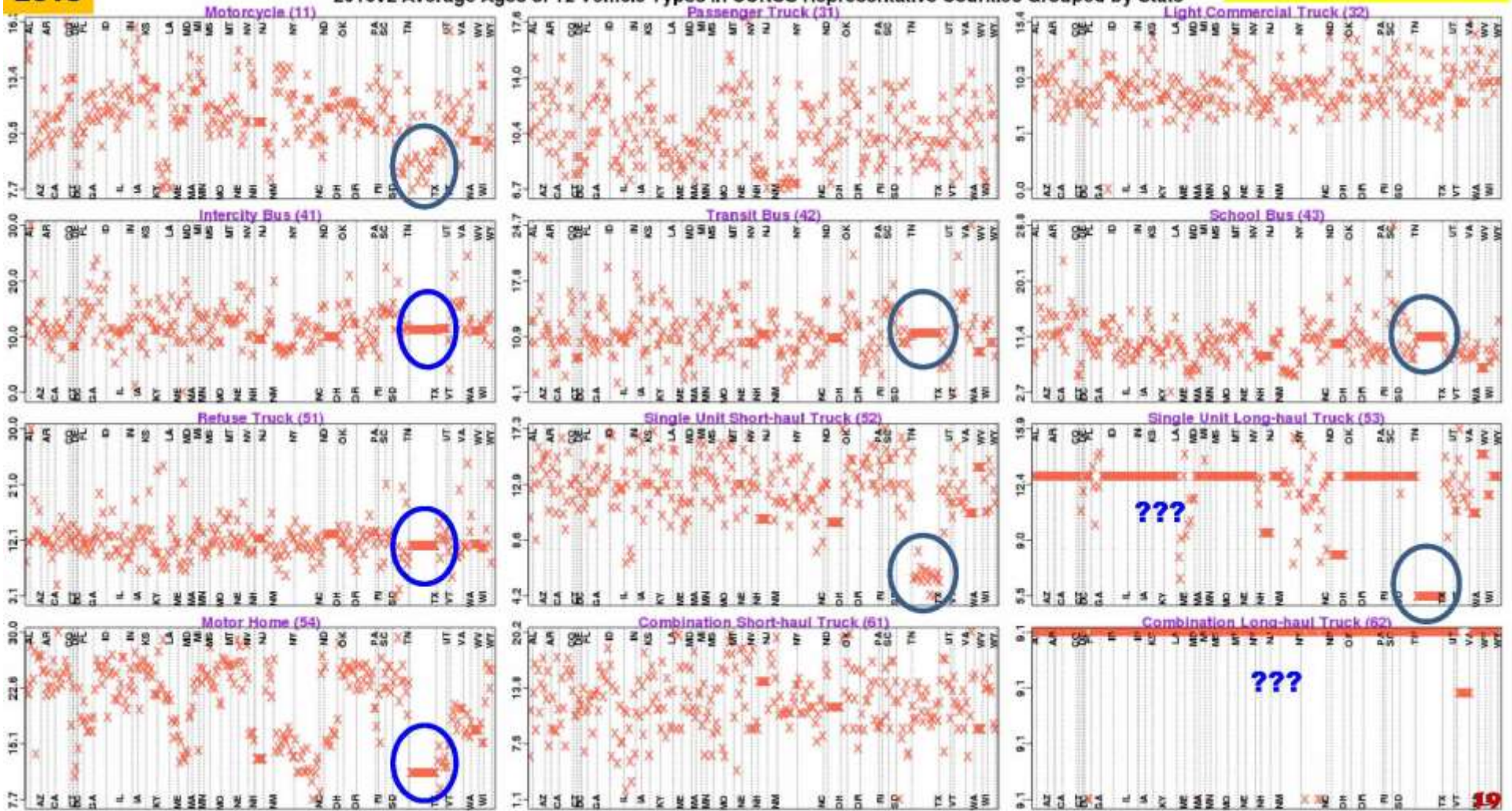
2016v2 Average Vehicle Age of Passenger Car (21) in CONUS Representative Counties Grouped by State



2016

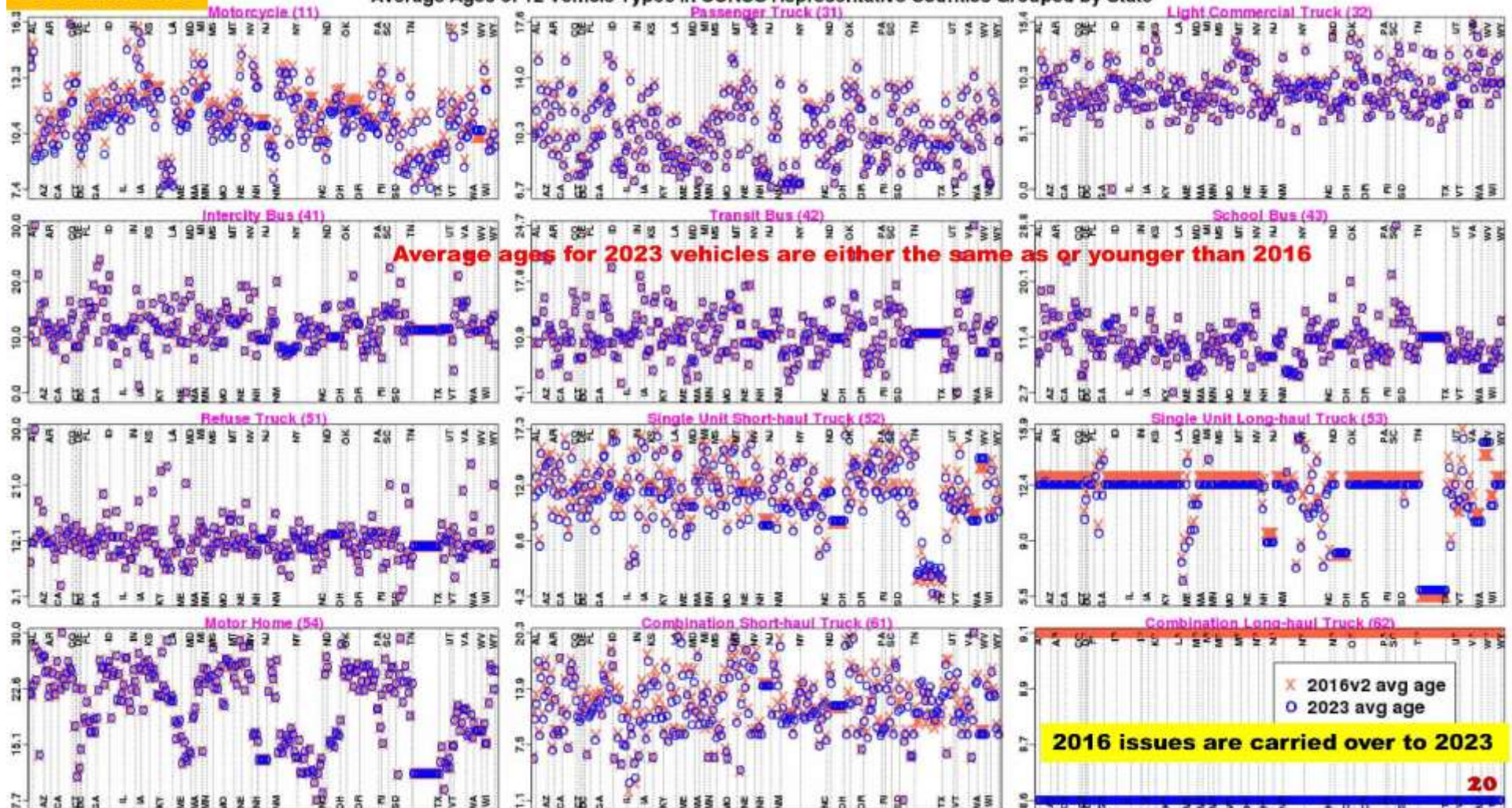
2016v2 Average Ages of 12 Vehicle Types in CONUS Representative Counties Grouped by State

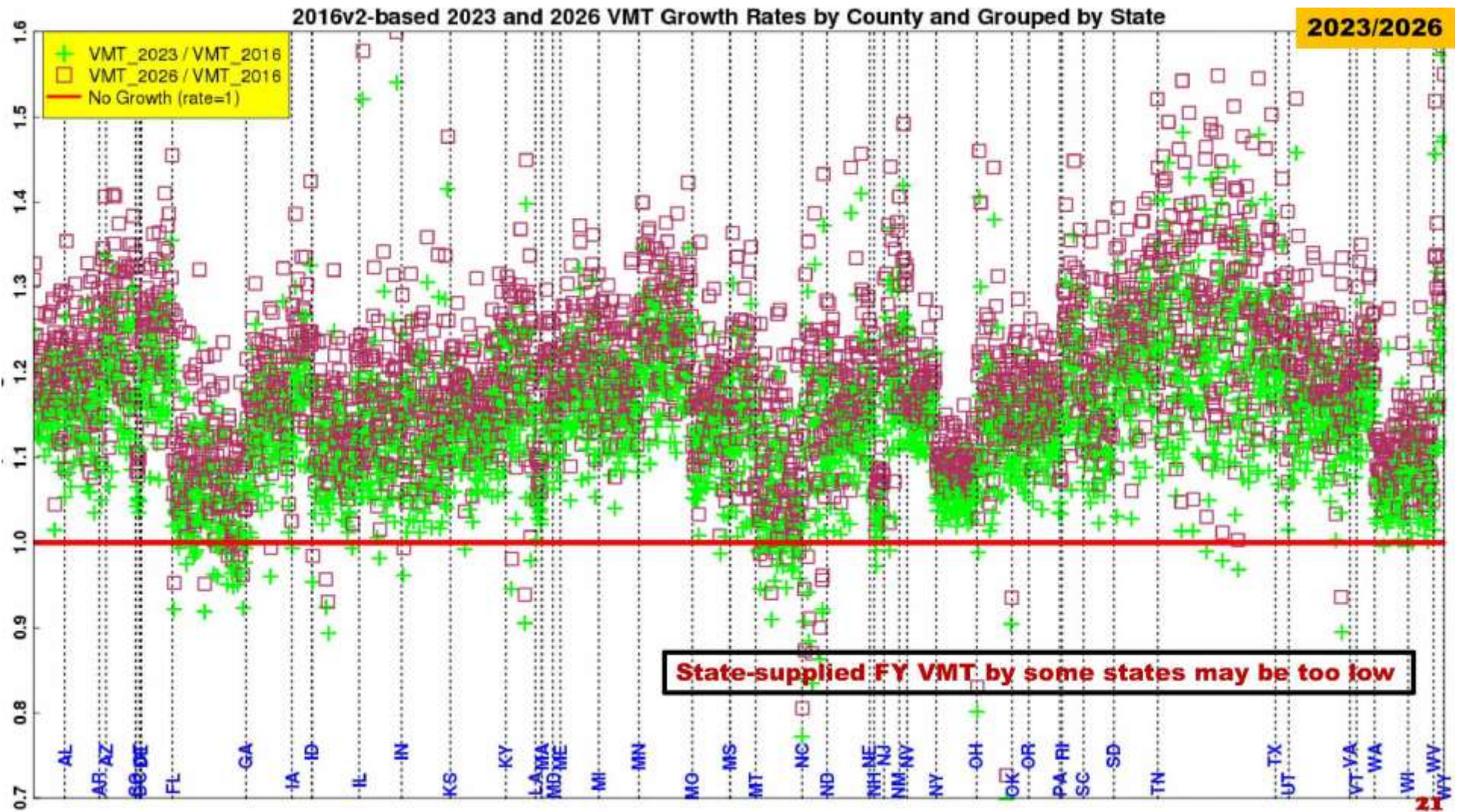
21 is plotted on previous page



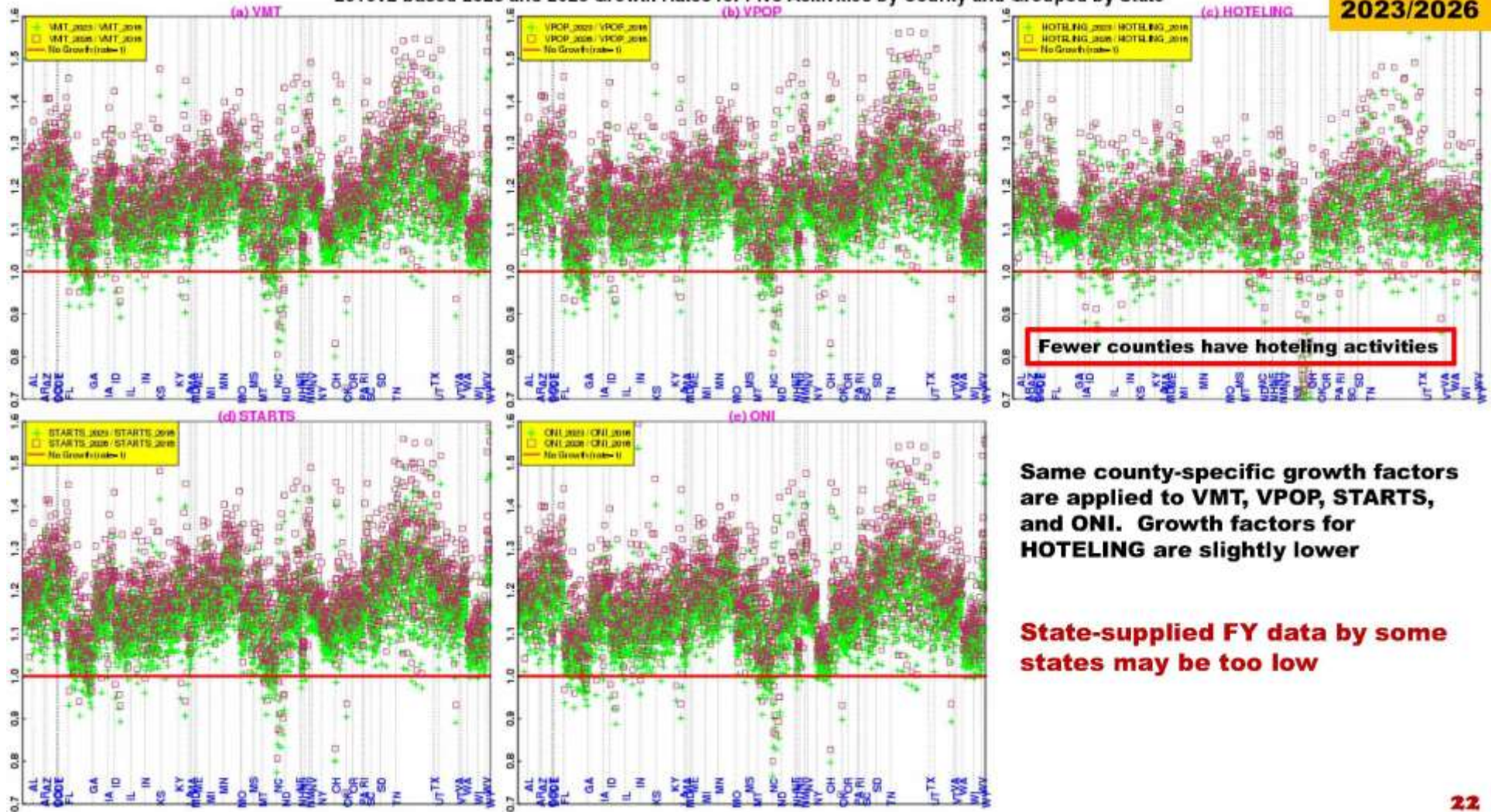
2016 and 2023

Average Ages of 12 Vehicle Types in CONUS Representative Counties Grouped by State





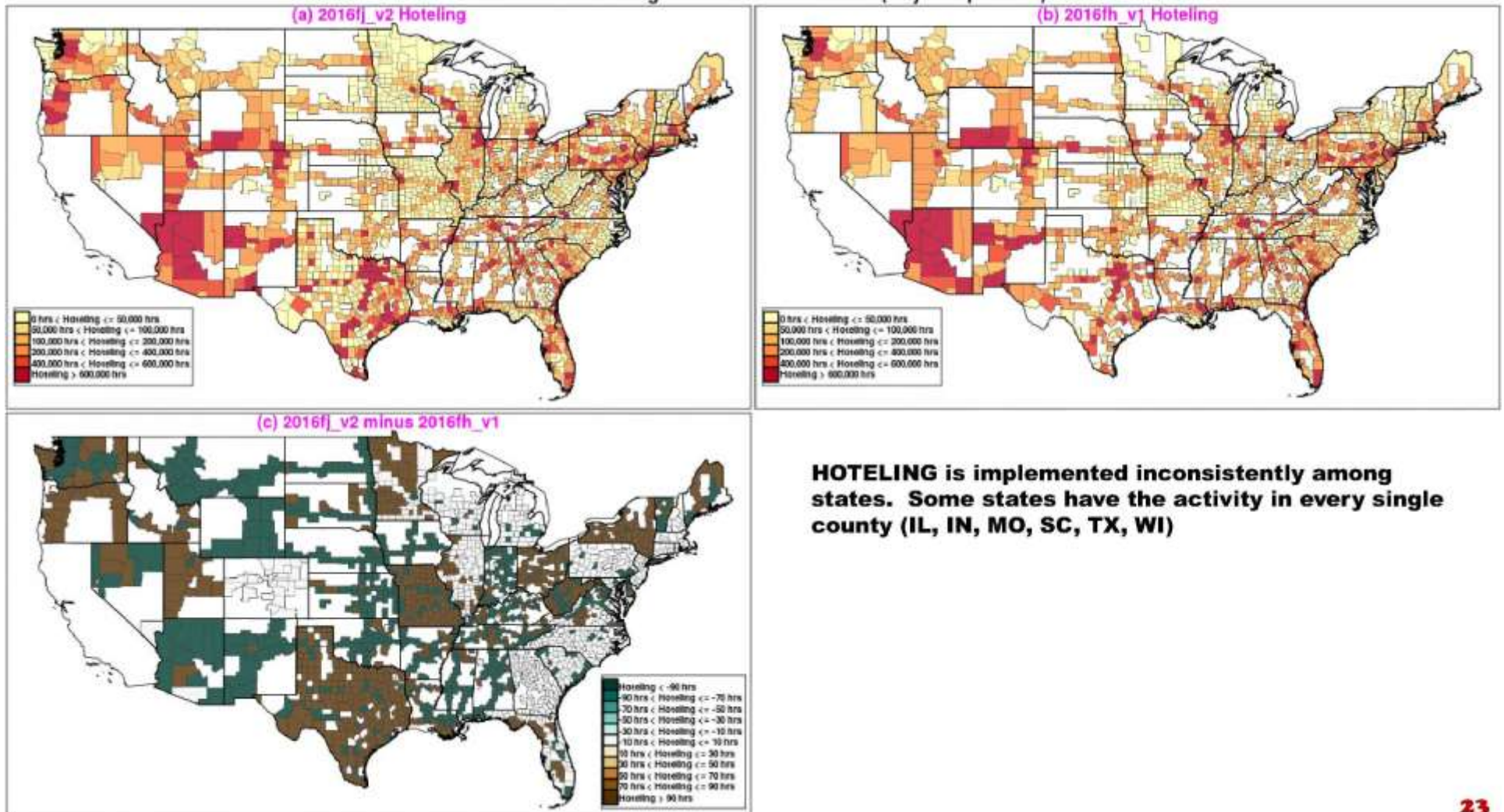
2016v2-based 2023 and 2026 Growth Rates for Five Activities by County and Grouped by State



Same county-specific growth factors are applied to VMT, VPOP, STARTS, and ONI. Growth factors for HOTELING are slightly lower

State-supplied FY data by some states may be too low

Differences in Hoteling Hours over Five Months (May – September)



CA excluded

2016 VPOP/VMT/NOx by Fuel

Gasoline (1) Diesel (2) CNG (3) E85 (5) Electricity (9)

(a) 2016[V2] VPOP

(b) 2016[V2] VMT

(c) 2016[V2] VPOP by Fuel (%)

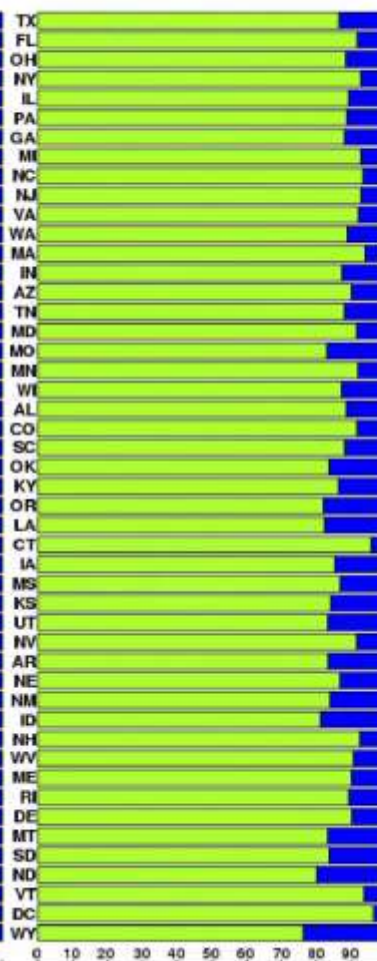
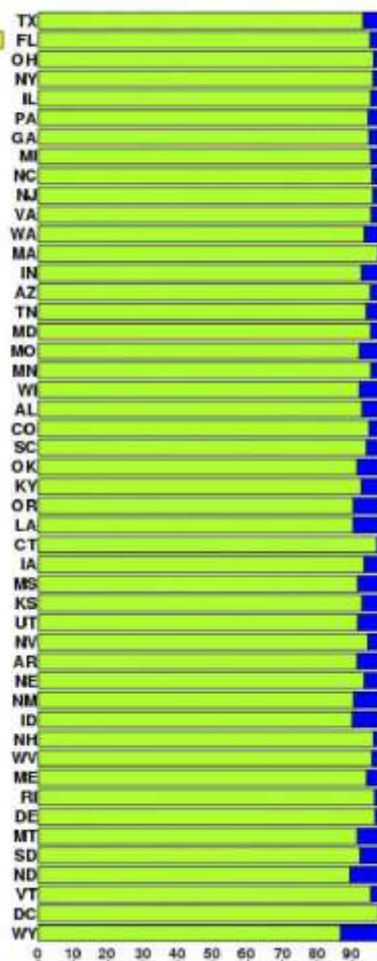
(d) 2016[V2] VMT by Fuel (%)

(e) 2016[V2] NOx by Fuel (%)

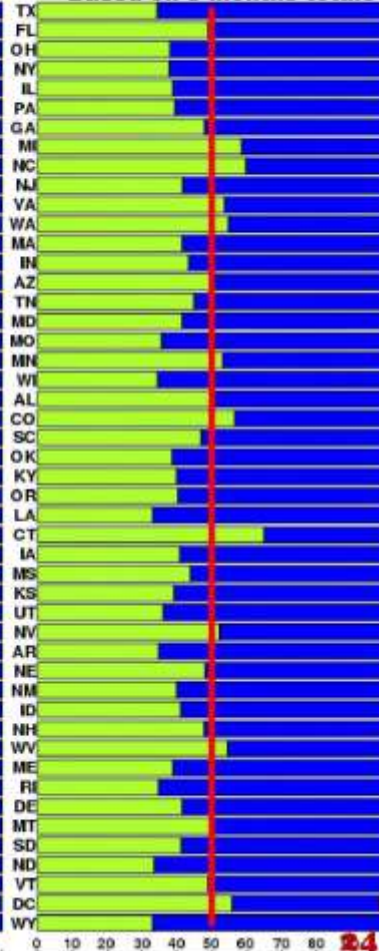
TX	(1)	8,321,305
FL	(2)	8,052,996
OH	(3)	4,737,086
NY	(4)	4,730,899
IL	(5)	4,607,948
PA	(6)	4,105,327
GA	(7)	3,885,056
MI	(8)	3,524,132
NC	(9)	3,335,745
NJ	(10)	3,152,501
VA	(11)	3,046,219
WA	(12)	3,019,743
MA	(13)	2,426,532
IN	(14)	2,390,906
AZ	(15)	2,295,088
TN	(16)	2,262,322
MD	(17)	2,200,240
MO	(18)	2,165,300
MN	(19)	2,082,588
WI	(20)	1,988,878
AL	(21)	1,904,666
CO	(22)	1,729,496
SC	(23)	1,722,521
OK	(24)	1,558,918
KY	(25)	1,570,278
OR	(26)	1,409,624
LA	(27)	1,390,582
CT	(28)	1,352,554
IA	(29)	1,114,171
MS	(30)	1,015,961
KS	(31)	1,001,788
UT	(32)	979,550
NV	(33)	912,562
AR	(34)	850,869
NE	(35)	676,292
NM	(36)	637,024
ID	(37)	555,666
NH	(38)	542,824
WV	(39)	533,142
ME	(40)	453,452
RI	(41)	429,246
DE	(42)	368,337
MT	(43)	355,466
SD	(44)	291,139
ND	(45)	223,584
VT	(46)	222,977
DC	(47)	182,543
WY	(48)	146,375

Ranked by passenger car (21) VPOP

TX	99,587,582,645
FL	105,647,584,940
OH	49,947,779,091
NY	52,746,998,132
IL	47,978,821,002
PA	44,618,856,895
GA	49,496,512,767
MI	44,019,268,804
NC	53,810,660,468
NJ	38,983,161,720
VA	39,013,719,803
WA	25,031,394,392
MA	29,638,301,311
IN	31,615,060,918
AZ	25,225,521,863
TN	30,073,944,453
MD	28,794,169,716
MO	26,205,096,862
MN	25,468,011,083
WI	25,548,363,364
AL	27,201,717,495
CO	20,320,410,284
SC	22,693,199,538
OK	15,982,834,496
KY	18,732,308,854
OR	13,137,278,738
LA	16,087,265,147
CT	15,696,067,493
IA	11,364,163,154
MS	15,306,082,490
KS	10,973,674,346
UT	11,702,576,974
NV	12,364,191,641
AR	11,288,159,577
NE	7,017,924,794
NM	9,340,157,242
ID	5,235,077,539
NH	6,147,005,764
WV	6,418,063,146
ME	5,408,471,366
RI	3,954,172,840
DE	4,369,909,605
MT	3,387,273,469
SD	2,779,426,395
ND	2,500,420,212
VT	2,845,668,027
DC	2,232,888,689
WY	2,117,185,687



Based on 5 months totals



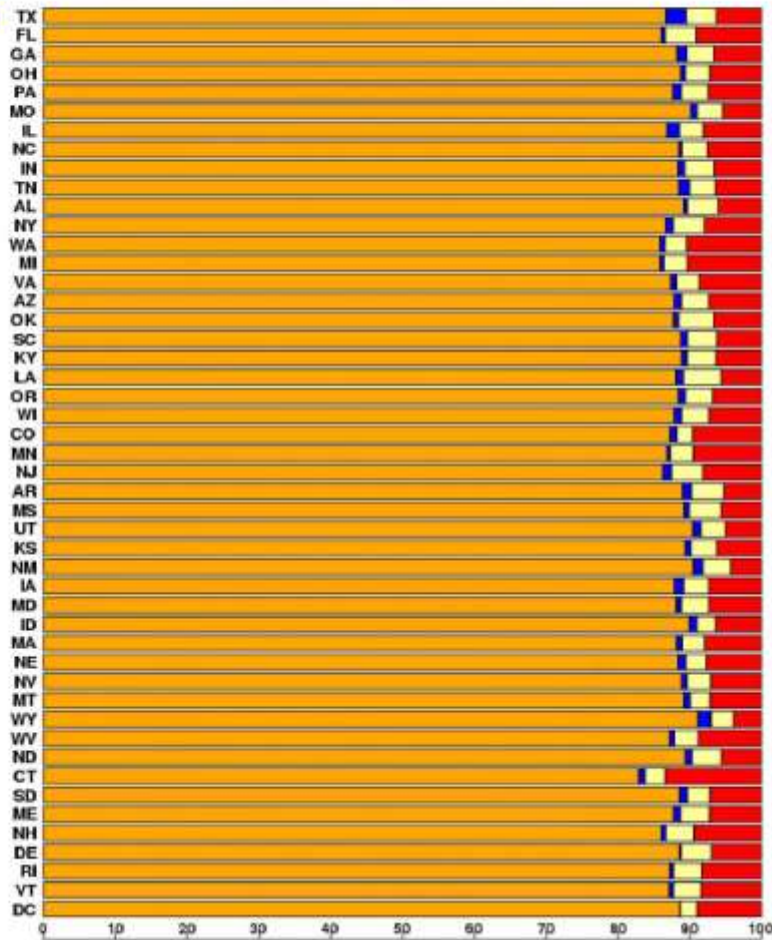
2016 NOx/VOCs by Sector



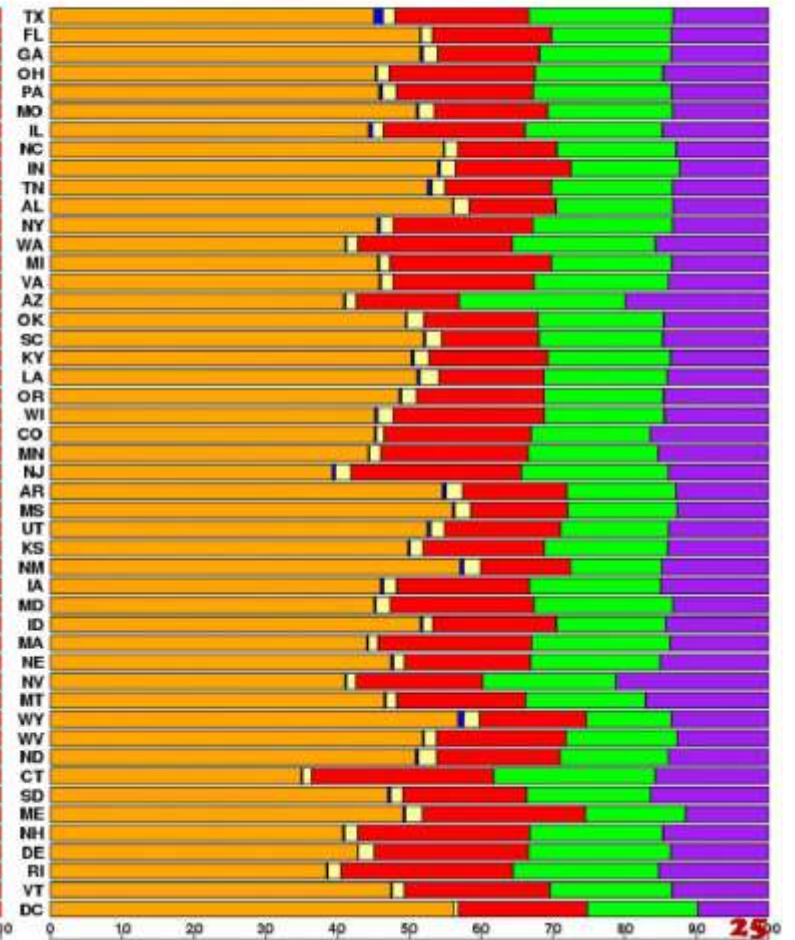
(a) 2016fj_v2 Five-Month NOx (tons)



(b) 2016fj_v2 NOx by Sector (%)



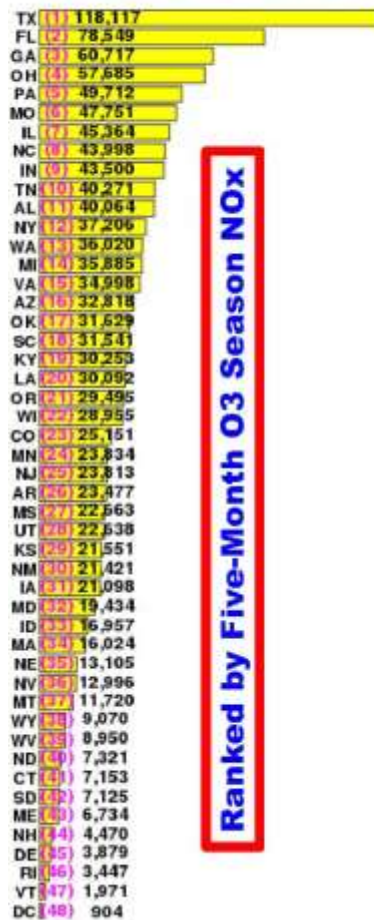
(c) 2016fj_v2 VOCs by Sector Type (%)



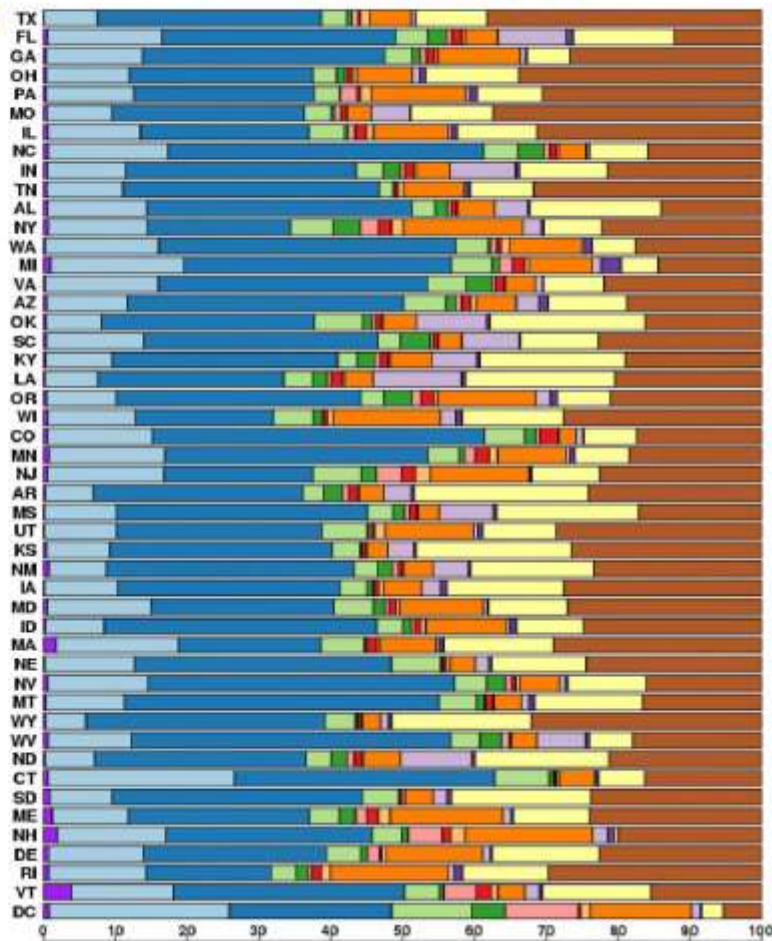
2016 NOx/VOCs by Vehicle Type



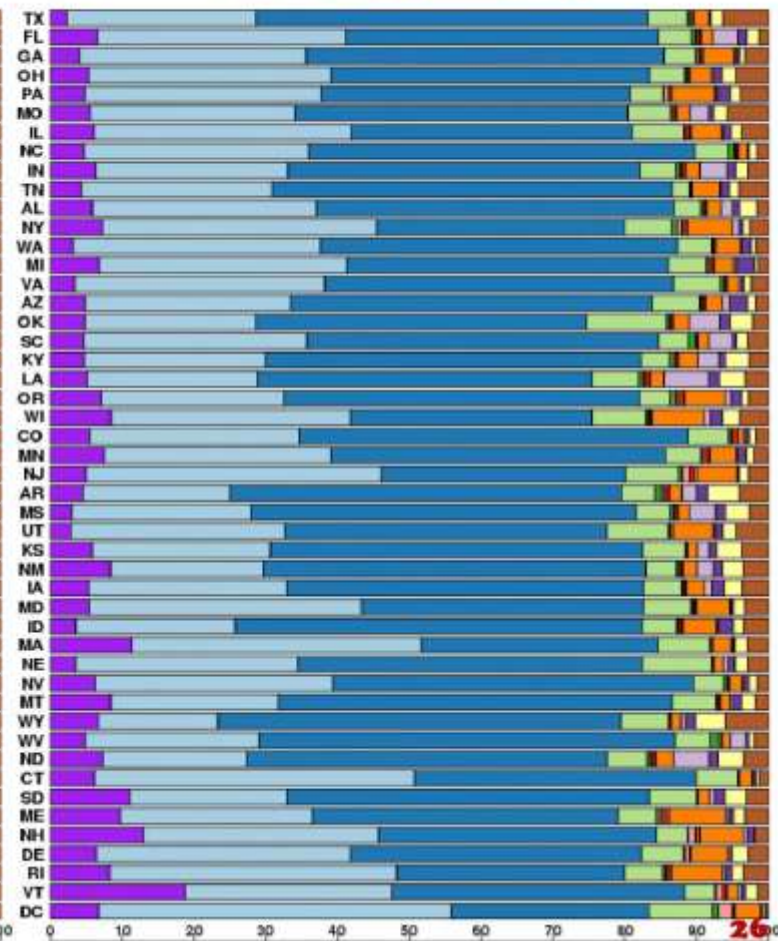
(a) 2016fj_v2 Five-Month NOx (tons)



(b) 2016fj_v2 NOx by Vehicle Type (%)

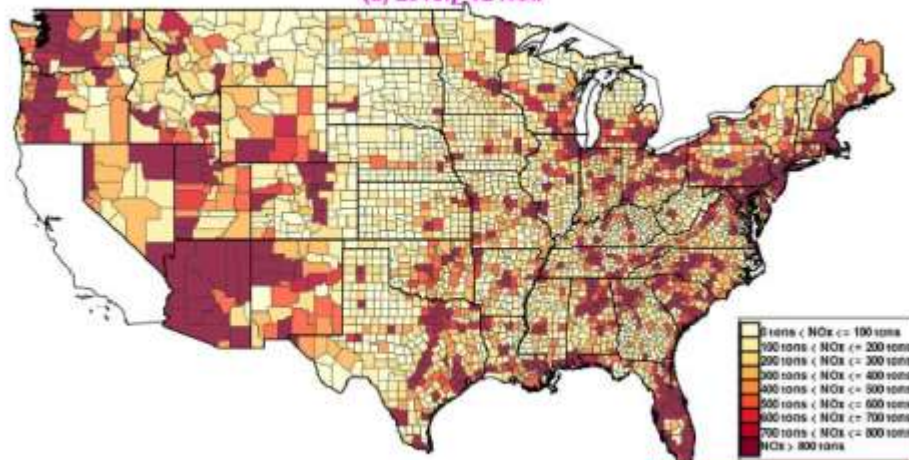


(c) 2016fj_v2 VOCs by Vehicle Type (%)

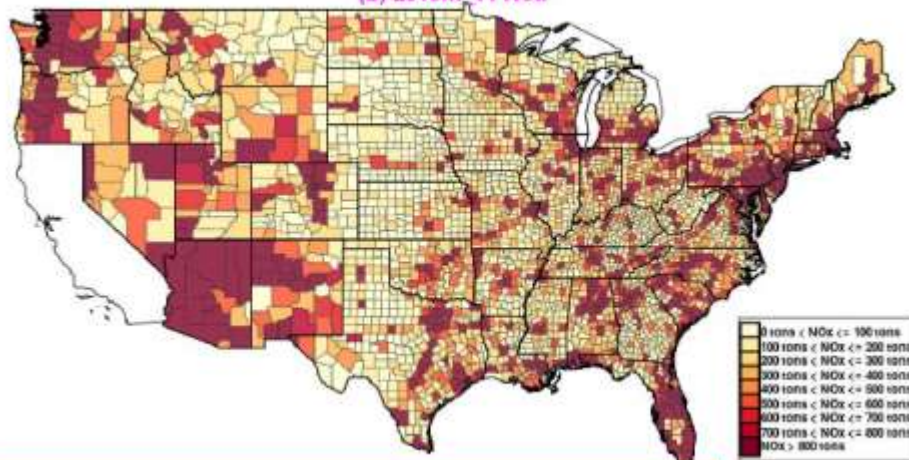


NOx Differences (in tons) over Five Months (May – September)

(a) 2016fj_v2 NOx

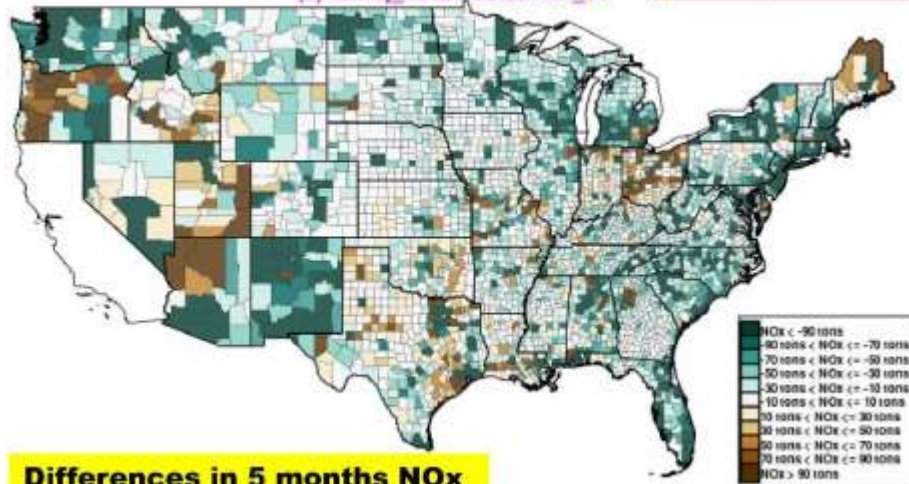


(b) 2016fh_v1 NOx



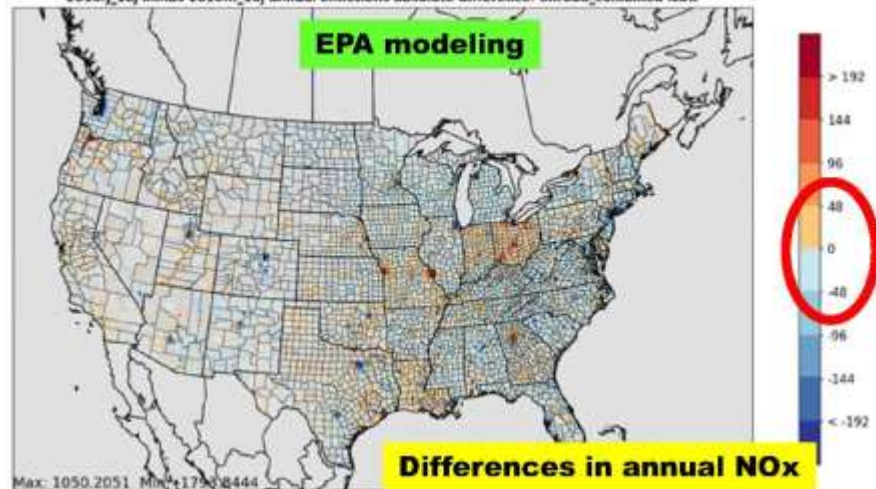
2016v2 < 2016v1. Version change, not future reduction!

(c) 2016fj_v2 minus 2016fh_v1



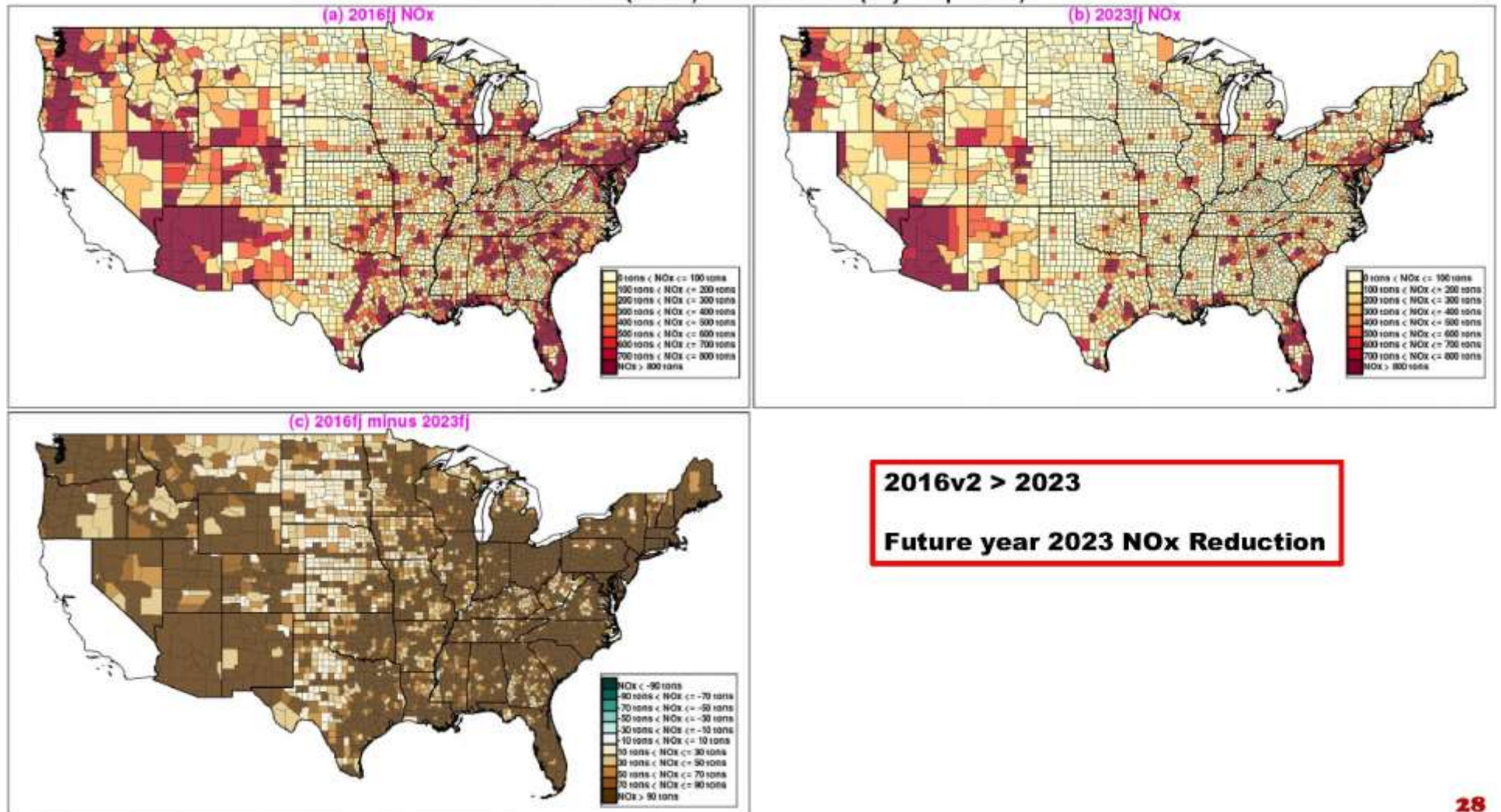
Differences in 5 months NOx

2016fj_16j minus 2016fh_16j annual emissions absolute difference: onroad_combined NOx

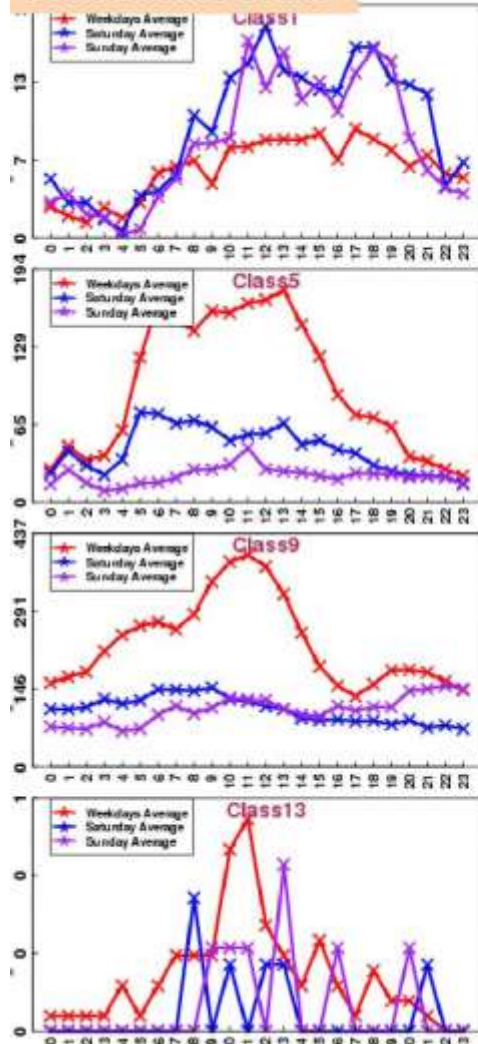


Differences in annual NOx

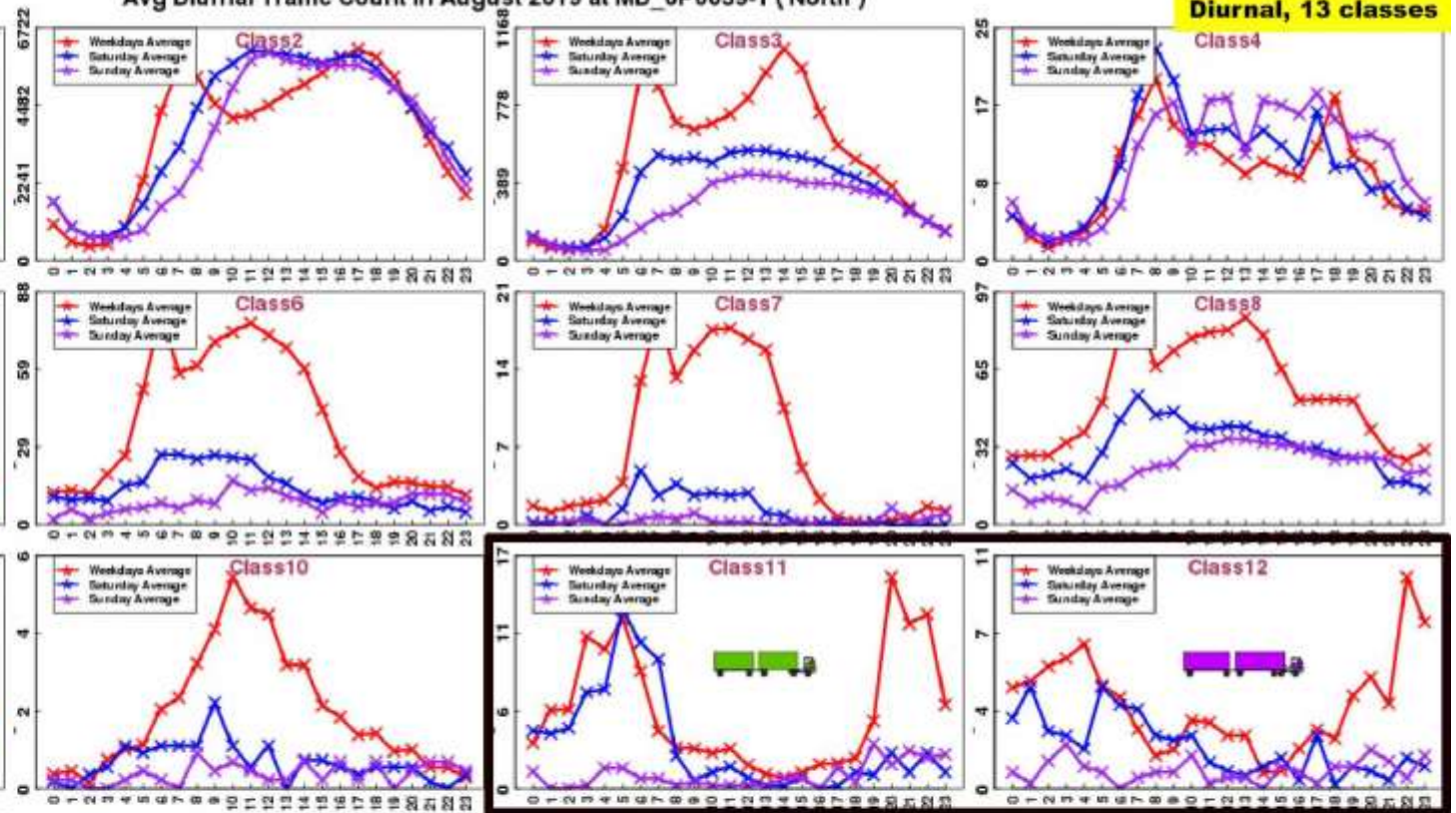
NOx Differences (in tons) over Five Months (May – September)



FHWA Traffic Count

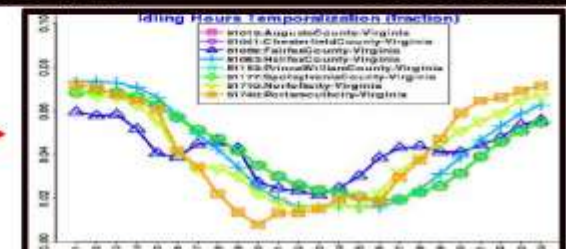


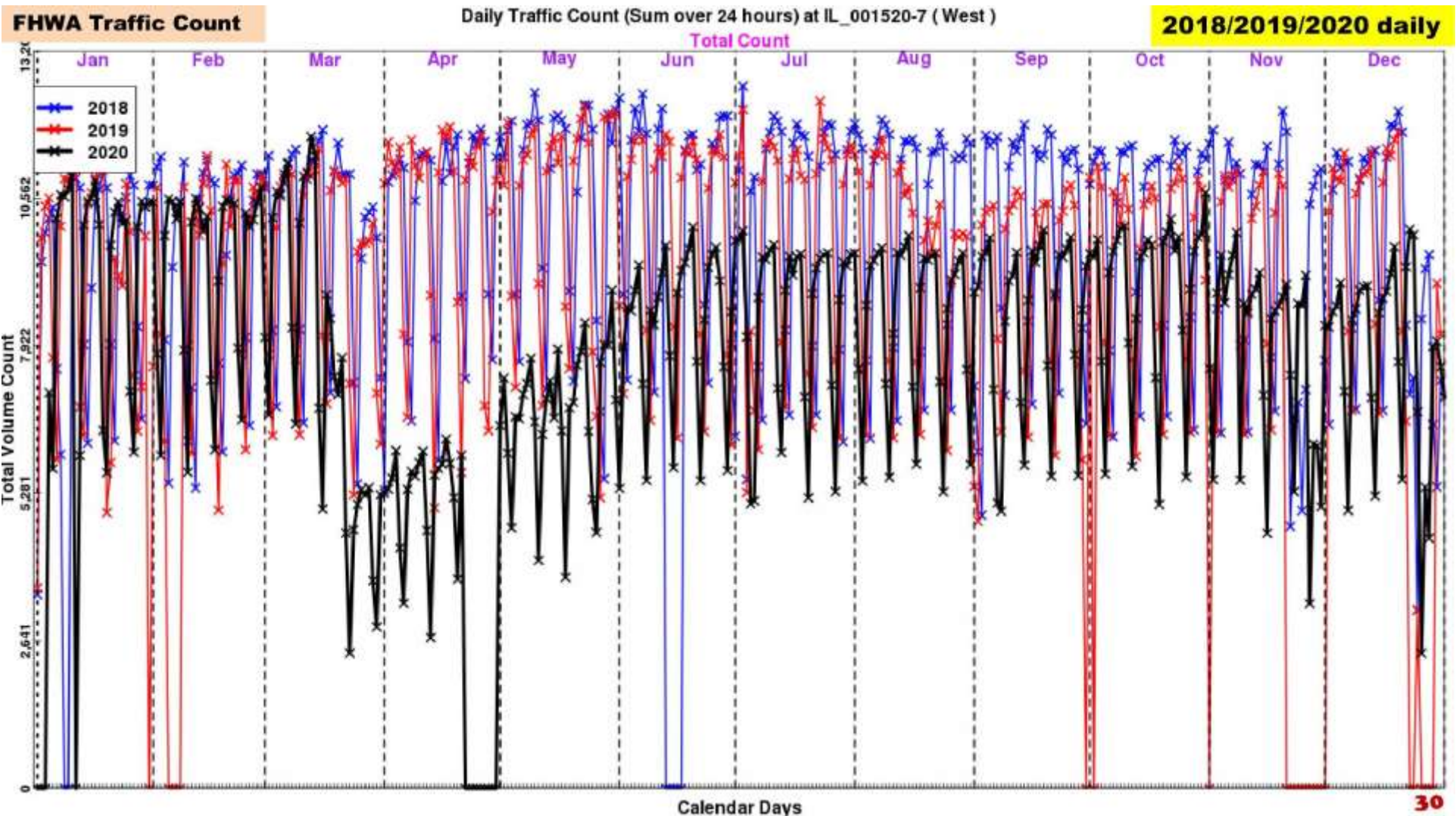
Avg Diurnal Traffic Count in August 2019 at MD_0P0039-1 (North)



Both Class 11 and 12 peak in early morning and late night hours, similar to SMOKE extended idling profiles for tractor trailers or diesel combination long-haul trucks (62)

Average diurnal profiles were prepared in a way similar to average meteorology in MOVES





Attachment 3: Transco 165 NSR Permit Dated January 28, 2020



Commonwealth of Virginia
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

BLUE RIDGE REGIONAL OFFICE
901 Russell Drive, Salem, Virginia 24153
(540) 562-6700 FAX (540) 562-6725
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

Robert J. Weld
Regional Director

January 28, 2020

Mr. Glen Jasek
VP Operations, Eastern Interstates
Williams
2800 Post Oak Blvd., Suite 900
Houston, TX 77056-6147

Location: Pittsylvania County
Registration No.: 30864

Dear Mr. Jasek:

Attached is a permit to construct and operate a project at a compressor station in accordance with the provisions of the Virginia State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution.

In the course of evaluating the application and arriving at a final decision to approve the Southeastern Trail project, the Department of Environmental Quality (DEQ) deemed the application complete on January 27, 2020.

This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

This permit approval to construct and operate shall not relieve Transco of the responsibility to comply with all other local, state, and federal permit regulations.

The proposed turbines are subject to 40 CFR 60, New Source Performance Standard (NSPS), Subparts KKKK and 40 CFR 63 Maximum Achievable Control Technology (MACT), Subpart YYYYY. Virginia has accepted delegation of these rules. In summary, the units may be required to comply with certain federal emission standards and operating limitations. The Department of

Environmental Quality (DEQ) advises you to review these regulations to ensure compliance with applicable emission and operational limitations. As the owner/operator you are also responsible for any monitoring, notification, reporting and recordkeeping requirements of the NSPS and MACT. Notifications shall be sent to Virginia DEQ.

The facility has emission units that may be subject to the following regulations: 40 CFR 60 Subparts JJJJ, OOOOa and 40 CFR 63 Subpart ZZZZ. Virginia has not accepted delegation of these rules. In summary, the units may be required to comply with certain federal emission standards and operating limitations. The Department of Environmental Quality (DEQ) advises you to review these regulations to ensure compliance with applicable emission and operational limitations. As the owner/operator you are also responsible for any monitoring, notification, reporting and recordkeeping requirements of the NSPS and MACT. Notifications shall be sent to both EPA, Region III and Virginia DEQ.

To review any federal rules referenced in the above paragraph or in the attached permit, the US Government Publishing Office maintains the text of these rules at www.ecfr.gov, Title 40, Part 60 and 63 as applicable.

The Board's Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. Please consult the relevant regulations for additional requirements for such requests.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director
Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

A copy of the results of performance tests required by 40 CFR 60, Subparts KKKK shall to be sent to:

Associate Director
Office of Air Enforcement and Compliance Assistance (3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

If you have any questions concerning this permit, please contact Anita Walthall at (540)562-6769 or anita.walthall@deq.virginia.gov.

Sincerely,



Robert J. Weld
Regional Director

Attachments: Permit
Source Testing Report Format

cc: Michael Callegari, Williams (michael.c.callegari@williams.com)
Mary Carder, ERM (mary.carder@erm.com)
James Puckett, DEQ BRRO Air Compliance Inspector (electronic)



Commonwealth of Virginia
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Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

Robert J. Weld
Regional Director

STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

This permit includes designated equipment subject to
New Source Performance Standards (NSPS).

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia
Regulations for the Control and Abatement of Air Pollution,

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Blvd., Suite 900
Houston, TX 77056-6147
Registration No.: 30864

is authorized to construct and operate

natural gas compressor station 165

located at

945 Transco Road in Chatham (Pittsylvania County), Virginia 24531

in accordance with the Conditions of this permit.

Approved on January 28, 2020.

A handwritten signature in blue ink, appearing to read "Robert J. Weld", written over a horizontal line.

Robert J. Weld
Regional Director

Permit consists of 27 pages.

Permit Conditions 1 to 69.

Attachment - Source Testing Report Format, 1 page

INTRODUCTION

This permit approval is based on the permit applications dated June 20, 2018, including supplemental information dated November 7, 2018, September 16, 2019, November 18, 2019, November 25, 2019, and January 27, 2020. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9VAC5-10-20 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9VAC5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

Equipment List – Equipment at this facility covered by this permit consists of:

Equipment included in the project:

Reference No.	Equipment Description	Rated Capacity	Delegated Federal Requirements
TUR-05	Solar Titan Combustion Turbine Model 130-23502S	23,150 hp*	40 CFR 60, Subpart KKKK
TUR-06	Solar Titan Combustion Turbine Model 130-23502S	23,150 hp*	40 CFR 60, Subpart KKKK
AUX-04	Caterpillar G3512 Emergency Engine	1,468 hp (1000 kW)	---
FUGS	Fugitive natural gas leaks from fugitive emission components	---	---
M/L 11	Clark TCV-10 Compressor Engine	3,400 hp	---

*Based on ambient temperature of 0°F and 100% operating load.

Specifications included in the above table are for informational purposes only and do not form enforceable terms or conditions of the permit.

PROCESS REQUIREMENTS

1. **Permanent Shutdown** – Upon start-up of either combustion turbine (TUR-05 or TUR-06) or (12) twelve months from the signature date of this permit, whichever occurs earlier, the ten (10) Clark TLA-6 reciprocating engines (M/L1 – M/L10) shall permanently cease operation. Restarting operation of M/L1 – M/L10 shall be considered equivalent to construction and operation of a new emissions unit and will be subject to the requirement to obtain a permit pursuant to the applicable provisions of 9VAC5 Chapter 80. The source may request an extension of the (12) twelve month time period by submitting the request the Blue Ridge Regional Office along with the justification for the extension within 30 days of the expiration of the time period.
(9VAC5-20-220 and 9VAC5-80-1180)
2. **Emission Controls** – Nitrogen oxides (NO_x) emissions from the combustion turbines (TUR-05, TUR-06) shall be controlled by dry low NO_x (SoLoNO_xTM) combustion control technology and selective catalytic reduction (SCR). The SCR system shall be designed to reduce NO_x emissions to an outlet concentration of 3.75 ppbvd as a 3-hour average when the compressor turbine's inlet air temperature is 0°F or greater. The SoLoNO_xTM technology shall be in operation at all times the respective combustion turbine is operating except during start-up and shutdown, as defined in Condition 5.
 - a. When a combustion turbine's inlet air temperature is less than 0°F, the SoLoNO_xTM technology must be operated to maximum extent possible, following the manufacturer's written protocol or best engineering practices for minimizing emissions. No compressor turbine shall operate below 50% load except during startup and shutdown.
 - b. Each combustion turbine shall be equipped with Pilot Active Control Logic (PACL) to minimize emissions when inlet air temperature is less than 0°F and the PACL shall be in operation when the respective combustion turbine is operating. Each SCR shall be in operation at all times the respective combustion turbine is operating, except during start-up and shutdown where operation shall be as described in Condition 5.e.
(9VAC5-50-260 and 9VAC5-80-1180)
3. **Emission Controls** – Carbon Monoxide (CO) and Volatile Organic Compound (VOC) emissions from the combustion turbines (TUR-05, TUR-06) shall be controlled by an oxidation catalyst system. Each oxidation catalyst system shall be provided with adequate access for inspection and shall be in operation at all times the respective combustion turbine is operating, except during each unit start-up, as defined in Condition 5.
(9VAC5-50-260 and 9VAC5-80-1180)
4. **Emission Controls** – Particulate emissions (PM, PM₁₀, PM_{2.5}) from the combustion turbines (TUR-05, TUR-06) shall be controlled by inlet air filters. Each filter shall be provided with adequate access for inspection and shall be in operation at all times the respective combustion turbine is operating.

(9VAC5-50-260¹ and 9VAC5-80-1180)

5. **Emission Controls** – The permittee shall operate and maintain each combustion turbine (TUR-05, TUR-06), all air pollution control equipment, and all monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times, including during start-up, shutdown, and malfunction.
- a. For the purpose of this permit, start-up is defined as the period beginning with the first fuel fed to the combustion turbine and ending when the combustion turbine reaches 50% load.
 - b. For the purpose of this permit, shutdown is defined as the period beginning when the combustion turbine drops below 50% load for the purpose of ceasing operation and ends when fuel feeding stops.
 - c. For the purpose of this permit, an oxidation catalyst system shall be considered in operation when the catalyst bed inlet gas temperature is above 600°F or the minimum combustion chamber temperature derived from the most recent performance test that demonstrates compliance with this permit.
 - d. The oxidation catalyst system shall be in operation during the shutdown of the respective combustion turbine.
 - e. During start-up and shutdown, each combustion turbine SCR system (including ammonia injection) and oxidation catalyst system shall be operated in a manner to minimize emissions following the manufacturer's written protocol or best engineering practices for minimizing emissions. Written documentation shall be maintained explaining the sufficiency of the practices. If such practices are used in lieu of the manufacturer's protocol, the documentation shall justify why the practices are at least equivalent to manufacturer's protocols with respect to minimizing emissions.
 - f. Annual time in start-up of each combustion turbine shall not exceed 25 hours per year. Annual hours of start-up shall be calculated as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
 - g. Annual time in shutdown of each combustion turbine shall not exceed 25 hours per year. Annual hours of shutdown shall be calculated as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

¹ 9VAC5-50-260 (BACT) applies to PM₁₀ and PM_{2.5}.

- h. Each combustion turbine shall operate in "SoLoNOx mode" at all times except for start-up, shutdown, and when a combustion turbine's inlet air temperature is less than 0°F. Operation not in "SoLoNOx mode" shall not exceed an annual total of 60 hours per combustion turbine, calculated as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

(9VAC5-50-260 and 9VAC5-80-1180)

- 6. **Emission Controls:** The emissions reduction requirements for the compressor engine (M/L 11) shall be met through engine combustion modifications (high pressure fuel injection).
(9VAC5-80-1180)
- 7. **Emission Controls** – Emissions from the emergency engine (AUX-04) shall be controlled by proper engine operation in accordance with the manufacturer's written instructions, or procedures developed by the permittee that are approved by the manufacturer, over the entire life of the engine. In addition, the permittee may only change those settings that are approved by the manufacturer in a manner consistent with good air pollution control practices for minimizing emissions.
(9VAC5-50-260 and 9VAC5-80-1180)
- 8. **Emission Controls** – The permittee shall implement the following work practices to reduce emissions from venting of natural gas from the facility.
 - a. Emissions from each emergency shutdown (ESD) test shall be controlled by installation of a block valve directly following each ESD blowdown valve. The block valve shall be closed prior to initiating any ESD test and shall be opened only after the ESD blowdown valve has closed.
 - b. Except as provided in Condition 8.f, the permittee shall control emissions from the shutdown of each combustion turbine by maintaining pressurized hold for the combustion turbine. Pressurized hold shall be achieved by maintaining sufficient differential pressure between the seal gas and combustion turbine case such that the dry seal maintains integrity for the entire duration of the shutdown. Sufficient differential pressure shall be determined for each combustion turbine during the tests required in Condition 44.
 - c. Pig launching and recovery shall be limited to three events per 12-month period. Emissions from these events shall be limited to the gas contained in the pig launching or recovery chambers. The permittee shall have available written operating procedures to minimize emissions from pig launching and recovery. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

- d. The permittee shall install a vent gas reduction system (VGRS) to ensure the sufficient differential pressure required in Condition 8.b is maintained. The VGRS shall be provided with adequate access for inspection and shall be in operation as necessary to ensure sufficient differential pressure between the seal gas and combustion turbine case such that the dry seal is maintained for the respective combustion turbine in compliance with Condition 8.f.
- e. The permittee shall continuously monitor and record the seal gas pressure and combustion turbine case pressure for each combustion turbine during pressurized holds.
- f. For each combustion turbine, the permittee shall vent gas no more than twelve (12) times per year, calculated monthly as the sum of each consecutive 12-month period. A combustion turbine may not vent gas unless the combustion turbine case pressure is less than or equal to 44.7 psia (30 psig). The permittee shall ensure isolation valves are closed and record the combustion turbine case pressure at the beginning of each combustion turbine shutdown venting event. The permittee shall minimize the amount of time for each combustion turbine start-up purge.

(9VAC5-50-260 and 9VAC5-80-1180)

- 9. **Emission Controls** – The permittee shall implement the following work practices to reduce emissions from leaks of natural gas from the facility.
 - a. The permittee shall develop, maintain, and implement a fugitive emission component monitoring and repair plan. In developing this plan, the definition of “fugitive emissions component” shall be the same as contained in 40 CFR 60.5430a. This plan shall consist of a daily auditory/visual/olfactory (AVO) inspection program for all fugitive emissions components. The plan shall also consist of a quarterly leak detection survey. A leaking fugitive emissions component for the purpose of the quarterly survey shall be an instrument reading of 500 ppm or more using Method 21 or an optical gas imaging camera. The instrument utilized must be maintained, calibrated, and operated in accordance with Method 21 and the manufacturer’s specifications. The initial survey shall be conducted no later than 60 days after the facility start-up with subsequent surveys conducted no less frequently than every calendar quarter. Consecutive surveys shall be no less than 60 days apart.
 - b. The first attempt to repair any fugitive emissions component found to be leaking during an AVO inspection or a quarterly survey shall be made as soon as practicable but no later than 3 days after discovery. The leaking fugitive emissions component shall be repaired within 15 days of discovery. The permittee shall maintain a list of difficult to repair fugitive emissions components, which when leaking, the repair requires facility shutdown or cannot otherwise be completed within 15 days of discovery; documentation justifying the inclusion of a fugitive emissions component on the list shall be included. If a leak is found that will emit more natural gas than the

required shutdown, the shutdown shall occur and the leak be repaired. If a leak is found that will emit less natural gas than a facility shutdown, repair may be delayed until the next facility shutdown unless the emissions from the total delayed repairs would exceed the emissions of the required shutdown. Records of the daily AVO inspection results, repair attempts, and the list of long-term leaking fugitive emissions components and reason for each delay shall be maintained on site.

- c. The monitoring plan shall be submitted to the Blue Ridge Regional Office for review and approval no later than 60 days prior to start-up of the facility.
- d. The fugitive emissions components on the VGRS shall be part of the daily AVO and quarterly leak detection survey.
- e. A summary of the results of the daily AVO and quarterly LDAR surveys shall be submitted with the quarterly reports required in Condition 51 detailing leaks detected, any corrective actions taken to address and minimize the leaks, and the dates of leak discovery and leak repair.

(9VAC5-50-260 and 9VAC5-80-1180)

10. **Monitoring Devices** – Each combustion turbine (TUR-05, TUR-06) shall be equipped with devices to continuously measure and record combustion turbine inlet air temperature, combustion turbine load, and “SoLoNOx” mode. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures that shall include, as a minimum, the manufacturer’s written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the combustion turbine is operating.
(9VAC5-50-20 C and 9VAC5-80-1180)
11. **Monitoring Devices** – Each SCR system shall be equipped with devices to continuously measure and record ammonia injection rate, catalyst bed differential pressure, and catalyst bed inlet gas temperature. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures that shall include, as a minimum, the manufacturer’s written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the SCR system is operating.
(9VAC5-50-20 C and 9VAC5-80-1180)
12. **Monitoring Devices** – Each combustion turbine shall be equipped with devices to continuously measure and record the seal gas pressure and the combustion turbine case pressure. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures that shall include, as a minimum, the manufacturer’s written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation at all times.
(9VAC5-50-20 C and 9VAC5-80-1180)

13. **Monitoring Devices** – Each oxidation catalyst system shall be equipped with a device to continuously measure and record the gas temperature at the catalyst bed inlet and the catalyst bed differential pressure. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures that shall include, at a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the oxidation catalyst system is operating.
(9VAC5-50-20 C and 9VAC5-80-1180)
14. **Monitoring Device** – The emergency engine (AUX-04) shall be equipped with a non-resettable hour meter to continuously measure hours of operation. The monitoring device shall be installed, maintained, calibrated, and operated in accordance with approved procedures, which shall include, as a minimum, the manufacturer's written requirements or recommendations. The monitoring device shall be provided with adequate access for inspection and shall be in operation when the emergency engine is operating.
(9VAC5-50-20 C and 9VAC5-80-1180)
15. **Monitoring Plan** – The permittee shall develop and operate in accordance with an approved monitoring plan for the monitoring devices identified in Conditions 10, 11, 12, and 13. The plan shall include ranges for each parameter. The range values shall be established during the initial performance tests required in Condition 35 and revalidated during the subsequent performance tests required in Condition 37. Ranges shall be 3-hour rolling averages. The monitoring plan shall be submitted to the Blue Ridge Regional Office with the test results as required in Condition 35.
(9VAC5-50-20 C and 9VAC5-80-1180)
16. **Monitoring Device - A Parametric Monitoring Systems (PMS)** shall be installed on the compressor engine (M/L 11) to measure and record the operating performance indicators as analytical monitoring for NO_x emissions. The PMS shall be installed, maintained, calibrated, and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the compressor engine (M/L 11) is operating. The PMS shall collect and record at a minimum four or more data points equally spaced over each hour the following parameters at the following frequencies:
 - (1) Fuel flow (FF_{SCFM}) in standard cubic feet per minute (SCFM) on an hourly average basis
 - (2) Engine speed (RPM) on an hourly average basis
 - (3) Air manifold temperature (AMT) in degrees F on an hourly average basis
 - (4) Critical trapped equivalence ratio (TER_C) on an hourly average basis
 - (5) Engine trapped volume (V_{TRAP}) in cubic feet (ft³) on an hourly average basis
 - (6) Actual air manifold pressure (AMPACT) in inches of mercury (in Hg) on an hourly average basis

(7) Critical air manifold pressure (AMPC) in inches of mercury (in Hg) on an hourly average basis

- a. If the one (1) hour average actual air manifold pressure (AMPACT) of the compressor engine (M/L 11) is less than the calculated critical air manifold pressure (AMPC) for a one-hour period, the permittee shall report a deviation from normal operation.
- b. If any three (3) hour average of AMPACT of the compressor engine (M/L 11) is less than the calculated AMPC for that engine, the source shall take timely corrective action such that the affected engine resumes normal operation.
- c. If the three (3) hour average of AMPACT of the affected engine (M/L 11) is less than the calculated AMPC for that engine for three (3) times during the year, the permittee shall repeat the testing required in Condition 39 to re-establish the correlation between parameter levels that indicate proper operation of the compressor engine (M/L 11) and assure compliance with the NOx limit. Testing shall be completed and the results submitted to the Blue Ridge Regional Office within ninety (90) days of the third occurrence.

(9VAC5-80-1180)

17. **Monitoring Device** - At least once per year, the permittee shall test the compressor engine (M/L 11) with a portable analyzer to demonstrate the validity of the PMS and compliance to the NOx emission limit in Condition 24. The engine shall be tested in the "as found" condition. The engine shall not be adjusted or tuned prior to any test for the purpose of lowering emissions, then returned to previous setting or operating conditions after the test is completed. The permittee shall submit the testing protocol for approval to the Blue Ridge Regional Office at least 30 days prior to the scheduled testing. The portable analyzer shall be capable of measuring NOx emissions over the full range of expected engine operating conditions. The permittee shall calibrate the portable analyzer in accordance to the provisions of 40 CFR Part 60 Appendix A, Method 7E or alternative as approved by the Administrator and record the results in a logbook.

(9VAC5-80-1180)

OPERATING LIMITATIONS

18. **Fuel** - The approved fuel for the combustion turbines (TUR-05, TUR-06) and emergency engine (AUX-04) is pipeline natural gas. A change in the fuel shall be considered a change in the method of operation of the combustion turbines (TUR-05, TUR-06) and emergency engine (AUX-04) and may require a new or amended permit. However, if a change in the fuel is not subject to new source review permitting requirements, this condition should not be construed to prohibit such a change.

(9VAC5-50-260 and 9VAC5-80-1180)

19. **Fuel** – The approved fuel for the compressor engine (M/L 11) is pipeline natural gas. A change in the fuel shall be considered a change in the method of operation of the compressor engine (M/L 11) and may require a new or amended permit.
(9VAC5-80-1180)
20. **Fuel Specification** – The pipeline natural gas shall not exceed a sulfur content of 1.1 grains of sulfur per 100 standard cubic feet at any time.
(9VAC5-80-1180)
21. **Fuel Monitoring** – The permittee shall use the fuel quality characteristics in a current, valid purchase contract, tariff sheet, or transportation contract for the fuel, specifying that the maximum total sulfur content for the natural gas being fired at the natural gas compressor station facility is 1.1 grains of sulfur or less per 100 standard cubic feet. In the alternative, the permittee may perform annual fuel analysis of on-site natural gas. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office no later than 60 days after test completion and shall conform to the test report format enclosed with this permit.
(9VAC5-50-410 and 9VAC5-80-1180)
22. **Operating Hours** – The emergency engine (AUX-04) shall be operated for the purposes of maintenance, testing, and emergencies (as defined in 9VAC5-80-1110C) only. The emergency engine (AUX-04) shall not operate more than 500 hours per year, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
(9VAC5-50-260 and 9VAC5-80-1180)
23. **Requirements by Reference** – Except where this permit is more restrictive than the applicable requirement, the combustion turbines (TUR-05, TUR-06) as described in the Introduction shall be operated in compliance with the requirements of 40 CFR 60, Subpart KKKK.
(9VAC5-50-400, 9VAC5-50-410, and 9VAC5-80-1180)

EMISSION LIMITS

24. **Emission Limits** – Emissions from the operation of the compressor engine (M/L 11) shall not exceed the limits specified below:

Nitrogen Oxides (as NO ₂)	19.20 lb/hr
---------------------------------------	-------------

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 6, 17, 19, 39 and 50.
(9VAC5-80-1180)

25. **Emission Limits** – Emissions from the operation of the emergency engine (AUX-04) shall not exceed the limits specified below:

Nitrogen Oxides (as NO ₂)	2.0 g/hp-hr	1.62 ton/yr
Carbon Monoxide	4.0 g/hp-hr	3.24 ton/yr
Volatile Organic Compounds	1.0 g/hp-hr	0.81 ton/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 7, 22, 36, 38 and 50. (9VAC5-50-260 and 9VAC5-80-1180)

26. **Emission Limits** – During the first 12-month period of operation, emissions from the operation of each Solar Titan combustion turbine (TUR-05, TUR-06) shall not exceed the limits specified below²:

Nitrogen Oxides (as NO ₂)	5.00 ppmvd @15% O ₂ *	3.45 lb/hr*	15.32 ton/yr
Carbon Monoxide	2.00 ppmvd @15% O ₂ *	0.84 lb/hr*	5.47 ton/yr
Volatile Organic Compounds	2.50 ppmvd @15% O ₂ *	0.60 lb/hr*	3.18 ton/yr
PM (filterable)		1.33 lb/hr*	5.81 ton/yr
PM ₁₀ (total)		1.33 lb/hr*	5.81 ton/yr
PM _{2.5} (total)		1.33 lb/hr*	5.81 ton/yr
Sulfur Dioxide		0.68 lb/hr*	2.98 ton/yr

*Limits are a 3-hour average and do not apply during periods of start-up, shutdown, or when ambient temperatures are below 0°F. The emission rates for startup/shutdown periods and low temperature operating mode (< 0°F and ≥ 50% load) are listed in Condition 28.

These emissions are derived from the estimated overall emission contribution from operating limits. Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period and shall include startup and shutdown periods, and when ambient temperatures are below 0 °F as applicable. Exceedance of the operating limits may

² 9VAC5-50-260 (BACT) refers to NO_x, CO, VOC, PM₁₀ and PM_{2.5} emissions for turbines TUR-05 and TUR-06.

be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 2, 3, 4, 5, 35 and 50. (9VAC5-50-260 and 9VAC5-80-1180)

27. **Emission Limits** – Beginning 12-months after start-up, during each 12-month period of operation, emissions from the operation of each Titan combustion turbine (TUR-05, TUR-06) shall not exceed the limits specified below¹:

Nitrogen Oxides (as NO ₂)	3.75 ppmvd @15% O ₂ *	2.59 lb/hr*	11.54 ton/yr
Carbon Monoxide	2.00 ppmvd @15% O ₂ *	0.84 lb/hr*	5.47 ton/yr
Volatile Organic Compounds	2.50 ppmvd @15% O ₂ *	0.60 lb/hr*	3.18 ton/yr
PM		1.33 lb/hr*	5.81 ton/yr
PM ₁₀		1.33 lb/hr*	5.81 ton/yr
PM _{2.5}		1.33 lb/hr*	5.81 ton/yr
Sulfur Dioxide		0.68 lb/hr*	2.98 ton/yr

*Limits are a 3-hour average and do not apply during periods of start-up, shutdown, or when ambient temperatures are below 0°F. The NO_x emission rates for startup/shutdown periods and low temperature operating mode (< 0°F and ≥ 50% load) are listed in Condition 29.

These emissions are derived from the estimated overall emission contribution from operating limits. Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period and shall include startup and shutdown periods, and when ambient temperatures are below 0°F as applicable. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 2, 3, 4, 5, **Error!**

Reference source not found.35, 37 and 50.

(9VAC5-50-260 and 9VAC5-80-1180)

28. **Emission Limits for Non-Standard Operating Modes** – During the first 12-month period of operation, emissions during start-up, shutdown, and low temperature mode from each Titan combustion turbine (TUR-05, TUR-06) shall not exceed the limits specified below:

	<u>Start-up</u>	<u>Shutdown</u>	<u>Low Temp Mode (<0 °F)</u>
Nitrogen Oxides (as NO ₂)	1.00 lb/event	1.00 lb/event	16.10 lb/hr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with this emission limit may be determined

as stated in Conditions 44 and 50.
 (9VAC5-50-260 and 9VAC5-80-1180)

29. **Emission Limits for Non-Standard Operating Modes** – Beginning 12-months after start-up, during each 12-month period of operation, emissions during start-up, shutdown, and low temperature mode from each Titan combustion turbine (TUR-05, TUR-06) shall not exceed the limits specified below:

	<u>Start-up</u>	<u>Shutdown</u>	<u>Low Temp Mode (<0 °F)</u>
Nitrogen Oxides (as NO ₂)	1.00 lb/event	1.00 lb/event	12.08 lb/hr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with this emission limit may be determined as stated in Conditions 44 and 50.
 (9VAC5-50-260 and 9VAC5-80-1180)

30. **Emission Limits** – Volatile organic compounds emissions shall not exceed the limits specified below:

Fugitive Emissions Components	0.89 ton/yr
Combined Combustion Turbine Venting (Start-up and Shutdown)	0.38 ton/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 8, 9, **Error! Reference source not found.**43, and 50.
 (9VAC5-50-260 and 9VAC5-80-1180)

31. **Visible Emission Limit** – Visible emissions from the each combustion turbine (TUR-05, TUR-06) shall not exceed 5% opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A).
 (9VAC5-50-260 and 9VAC5-80-1180)
32. **Visible Emission Limit** – Visible emissions from the emergency engine (AUX-04) shall not exceed 5% opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A).
 (9VAC5-50-260 and 9VAC5-80-1180)
33. **Visible Emission Limit** – Visible emission observations from combustion turbines (TUR-05, TUR-06) shall be conducted at least once a week. If visible emissions are observed, the permittee shall take timely corrective action such that the equipment resumes operation with no visible emissions or perform a visible emission evaluation (VEE) in accordance with 40 CFR 60, Appendix A, Method 9 to assure visible emissions from the emission unit is less than five (5) percent opacity. A record of the date, time, observer, cause and

corrective measures taken shall be made. If no visible emissions were observed, a record of the date, time and observer shall be made. These records shall be maintained on site by the permittee for the most recent 5-year period.
(9VAC5-80-1180)

TESTING

34. **Emissions Testing** – The facility shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. Sampling ports, safe sampling platforms, and access shall be provided when requested.
(9VAC5-50-30 F and 9VAC5-80-1180)
35. **Stack Test** – Initial performance tests shall be conducted for CO, VOC, PM₁₀, and PM_{2.5} from each combustion turbine (TUR-05, TUR-06) to determine compliance with the emission limits contained in Condition 26. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9VAC5-50-30, and the test methods and procedures contained in each applicable section or subpart listed in 40CFR Part 51 Appendix M or 9VAC5-50-410. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility and shall conform to the test report format enclosed with this permit.
(9VAC5-50-30 and 9VAC5-80-1200)
36. **Stack Test** – Initial performance tests shall be conducted for NO_x, CO, and VOC from the emergency engine (AUX-04) to determine compliance with the emission limits contained in Condition 25. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9VAC5-50-30, and the test methods and procedures contained in each applicable section or subpart listed in 9VAC5-50-410. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility and shall conform to the test report format enclosed with this permit.
(9VAC5-50-30 and 9VAC5-80-1200)
37. **Stack Test** – The permittee shall repeat the performance tests contained in Condition 35 every two years to determine compliance with the emission limits contained in Condition 27. Subsequent tests shall be performed no later than 26 months after the previous test.

The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office no later than 60 days after test completion and shall conform to the test report format enclosed with this permit.
 (9VAC5-50-30 and 9VAC5-80-1200)

38. **Stack Test** – The permittee shall repeat the performance tests contained in Condition 36 every 8,760 hours of operation or 36 months, whichever is earlier. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office no later than 60 days after test completion and shall conform to the test report format enclosed with this permit.
 (9VAC5-50-30 and 9VAC5-80-1200)
39. **PMS Relative Accuracy Test** – Unless previously completed, the permittee shall perform a minimum of nine (9) emissions tests runs to establish a correlation between the engine operating parameters in Condition 16 and NOx emissions in Condition 24 from the compressor engine (M/L 11) using the following equation and constants A, B, and C referenced below:

$$AMP_C = \frac{\{AF_{ST} \times (0.0765 \times FSG) \times \frac{FF_{SCFM}}{RPM} \times (AMT + 460)\}}{(2.699 \times TER_C \times V_{TRAP})} - 14.73 \times 2.036$$

Where:

AMP_C = critical air manifold pressure in inches of mercury (in Hg)
 AF_{ST} = stoichiometric air/fuel ratio
 FSG = fuel gas specific gravity
 FF_{SCFM} = unit fuel flow rate in standard cubic feet per minute (SCFM)
 RPM = unit speed in revolutions per minute
 AMT = air manifold temperature in °F
 TER_C = critical trapped equivalence ratio
 V_{TRAP} = engine trapped volume in cubic feet (ft³)

And:

$$TER_C = A \times \frac{(FF_{SCFM})^2}{(RPM)^2} + B \times \frac{(FF_{SCFM})}{(RPM)} + C$$

Where:

A, B, and C = constants determined based upon initial performance testing of affected unit.

(9VAC5-80-1180)

40. **Test Protocol and Results** - Tests for compressor engine (M/L 11) shall be conducted and reported and data reduced as set forth in 9VAC5-50-30 and the test methods and procedures contained in each applicable section listed in 40 CFR Part 60, Appendix A or alternative as approved by the Administrator. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to the scheduled testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.
(9VAC5-80-1180)
41. **Future Testing** - If the compressor engine (M/L 11) is changed in a manner that results in significant changes in the parameters established in Condition 39, the permittee shall repeat the testing required in Condition 39 to re-establish the correlation between parameter levels that indicate proper operation of the affected engine (Ref. M/L 11) and assure compliance with the NOx limit. Testing shall be completed and the results submitted to the Blue Ridge Regional Office within ninety (90) days of the engine change.
(9VAC5-80-1180)
42. **Visible Emissions Evaluation** – Concurrently with the initial performance tests in Conditions 35 and 36 and subsequent performance tests in Conditions 37 and 38, Visible Emission Evaluations (VEE) in accordance with 40 CFR Part 60, Appendix A, Method 9, shall also be conducted by the permittee. Each test shall consist of 30 sets of 24 consecutive observations (at 15 second intervals) to yield a six-minute average. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. The initial test shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Should conditions prevent concurrent opacity observations, the Blue Ridge Regional Office shall be notified in writing, within seven days, and visible emissions testing shall be rescheduled within 30 days. Rescheduled testing shall be conducted under the same conditions (as possible) as the initial performance tests. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility and shall conform to the test report format enclosed with this permit.
(9VAC5-50-30 and 9VAC5-80-1200)
43. **VGRS Evaluation** - The permittee shall ensure proper operation and maintenance of the pressurized hold required in Condition 8.b by performing an evaluation for each combustion turbine by quantitative analysis of leaks during a pressurized hold using Method 21 or an optical gas imaging camera. The seal gas pressure and the combustion turbine case pressure shall be monitored during this evaluation to ensure continued proper operation of the VGRS and shall form acceptable ranges for on-going operation. The initial evaluation shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Subsequent annual

evaluations shall be performed, reported, and demonstrate compliance thereafter at a period not to exceed 13 months from the preceding evaluation. The test report shall conform to the test report format enclosed with this permit and shall include the established pressure ranges.

(9VAC5-50-30 and 9VAC5-80-1200)

CONTINUOUS EMISSION MONITORING SYSTEMS (CEMS)

44. **CEMS - Continuous Emission Monitoring Systems**, meeting the design specifications of 40 CFR Part 60, Appendix B, shall be installed to measure and record the emissions of nitrogen oxides (NOx) and the oxygen content of the exhaust gas from the compressor turbine stack as ppmvd corrected to 15% O₂. Except where otherwise approved by the DEQ, the CEMS shall be installed, calibrated, maintained, audited and operated in accordance with the requirements of 40 CFR 60.13, 40 CFR 60, Subpart KKKK and 40 CFR 60, Appendices B and F. Data shall be reduced to 3-hour rolling averages, using procedures approved by the Blue Ridge Regional Office.

(9VAC5-50-40 and 9VAC5-80-1180)

45. **CEMS Performance Evaluations** - Performance evaluations of the CEMS shall be conducted in accordance with 40 CFR Part 60, Appendix B, and shall take place during the performance tests required by Conditions 35 and 37 or within 30 days thereafter. One copy of the performance evaluations report shall be submitted to the DEQ within 45 days of the evaluation. The CEMS shall be installed and operational prior to conducting initial performance tests. Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation and calibration of the device. A 30 day notification, prior to the demonstration of the CEMS performance, and subsequent notifications, shall be submitted to the Blue Ridge Regional Office.

(9VAC5-80-1180 and 9VAC5-50-40)

46. **CEMS Quality Control Program** - A CEMS quality control program which is equivalent to the requirements of 40 CFR 60.13 and 40 CFR 60 Appendix F shall be implemented for all continuous emissions monitoring systems.

(9VAC5-80-1180 and 9VAC5-50-40)

47. **CEMS Excess Emissions and Monitor Downtime for NOx** - For the purpose of this permit, periods of excess emissions and monitor downtime that must be reported under Condition 48 are defined as follows:

- a. An excess emission is any unit operating period in which the 3-hour rolling average NOx emission rate exceeds the applicable emission limit in Conditions 26 or 27 and
- b. A period of monitor downtime is any unit operating hour in which the data for any of the following parameters are either missing or invalid: NOx concentration, O₂ concentration and fuel flow rate.

(9VAC5-50-50 and 9VAC5-50-410)

48. **CEMS Reports** - The permittee shall furnish written reports to the DEQ of excess emissions from any process monitored by a CEMS with the quarterly report required in Condition 51. These reports shall include, but are not limited to the following information:
- a. The magnitude of excess emissions, any conversion factors used in the calculation of excess emissions, and the date and time of commencement and completion of each period of excess emissions;
 - b. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the process, the nature and cause of the malfunction (if known), the corrective action taken or preventative measures adopted;
 - c. The date(s) and time(s) identifying each period during which the CEMS was inoperative except for zero and span checks and the nature of the system repairs or adjustments; and
 - d. When no excess emissions have occurred or the CEMS have not been inoperative, repaired or adjusted, such information shall be stated in that report.

(9VAC5-80-1180 and 9VAC5-50-50)

ADDITIONAL REQUIREMENTS

49. **Ambient Air Quality Monitoring** – The permittee shall conduct ambient air monitoring for NO₂ beginning with the startup of either combustion turbine (TUR-05, TUR-06). No later than 180 days prior to startup of the combustion turbines (TUR-05, TUR-06), the permittee shall submit an Ambient Air Quality Monitoring Quality Assurance Project Plan (QAPP) for approval by the Blue Ridge Regional Office. The Quality Assurance Project Plan shall be developed consistent with the requirements of EPA's "Guide to Writing Quality Assurance Project Plans for Ambient Air Monitoring Networks" (EPA-454/8-18-006). The permittee shall not certify ambient monitoring data without an approved QAPP. The plan shall include, at a minimum, all the elements described in EPA-454/8-18-006 in addition to the following elements:
- a. Description of the site selection process for air quality and meteorological monitors;
 - b. Description of procedures for all aspects of the operation of monitoring equipment including maintenance, data processing, data validation, data reporting and data certification. These procedures shall be developed consistent with the requirements described in EPA's "Guidance for Preparing Standard Operating Procedures (SOPs)" (EPAQA/G-6). The SOPs shall be submitted to the Blue Ridge Regional Office for approval with the QAPP.

- c. All monitoring and associated tasks shall conform to, at a minimum, the applicable requirements of 40 CFR Parts 50, 53, 58, and any other requirements specified by the Blue Ridge Regional Office.
- d. Performance Evaluations (PE) for all monitoring equipment installed consistent with these conditions shall be performed by the permittee or their designated representative. These PEs shall be performed consistent with the requirements of 40 CFR Part 58, Appendix A Section 3. Results of the PE shall be submitted to the Blue Ridge Regional Office 3 months after the performance date of the PE. The permittee shall be responsible for submitting the results of the PE to the EPA Air Quality Subsystem database. If the PE does not meet the requirements of the 40 CFR Part 58 Section 3, the Blue Ridge Regional Office shall be notified prior to the submittal of the data to the AQS database. This notification is to include any remedial action taken or planned to be taken by the permittee to bring the system into compliance with the requirements of 40 CFR Part 58 Section 3.

The Blue Ridge Regional Office will approve the monitoring location(s) based on EPA's siting criteria and the proximity to the maximum modeled impact from the compressor station for each pollutant. Completion of ambient air monitoring subject to approval by the Blue Ridge Regional Office.
(9VAC5-80-1180)

RECORDS AND REPORTING

- 50. **On Site Records** – The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Blue Ridge Regional Office. These records shall include, but are not limited to:
 - a. Monthly and annual consumption of natural gas for the turbines (TUR-05, TUR-06) and emergency engine (AUX-04). Annual throughput shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
 - b. Operation and control device monitoring records as required in Conditions 8, 9, 10, 11, 12, 13, 14, and 21.
 - c. Records for each event when a combustion turbine does not operate in "SoLoNOx mode" shall include event duration, event reason, and annual hours. Annual hours shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

- d. Documentation from Solar for all parameters and their ranges that are relevant to the "SoLoNOx mode" determination.
- e. Records of fuel quality characteristics to demonstrate compliance with Condition 21.
- f. Monthly emissions calculations for NO_x, CO, VOC, PM, PM₁₀, PM_{2.5}, and SO₂ from the combustion turbines (TUR-05, TUR-06) and emergency engines (AUX-04) using calculation methods approved by the Blue Ridge Regional Office to demonstrate compliance with the annual emission limitations in Conditions 25, 26, 27, and 30.
- g. Scheduled and unscheduled maintenance and operator training.
- h. Records of actual piping pressure prior to venting gas from that section of piping, the clock time for the opening and closing of any vent valve, the amount of gas vented during the event, and any mitigation measures used. These records include the ESD testing, combustion turbine start-up purge, and combustion turbine shutdown venting.
- i. Records of the time, date, and duration of each combustion turbine start-up and shutdown event.
- j. Records of the operating time and reason for each operation of the emergency engine (AUX-04)
- k. Results of all stack test data, VGRS evaluations, and visible emissions evaluations.
- l. CEMS calibrations, calibration checks, percent operating time, and excess emissions.
- m. The occurrence and duration of any periods during which a CEMS is inoperative.
- n. Periodic monitoring records for the compressor engine (M/L 11) necessary to demonstrate compliance with the NO_x emission limit in Condition 24.
- o. Calculations for the compressor engine (M/L 11) demonstrating compliance with the NO_x emissions limit listed in Condition 24.
- p. A summary of any corrective maintenance taken.
- q. Records of the portable analyzer calibration for the compressor engine (M/L 11).

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

(9VAC5-80-1180 and 9VAC5-50-50)

51. **Reporting** - The permittee shall submit a certification of compliance with all terms and conditions of this permit, including emission limitation standards or work practices, as well as any other applicable requirement to the Blue Ridge Regional Office no later than March

1 and September 1 of each calendar year. This report must be signed by a responsible official, consistent with 9VAC5-20-230. The time periods to be addressed are January 1 to June 30 and July 1 to December 31. Each report shall include the following information:

- a. Exceedances of emissions limitations or operational restrictions;
- b. Excursions from control device operating parameter requirements, as documented by continuous emission monitoring;
- c. Failure to meet monitoring, recordkeeping, or reporting requirements contained in this permit;
- d. Summary results of the daily AVO and quarterly LDAR surveys required in Condition 9; and
- e. Excess emission reports required in Condition 48.

If there were no deviations from permit conditions during the time period, the permittee shall include a statement in the report that "no deviations from permit requirements occurred during this semi-annual reporting period." These reports shall be maintained and shall be current for the most recent five years.
(9VAC5-80-1180 and 9VAC5-50-50)

NOTIFICATIONS

52. **Initial Notifications** – The permittee shall furnish written notification to the Blue Ridge Regional Office of:
- a. The actual date on which construction of the combustion turbines (TUR-05 and TUR-06) and the emergency engine (AUX-04) commenced within 30 days after such date.
 - b. The actual date on which shutdown of the Clark TLA-6 reciprocating engines (M/L1 – M/L10) occurred within 15 days of such date.
 - c. The anticipated start-up date of the combustion turbines (TUR-05 and TUR-06) and the emergency engine (AUX-04) postmarked not more than 60 days nor less than 30 days prior to such date.
 - d. The actual start-up date of the combustion turbines (TUR-05 and TUR-06) and the emergency engine (AUX-04) within 15 days after such date.
 - e. The anticipated date of performance tests postmarked at least 30 days prior to such date.
 - f. Copies of the written notification referenced in items 52.a, and 52.c through 52.e above are to be sent to:

Associate Director
Office of Air Enforcement and Compliance Assistance (3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

(9VAC5-50-50 and 9VAC5-80-1180)

GENERAL CONDITIONS

53. **Permit Invalidation** – This permit to construct the combustion turbines (TUR-05 and TUR-06) and the emergency engine (AUX-04) shall become invalid, unless an extension is granted by the DEQ, if:

- a. A program of continuous construction is not commenced within 18 months from the date of this permit.
- b. A program of construction is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.

(9VAC5-80-1210)

54. **Permit Suspension/Revocation** – This permit may be suspended or revoked if the permittee:

- a. Knowingly makes material misstatements in the permit application or any amendments to it;
- b. Fails to comply with the conditions of this permit;
- c. Fails to comply with any emission standards applicable to a permitted emissions unit;
- d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or
- e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emissions limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

(9VAC5-80-1210 G)

55. **Right of Entry** – The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
- b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
- c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
- d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.
(9VAC5-170-130 and 9VAC5-80-1180)

56. **Maintenance/Operating Procedures** – At all times, including periods of start-up, shutdown, and malfunction, the permittee shall, to the extent practicable, maintain and operate the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment and process equipment which affect such emissions:

- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
- b. Maintain an inventory of spare parts.
- c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.
- d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.
(9VAC5-50-20 E and 9VAC5-80-1180 D)

57. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown, or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9VAC5-20-180 J and 9VAC5-80-1180 D)
58. **Notification for Facility or Control Equipment Malfunction** – The permittee shall furnish notification to the Blue Ridge Regional Office of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour. Such notification shall be made no later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within 14 days of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Blue Ridge Regional Office.
(9VAC5-20-180 C and 9VAC5-80-1180)
59. **Violation of Ambient Air Quality Standard** – The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9VAC5-20-180 I and 9VAC5-80-1180)
60. **Change of Ownership** – In the case of a transfer of ownership of the stationary source, the new owner shall abide by any current minor NSR permit issued to the previous owner. The new owner shall notify the Blue Ridge Regional Office of the change of ownership within 30 days of the transfer.
(9VAC5-80-1240)
61. **Permit Copy** – The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9VAC5-80-1180)

STATE-ONLY ENFORCEABLE (SOE) REQUIREMENTS

The following terms and conditions are included in this permit to implement the requirements of 9VAC5-40-130 et seq., 9VAC5-50-130 et seq., 9VAC5-60-200 et seq. and/or 9VAC5-60-300 et seq. and are enforceable only by the Virginia Air Pollution Control Board. Neither their inclusion in this permit nor any resulting public comment period make these terms federally enforceable.

62. **(SOE) Operating Limit** – The testing of either Station 166 emergency engine (ENG1, ENG2) shall not coincide with the startup or shutdown of any Station 165 or 166 turbine (TUR-01 - TUR-06).
(9VAC5-60-320, 9VAC5-80-1120F, and 9VAC5-80-1180)

63. **(SOE) Emission Limits** – Formaldehyde (CAS# 50-00-0) emissions from the facility shall not exceed the limits specified below:

TUR-05	0.30 lb/hr*	0.29 lb/hr**	1.66 ton/yr
TUR-06	0.30 lb/hr*	0.29 lb/hr**	1.66 ton/yr
AUX-04	0.64 lb/hr		0.16 ton/yr
Total Facility	1.24 lb/hr		3.48 ton/yr

* Limit applies only when ambient temperatures are below 0°F and the turbine is operating at greater than or equal to 50% load – not during start-up or shutdown.

** Limit applies only when ambient temperatures are greater than or equal to 0°F and the turbine is operating at greater than or equal to 50% load – not during start-up or shutdown.

Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period. These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3, 5, 7, 8, 22, 66, 67, and 69. (9VAC5-60-320, 9VAC5-80-1120F, and 9VAC5-80-1180)

64. **(SOE) Emission Limits** – Start-up and shutdown emissions of Formaldehyde (CAS# 50-00-0) from TUR-05 and TUR-06, shall not exceed the limits specified below:

Start-up	2.90 lb/event	3.15 lb/hr
Shutdown	2.40 lb/event	2.65 lb/hr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3, 5, 7, 22, 66, 67, and 69. (9VAC5-60-320, 9VAC5-80-1120F, and 9VAC5-80-1180)

65. **(SOE) Emission Limits** – Hexane (CAS# 110-54-3) emissions from venting events at the facility shall not exceed the limits specified below:

TUR-05	0.24 lb/hr
TUR-06	0.24 lb/hr

Compliance with these limits may be determined as stated in Conditions 8, 68, and 69. (9VAC5-60-320, 9VAC5-80-1120F, and 9VAC5-80-1180)

66. **(SOE) Stack Test** – Concurrently with the performance tests in Condition 35 and 37, initial performance tests shall be conducted for formaldehyde from the compressor turbines (TUR-05, TUR-06) to determine compliance with the emission limits contained in Condition 63. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9VAC5-60-30, and the test methods and procedures contained in each applicable section or subpart listed in 9VAC5-60-100. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility and shall conform to the test report format enclosed with this permit.
(9VAC5-60-30, 9VAC5-80-1120F, and 9VAC5-80-1180)
67. **(SOE) Stack Test** – Concurrently with the performance tests in Conditions 36 and 38, initial performance tests shall be conducted for formaldehyde from the emergency engine (AUX-04) to determine compliance with the emission limit contained in Condition 63. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9VAC5-60-30, and the test methods and procedures contained in each applicable section or subpart listed in 9VAC5-60-100. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility and shall conform to the test report format enclosed with this permit.
(9VAC5-60-30, 9VAC5-80-1180, and 9VAC5-80-1120F)
68. **(SOE) Fuel Monitoring** – The permittee shall use the fuel quality characteristics in a current, valid purchase contract, tariff sheet, or transportation contract for the fuel, specifying the maximum hexane content for the natural gas being fired at the natural gas compressor station facility. In the alternative, the permittee may perform annual fuel analysis of on-site natural gas. The details of the tests are to be arranged with the Blue Ridge Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Blue Ridge Regional Office no later than 60 days after test completion and shall conform to the test report format enclosed with this permit.
(9VAC5-80-1120F and 9VAC5-80-1180)
69. **(SOE) On Site Records** – The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content

and format of such records shall be arranged with and approved by the Blue Ridge Regional Office. These records shall include, but are not limited to:

- a. Hourly, monthly, and annual emissions (in pounds and tons) of formaldehyde and hexane, including hexane emissions exhausted during any venting event, to demonstrate compliance with the emissions limitations in Conditions 63, 64, and 65. Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period.
- b. Results of all stack test data.
- c. Equipment status to demonstrate compliance with Condition 62.
- d. Hexane analysis results to demonstrate compliance with Condition 68.

These records shall be available for inspection by the Blue Ridge Regional Office and shall be current for the most recent five years.

(9VAC5-60-50, 9VAC5-80-1120F and 9VAC5-80-1180)

SOURCE TESTING REPORT FORMAT

Report Cover

1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Test Dates.
4. Tester; name, address and report date

Certification

1. Signed by team leader/certified observer (include certification date)
2. Signed by responsible company official
3. *Signed by reviewer

Copy of approved test protocol

Summary

1. Reason for testing
2. Test dates
3. Identification of unit tested & the maximum rated capacity
4. *For each emission unit, a table showing:
 - a. Operating rate
 - b. Test Methods
 - c. Pollutants tested
 - d. Test results for each run and the run average
 - e. Pollutant standard or limit
5. Summarized process and control equipment data for each run and the average, as required by the test protocol
6. A statement that test was conducted in accordance with the test protocol or identification & discussion of deviations, including the likely impact on results
7. Any other important information

Source Operation

1. Description of process and control devices
2. Process and control equipment flow diagram
3. Sampling port location and dimensioned cross section Attached protocol includes: sketch of stack (elevation view) showing sampling port locations, upstream and downstream flow disturbances and their distances from ports; and a sketch of stack (plan view) showing sampling ports, ducts entering the stack and stack diameter or dimensions

Test Results

1. Detailed test results for each run
2. *Sample calculations
3. *Description of collected samples, to include audits when applicable

Appendix

1. *Raw production data
2. *Raw field data
3. *Laboratory reports
4. *Chain of custody records for lab samples
5. *Calibration procedures and results
6. Project participants and titles
7. Observers' names (industry and agency)
8. Related correspondence
9. Standard procedures

* Not applicable to visible emission evaluations