

Calvert City Special Study

FINAL REPORT:
OCTOBER 24, 2020 – OCTOBER 31, 2021



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Report Purpose:

According to Chapter 25.0 of the Kentucky Division for Air Quality's (KDAQ) Quality Assurance Project Plan (QAPP) for Volatile Organic Compound (VOC) Monitoring near the Calvert City Industrial Complex, KDAQ is to provide an account of the monitoring activities and summarize the data collected in support of this special study. Minimally, the report must include the following statistics for the study's Chemicals of Potential Concern (COPCs) at each monitoring site:

- Number of valid observations
- 1st-4th maximum 24-hour concentrations recorded
- Annual arithmetic mean
- Comparison of data to national VOC data in AQS

Data is also compared against the data quality indicators (DQIs) found in Chapter 25.0 of the QAPP. This final report is intended to supplement the analysis previously provided by quarterly status report submittals, as well as the plans, objectives, and quality assurance activities provided by the QAPP. It is intended to serve as a generalized overview of the study and to assist with data interpretation. EPA's risk assessment will rely upon quality-assured data, as reported to the AQS database.

Summary of Monitoring Activities:

The measurement goal of the Calvert City Special Study is to estimate 24-hour average passive canister sample concentrations of VOCs, utilizing EPA Compendium Method TO-15, for target COPCs. COPCs were identified by a risk screening assessment conducted by EPA Region 4, utilizing VOC data previously collected by KDAQ from 2011-2017 in the Calvert City Industrial Complex. The screening assessment identified five COPCs that contributed to elevated cancer risk-screening levels. The COPCs for the study are:

Calvert City Study: Chemicals of Potential Concern (COPCs)								
Target Pollutants	Analyte Class & Analysis Method	CAS #	AQS Code	Molecular Weight	Carbon Count	Chronic Screening Level		
						ug/m3	ppbC	ppbV
Ethylene Dichloride (EDC, 1,2-Dichloroethane)	VOCs via TO-15 (Method Code 149)	107-06-2	43815	98.96	2	0.0385	0.01904	0.00952
Vinyl Chloride (VC, Chloroethene)		75-01-4	43860	62.5	2	0.114	0.0892	0.0446
1,3-Butadiene (Buta-1,3-diene)		106-99-0	43218	54.09	4	0.0333	0.0604	0.0151
Acrylonitrile (Prop-2-enenitrile)		107-13-1	43704	53.06	3	0.0147	0.02034	0.00678
Benzene		71-43-2	45201	78.11	6	0.128	0.2406	0.0401

$ppbC = ppbV * Carbon\ Count$

Chronic screening levels were calculated using EPA's Dose-Response Assessment Tables for Hazardous Air Pollutants (<https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants>), which compiles and prioritizes toxicity values from many sources including the EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), the State of California, and other government bodies. These tables support hazard identification and dose-response assessment, as defined in the National Academy of Sciences (NAS) risk assessment paradigm, for estimating the risk of contracting cancer and the

level of hazard associated with adverse health effects other than cancer. More information regarding screening levels and the calculations used for this study can be found in Appendix B of the QAPP.

In accordance with the QAPP, KDAQ established three monitoring sites, based upon air dispersion modeling conducted by EPA Region 4. The modeling was performed with KDAQ emissions data from 2013-2017 for ethylene dichloride and vinyl chloride. To aid in data interpretation and analysis, hourly meteorological measurements were taken at one of the monitoring sites during the study. For comparisons against background concentrations, data was also collected at the previously established National Air Toxics Trends Site (NATTS), located at Grayson Lake, KY.

A summary of each site, including the sampling instruments, sampling media, sampling schedules, and monitoring purpose, is shown by the table below:

Calvert City Study: Site & Monitor Summary						
Site/AQS ID/Coordinates	Objective	Sampling Instruments	Sampling Media	Monitor Type	Sampling Schedule	Monitor Purpose
LWD Collocated & Meteorological Site (LWD) 21-157-0021 37.047906, -88.338347	Maximum Expected Ethylene Dichloride* Concentration and Meteorology	Xonteck 911a	6-Liter stainless steel canister	Primary and collocated	Primary- Every 6 days; Collocated- Every 12 days	Characterization of maximum EDC concentration
		RM Young 05305V	n/a	n/a	Continuous	Characterization of wind speed/direction, representative of entire study area
Johnson-Riley Road (JRR) 21-157-0020 37.041179, -88.351889	Maximum Expected Vinyl Chloride* Concentration	Xonteck 911a	6-Liter stainless steel canister	Primary	Every 6 days	Characterization of maximum VC concentration
Calvert City Elementary (CCE) 21-157-0018 37.026746, -88.343747	High Air Toxics Concentration in Area of Expected Population Exposure	Xonteck 911a	6-Liter stainless steel canister	Primary	Every 6 days	Characterization of air quality in more heavily populated area
Grayson Lake NATTS (GLKY) 21-043-0500 38.238972, -82.988084	Comparative Background Concentrations (previously established NATTS site)	ATEC 2200	6-Liter stainless steel canister	Primary and collocated	Primary- Every 6 days; Collocated- 6/Year	Background

**Note LWD was incorrectly identified as the maximum concentration VC site in the QAPP. JRR is the maximum concentration VC site and LWD is the maximum concentration EDC site.*

Monitoring sites were procured and established by KDAQ, with the assistance of EPA Region 4. EPA approved the locations of the monitoring sites, prior to commencement of monitoring, to ensure that the sites would meet monitoring objectives. Additionally, KDAQ conducted siting criteria evaluations on October 29, 2020, and found that siting was acceptable. A September 29, 2021, criteria siting evaluation found that siting remained acceptable through the study.

Prior to the commencement of monitoring, KDAQ worked with EPA Region 4 to develop an acceptable QAPP. All EPA signatures were obtained on October 27, 2020. In 2021, an annual review of the QAPP was completed with only minor revisions necessary. EPA signatures were obtained for the revised QAPP on September 16, 2021.

KDAQ originally intended to start sampling January 1, 2020, as stated in the 2019 Annual Network Plan. However, KDAQ and EPA agreed to delay the commencement of sampling as a result of the COVID-19 pandemic. The study's COPCs and site-expectations were outlined in the 2020 Annual Network Plan and re-iterated in the 2021 Annual Network Plan.

KDAQ began collecting VOC samples on October 24, 2020. Since the QAPP required one full year of sampling, with 12 complete months, EPA and KDAQ agreed that the risk assessment should encompass data collected between October 24, 2020, and October 31, 2021; as such, these are the data summarized for this Final Report.

KDAQ will continue to collect VOC samples at all three monitoring sites until the results of the risk assessment are released. However, the meteorological tower was shut down on December 31, 2021, due to safety concerns. The results of the EPA risk assessment will be made available to the general public.

Data Validation and Verification:

At the time of this report, data has been uploaded to AQS through December 2021. KDAQ has validated and verified all CoCs, laboratory reports, and AQS data through October 31, 2021, for this report. There must be one disclaimer made for data validation:

- KDAQ has not received and reviewed the results of 4Q21 and 1Q22 lab PT results, which are used for bracketing data for “4”- Lab Issue flags for any pollutant that doesn't meet MQOs during two subsequent PTs. According to Battelle, the EPA contractor responsible for PT oversight, the reporting of results has been delayed. However, KDAQ believes it is acceptable to release the dataset as PTs are not used to invalidate samples. If flags are necessary, they can be applied without altering concentration data. KDAQ will notify all known stakeholders if additional flags are required.

Summary of Quality Assurance & Control Activities:

- **Flow Checks:** Flowrates were set to 3.15-3.85 sccm by the KDAQ site operator, with a target flow of approximately 3.50 sccm, in accordance with the QAPP. Flowrates were checked against a NIST-traceable standard at least once each month by the site operator. Flows outside of 3.15-3.85 sccms were reset in order to achieve optimal canister volume during sampling. Ultimately, canister sample volumes (as measured by the ERG lab) determined sample validity. Leak checks were performed with each flow check, as well as before each sample run.

KDAQ applied action and control limits for flows that ensure bias was less than 25%. In combination with performance audits (below), data meets the DQI of “**Field Collection Bias**”. Detailed results are summarized in the quarterly reports.

- **Performance Audits:** The KDAQ Quality Assurance Section conducted audits at least once each quarter, using NIST-traceable standards, in accordance with the QAPP. Corrective actions were issued if the audit indicated flowrates outside of 3.15-3.85 sccm. If necessary,

flows were reset in order to achieve optimal canister volume during sampling. Ultimately, canister sample volumes (as measured by the ERG lab) determined sample validity. The meteorological tower was also audited quarterly, in accordance with the QAPP; no corrective actions were necessary. Results of VOC sampler and meteorological audits are summarized in the quarterly reports.

- **Systems Audits:** The KDAQ Quality Assurance Section, conducted technical systems audits as least annually, in accordance with the QAPP. No major finding that jeopardize data quality were found. The study's systems audits are summarized in the 1Q22 Status Report.
- **Non-Biasing Certifications:** In accordance with the QAPP, samplers used for the study were sent to ERG to receive Non-Biasing Certifications (NBCs). Samplers were required to pass the NBC for the study's COPCs. The sample data for non-COPC pollutants were flagged "SB" if they did not pass. In accordance with EPA guidance, data collected with samplers having an expired NBC were flagged "2". The status of each sampler used in the study was tracked in quarterly reports.
- **Lab Proficiency Tests:** In accordance with the QAPP, the ERG laboratory participated in NATTS proficiency tests (PTs). In accordance with EPA guidance, KDAQ requests that ERG flag all AQS sample data as "4"-Lab Issue for any pollutant that does not meet measurement quality objectives (MQOs) of 25% during two subsequent PTs. VOC PTs were conducted 1Q21, 2Q21, and 3Q21. All VOC data were found to be within MQOs; thus, no flags were applied. As such, data meets the DQI of "**Laboratory Bias**". While VOC PTs were also conducted in 4Q21 and 1Q22, results have not been received. However, KDAQ believes it is acceptable to release the dataset as PTs are not used to invalidate samples. If flags are necessary, they can be applied later without altering concentration data.
- **Lab Method Detection Limits:** According to the QAPP, the ERG laboratory was required to report MDLs that were equal to or less than the MDLs required for NATTS-program pollutants. Three pollutants (ethylene dichloride, vinyl chloride, and benzene) were both NATTS pollutants and Calvert City Special Study COPCs. For those three COPCs, ERG reported study MDLs that were below the MDLs used by the NATTS program; as such, the study met the DQI for "**Sensitivity**".

ERG Method Detection Limits					
COPC	AQS Code	NATTS MDLs (ug/m3)	NATTS MDLs (ppbV)	2020 MDL (ppbV)	2021 MDL (ppbV)
Ethylene Dichloride	43815	n/a	n/a	0.0107	0.00724
Vinyl Chloride	43860	0.11000	0.04303	0.0154	0.00861
1,3-Butadiene	43218	0.10000	0.04520	0.0119	0.0165
Acrylonitrile	43704	n/a	n/a	0.0109	0.0171
Benzene	45201	0.13000	0.04069	0.0102	0.0117

Final Data Recovery:

The chart below summarizes monthly and annual data recovery.

Calvert City Study: Monthly Data Recovery										
Month	# Scheduled 1/6 Run Days	# Scheduled 1/12 Run Days	Calvert City Elem. (CCE)		Johnson-Riley Rd. (JRR)		LWD-Primary (LWD-P)		LWD-Collocated (LWD-C)	
			# Valid	% Rec.	# Valid	% Rec.	# Valid	% Rec.	# Valid	% Rec.
Oct-2020*	2	1	2	100.0	2	100.0	2	100.0	1	100.0
Nov-2020	5	2	5	100.0	5	100.0	3	60.0	2	100.0
Dec-2020	5	3	5	100.0	5	100.0	6	120.0	2	66.7
Jan-2021	5	2	5	100.0	5	100.0	5	100.0	2	100.0
Feb-2021	5	3	5	100.0	2	40.0	5	100.0	2	66.7
Mar-2021	5	2	5	100.0	5	100.0	5	100.0	2	100.0
Apr-2021	5	3	5	100.0	5	100.0	5	100.0	3	100.0
May-2021	5	2	5	100.0	3	60.0	5	100.0	2	100.0
Jun-2021	5	3	5	100.0	6	120.0	5	100.0	3	100.0
Jul-2021	5	2	5	100.0	5	100.0	4	80.0	2	100.0
Aug-2021	5	3	5	100.0	5	100.0	5	100.0	3	100.0
Sep-2021	5	2	5	100.0	5	100.0	5	100.0	2	100.0
Oct-2021	6	3	4	66.7	5	83.3	6	100.0	2	66.7
Total Observations	61	31	Total	Avg. %	Total	Avg. %	Total	Avg. %	Total	Avg. %
			61	97.4	58	92.6	61	96.9	28	92.3
Comparison Against Total Annual Obs.			100.0 %		95.1 %		100.0 %		90.3 %	

* Sampling did not start until October 24, 2020.

- According to the QAPP, at least 75% of all data must be reported annually. As such, the study met the DQI of “**Completeness**”.
- According to the QAPP, sampling must occur at a one-in-six day frequency, from midnight to midnight local standard time, over 24 hours \pm 1 hour. Due to incorrect run dates from the lab, collocated samples at LWD were initially collected at the required frequency, but not on the same days as the national sampling calendar. EPA and KDAQ decided that while the actual run dates didn’t affect the sample validity, precision calculations, nor representativeness, collection against the national calendar was preferred since that was specified in the QAPP. Collocated sampling began on the national schedule starting March 11, 2021. Otherwise, samples were collected against the schedule and sample time requirements stated in the QAPP; thus, data have met the DQI of “**Representativeness**”. When necessary, makeups were collected in accordance with the QAPP. Details regarding data loss and makeups were included in quarterly reports.

Collocated Precision:

For individual sample pairs, relative percent different (RPD) was used as an estimator of collocated precision, when one or both samples had a concentration greater than five times the method detection limit (MDL). In accordance with the QAPP, sample data were flagged “QX” when collocated precision was more than 25 RPD.

According to the QAPP, the overall annual coefficient of variance (% CV) should be no more than 15%, based upon sample pairs where one or both samples had concentrations greater than 5 x MDL. This precision calculation is different than the precision estimation criteria between individual sample pairs discussed in the previous paragraph; imprecision of the latter is permitted to be larger than 15%. The tables below summarize both individual sample pair precision and overall % CV for data collected at the LWD site between 10/24/20 and 10/31/21. Data comparisons were not possible for 1,3-butadiene and acrylonitrile, as all collocated data were less than five times the MDL.

Overall, the CV for vinyl chloride and benzene were both below 15%. The CV for ethylene dichloride was 24.59%; however, the dataset includes a comparative outlier on 2/21/21. Without that data point, CV was 11.66%. Re-audit of the 2/21/21 sample show that while both the primary and collocated samples/instruments met study requirements, the flow on the primary sampler was substantially lower (with a higher remaining vacuum) than the collocated sampler. Since both instruments met requirements, data were not invalidated, but the precision calculations for this data are not representative. This decision was confirmed with EPA. Additionally, the 2/21/21 sample pair was the lowest ethylene dichloride concentration still eligible for inclusion in the CV calculation. Higher concentration data (e.g. above 10.0 ppbV) was found to have excellent precision. Data for the study was considered to meet the DQI for “**Precision**”.

Calvert City Study: LWD Collocated Precision										
Ethylene Dichloride (43815)						Vinyl Chloride (43860)				
n=20 % CV=11.66 (*24.59 with Outlier)						n=22 % CV= 8.95				
Date	LWD-P	LWD-C	RPD	Flag	5 x MDL	Date	LWD-P	LWD-C	RPD	Flag 5 x MDL
10/28/20	55.7	53.5	4.0		0.0535	10/28/20	0.684	0.65	5.1	0.0770
11/17/20	18.5	19.1	-3.2			11/17/20	0.596	0.61	-2.3	
1/28/21	4.18	5.08	-19.4			1/16/21	0.537	0.543	-1.1	
2/9/21	7.6	7.59	0.1			1/28/21	0.295	0.389	-27.5	QX
2/21/21	0.372	0.108	110.0	QX*		2/9/21	0.796	0.749	6.1	
3/11/21	1.08	1.08	0.0		0.0362	3/11/21	0.21	0.216	-2.8	0.04305
4/16/21	4.25	4.31	-1.4			4/4/21	0.198	0.193	2.6	
4/28/21	0.291	0.289	0.7			4/16/21	1.16	1.14	1.7	
5/10/21	7.55	7.45	1.3			4/28/21	0.185	0.186	-0.5	
5/22/21	0.321	0.318	0.9			5/10/21	3.27	3.17	3.1	
6/3/21	0.473	0.525	-10.4			5/22/21	0.582	0.495	16.2	
6/15/21	13.4	13.2	1.5			6/3/21	0.346	0.354	-2.3	
7/9/21	2.94	2.34	22.7			6/15/21	0.903	0.879	2.7	
7/21/21	38.2	39.5	-3.3			7/9/21	0.329	0.25	27.3	QX
8/2/21	27.2	28	-2.9			7/21/21	2.15	1.96	9.2	
8/14/21	21.6	19.5	10.2			8/2/21	0.997	1.01	-1.3	
8/26/21	3.83	4.22	-9.7			8/14/21	0.714	0.652	9.1	
9/7/21	0.385	0.252	41.8	QX		8/26/21	0.115	0.128	-10.7	
9/19/21	4.78	4.9	-2.5			9/7/21	0.126	0.126	0.0	
10/1/21	6.77	6.57	3.0			9/19/21	0.338	0.345	-2.0	
						10/1/21	0.127	0.122	4.0	
						10/25/21	0.17	0.165	3.0	
Benzene (45201)						1,3- Butadiene (43218)				
n=27 % CV= 5.75						n=0 % CV= n/a				
Date	LWD-P	LWD-C	RPD	Flag	5 x MDL	Date	LWD-P	LWD-C	RPD	Flag 5 x MDL
10/28/20	0.469	0.448	4.6		0.0510	No sample pairs eligible. All collocated data less than five times the MDL.				
11/17/20	0.14	0.142	-1.4							
12/11/20	0.131	0.123	6.3							
12/23/20	0.113	0.118	-4.3							
1/16/21	0.144	0.144	0.0							

1/28/21	0.155	0.167	-7.5	0.0585	
2/9/21	0.224	0.226	-0.9		
2/21/21	0.135	0.125	7.7		
3/11/21	0.0854	0.0857	-0.4		
3/23/21	0.0904	0.0895	1.0		
4/4/21	0.152	0.15	1.3		
4/16/21	0.143	0.149	-4.1		
4/28/21	0.0822	0.0794	3.5		
5/10/21	0.109	0.105	3.7		
5/22/21	0.125	0.127	-1.6		
6/3/21	0.0988	0.103	-4.2	QX	Acrylonitrile (43704) n=0 % CV= n/a Date LWD-P LWD-C RPD Flag 5 x MDL No sample pairs eligible. All collocated data less than five times the MDL.
6/15/21	0.121	0.117	3.4		
7/9/21	0.126	0.0961	26.9		
7/21/21	0.271	0.269	0.7		
8/2/21	0.277	0.273	1.5		
8/14/21	0.107	0.119	-10.6		
8/26/21	0.127	0.121	4.8		
9/7/21	0.138	0.139	-0.7		
9/19/21	0.0911	0.0917	-0.7		
10/1/21	0.208	0.195	6.5		
10/13/21	0.097	0.0977	-0.7		
10/25/21	0.0786	0.0762	3.1		

Data Summary:

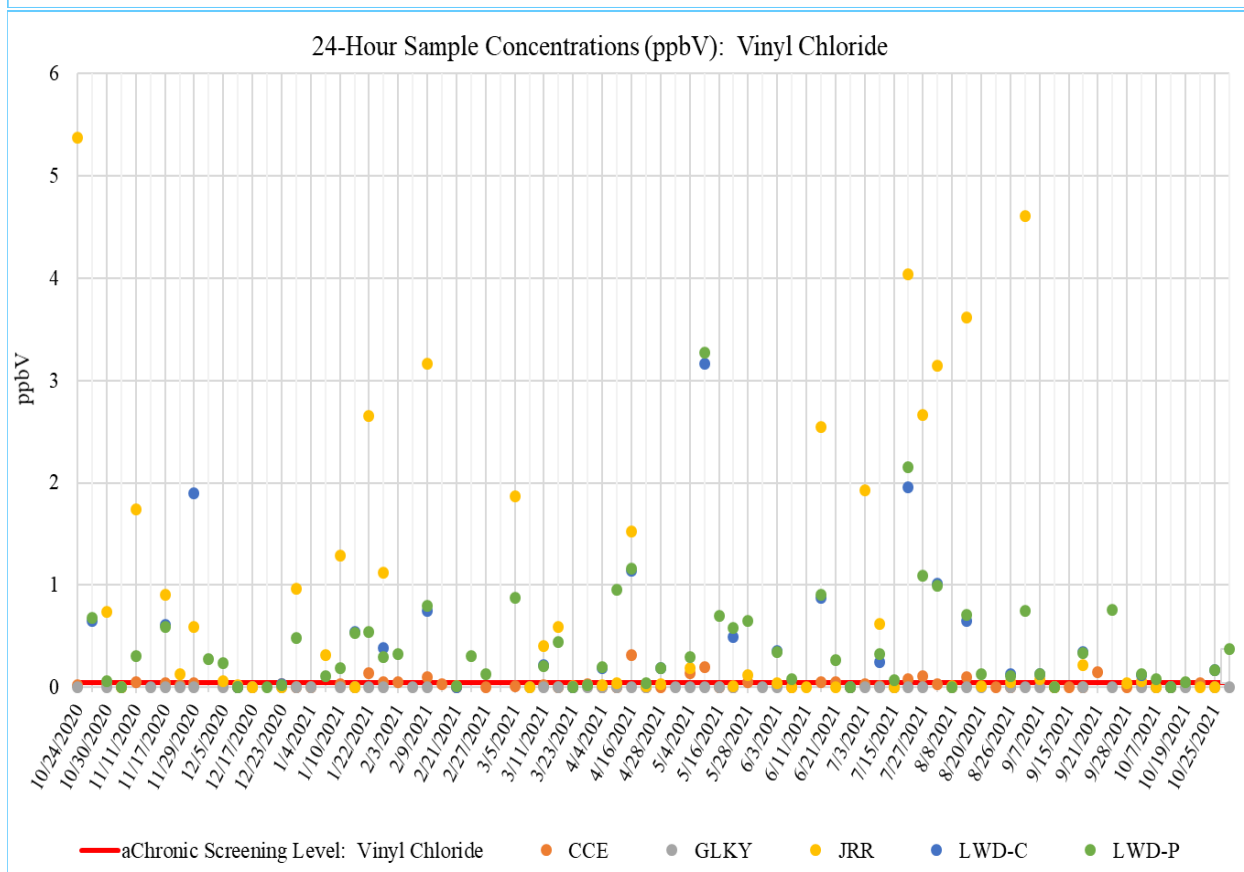
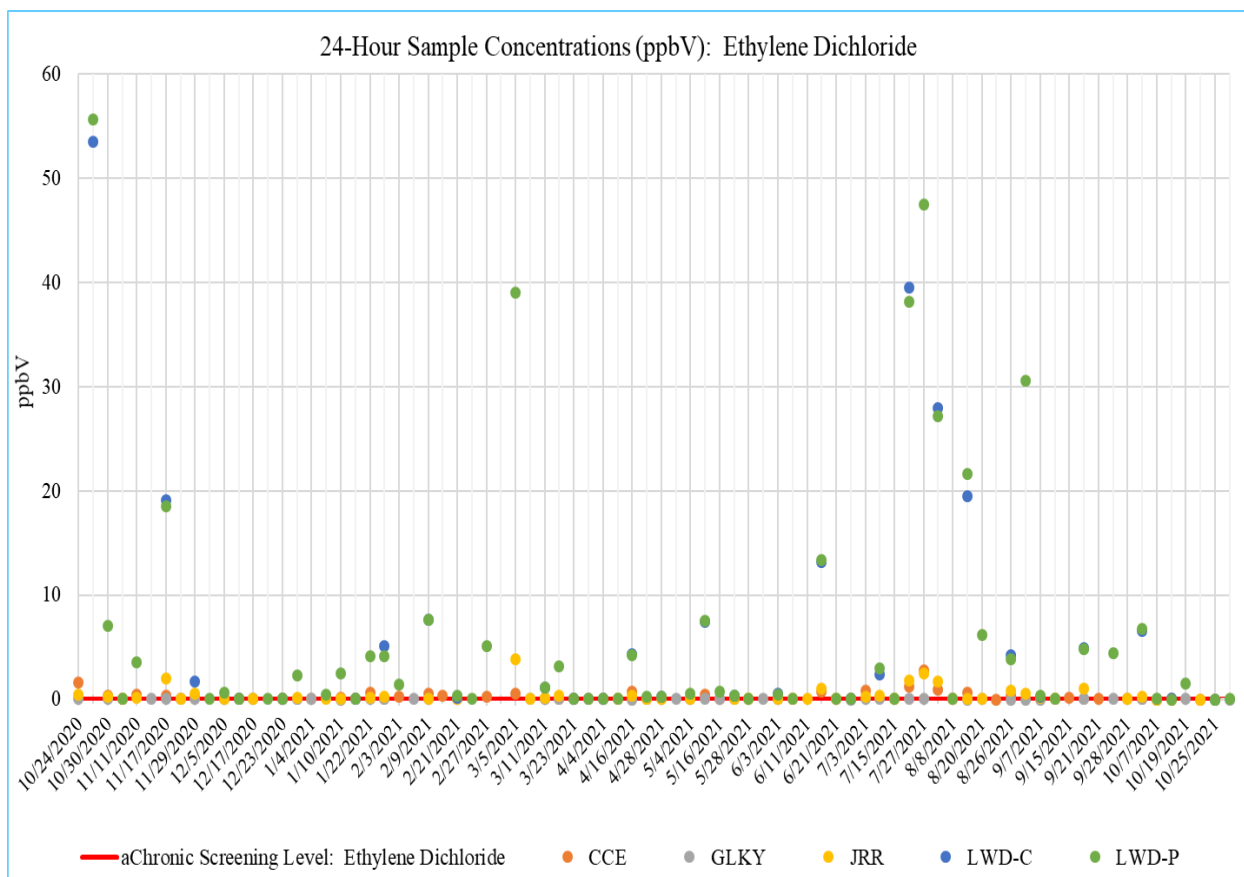
The chart below displays the maximum 24-hour concentrations and the annual mean per pollutant by site and COPC for samples collected October 24, 2020 – October 31, 2021.

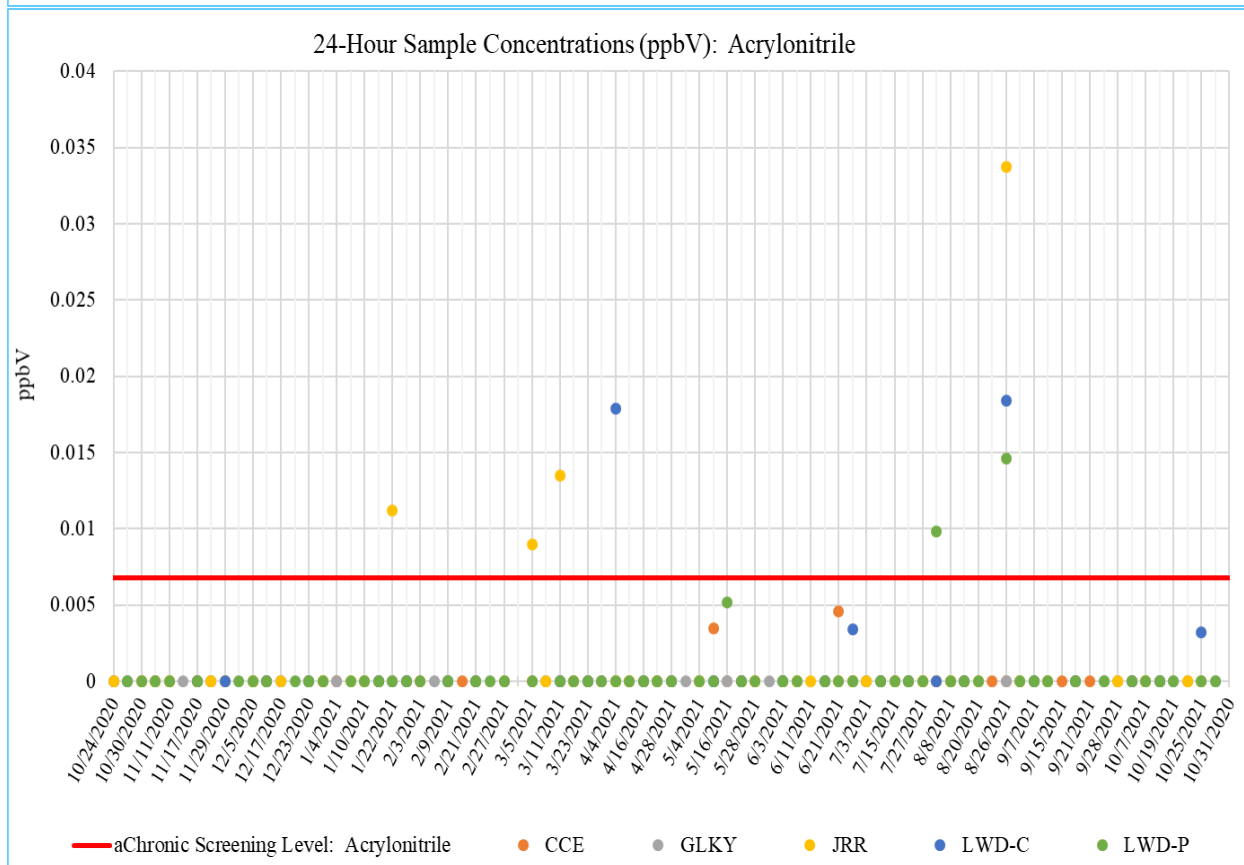
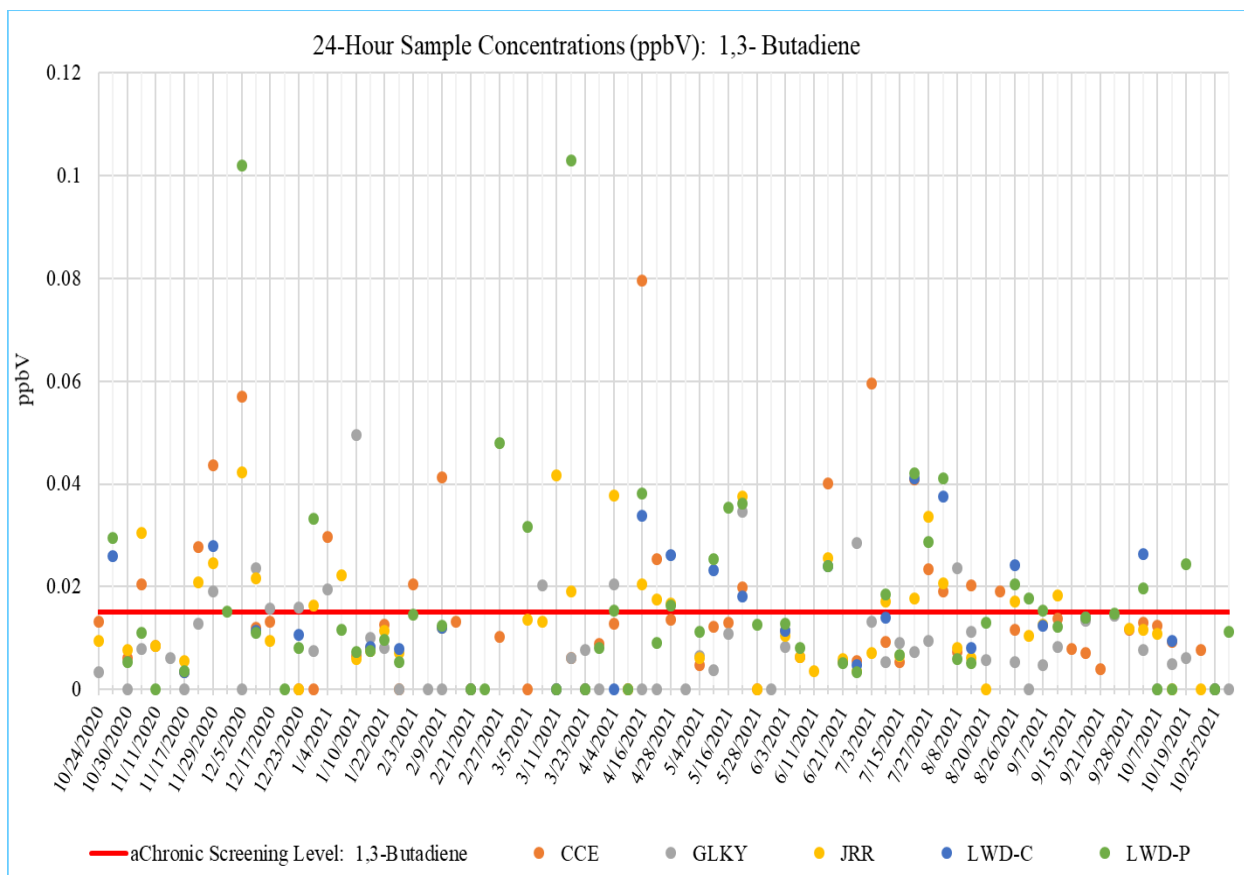
Data Summary (ppbV): October 24, 2020 - October 31, 2021										
Monitor	Ethylene Dichloride (43815)					Vinyl Chloride (43860)				
	Chronic Screening Level = 0.00952 ppbV					Chronic Screening Level = 0.0446 ppbV				
	1st Max	2nd Max	3rd Max	4th Max	Mean	1st Max	2nd Max	3rd Max	4th Max	Mean
Calvert City Elementary (CCE) 21-157-0018	2.77	1.65	1.21	0.92	0.2556	0.315	0.198	0.146	0.145	0.0356
Johnson-Riley Rd (JRR) 21-157-0020	3.81	2.46	1.97	1.79	0.3452	5.38	4.61	4.04	3.62	0.8218
LWD- Primary (LWD-P) 21-157-0021-06	55.7	47.5	39.0	38.2	6.2449	3.27	2.15	1.16	1.09	0.4182
LWD- Collocated (LWD-C) 21-157-0021-07	53.5	39.5	28.0	19.5	7.577	3.17	1.96	1.90	1.14	0.5613
Grayson Lake NATTS (GLKY) 21-043-0500-06	0.0403	0.0282	0.0208	0.0199	0.0130	ND	ND	ND	ND	ND

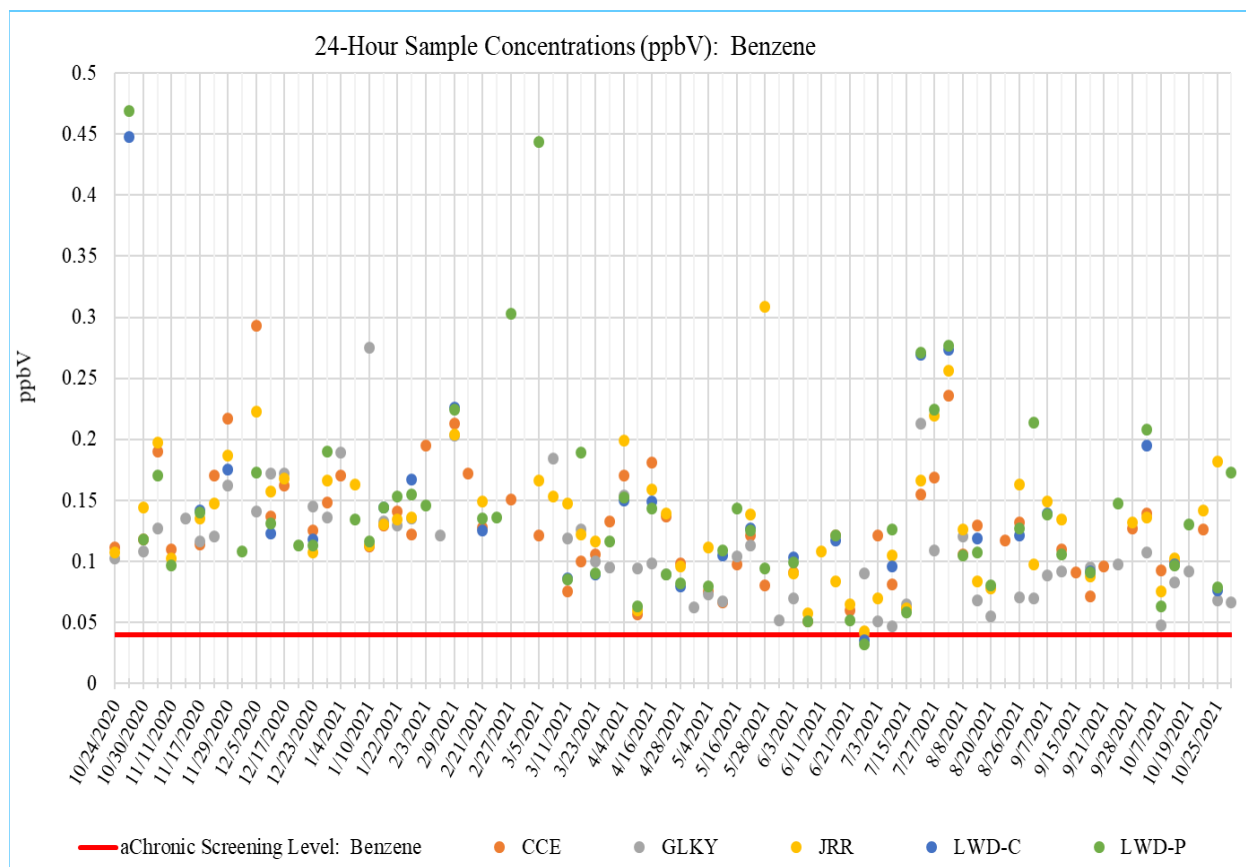
Monitor	1,3-Butadiene (43218)					Acrylonitrile (43704)				
	Chronic Screening Level = 0.0151 ppbV					Chronic Screening Level = 0.00678 ppbV				
	1st Max	2nd Max	3rd Max	4th Max	Mean	1st Max	2nd Max	3rd Max	4th Max	Mean
Calvert City Elementary (CCE) 21-157-0018	0.0796	0.0596	0.0571	0.0436	0.0150	0.0046	0.0035	ND	ND	0.0001
Johnson-Riley Rd (JRR) 21-157-0020	0.0422	0.0417	0.0378	0.0375	0.0132	0.0337	0.0135	0.0112	0.0090	0.0012
LWD- Primary (LWD-P) 21-157-0021-06	0.1030	0.1020	0.0480	0.042	0.0171	0.0146	0.0098	0.0052	ND	0.0005
LWD- Collocated (LWD-C) 21-157-0021-07	0.0412	0.0376	0.0339	0.0280	0.0151	0.0184	0.0179	0.0034	0.0032	0.0015
Grayson Lake NATTS (GLKY) 21-043-0500-06	0.0495	0.0346	0.0286	0.0236	0.0089	ND	ND	ND	ND	ND
Monitor	Benzene (45201)					ND= Not Detected Red Font= Concentrations above chronic screening level Note: Risk estimates are based upon calculations of 70-year lifetime exposures of the 95 th percentile upper confidence limit of the mean concentration. Data in this table are for summary purposes only.				
	Chronic Screening Level = 0.0401 ppbV									
	1st Max	2nd Max	3rd Max	4th Max	Mean					
Calvert City Elementary (CCE) 21-157-0018	0.293	0.236	0.217	0.213	0.1257					
Johnson-Riley Rd (JRR) 21-157-0020	0.309	0.256	0.233	0.219	0.1344					
LWD- Primary (LWD-P) 21-157-0021-06	0.469	0.444	0.303	0.277	0.1417					
LWD- Collocated (LWD-C) 21-157-0021-07	0.448	0.273	0.269	0.226	0.1444					
Grayson Lake NATTS (GLKY) 21-043-0500-06	0.275	0.213	0.203	0.189	0.1110					

Concentration Trends:

Time trends were constructed using all 24-hour sample concentrations collected at Calvert City Study sites, as well as the Grayson Lake background site, for data collected October 24, 2020-October 31, 2021. Chronic screening levels are included for reference, but it should be noted that EPA's risk assessment will be based upon statistical calculations estimating lifetime exposures.







National Comparison:

For comparison against the national dataset, KDAQ pulled all available COPC data reported to AQS from October 24, 2020- October 31, 2021. Concentration data (24-hour averages for intermittent samplers) were pulled from AQS as it was reported by each monitoring organization. KDAQ converted all concentrations to units of parts per billion (ppbV) for this comparison. Data marked as invalid was removed from the dataset. Data was included regardless of a site's monitoring objectives; as such, the data includes a mix of rural, urban, and industrially sited monitors, and includes data-sets of varying sample size.

KDAQ calculated the average concentration at each monitor in the dataset then ordered each site by rank (based upon the highest average concentration). The rank of each Calvert City site, compared to the national dataset, is listed in the table below. The converted data used to construct this summary is attached at the end of this report.

Site Ranking: Calvert City Averages versus National Averages Summary							
COPC	Total Number Sites in AQS Dataset	Total Number Sites in AQS Dataset with Average Concentration > 0	CCE Monitor Rank (21-157-0018)	JRR Monitor Rank (21-157-0020)	LWD- P Monitor Rank (21-157-0021-06)	LWD- C Monitor Rank (21-157-0021-07)	GLKY Monitor Rank (21-043-0500)
Ethylene Dichloride (43815)	154	121	4	3	2	1	75
Vinyl Chloride (43860)	153	69	8	1	3	2	62
1,3-Butadiene (43218)	184	152	106	112	96	94	124

Acrylonitrile (43704)	80	41	39	30	37	29	41
Benzene (45201)	195	195	155	135	138	129	169

Note: Data comparisons in a previous quarterly status report relied upon AQS reports with units of ppbC. EPA notified KDAQ that the AQS report used substituted data below the MDL. As such, KDAQ converted data for this report from the units reported by monitoring organizations to ppbV. KDAQ recommends that AQS standard reports be fixed to report data in accordance with EPA recommended data reporting policies. KDAQ data are reported to AQS in units of ppbV; as such, KDAQ data did not need to be converted for this comparison.

Note: Data reported to AQS by monitoring organizations are subject to change.

When compared to the average concentrations of other monitors reporting ethylene dichloride data, the primary and collocated samplers at the LWD sites were the highest reading monitors in the US, with monitors at JRR and CCE ranking 3rd and 4th highest, respectively. For vinyl chloride, the JRR monitor was the highest reading monitor in the US, with LWD collocated and primary monitors ranking 2nd and 3rd highest. The monitor at CCE was the 8th highest reading monitor in the US. Since the locations of monitors in the Calvert City Study were determined upon the expected area of maximum concentrations for ethylene dichloride and vinyl chloride, actual concentrations collected during this special study were expected to be high. Concentration data shows that siting of these monitors was appropriate and that the monitors are unique in the national dataset. More information on the monitoring objectives and siting of national monitors would be necessary to determine if other sites are located near sources of ethylene dichloride and vinyl chloride; and if so, if emission-levels are similar to facilities located in Calvert City.

Concentration comparisons for benzene, acrylonitrile, and 1,3-butadiene show that the Calvert City sites are not unique when compared to the national dataset. This may be because the monitors in the Calvert City Special Study were not specifically sited to measure maximum concentrations of these pollutants. Similarity in the national dataset may also indicate that these pollutants are ubiquitous in the atmosphere. Since risk is cumulative, they continue to be included as a COPCs for the Calvert City Special Study.

Conclusions:

The data collected in support of this Calvert City Special Study was released for use in EPA's risk assessment. The data collected meets the study's data quality objectives, and is of a sufficient quality and quantity to be used in the assessment. KDAQ will continue to collect VOC data at the Calvert City sites, as well as at the Grayson Lake background site, until EPA has finished their risk assessment. At that point, KDAQ will work with EPA to determine next steps. The data from AQS is available for FOIA requests, as received. Additionally, EPA will publicly release the results of the risk assessment.

Site Ranking Table: Calvert City Averages versus National Averages										
Rank	Ethylene Dichloride (43815)		Vinyl Chloride (43860)		1,3-Butadiene (43218)		Acrylonitrile (43704)		Benzene (45201)	
	Monitor ID	Avg. ppbV	Monitor ID	Avg. ppbV	Monitor ID	Avg. ppbV	Monitor ID	Avg. ppbV	Monitor ID	Avg. ppbV
1	21_157_0021_7	6.7277	21_157_0020_6	0.7212	37_119_0041_2	0.9262	39_061_0047_1	0.2843	18_089_0035_1	1.1443
2	21_157_0021_6	5.5222	21_157_0021_7	0.5174	37_067_0022_2	0.6171	26_111_0960_2	0.1170	39_081_0017_1	1.0712
3	21_157_0020_6	0.3174	21_157_0021_6	0.3998	37_183_0014_1	0.5990	26_111_0960_1	0.1005	42_003_0008_1	0.6658
4	21_157_0018_6	0.2544	42_101_0063_3	0.3280	37_183_0014_8	0.5450	55_027_0001_6	0.0644	04_013_4003_6	0.4801
5	26_111_0955_1	0.0815	42_101_0055_4	0.1049	42_101_0055_4	0.5074	55_079_0010_6	0.0307	48_479_0017_1	0.4085
6	42_101_0063_3	0.0797	42_101_0014_4	0.0599	37_021_0035_1	0.5000	12_103_0026_1	0.0221	41_029_2129_7	0.3967
7	42_101_0014_4	0.0587	42_101_0048_1	0.0441	42_101_0048_1	0.3982	12_057_3002_1	0.0164	08_045_0023_1	0.3586
8	42_101_0048_1	0.0368	21_157_0018_6	0.0375	42_101_0063_3	0.3967	12_011_0034_1	0.0163	50_021_0002_1	0.3566
9	18_019_0009_1	0.0361	55_079_0010_1	0.0140	37_129_0010_1	0.3831	12_103_0018_1	0.0144	08_045_0005_1	0.3500
10	55_027_0001_1	0.0313	18_167_0025_1	0.0128	42_101_0014_4	0.3197	06_073_1014_1	0.0135	22_033_0009_3	0.3477
11	18_089_0035_1	0.0300	55_027_0001_1	0.0110	37_147_0006_1	0.2475	26_163_0033_1	0.0133	04_013_9997_6	0.3246
12	23_005_5506_1	0.0300	37_067_0022_2	0.0092	13_089_0003_1	0.1781	40_109_1037_6	0.0111	10_003_2004_1	0.3129
13	23_005_5502_1	0.0268	37_129_0010_1	0.0091	37_123_0001_1	0.1580	06_073_1014_2	0.0109	04_013_9997_7	0.3079
14	37_067_0022_2	0.0268	37_123_0001_1	0.0089	13_089_0002_1	0.1416	42_003_0008_6	0.0104	53_033_0030_6	0.3044
15	23_005_6606_1	0.0259	37_021_0035_1	0.0076	13_089_0002_2	0.1351	40_143_0235_6	0.0098	40_143_0235_6	0.3034
16	37_129_0010_1	0.0252	37_183_0014_1	0.0070	04_013_4003_6	0.1115	06_073_1026_1	0.0096	22_005_0004_2	0.2945
17	23_005_5501_1	0.0244	24_510_0040_1	0.0050	04_013_9997_7	0.0745	41_029_2129_7	0.0053	39_061_0014_1	0.2865
18	37_021_0035_1	0.0242	37_183_0014_8	0.0043	04_013_9997_6	0.0721	51_670_0010_4	0.0049	54_069_0010_1	0.2853
19	55_079_0010_1	0.0236	37_147_0006_1	0.0039	53_033_0030_6	0.0607	50_021_0002_1	0.0043	24_005_3001_2	0.2731
20	23_005_5504_1	0.0233	34_007_0002_6	0.0035	06_025_0005_5	0.0569	26_163_0015_2	0.0035	06_037_1103_4	0.2720
21	23_005_5505_1	0.0231	37_119_0041_2	0.0035	41_029_2129_7	0.0553	50_007_0014_1	0.0029	06_037_1103_5	0.2715
22	23_005_6607_1	0.0226	48_439_3009_2	0.0031	08_045_0023_1	0.0529	51_087_0014_4	0.0027	23_005_5502_1	0.2714
23	37_123_0001_1	0.0225	23_005_5501_1	0.0029	10_003_2004_1	0.0500	50_007_0014_2	0.0022	06_037_1103_8	0.2695
24	23_005_5503_1	0.0215	48_139_1044_1	0.0023	53_053_0024_6	0.0469	34_039_0004_6	0.0020	34_007_0002_6	0.2691
25	41_051_2011_7	0.0214	12_011_0034_1	0.0021	53_053_0029_6	0.0467	17_031_3103_6	0.0019	24_005_3001_3	0.2649
26	50_021_0002_1	0.0211	06_073_1014_1	0.0020	48_479_0017_1	0.0457	39_081_0017_1	0.0017	26_163_0015_2	0.2588
27	50_007_0014_2	0.0209	06_073_1014_2	0.0019	06_037_1103_4	0.0450	29_510_0085_6	0.0017	13_089_0003_1	0.2552
28	23_003_1011_1	0.0208	26_163_0015_2	0.0017	23_005_6607_1	0.0446	50_007_0007_1	0.0014	06_065_8001_4	0.2530
29	37_183_0014_1	0.0205	48_121_0034_2	0.0017	18_097_0087_1	0.0446	21_157_0021_7	0.0014	08_077_0018_6	0.2502
30	41_039_0059_7	0.0203	42_003_0008_1	0.0017	06_037_1103_5	0.0442	21_157_0020_6	0.0012	06_065_8001_8	0.2497
31	50_007_0014_1	0.0203	06_073_1026_1	0.0015	18_089_0035_1	0.0433	34_023_0011_6	0.0009	53_053_0029_6	0.2487
32	50_007_0007_1	0.0199	45_025_0001_1	0.0014	06_065_8001_4	0.0413	34_007_0002_6	0.0008	53_053_0024_6	0.2484
33	41_051_2010_9	0.0197	17_031_4201_6	0.0013	06_065_8001_5	0.0412	08_077_0018_6	0.0008	42_101_0055_4	0.2477
34	23_019_0017_1	0.0197	13_089_0003_1	0.0010	41_051_2011_7	0.0403	17_031_4201_6	0.0007	06_025_0005_5	0.2475
35	42_049_0004_2	0.0196	17_031_3103_6	0.0009	18_019_0009_1	0.0394	04_013_9997_6	0.0007	23_005_5506_1	0.2450
36	41_061_0123_7	0.0195	23_005_5505_1	0.0006	17_031_3103_6	0.0388	40_143_1127_6	0.0006	18_019_0009_1	0.2421
37	23_005_0029_1	0.0189	24_033_0030_1	0.0006	23_005_6606_1	0.0378	21_157_0021_6	0.0004	41_039_0059_7	0.2382
38	34_007_0002_6	0.0189	23_005_5503_1	0.0005	08_077_0018_6	0.0376	39_067_0005_1	0.0003	06_085_0006_3	0.2368
39	41_051_2010_7	0.0188	23_005_6606_1	0.0005	41_039_0059_7	0.0363	21_157_0018_6	0.0003	06_073_1014_2	0.2357
40	06_073_1014_2	0.0187	13_089_0002_1	0.0004	23_005_5502_1	0.0361	34_027_3001_6	0.0002	40_143_1127_6	0.2346
41	06_073_1026_1	0.0185	29_510_0085_6	0.0004	18_097_0078_1	0.0361	21_043_0500_6	4.5E-05	34_039_0004_6	0.2341
42	06_073_1014_1	0.0183	50_021_0002_1	0.0003	53_033_0057_6	0.0355	04_013_4003_6	0	41_051_2010_9	0.2312
43	36_055_1007_20	0.0180	48_479_0017_1	0.0003	53_053_0031_6	0.0351	04_013_9997_7	0	36_085_0111_2	0.2297
44	42_049_0003_2	0.0179	34_039_0004_6	0.0003	06_029_0014_5	0.0350	06_001_0007_3	0	42_003_0008_6	0.2297
45	41_029_2129_7	0.0177	40_109_1037_6	0.0003	41_051_2010_9	0.0346	06_001_0009_3	0	55_079_0010_6	0.2286
46	04_013_9997_7	0.0176	08_077_0018_6	0.0003	34_039_0004_6	0.0341	06_001_0011_3	0	13_089_0002_3	0.2286
47	36_055_1007_10	0.0175	34_023_0011_6	0.0002	55_079_0010_6	0.0333	06_001_0012_3	0	54_039_0020_1	0.2281
48	23_005_0029_2	0.0174	34_027_3001_6	0.0002	06_073_1026_1	0.0333	06_001_0013_3	0	13_089_0002_4	0.2267
49	36_101_0003_2	0.0174	04_013_4003_6	0.0002	06_029_0014_6	0.0332	06_001_0015_3	0	06_073_1014_1	0.2246
50	23_001_0011_1	0.0173	50_007_0014_2	0.0002	26_163_0015_2	0.0330	06_013_0002_3	0	39_017_0020_1	0.2241
51	23_017_2011_1	0.0172	42_003_0008_6	0.0002	06_085_0005_5	0.0326	06_013_0006_3	0	41_051_2011_7	0.2240
52	45_025_0001_1	0.0170	40_143_1127_6	0.0002	23_005_5501_1	0.0324	06_013_1001_3	0	18_097_0087_1	0.2219
53	51_087_0014_4	0.0168	18_097_0087_1	0.0001	23_005_5503_1	0.0322	06_013_1002_3	0	18_097_0078_1	0.2185
54	13_089_0002_2	0.0159	50_007_0014_1	0.0001	40_143_1127_6	0.0317	06_013_1004_3	0	23_005_6606_1	0.2178
55	17_031_4201_6	0.0159	18_163_0016_1	0.0001	41_051_2010_7	0.0316	06_013_2001_3	0	36_047_0118_2	0.2158
56	04_013_9997_6	0.0157	13_089_0002_2	0.0001	24_005_3001_1	0.0314	06_041_0001_3	0	23_005_6607_1	0.2154
57	49_011_0004_6	0.0155	18_089_2008_1	0.0001	42_003_0008_1	0.0308	06_041_0004_3	0	06_037_0002_4	0.2153
58	12_011_0034_1	0.0155	53_033_0080_6	0.0001	23_003_1011_1	0.0307	06_055_0004_3	0	06_065_8001_5	0.2152
59	13_089_0003_1	0.0152	04_013_9997_6	0.0001	06_073_1022_5	0.0302	06_075_0005_3	0	55_079_0010_1	0.2140
60	29_510_0085_6	0.0151	55_079_0010_6	0.0001	36_005_0110_2	0.0300	06_075_0005_4	0	53_033_0057_6	0.2129
61	12_103_0026_1	0.0151	49_011_0004_6	9.7E-05	36_047_0118_2	0.0296	06_081_1001_3	0	49_011_0004_6	0.2128
62	13_089_0002_1	0.0149	21_043_0500_6	7.6E-05	36_005_0110_20	0.0289	06_085_0005_3	0	23_005_5503_1	0.2120
63	55_079_0010_6	0.0149	50_007_0007_1	6.2E-05	36_005_0133_2	0.0289	06_085_0006_3	0	24_510_0040_1	0.2098
64	17_031_3103_6	0.0149	40_143_0235_6	6E-05	36_005_0110_10	0.0288	06_095_0004_3	0	36_005_0110_2	0.2087
65	37_183_0014_8	0.0149	55_027_0001_6	0.00005	06_019_0011_5	0.0284	06_097_0004_3	0	06_085_0005_3	0.2076
66	34_023_0011_6	0.0145	36_063_7001_2	4.4E-05	06_007_0008_5	0.0281	11_001_0043_4	0	36_081_0124_4	0.2070

67	12_103_0018_1	0.0143	12_057_3002_1	4.1E-05	34_007_0002_6	0.0278	26_111_0953_1	0	06_029_0014_5	0.2057
68	40_143_0235_6	0.0143	26_163_0033_1	3.5E-05	23_005_5504_1	0.0271	26_111_0955_1	0	41_051_2010_7	0.2057
69	40_109_1037_6	0.0142	12_103_0018_1	2.7E-05	06_077_1002_5	0.0266	26_111_0959_1	0	17_031_3103_6	0.2055
70	53_033_0080_6	0.0141	04_013_9997_7	0	23_005_0029_2	0.0266	26_163_0015_1	0	36_005_0110_10	0.2045
71	12_057_3002_1	0.0141	06_001_0007_3	0	06_073_1014_1	0.0265	39_035_0038_1	0	36_005_0133_4	0.2043
72	26_163_0033_1	0.0141	06_001_0009_3	0	23_005_5505_1	0.0260	39_035_1002_1	0	53_053_0031_6	0.2041
73	55_027_0001_6	0.0140	06_001_0011_3	0	06_073_0001_5	0.0256	39_049_0034_1	0	36_005_0110_20	0.2040
74	34_027_3001_6	0.0139	06_001_0012_3	0	06_073_1014_2	0.0255	41_039_0059_7	0	06_029_0014_6	0.2040
75	21_043_0500_6	0.0137	06_001_0013_3	0	06_037_0002_4	0.0254	41_051_2010_7	0	39_049_0034_1	0.2030
76	34_039_0004_6	0.0136	06_001_0015_3	0	23_005_5506_1	0.0250	41_051_2010_9	0	49_011_0004_8	0.2004
77	42_101_0055_4	0.0136	06_013_0002_3	0	23_017_2011_1	0.0247	41_051_2011_7	0	39_035_0038_1	0.1997
78	26_163_0015_2	0.0133	06_013_0006_3	0	36_005_0133_4	0.0247	41_061_0123_7	0	24_027_0006_1	0.1997
79	40_143_1127_6	0.0133	06_013_1001_3	0	23_005_0029_1	0.0242	49_011_0004_6	0	39_017_0019_1	0.1985
80	51_670_0010_4	0.0130	06_013_1002_3	0	55_079_0010_1	0.0238	53_033_0080_6	0	23_005_5501_1	0.1980
81	04_013_4003_6	0.0128	06_013_1004_3	0	23_001_0011_1	0.0237			06_073_1026_1	0.1974
82	42_003_0008_6	0.0127	06_013_2001_3	0	41_061_0123_7	0.0230			36_005_0133_2	0.1967
83	36_085_0111_2	0.0123	06_037_1103_4	0	40_143_0235_6	0.0230			23_005_5504_1	0.1954
84	36_005_0110_10	0.0121	06_041_0001_3	0	29_510_0085_6	0.0228			36_001_0013_2	0.1944
85	08_077_0018_6	0.0119	06_041_0004_3	0	26_163_0033_1	0.0222			26_163_0015_1	0.1934
86	36_055_1007_2	0.0118	06_055_0004_3	0	06_075_0005_5	0.0221			26_163_0033_1	0.1931
87	36_005_0110_20	0.0117	06_065_8001_4	0	06_061_0006_5	0.0220			18_089_2008_1	0.1923
88	36_029_0005_2	0.0114	06_075_0005_3	0	49_011_0004_6	0.0218			11_001_0043_4	0.1900
89	36_005_0110_2	0.0114	06_075_0005_4	0	18_089_0034_1	0.0218			39_067_0005_1	0.1873
90	36_081_0124_4	0.0114	06_081_1001_3	0	06_111_2002_5	0.0211			06_001_0011_3	0.1863
91	36_005_0133_4	0.0113	06_085_0005_3	0	18_163_0016_1	0.0206			41_061_0123_7	0.1841
92	36_047_0118_2	0.0113	06_085_0006_3	0	12_103_0026_1	0.0203			29_510_0085_6	0.1818
93	36_063_7001_2	0.0113	06_095_0004_3	0	39_081_0017_1	0.0201			18_089_0022_7	0.1816
94	36_029_1014_2	0.0112	06_097_0004_3	0	21_157_0021_7	0.0201			23_017_2011_1	0.1803
95	36_001_0013_2	0.0111	10_003_2004_1	0	42_003_0008_6	0.0200			08_045_0019_3	0.1800
96	18_163_0016_1	0.0110	11_001_0043_4	0	21_157_0021_6	0.0186			18_089_0034_1	0.1790
97	42_003_0008_1	0.0108	12_103_0026_1	0	36_081_0124_2	0.0183			06_013_0006_3	0.1785
98	18_089_0034_1	0.0101	18_019_0009_1	0	53_033_0080_6	0.0182			51_087_0014_4	0.1780
99	45_025_0001_2	0.0100	18_089_0022_7	0	18_089_2008_1	0.0176			08_045_0019_2	0.1773
100	36_031_0003_2	0.0100	18_089_0034_1	0	23_019_0017_1	0.0176			39_035_1002_1	0.1764
101	37_147_0006_1	0.0096	18_089_0035_1	0	36_081_0124_4	0.0172			23_001_0011_1	0.1728
102	48_139_1044_1	0.0093	18_097_0078_1	0	12_057_3002_1	0.0164			06_077_1002_5	0.1724
103	18_097_0078_1	0.0089	18_127_0024_1	0	34_023_0011_6	0.0161			23_005_0029_1	0.1700
104	18_089_2008_1	0.0087	23_001_0011_1	0	04_013_9997_8	0.0160			23_005_0029_2	0.1690
105	18_097_0087_1	0.0087	23_003_1011_1	0	55_027_0001_1	0.0151			42_101_0048_1	0.1669
106	18_167_0025_1	0.0083	23_005_0029_1	0	21_157_0018_6	0.0151			42_101_0063_3	0.1669
107	18_089_0022_7	0.0078	23_005_0029_2	0	36_085_0111_2	0.0150			06_095_0004_3	0.1662
108	24_510_0040_1	0.0077	23_005_5502_1	0	12_103_0018_1	0.0149			06_001_0009_3	0.1640
109	18_127_0024_1	0.0074	23_005_5504_1	0	17_031_4201_6	0.0146			42_101_0014_4	0.1633
110	37_119_0041_2	0.0071	23_005_5506_1	0	40_109_1037_6	0.0144			23_005_5505_1	0.1614
111	48_439_3009_2	0.0069	23_005_6607_1	0	24_027_0006_1	0.0138			06_081_1001_3	0.1609
112	48_479_0017_1	0.0061	23_017_2011_1	0	21_157_0020_6	0.0134			50_007_0014_1	0.1599
113	48_121_0034_2	0.0051	23_019_0017_1	0	36_001_0013_2	0.0133			40_109_1037_6	0.1593
114	11_001_0043_4	0.0042	24_005_3001_1	0	18_167_0025_1	0.0128			18_163_0016_1	0.1590
115	39_017_0019_1	0.0030	24_027_0006_1	0	49_011_0004_8	0.0128			06_013_1004_3	0.1585
116	24_005_3001_1	0.0029	26_163_0015_1	0	36_055_1007_20	0.0126			50_007_0014_2	0.1579
117	39_017_0020_1	0.0029	36_001_0013_2	0	18_089_0022_7	0.0122			24_033_0030_3	0.1573
118	10_003_2004_1	0.0029	36_005_0110_10	0	51_670_0010_4	0.0122			06_073_1022_5	0.1553
119	24_033_0030_1	0.0013	36_005_0110_2	0	36_055_1007_10	0.0104			36_081_0124_2	0.1550
120	24_027_0006_1	0.0009	36_005_0110_20	0	51_087_0014_4	0.0104			37_067_0022_2	0.1535
121	39_035_1002_1	0.0005	36_005_0133_4	0	24_510_0040_1	0.0103			39_061_0047_1	0.1527
122	06_001_0007_3	0	36_029_0005_2	0	39_017_0019_1	0.0098			42_049_0003_2	0.1518
123	06_001_0009_3	0	36_029_1014_2	0	06_095_0004_3	0.0097			34_023_0011_6	0.1507
124	06_001_0011_3	0	36_031_0003_2	0	21_043_0500_6	0.0087			08_045_0009_1	0.1500
125	06_001_0012_3	0	36_047_0118_2	0	08_045_0019_2	0.0083			24_033_0030_2	0.1492
126	06_001_0013_3	0	36_055_1007_10	0	39_017_0020_1	0.0083			45_025_0001_1	0.1489
127	06_001_0015_3	0	36_055_1007_2	0	06_085_0006_3	0.0083			23_003_1011_1	0.1489
128	06_013_0002_3	0	36_055_1007_20	0	48_439_3009_2	0.0080			06_001_0012_3	0.1483
129	06_013_0006_3	0	36_081_0124_4	0	17_031_4201_8	0.0078			21_157_0021_7	0.1477
130	06_013_1001_3	0	36_085_0111_2	0	36_029_0005_2	0.0078			06_085_0005_5	0.1473
131	06_013_1002_3	0	36_101_0003_2	0	06_085_0005_3	0.0076			06_055_0004_3	0.1473
132	06_013_1004_3	0	39_017_0019_1	0	06_001_0011_3	0.0071			23_019_0017_1	0.1466
133	06_013_2001_3	0	39_017_0020_1	0	36_055_1007_2	0.0068			06_075_0005_4	0.1447
134	06_041_0001_3	0	39_035_0038_1	0	18_127_0024_1	0.0064			36_055_1007_20	0.1439
135	06_041_0004_3	0	39_035_1002_1	0	12_011_0034_1	0.0049			21_157_0020_6	0.1438
136	06_055_0004_3	0	39_049_0034_1	0	39_049_0034_1	0.0048			04_013_9997_8	0.1431
137	06_075_0005_3	0	39_061_0014_1	0	39_067_0005_1	0.0045			06_001_0007_3	0.1428
138	06_075_0005_4	0	39_061_0047_1	0	34_027_3001_6	0.0045			21_157_0021_6	0.1427
139	06_081_1001_3	0	39_067_0005_1	0	36_063_7001_2	0.0041			37_183_0014_1	0.1417
140	06_085_0005_3	0	39_081_0017_1	0	36_029_1014_2	0.0040			06_001_0015_3	0.1416

141	06_085_0006_3	0	41_029_2129_7	0	48_121_0034_2	0.0039	51_670_0010_4	0.1412
142	06_095_0004_3	0	41_039_0059_7	0	55_027_0001_6	0.0032	36_055_1007_10	0.1408
143	06_097_0004_3	0	41_051_2010_7	0	24_033_0030_1	0.0027	18_167_0025_1	0.1400
144	26_111_0953_1	0	41_051_2010_9	0	06_081_1001_3	0.0025	36_029_0005_2	0.1391
145	26_111_0959_1	0	41_051_2011_7	0	36_101_0003_2	0.0020	18_127_0024_1	0.1387
146	26_111_0960_1	0	41_061_0123_7	0	06_013_1002_3	0.0016	53_033_0080_6	0.1387
147	26_111_0960_2	0	42_049_0003_2	0	06_041_0001_3	0.0013	48_121_0034_2	0.1386
148	26_163_0015_1	0	42_049_0004_2	0	06_097_0004_3	0.0013	06_001_0013_3	0.1373
149	39_035_0038_1	0	45_025_0001_2	0	45_025_0001_1	0.0013	17_031_4201_8	0.1368
150	39_049_0034_1	0	51_087_0014_4	0	06_013_1004_3	0.0012	55_027_0001_1	0.1358
151	39_061_0014_1	0	51_670_0010_4	0	11_001_0043_4	0.0008	06_111_2002_5	0.1355
152	39_061_0047_1	0	54_039_0020_1	0	48_139_1044_1	0.0005	12_103_0026_1	0.1346
153	39_067_0005_1	0	54_069_0010_1	0	04_013_9997_9	0	17_031_4201_6	0.1335
154	39_081_0017_1	0			06_001_0007_3	0	06_073_0001_5	0.1307
155					06_001_0009_3	0	21_157_0018_6	0.1298
156					06_001_0012_3	0	37_021_0035_1	0.1294
157					06_001_0013_3	0	06_007_0008_5	0.1279
158					06_001_0015_3	0	42_049_0004_2	0.1271
159					06_013_0002_3	0	37_183_0014_8	0.1254
160					06_013_0006_3	0	37_119_0041_2	0.1253
161					06_013_1001_3	0	06_013_2001_3	0.1240
162					06_013_2001_3	0	36_055_1007_2	0.1224
163					06_041_0004_3	0	06_097_0004_3	0.1196
164					06_055_0004_3	0	06_019_0011_5	0.1195
165					06_075_0005_3	0	36_029_1014_2	0.1190
166					06_075_0005_4	0	12_011_0034_1	0.1156
167					08_045_0005_1	0	06_013_1002_3	0.1138
168					08_045_0009_1	0	36_063_7001_2	0.1135
169					08_045_0019_3	0	21_043_0500_6	0.1135
170					26_163_0015_1	0	50_007_0007_1	0.1131
171					36_031_0003_2	0	12_057_3002_1	0.1119
172					39_035_0038_1	0	48_439_3009_2	0.1111
173					39_035_1002_1	0	45_025_0001_2	0.1100
174					39_061_0014_1	0	12_103_0018_1	0.1087
175					39_061_0047_1	0	06_075_0005_3	0.1086
176					42_049_0003_2	0	55_027_0001_6	0.1079
177					42_049_0004_2	0	34_027_3001_6	0.1066
178					45_025_0001_2	0	06_041_0001_3	0.1061
179					50_007_0007_1	0	36_101_0003_2	0.0996
180					50_007_0014_1	0	37_129_0010_1	0.0990
181					50_007_0014_2	0	06_061_0006_5	0.0963
182					50_021_0002_1	0	06_013_0002_3	0.0957
183					54_039_0020_1	0	48_139_1044_1	0.0946
184					54_069_0010_1	0	37_123_0001_1	0.0846
185							06_075_0005_5	0.0840
186							37_147_0006_1	0.0838
187							26_111_0955_1	0.0736
188							36_031_0003_2	0.0712
189							04_013_9997_9	0.0700
190							06_013_1001_3	0.0691
191							26_111_0960_2	0.0645
192							06_041_0004_3	0.0536
193							26_111_0959_1	0.0510
194							26_111_0953_1	0.0443
195							26_111_0960_1	0.0235