Evaluation of City of Winchester air samples for public health implications

CITY OF WINCHESTER & FREDERICK COUNTY, VIRGINIA

Letter Health Consultation

April 3, 2015

Virginia Department of Health
Division of Environmental Epidemiology
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Richmond, Virginia 23219

COMMONWEALTH of VIRGINIA

Department of Health – Office of Epidemiology

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April 3, 2015

Ms. Patricia McMurray
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Virginia Department of Environmental Quality
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Richmond, VA 23219

Dear Patricia,

This letter is in response to your request for the Virginia Department of Health (VDH) to examine air monitoring data collected in the City of Winchester and Frederick County, VA from January 2005 to June 2006, and determine *if the concentrations of hazardous air pollutants posed a health risk in 2005-2006.*

BACKGROUND

In 2004, the US Environmental Protection Agency (EPA) Region III awarded Virginia Department of Environmental Quality (DEQ) a special grant to establish and operate a comprehensive Air Toxics monitoring network in the Winchester area. The study was conducted in response to citizens' health concerns about elevated cancer rates in the Winchester area. At that time, the Lord Fairfax Health Director agreed that the area had slightly higher cancer rates of ovarian and breast cancer than the state average, but found that the all-cancers rate for the area was less than the state average. The Director also advised that social, economic, and other factors may also impact cancer rates for the area.[1] Sampling activities were conducted from January 2005 to June 2006 from three sites: General Electric Plant (upwind), Winchester Courthouse (central), and the Clearbrook Fire Station (downwind). The site selection was made based on spatial coverage, availability of sampling location, and wind direction, which has historically been southwest.

DEQ selected hazardous air pollutants (HAPs) to monitor based on availability and capacity of the current sampling and analytical systems. The HAPs targeted included volatile organic compounds (VOCs), carbonyls, toxic metals, and hexavalent chromium (Cr VI). Sampling occurred every sixth day and collocated samples were collected every twelve days.

[1] Virgina Department of Environmental Quality. Final Report of the Special Ambient Air Sampling Project in Winchester, VA. October 2006.

Site description and demographics

Winchester is an independent city located in the Shenandoah Valley on the northwestern portion of Virginia. It has numerous air pollution point sources, on and off road sources, and agricultural pesticides within its boundaries. Interstates 81 and 66, and Route 50 are thought to contribute to the presence of ambient VOCs in the area.

In 2013, the population of Winchester was 27,216 while the population in the state of Virginia was 8,260,405. Caucasians represented the majority race at 68.3%. Hispanics and Latinos comprised of 15.9% while African Americans represented 11.3%.[2] In 2012, there were 10,454 households in Winchester and the median household income was $45,684 compared to $34,335 in 2000.

In 2010, the total population living within one mile of the three monitoring sites (General Electric Plant, Winchester Courthouse, and Clearbrook Fire Station) was 14,861, of which the Winchester Courthouse had the highest population (12,827) and Clearbrook Fire Station had the lowest population within one mile (212). In the same year, the total number of children aged 6 and younger living within one mile of all three sites was 1,507, of which the Winchester Courthouse had the highest corresponding population of 1,323, and Clearbrook Fire Station had the lowest population of 16. Additionally, the total number of females aged 15 to 44 residing within one mile of all three sites was 3,046, of which the Winchester Courthouse had the highest corresponding number of 2,664, and Clearbrook Fire Station had the lowest number of 36. See attachments 1 and 2 for the demographic statistics and a detailed map for each of the three monitoring stations.

DISCUSSION

Sampling Methods

The standardized TO-15 method was used to collect VOC in the air. Samples were collected in a summa canister via pressurized sampling mode and analyzed by GC/MS. Ambient air concentrations of carbonyl compounds were collected using the TO-11A method. In this method, carbonyl compounds are collected using adsorbent cartridge and analyzed using high performance liquid chromatography. Toxic metal samples were collected from the ambient air using method IO-3. Method IO-3 was used to analyze the elemental metal components in ambient air particulate matter collected on high volume PM-10 Quartz filter. The PM-10 sample was analyzed by ICP-MS. Hexavalent chromium was collected using modified California 39 and ERG methods. Samples were analyzed using a low volume PM-10's 47 mm sodium bicarbonate treated cellulose filter.

Results

The following section contains the results and comparison values (CVs) for the HAPs monitored in 2005-2006. CVs are discussed in more detail in the public health implications section.

[2] United States Census Bureau. http://quickfacts.census.gov/qfd/states/51/51840.html

Particulate matter (PM_{10}*)*

PM_{10} was detected at each monitoring location. The average concentrations of PM_{10} detected at GE and the Winchester Courthouse were 18.7 µg/m^3 and 20.4 µg/m^3 respectively. Of the three locations, Clearbrook Fire Station had the highest average concentration, 30.8 µg/m^3, of PM_{10} (See Table 1).

Table 1. Summary of PM_{10} samples

(µg/m^3)	GE (upwind)			Courthouse (central)			Clearbrook (downwind)			NAAQS Standard
PM_{10}	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	
	3.1	38.7	18.7	3.4	41.4	20.4	2.7	87.0	30.8	150

(*Source*: DEQ) Min = minimum, Max = maximum, Avg = average, NAAQS = national ambient air quality standard, µg/m^3 = micrograms per cubic meter.

Metals

The PM_{10} samples were analyzed for metals. Detected metals included: Arsenic (As), Beryllium (Be), Cadmium (Cd), total Chromium (Cr), Manganese (Mn), Nickel (Ni), and Lead (Pb). From the results, Pb and Mn were the highest contributors of particulate matter. The average concentrations of Pb and Mn at GE, Winchester Courthouse, and Clearbrook Fire station were 0.00712 µg/m^3 and 0.00318 µg/m^3, 0.00524 µg/m^3 and 0.0042 µg/m^3, and 0.00392 µg/m^3 and 0.00494 µg/m^3, respectively (See Table 2).

Hexavalent chromium

The average and maximum concentration of 50 Cr VI samples collected at the Winchester Courthouse site were 0.000061 and 0.000471 µg/m^3, respectively. The chronic EMEG is 0.005 µg/m^3.

Table 2. Summary of metals monitoring

Metals (µg/m^3)	GE (upwind)		Courthouse (central)		Clearbrook (downwind)		Comparison Value	CV Type
	Max	Avg	Max	Avg	Max	Avg		
Arsenic	0.00237	0.00088	0.00278	0.00091	0.00601	0.00117	0.00023	CREG
Beryllium	0.00028	0.00005	0.00028	0.00004	0.00033	0.00004	0.00042	CREG
Cadmium	0.00058	0.00017	0.00415	0.00021	0.00069	0.00018	0.01	EMEG
Chromium (total)*	0.01486	0.00102	0.03058	0.00141	0.003	0.00093	0.005	EMEG
Manganese	0.0077	0.00318	0.00863	0.0042	0.01206	0.00494	0.3	EMEG
Nickel*	0.00791	0.00092	0.01629	0.00146	0.00747	0.00177	0.09	EMEG
Lead	0.03971	0.00712	0.02457	0.00524	0.01071	0.00392	0.15	NAAQS

(*Source*: DEQ) Min = minimum, Max = maximum, Avg = average, CREG = cancer risk evaluation guide, EMEG = environmental media evaluation guide, NAAQS=national ambient air quality standard, µg/m^3 = micrograms per cubic meter, *Results with blank correction.

Carbonyl compounds

EPA TO-11A method was used for the analyses carbonyl compounds (See Table 3). The carbonyl compounds included: acrolein, acetone, acetaldehyde, formaldehyde, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK) and propionaldehyde. Five carbonyl compounds (acetone, acetaldehyde, formaldehyde, MEK, and propionaldehyde) were found in almost all collected samples. Of all the carbonyl compounds detected, formaldehyde had the highest average concentration at all three sampled sites 2.36 ppb, 3.08 ppb, and 2.49 ppb at GE, Winchester Courthouse, and Clearbrook Fire Station sites, respectively.

Table 3. Summary of carbonyl compounds monitoring

Carbonyl Compound (ppb)	GE (upwind)			Courthouse (central)			Clearbrook (downwind)			CV	CV Type
Carbonyls	Detects	Max	Avg	Detects	Max	Avg	Detects	Max	Avg		
acetaldehyde	60	1.94	1.06	60	2.27	1.37	60	1.79	1.06	5	RSL
acetone	60	3.45	1.83	60	7.6	2.18	60	3.47	1.91	13,000	EMEG
formaldehyde	60	7.45	2.36	60	8.61	3.08	60	7.21	2.49	8	EMEG
methyl ethyl ketone	49	0.67	0.31	48	1.81	0.41	54	0.5	0.3	1,763	RSL
methyl isobutyl ketone	1	0.09	0.09	8	0.2	0.11	0	0	0	732	RfC
propionaldehyde	56	0.77	0.22	58	0.55	0.27	56	0.6	0.22	3	RSL

(*Source*: DEQ) ppb=parts per billion, Max = maximum, Avg = average, CV = comparison value, RSL = regional screening level, EMEG = environmental media evaluation guide, RfC = reference concentration.

Volatile organic compounds

EPA's TO-15 method was used to analyze for VOCs at the three sites (See Table 4). At the GE site, 23 VOCs were detected above the method detection limits (MDL) and nine VOCs were consistently detected in all samples. At the Winchester Courthouse site, 39 VOCs were detected above the MDL and 13 were frequently detected. Twenty-five VOCs were detected above the MDL and 10 were frequently detected pollutants at the Clearbrook Fire Station site.

Table 4. Summary of volatile organic compounds monitoring (continues on next page)

Volatile organic compound (ppb)	GE (upwind) (total samples = 53)			Courthouse (central) (total samples = 75)			Clearbrook (downwind) (total samples = 59)			CV	CV Type
	Detects	Max	Avg	Detects	Max	Avg	Detects	Max	Avg		
Dichlorodifluoromethane	49	0.8	0.52	71	0.94	0.55	59	0.91	0.52	20	RSL
Chloromethane	52	0.79	0.57	73	0.97	0.57	59	0.89	0.54	50	Chronic EMEG
Ethyl chloride	9	0.56	0.24	21	2.42	2.42	23	1.28	0.55	3,790	RSL
Trichlorofluoromethane	45	2.63	0.34	65	1.53	0.39	54	1.86	0.31	130	RSL
Methylene chloride	18	0.21	0.12	43	0.22	0.12	24	0.2	0.11	300	Chronic EMEG

Volatile organic compound (ppb)	GE (upwind) (total samples = 53)			Courthouse (central) (total samples = 75)			Clearbrook (downwind) (total samples = 59)			CV	CV Type
	Detects	Max	Avg	Detects	Max	Avg	Detects	Max	Avg		
1,1,2-trichloro-1,2,2-trifluoroethane	35	0.23	0.11	44	0.24	0.11	37	0.17	0.1	4,045	RSL
1,1,1-trichloroethane	1	0.09	0.09	1	0.08	0.08	1	0.09	0.09	700	Interm. EMEG
Ethyl acetate				2	6.31	3.26	15	30	7.21	388,492	NIOSH RELS
Benzene	30	0.36	0.16	54	0.48	0.23	31	0.37	0.19	3	Chronic EMEG
Carbon tetrachloride	22	0.61	0.13	29	0.19	0.11	23	0.16	0.1	30	Chronic EMEG
1,2-Dichloropropane	1	0.41	0.41	2	1.58	1.03	4	0.33	0.24	7	Interm. EMEG
Toluene	40	1.68	0.24	73	2.9	0.49	58	11	1.45	80	Chronic EMEG
Ethylbenzene				14	0.17	0.11	1	0.09	0.09	60	Chronic EMEG
Tetrachloroethene	3	0.14	0.1	3	0.1	0.09	3	0.1	0.09	40	Chronic EMEG
m&p-Xylene	3	0.12	0.1	21	0.53	0.2	3	0.09	0.09	50	Chronic EMEG
o-Xylene				14	0.18	0.11	2	0.1	0.1	23	RSL
1,2,4-Trimethylbenzene	1	0.08	0.08	23	0.52	0.18	4	0.16	0.12	1.5	RSL
Hexachloro-1,3-butadiene	3	0.28	0.15	3	0.38	0.21	1	0.08	0.08	0.0043	CREG

(*Source*: DEQ) ppb=parts per billion, Max = maximum, Avg = average, CV = comparison value. RSL = regional screening level. EMEG = environmental media evaluation guide. CREG = cancer risk evaluation guide. REL = recommended exposure level, Interm.= intermediate, Shaded = not detected.

Public Health Implications

Contaminants in the environment can only impact human health if individuals are (1) exposed to contaminants and (2) if contaminants are present at sufficient concentrations. Residents can be exposed to contaminants in ambient air when they breathe outdoors. Evaluation of the HAPs with air concentrations above their CV are discussed below.

Contaminant evaluation

VDH uses CVs to evaluate air contaminant concentrations. CVs are media-specific concentrations used to identify contaminants that require additional evaluation. They are derived using standard default exposure assumptions and are not site-specific. For contaminants detected below their respective CVs, exposure is not anticipated to result in adverse health effects. Concentrations above CVs do not mean that adverse health effects occurred or will occur, but that further investigation is needed. Therefore, the CVs should not be used to predict the occurrence of adverse health effects. CVs

used to evaluate contaminants at the sampling sites included the Agency for Toxic Substances and Disease Registry (ATSDR's) environmental media evaluation guides (EMEGs), and cancer risk evaluation guides (CREGs). EMEGs are estimated contaminant concentrations that are not expected to result in adverse non-carcinogenic health effects based on ATSDR evaluation. They are based on conservative assumptions about exposure, such as intake rate, exposure frequency and duration, and body weight. ATSDR has developed EMEGs that apply to acute (14 days or less), intermediate (15–364 days), and chronic (365 days or more) exposures. CREGs are media-specific comparison values that are used to identify concentrations of cancer-causing substances that are unlikely to result in a significant increase of cancer rates in an exposed population. ATSDR develops CREGs using EPA's cancer slope factor or inhalation unit risk, a target risk level (10^{-6}), and default exposure assumptions. The target risk level of 10^{-6} represents an estimated risk of 1 excess cancer case in an exposed population of 1 million.

If ATSDR does not have a CV for a substance, then other federal or state guidelines are used if available. VDH used EPA's NAAQS to evaluate the air concentration of PM_{10} and lead, and EPA's regional screening levels (RSL) to evaluate VOCs where ATSDR did not have an applicable CV. VDH used the ***primary*** NAAQS, which provides protection to the general population, including "sensitive" populations such as asthmatics, children, and the elderly. RSLs are risk-based concentrations that combine exposure assumptions and toxicity data to yield environment contaminant levels that are considered protective for humans over a lifetime. Lastly, the National Institute for Occupational Safety and Health (NIOSH's) recommended exposure limit (REL) was used to evaluate the air concentration of ethyl acetate. REL are developed to be protective of workers and not necessarily the general population. However, the REL for ethyl acetate is more than 38,000 times higher than the highest concentration detected. Therefore, further evaluation of ethyl acetate is not warranted.

Arsenic

Sampling results indicated that arsenic was the only metal detected above its CV in all three locations. The Department of Health and Human Services has determined that inorganic arsenic is known to be a human carcinogen. Exposure to arsenic is associated with lung, bladder, kidney, liver, and non-melanoma skin cancers.[3,4] Individuals are exposed to arsenic from either contaminated drinking water, soil, food, or inhalation. Although arsenic concentrations exceeded the arsenic CREGs, it is normal to find background levels of arsenic to be 10 to 100 times above the CREG.[5] To determine the health implications of arsenic, VDH calculated the estimated excess cancer risk. To estimate cancer risk from arsenic inhalation, the inhalation unit risk (IUR) factor for arsenic $(0.0043\ \mu g/m3)^{-1}$ is multiplied by the average air concentration of arsenic in $\mu g/m^3$ (see below). The calculated excess cancer risk using the average arsenic air concentration value at GE, Winchester Courthouse, and Clearbrook Fire Station was 4 in 1,000,000, 4 in 1,000,000, and 5 in 1,000,000, respectively.

[3] Smith AH, Steinmaus CM. Health effects of arsenic and chromium in drinking water: recent human findings. Annu Rev Public Health. 2009;30:107–122.
[4] IARC (International Agency for Research on Cancer) Some Drinking-water Disinfectants and Contaminants, Including Arsenic. IARC Monogr Eval Carcinog Risk Hum. 2004;84:1–477
[5] ATSDR 2007. Agency for Toxic Substances and Disease Registry. Toxicological profile for Arsenic. Atlanta, GA: US Department of Health and Human Services; August. Available at: http://www.atsdr.cdc.gov/toxprofiles/tp2.html. Last accessed January 19, 2010.

Cancer Risk = IUR x Concentration

GE (upwind)

$3.78 \times 10^{-6} = 0.0043\ (\mu g/m^3)^{-1}$ **x** $0.00088\ \mu g/m^3$ = 4 additional cancers in a million

Winchester Courthouse (central)

$3.91 \times 10^{-6} = 0.0043\ (\mu g/m^3)^{-1}$ **x** $0.00091\ \mu g/m^3$ = 4 additional cancers in a million

Clearbrook Fire Station (downwind)

$5.03 \times 10^{-6} = 0.0043\ (\mu g/m^3)^{-1}$ **x** $0.00117\ \mu g/m^3$ = 5 additional cancers in a million

Volatile organic compounds

VOCs are a wide range of chemicals which are volatile at ambient room temperature. VOCs are either inhaled or absorbed through the skin from the environment and subsequently lead to adverse health effects. VOCs have been linked to diabetes, gastrointestinal and liver diseases, lung disorders and different types of cancer.[6,7]

Hexachloro-1,3-butadiene was the only VOC detected above is CV. It was detected in less than 5% of all samples (187 total samples). The highest reported concentration was 0.38 ppb at the Winchester Courthouse (central) monitoring station. Information on the chronic health effects from inhalation of hexachloro-1,3-butadience is very limited. The International Agency for Research on Cancer has determined that hexachloro-1,3-butadiene is not classifiable as to its carcinogenicity in humans due to limited evidence its carcinogenicity in rats.[8] However, the EPA has determined that hexachloro-1,3-butadiene is a possible human carcinogen.[9]

[6] Probert CSJ, Ahmed I, Khalid T, Johnson E, Smith S, Ratcliffe N. 2009. Volatile organic compounds as diagnostic biomarkers in gastrointestinal and liver diseases. J. Gastrointestin. Liver Dis. 18:337–343

[7] Hakim M, Broza YY, Barash O, Peled N, Phillips M, Amann A, Haick H. 2012. Volatile organic compounds of lung cancer and possible biochemical pathways. Chem. Rev. 112:5949–5966

[8] http://www.atsdr.cdc.gov/hac/pha/NorthBirminghamAirSite/35th%20Avenue%20Site_PHA_PC_06-26-2014_508.pdf

[9] US Environmental Protection Agency. 2012. Integrated risk information system. Hexachlorobutadiene. (CASRN 85-01-8). Last updated August 9, 2012. Available at: http://www.epa.gov/iris/subst/0058.htm.

CONCLUSIONS

Exposure to PM_{10} in Winchester City in 2005-2006 is not expected to harm people's health because the average concentration and the highest concentration reported for PM_{10} were both below the NAAQS.

The concentration of arsenic in the air in Winchester in 2005-2006 is not expected to harm people's health because the additional estimated cancer risk is extremely low (less than 6 cancers per 1,000,000 people) when compared to the background cancer risk (1 in 3 people).

Exposure to HAPs in the air in Winchester in 2005-2006 is not expected to harm people's health because the average concentration and the highest concentration of reported HAPs were below their CVs or their rate of detection was less than 5%.

RECOMMENDATION

VDH recommends that the air quality results and associated conclusions be provided to the three communities where the samples were collected in 2005-2006.

VDH is available to assist DEQ with community outreach if needed.

REPORT PREPARERS

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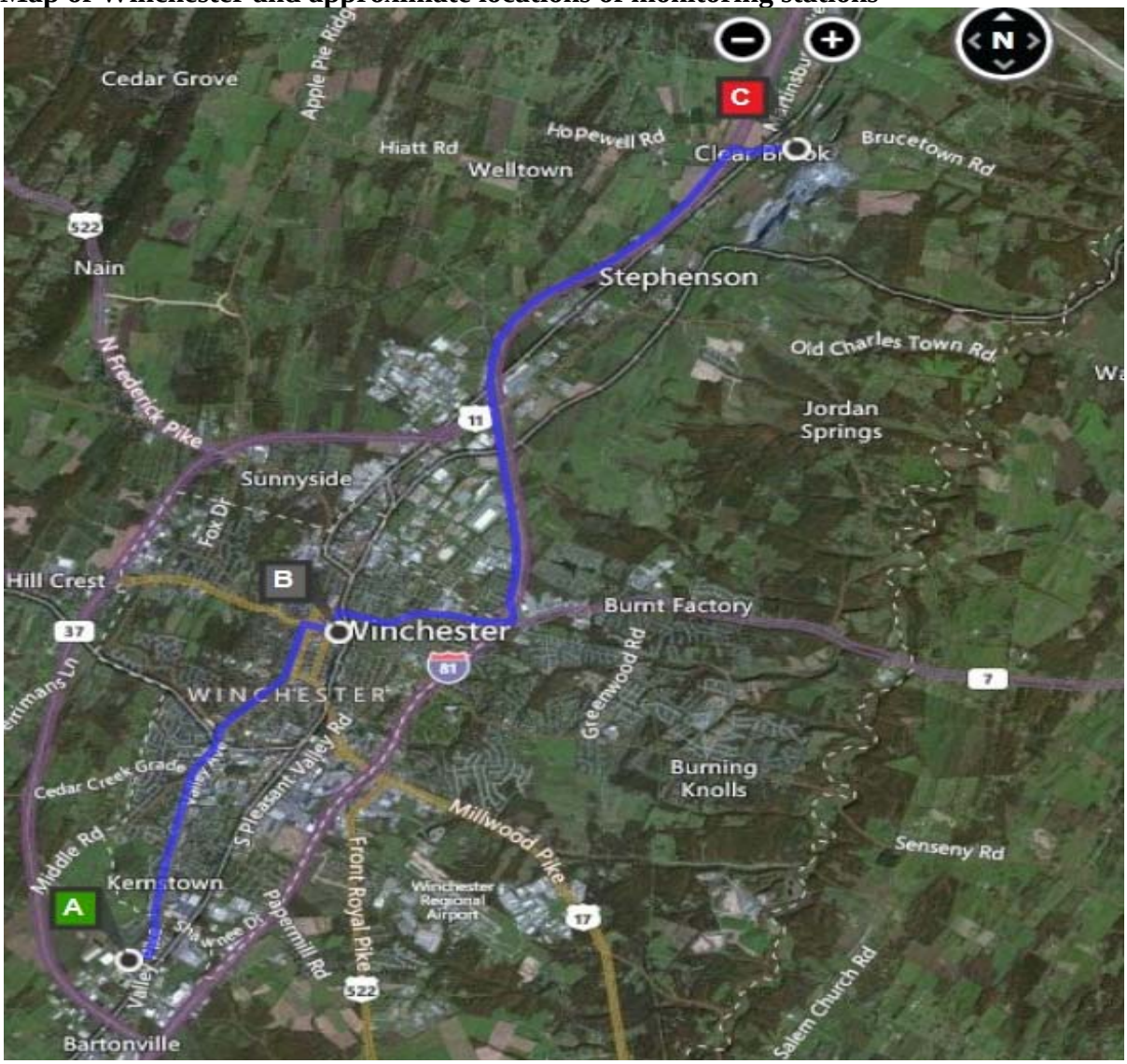
Attachment 1

Map of Winchester and approximate locations of monitoring stations



A= GE site (125 Apple Valley Rd, Winchester, VA); **B**= Winchester Courthouse (5 N Kent St, Winchester, VA); **C=** Clearbrook Fire Station (1256 Brucetown Rd, Clearbrook, VA).

Attachment 2
Site maps and demographics

125 Apple Valley Road

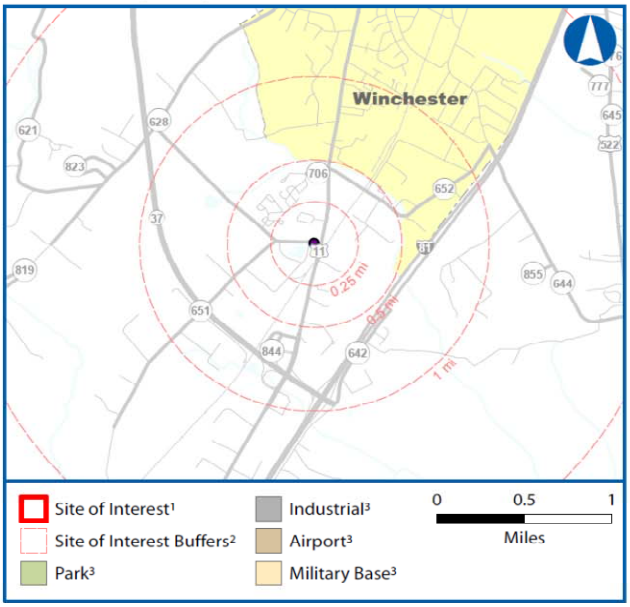
Winchester, Frederick County, VA

GENERAL SITE PROFILE

EPA FACILITY ID 4570

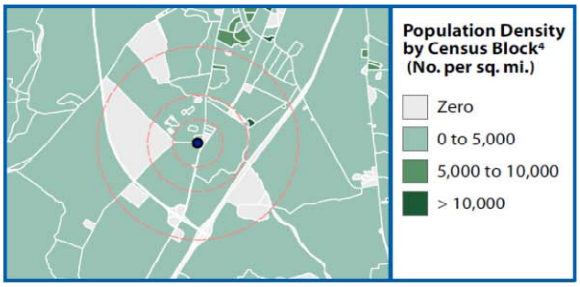
INTRODUCTORY MAP SERIES

Site Vicinity Map

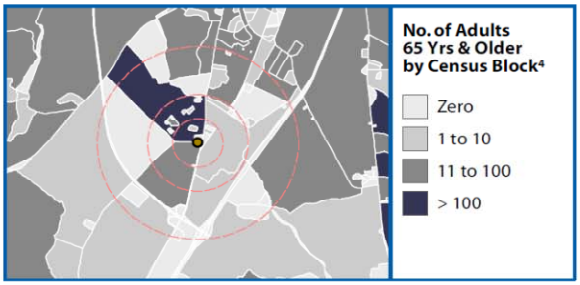


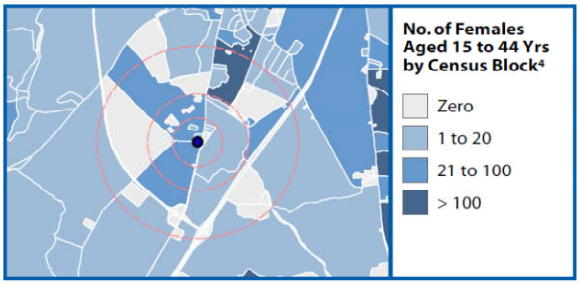
The **General Site Profile Map** depicts the hazardous waste site of interest, highlights locations of other environmental hazards and community gathering points, and provides community demographic and housing statistics.

General Population Density



Sensitive Populations





Demographic Statistics[4,5]

Within 1 mile buffer of site boundary

Measure	2000	2010	Change
Total Population	1,537	1,822	+18%
White Alone	1,330	1,345	+1%
Black Alone	110	164	+49%
Am. Indian & Alaska Native Alone	6	8	+33%
Asian Alone	22	25	+13%
Native Hawaiian & Other Pacific Islander Alone	0	0	+0%
Some Other Race Alone	36	231	+541%
Two or More Races	31	53	+70%
Hispanic or Latino[6]	57	349	+512%
Children Aged 6 and Younger	145	168	+15%
Adults Aged 65 and Older	213	349	+63%
Females Aged 15 to 44	344	346	+0%
Housing Units	737	873	+18%
Housing Units Pre 1950	61	57	-6%

Data Sources: [1]ATSDR GRASP Hazardous Waste Site Boundary Database (2012). [2]ATSDR GRASP. [3]TomTom International BV (2012). [4]US Census 2010.
Notes: [5]Calculated using area-proportion spatial analysis method. [6]Individuals identifying origin as Hispanic or Latino may be of any race.
Projection: Projection used for all map panels is NAD 1983 StatePlane Virginia North FIPS 4501 Feet.

PRJ 04570 JXA0 12/16/14

GRASP

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

ATSDR

FINAL - FOR PUBLIC RELEASE

5 North Kent Street

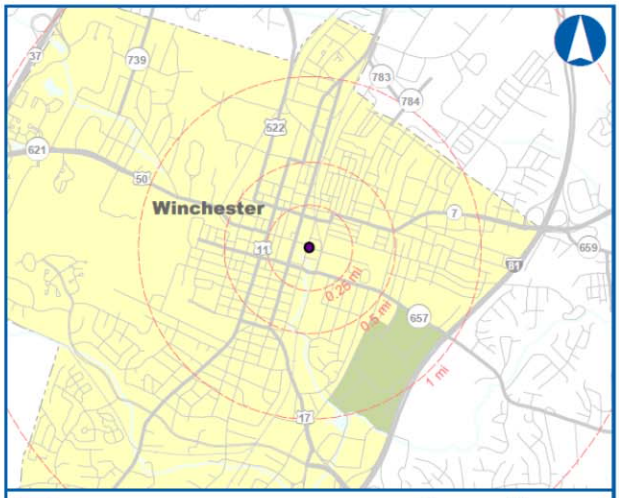
Winchester, Frederick County, VA

GENERAL SITE PROFILE

EPA FACILITY ID 4570

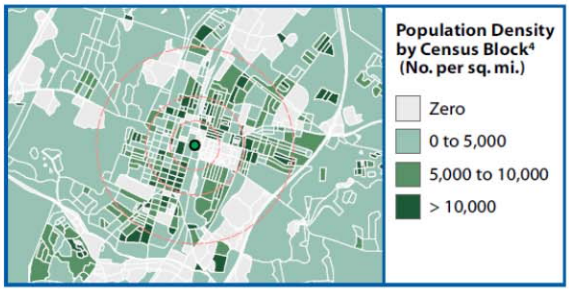
INTRODUCTORY MAP SERIES

Site Vicinity Map

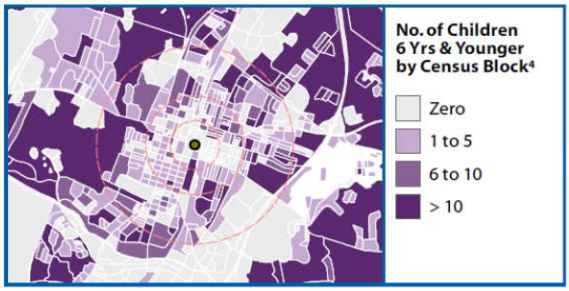


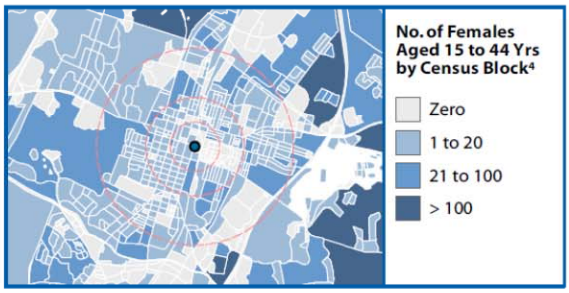
The **General Site Profile Map** depicts the hazardous waste site of interest, highlights locations of other environmental hazards and community gathering points, and provides community demographic and housing statistics.

General Population Density



Sensitive Populations





Demographic Statistics[4,5]

Within 1 mile buffer of site boundary

Measure	2000	2010	Change
Total Population	12,649	12,827	+1%
White Alone	9,969	9,294	-6%
Black Alone	1,870	1,798	-3%
Am. Indian & Alaska Native Alone	33	41	+24%
Asian Alone	130	154	+18%
Native Hawaiian & Other Pacific Islander Alone	5	0	-100%
Some Other Race Alone	340	1,111	+226%
Two or More Races	303	425	+40%
Hispanic or Latino[6]	622	2,093	+236%
Children Aged 6 and Younger	1,194	1,323	+10%
Adults Aged 65 and Older	1,817	1,664	-8%
Females Aged 15 to 44	2,796	2,664	-4%
Housing Units	5,841	5,938	+1%
Housing Units Pre 1950	1,859	1,788	-3%

Data Sources: [1]ATSDR GRASP Hazardous Waste Site Boundary Database (2012). [2]ATSDR GRASP. [3]TomTom International BV (2012). [4]US Census 2010.
Notes: [5]Calculated using area-proportion spatial analysis method. [6]Individuals identifying origin as Hispanic or Latino may be of any race.
Projection: Projection used for all map panels is NAD 1983 StatePlane Virginia North FIPS 4501 Feet.

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GRASP

Agency for Toxic Substances and Disease Registry

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Suburban/ Industrial Site

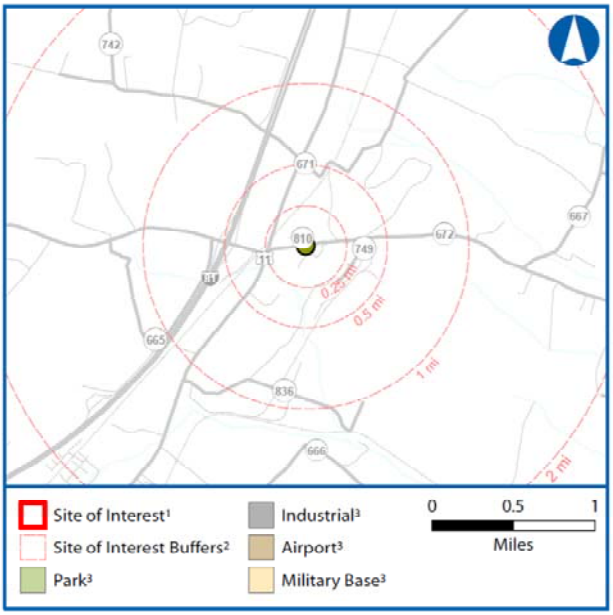
Clearbrook, Frederick County, VA

GENERAL SITE PROFILE

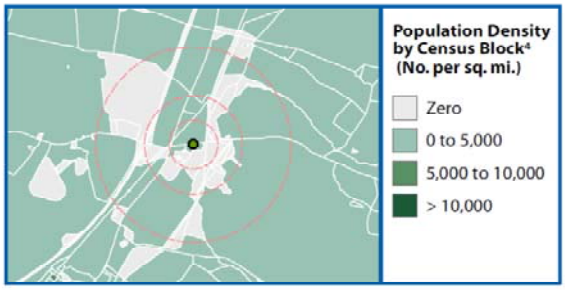
EPA FACILITY ID 4570

INTRODUCTORY MAP SERIES

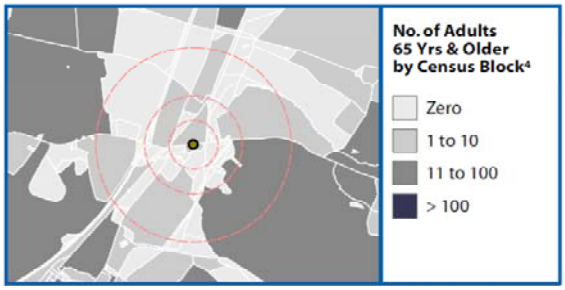
Site Vicinity Map



General Population Density



Sensitive Populations



The **General Site Profile Map** depicts the hazardous waste site of interest, highlights locations of other environmental hazards and community gathering points, and provides community demographic and housing statistics.

Demographic Statistics[4,5]

Within 1 mile buffer of site boundary

Measure	2000	2010	Change
Total Population	251	212	-15%
White Alone	239	205	-14%
Black Alone	6	1	-83%
Am. Indian & Alaska Native Alone	1	0	-100%
Asian Alone	0	1	N/A
Native Hawaiian & Other Pacific Islander Alone	0	0	+0%
Some Other Race Alone	2	5	+150%
Two or More Races	2	0	-100%
Hispanic or Latino[6]	2	5	+150%
Children Aged 6 and Younger	19	16	-15%
Adults Aged 65 and Older	21	24	+14%
Females Aged 15 to 44	44	36	-18%
Housing Units	101	93	-7%
Housing Units Pre 1950	22	27	+22%

Data Sources: [1]ATSDR GRASP Hazardous Waste Site Boundary Database (2012). [2]ATSDR GRASP. [3]TomTom International BV (2012). [4]US Census 2010.
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