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2015 ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER VI**

# **HAZARDOUS MATERIALS**

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# **VI. HAZARDOUS MATERIALS**

## **A. OVERVIEW, INCIDENTS AND REPORTING**

### **1. Overview**

As this report is being prepared, Fairfax County is working on its MS4 (Municipal Separate Storm Sewer System) Program Plan. While the primary focus is storm water management, discharge protection is included to locate and eliminate illicit discharges and improper disposal.<sup>10</sup> Fairfax County already has many programs addressing illicit discharges and improper disposal. Many of these are included in this chapter about hazardous materials.

Almost daily the news includes an incident somewhere involving a hazardous material. It may be a vehicle accident with spilled fuel, a tanker or train leaking a chemical, a fire in a plant containing hazardous chemicals or a broken mercury thermometer or light bulb. Very little is covered about individuals handling and disposing of hazardous materials that are located in most homes. A hazardous material is any item or agent (biological, chemical, radiological and/or physical) which may cause harm to humans, animals or the environment, either by itself or through interaction with other factors (fire, moisture, other chemicals). Fairfax County is relatively “clean” in that we don’t have manufacturing or storage of fertilizers or chemicals. The main concerns are hazardous materials incidents involving spills, leaks, transportation accidents, ruptures or other types of emergency discharges. Secondary is the use and disposal of hazardous materials in either daily household activities or by small quantity commercial generators.

Although the news media reports industrial and transportation related hazardous materials incidents, there is a general lack of awareness by the public of health and safety risks associated with the use, storage and disposal of common household hazardous materials. Educating the public on the implications of these hazardous materials on peoples’ lives remains a significant goal.

The discarding of older model televisions, as well as computer monitors and peripherals, requires continued effort to help keep lead from entering the solid waste system. Compact fluorescent light (CFL) bulbs contain small amounts of mercury; they therefore must be disposed of properly when the bulbs are used as well as if they are broken. With the phase-out of incandescent light bulbs well underway, the proper disposal of CFL bulbs is becoming more important and the county has expanded its capability to support this requirement.

The Fire and Rescue Department is using Tier II Manager Software for emergency and hazardous chemical reporting. This allows for Web-based entry of Tier II information by submitting facilities. The most significant advantage

of this software is that it automatically generates the Hazardous Material Emergency Response Plan for the critical hazard facilities. Currently, over 500 total facilities are in the system. Tier II reviews were conducted for county facilities between January and March 2014.<sup>13</sup>

The Fire and Hazardous Materials Investigative Services Section initiated a records management system in 2012 called Fire Files. This new record management system combines previously collected data from the section's Hazardous Materials Complaint Database and its Fire Investigations Case Files into one single records management system.

## **2. Hazardous Materials Incidents**

### **a. Overview of 2014 Hazardous Materials Incidents**

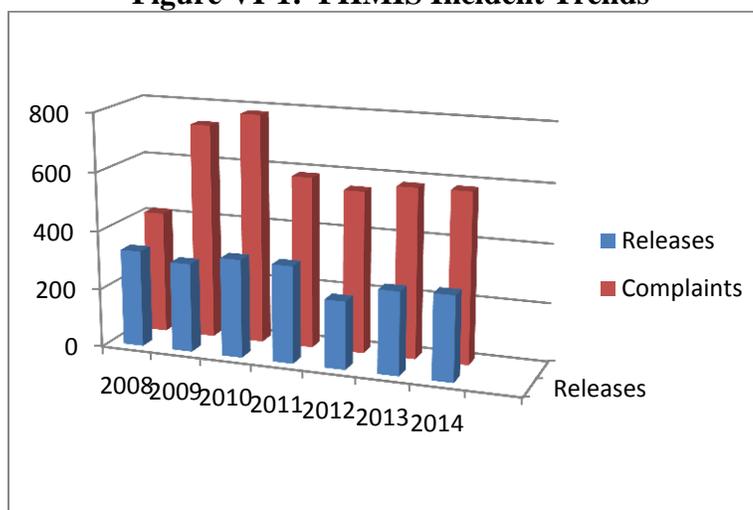
The Fire and Rescue Department's Fire and Hazardous Materials Investigative Services (FHMIS) section responds to all reported incidents of hazardous materials releases, spills and discharges in Fairfax County and the towns of Herndon, Vienna and Clifton as requested or directed by the Fire and Rescue Department's Operation Division's first responders, the Department of Public Safety Communications, other county agencies, the Commonwealth of Virginia and/or complaints from residents. The mission of the section is to prevent the inception or recurrence of fire and hazardous conditions through the enforcement of applicable codes and laws. The section issues notices of violation and summons where appropriate and ensures the proper cleanup of the releases. The section received 581 case entries into its Fire Files record management system in 2014. The actual spill, leak, or release of hazardous materials into the environment occurred in 289 of these cases. Of these 289 releases, 125 involved petroleum based products. There were 22 hydraulic oil spills/releases (mostly from trash trucks), 22 gasoline releases, 10 fuel oil or home heating oil releases and 40 diesel fuel releases. The remainder consisted of a variety of materials including, paint, antifreeze, cleaners, various gases, various chemicals and mercury. There were 22 incidents where the release of hazardous materials did impact storm drains or surface waters. The section tracked eight sites for both short and long term remediation activities. The vast majority of these releases were small in scale. The section also staffs the Hazardous Materials and Fire Investigations Mobile Lab. The Mobile Lab was requested to respond to no hazmat incidents and eight fire events in 2014. The trend in the number of case entries and actual spills over recent years is presented in Table VI-1 and Figure VI-1.

Section personnel maintain relationships with the major hazardous materials pipeline companies and blasting companies that operate in Fairfax County in an effort to reduce risks and increase response capabilities should emergency incidents occur with these operations. FHMIS staff is also

working in partnership with multiple other county agencies on the county’s new MS4 permit project.<sup>1</sup>

<b>Table VI-1</b> Fire and Rescue Department’s Fire and Hazardous Materials Investigative Services Incident Trends		
<b>Fiscal Year</b>	<b>Complaints/Case Entries</b>	<b>Spills, Leaks, or Releases of Hazardous Materials</b>
FY 2014	581	289
FY 2013	579	283
FY 2012	552	231
FY 2011	585	331
FY 2010	782	335
FY 2009	735	303
FY 2008	418	330

**Figure VI-1: FHMIS Incident Trends**



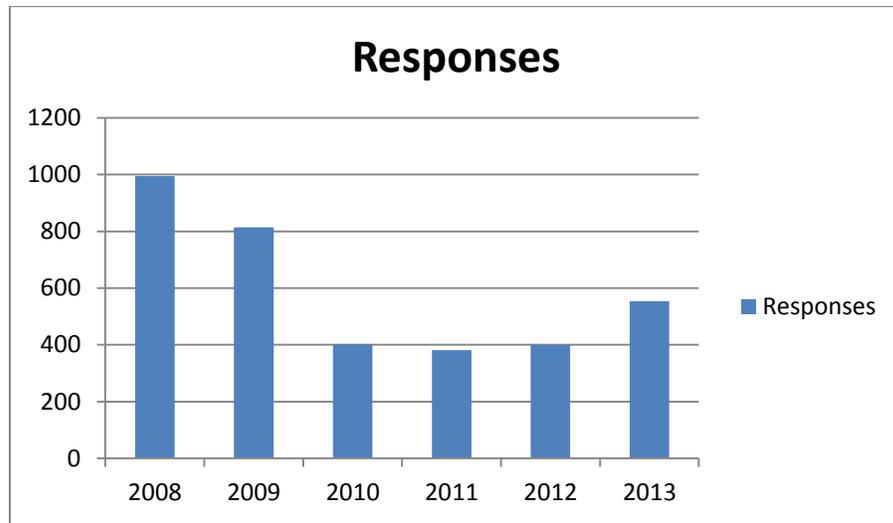
**b. Hazmat Response Team Information**

The Fire and Rescue Department maintains a well-equipped hazardous materials response team for emergency response. The primary unit operates out of Fairfax Center Fire Station 40. There are four satellite stations located throughout the county in support. These stations are located at Fire Station 1 in McLean, Fire Station 11 in Penn Daw, Fire Station 19 in Lorton and Fire Station 26 in Springfield. These units are strategically positioned to provide rapid response and adequate coverage throughout Fairfax County. Response personnel are trained and equipped to initiate product control and

mitigation measures to prevent or minimize adverse environmental impact and damage. All units are staffed 24 hours per day, seven days per week.<sup>1</sup>

In 2013, the Hazardous Materials Response Team (HMRT) responded to 554 calls. The team responded to a myriad of incidents including methane/propane gas emergencies, transformer fires, overturned gasoline/ethanol tank trucks, weapons of mass destruction investigations for suspicious packages or white powder, mercury events, chemical odors or spills, petroleum releases, the dumping of hazardous materials and various other Department of Transportation HazMat-class events.<sup>1</sup> The trend in the HMRT responses is captured in Figure VI-2.

**Figure VI-2: Hazmat Response Team Responses**



In addition to the efforts of the Operations Division and Hazardous Materials Investigative Services Section personnel, the Fire and Rescue Department maintains a contract with a major commercial hazardous materials response company to provide additional support for large-scale incidents. The Fire and Rescue Department has stressed its commitment to protecting the environment and residents through proper enforcement of the Fairfax County Fire Prevention Code and through rapid identification, containment and cleanup of hazardous material incidents.

The Fire and Rescue Department, in conjunction with the Fairfax Joint Local Emergency Planning Committee, maintains an online software program called Tier 2 Manager. This program allows companies that use, store or manufacture chemicals in the county to report this information electronically to the department and FJLEPC so that the community and first responders will be aware of these chemicals within our community as required by the Emergency Planning and Community Right to Know Act.

Emergency planners and response personnel have instant access to chemical inventories and Emergency Response Plans for each facility deemed to be a Critical Hazard Facility. Additionally, Emergency Response Plans are developed for critical infrastructure facilities such as sewage and water treatment plants and bulk petroleum storage facilities. Current Tier 2 data indicates, based on 2013 reporting data, that there are 449 active facilities with hazardous materials in the county. Of these, 133 store extremely hazardous substances above the threshold planning quantity. Of the 449 facilities, eight store bulk petroleum.<sup>1</sup>

The Virginia Department of Environmental Quality (DEQ) report for 2014 Leaking Storage Tanks in Fairfax County included regulated (i.e. gas station) and unregulated (i.e. residential heating oil).<sup>15</sup>

<b>Table VI-2 DEQ Storage Tank Leaks</b>		
	<b>Regulated</b>	<b>Unregulated</b>
<b>Total cases closed</b>	1108	2036
<b>Total cases open</b>	16	46
<b>Cases opened in 2014</b>	7	82
<b>Cases closed in 2014</b>	14	75

### 3. Reporting Environmental Concerns and Issues

Environmental issues affect everyone living and working in the county. All environmental concerns and events negatively impacting the county should be reported. In past years, this chapter presented a list of contact information relating to environmental crimes. This list has been removed from this chapter and is now presented in the introductory section of this report, after the presentation of the “Scorecard.”

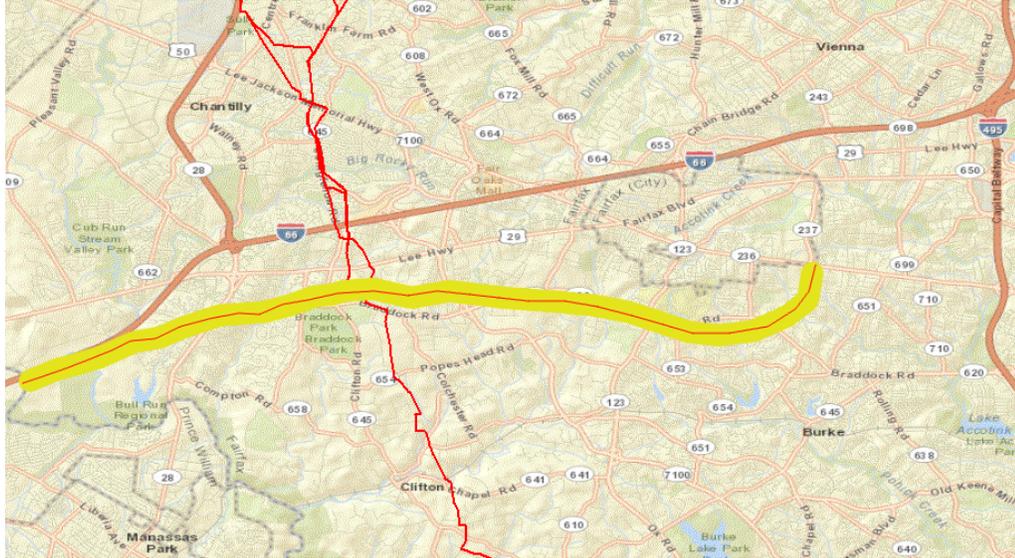
## B. ISSUES

### 1. Pipelines

Pipelines traverse Fairfax County carrying refined petroleum products (for two companies) and natural gas (for three companies). The Office of Pipeline Safety in the U.S. Department of Transportation regulates pipeline design and the construction, operation and maintenance of pipelines to ensure safe transportation of hazardous liquids and natural gas.<sup>7</sup>

Pipelines are cost-effective for shipping large quantities of refined petroleum products to a few destinations, but not to end customers such as gas stations. Except for airports that receive jet fuel directly, most gasoline and distillates, such as heating oil, finish their journey in a truck. In contrast, most natural gas

is delivered via pipeline all the way to the customer's home or business. There are some exceptions – Liquefied petroleum gas can be shipped in railroad tanker cars and trucks, and compressed propane gas is transported via truck to refill tanks at the homes/businesses that are not connected directly to pipelines. In addition, customers with backyard grills handle the last leg of some propane transport, by exchanging propane tanks at businesses to get refills.<sup>17</sup>



A 22-inch wide pipeline (red line with yellow border) transports petroleum products from the main Colonial Pipeline to the tank farm on Pickett Road, near the intersection with Route 236.  
Source: US Department of Transportation, National Pipeline Mapping System (17)

Starting in the 1990s, the development of the hydraulic fracturing (“fracking”) process for “tight gas” formations on the western edge of the Appalachians led to a dramatic increase in the supply of natural gas from domestic resources. The market for that gas includes urban areas in the eastern U.S. Building pipelines to deliver that new supply of gas to customers on the east side of the Appalachians is not a risk-free business and not every project announced is completed. Pipeline companies have announced several competing plans to bring Appalachian Basin shale gas to markets in Virginia and North Carolina, including the Atlantic Coast Pipeline, Mountain Valley Pipeline and Appalachian Connector. The latter two are planned to connect with the existing Transco pipeline at the same location, the compressor station in Pittsylvania County known as Station 165. Within Virginia, Virginia Nation Gas owns the largest intrastate gas pipeline, carrying gas from the Transco system in Northern Virginia to Richmond and Hampton Roads. In Northern Virginia, Transco is located in Manassas. If oil and gas is discovered in commercial quantities under the Outer Continental Shelf of Virginia, pipelines will be constructed to move the hydrocarbons from wells to tank farms offshore.<sup>17</sup>

Pipeline accidents can affect both human safety and the environment. Northern Virginia and Fairfax County, specifically, have had pipeline spills and leaks in the past. In 1993, a break in the Colonial Pipeline released 400,000 gallons of

diesel oil into Sugarland Run. Fairfax County had to close its drinking water intake on the Potomac River for 11 days, while the oil was skimmed off. Tank farms at the end of pipelines can also be the site of oil spills. The Motiva tank farm on Pickett Road in the City of Fairfax handles 40% of gasoline in the Northern Virginia area. In 1980, 300,000 gallons of gasoline spilled on the surface there, when a pipeline shipment was directed to a small rather than a large tank. The spill forced evacuation of the Comstock subdivision south of the tank farm. In 1990, rainstorms brought to the surface some petroleum that had accumulated underground from leaking pipes and small overfills of trucks at the tank farm since it was built in 1965. The contaminated groundwater, fumes and oil sheens at the surface caused property values in the nearby Mantua subdivision to nosedive. Since then, there have been periodic lesser leaks and spills that have been addressed immediately. Colonial Pipeline had a discharge of 200,000 gallons of aviation-grade kerosene near Manassas which flowed from Route 234/Sudley Road to Bull Run and ultimately into the Occoquan Reservoir – a major water supply for Fairfax County and Prince William County.<sup>17</sup>

Pipes transporting other chemicals onsite can also cause hazardous materials or environmental incidents when they leak or burst. In 2011, the Pepco power plant in Alexandria had, as reported by Alexandria fire officials, 21,000 gallons of mineral oil leak after a pipe burst. The pipe, connected to a transformer, carried mineral oil to cool the transformer. Some of the spill entered the Potomac River. Once the spill entered the river, it exited Alexandria’s jurisdiction.<sup>20</sup>

To continue the relative human and environmental safety of the past couple decades, attention should be given to any future increase of production and transport by pipeline of hazardous materials to or through Fairfax County.

## **2. Rail Transport of Hazardous Materials**

Chemicals and materials that are hazardous have regularly been transported by rail. While having chemicals and hazardous materials transported by rail keeps them off the highways, accidents or leaks have been, and continue to be, a cause for concern. Concerns introduced as a result of the September 11, 2001 terrorist attack and more recent terrorist attacks, new ethanol transfer stations, new methods to retrieve oil and gases, as well as shipments of radioactive nuclear waste throughout the country require vigilance for safe transportation.

### **a. Incidents of Note**

In a 2013 train accident in Quebec, tanker cars carrying crude oil from North Dakota exploded and over 40 people died. Afterwards, CSX reassured residents in Washington, D.C. that, in 2013, only three tank cars loaded with crude oil were transported by the 7,000 trains that traveled on

the CSX rail line going through the city (and across the Potomac River, through Alexandria). That claim may have been accurate for crude oil shipments, but news stories at the time discussing risks of hazardous materials transport failed to address the number of rail cars loaded with ethanol or refined petroleum products traveling through Alexandria, Fredericksburg, Richmond, etc.<sup>17</sup> Rail cars traveling through Alexandria will either travel through Fairfax County or be unloaded at the Van Dorn rail yard adjacent to Fairfax County.

An April 2014 train accident in Lynchburg resulted in dramatic pictures of tanker cars burning along the city's downtown waterfront along the James River. The crude oil in those cars had come from the Bakken formation in North Dakota. That oil production region has surged due to the success of hydraulic fracturing. The supply exceeded available pipeline capacity, so Bakken crude oil was shipped by rail to refineries in the Northeastern United States.<sup>17</sup>

A February 2015 train accident in West Virginia blocked transport of the oil trains running on the normal CSX route along the James River. Until the tracks were repaired at the accident site, CSX arranged with Norfolk Southern to transport Bakken crude oil on tracks that parallel the New River, and then go through Roanoke and Petersburg to reconnect with the CSX line.<sup>17</sup> With the increase in number of rail cars moving Bakken crude oil, there have been additional train accidents and derailments that result in the rail cars being rerouted onto other rail lines through other communities.

An incident not to be forgotten was the July 18, 2001 CSX train fire in a Baltimore, Maryland tunnel involving a train car with hazardous materials; the incident had wide-range, long-term consequences. Major sections of the downtown were closed, businesses were impacted, Baltimore Orioles' games had to be rescheduled and portions of a major street were closed for five weeks.<sup>3</sup>

**b. Ethanol**

Most ethanol is distilled from corn and produced in the middle of the United States, but primary markets are urban areas with Clean Air Act compliance challenges. At rail yards, like the Van Dorn rail yard in Alexandria, tanker cars unload ethanol into trucks, which carry it to tank farms with blending terminals. There, ethanol is added to create E-10, E-15 and E-85 mixes, while other additives are blended in to create the specific gasoline formulas sold by brand name retailers such as Exxon, Shell, etc. "Finished" gasoline with specific brand names is then carried by tanker trucks to local gas stations, completing the supply chain.<sup>17</sup>

Why isn't ethanol transported by truck from the Midwest ethanol refineries to Virginia? Transport by rail in 30,000-gallon tank cars costs far less than shipping via 9,000-gallon trucks, each which requires its own driver – compared to two railroad workers driving a train that can haul 100 tanker cars.<sup>17</sup>

As noted by the U.S. Energy Information Administration:

*Because of the chemical characteristics of ethanol, finished gasoline (which contains ethanol) cannot be shipped via pipeline. Thus, ethanol generally is shipped by rail from the Midwest to blending terminals on the East Coast.*<sup>17</sup>

The Norfolk Southern railroad imports biofuels by train to Thoroughbred Bulk Transfer terminals in Alexandria, Petersburg and Roanoke. CSX has ethanol terminals in Norfolk, Portsmouth, Chesapeake, Richmond and Fredericksburg. CSX may also transport ethanol to the storage and distribution hub at the former oil refinery in Yorktown. CSX announced plans in 2012 to extend its line of ethanol terminals further north to Prince William County. As described by CSX:

*With access to multiple rail providers and interstates, Prince William County is an ideal location from which to serve Mid-Atlantic markets.*<sup>17</sup>

Norfolk Southern operates an ethanol transloading terminal in the Van Dorn rail yard in Alexandria, from which trucks carry ethanol to gasoline tank farms in Springfield and in Fairfax City. Though Alexandria developed as a transportation hub in the 1800s, today its economy is based on professionals who work in offices, high-end retail and tourism. The former Potomac Yard, where rail cars were classified and lined up into trains headed to various destinations for almost a century, has transformed into a mixed-use community with residential developments.<sup>17</sup>

Industrial operations transferring a flammable, hazardous material from rail to truck are considered by the City of Alexandria to be an inappropriate use near communities such as Cameron Station. Tanker trucks carrying ethanol through city streets are considered safety risks and traffic impediments. As noted in Alexandria's lawsuit attempting to regulate activities at the Van Dorn ethanol transfer facility:



*Transferring ethanol from rail car to tank truck, for transport to a tank farm where ethanol will be blended with gasoline for final shipment by truck to gas stations  
Map Source: City of Alexandria, Ethanol Transloading (presented to City Council, May 27, 2008)*

*An accident on City streets involving a truck transporting ethanol would pose a serious risk of injury to persons and property, depending on the circumstances of the accident. An elementary school, playing fields, the Van Dorn Street Metro Station, and several businesses are all located within 1,000 feet of the Facility. There is also a high-density residential neighborhood within 1,000 feet of the facility and another within one-half mile of the facility.<sup>17</sup>*

The Federal Surface Transportation Board and a federal judge ruled in 2009 that local land use controls and truck-hauling permits are trumped by federal laws for interstate rail operations, so Alexandria could not require Norfolk Southern to obtain permits for operating the ethanol transfer facility at the Van Dorn rail yard. However, state air quality permits would be required for the railroad to increase transfer capacity from 14 to 30 tanker cars, as Norfolk Southern proposed in May 2013.<sup>17</sup>

Biodiesel and ethanol for blending can also be shipped via barge/truck to customers, bypassing the constraints of transporting biofuels in pipelines. There are no ethanol pipelines in Virginia. Ethanol is transported in bulk by rail and truck rather than by pipeline, because the alcohol-based ethanol absorbs water that can rust pipeline equipment. For the same reason, pipelines do not ship finished gasoline, because it contains ethanol.<sup>17</sup>

Trains hauling crude oil from the Bakken region have been involved in multiple derailments in recent years, some causing fires. U.S. transportation

officials recently extended an order for railroads to notify states about hazardous crude oil shipments.<sup>18</sup>

Rail through Fairfax County is in the eastern and southern portions of the county and does not include tunnels. Residents are generally not located as close to the freight rails in Fairfax County as in other jurisdictions. However, some hazardous materials, alone or in combination, when released can affect areas up to miles from the initial site of the incident. It is conceivable that Fairfax County residents could be impacted with hazardous materials from a rail incident in another jurisdiction.

### **3. Hazardous Materials in the Waste Stream**

Household hazardous wastes (HHW) are products used in and around the home that are considered to be hazardous because they are ignitable, corrosive, reactive and/or toxic. Depending upon their constituents, these materials may cause a safety problem if they become mixed with the regular trash during collection or disposal. Of particular significance for this report, if HHW is improperly disposed (e.g., illegal dumping), there is the potential for significant stream and groundwater pollution, and also possibly soil contamination. By disposing of HHW separately in an appropriate manner, these materials can be properly packaged for shipment to a final recycling or disposal point which minimizes the likelihood that they will spoil the environment.

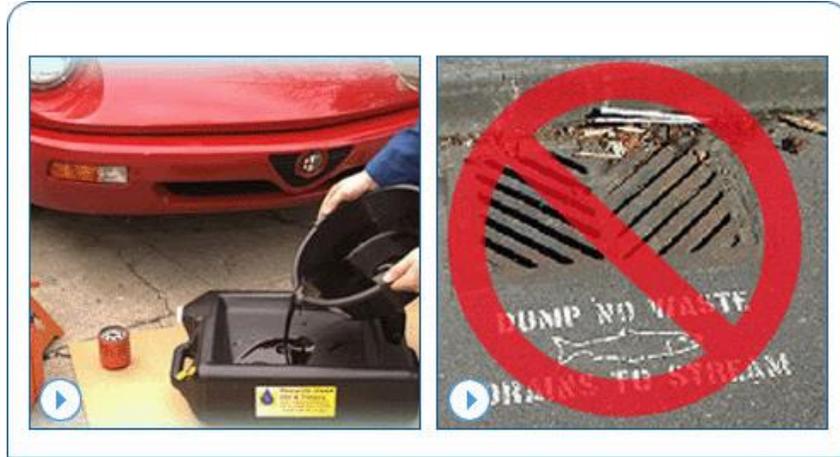
While HHW is largely exempt from regulation, similar types of hazardous waste that are generated in commercial business, institutions and other non-residential settings are heavily-regulated by the commonwealth and also at the federal level.

#### **a. Used Automotive Oil and Fluids**

Millions of household “do-it-yourselfers” change their own oil. While some of the used oil is disposed of properly at a used-oil recycling center, a significant volume is disposed of in garbage cans, sewers, storm drains and backyards; these are practices that can contaminate soil, local streams, rivers, bays and beaches. One gallon of used motor oil, if not disposed of properly, can contaminate one million gallons of water.<sup>4</sup>

In FY 2015, Fairfax County residents recycled 12,355 gallons of oil through the county’s HHW program. Residents also recycled 1,730 gallons of antifreeze.<sup>14</sup>

This recycled motor oil is used for many purposes. The primary use is to refine it back into a base stock for lubrication oil; a secondary use is to burn it for energy. When used as fuel, two gallons of used oil can generate enough electricity to run an average household for almost 24 hours.<sup>4</sup>



Many service stations, repair facilities and quick lubes will accept used oil and used oil filters. (4)

As a part of its ongoing effort to educate all Americans on environmental responsibility, the U.S. Environmental Protection Agency launched “You Dump it, You Drink It” (“Si lo tira, se lo toma”), a new Spanish-language campaign. Despite the fact that about half of all automotive mechanics in the United States speak Spanish as their first language, little if any Spanish-language materials exists for the automotive repair industry and those consumers who change their own motor oil. EPA hopes to fill this void through a wide-scale distribution of these materials, which include posters, brochures and bumper stickers. These materials are available to download from the EPA website.<sup>5</sup>

**b. Spills**

Spills of liquid and solid chemicals must also be a focus of proper handling to avoid being introduced into the environment. Washing down with water or sweeping up to dispose of in the regular trash may not be appropriate handling.



Commercial sites are more likely to handle spills appropriately. Education should be directed to individual homeowners, do-it-yourselfers and small independent businesses.

**c. Pesticides, Herbicides, Fertilizers and other HHW**

Residents and sometimes small businesses will dispose of unwanted or expired chemicals used around the home or business. Conscious or intentional “out-of-site, out-of-mind” choices are made to easily and quickly dispose of the HHW and other chemicals in the regular trash, emptying down the drain, or dumping outside or down a storm drain.

A trend that bears watching is the larger automotive stores that sell products that are immediately used in the parking lot by the consumer, sometimes with the assistance of the store employees who may or may not be trained in spill cleanup. These activities include adding or changing automotive fluids and changing batteries.

**C. PROGRAMS, PROJECTS AND ANALYSES**

**1. Household Hazardous Waste Program**

The HHW program is one of the county’s premier pollution prevention programs. The Fairfax County HHW program accepts hazardous materials free of charge from residents and disposes or recycles these materials according to local, state and federal regulations. The safest way for Fairfax County residents to dispose of HHW is to carefully pack and bring them to one of the county's two permanent HHW collection sites, located at the I-66 Transfer Station and the I-95 Landfill as shown in Table VI-2.

Household hazardous waste refers to used or leftover contents of consumer products that contain materials with one of the four characteristics of a hazardous waste: toxic; ignitable; corrosive; or reactive. (See the [Virginia DEQ Household Hazardous Waste Fact Sheet](#) for more information.) Household hazardous waste should not be disposed of in the regular trash.

In FY 2015, 39,557 households participated in the HHW program, disposing of 636,422 pounds of HHW. Compared to FY 2014, this represents a 25 percent increase in the number of users and 15.6 percent increase in the weight of HHW disposed. The cost per household again reduced from the previous year. Program details are provided in Table VI-3.<sup>14</sup>

The Solid Waste Management Program (SWMP) expanded operating hours at the HHW Collection Sites (see Table VI-4) to match the regular operating hours of the recycling and disposal centers where residents bring their recyclables and ordinary household refuse. The expanded hours began on July 1, 2014.

<b>Table VI-3 Fairfax County Household Hazardous Waste Program: Record of Fiscal Year Disposal</b>			
<b>Fiscal Year</b>	<b>Participation (# of users)</b>	<b>HHW (pounds)</b>	<b>Cost per household</b>
FY 2015	39,557 households	636,422	\$21.22
FY 2014	31,726 households	550,463	\$23.13
FY 2013	28,723 households	470,775	\$23.07
FY 2012	26,889 households	423,275	\$25.30
FY 2011	21,909 households	416,110	\$25.62
FY 2010	23,110 households	350,815	\$27.11

Source: Fairfax County Department of Public Works and Environmental Services, Solid Waste Management Program.



EQAC has long advocated for expanded collection capability at permanent sites for the growing amounts of household hazardous waste and e-waste.

HHW program services are provided free to residents. The program receives its funding through the SWMP tip fees for regular refuse. In FY 2015, materials deposited by residents for recycling or disposal primarily consisted of antifreeze, motor oil, lead-acid batteries, various acids, pesticides and oil-based paint. It is

germane to note that none of these materials is regulated as hazardous waste, but the county collects them separately to minimize the potential environmental hazard that could be caused by improper disposal. A summary of participation information for the program is shown in Table VI-3.<sup>14</sup>

**a. E-waste**

E-waste contains constituents of concern that could cause long-term harm, if released into the environment. By removing e-waste from the solid waste stream, the county is effectively removing these potential contaminants from the fuel source that is used at the waste-to-energy facility. Currently, disposal of e-waste is free to county residents.

Daily collection of e-waste at the resident drop-off centers has successfully replaced other costly collection programs, resulting in a 16 percent increase in the amount of waste removed from the waste stream (almost 1.6M pounds in FY 2015). Further, the expanded access has reduced the unit cost for the program by 50 percent (from over \$.19 per pound to \$.095 per pound).<sup>14</sup>

<b>Table VI-4: Household Hazardous Waste Collection Sites</b>	
<b>I-66 Transfer Station (Fairfax)</b>	<b>I-95 Landfill (Lorton)</b>
4618 West Ox Road, Fairfax, VA 22030 <b>703-631-1179, TTY 711</b>	9850 Furnace Road, Lorton, VA 22079 <b>703-690-1703, TTY 711</b>
<b>Trash and Recycling:</b> Monday - Friday: 6 a.m. - 6 p.m. Saturday: 6 a.m. - 6 p.m. Sunday: 9 a.m. - 6 p.m.	<b>Trash and Recycling:</b> Monday - Friday: 7 a.m. - 6 p.m. Saturday: 7 a.m. - 4 p.m. Sunday: 7 a.m. - 4 p.m.
<b>Household Hazardous Waste</b> Monday – Saturday: 8 a.m. - 4 p.m. Sunday: 9 a.m. – 4 p.m.	<b>Household Hazardous Waste</b> Sunday - Saturday: 8 a.m. - 4 p.m.
<b>E-waste Recycling</b> Monday – Saturday: 8 a.m. - 4 p.m. Sunday: 9 a.m. – 4 p.m.	<b>E-waste Recycling</b> Sunday - Saturday: 7 a.m. - 4 p.m.
<p><b>Both Facilities</b></p> <p><b>Holiday Schedule:</b></p> <p>07/04/15: Independence Day - Closed            11/26/15: Thanksgiving Day - Closed            12/24/15: Christmas Eve Day - Closing at 1 p.m.            12/25/15: Christmas Day - Closed            12/31/15: New Year's Eve Day - Closing at 2 p.m.            01/01/16: New Year's Day - Closed</p> <p><b>All Other Holidays - Open Regular Hours</b></p> <p style="text-align: center;"><a href="#">Household Hazardous Waste Program</a>            Infoline: 703-324-5068, TTY 711</p>	

With access to HHW and e-waste services during operating hours every day, it is anticipated that other, ad-hoc (and more expensive) collection programs can be phased out.<sup>14</sup>

**b. Rechargeable Battery Recycling**

The SWMP’s battery program collects rechargeable batteries at its HHW facilities. Non-rechargeable household batteries are not accepted by the program and can be safely thrown away as refuse, due to federal regulations which required the reformulation of batteries approximately 20 years ago.<sup>14</sup>

A few years ago, the SWMP also placed rechargeable battery collection boxes at the Fairfax County Government Center and each of the Board of Supervisors' offices, and program staff collects these batteries on a routine basis. A complete listing of collection locations is on the county website at: [www.fairfaxcounty.gov/dpwes/recycling/mat-bat.htm](http://www.fairfaxcounty.gov/dpwes/recycling/mat-bat.htm).<sup>14</sup>

Additionally, any person, business or other entity can use the services of Call2Recycle.org. This is an industry-funded product stewardship initiative through which the manufacturer of a product known to contain hazardous constituents pays for the collection and appropriate disposal of the item at the end of its useful life. Program users sign up online, and they will receive a cardboard box with a prepaid shipping label. The user fills the box with rechargeable batteries after the batteries are placed into individual plastic bags (to prevent arcing and potential fires in shipping). The user calls for pickup by UPS, which sends the container to a permitted hazardous waste disposal facility at no charge to the user. The SWMP strongly encourages users of rechargeable batteries to participate in this free program.<sup>14</sup>

**c. Fluorescent Lights**

Compact fluorescent light bulbs have become popular for residential use due to their energy savings potential. Incandescent light bulbs are being phased out and are no longer being sold. However, CFLs contain minute quantities of mercury, which causes them to be classified as HHW for disposal purposes. CFLs are therefore accepted from residents for disposal at the county's HHW facilities.<sup>14</sup>

Small businesses that generate less than the regulated quantity of fluorescent lights may bring them to collection events described in the "Commercial Hazardous Waste" section of this chapter. Other larger businesses that generate regulated quantities of these materials must comply with federal and state regulations regarding the proper disposal or recycling of the lights (40 CFR Part 273).<sup>14</sup>

A brochure about the value of using fluorescent lights and how to recycle them is available on Fairfax County's website. The website also refers the consumer to an EPA website (at [www2.epa.gov/cfl](http://www2.epa.gov/cfl)) for instructions on procedures for disposing of fluorescent light bulbs that have been broken. In addition to county facilities, Home Depot and other large hardware stores will accept CFLs from consumers and dispose of them safely and responsibly.<sup>14</sup>

**d. Mercury Thermostat Recycling**

In FY 2014-15, Fairfax County government partnered with the Thermostat Recycling Corporation (TRC) in an effort to further mitigate the amount of

mercury polluting our environment. TRC is a non-profit organization that facilitates and manages the collection and proper disposal of mercury-containing thermostats. TRC has an ongoing commitment to raising awareness of the universal need to properly dispose of mercury-containing thermostats, and actively solicits program participation across the country. Through national and regional advertising, industry events, workshops and other outreach activities, TRC creates a dialog with industry stakeholders and consumers and actively promotes the need for safe and proper disposal of mercury-containing thermostats.<sup>14</sup>



Participation as a collection site is simple: TRC provides storage and shipping containers and promotional materials to encourage participation. TRC charges a modest \$25 one-time fee (per container) to participate. Fairfax County government has extended this free service to its businesses and residents.<sup>14</sup>

**e. Cooking Oil Recycling**



As an ongoing waste minimization initiative, and to prevent cooking oil from being disposed in storm water drains, Fairfax County government partnered with Greenlight Biofuels, in a pilot program that began in January 2014, to recycle waste vegetable and cooking oil. The pilot was so successful that a new contract was awarded in February 2015. Approximately 3,720 gallons of oil were collected and recycled in FY 2015.<sup>14</sup>

The recycled waste vegetable oil is converted into biodiesel, a clean-burning fuel that results in a significant net emissions decrease with lower SO<sub>2</sub> (sulfur dioxide) and NO<sub>x</sub> (nitrogen oxides) emissions than heavy oils. Biofuels generally burn cleaner than No. 2 residual fuel oil, with little or no sulfur emissions.<sup>14</sup>



**f. Habitat for Humanity Latex Paint Recycling Stewardship Pilot Program**

Through the SWMP's HHW, the county has formed a partnership with Habitat for Humanity to reduce and reuse the amount of waste latex paint being generated by homeowners.<sup>14</sup>

Through partnerships with various Habitat for Humanity ReStores throughout Virginia, the program redistributes usable latex paint delivered by residents to the HHW program, rather than sending it for disposal. Reusable paint will be donated to various participating Habitat for Humanity ReStores, allowing them to resell or reuse it.<sup>14</sup>



It is important to note that, while latex paint has historically been managed through the HHW program, it is not a hazardous waste. When residents deliver latex paint to the county for disposal, they create additional unnecessary expenditures for the county. The donation of usable paint to Habitat for Humanity will provide the following benefits:

- Reduce the volume of paint disposed by 20-30 percent annually.
- Reduce potential environmental impacts from paint disposal.
- Establish a sustainable waste management practice.

The primary mission of the Virginia-based Habitat for Humanity ReStores is to generate revenue for the homebuilding efforts of the Habitat for Humanity affiliates in local communities throughout Virginia. The Habitat ReStores aim to offer quality household goods and building materials to the public at reasonable prices and to divert unnecessary waste from disposal.<sup>14</sup>

**2. Remote Household Hazardous Waste Events**

As an adjunct to the permanent household hazardous waste facilities, and as described in the Solid Waste chapter of this report, the Solid Waste Management Program has supported the remote HHW program since 2012 with four events per year scheduled and paid for by the Solid Waste Management Program. Remote collection events for 2015 were held from 9 a.m. - 2 p.m. on the following dates:

- Saturday, March 28 - South County Government Center, 8350 Richmond Highway, Alexandria.
- Saturday, April 25 - Reston South Park & Ride Lot located at the intersection of Lawyers Road and Fox Mill Road in Reston.

- Saturday, May 16 - Mason Governmental Center, 6507 Columbia Pike, Annandale.
- Saturday, September 12 - McLean Community Center, 1234 Ingleside Ave, McLean.<sup>11</sup>

### 3. Commercial Hazardous Waste

The management of hazardous waste is regulated under 40 CFR Part 261. In essence, any significant quantity of these wastes (defined by the regulation) generated under circumstances other than household use is subject to tracking, documentation of use and proper recycling or disposal. Businesses that fall below defined thresholds for how much waste they generate and store are exempt from some of the substantive documentation and disposal tracking requirements (although they must dispose of this waste in a proper, responsible manner).<sup>14</sup>

In Fairfax County, these Conditionally Exempt Small Quantity Generators (CESQGs) typically consist of small Fairfax County-based businesses, government agencies, non-profits, schools, universities and places of worship.<sup>14</sup>

In order to promote safe, cost-effective and responsible disposal of hazardous waste, the SWMP sponsors three events annually, using the services of a permitted hazardous waste management contractor. CESQGs are invited to bring their accumulated hazardous waste to these events, where they pay a fee for disposal. The economies-of-scale realized by these countywide events translate into a disposal fee that is generally lower than the cost to have a permitted hazardous waste contractor collect and appropriately manage the waste for an individual small business.<sup>14</sup>

In FY 2014, 101 companies participated in the three CESQG events, and in FY 2015, a total of 91 companies took part. Details on the CESQG program and a list of permitted hazardous waste disposal companies are available on the county's website at [www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm](http://www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm).<sup>14</sup>

### 4. Fairfax Joint Local Emergency Planning Committee

The establishment of Local Emergency Planning Committees is required by Section 301[c] of Title III of the Emergency Planning and Community Right-to-Know Act, a freestanding provision of the Superfund Amendments and Reauthorization Act of 1986. The main thrust of SARA is to identify and clean up waste sites that are potentially toxic. Title III has two important provisions: 1) it provides for emergency response planning to cope with the accidental release of toxic chemicals into the air, land and water; and 2) the community right-to-know provisions of Title III help to increase the public's knowledge and access to information on the presence of hazardous chemicals in their communities and releases of these chemicals into the environment. Under Title

III, states are required to organize into planning areas and to establish Local Emergency Planning Committees.

The Fairfax Joint Local Emergency Planning Committee (FJLEPC) is comprised of representatives of the city of Fairfax, the county of Fairfax, the town of Herndon and the town of Vienna. Committee members include local government officials, police, fire and rescue officials, environmental and governmental planners, public health professionals, hospital officials, public utility and transportation officials, representatives of business organizations, professional societies, civic organizations and the media. These representatives meet six times per year. The FJLEPC: (1) collects information about hazardous materials; (2) develops and updates, on an annual basis, the Hazardous Materials Emergency Response Plan; and (3) provides information to the public about the use, storage and manufacture of hazardous materials. The Hazardous Materials Emergency Response Plan contains notification procedures in the event of an incident, on site means of detecting incidents, evacuation routes, clean-up resources and identification of parties responsible for the site. The annual plan is exercised regularly. Member organizations have been focused on many plan exercises, ranging from community response to incidents at the Upper Occoquan Service Authority and the Fairfax City tank farm to active shooter incidents at hospitals and many schools.

FJLEPC provides education and outreach to the public. Information is disseminated through public meetings, brochures, newsletters and a website: [www.lepcfairfax.org](http://www.lepcfairfax.org). FJLEPC produced a video about shelter in place. The video is available through any of the Fairfax County public libraries as well as online through the county's "video on demand" service at [www.fairfaxcounty.gov/cable/channel16/vod.htm](http://www.fairfaxcounty.gov/cable/channel16/vod.htm).<sup>8</sup> LEPC members are available to speak to businesses or residents' groups, as requested.

## **5. Storm Drain Education Programs**

Many residents in Fairfax County are unaware that storm drains lead to the local streams that eventually join with other bodies of water (see the Water Resources chapter of this report). A system of publicly and privately maintained pipes, structures, channels and underground pipes carry stormwater (rain water) from streets and parking lots to ponds, lakes, streams and rivers. This water is not treated to remove chemicals and litter. Some chemicals are accidentally introduced to the storm drain, like a vehicle fluid leak or overuse of lawn fertilizer. Other chemicals are intentionally introduced by disposing or dumping into the storm drain as "out-of-sight, out-of-mind."

Pollution that enters our water resources through storm drains is called nonpoint source pollution because it comes from all our homes and communities. Nonpoint source pollution has been a leading cause of the water quality deterioration in the Chesapeake Bay. This includes what is put on yards and

driveways as well as litter on streets that will wash off with the rain water into these drains. A big, if not a bigger, problem is the intentional disposal of items into the drains such as used motor oil, fertilizer, antifreeze, pesticides, herbicides and other hazardous materials as well as pet waste, grass and leaves.



There are many organizations helping to educate about the importance of hazardous materials entering our natural waters through storm water runoff systems. Here are a few working for Fairfax County.

**a. The Northern Virginia Soil and Water Conservation District (NVSWCD)**

NVSWCD provides high quality environmental and stewardship offerings to individuals and communities. One of the very successful programs is the Storm Drain Education Program. Storm Drain labeling is an effective, low-cost method of educating residents about water quality problems in streams, lakes, rivers and the Chesapeake Bay. The labels identify the stream or Potomac River watershed in addition to providing a “No Dumping message.



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This program is key to getting that message out to the public and provides an ongoing reminder to not dump anything in storm drains. In addition to marking the drains in a community, the volunteers provide an educational flier to residents about how everyone can help make sure nothing goes down storm drains except rain.

During FY 2015, 484 volunteers worked in their communities, logging over 2,883 hours, to carry out 33 projects to label 2,303 storm drains and educate 12,249 households. Since the start of this program, one-quarter of the county’s over 80,000 storm drains have been labeled.<sup>6</sup>

NVSWCD also publishes a quarterly newsletter, Conservation Currents, for Fairfax County residents. Articles are available on hazardous waste

reduction, including an article entitled “Healthy Homes, Healthy Communities: Household Hazardous Waste Reduction in Fairfax County.”

More information about NVSWCD’s Storm Drain Education Program and newsletter articles are available at:

[www.fairfaxcounty.gov/nvswcd/stormdrained.htm](http://www.fairfaxcounty.gov/nvswcd/stormdrained.htm)<sup>6</sup>



*Pictures of storm drain marking by local volunteers (provided by NVSWCD )*

**b. Northern Virginia Clean Water Partners**

A group representing 19 Northern Virginia local governments, school systems, independent water and sanitary sewer authorities and local businesses that care about the quality of our waterways and the region’s quality of life makes up the Northern Virginia Clean Water Partners. Their goal is to work together to keep local residents healthy and safe by reducing the amount of pollution, including hazardous pollutants, that reaches streams and rivers.<sup>2</sup>



*The logo, and theme, for the Northern Virginia Clean Water Partners*

Print, video and Web-based products have been developed to aid in raising awareness about behaviors leading to nonpoint source pollution and the actions residents can take to protect local and regional water quality. The most recent TV ad, the Rubber Ducks: “Cleaner Streets mean Cleaner Water,” is available in English and Spanish. All TV and radio ads are available to watch and listen to on the organization’s website: [www.onlyrain.org](http://www.onlyrain.org).<sup>2</sup>



### c. Virginia Cooperative Extension

Virginia Cooperative Extension is a joint program of Virginia Tech, Virginia State University, the U.S. Department of Agriculture and state and local governments. Fairfax County has a local office with personnel who participate in many programs helping the people of Fairfax County improve their lives.

One program offered is a hazmat collection of pesticides, herbicides, fertilizers and any yard chemicals that residents may have that are no longer needed or past their expiration dates. The goal is to keep these chemicals from being incorrectly disposed of, including being put down storm drains.

This program is held every five years. The last collection was in 2010 with 15,341 pounds of chemicals turned in. The next collection was to have been held during September 2015.<sup>16</sup>

## 6. Railroad Transportation Plan

The U.S. Department of Transportation has predicted that U.S. freight railroad demand will rise 88 percent by 2035. Railroads will take on an increasing responsibility for movement of the nation's goods, including hazardous materials. Transporting hazardous materials is crucial to the nation's viability. Twenty percent of the nation's chemical are moved by rail, including an even higher percentage of those chemicals essential to the public health and standard of living for the United States. Railroads move 22 percent, or 35,000 carloads annually, of chlorine, which is an essential element used to purify more than half the nation's water supplies and contained in 85 percent of all pharmaceuticals. Other hazardous materials moved by rail include fuels, fertilizers, disinfectants and cleaners, along with the chemicals used in foods, glass, medicines, weapons and munitions. The Hazardous Materials Transportation Uniform Safety Act of 1990 emphasized the need to assess the risks and benefits associated with the transportation of hazardous materials by truck and rail. Given the dimension of terrorism, transportation of hazardous materials has become an even greater problem and major concern.<sup>19</sup>

Fairfax County has one freight rail, CSX, which traverses the eastern part of the county, with no rail or transfer yards located in the county. At [www.csx.com](http://www.csx.com), CSX reports that each year it moves over 350,000 tons of hazardous materials

and has a low number of incidents. For every billion ton-miles of hazardous materials transported, trucks (which operate over inherently more dangerous highways) are involved in 16 times as many accidents as the rails. CSX has achieved a 99.9 percent success rate for safe transportation of hazardous materials. CSX has been involved with years of hearings and legal proceedings concerning the safety with urban rail transportation of certain hazardous materials. Among these is the re-routing of trains around Washington, D.C.<sup>9</sup>

CSX provides emergency planning assistance and training to local fire, police and emergency response personnel in communities they serve. This free online training program educates emergency personnel on how to safely respond to incidents on and around railroad property and equipment. A written copy of the “Community Awareness Emergency Planning Guide,” dated October 2008, is on file with the Fairfax County Fire and Rescue Hazmat Station 40.<sup>12</sup>

## **7. Pre-Disaster Recovery Plan (PDRP)**

Much of the following discussion has been taken from a county website addressing the development of a Fairfax County Pre-Disaster Recovery Plan ([www.fairfaxcounty.gov/oem/pdrp/](http://www.fairfaxcounty.gov/oem/pdrp/)).

Fairfax County is susceptible to a variety of natural hazards, including floods, hurricanes and tornadoes, as well as man-made hazards such as terrorist acts and accidental releases of hazardous materials. Some of these events have the capacity for catastrophic local and regional impacts. Following a major disaster, complex issues with impacts far beyond county government will arise. The local economy may falter due to supply-chain disruptions, infrastructure failures, business closures and/or inaccessible work-places. There will likely be population displacement, housing shortages and rebuilding issues and potential social and psychological impacts. While the effects of disasters are wide ranging and cannot be predicted, pre-event planning can position Fairfax County to recover from a major incident. Methodical, thoughtful pre-event planning can establish priorities, decision-making structures and procedures and recovery goals. These can focus and accelerate the recovery process during the stressful and often fraught post-disaster period.

A Pre-Disaster Recovery Plan will provide Fairfax County with a single reference for guiding policy and action during recovery from a significant natural or human-caused disaster. The plan will allow the government to support the private and nonprofit sectors as the community works together to restore the economic base, neighborhoods, social fabric and other elements over the long-term.

A draft Fairfax County Pre-Disaster Recovery Plan was released for public review and comment in November 2011. Included in the plan was an organizational structure and identification of roles and processes for a recovery

agency. Several recovery support function branches were identified within this structure, including a Natural and Cultural Resources RSF Branch. The PDRP outlines the structure of this branch as well as anticipated pre-disaster planning activities.

In January 2012, the Board of Supervisors endorsed a final Pre-Disaster Recovery Plan, and the plan was tested through a table-top exercise in February 2012. Approximately 85 people participated in this exercise; participants included representatives of county agencies, local nonprofit organizations and the Virginia Department of Emergency Management. An After-Action Report/Improvement Plan is available for review at [www.fairfaxcounty.gov/oem/pdrp/ffx-pdrp-ttx-feb10-2012.pdf](http://www.fairfaxcounty.gov/oem/pdrp/ffx-pdrp-ttx-feb10-2012.pdf).

## **D. LEGISLATIVE UPDATE**

None.

## **E. STEWARDSHIP**

What is considered to be hazardous materials has changed in recent decades. Formerly, hazardous materials were primarily associated with industrial releases or the transportation of chemicals. Hazardous material then came to include some household chemicals used for cleaning and chemicals used for yard work. Now, hazardous material includes items that individuals use in everyday life, such as rechargeable batteries for cell phones and power tools, as well as compact fluorescent light bulbs. Proper management of discarded electronics has become an area of increasing concern. Fairfax County has implemented its e-cycling program, which has diverted significant quantities of electronics from disposal to recycling. Stewardship for the storage, use and disposal of hazardous materials is no longer solely an industry issue; it now belongs to individuals, and with more than a million individuals in Fairfax County, household hazardous waste volumes will continue to increase.

## **F. COMMENTS**

1. To continue the relative human and environmental safety of the past couple decades, attention should be on any future increase in the production and transport of hazardous materials to or through Fairfax County.
2. A trend that bears watching is the larger automotive stores that sell products that are immediately used in the parking lot by the consumer, sometimes with the assistance of the store employees who may or may not be trained in spill

cleanup. These activities include adding or changing automotive fluids and changing batteries.

## G. RECOMMENDATION

None.

## REFERENCES

1. Fairfax County's Fire & Hazmat Investigative Services Section, W. Trice Burgess Jr – Assistant Fire Marshal emails: June 3 and June 6, 2011; May 21, 2015
2. Northern Virginia Clean Water Partners website: [www.onlyrain.org](http://www.onlyrain.org)
3. "Waste shipping debate examines Baltimore tunnel fire", *Review Journal*, 9 May 2003, and discussion thread at [http://health.phys.iit.edu/extended\\_archive/0305/msg00178.html](http://health.phys.iit.edu/extended_archive/0305/msg00178.html).
4. American Petroleum Institute, *Used Motor Oil Collecting and Recycling*, [www.recycleoil.org](http://www.recycleoil.org), viewed August, 2008 and July 2015.
5. U.S. Environmental Protection Agency, Wastes-Used Oil Management Program, [www.epa.gov](http://www.epa.gov).
6. Northern Virginia Soil & Water Conservation District: July 2015 email and website [www.fairfaxcounty.gov/nvswcd/stormdrained.htm](http://www.fairfaxcounty.gov/nvswcd/stormdrained.htm)
7. Fairfax Joint Local Emergency Planning Committee, [www.lepcfairfax.org](http://www.lepcfairfax.org).
8. An example of Video on Demand from Fairfax County is the link to "Fairfax Joint Local Emergency Planning Committee Produces Shelter in Place Video" at [www.fairfaxcounty.gov/cable/channel16/vod.htm](http://www.fairfaxcounty.gov/cable/channel16/vod.htm) under the heading "Emergency Information."
9. CSX, [www.csx.com](http://www.csx.com), viewed 24 August 2009.
10. Fairfax County MS4 Permit Update Power Point slide presentation to NVSWCD by Kate Bennett and Brian Schoester, Fairfax County Government Department of Public Works and Environmental Services, July 28, 2015
11. [www.fairfaxcounty.gov/dpwes/trash/disphhw.htm](http://www.fairfaxcounty.gov/dpwes/trash/disphhw.htm)

12. Landstreet, Michael Lieutenant; Fairfax County Fire Marshall's Office; August 24, 2009 email.
13. Woodrum, Pamela; Fire Prevention Division; memo to EQAC
14. Fairfax County, Solid Waste Management Department email from Charles D. Forbes, Linda Boone, Daniel Brooks, July 28, 2015
15. Virginia Department of Environmental Quality email from Rebecca Shoemaker, June 26, 2015
16. Virginia Cooperative Extension, <http://offices.ext.vt.edu/fairfax/> and July 13, 2015 email from Adria Bordas, Unit Coordinator for the Fairfax Office.
17. [www.virginiaplaces.org/transportation/gaspipeline.html](http://www.virginiaplaces.org/transportation/gaspipeline.html)
18. "Crude oil train derailment in Montana prompts evacuations"; [www.foxnews.com/us/2015/07/17/crude-oil-train-derailment-in-montana-prompts-evacuations/?intcmp=hpnave](http://www.foxnews.com/us/2015/07/17/crude-oil-train-derailment-in-montana-prompts-evacuations/?intcmp=hpnave)
19. "The Case for Rail Transportation of Hazardous Materials", Journal of Management and Marketing Research, [www.aabri.com/manuscripts/09224.pdf](http://www.aabri.com/manuscripts/09224.pdf)
20. "Oil Spill Prompts Investigations," [alextimes.com/2011/01/oil-spill-prompts-investigations/](http://alextimes.com/2011/01/oil-spill-prompts-investigations/)