FY2022
HAZARDOUS WASTE MANAGEMENT FUND

A Report to the General Assembly

TEAM KENTUCKY®

ENERGY AND ENVIRONMENT CABINET

Department for Environmental Protection
Division of Waste Management
502-564-6716
https://eec.ky.gov/Environmental-Protection/Waste/Pages/default.aspx

TABLE OF CONTENTS

EEC MANDATE

This report has been prepared as required by KRS 224.46-580(13)(c). The purpose of this report is to provide information related to the commonwealth's Hazardous Waste Management Fund (HWMF). Specifically, the report includes information related to the expenditures and revenues of the Hazardous Waste Management Fund for Fiscal Years (FY) 2021 and 2022.

KRS 224.46-580(13)(c): "The cabinet shall file with the Legislative Research Commission a biennial report, beginning two (2) years after July 15, 2008, on the revenues and expenditures of the fund."

HISTORY AND PURPOSE OF FUND

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted by Congress in 1980 in response to the threat of hazardous waste sites. The two sites that caused the need for this legislation were Love Canal in upper New York state, and A.L. Taylor, Distler Farms (also known as the Valley of the Drums) in Shepherdsville, Kentucky. Precipitated by the discovery of the A.L. Taylor, Distler Farms site, the Kentucky State Superfund Program was initiated in 1981. There have been more than 6,471 sites that have been investigated, characterized, cleaned up, or are being investigated, remediated, or under long-term management since the program started. The Superfund Program maintains an inventory of these Superfund sites (See Figure 1).

In 1980 the General Assembly created the HWMF to provide the Energy and Environment Cabinet with the funds necessary to protect the health of the citizens and environment of the commonwealth from threats associated with releases of hazardous substances, pollutants, and contaminants. Since then, almost $85.0 million has been spent remediating almost 600 contaminated sites, making the Commonwealth of Kentucky a cleaner and safer place to live. In FY2021 and FY2022, the cabinet registered 78 new Superfund sites and oversaw remediation of 123 sites. In addition, the cabinet performed 783 technical site reviews, supervised managed closures for 301 sites, and designed and managed state-lead actions at 39 sites. Additionally, the cabinet finalized state-lead actions that resulted in the closing of seven state-lead sites.

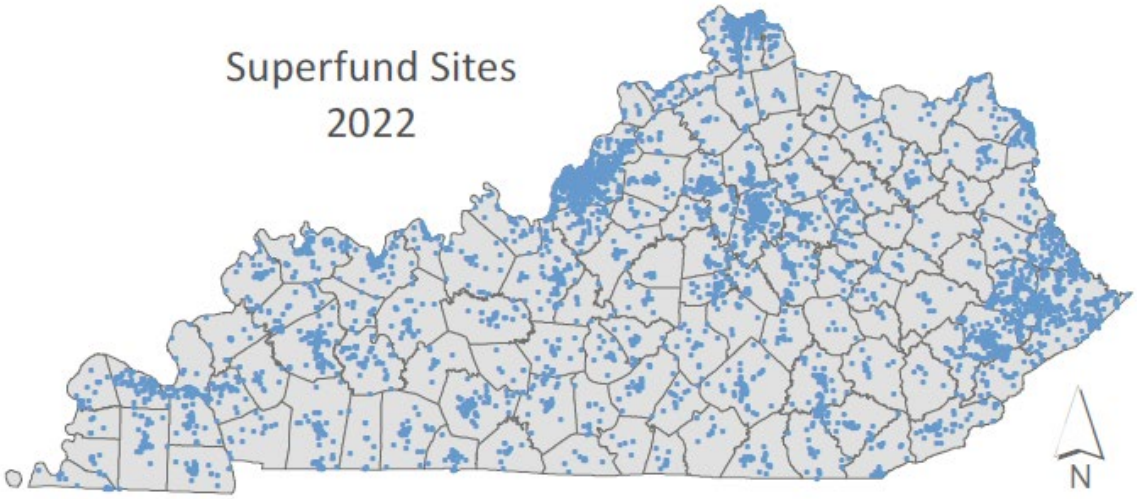

Figure 1: Active, Managed, and Closed Superfund Sites in Kentucky

The HWMF is the sole source of funding to clean up sites where a release of hazardous substances, pollutants, or contaminants has been discovered where no viable responsible party is available. Specifically, HWMF funds are used throughout the commonwealth for:

- Response to emergencies with releases of hazardous substances, pollutants, and contaminants;
- Assessments and remediation of contaminated sites where a viable responsible party cannot be identified;
- Technical reviews and oversight of state-lead and responsible party-driven remediation projects; and
- Provision of core funding for the Kentucky Pollution Prevention Center's (KPPC) technical assistance and outreach services as part of the University of Louisville's J.B. Speed School of Engineering.

To date, the HWMF has cumulatively provided more than $10.7 million in funding for the Kentucky Pollution Prevention Center (KPPC). KPPC was established in 1994 to provide technical assistance to business and industry and promote pollution prevention technologies and procedures. The HWMF contributes a percentage of the assessment fee receipts to KPPC annually per the statute KRS 224.46-330 (Appendix, Table 2). For specific activities performed by KPPC, visit https://kppc.org/.

During the 2008 legislative session, the HWMF was extended through June 30, 2016, and a requirement was added that tasks the cabinet to submit a biennial report regarding HWMF

revenues, related activities, and expenditures. The legislation was extended again during the 2015 session to extend the HWMF through 2024. This biennial report is required by KRS 224.46-580(13)(c) and this biennial report includes information from FY2021 and FY2022.

REVENUES

The HWMF sources of revenue include the hazardous waste generator assessment fees, transfers from the Petroleum Storage Tank Environmental Assistance Fund (PSTEAF), Brownfield Redevelopment Program application fees, interest earned on the HWMF account, cost recoveries (monies recovered from responsible parties), returns from investment and capital closeout accounts (Appendix, Table 1).

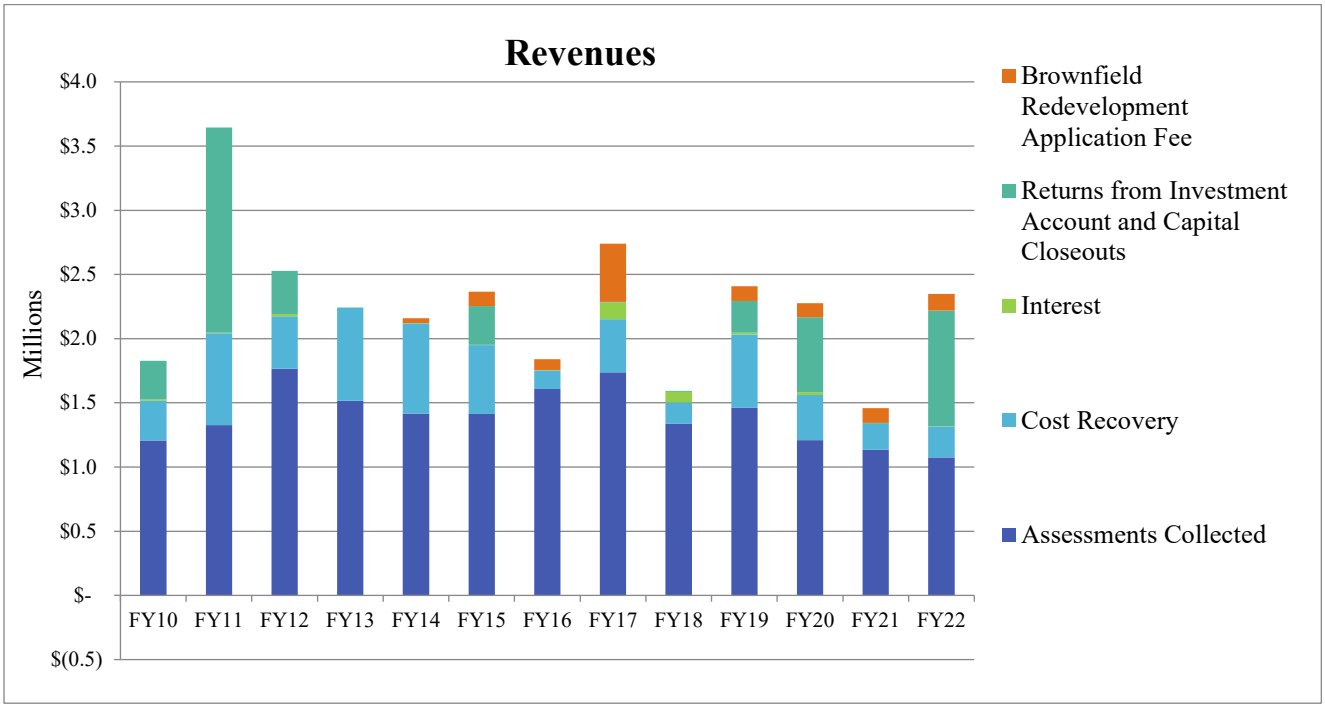

Figure 2: HWMF Revenues for FY2010 - FY2022

HAZARDOUS WASTE GENERATOR ASSESSMENT FEE

The hazardous waste generator assessment fee is authorized as established in KRS 224.46-580(8) and is collected from generators of hazardous waste at the rate of one and two-tenths cents ($0.012) per pound for liquid waste and two-tenths of a cent ($0.002) per pound for solid waste.

During the last twenty years, there has been an overall steady decline in revenue generated annually through the HWMF assessment fee.

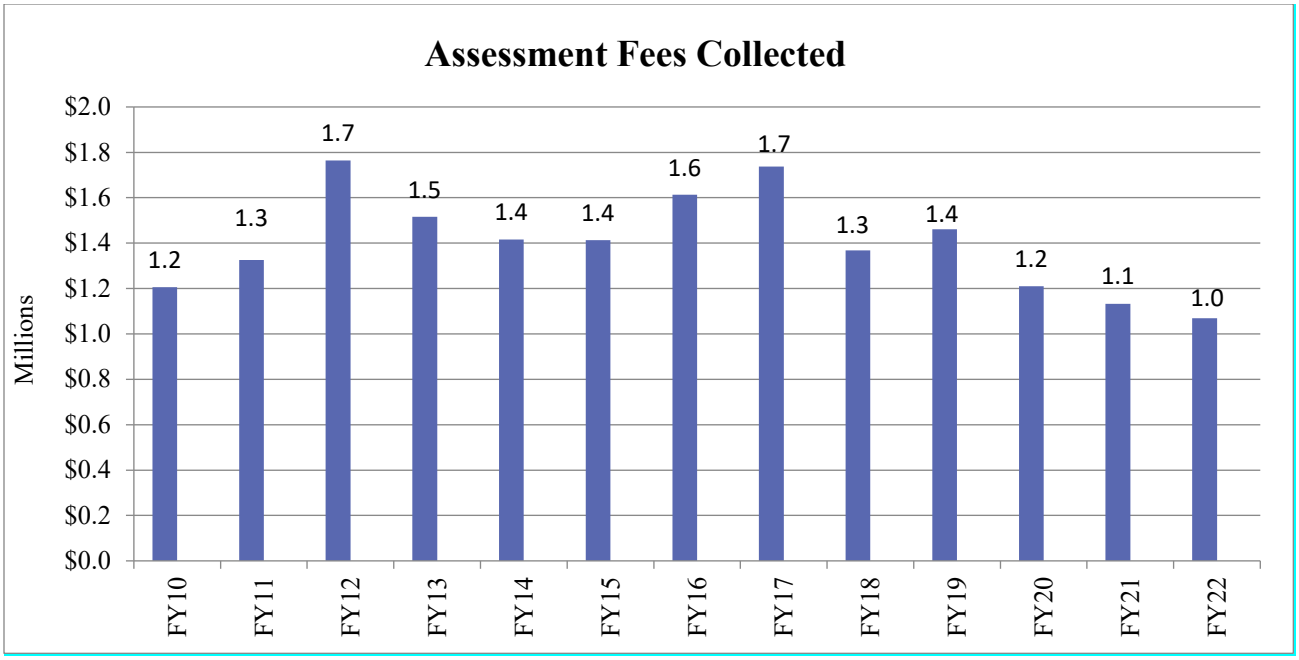

Figure 3: HWMF Assessment Fee Revenues FY2010 - FY2022

Factors which contribute to the decline in assessment fees include amendments to KRS 224.46-580 that provide these exemptions:

- Emission control dust and sludge from the primary production of steel that is recycled by temperature metals recovery or managed by stabilization of metals, effective 2004;
- Assessment fee waiver granted for hazardous waste generators owing less than fifty dollars ($50), effective 2006;
- Waste that is delivered from the generator to an industrial boiler or furnace and burned for energy recovery shall be assessed at half the rate of the assessment, effective 2008.

Other declines in revenue can be explained by companies filing for bankruptcy, companies moving their operations out of state, a decline in the number of generators, and increases in waste minimization and recycling efforts. In recent years, the cabinet's cost recovery efforts have assisted in offsetting some of the decline in assessment fee revenue.

EXPENDITURES

The Superfund Program, pursuant to KRS 224.1-400 and KRS 224.1-405, evaluates and oversees the cleanup of waste sites contaminated by the release of hazardous substances and petroleum from sources other than regulated underground storage tanks that are risks to human health and the environment. In some cases, this means overseeing companies or individuals who have taken responsibility for cleaning up contamination found on their property. In many other cases where a responsible party cannot be found or is unable to act, the Superfund Branch takes a direct role in cleaning up a site. Abandoned hazardous waste sites are cleaned up using the Hazardous Waste

Management Fund established under KRS 224.46-580. Additionally, pursuant to KRS 224.1-415, the Superfund Program is responsible for the safe and productive redevelopment and reuse of sites and properties on which releases have occurred, residual contamination remains, or there is the perceived presence of releases. The program promotes and assures this by evaluating and approving voluntary remedial actions and property management plans.

The cabinet also utilizes HWMF monies to provide technical reviews and oversight of state-lead and responsible party-driven remediation projects. Many of these projects result from previous heavy industrial activities such as wood treatment, metals plating, chemical production, and dry cleaning.

The cabinet directly manages (state-lead) the cleanup of contaminated sites if there are no viable responsible parties. When a significant amount of remediation is necessary, a capital project account is created within the HWMF (Appendix, Table 3). A capital project may include site investigation, site remediation, or a declared environmental emergency; typical costs range from $20,000 to several millions of dollars per site. The costs may extend over multiple years, and do not include expenses for long-term monitoring, maintenance, operation, or costs for resources required at sites unable to achieve acceptable clean-up levels (i.e. unrestricted use). Project scope reductions or completions below projected costs will result in transfers of dollars back into the HWMF. Currently, due to limited funding, capital project expenditures are very minimal. HWMF expenditures have declined in direct proportion to the decline in revenue available.

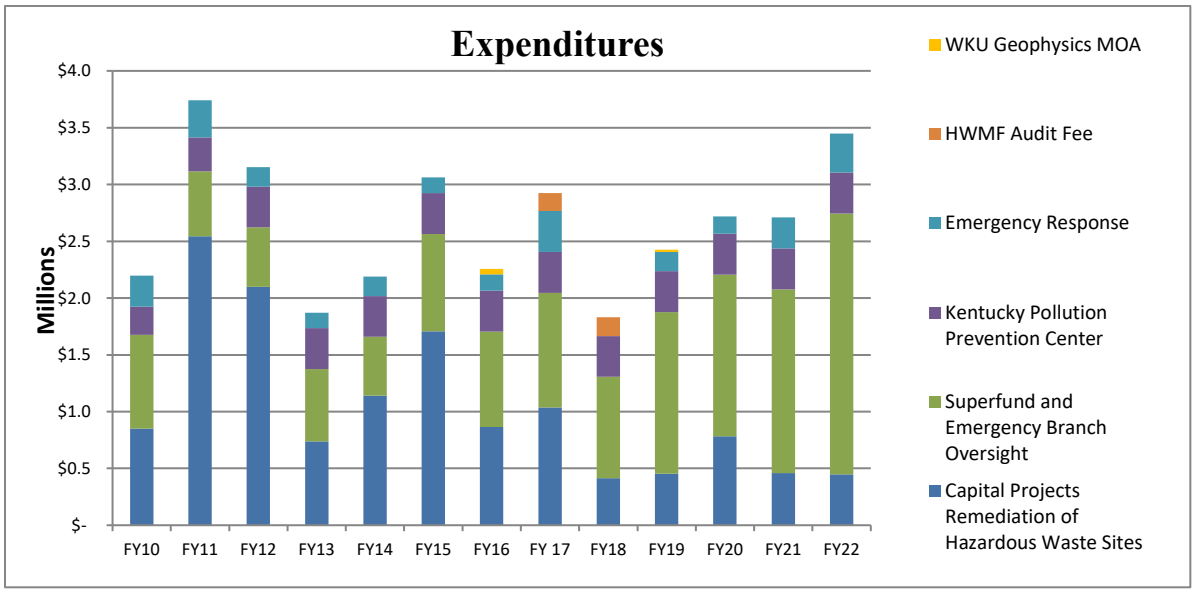

Figure 4: HWMF Expenditures FY2010 - FY2022

The cabinet provides a service to the citizens of Kentucky through technical and professional oversight activities ensuring emergency response and cleanup projects are properly conducted. Cabinet personnel response typically includes the following:

- Contracting for and conducting state-lead cleanups in the role of an absentee responsible party;
- Assisting responsible parties in the cleanup of their sites, and
- Participating in emergency responses.

The HWMF is also used to fund oversight and maintenance activities on federal Superfund sites that have been delisted by the United States Environmental Protection Agency (EPA). These sites are known as National Priority List (NPL) sites. The expenditures are likely to increase over time as more federal sites are delisted or reach the legal lifespan of federal oversight.

Large capital projects are a key component of state-lead oversight that the cabinet performs, but small, remedial actions can be equally important; they constitute a substantial volume of the remediation work performed. These corrective actions include anything from site characterization to remediation. Sites requiring cleanup can range from causes such as wire burning operations, collection, and disposal of mercury waste and transformer spills, to industrial chemical spills, and the removal and disposal of abandoned drums. Some of the contaminants discovered at these sites include toxic heavy metals, including lead, arsenic, and mercury, or toxic or cancer-causing chemicals, such as polychlorinated biphenyls, benzene, and trichloroethylene. These sites have a strong potential to be immediately dangerous to residents, wildlife, and vegetation, and they pose long-term threats to both the public and the environment. To compound the problem, these sites are typically located along highways or waterways, which are easily accessible to people.

The Emergency Response Team (ERT) is tasked with responding to environmental emergencies including petroleum releases, landfill fires, train derailments, tanker truck releases, industrial chemical releases, crude oil releases, and many other environmental issues requiring immediate attention. During FY2021 and FY2022, ERT received 15,774 notifications; 878 required an emergency response. Of those, 20 were declared an emergency and addressed using HWMF monies. Superfund site remediation and responses to emergencies throughout the commonwealth are costly expenditures.

EMERGENCY PROJECTS

These projects typically consist of short-term immediate actions to contain and, if necessary, remediate a release that poses an immediate hazard to human health or the environment. The following are examples of emergency incidents where the cabinet performed emergency actions to abate the immediate threat to human health and the environment.

Slim Island Road Crude Oil Spill
Bowling Green, Warren County
Expenditures FY2022 - $74,700.59

This incident originated as a result of the vandalism of a crude oil above-ground storage tank on the Robert Cherry Lease located in Bowling Green, Warren County. The release was discovered by Warren County Emergency Management personnel on December 25, 2021 with a confirmed impact to an unnamed tributary (UT) with an outfall into the Barren River. The identified responsible party (RP) declined to perform the necessary measures to contain and remediate the release so the cabinet initiated emergency containment and clean-up measures and notified the United States Environmental Protection Agency (USEPA) seeking financial assistance to address the release. An estimated 3,500 gallons of crude oil was released with 3,000 gallons estimated to have impacted approximately 0.6 miles of the UT with a visible sheen reported on Barren River. A total of 84 tons of impacted soil and solid media was removed for disposal and 5,000 gallons of crude oil and impacted water collected and disposed during the emergency response activity. The cabinet is seeking recovery of monies expended through the United States Coast Guard via a Pollution Removal Funding Authorization (UCGPE22402).

Figure 5: Slim Island Crude Oil Spill, impacted unnamed tributary of Barren River.

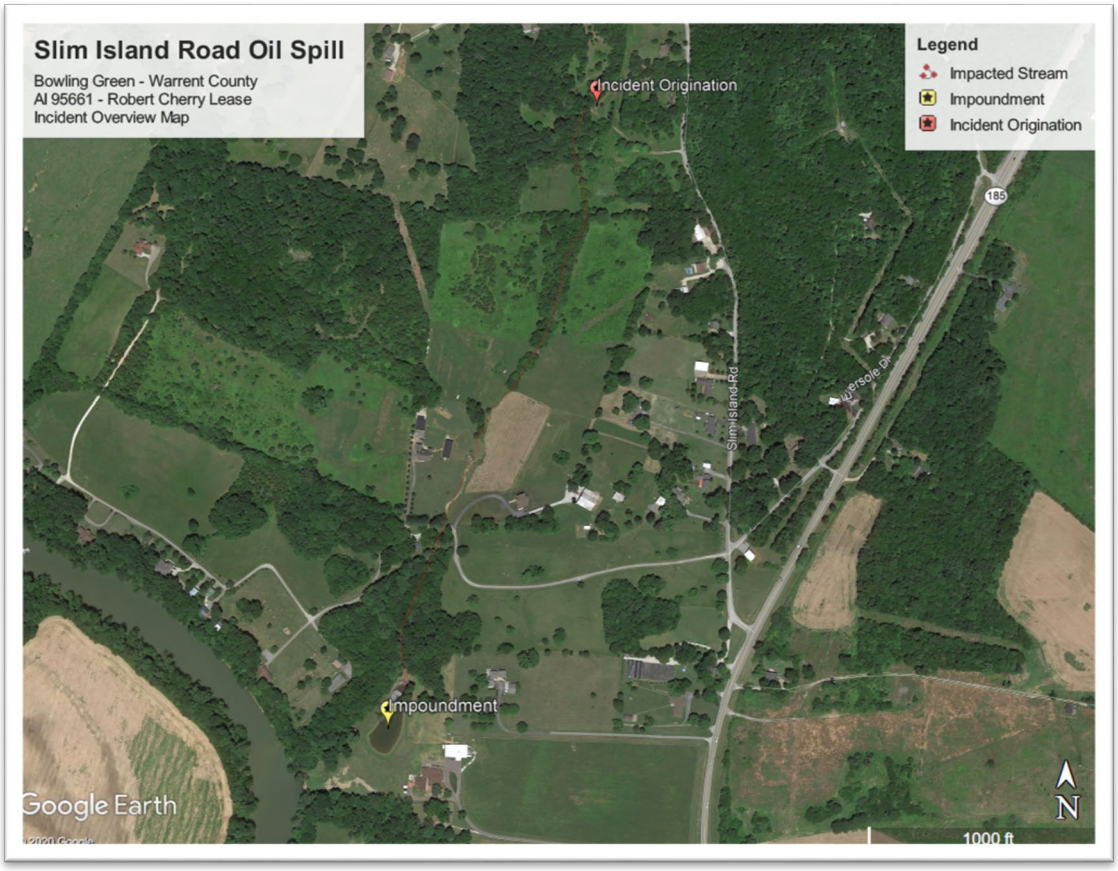

Figure 6: Slim Island Crude Oil Spill, map of impacted area.

L&N Leaking Abandoned Hydrogen Sulfide Gas Well Lease
Salyersville, Magoffin County
Expenditures FY2022 - $114,260.93

Emergency plugging activities were conducted by the cabinet to address an actively leaking and structurally deteriorating high-pressure natural gas well with high concentrations of hydrogen sulfide gas located within proximity of several residential structures. The leaking well was identified following numerous odor complaints received from nearby residents and emergency action was taken to secure the leaking well and permanent abandonment was completed by plugging of the well with technical and regulatory assistance provided by the cabinet's Division of Oil Gas (DOG). The cabinet implemented emergency air monitoring at the nearby residential structures during the emergency well-plugging activities.

Figure 7: L&N Leaking H2S Gas Well, flaring of well prior to emergency plugging.

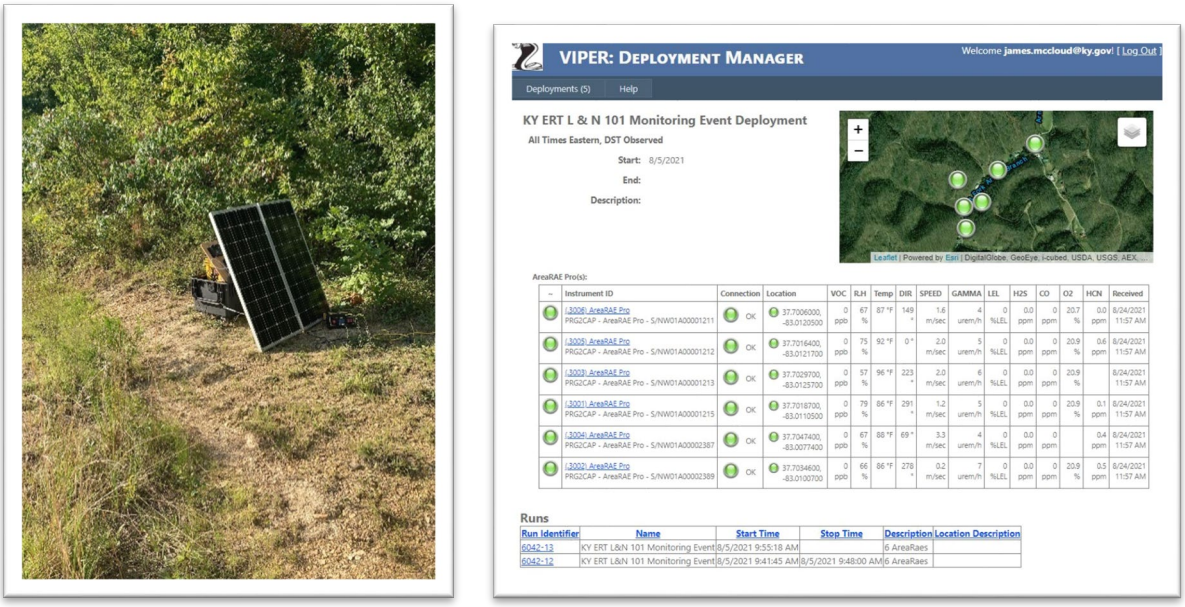

Figure 8: L&N Leaking H2S Gas Well, air monitoring equipment and remote monitoring dashboard.

RN Sparks Lease Crude Oil Spill – Leaking Orphaned Crude Oil Well
Martha, Lawrence County
Expenditures FY2021 - $33,568.04

The cabinet implemented emergency containment, product recovery and well abandonment activities in response to a leaking orphaned/abandoned crude oil well located on the RN Sparks Lease in Martha, Lawrence County. The leaking orphaned crude oil well resulted in a crude oil impact of Cam Creek so the cabinet constructed temporary containment structures along the tributary and performed emergency plugging of the orphaned/abandoned crude oil well.

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Figure 9: RN Sparks Crude Oil Spill, emergency well plugging activities.

Figure 10: RN Sparks Crude Oil Spill, construction of emergency underflow dam for product collection.

CAPITAL PROJECTS

These projects have ongoing remedial activities necessary to protect human health and the environment. Several projects are presented on the subsequent pages of this section. Figure 11 summarizes capital projects with expenditures for the period of FY2021-2022 with expenditures over $20,000.

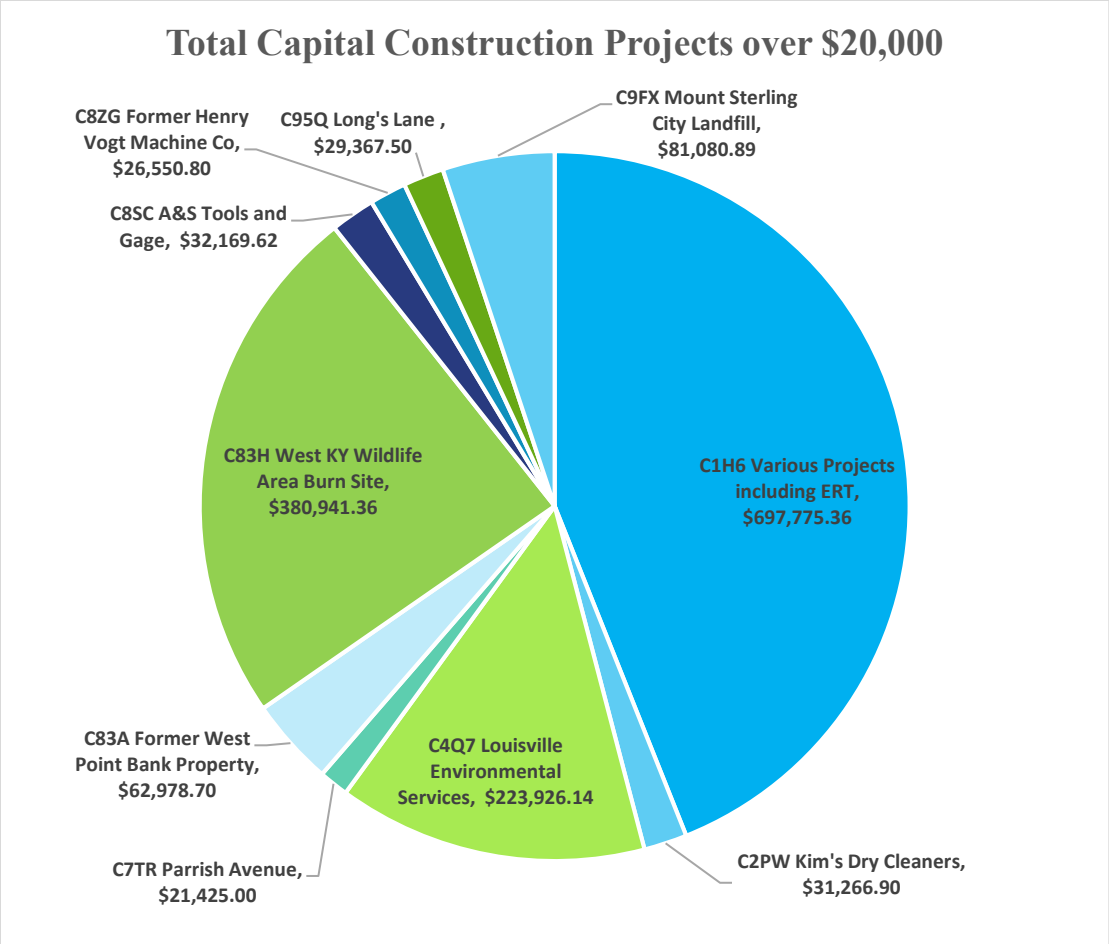

Figure 11: HWMF Active Capital Project Expenditures over $20,000 FY2021-2022

Louisville Environmental Services
Louisville, Jefferson County
Expenditures FY2021 and FY2022-$223,926.14

Louisville Environmental Services (LES) is a 27 acre property located along the Ohio River. A series of companies operated the facility for petroleum distribution and refining from 1947 to 1985. Louisville Environmental Services (LES) acquired the property in 1993 for purposes of operating a hazardous waste storage/treatment facility. LES went out of business during 2000 and the property sat abandoned. During February 2001, USA EPA Region IV inspected the site and found that two large above-ground fuel tanks were leaking. EPA responded by contracting the removal of the storage tanks and most of the abandoned structures. Grossly impacted soils were also excavated & disposed at a landfill.

Figure 12: View of the groundwater seeps along the Ohio River shoreline. Strong petroleum odors and sheers were present.

The cabinet later discovered seeps along the riverbank exhibiting petroleum sheen and odor (see photo below). Water samples collected form from sheens contained concentrations of petroleum compounds in excess of safe drinking water and ecological screening levels.

The cabinet contracted an environmental consultant to investigate the nature and extent of the remaining petroleum contamination. Based on the investigation, the consultant developed a plan to remediate the contaminated groundwater. The plan designed to inject an underground 'wall' of remediation product just above the shoreline. The product is an activated carbon slurry containing nutrients and an oxygen-containing compound. The carbon effectively traps the hydrocarbons and the nutrients allow microorganisms to break down the petroleum compounds. The design was intended to treat the impacted groundwater before it discharges into the Ohio River.

Figure 13: View of the equipment used during the injection process

During late 2020, bid specifications were developed then advertised by the Finance Cabinet. The selected remediation contractor implemented the plan during early March 2021. Over 50,000 pounds of remediation material was injected into the subsurface at 69 locations near the shoreline (see photo and map below).

The safe drinking water and fish tissue consumption levels for the primary contaminant, benzene, are 5 and 51 ppb, respectively. Prior to the remediation, benzene concentrations ranged from 190

to 750 parts per billion (ppb). In the two sampling events conducted since the remediation, benzene was only detected at levels between 16 and 64 parts ppb. Sampling will continue on an annual basis to monitor the long-term effectiveness of the remediation.

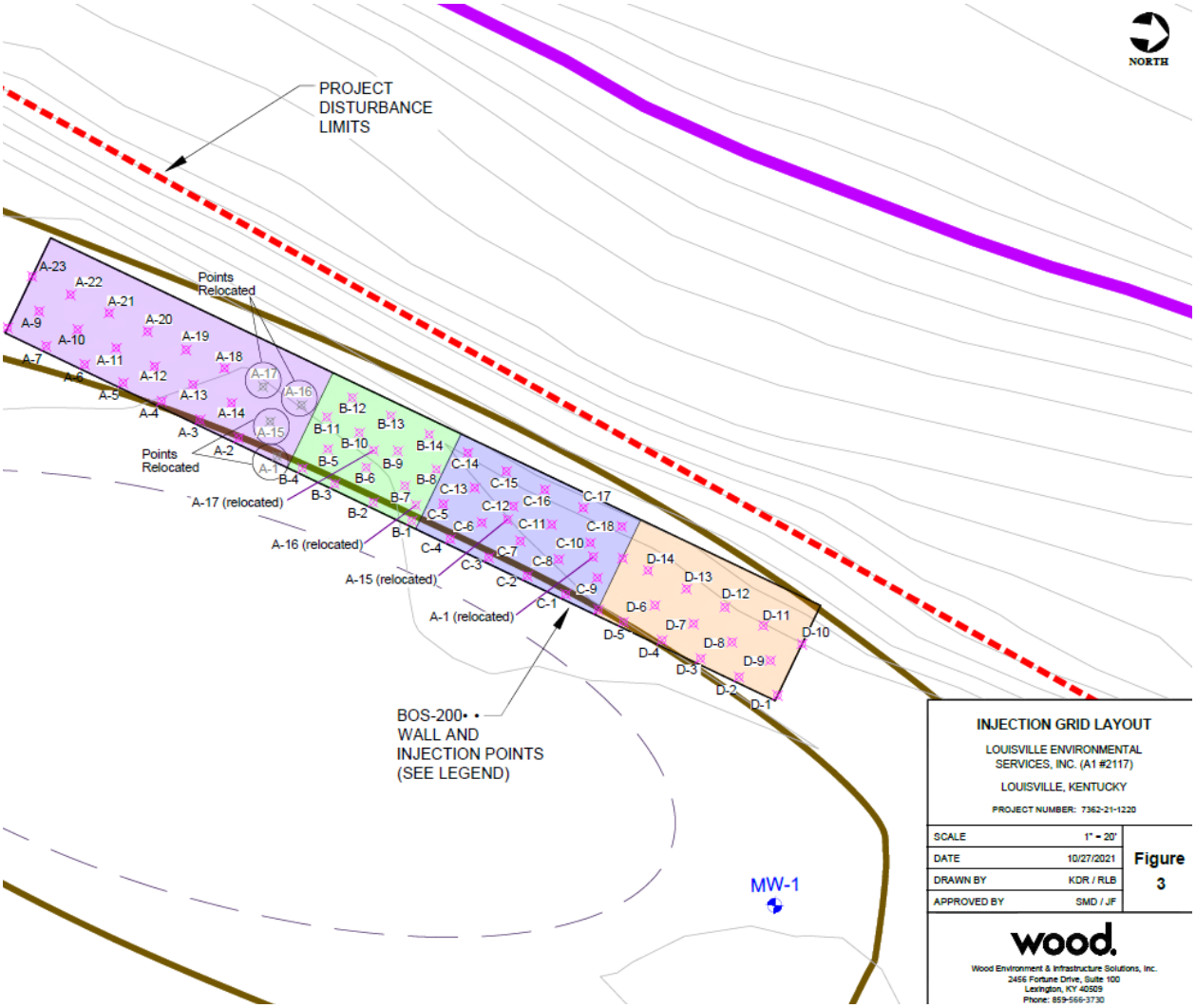

Figure 14: Map showing the injection locations. The Ohio River is to the upper right.

Western Kentucky Wildlife Management Area (WKMA) Wire Burn Site
Kevil, McCracken County
Expenditures FY2021 and FY2022-$380,941.36

The site is located within the Western Kentucky Wildlife Management Area (WMA). During the early 2000s, KY Fish & Wildlife employees reported a number of barren areas within a wooded portion of the WMA. The areas was littered with small pieces of various debris including metal fragments, broken glass, and ceramic insulators. This appearance suggested that wire and other electrical equipment were burned in the past for recovery of copper. Soil samples collected by the cabinet detected elevated concentrations of several metals, notably lead, as well as polychlorinated biphenyls (PCBs)**.**

The cabinet was unable to determine the parties responsible for the contamination. Historic aerial photographs suggest the burning dated back to the 1980s. Although the area is relatively isolated, hunters and other recreational users could have been exposed to the contaminants. Game and other wildlife were exposed when foraging through these areas. During late 2016, funding became available to establish a capital construction account in order to address the contamination as a state-lead project.

Figure 15: The bare spots represent former wire burn locations. These locations cannot support sufficient plant roots to retain fallen leaves.

Figure 16: A close-up showing typical surface debris in a burn area.

The Superfund Branch (SFB) investigated the site using its X-Ray Fluorescence (XRF) units. An XRF allows real-time measurements of metals concentrations in soil. Soil samples were also collected for laboratory analysis in order to verify the XRF data. The investigation found the contamination to be shallow in nature, typically extending a few inches to less than a foot below the surface. The main contaminated area covered approximately 1.7 acres. Several small satellite burn spots were also located in the vicinity.

During early 2021, Superfund contracted an engineering firm to develop bid specifications for a soil removal project. The engineer also subcontracted removal of trees from the work zones so the impacted areas would be accessible and clearly marked. During May 2021, the removal project was advertised by the Finance Cabinet. A remediation company was awarded the contract during early June 2021.

Figure 17: Several small satellite burn spots were also located in the vicinity.

The removal work started on July 26 and completed on August 12, 2021. Superfund personnel oversaw the removal and collected XRF readings & soil samples to ensure the impacted material was removed. Approximately 2,950 tons of contaminated soil was excavated and disposed at a permitted landfill. The excavated areas were backfilled with clean soil and re-seeded. Subsequent inspections found the grass cover became well established across the restored area.

Figure 18: July 2021- View of the contaminated soil loaded for disposal at a contained landfill.

Figure 19: July 2021 – Looking north across the northern portion of the main removal area after the impacted spoil was stockpiled for disposal.

Figure 20: July 2021- View of the above area after it was backfilled with clean soil and seeded.

Figure 21: October 2021 – Looking north along the center of the main removal area. The grass cover established well over the summer following the cleanup.

Figure 22: October 2021 - Panoramic view showing how well the grass cover established over the summer following the cleanup.

Southern Wood Treatment Long Lane
Montgomery County
Expenditures FY2021 and FY2022 -$29,367.50

Southern Wood Treatment is an example of a site with environmental releases that seemingly had no immediate threat to human health becoming a site with serious threats to human health. Prior

to 1998, oversight of the ammonical copper arsenate facility was being handled by the Superfund Branch. A decision was made to transfer oversight to another branch for possible waste permitting violations. However good these intentions may have been, oversight by KDEP was lost after the transfer. During a hardcopy scanning project in 2015 of Superfund files, the site was rediscovered. Superfund Branch staff then realized no regulatory oversight activity had occurred for over 17 years.

Little was known about the site's location due to the limited files existing. Several attempts were made to locate the facility using old maps, but the land use had changed to such an extent all former landmarks had been removed. With the location of the former facility not clearly resolved, Superfund Branch staff began screening soil in the general area for metals using an X-Ray Fluorescence (XRF) meter. After a couple of trips to locate the former facility, staff decided to sample some residential lots that perhaps were located on or near the former treatment area. Soil screening revealed concentrations of arsenic three orders of magnitude above expected background for the Bluegrass Region. Some readings exceeded 10% arsenic and contained a greenish tint (a result of the copper). Knowing that the error of an XRF meter is typically no more than 10% of a laboratory analysis and with visual confirmation of a release, an environmental emergency was declared within 24 of the first field screening.

To preform environmental work on residential lots, it was quickly determined that the residents had to be relocated. Due to budget constraints, DEP determined the most cost-effective approach to remove the emergency condition was to excavate and properly dispose the surficial contamination and cap the deeper impacts. Fortunately, most of the residential properties were cleaned to concentrations achieving native background. The emergency was removed, but the site remained contaminated with high levels of arsenic beneath a fragile soil cap subject to erosion. DEP had no legal authority to place a legal instrument on the impacted properties to restrict future land use. Lastly the drainage ditches and ponds were not cleaned but didn't pose an immediate exposure threat to returning residents.

The emergency actions taken by DEP were quite extensive, but it did not produce a tenable long-term remedy. Signs were eventually posted at all remaining impacted areas to inform the reader of site conditions. The former process area is now fenced and SFB staff mow and maintain that area. All signs are inspected each site visit and their condition evaluated.

DEP seeks a long-term remedy that removes all environmental impacts. Due to the expense which may exceed S15 million, DEP proposes to address the site in phases. The first phase is the removal of the impacts in the draining leading to and from the facility's former process water pond. An environmental engineer has been recently hired to prepare bid specification for this phase. Work to cleanup this drainage is expected to occur in FY 2023.

Figure 23: Signs placed at various locations at the site to warn of potential exposures.

FY 2021 and 2022

SFB was able to perform operations and maintenance to prevent exposures to residents.

The Division of Water (DOW) provided a drone with LIDAR capability to determine general terrain conditions providing volume calculations of soil in designated borrow areas.

Superfund staff characterized the extent of contamination in the process pond drainage. A site specific background was also determine by sampling a four-foot soil profile in an adjacent field. Sampling from surface to depth was needed to ensure there were no surficial impacts from windblown dust into the field. With background known the extent of the excavation in drainage area can be estimated.

In May 2022, SFB started the Request for Proposal to find Engineering services for Long Lane. The engineer will write bid specifications and provide oversight for various areas requiring remediation. As of June 27, 2022 a contract was awarded the contract for Engineering services and oversight.

Kelly Enterprises, LLC Property, Brewer Property, and Wright Property
Lexington, Fayette County
Expenditures FY21 and FY22 – $31,883.05 expended through the HWMF various projects fund

The Kelly Enterprises, LLC property (Kelly Property) is a multi-family residential complex in a historic neighborhood of downtown Lexington. In August 2020, the KY Division of Waste Management received a complaint of a potential release of lead-based paint dust from improper removal practices that occurred at the Kelly Property in May 2020. Members of the Field Operations Branch conducted preliminary testing of both the Kelly Property and the adjacent property. Through X-Ray Fluorescence (XRF) testing and soil sampling, they determined that the release of lead-based paint dust had impacted soils at both properties and referred the site to the Superfund Branch (SFB).

SFB personnel conducted further XRF and soil testing at both the properties to delineate the extent of contamination from the release. During this process, SFB personnel investigated another adjacent property and found that the release of lead-based paint dust from the Kelly Property had also impacted surface soils there. After SFB delineated the extent of contamination from the May 2020 release, the responsible party devised a work plan to address the contamination at the three properties.

After a period of deliberations regarding the work plan, initial removal and remediation efforts began in August 2021. The responsible party retained a company to conduct soil and gravel removal at all three properties, while SFB agreed to utilize XRF testing to determine if removal efforts were successful in addressing the May 2020 release. However, due to disputes between all involved parties over the correct removal depth, work at the site was halted before removal efforts.

In the interest of avoiding prolonged deliberations while the properties remained open excavation areas, SFB assumed the lead role for the removal and remediation efforts at the two adjacent properties. SFB contracted an environmental consulting company to complete the removal and remediation work in October 2021. SFB personnel used XRF testing to delineate the areas that needed further excavation at the Brewer and Wright properties. The environmental consulting company then conducted the removal of soil and gravel in the impacted areas. They also completed backfilling of soil and placement of sod and backfilling of gravel and grading of a gravel driveway in areas from both removal effort events at the Brewer and Wright properties.

The responsible party was required to finish the work and resumed removal efforts with the contracted company in January 2022. Removal efforts included further removal of soil and gravel at the subject property. SFB conducted further XRF testing during removal efforts at the site to determine the depth to which removal was required. After removal was completed, the responsible party completed backfilling of soil and gravel.

Figure 24: Photograph of Wright Property Backyard after removal of impacts from the 2020 release. Soil backfill prior to placement of sod

A&S Tool and Gage
Simpson Co
Expenditures FY21 and FY22 – $32,169.62

In 2021 the Superfund Branch provided oversight for the removal of approximately 16.5 tons of contaminated soil from a small electroplating operation at the former A&S Tool and Gage site in Simpson County. While in operation the facility produced specialty gauges according to customer specifications in a designated room of the single building on the property. The primary constituent

of concern was hexavalent chromium residue from plating solutions that had been allowed to accumulate on the plating room floor. Following removal of the concrete flooring, impacted soils underneath were successfully remediated by excavation to varying depths, extending very close to bedrock in at least one section, followed by backfilling with gravel. The project also included removal of contaminated equipment, including an exhaust hood/exit piping assembly. An earlier action conducted by EPA Region IV in 2016-17 included the removal of numerous drums, buckets, and other containers from storage areas at the facility.

As the site is located in a residential area adjacent to the Franklin municipal water treatment plant, preliminary investigation was conducted to confirm that impacts had not occurred in media surrounding the plating area, including Drakes Creek several hundred feet to the east where the treatment plant surface water intakes were located a short distance downstream. No impacts were found in soil or surface water media in the area, including samples taken from the creek, and raw/finished water and filter media samples obtained from the city plant.

Figure 25: Backfill of clean soil after removal of impacted soil below building floor slab

BROWNFIELD REDEVELOPMENT SITES

Spalding University's new athletic complex located in downtown Louisville, Kentucky is one of many success stories linked to Kentucky's Brownfield Redevelopment Program. Among the facilities offered to students are a softball field and several soccer fields, all of which are covered

with a realistic looking artificial turf. From time to time, the complex is also made available to other groups unaffiliated with the university, making it an asset to the community at large.

This site was once two contiguous properties. Historically, the site housed various industries including a compressor parts manufacturer, machine shop and automotive repair shop. Extensive soil sampling identified poly-aromatic hydrocarbons as well as arsenic and lead as contaminants of concern. Following the removal of various abandoned structures, the land was graded, new drainage lines were installed and several feet of clean soil was placed over the site. Landscaping was also installed. Site access is now controlled by an attractive fence that surrounds the property. In addition to protecting the site from would be vandals, the fence also serves as an engineering control by helping to prevent possible inadvertent exposure to the now buried contaminated soils. Annual site inspections insure that all necessary controls remain in place.

Figure 26: Softball Field: Part of the Spalding University Athletic Complex Louisville Urban League

The Louisville Urban League encompassed all aspects of DEP's Brownfield Programs. The 24 acre facility off Muhammad Ali Blvd, Louisville was formerly used as a tobacco product manufacturing and storage facility. The site was assessed through the targeted brownfield program. The Division of Compliance Assistance (DCA) and the applicant requested that SFB perform the assessment of the property at no cost to the non-profit entity. Utilizing that assessment, the site was entered in the brownfield redevelopment program. The Primary environmental issue was

polynuclear aromatic hydrocarbons (PAHs) in soil. The Property Management Plan approved in 2019 requires capping and management of affected areas. The urban league fully opened February 2021, featuring 90,000 square feet of floor space, 4,100 seat banked indoor track, 400 meter outdoor track and field stadium. The completion report was received March 15, 2021.

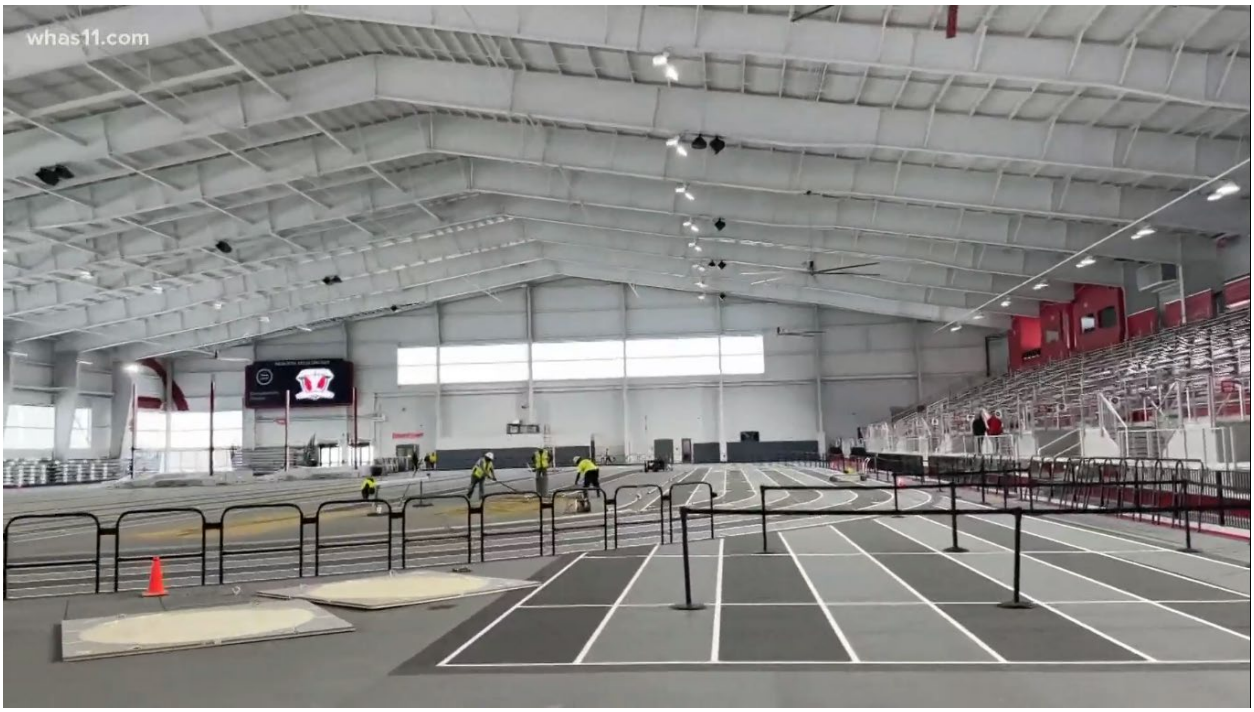

Figure 27: Finishing steps of construction of indoor track

FY2021-2022 Brownfield Initiatives

The Superfund Branch has an established audit process for Brownfield sites. An audit requires staff to review the existing property management plan to determine specific site management requirements. The participant is contacted by an auditor who arranges a site visit. The audit stresses compliance assistance rather than creating a confrontational inspection. Fines are not generated from the audits. If mismanagement is noted, the participant is allowed to correct the issue and submit verification of the correction. If extreme or blatant mismanagement of a subject site is noted, the authority to void brownfield status (concurrence) resides with the Director of the Division of Waste Management, as established in 401 KAR 102:010, Section 7. During FY2021 and FY2022, DWM conducted 48 audits. A total of 99 total audits have been conducted since the program's inception representing approximately 33% of all sites in the program. To date, there have been no sites referred to the Director's Office.

The Superfund Branch has also established an audit program for the 301 managed closure sites. During FY 2021 and 2022, 50 managed closure sites were inspected by central office staff. Although Environmental Covenants require the owners of these properties to certify that

conditions of management are being met, no actual inspection or audit of site conditions by DWM had been occurring until 2019. This verification project has discovered noncompliance but has not necessitated any notice of violations as problems are corrected and documentation of those corrections are submitted back to the Superfund Branch.

COSTS OF CLEANUP

The Kentucky Superfund program currently is working with a total of 315 active Superfund sites. Many, possibly all of these sites, could become state-lead sites. Due to several emergency events caused by old Resource Conservation and Recovery Information System (RCRIS) facilities, the Superfund branch was directed to evaluate and rank four major RCRIS category sites from the RCRIS generator list. Based on published research and staff knowledge, these were the industry types most likely to become future Superfund sites. The four categories are existing and former RCRIS generator Wood Treating Facilities (37), Plating Operations (73), Battery Operations (25), and Dry Cleaners (294). Approximately 3,600 other RCRIS generator sites, may also have had an unreported or unknown Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or a KRS 224.1-400/405 release. As a conservative estimate, if 10 percent of the sites have unreported or unknown releases, this would result in 360 additional Superfund sites requiring some level of action. Any of these estimated 360 sites could become state-led superfund sites due to the non-viability or insolvency of potentially responsible parties.

Many variables affect the cost to complete a cleanup. Site-specific characteristics such as the mass of the contamination, the character of the contaminant, the geological setting, and the physical location of the site all influence costs. Using historic Kentucky Superfund cost information site costs range from $10,000 to several million dollars. Studies including the U.S. Department of Defense, the EPA, national dry cleaner insurers' estimates, and Kentucky's historic database from 1993 to 2013 indicate a trending range from $200,000 to more than $700,000 per site. Using an average from these studies, an estimated cost per site can be calculated for the total active superfund sites and impending RCRIS sites. This estimated cost for potential maximum liability, 1104 known sites, approaches $582,500,000. This estimate is conservative. Certain category sites such as former wood treating facility average cleanup costs over 20 million dollars per site. Additionally, larger industrial type sites range in cost from $1 million to $10s of millions of dollars per site. The Kentucky Superfund program has steadily averaged 173 registered new superfund sites annually. Additionally, the state has 18 existing and delisted CERCLA National Priority List (NPL) Superfund sites who's long-term annually cyclic monitoring and maintenance liabilities, in one form or another, eventually fall to the state. Internal estimates of the annual cyclic, in perpetuity costs range from over $10,000 to over $500,000 per year based on the CERCLA NPL Records of Decision (RODs). Considering all these factors, and revising internal estimates based on national historic and similar industry-specific clean-ups, the total CERCLA, release liabilities in Kentucky range from *$1.8 billion* to *$2.6 billion dollars*.

Based on the superfund's HWMF current level of funding in 2021 and 2022 Fiscal Years, emergency sites addressed and other annual state-led remedial actions, the superfund program is currently unable to adequately address the increasing number of state-lead clean-ups.

Emerging Contaminants Per-and Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a group of over 5,000 man-made, fluorinated chemicals that, because of their unique chemical characteristics, are used in a large number of consumer products and industrial applications. The widespread use of PFAS in many consumer, commercial and industrial products over the last seventy (70) years and recent concerns about the health effects of PFAS create challenges for federal and state agencies to address these emerging contaminants. The PFAS compounds are ubiquitous and persistent in the environment and do not break down easily or within measurable time-frames. This group of chemicals impacts all the environmental media for which the Department for Environmental Protection regulates, including air, water, and land.

Currently, PFAS are not regulated by EPA under the Clean Air Act (CAA), Clean Water Act (CWA), or Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, to reduce the potential impacts on human health and the environment, the United States Environmental Protection Agency (U.S. EPA) launched the PFOA Stewardship Program in 2006 and worked with eight chemical companies to reduce and eliminate the use and emissions of PFOA and PFOS. Furthermore, concerning the increasing concern and urgency of PFAS impacts the U.S. EPA issued its PFAS "Strategic Road Map Action Plan 2021 – 2024". The U.S. EPA PFAS Strategic Road Map outlines EPA's priorities in aggressively addressing PFAS nationwide. The plan outlines five (5) major areas and goals EPA will actively address and implement over the next four (4) years:

- Move aggressively to promulgate enforceable drinking water standards for PFAS, in particular for PFOA, PFOS, HFPO-DA (Gen-X), and PFBS.
- Designating PFOA, PFOS, HFPO-DA (Gen-X), and PFBS as hazardous substances under CERCLA.
- Designating PFOA, PFOS, HFPO-DA (Gen-X), and PFBS as hazardous waste under RCRA.
- Developing effluent limitations for certain industry categories.
- Finalizing toxicity assessment for HFPO-DA (Gen-X).

Finally in indicating the level of concern, urgency and regulatory intent for PFAS, the U.S. EPA recently upgraded its Health Advisories (HA) for PFAS and PFOS from Seventy (70) parts per trillion (ppt) to 0.004 ppt (4 parts per quadrillion) for PFOA and 0.02 ppt for PFOS, and added HFPO-DA (Gen-X) and PFBS HAs at 10 ppt and 2,000 ppt respectively.

PFAS Remediation, Treatment, Disposal and Land Use Management Annual Costs - Commonwealth of Kentucky

The estimated funds include several states' federal, state, and local efforts, but is based on a presently very limited and incomplete PFAS data base inventory. Just how much an individual state's cost to remediate, treat, dispose and implement land use manage requirements for PFAS impacts will fluctuate per site and in totality based on the known levels of contamination, extant state level statutory and regulatory requirements and the final federal level regulatory requirements.

In the Commonwealth of Kentucky, many PFAS impacted sites will depend partially or entirely on Kentucky's Hazardous Waste Management Fund (HWMF) to protect human health and the environment in the Commonwealth of Kentucky. In many PFAS impact cases there are or will be no financially or existing viable responsible party(s), or a site will be abandoned. Also, many responsible party sources of PFAS have very limited financial resources that are significantly insufficient to carry out the characterization and remediation necessary to address the complexity of PFAS impacts. Such sites would also need to be addressed through the HWMF. Lastly, PFAS is not the sole contaminant impact that utilizes the HWMF, but will be an *overwhelming significant additional* strain on the already entirely underfunded HWMF.

Finally, due to the ubiquitous and persistence nature of PFAS (centuries to millennia) in the environment and natural resources; extremely low concentration levels of risk (part per trillion and parts per quadrillion) and complexity of PFAS; most if not all PFAS impacted sites will require long-term land use management as part of their remedial design and implementation. Furthermore, due to the extreme longevity of PFAS in the environment, land use management for PFAS will effectively be "*forever*" per site.

SUPERFUND SITES NEAR YOU

Typical historical Superfund sites are primarily perceived to be sprawling industrial complex sites, caches of illegally buried drums by large companies, or otherwise highly visible, newsworthy sites such as "Love Canal," "Maxey Flats," and the "Valley of the Drums". Most of these sites' concerns and liabilities are typically addressed by potentially responsible parties with abundant, sustainable financial resources or by federal funding through the NPL program. Although these types of sites still exist they no longer reflect the greater number and pervasive threat to human health and the environment in the commonwealth. The typical sites that are entering into superfund are smaller sites that have geological, technical, or chemical/contaminant characteristics that are complex and financially difficult to address. These types of sites pose the greatest threat to the citizens of the commonwealth and to Kentucky's natural resources. They encompass the largest growing number of sites entering the state Superfund program.

The human health and natural resource concerns from these sites are increased by their proximity to areas where people live, eat, and play. These same areas often lack the kinds of property controls common to industrial sites. Additionally, the smaller lot sizes of many of these sites mean that a contamination plume typically impacts multiple neighboring properties, including residential homes, schools, recreational areas, and other locations that a person would not normally anticipate having contamination issues.

Many of these sites from which hazardous substances have been released into the environment, such as dry cleaners, are proprietary, small businesses with limited to no resources. Most do not have adequate assets or insurance to pay clean-up costs resulting from releases on their parcels. These clean-up costs typically exceed the owner's equity in the entire venture and the value of the real property combined.

Most hazardous substances and contaminants released into the environment have scientifically-proven persistence as a risk to human health and resource damages from 50 to over 100 years and in many cases (such as metals) in perpetuity. Large multi-national Standard and Poore (S&P) Fortune 500 companies have maximum life spans of 40 to 50 years[1], while most U.S. S&P Fortune 500 companies have maximum life spans of less than 20 years[2]. These figures represent the most financially solvent types of companies and their lifespans, which greatly outlive most locally or regionally owned companies that release hazardous substances into the environment (i.e. a "best financially solvent case scenario"). With most contaminants lasting 100 or more years, the "best" of businesses averaging less than 20 years of financial solvency, and most smaller entities are financially insolvent relative to clean-up costs, Kentucky is the ultimate "steward" of these issues. In addition to annual clean up issues that result from modern society using hazardous substances as part of its production of goods, these concerns increasingly burden the state's resources in personnel and funding such that the statutory duty to protect human health and the environment is tenuously attained.

[1] Crainer, Stuart. "The Living Company by Arie de Geus". *July 1998* Strategy+Business. https://www.strategy-business.com/article/18728?gko=8c8f1

[2] Sheetz, Michael. "Technology killing off corporate America: Average life span of companies under 20 years" *August 2017*.CNBC.com. https://www.cnbc.com/2017/08/24/technology-killing-off-corporations-average-lifespan-of-company-under-20-years.html

The state Superfund program and HWMF is the lone entity with authority and sufficient longevity to maintain protection of human health and the environment mandated by KRS 224.10-100. Due to the number, difficulty, and lack of financial resources, these sites place an increasing strain on the HWMF (Figure 6).

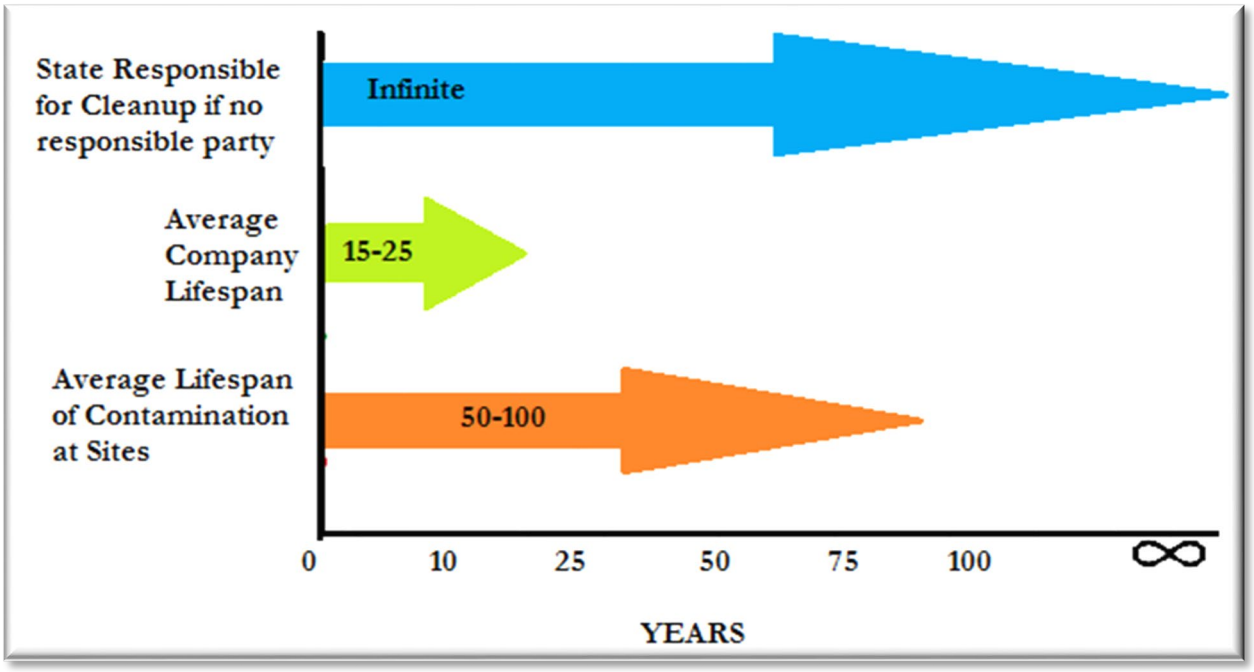

Figure 28: State Cleanup Responsibility Outlives Company Responsibility by 400 Percent.

FUTURE OF THE FUND

The HWMF was created to provide the Energy and Environment Cabinet with necessary funds to protect the health of the citizens and natural resources of the commonwealth from threats associated with releases of hazardous substances, pollutants, and contaminants. The cabinet uses the HWMF to provide technical reviews, oversight of responsible party-driven, and state-lead remediation projects. The HWMF is the Commonwealth's single source of financial support for contaminated sites where there are either no known responsible or financially solvent parties available to take action. The HWMF finances regulatory oversight, emergency responses, state-lead, and time-critical remediation projects at sites throughout Kentucky. These projects range from large industrial sites and persistent dry cleaner plumes to small projects including roadside drums, orphan wastes, and transformers. There are no other current available funding sources to conduct emergency response, state-lead cleanup actions, or regulatory oversight.

In addition to evaluation and mitigation measures, HWMF funds are used to purchase leading-edge equipment to complement time-critical projects. The SFB also routinely purchases passive soil gas vapor monitors to screen vapor at sites with the potential of releases from volatile

constituents. These purchases allow this branch to quickly mobilize to screen or perform maintenance and operations on-site.

The HWMF has experienced challenges since 2008 resulting from decreases from exemptions and reductions of general, and federal funds available to the cabinet. Additional negative impacts include increased costs for:

- Cleanup;
- Growing numbers of non-viable and financially insolvent responsible parties from which to recover cost;
- Cyclic annual in perpetuity cost for the long-term maintenance and monitoring of NPL sites; or
- Potential large scale sites and the number of RCRIS sites, and new superfund sites.
- Future PFAS site of varying industry type.

These impacts have resulted in the HWMF no longer being able to sustain and manage all existing and projected superfund backlogs. Insufficient funding to support large scale emergency remedial projects that arise unpredictably year-to-year, and the inability to reasonably fulfill its statutory mandate to protect human health and the environment continue to burden the funds.

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The mission of the Kentucky Division of Waste Management is to protect human health and the environment by minimizing adverse impacts on all citizens of the Commonwealth through the development and implementation of fair, equitable and effective waste management programs.

July 2022

APPENDIX

TABLE 1: Hazardous Waste Management Fund Revenues, FY1993-2022

	Assessments Collected	Cost Recovery	Interest	Return on Investment Account & Capital Closeouts	Brownfields Application Fees	Transfer from PSTEAF per KRS 224.46-580	DOG- for Carter Caves & AL Taylor Reimbursement	TOTAL
FY93-FY02	$26,497,996.00	$3,623,784.00	$1,114,921.00	$5,663,178.00	-	-	-	$36,899,879.00
FY03	$1,831,535.00	$579,544.00	$81,162.00	$65,735.14	-	-	-	$2,557,976.14
FY04	$1,876,572.00	$293,420.00	$37,370.00	$1,295,046.00	-	-	-	$3,502,408.00
FY05	$1,766,239.12	$311,827.28	$17,565.74	$812,841.38	-	-	-	$2,908,473.52
FY06	$1,871,802.74	$119,138.54	$11,916.21	$404,327.01	-	-	-	$2,407,184.50
FY07	$1,804,954.42	$407,829.27	$28,873.17	$457,975.78	-	-	-	$2,699,632.64
FY08	$1,760,870.25	$331,372.35	$16,201.64	$711,505.58	-	-	-	$2,819,949.82
FY09	$1,506,853.23	$126,314.75	$8,238.64	$178,204.44	-	-	-	$1,819,611.06
FY10	$1,205,801.18	$309,757.11	$10,645.88	$300,000.00	-	$318,346.77	-	$2,144,550.94
FY11	$1,325,342.34	$715,588.96	$6,512.49	$1,597,180.97	-	$637,062.05	-	$4,281,686.81
FY12	$1,764,288.24	$410,100.86	$16,362.73	$335,760.36	-	$554,562.44	-	$3,081,074.63
FY13	$1,515,949.68	$725,993.60	$1,098.03	-	-	$170,697.75	-	$2,413,739.06
FY14	$1,415,327.98	$704,332.51	$683.31	-	$38,500.00	$450,932.31	-	$2,609,776.11
FY15	$1,413,123.93	$536,705.15	$1,052.53	$303,833.88	$110,131.00	$582,465.64	-	$2,947,312.13
FY16	$1,612,788.65	$143,713.98	$1,218.62	$188,137.62	$70,000.00	$599,253.59	-	$2,615,112.46
FY17	$1,738,004.00	$413,625.00	$7,087.00	$452,080.00	$125,000.00	$417,421.00	-	$3,153,217.00
FY18	$1,336,545.00	$166,246.00	$6,461.00	$0.00	$82,500.00	$325,337.00	-	$1,917,089.00
FY19	$1,461,476.11	$569,243.99	$16,323.96	$245,527.38	$115,000.00	$742,352.26	-	$3,149,923.70
FY20	$1,210,200.01	$351,178.36	$22,149.92	$582,785.07	$110,000.00	$692,012.36	-	$2,968,325.72
FY21	$1,133,180.39	$204,277.25	($117.80)	$6,268.66	$115,000.00	$976,882.88	-	$2,435,491.38
FY22	$1,074,648.86	$240,070.37	$995.09	$903,700.00	$130,000.00	$1,104,205.41	$216,511.38	$3,670,131.11
GRAND TOTAL	**$57,123,499.13**	**$11,284,063.33**	**$1,406,721.16**	**$14,504,087.27**	**$896,131.00**	**$7,571,531.46**	**$216,511.38**	**$93,002,544.73**

TABLE 2: Hazardous Waste Management Fund Expenditures, FY1993-2022

	Capital Projects Remediation HW Sites	Maxey Flats Site	WKU Geophysical MOA	Superfund & ERT Technical/Professional Oversight *FY21-22 Salaries for SFB and HWMF %-ERT staff	Kentucky Pollution Prevention Center	HWMF Audit Fee
FY93-FY02	$19,800,000.00	$6,258,654.00	-	$7,131,214.00	$3,514,900.00	-
FY03	$1,000,000.00	-	-	$797,991.00	$420,000.00	-
FY04	$2,200,000.00	-	-	$1,215,955.00	$420,000.00	$11,033.00
FY05	$1,684,853.34	-	-	$809,567.75	$420,000.00	-
FY06	$853,900.00	-	-	$1,055,581.73	$420,000.00	-
FY07	$1,734,387.89	-	-	$606,379.41	$362,080.00	-
FY08	$1,338,707.98	-	-	$772,847.34	$351,793.85	-
FY09	$500,000.00	-	-	$929,296.70	$299,705.39	-
FY10	$850,000.00	-	-	$1,100,956.70	$247,078.50	-
FY11	$2,544,731.00	-	-	$897,226.30	$300,000.00	-
FY12	$2,100,000.00	-	-	$693,369.49	$360,000.00	-
FY13	$737,000.00	-	-	$773,016.63	$360,000.00	-
FY14	$1,142,160.94	-	-	$886,037.02	$360,000.00	-
FY15	$1,706,300.00	-	-	$994,676.38	$360,000.00	-
FY16	$855,500.00	-	$29,830.35	$758,065.20	$360,000.00	-
FY17	$1,037,253.50	-	$63,441.87	$1,166,497.72	$360,000.00	$157,996.74
FY18	$414,500.00	-	$79,156.12	$1,057,079.65	$360,000.00	$165,800.00
FY19	$454,500.00	-	$17,991.00	$1,592,245.63	$360,000.00	-
FY20	$782,500.00	-	-	$1,640,874.92	$360,007.96	-
FY21	$458,351.85	-	-	$1,275,427.12	$360,000.00	-
FY22	$447,195.06	-	-	$1,812,635.57	$360,000.00	-
GRAND TOTAL	**$42,641,841.56**	**$6,258,654.00**	**$190,419.34**	**$27,966,941.26**	**$10,715,565.70**	**$334,829.74**

TABLE 3: Cumulative Expenditures on Active Capital Project Accounts FY2021-2022

		Engineering	Construction	Analytical
C1H6	HWMF- Various Projects	$15,143.00	$643,126.96	$39,505.40
C2PW	HWMF- Kim's Dry Cleaners	$31,266.90	$0.00	$0.00
C4Q7	HWMF- Louisville Environmental Services	$38,576.14	$185,350.00	$0.00
C52G	HWMF- Distler Farm	$0.00	$2,460.00	$0.00
C5GL	HWMF- Lees Lane Project	$4,000.00	$0.00	$0.00
C6AM	HWMF- Jackson's Pronto Cleaners	$12,325.00	$0.00	$0.00
C7TR	HWMF- Parrish Avenue	$1,330.00	$20,095.00	$0.00
C83A	HWMF- Former West Point Bank Property	$62,978.70	$0.00	$0.00
C83H	HWMF- West KY Wildlife Area Burn Site	$51,750.00	$327,571.36	$1,620.00
C8SC	HWMF- A&S Tools and Gage	$0.00	$32,169.62	$0.00
C8ZG	HWMF- Former Henry Vogt Machine Co	$26,550.80	$0.00	$0.00
C95Q	HWMF- Southern Wood Treatment- Long's Lane Op. & Maint Phase	$73,417.50	$0.00	$1,765.00
C9FX	HWMF- Mount Sterling City Landfill	$81,080.89	$0.00	$0.00
CA4U	HWMF- Sanders Cleaners	$440.00	$0.00	$900.00
	TOTAL	**$398,858.93**	**$1,210,772.94**	**$43,790.40**

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