



**Division of
Waste
Management**

Fiscal Year 2020 Annual Report

Commonwealth of Kentucky

Department for Environmental Protection

Division of Waste Management

eeq.ky.gov/Environmental-Protection/Waste





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MESSAGE FROM THE ASSISTANT DIRECTOR

On behalf of the Division of Waste Management, I am pleased to present the 15th edition of the annual report. This report highlights division activities and accomplishments for the 2020 Fiscal Year (FY20) (July 1, 2019, through June 30, 2020). In this period the Division has completed multiple, significant projects.

The Hazardous Waste Branch, after years of planning and coordination with both the Army and the community, saw its first year of active chemical munition destruction at the Bluegrass Army Depot. Thirty-six (36) tons of H-mustard and 28.8 tons of GB (Sarin), almost 13 percent of the total BGAD stockpile, was destroyed.

For many years, Recycling and Local Assistance Branch has been an advocate for integrating used tires into asphalt. This past year, 5 miles of roads in Kentucky were paved using rubber modified asphalt. This effort prevented 4,000 vehicle tires from entering the state's landfills.

The Solid Waste Branch, through an arrangement with the City of Bowling Green, provided a forced main to transport leachate from the Historic Butler County Landfill to the Morgantown Waste Water Treatment Plant. Before the installation of the forced main, leachate from the landfill had to be trucked for disposal. The new forced main will save Bowling Green \$85,000 per year.

These are off the cuff examples, which I found interesting, and there were other projects, too. The Division's primary duties, however, are less interesting, but paramount, to the protection of the Citizens of the Commonwealth and the protection of the land upon which we live. Each of the 8 branches within the Division of Waste Management has contributed to the protection of your health and our environment from hazardous and toxic chemicals, petroleum contamination, and illegal disposal of solid wastes.

As an enumeration of select accomplishments of the division's employees in FY20, 5,968 underground storage tanks, solid waste, and hazardous waste inspections were conducted across the state. Eight-thousand three-hundred and thirty (8,330) complaints were addressed. Seventy-two (72) illegal dumpsites were cleaned up through the collection of 14,876 tons of waste. Over 284 tons of household hazardous wastes were properly disposed of. Thirty-nine (39) Brownfield sites were primed for redevelopment. Additionally, 581 directives were issued for site investigation and corrective action activities to underground storage tank sites. Finally, division personnel mobilized to 553 emergency events.

In most years, the above would be sufficient to introduce the annual report and the work of the Division of Waste Management, but this year had been no ordinary year. The COVID-19 pandemic forced staff to develop new processes to work from home and to work while social distancing, all the while maintaining full service to the public. In a very short period, we mustered our



technological skills to enable staff to communicate with one another, transfer documents, and account for their work product. I would be amiss if I failed to thank everyone for their flexibility and dedication to making the transition to “Safer at Home” successful.

This annual report presents what the Division’s staff has done on behalf of their neighbors - the citizens of Kentucky.

*Edward Winner, Ph.D.
Kentucky Division of Waste Management*

EXECUTIVE SUMMARY

The Kentucky Division of Waste Management (DWM) employs a staff of 236 individuals within the Department of Environmental Protection (DEP). The 8 branches that comprise the DWM are:

Program, Planning, & Administration
Field Operations
Hazardous Waste
Solid Waste

Superfund
Underground Storage Tank
Recycling & Local Assistance
Emergency Response

2019 CALENDAR YEAR AND 2020 STATE FISCAL YEAR SELECTED ACHIEVEMENTS AND CHALLENGES

Brownfield Redevelopment Program:

Success continues with the Brownfield Redevelopment Program. In FY20, 39 brownfield sites were reviewed in accordance with KRS 224.1-415. The Division issued 20 Notice of Eligibility letters and 29 Notification of Concurrence letters. Four (4) sites are pending review at the end of this fiscal year.

Municipal Solid Waste Collection:

Participation in Municipal Solid Waste (MSW) collection has remained steady since legislation in 2002 began requiring waste haulers and recycling haulers to register and to report in each county for which they provide service. Kentucky disposed of 4.8 M tons of MSW in CY2019.

Illegal Open Dumpsites:

Since the Division's Open Grant program was updated in 2006, over 2,231 illegal open dumpsites have been addressed at a cost of \$23.1 million. In CY2019, counties cleaned 72 illegal open dumps at a cost of \$4.4 million and collected 14,876.14 tons of waste. The fourteenth round of grants was awarded in January 2020 for the remediation of 122 dumpsites at a projected cost of \$1.04 million.

Litter Along Public Roads:

The Cabinet's Litter Abatement Grant, supported by the Kentucky Pride Fund, as well as Eastern Kentucky PRIDE, Bluegrass Greensource, Kentucky Transportation Cabinet, the Adopt-A-Highway program, and cities and counties across the commonwealth, contributed to the cleanup of about 1,689,920 pounds of litter at a cost of \$7.63 million in CY2019. The average cost of litter picked up in CY2019 was 65 cents per pound.

Maxey Flats Project:

In FY20, effective January 1, 2020, the Maxey Flats Disposal Sites (MFDS) received permission from U.S. EPA to implement the Institutional Controls Work Plan, and Sampling, Analysis and



Data Evaluation Plan (SADEP) and the O&M Inspection Program. Approval of the full plan is still pending. The SADEP and O&M Inspection Program were designed as the basis for environmental monitoring and evaluation of the remedy. Since completion of the Final Cap in 2017, there have been no performance concerns regarding the cap and its components. The vegetative cover increases in density each year, erosion in the adjacent drains is stable as it relates to storm water management from the cap, and seepage contamination levels remain below the conservative screening levels. Additionally, the MFDS laboratory is establishing new procedures for the analysis of gross alpha and gross beta. This will ensure effective contamination mobility monitoring as tritium naturally decays and becomes a less representative indicator.

Methamphetamine Lab Cleanup Program:

In FY20, the Methamphetamine Lab Cleanup Program decontaminated 8 properties. A total of 791 properties have been decontaminated since the inception of this program in 2007.

Recycling Program:

Kentuckians recycled 1,941,634 tons of common household recyclables (including aluminum, cardboard, steel, plastic, newspaper, glass, and paper) for a recycling rate of 31.7 percent in CY2019.

State Government Office Paper Recycling Program:

This program continues to thrive, serving more than 115 agencies in Frankfort. State employees recycled 1,203 tons of waste paper in CY2019, approximately generating \$189,561 in revenue. A slight increase in tonnage and a slight decrease in revenue in CY2019 may reflect typical fluctuations in commodity prices over time, but is likely at least partially driven by global developments such as China's increasingly restrictive import policies.

Underground Storage Tank Program:

The Underground Storage Tank (UST) program emphasizes timely and effective remediation. In FY20, The UST Branch issued 184 No Further Action letters, reviewed 80 closure assessments, 13 site checks and Phase II reports, and issued 581 directives for site investigation and corrective action activities.

Waste Tire Program:

In FY20, waste tire collection events (formerly referred to as “tire amnesties”) were conducted in the counties comprising the Buffalo Trace, FIVCO, Cumberland Valley, and Gateway Area Development Districts (ADDs). The KY River ADD counties were also scheduled to conduct events in FY20, but most of those events were postponed to FY21 due to the COVID-19 pandemic. These postponements resulted in a significant decrease in total tires collected. The equivalent of 217,293 waste passenger car tires were recovered through FY20 collection events at a cost of \$343,323.

INTRODUCTION

The Division of Waste Management is one of 6 sections within the Department for Environmental Protection (DEP) in the Energy and Environment Cabinet. The departmental strategic operational plan for the state FY20 describes the goals of the agency:

DIVISION OF WASTE MANAGEMENT MISSION STATEMENT

“Preserve and restore Kentucky’s land through the development and implementation of fair, equitable, and effective waste management programs.”

As Kentucky’s population grows, the number of homes, businesses, and industries that provide jobs, services, and goods for residents continues to increase. This population and economic growth results in increased use of chemicals and residential and industrial materials, which increases the waste streams and emergencies associated with these activities. The DEP safeguards and ensures protection of human health and the commonwealth’s land, air, water and groundwater resources.

To accomplish this, the department administers an array of programs that work together to protect human health and the environment from the impacts related to waste, ranging from hazardous, chemical, and petroleum contamination to illegal trash disposal. This strategy protects and benefits the commonwealth in a number of ways. It protects the citizens of the Commonwealth as well as protects and restores Kentucky’s natural resources through preventive monitoring programs and remediation. Programs also preserve existing green space through the restoration and reuse of brownfield space for new commercial and industrial ventures. They develop properties with existing infrastructure, beautify communities, and raise the value of surrounding properties. The department regulates and educates the public on these issues concerning solid and hazardous waste management, site remediation at contaminated properties, redevelopment and reuse of impacted properties, operation and corrective action of underground storage tanks, and recycling waste products.

The management of solid and hazardous wastes are achieved through comprehensive permitting, registration, monitoring, reporting, and training requirements. In addition, the department promotes solid and hazardous waste minimization, landfill inspections, conducts public hearings, and provides evaluation of waste streams to ensure proper protection of our state’s natural resources.

The human health and environmental threats from leaking underground storage tanks are managed by a two-fold approach that monitors and prevents leaks and spills, and assesses and remediates contaminated sites. Prevention is achieved through a focus on compliance with state and federal operation and maintenance requirements. The complementary focus on oversight of site assessment and cleanup is supported by the department’s management of state funds available for these activities.

The department uses state and federal funds to address environmental emergencies, state-lead assessments, cleanup and remediation of State-Lead and National Priority List sites that are contaminated and abandoned, which pose a serious threat to human health and the environment, and redevelopment programs to support and encourage redevelopment of properties with real or perceived adverse environmental conditions. Department personnel work with regulated businesses, contractors, government agencies, and various stakeholders to characterize and remediate sites where contamination has been released into the environment. In addition, the department uses regional field offices to support the programs by performing inspections, and ensuring that facilities are compliant with regulatory requirements.

The department encourages public participation through various programs to protect our environment by recycling and reducing waste in order to minimize land disposal and to conserve energy and natural resources. These programs educate citizens and industry on environmentally friendly practices in the proper management of waste while emphasizing the significant environmental and economic benefits of reducing, reusing, and recycling materials.

Objective 1 - Ensure Programs Adhere to Federal and State Statutory and Regulatory Requirements:

Tactic 1.1: Review and revise administrative regulations and propose legislative amendments to comply with federal regulatory requirements.

Measures:

- Number of legislative proposals drafted in the current fiscal year.
- Number of regulatory packages developed, promulgated, and finalized in the current fiscal year.
- Number of public notices issued and public hearing conducted by branch.

Action 1.1.1: Develop regulation packages for division programs that comply with state statutory and federal requirements in a manner protective of human health and the environment that accurately reflect programmatic policy.

Action 1.1.2: Prepare draft legislative agenda to address any issues requiring legislative solutions and pursue enactment.

Action 1.1.3: Develop regulation packages that are inclusive of stakeholder concerns.

Tactic 1.2: Provide resources and oversight to the regulated community to achieve compliance with federal and state regulations.

Measures:

- Number and percentage of underground storage tank owners/operators that have completed the required UST Operator Certification training.



- Number and percentage of solid waste sites complying with KRS 224.43-500, including those solid waste sites required to submit the Environmental Remediation Fee.
- The percentage of authorized hazardous waste facilities in compliance.
- The percentage of registered underground storage tanks in compliance.
- Number of facility inspections completed by staff to ensure regulatory compliance.

Action 1.2.1: Utilize Kentucky Tank Operator Online Learning System (KY TOOLS) as a program for UST Operator Certification in accordance with the federal Energy Policy Act. KY TOOLS offers a site-specific approach to training and testing to support certification, which will significantly aid in increased overall compliance and leak prevention. Other Certifications are accepted as well, as long as the training meets all requirements.

Action 1.2.2: Maintain and enhance ARM reporting to accurately track and report on measures.

Action 1.2.3: Inspect regulated sites at established intervals to facilitate and ensure compliance with agency requirements.

Action 1.2.4: Take enforcement action on regulated sites as necessary to facilitate and achieve compliance with agency requirements.

Tactic 1.3: Review and revise quality assurance documents annually and update as necessary.

Measures:

- Number of Standard Operating Procedures and guidance documents developed or revised in the current fiscal year.
- Number of Quality Assurance Project Plans developed or revised in the current fiscal year.

Action 1.3.1: Develop and revise standard operating procedures that comply with state and federal requirements and agency policy.

Action 1.3.2: Revise Quality Assurance Annual Report.

Action 1.3.3: Prepare the division annual report and update the Strategic Operational Plan.

Action 1.3.4: Develop and revise Quality Assurance Project Plans as necessary.

Tactic 1.4: Ensure waste management programs are fiscally and administratively viable.

Measures:

- The division staffing levels as compared to cap and budgeted amounts.
- Number of grant programs administered and completed.
- Amount of Environmental Remediation Fee collected.

Action 1.4.1: Prepare the division budget for the state fiscal year.

- Action 1.4.2:** Communicate and coordinate with DEP budget staff on the needs of the division.
- Action 1.4.3:** Track expenditures and receipts to ensure programs are within designated budgetary amounts.
- Action 1.4.4:** Implement cabinet, department, and division's operational, personnel, and human resource policies and procedures.
- Action 1.4.5:** Monitor staffing levels and ensure timely processing of personnel actions.
- Action 1.4.6:** Educate division staff on cabinet, department, and division policies.
- Action 1.4.7:** Track grants programs and ensure grant programs are meeting expectations.
- Action 1.4.8:** Ensure accurate and timely data entry and reporting.
- Action 1.4.9:** Track amount of environmental remediation fee collected to build trending data on the success of division administration of the fee.

Objective 2 - Ensure Permits are Protective of Human Health and Kentucky's Land Resources:

Tactic 2.1: Issue appropriate, lawful permits in a timely manner.

Measures:

- Number of hazardous waste permit applications received.
- Number of hazardous waste permits pending review.
- Percentage of hazardous waste permit reviews completed within regulatory timeframes.
- Number of solid and special waste permit applications received by type.
- Number of solid and special waste permits pending review.
- Number and percentage of solid and special waste permit reviews completed within regulatory timeframes.
- Number of training classes completed by division staff.

Action 2.1.1: Issue permitting actions that are inclusive of all federal and state regulatory requirements.

Action 2.1.2: Issue permitting actions within the regulatory timeframes.

Action 2.1.3: Utilize ARM to accurately track and report on permitting actions.

Action 2.1.4: Evaluate and implement streamlining opportunities to address procedural and institutional inefficiencies.

Action 2.1.5: Allocate staff as necessary to assist in data entry and permit review.

Action 2.1.6: Recruit qualified staff.

Action 2.1.7: Provide training to increase knowledge and enhance retention of qualified staff.

Tactic 2.2: Reduce, eliminate, and maintain zero permit and permit activity backlogs.

Measures:

- Number and percentage of hazardous waste permits pending review outside regulatory timeframes.
- Number and percentage of hazardous waste permit reviews completed outside regulatory timeframes.
- Number and percentage of solid and special waste permits pending review outside regulatory timeframes.
- Number and percentage of solid and special waste permit reviews completed outside regulatory timeframes.

Action 2.2.1: Obtain a zero backlog on all remaining applications beyond regulatory periods.

Action 2.2.2: Allocate staff as necessary to assist with data entry and permit review.

Objective 3 - Ensure Remedial Investigation, Restoration, and Management in Place Decisions are Site Specific, Risk Based, and Environmental Performance Standards Prone:

Tactic 3.1: Restore sites or manage contamination at sites with known or suspected releases to soil or groundwater.

Measures:

- Number of sites with known or suspected releases with potential human exposures where no further action is required or otherwise controlled as a result of implementing a management in place technique.
- Number of underground storage tank cleanups conducted that resulted in a no further action letter being issued and number remaining.
- Number of hazardous waste program corrective actions completed and number remaining.
- Number of EPA environmental indicators corrective action measures achieved.
- Number of historic landfills remediated and number remaining.
- Number of historic landfills with on-going remediation projects.
- Number of solid and special waste facilities in groundwater assessment.
- Number of illegal open dumps remediated under the Kentucky Pride Program and number remaining.
- Number of tire dumps remediated under the Waste Tire Trust Fund and number remaining.
- Number of new Superfund sites.
- Number of PRP-Lead State Superfund sites under review and number remediated.
- Number of State-Lead sites that require remediation, number remediated utilizing the Hazardous Waste Management Fund, and number under review.
- Number of sites with a release of petroleum or a petroleum product remediated from a source other than a petroleum storage tank and number under review.

- Number of methamphetamine-contaminated properties reported and number decontaminated.
- Number of emergency or incident responses made and number of cases closed.

Action 3.1.1: Identify resource and program constraints hindering achievement of our measures; pursue program changes and request funding as necessary in budget. At a minimum, work to maintain current level of funding in cleanup programs.

Action 3.1.2: Provide technical oversight and directives for projects to investigate, remediate, manage, or restore properties with contamination.

Action 3.1.3: Review analytical and reporting data for projects.

Action 3.1.4: Issue letters upon the completion of all corrective actions for facilities.

Action 3.1.5: Inventory the list of sites with known or suspected contamination.

Objective 4 - Support and Encourage Economic Redevelopment of Property With Real or Perceived Contamination:

Tactic 4.1: Provide oversight to the investigation, remediation, management, or redevelopment of properties with real or perceived contamination.

Measures:

- Number of sites under review pursuant to the Voluntary Environmental Remediation Program.
- Number of brownfield sites assessed under the Targeted Brownfield Assessment Program and number awaiting review.
- Number of KRS 224.1-415 Brownfields Redevelopment Program applications received, number of eligibility letters issued, and number of concurrence letters issued.

Action 4.1.1: Review project data and determine compliance with program requirements.

Action 4.1.2: Issue notices and letters for projects in accordance with regulatory guidelines.

Objective 5 - Minimize Waste Generation and Disposal:

Tactic 5.1: Ensure proper management and disposal of waste.

Measures:

- The compliance rates for authorized solid waste management facilities.
- The amounts, by weight, of litter, open dump waste, and household hazardous waste collected by counties through the Kentucky Pride program.

Action 5.1.1: Inspect regulated sites at established intervals to facilitate and ensure compliance with agency requirements.

Action 5.1.2: Increase communications between permitting central office staff and field operations staff.

Objective 6 - Encourage Beneficial Reuse and Recycling:

Tactic 6.1: Encourage reduced waste generation and disposal by promoting beneficial reuse, recycling, waste minimization, and pollution prevention.

Measures:

- Tonnage of municipal solid waste recycled or reused, by type.
- Tonnage of material recycled through the State Government Recycling Program.
- Tonnage of solid or special waste used as Alternate Daily Cover (ADC).
- Percentage of solid or special waste used as ADC.
- Number of waste tires used in tire-derived fuel projects, crumb rubber grants, and other beneficial reuse purposes as a percentage of number of tires generated.
- Number of recycling grants and total amount of funding administered.

Action 6.1.1: Maintain and enhance ARM reporting or other databases to accurately track and report on measures.

Action 6.1.2: Provide education and outreach for recycling opportunities.

Action 6.1.3: Update recycling fact sheets as more current information is available.

Action 6.1.4: Administer grant programs in accordance with regulatory requirements.

Action 6.1.4: Publish The Marketplace for Recycling Commodities newsletter.

Action 6.1.5: Identify resource and program constraints hindering achievement of measures; pursue program changes and request funding as necessary in budget.

Objective 7 - Respond to Environmental Emergencies:

Tactic 7.1: Respond with efficient, coordinated, and effective action to minimize environmental damage.

Measures:

- Number and percentage of plans/procedures reviewed/revised.
- Number and percentage of required training courses completed.
- Number and amount requested of grant applications submitted.

Action 7.1.1: Coordinate the activities of the Emergency Response Team (ERT) to effectively respond to environmental incidents.

Action 7.1.2: Develop and maintain all Standard Operating Procedures and Standard Operating Guidelines of the ERT to include ERT Operations and Procedures Plan, On-Scene Coordinators Field Guide, Drinking Water Emergency Plan, Response Coordinators Guidelines, BGAD Re-entry & Recovery Plan, Emergency Transition Plan, and others as necessary.

Action 7.1.3: Coordinate training for the ERT On-Scene Coordinators to include Hazwoper, QCS Training, Air Monitoring, Oil Spill Containment Training, Flood Control Training, Hazardous Materials Training, and others as necessary.

Action 7.1.4: The ERT will seek to upgrade outdated air monitoring equipment.



Action 7.1.5: The ERT will acquire 3 cargo trailers. The trailers will allow the Branch to outfit the trailers with supplies consisting of sample containers, absorbent pads and booms, etc. This will allow the Branch to respond quicker with supplies during spills throughout the Commonwealth.

PROGRAM, PLANNING & ADMINISTRATION BRANCH

The mission of the Program Planning & Administration (PPA) Branch is to provide administrative and operational support to all of the branches in the Division of Waste Management through efficient and effective financial administration, personnel management, and regulatory development.

BUDGET

The budget for the Division covers numerous programs and activities, including partial funding of the Division of Enforcement. The Division is financially supported by general funds, federal grants, and restricted funds. Monies received include fees collected for permits and registration activities, Petroleum Storage Tank Environmental Assurance Fund (PSTEAF), waste tire fees, environmental remediation fees, and an annual appropriation from the Kentucky Transportation Road Fund.

The Division had the budget to employ 236 full-time permanent employees in FY20 (Figure 1). While the number of funded positions decreased significantly in 2014, funded positions have remained relatively unchanged since then. However, previous reductions in personnel continue to challenge the division to evaluate program priorities and to identify efficiencies (Figure 2).

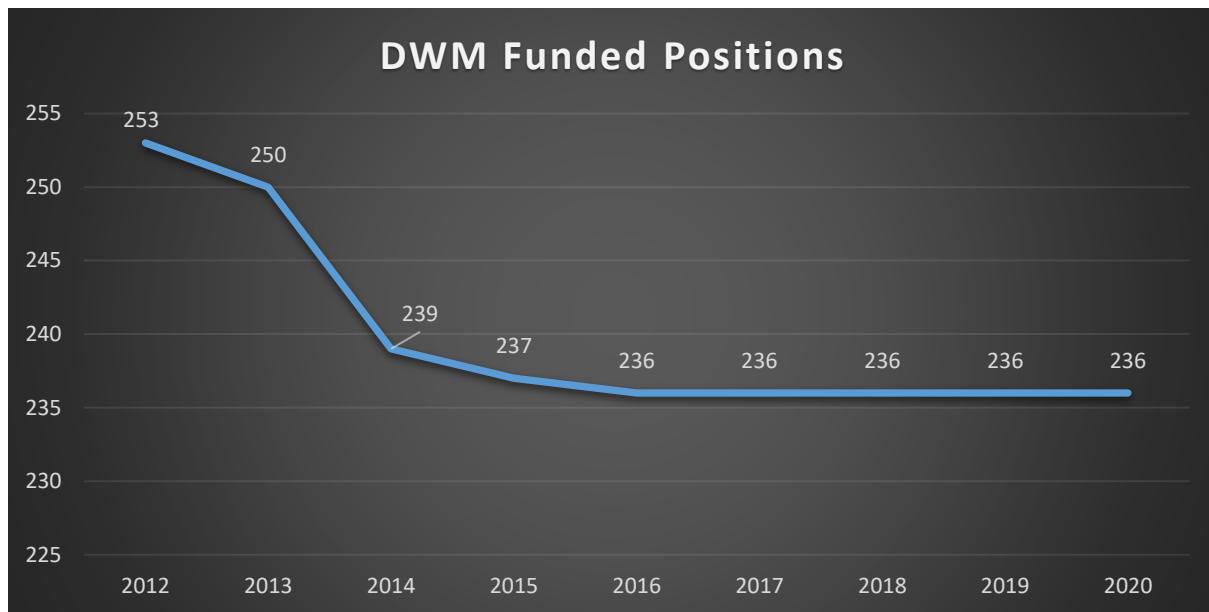


Figure 1: Division of Waste Management Funded Positions

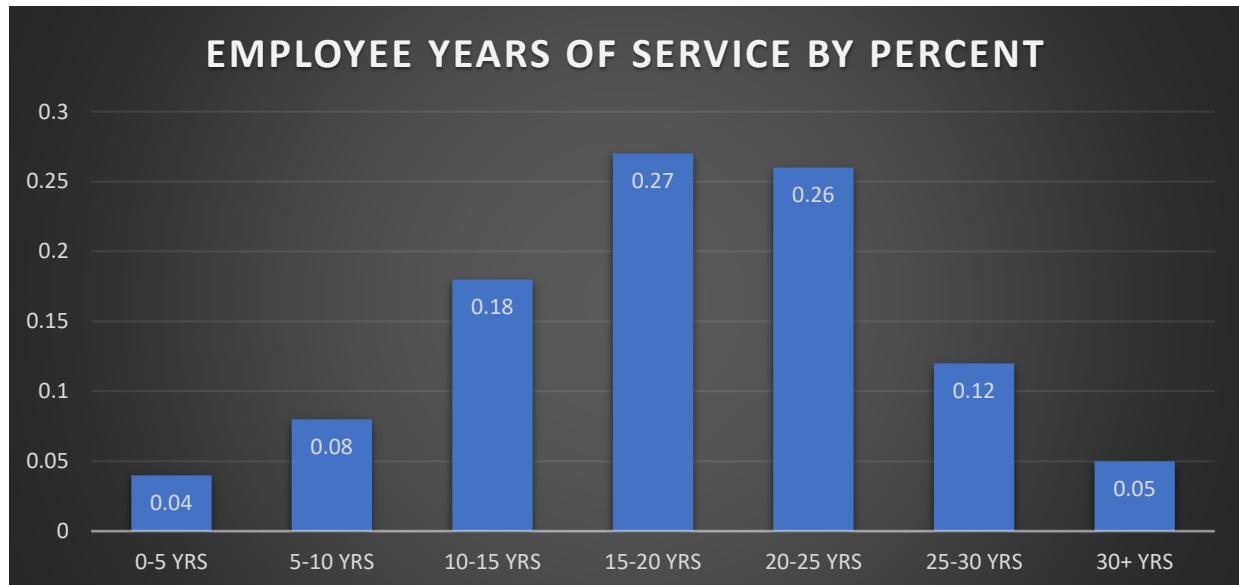


Figure 2: Employee Years of Service by Percent

PROJECT ADMINISTRATION SECTION

The Project Administration Section performs the Division's procurement, contract administration, and grant management. This section also manages the Division's accounts payable functions and payment processing for major fee-supported programs.

Project Administration typically manages a number of personal service contracts, memoranda of agreements (MOA) with other government entities, and the solicitation and contracting for



necessary goods and services. The section administered MOA's with the City of Cadiz to provide safe drinking water to residents and the City of Bowling Green to create a leachate collection force-main system from the landfill to the local utility company. Large purchases were also made for vehicles, lab supplies and equipment, boat, UTV, and satellite radios for the Emergency Response Team.

Many of the Division's programs are completely supported by federal funds, while others are only partially supported or not supported by federal funds at all. Currently, the Division receives funding from a total of 15 federal grants and cooperative agreements. This financial support includes:

- Financial assistance from EPA is awarded for the ongoing work at the B.F. Goodrich facility (BFG) in Calvert City, Kentucky. The agreement outlines the technical work to be performed and funds field oversight support, meetings, and travel cost.
- The Assembled Chemical Weapons Alternative (ACWA) Grant from the U.S. Department of Defense (DoD) provides financial support for the Division's efforts to ensure compliance with storage regulations; to review, amend, and approve permit applications; to keep stakeholders and the community informed; and to ensure compliance during construction and operation of the Bluegrass Chemical Agent-Destruction Pilot Plant (BGCAPP) and the Explosive Destruction Technology (EDT) facility.
- The Agreement in Principle (AIP) with the U.S. Department of Energy (DOE) funding allows the Division to conduct independent and impartial assessments of potential environmental impacts of DOE activities at the Paducah Gaseous Diffusion Plant (PDGP). Through the support of the agreement, the Division is able to manage independent environmental monitoring and research. These funds also allow the Division to enhance communications with concerned citizens.
- The Federal Facilities Agreement (FFA), a three-party agreement between DOE, EPA, and Kentucky, was developed to ensure compliance with and avoid duplication between the corrective action provisions of the Resource Conservation and Recovery Act (RCRA) permitting program and the corrective action requirements as established by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) at the PGDP site. The FFA outlines regulatory structure and guides interactions between the 3 parties.
- In accordance with Section 128(a) of CERCLA, the EPA provides financial support to the Brownfield Redevelopment Program to address the assessment, cleanup, and redevelopment of brownfield sites.
- The DoD and State Memorandum of Agreement (DSMOA) provides funding to improve communication, coordination, and cooperation between DoD and the Division in providing protection of human health and the environment on DoD installations in Kentucky. The DSMOA program ensures environmental restoration at DoD installations occurs consistently with state and federal law.
- The Five-Year Review Cooperative Agreement (FYR) provides funding from the EPA to the Superfund Program to perform five-year reviews of remedial action at National Priority



List (NPL) sites in Kentucky. The purpose of a five-year review is to determine whether a site's ongoing or completed remedial actions will remain protective of human health and the environment.

- The Support Agency Cooperative Agreement (SACA) provides additional financial support to the Superfund Program to perform five-year reviews of remedial action at NPL sites in Kentucky.
- With financial support from the Preliminary Assessment/Site Investigation Cooperative Agreement (PASI), the Superfund Program assists the EPA with the evaluation of sites with known or suspected releases of hazardous substances, pollutants, or contaminants. Under PASI, the Division assists the EPA through all aspects of the site assessment process and helps identify candidate sites for the NPL list. The NPL list consists of CERCLA sites that represent the most significant risk to human health and the environment.
- The Brownfields Assessment and Cleanup Grant (BAG) from the EPA provides funding to communities that wish to address brownfield properties in order to protect and/or improve water resources. This grant was designed to target rural areas impacted by coal mining, but it may also be used to assess approved sites throughout the commonwealth.
- Financial assistance from the Core Program Cooperative Agreement (CORE) helps the Division's Superfund Program carry out its activities and responsibilities as established by CERCLA in identifying, investigating, and addressing environmentally contaminated sites in accordance with CERCLA.
- The Leaking Underground Storage Tank (LUST) Cleanup Cooperative Agreement with the EPA provides financial assistance to the Underground Storage Tank (UST) program to oversee the cleanup of leaking USTs by responsible parties and to ensure the cleanup at sites where an owner or operator is unwilling or unable to take necessary corrective action.
- The LUST Prevention Assistance Agreement (LPG) with the EPA provides financial support for the development, implementation, and maintenance of the UST program as well as financial support for the detection and prevention, of leaking USTs in Kentucky.
- The RCRA Grant provides the Division's Hazardous Waste Management Program with the financial support necessary to implement RCRA permitting, corrective action, closure, compliance, and enforcement in accordance with the EPA's performance expectations.
- The EPA's Toxic Substances Control Act (TSCA) Compliance Monitoring Cooperative Agreement provides financial support to the Division to implement the polychlorinated biphenyls (PCBs) compliance monitoring program. The agreement allows the Field Operations Branch (FOB) to perform PCB inspections, generate inspection reports, and track facility information in the PCB Transformer Registration Database.

PERSONNEL AND ADMINISTRATIVE SUPPORT SECTION

The Personnel and Administrative Support Section performs support-related duties for the PPA Branch and the Division. These duties include the coordination and procurement of goods and services on state contracts such as office supplies, equipment, furniture, uniforms, and boots for the Division's Central Office. This section provides support in identifying facility needs for Division personnel, including workspace logistics. Furthermore, the Personnel and Administrative

Support Section is tasked with the coordination of employee training and development, in-state and out-of-state travel logistics, and reimbursement of expenses.

This section also works closely with the ERT in processing invoices and payments related to emergency responses and cleanups. In FY20, 50 new ERT contracts were awarded to vendors, 9 of which were done so in an emergency declaration. Moreover, this section provides support in recovering response costs when viable responsible parties are available. For FY20, the Division was able to recover a total of \$351,178 in emergency response costs. These funds were deposited back into the Hazardous Waste Management Fund (HWMF) to be re-utilized for the remediation of environmental contaminations throughout Kentucky.

PROGRAM DEVELOPMENT SECTION

The Program Development Section (PDS) performs a variety of functions, such as management of planning initiatives, development of regulations, and coordinating the review of proposed bills during the legislative session.

Legislation:

During the 2020 Legislative Session, PDS completed 20 bill reviews. These involved evaluating and commenting on how the proposed bills might affect Kentucky's Division of Waste Management on a structural and fiscal level.

In this Legislative Session, the Kentucky Legislature passed House Bill (HB) 351 and HB 362. HB 351 amends KRS Chapter 224 to extend the new tire fee and petroleum storage tank assurance fund process for 4 additional years. HB 362 amends KRS Chapter 224A to encourage the deployment of broadband services to underserved and unserved areas in the Commonwealth via grants and existing funds.

Reports:

During FY20, PPA prepared the Hazardous Waste Management Fund (HWMF) Biennial Report, as mandated by KRS 224.46-580(13)(c), which discusses information related to the expenditures and revenues of the HWMF for FY19 and FY20. This report is available for review by accessing the Division website, HWMF section, at <https://eec.ky.gov/Environmental-Protection/Waste/Pages/division-reports.aspx>.

Additionally, PPA prepared the Division's Strategic Operational Plan and mid-year status updates of planning initiatives for CY2019.

The Waste Tire and Trust Fund (WTTF) CY2019 Annual Report was submitted in January 2020, as mandated by KRS 224.50-872. This report provides information relevant to Kentucky's waste tire program, its expenditures, revenues, and effectiveness in developing markets. The benefits of the fee in funding the EEC's implementation of the waste tire program and recommendations for improvement were included. This report is available for review by accessing the Division website,

Waste Tire Program Report section, at <https://eec.ky.gov/Environmental-Protection/Waste/Pages/division-reports.aspx>.

COVID-19 RESPONSE

Due to COVID-19, the way PPA conducts its business changed significantly in March of CY2020 as they transitioned from working in the office to working from home. Although challenging at times, PPA continued its work and supported the division in a highly effective and successful manner.

FIELD OPERATIONS BRANCH

The mission of the Field Operations Branch (FOB) is to identify and abate imminent threats to human health and the environment through inspections, technical assistance, and education. This branch performs inspections at sites managing solid waste, hazardous waste, USTs, and PCBs. The primary duty of a regional inspector is to inspect regulated facilities for compliance. The FOB includes a central office, Richmond satellite office, and 10 regional offices located throughout Kentucky. The regional staff is familiar with the local waste management issues and responds to questions and concerns.

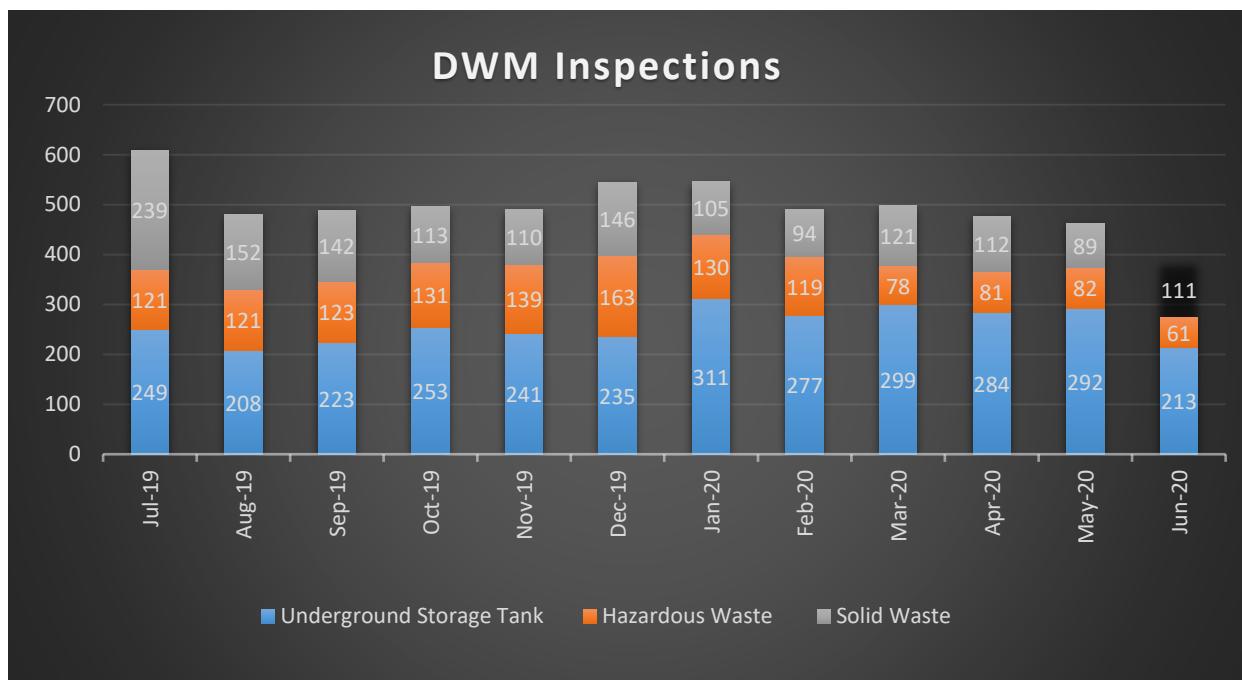


Figure 3: Division of Waste Management Inspections

During FY20, the FOB conducted 5,968 UST, solid waste, and hazardous waste inspections. This was a decrease of 10 percent under inspections completed in FY19. This is attributed to the



limitations on in-person and inside facility inspections during the months of Mid-March through Mid-June, CY2020 due to the COVID-19 pandemic. The staff was able to keep some of the inspections at slightly lower numbers due to FOB's routine inspectors implementing creative ways to complete virtual inspections during the pandemic, but the Hazardous Waste Inspections were almost completely halted for 3 months.

The 3,085 UST inspections conducted in FY20 accounted for 52 percent of the total inspections. Thirty-five (35) of the inspections were Desk Audits completed during the COVID-19 pandemic; seven (7) were Monitoring Well Audits requested by the UST Branch; with the remaining 3,043 as traditional on-site inspections. The total number of UST inspections were approximately 7 percent lower than FY19, mostly likely due to the turnover of staff in the FOB's most populous area (Louisville). UST compliance rates¹ began in the lower 40's, but trended up, ending with an overall increase of 6 percent from the previous year at 52 percent. UST Notices of Violations increased from FY19 by 29 percent. The initial decrease in compliance can be attributed to Kentucky adopting all of the Federal UST regulations that went into effect in CY2015. These adopted regulation changes became effective in April 2019, but had compliance deadlines at the Federal level in October 2018. By the beginning of CY2020, many of the UST sites were being revisited for their triannual inspection requirement and maintaining their compliance.

The FOB conducted 1,532 solid waste inspections in FY20. This is a 15 percent decrease from the previous year. This reduction is attributed to limitations implemented to slow the spread of COVID-19. The average compliance rate for solid waste facilities was at 65 percent. Compliance rates increased by 1 percent from FY19.

The FOB conducted 1,351 hazardous waste inspections in FY20, a decrease of 9 percent from the previous year. The decrease in inspections is attributed to the in-person/in-building inspections limitations implemented to slow the spread of COVID-19. The compliance rate for hazardous waste facilities averaged at 80 percent, showing an overall increase of 2 percent from FY19.

In FY20, FOB conducted 8,330 complaint investigations, total inspections, and investigations. UST technical compliance inspections (TCI) ranging between 42 and 58 percent through from July 2017 through July 2018. (Figure 4). Overall, all compliance rates appear to be trending up with both Hazardous Waste and UST implementing new regulations.

¹ "Compliance Rate" means the percent of total inspections where an inspector noted that no violation had occurred. This does not include investigations triggered by citizen complaints.

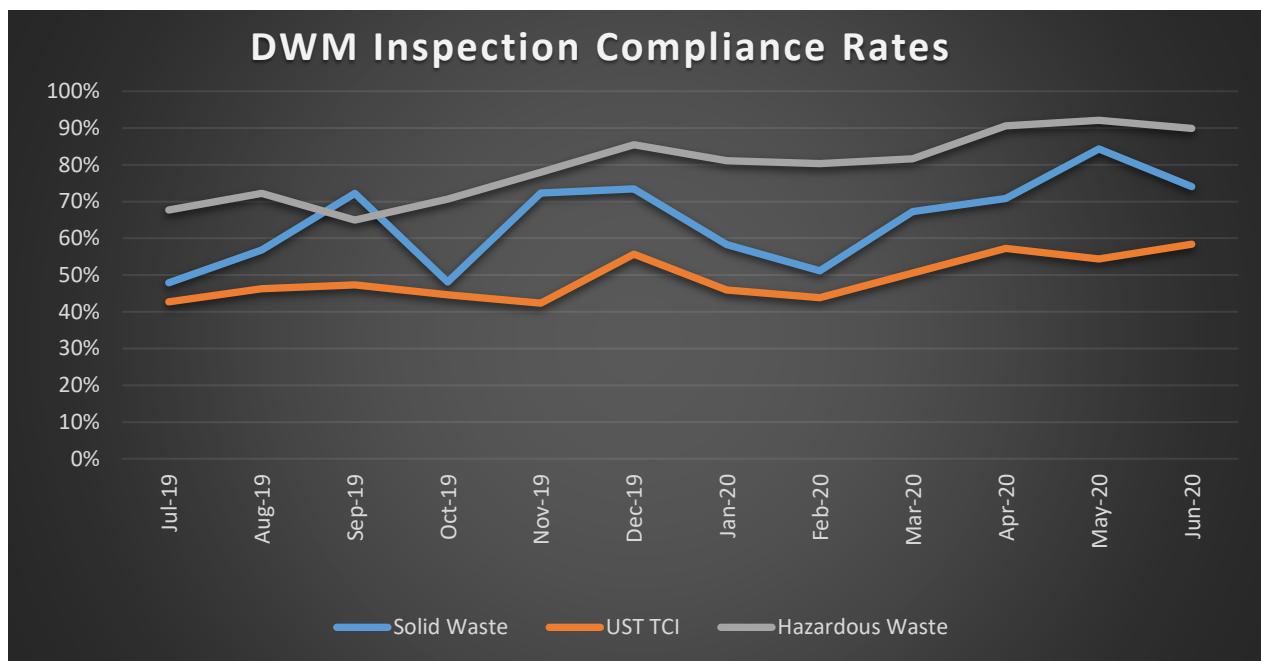


Figure 4: Division of Waste Management Inspection Compliance Rates

COVID-19 RESPONSE

Due to limitations from the COVID-19 pandemic, FOB was unable to complete as many solid and hazardous waste inspections as in previous years. Although no in-person and in-building inspections were able to be carried out, the staff implemented virtual inspections to continue inspections during the pandemic.

When COVID-19 became a threat to the offices, FOB seamlessly transitioned into telecommuting by moving the staff's computer workstations to their homes and continued the office work without any disruptions to normal work functions. For many years, the branch has utilized a conference call system due to the offices being spread out across the state. Monthly conference calls were used to update and keep the staff and supervisors updated on any changes or information they needed to share. In the past the FOB has utilized video conferencing calls such as Skype and Link. When they most recently transitioned to Microsoft Teams, staff easily adapted to the new software.

FIELD OPERATIONS BRANCH HIGHLIGHT

By: Leslie Carr

For many years, The Division of Waste Management Field Operations Branch has been implementing multiple resources and equipment to make the transition to working remotely successful. Due to the nature of the work and the required duties of an inspector, staff have found it necessary in the past to work remotely to increase production and efficiency (doing more with

less). Starting about 6 years ago, FOB began implementing processes to create a “mobile employee”.

FOB began by requesting all employees to have a VPN, allowing them to access their files and data from the server remotely and to operate from a laptop as if they were sitting at a desk in the office. Next, they began transitioning their employees from flip phones to smart phones. This allowed an inspector to combine 3 pieces of equipment into 1; their phone, GPS, and camera.



Photo 1: Illustration of Smart Phone Capabilities. Photo by Leslie Carr.

Once all employees had a smart phone device, FOB updated their plans to allow for Hotspots. Prior to this, an inspector would have to log into their device from a mobile location with a Wi-Fi connection, such as a library. Hotspots allowed inspectors to log onto their laptops from any location. This way, they were allowed to do work from the sites they were inspecting or investigating, rather than traveling to Wi-Fi access points to input information.

The last transition FOB made for equipment, was switching all employees over from a laptop to a tablet. Tablets allowed employees to utilize a built in camera for video conferencing, without any additional equipment. They allow the inspector to use the tablet as a way to take notes in the field or directly enter the inspection data in real time.

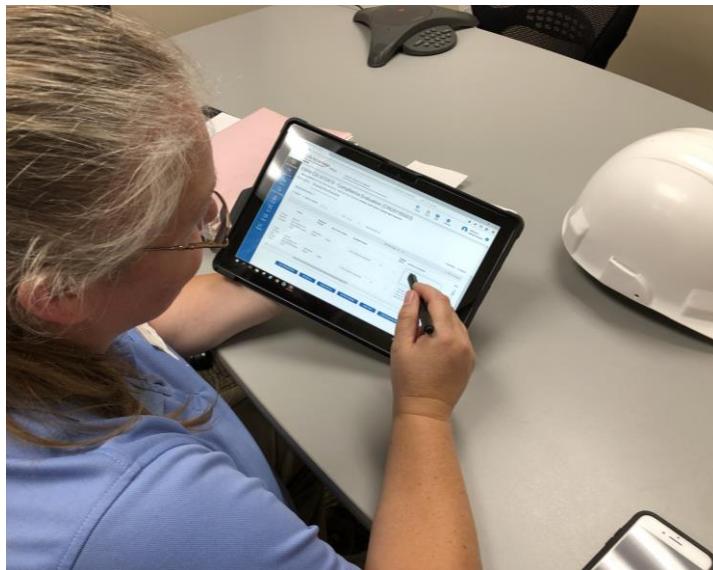


Photo 2: Staff Using Tablet in the Field. Photo by Leslie Carr.

HAZARDOUS WASTE BRANCH

The Hazardous Waste Branch (HWB) is delegated authority from the U.S. EPA to manage the regulations of the Resource Conservation and Recovery Act (RCRA).

BLUE GRASS ARMY DEPOT (BGAD) SECTION

The BGAD Section in the HWB reviews applications and issues permits to the U.S. Army's Blue Grass Army Depot in Richmond, Kentucky. BGAD has stored 523 tons of chemical agent in rockets and projectiles. The chemical agent consists of GB (sarin) and VX nerve agents, and H mustard (blister agent). A large industrial plant, called the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) was constructed on the BGAD facility to destroy the chemical weapons. It is the responsibility of the BGAD Section to ensure that all regulatory and safety requirements are met under BGAD's hazardous waste permit.

Chemical weapon destruction started on June 7, 2019 with destruction of H-mustard projectiles using the Explosive Destruction Technology (EDT) process. Another milestone was reached on January 17, 2020, when GB projectile destruction began in the Main Plant, which utilizes neutralization to destroy the nerve agent. GB projectile destruction was completed on May 11, 2020. Over 12 percent of the entire BGAD stockpile has been destroyed as of June 2020. The remaining weapons are VX projectiles, VX rockets, GB rockets, and the remainder of the H-mustard projectiles.

The destruction processes are complex and utilize many steps that are first-of-a-kind or have not been used on a large scale previously. Therefore, many issues have been worked out in painstaking detail during systemization, requiring a large number of permit modifications. During FY20, the Division issued 76 permit modifications to the facility, including 2 new sections of the permit. Because of the complexity and short deadlines within the project, working together as a team with the Army and contractors has been critical to success. The Army is obligated under treaty and funding deadlines to complete destruction of all chemical weapons by the end of CY2023.

Many challenges lie ahead, including major processing changes that were announced by the Army last year, in order to meet deadlines and safely destroy problematic weapons. Under the new procedure, GB and VX rocket warheads will be punched and drained of agent, then containerized and fully destroyed later using an expanded and upgraded EDT process. The BGAD Section is ready to do its part to meet the upcoming project challenges.



Photo 3: New BGAD Commander Colonel Stephen D. Dorris (L) receives the installations “colors” from Jerry Cecil. Photo by Brandon May.

PADUCAH GASEOUS DIFFUSION PLANT SECTION

C-400 Remedial Investigation:

The C-400 building at the Paducah Gaseous Diffusion Plant in Paducah is the main source of 2 four-mile long Trichloroethene (TCE) ground-water contamination plumes, commonly identified as the Northeast and Northwest Plumes. The groundwater plumes are the largest known sources of contamination leaving the site and are therefore the main risk to human health and the environment. In order to clean up contamination at the C-400 complex, a comprehensive investigation will define the extent of contamination. This is needed to set the parameters necessary to evaluate and choose the most effective treatment options.

Scoping meetings for the investigation work plan phase began in CY2018 and continued into CY2019. The purpose of the meetings were to support a meaningful exchange of information and expectations; to develop a general consensus on the scope, to facilitate development of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan, thereby accelerating the document review, comment and approval process. During the scoping process, sample locations were identified; concepts and data needs were determined; exchanges of investigation methods were discussed; and concerns relating to RI/FS Work Plan development were resolved.

Through meetings, discussions, and correspondence during the scoping process the DOE, EPA, and KDEP were able to agree to the scope of the RI/FS Work Plan, which received final approval from EPA and KDEP on October 7, 2019. The DOE announced implementation of the RI/FS Work Plan fieldwork on November 11, 2019. Initial field activities in the C-400 operable unit included gamma walkover surveys, maintenance/redevelopment of existing monitoring wells, obstacle removal at designated sampling locations, and ground survey marking of drill locations and underground utilities. Installation of new monitoring wells began on March 3, 2020. Four (4) monitoring wells were installed at 3 locations prior to the suspension of C-400 RI field activities on March 24, 2020 due to the COVID-19 pandemic. Cleanup progress at the site is made possible, in part, by active participation by site stakeholders, regulators, workers, elected officials, and other members of the public.

SWMU 211-A Enhanced In Situ Bioremediation:

TCE was used as a solvent to clean equipment in and outside of the C-720 building. In addition to C-720 cleaning operations, at least one former plant worker reported that drums of TCE were dumped in a ditch north of the C-720 building. Through a series of investigations, beginning in the mid-1990s, it was determined that TCE contaminated the soil and groundwater around the C-720 building. A remedial action is getting ready to start at one of the impacted areas located northeast of C-720 building, identified as SWMU 211-A.



Photo 4: Location of SWMU 211-A Building. Photo by Brandon May.



SWMU 211-A is located northeast of the C-720 Building where drums of TCE were said to have been dumped and various parts were cleaned with

A Remedial Design Report determined that SWMU 211-A is a suitable site for a type of treatment known as Enhanced In Situ Bioremediation (EISB). This type of remediation begins by injecting a slurry containing sand and microscale zero-valent iron (mZVI) as proppants using Direct Push Technology (DPT) jet injection to create lenses with higher permeability within the UCRS. Then microorganisms and amendments (and nutrients) are added to stimulate and enhance biological activity. The microorganisms consume, digest and transform the TCE through a process called reductive dechlorination, resulting in the non-toxic end product, ethene.

The bioremediation treatment footprint will be approximately 13,200 ft² and cover 2 distinct areas. Injection locations were selected to provide coverage of the treatment area with a 15 ft design radius of influence and accounts for injection overlapping of about 30 percent. The treatment depth generally extends from 17 ft to 65 ft below ground surface. The vertical spacing between injection depths will range from 3 ft to 4 ft at each location, with closer spacing occurring in higher known TCE concentration areas.

In the field, hydraulic fracturing, using DPT jet injection will create horizontal fractures so sand and iron can be delivered under pressure to fill the void space. Emulsified vegetable oil will be mixed with anaerobic water and injected into each well, followed by the microbes and nutrients, which will occupy voids and start reducing TCE concentrations.

This EISB remedy includes both a performance monitoring program and a long-term monitoring program. Performance monitoring will provide data on the bioremediation action and subsurface conditions, while the long-term monitoring will provide data on the VOC concentrations. Baseline monitoring will be performed prior to EISB implementation so comparisons can be made before and after treatment begins.

Several parameters will be measured during performance monitoring. Among them, ethene and ethane concentrations will be monitored because they are the end products of TCE reduction. Methane will also be tracked and used as an indicator of groundwater geochemistry since methane-producing bacteria typically are active under the same geochemical conditions as dechlorinating bacteria. Several other parameters will also be monitored during this time. The implementation of field activities for the 211-A bioremediation project are expected to last approximately 9-12 months.

PERMITTING AND CORRECTIVE ACTION SECTION:

The Permit Review and Corrective Action Section of the HWB completed numerous significant activities of interest during FY20. The Section has continued to make progress in meeting Environmental Indicators (EIs), which are measures developed by the EPA to track remediation achievements. These include “Remedy Constructed”, “Performance Standards Attained” and “Ready for Anticipated Use.” The Permit Review and Corrective Action Section also continued to



conduct groundwater monitoring program inspections and assessments, completed work on sites not on the GPRA baseline and regulated under CERCLA/Superfund, and completed two operating permit renewals.

Environmental Indicators Determinations Completed:

In FY20, 4 total EIs were completed, which involved the evaluation and documentation of the meeting of certain requirements. These included:

One (1) Ready for Anticipated Use

- Dyno Nobel

Three (3) Performance Standards Attained:

- Midwest Environmental Services, Louisville
- Kentucky Electric Steel (currently SWVA Kentucky), Ashland
- Blue Grass Army Depot, Lexington

Groundwater Monitoring System Inspections Conducted:

A total of 13 groundwater monitoring inspections were conducted during FY20 at these sites:

- Arch Chemicals, Brandenburg, 3114
- Arkema, Calvert City
- Atkemix Ten, Louisville
- Blue Grass Army Depot, Richmond
- Dunaway Timber, Fordsville
- Florida Tile, Lawrenceburg
- Fort Campbell Military Reservation, Fort Campbell
- Gates, Elizabethtown
- GE Appliance Park, Louisville
- Naval Ordnance Station, Louisville
- Owensboro Riverport Properties, Owensboro
- Phillips Lighting, Danville
- Pregis, Wurtland

Permits Reviewed/Renewed/Issued:

Permit Review and Corrective Action Section personnel also completed the following actions:

- Issued 5 Notices of Deficiencies regarding permit renewals
- Determined 2 permit renewal applications as complete
- Completed 1 permit modification
- Completed the public involvement process for 2 permit renewals
- Issued 2 permit renewals

Investigation and Remediation Work Plans and Reports:

During FY20, 3 RCRA Facility Investigation related activities and 5 Interim Measures related activities were completed. A total of 6 Corrective Measures Study/Corrective Measures Implementation activities were performed and 11 miscellaneous actions were completed. This branch reviewed 63 monitoring reports in FY20.

Significant work was conducted by the HWB pertaining to the following specific projects:

- Final approval of Custom Resins Inc (AI#1797) Corrective Measures Report.
- Conditional approval of Custom Resins' Corrective Measures Implementation Work Plan.
- Corrective Measures Implementation Report approval for Arkema Inc. (PMC Organometallix, Inc) for construction of surface caps on SWMU 22, B-3 Hot Spot, and North Side TRS Pad Area and installation of B-65 Perched Waste Recovery System.
- Review of Dunaway Timber Co Revised Permit Renewal Application and issued second Notice of Deficiency June 10, 2020.
- Work Plans approved for Safety Kleen Smithfield to 1) conduct phyto- and bioremediation/injection system to address residual VOCs and 2) perform monitoring well rehab to bring dilapidated wells back into compliance.
- Engineering Evaluation approved for the Frankfort Civil War Dump Site for removal of cannonballs and parrot shells from the dump pit.
- Final Remedial Investigation reviewed and approved for Louisville Air National Guard
- Time Critical Removal Action After Action Report for Camp Breckenridge reviewed and approved.
- Blue Grass Army Depot TNT Washout Facility RFI report reviewed and approved.
- Rohm and Haas Site Management Plan reviewed and approved to outline restrictions for areas where contamination was left in place, and accompany the environmental covenant to prevent exposure to contaminants in soil and groundwater.
- Final issuance of the RCRA Part B Operating Permit for Calgon Carbon, which both renewed storage of hazardous waste and completed initial permitting of the Carbon Regeneration Unit.

COVID-19 RESPONSE

When staff were assigned to telecommute remotely to their workstations in March due to COVID-19, it was a new paradigm for most employees. Every staff member had to learn to do their job in a slightly different way, and, to compound the matter, HWB had a few employees in new positions trying to navigate both the challenges of their new job tasks and the constrictions of COVID-19 at the same time.

In-person meetings have been eliminated entirely, which makes demonstrations and walkthroughs not possible. HWB has many resources, but communication has never been more important or a larger portion of how work gets done. That does nothing to change the task at hand and the commitments made, and the staff have risen to the challenge of meeting goals and protecting the Commonwealth while protecting HWB's workforce as well.



HAZARDOUS WASTE BRANCH HIGHLIGHT

By: April Webb

During FY20 several changes, moves and milestone events occurred for the Hazardous Waste Branch. After many years of permit drafts, public participation and countless hours of planning, the Blue Grass Army Depot's Chemical Weapons Demilitarization saw its first year of operation. After a generation of careful deliberation, chemical weapons are being safely destroyed in the Commonwealth.

Inside the HWB, the staff have had streamlining and modernization in the forefront. What was previously 2 independent sections in the Permit Review and Corrective Actions sections is now consolidated into 1 team. The tasks of writing operational permits for the RCRA facilities and the long-term stewardship of the site after operation will be looked at through a joined perspective with the common goal of protecting the stakeholders and future generations of Kentuckians.

Forms and applications underwent changes to standardized federal forms and were brought into a new era, fully electronic payments, submittals and communications with immediate results will soon be possible.

RECYCLING & LOCAL ASSISTANCE BRANCH

The Recycling and Local Assistance (RLA) Branch works primarily with county and local governments to assist in solid waste management planning, as well as recycling, litter abatement, illegal open dump cleanup, waste tire management, and other issues. RLA provides technical assistance, outreach, and training to public and private entities, and administers numerous grant programs.

RECYCLING INFORMATION

Global recycling markets continued to struggle in CY2019. China's changing import policies in recent years on accepting recyclable commodities have significantly affected global markets. These policies have included slowing the issuance of import permits for recyclables, greatly decreasing acceptable contamination levels, and a complete import ban on certain materials. These restrictions in turn have resulted in other countries tightening their import policies after seeing their markets flooded with low-grade material that was previously bound for China. Overall economic conditions and petroleum prices also have a strong effect on recycled commodity prices. Looking to the future, it is likely that any economic downturn resulting from the global COVID-19 pandemic will continue to depress recycling markets. However, these poor market conditions may ultimately result in improved sorting and processing technology and growth in domestic



outlets for recycled commodities, which in turn could increase demand and pricing in the long term.

In accordance with KRS 224.43-315, Kentucky recyclers are required to report annually to their counties the amount of municipal solid waste collected for recycling by volume, weight, or number of items, and the type of items recycled.

The RLA branch relies on individual counties and recycling operations to report accurate data. A strong effort to confirm and cross check these numbers ensures that entities are generally consistent with uniform data generation. An effort is also made to interpret the raw data in a way that allows useful comparison to recycling rates calculated by other states and by the EPA. Kentucky's calculated recycling rate for CY2019 was 31.7 percent, significantly lower than the CY2018 rate of 38.8 percent.

Three (3) circumstances appear to have had an effect on the calculated recycling rate for 2019. First, commodity markets have continued to weaken, which caused county level recycling operations to struggle. Second, the COVID-19 outbreak disrupted some counties' administrative processes at around the time they were finalizing their annual reports and it is possible that data compilation or quality control was affected by staffing or other issues. Finally, the totals provided by one large steel plant have not been included because it is not clear what percentage of their reported volume was generated in Kentucky, which lowers the calculated statewide rate. So, while it is reasonable to expect that the recycling rate in Kentucky, and across the country, would drop in CY2019, it is also important to note that the confidence in reported CY2019 data is not as strong as previous years.

RLA will be conducting a thorough review and update of data collection and analysis procedures for the CY2020 report year. The review will focus on uniformity of reporting methods across counties, and on interpretation of data in a way that is consistent with other states and with EPA's national level data. It is possible that Kentucky's CY2020 reported recycling rate will differ from historic trends, but, moving forward, the data will be consistent and more reliably comparable to other states and to national data.

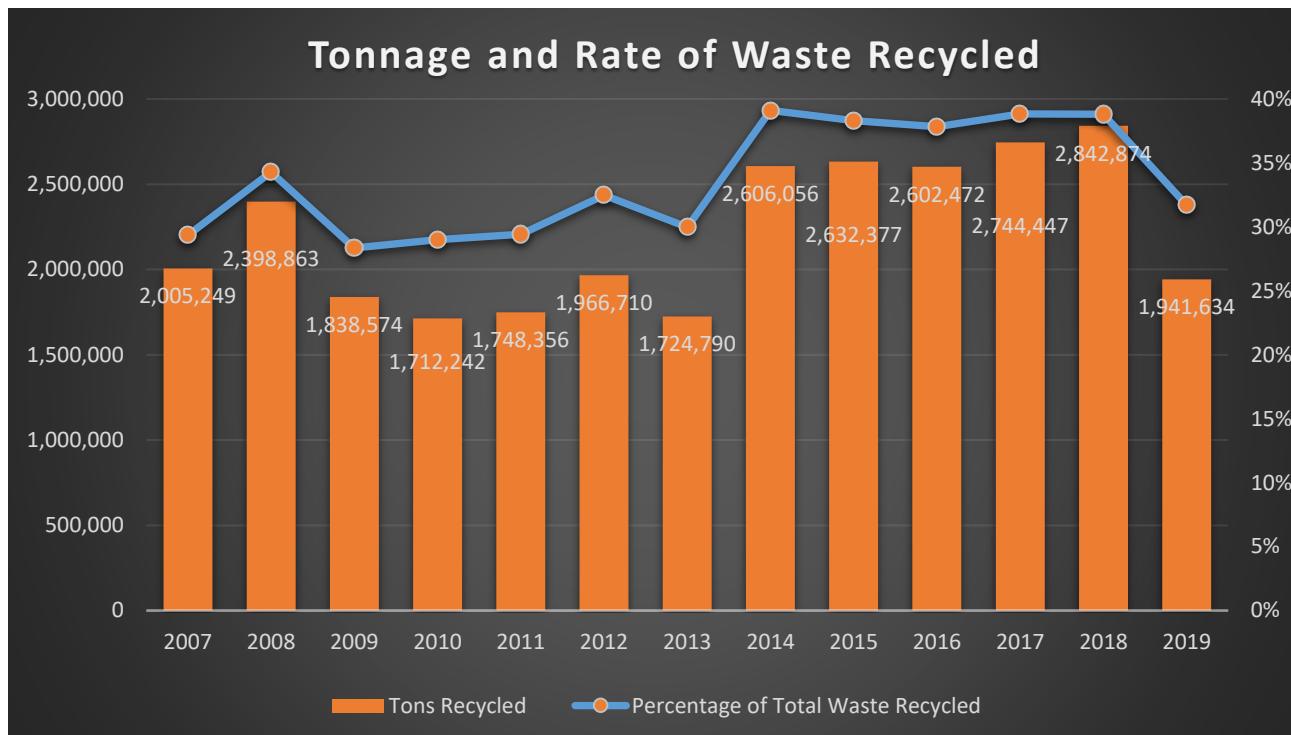


Figure 5: Tonnage of Waste Recycled and Rate of Waste Recycled in Kentucky

MARKET CONDITIONS

- Fiber commodity values continued to struggle throughout 2019. Cardboard prices saw a steady drop and sorted and mixed paper remained low throughout the year.
- Prices for most plastic grades dropped in 2019, with the exception of high density polyethylene, which saw steady growth. Global plastic markets are specifically affected by petroleum prices, with lower petroleum prices making manufacture of virgin material more cost competitive with recycled plastics.
- Residential glass recycling remains problematic due to single stream and curbside collection that often results in cross contamination of materials which greatly diminishes its market value.
- Most ferrous and non-ferrous metals showed a steady decrease through 2019, but compared to many other commodities still have decent markets. Scrap steel (including white goods, i.e., appliances), steel cans, aluminum, and copper bearing scrap continued to be in demand, and are very dependent on economic conditions. Most of these items require little or no processing, which makes them valuable additions to a community recycling program. White goods prices tend to have very little volatility.

WASTE TIRE PROGRAM

Waste Tire Trust Fund:

The Waste Tire Trust Fund (WTTF) was reauthorized by the General Assembly in their 2018 session and will remain effective through June 30, 2020. The previous \$1 per tire fee on the sale of all new motor vehicle tires sold in Kentucky, which is the source of the WTTF, was increased to \$2 per tire. However, it is expected that up to \$3 million will be diverted from the WTTF for other state budgetary needs resulting in a net decrease in funding available for waste tire programs.

The WTTF is used to conduct waste tire collection events, provide annual funding directly to counties for waste tire management, award crumb rubber and rubber-modified asphalt grants, facilitate market development for the use of waste tires, and to clean up waste tires at mismanaged sites.

Beginning in 2011, the Division offered a \$3,000 annual grant available to counties for recycling or disposal of waste tires. This amount was increased to the current \$4,000 in FY2014.

Waste Tire Collection Events (formerly referred to as “tire amnesties”):

FY20 events were conducted in the counties comprising the Buffalo Trace, FIVCO, Cumberland Valley, and Gateway Area Development Districts (ADDs). The KY River ADD counties were also scheduled to conduct events in FY20, but most of those events were postponed to FY21 due to the COVID-19 pandemic. These postponements resulted in a significant decrease in total tires collected. The equivalent of 217,293 waste tires were recovered through FY20 collection events at a cost of \$343,323.

Crumb Rubber/Tire Derived Products Grant:

From 2004 to 2020, the Division has awarded 510 grants totaling over \$9.4 million to local governments, schools, daycares, churches, and other entities for projects that utilize products made from recycled tires.

In 2020, 20 grants totaling \$500,000 were awarded for the application of crumb rubber used for landscaping and other tire-derived products from recycled Kentucky tires. Poured-in-place rubberized pavement projects continue to be popular grant requests. This material can be used for walking trails, playgrounds, outdoor patios, or courtyards, etc. Also popular in 2020 grant applications were picnic tables and benches made from recycled tires. This grant does not fund crumb rubber applied to athletic fields, or loose shredded playground mulch.

Waste Tire Working Group:

In 2011, House Bill 433 established the Waste Tire Working Group (WTWG). The WTWG is a committee appointed by the governor in accordance with KRS 224.50-855 to discuss and research topics in waste tire management, and make recommendations to the cabinet in efforts to improve



Kentucky's programs. The committee is tasked with meeting twice per year with all meetings open to the public. The WTWG consists of 2 ex-officio members and 6 appointed members.

Current members of the WTWG:

- Director of the Division or designee: [Byron Bland](#) (ex-officio)
- Manager of RLA Branch: [Gary Logsdon](#) (ex-officio)
- KY Department of Agriculture representative: Harlan Hatter
- Solid Waste Coordinators of Kentucky, two members: (1) Stephanie Givens (Hardin Co.) (2) Pending
- Mayor: Vacant
- County Judge/Executive: Shane Gabbard, Jackson County
- Retail tire sales in private industry representative: Pending

Rubber Modified Asphalt:

In the spring of 2016, the RLA launched the Rubber-Modified Asphalt (RMA) Grant program. This grant funds the paving of approximately one mile of a county road with RMA, with the county then required to pave the same area of a similar road with standard asphalt, and to monitor both sections for a five year period. The Division awarded 6 RMA grants in FY20, and has awarded 23 grants totaling \$1,729,190 since 2016.

RMA is slowly becoming more common across the U.S., and has been found in many applications to improve durability and performance of pavement at a competitive price. There are several different methods for incorporating recycled tire rubber into pavement and the grant is open to 2 different types of paving: chip seal (a process that combines one or more layers of asphalt with one or more layers of aggregate), and thin overlay (approximately 1.5 inch asphalt layer installed over existing asphalt pavement).

KENTUCKY PRIDE FUND

The Kentucky Pride Fund is supported by an environmental remediation fee of \$1.75 per ton of waste disposed in Kentucky landfills. This money is used for closure of historic landfills, recycling grants, household hazardous waste management grants, and remediation of illegal open dumps. Additionally, this fund receives \$5 million annually from the Kentucky Transportation Cabinet, specifically for distribution to counties and incorporated cities for litter abatement activities.

Litter Abatement:

Since 2001, the Division has been tracking the cost of litter activities and the amount of litter collected. Litter abatement grant funding through the Kentucky Pride Fund was initiated in FY02. In 2019, counties removed 584,496 bags of litter (an estimated 11,689,920 pounds) from 148,425.67 miles of Kentucky roadways at a total cost of \$7.63 million. Counties report on all their litter abatement activities, including activities conducted outside of the grant



program. This data may not include litter collected by state road crews as part of the Transportation Cabinet's efforts to maintain state roads.

Litter collection is expensive, with an average cost of 65 cents per pound, or \$1,300 per ton, compared to an average landfill disposal rate of around \$42 per ton. Counties are encouraged to utilize some of their Grant funding education and outreach activities to help prevent littering. The most common items found on roadways are plastic bottles and food containers.

There has been a substantial variation of dollars spent per number of bags collected over the past 10 years. Collection and record keeping procedures might not be consistent among the counties. Expenses such as education and outreach, which do not contribute to the number of bags collected, can vary considerably from year to year.

Illegal Open Dumpsites:

In 2006, the Division's Illegal Open Dump Grant program was amended to its current format, to provide counties with incentives and necessary resources to identify and clear their communities of old dump sites. Since that time, more than \$23.1 million has funded the cleanup of 2,231 dumpsites.

In 2019, counties cleaned 72 illegal open dumps at a cost of approximately \$4.4 million, and collected 14,876.14 tons of waste. 2019 totals include approximately \$3 million expended on one very large cleanup of 6,961 tons of eWaste at the former Global Environmental Services sites in Harrison and Clark counties. The fourteenth round of grants was awarded in January 2020 for the remediation of 122 dumpsites at a projected cost of \$1.04 million.

Recycling, Composting and Household Hazardous Waste Grants:

The Kentucky Pride Fund was amended in 2006 to provide grants for the development and expansion of recycling programs and household hazardous waste (HHW) management. In recent years, this program has begun to provide grant funding for composting operations as well. The recycling and composting grants help fund infrastructure to promote a regional approach to decrease the amount of waste going to Kentucky landfills. The HHW grants fund county collection events that encourage proper management of such wastes as electronic scrap, pesticides, solvents, mercury, and other potentially hazardous products from residences.

During FY20, 82 entities were awarded grants exceeding \$4.6 million. A total of 49 recycling grants and 6 composting grants were awarded to cities, counties, and universities. HHW grants were awarded to 29 counties in Kentucky, resulting in the collection of 300 tons of material. Recipients of these grants are required to provide a 25 percent local match in the form of cash or "in-kind" personnel, educational activities/materials, or advertising to promote the program.

STATE OFFICE PAPER RECYCLING PROGRAM

The Government Recycling Section continues to operate the State Office Paper Recycling Program, serving more than 115 agencies in Frankfort. The program offers free pickup and document destruction of governmental office paper. Their location on Northgate Drive in Frankfort offers a secure environment to ensure proper processing of confidential documents.

Office paper represents approximately 70 percent of the waste stream in the office environment. Since 2006, state employees have recycled more than 19,622 tons of waste paper, generating approximately \$3.86 million in revenue.

In CY2019, state employees recycled 1,203 tons of waste paper, generating \$189,561 in revenue. A slight increase in tonnage and a slight decrease in revenue in CY2019 may reflect typical fluctuations in commodity prices over time, but is likely at least partially driven by global developments such as China's increasingly restrictive import policies. Over the next few years several paper mills are expected to open or re-open in the U.S., creating an increase in domestic demand for recycled paper and cardboard that may partially offset the decrease in global demand. The Government Recycling Section is able to maintain relatively healthy markets for their various paper grades through an emphasis on proper sorting and the generation of high quality bales.

ELECTRONIC SCRAP RECYCLING

Proper management of waste computer and electronic parts and equipment (e-scrap) continues to be a challenge throughout the state. Many counties offer some type of e-scrap collection, year-round drop-off programs, or periodic events. From 2009 to 2015, the Finance and Administration Cabinet maintained a statewide e-scrap contract to provide e-scrap management services to state agencies, school districts, universities, and county and local governments. This contract provided for statewide pickup and recycling services, and typically paid the generator a small reimbursement for the items collected. From January 2009 to September 2015, over 7,937 tons of e-scrap were collected under the contract, and refurbished or recycled in an environmentally sound and data-secure manner. Payments to generators netted over \$494,000 during this timeframe.

In late 2015, it was determined that Global Environmental Services, the statewide e-scrap contractor, was in violation of several environmental regulations, and their contract was voided. This was the second vendor to go out of business while holding the statewide contract. Management and internal issues likely played significant roles in each instance, but it became evident that the e-scrap management industry as a whole was struggling with outdated business models and low commodity prices. In response, the Division collaborated with other executive branch agencies to develop a new contract framework for statewide e-scrap collection based on current market conditions and increasing data security needs. In late 2018 this contract was awarded to Powerhouse Recycling.

The contract has been successful, with over 280 tons of e-scrap collected in 2019. To date, the primary users of the contract has been state agencies. However, county governments have been encouraged to take advantage of this opportunity to properly manage their e-scrap. E-scrap



generators continue to be reimbursed for certain items which should make this an attractive option for county governments, and it is expected that more of them will start utilizing the contract going forward.

The Division also promotes proper management of e-scrap through the Household Hazardous Waste (HHW) Grant Program. Since 2006, the Kentucky PRIDE Fund has provided grant awards for the management of HHW, a category that includes e-scrap and mercury bearing wastes.

THE MARKETPLACE

The publication of *The Marketplace* newsletter is on hiatus due to staffing and organizational changes, with plans to introduce an updated format in the coming months. However, the Division continues to track the prevailing prices paid for aggregate recyclable materials.

COVID-19 RESPONSE

RLA operations have been somewhat affected by the COVID-19 pandemic and resulting telecommuting plan, but, with the exception of a few postponements, all work is being completed as before. The branch has been able to complete the review and approval of Area Solid Waste Management Plan Annual Reports and have been able to conduct business as usual with the various grant programs. The Government Recycling Section has been able to operate fully under a social distancing work plan. RLA programs have been affected in 2 ways: First, the spring Waste Tire Collection Events were postponed until the fall, and are currently being rescheduled pending a social distancing safety protocol; Second, some in-person outreach activities, including solid waste management planning trainings and an annual workshop, as well as general meetings and site visits, have not been conducted. Many of these have been or will be conducted via telephone or video conferences or possibly webinars, and others are postponed until face-to-face meetings are feasible again.

RECYCLING & LOCAL ASSISTANCE BRANCH HIGHLIGHT

Rubber Modified Asphalt Engineering Workshop:

By: Gary Logsdon

One of the primary goals of the Recycling and Local Assistance Branch's waste tire program is to promote the growth of end markets for recycled Kentucky waste tires. With healthy and sustainable end markets, waste tires can become a valuable commodity instead of a difficult to manage waste. Current markets include tire-derived fuel, landscaping mulch, and other low value-added products. One promising higher value-added technology that is seeing increased use across the country is rubber-modified asphalt (RMA). There are several different processes and applications for RMA, but they all entail using finely ground waste tires in asphalt pavement. Although RMA use is not universal, in states where it has become more popular it has been shown in many applications to have several benefits over standard and polymer-modified asphalt, including decreased cracking



and rutting, improved stopping distances, and noise reduction. The cost of RMA is usually competitive with standard or polymer-modified asphalt.

For several years, RLA has promoted this material through a grant that encourages its use on county road paving projects. However, considering that on a per-mile basis this technology does not use a large number of tires, in order to become a significant end market RMA will need to be commonly used on state and federal highways.

To encourage this increased usage, Kentucky's Division of Waste Management partnered with the U.S. Tire Manufacturers Association (USTMA) and the Kentucky Transportation Cabinet (KYTC) to host a Rubber-Modified Asphalt Engineering Workshop on February 11, 2020. The event was held in Frankfort, and attendees came from varied backgrounds, but the primary audience was staff and engineers with KYTC, with the goal of communicating the benefits of RMA to professionals who may be in position to approve its use in future projects. It is important to note that RLA staff are not experts in the technical aspects of paving and that the waste tire program is driven primarily by environmental concerns associated with illicit disposal of waste tires. However, in order to promote RMA to paving professionals the Workshop topics were entirely focused on technological and economic benefits, and environmental issues were not emphasized.

The workshop agenda included presentations from national experts on the technical performance of RMA. There were also presentations on 2 competing technologies ("wet process" vs. "dry process") as well as case studies on RMA usage in California and Georgia. The event drew nearly 40 attendees and had strong audience participation. The workshop represents another step in moving Kentucky into the small but growing group of states that commonly use RMA and that have a strong end use market that drives recycling of waste tires, instead of illicit dumping.

SOLID WASTE BRANCH

The mission of the Solid Waste Branch (SWB) is to ensure proper management of Kentucky's waste materials. This is accomplished by implementing a comprehensive program for solid waste and special waste disposal facilities. This branch reviews permit applications, issues permits, assesses fees, and monitors construction, recordkeeping, and operational activities at solid and special waste facilities. The branch also oversees the closures of abandoned historic landfills.

TYPES OF WASTE

The SWB is responsible for reviewing technical applications and reports for all types of landfills, including municipal solid waste, construction debris, industrial waste, and coal ash, as well as land application and composting facilities. These waste streams are grouped into either solid waste or special waste categories.

- Solid waste types include household, commercial, and industrial waste.
 - Solid waste administrative regulations include 401 KAR Chapters 47 and 48.



- Municipal solid waste is a combination of household and commercial waste.
- Special waste is specifically defined by KRS 224.50-760.
 - The most commonly managed special wastes in Kentucky are wastewater and water treatment sludge, and coal combustion residuals or coal combustion by-products.
 - Special waste administrative regulations include 401 KAR Chapter 45.
 - Coal combustion residuals (CCR) administrative regulations include 401 KAR Chapter 46.

The SWB issues or denies construction and operation permits based on information provided by the applicant and verified by the branch's personnel, and is also responsible for the registration of solid waste permit-by-rule facilities.

WASTE DISPOSAL AND FACILITY METRICS

The SWB enters data based on waste quantity reports submitted by the landfill disposal facilities. The table below summarizes an export of the data and provides a breakdown of waste origin. This table does not represent the tonnage of waste generated in Kentucky and sent to another state for disposal.

Quarter and Year	Tonnage of Waste Received for Disposal	Tonnage of Waste Received from Out of State for Disposal	% of Out of State Waste	Tonnage of Waste Received for Alternate Daily Cover
2Q 2019	1,730,966.60	273,462.90	15.80%	94,576.60
3Q 2019	1,681,141.40	232,372.00	13.82%	64,006.25
4Q 2019	1,528,557.90	219,441.10	14.36%	54,756.31
1Q 2020	1,589,757.90	238,251.00	14.99%	57,012.24

Table 1: Summary of Waste Quantity Reports

The last column in the table above represents the additional tonnage of waste received by a Contained Landfill and used for alternate daily cover (ADC). Some wastes have been deemed acceptable for use as daily cover in lieu of or in addition to soil cover. The SWB reviews ADC applications on a case-by-case basis for wastes proposed to be used as ADC.

In addition to the 121 landfill disposal facilities of various types with active permits, the SWB permits a variety of sites or facilities that divert waste from disposal and reuse it in ways that preserve natural resources and prevent pollution. These facilities include locations where wastes are beneficially reused; landfarms used to promote soil structure and fertility; and composting and sludge giveaway operations distributing processed waste for use. There are at least 83 special waste facilities and at least 36 solid waste facilities authorized for beneficial reuse. There are 27 sites with active compost permits, 26 sites with active landfarm permits, and 39 sites with active sludge giveaway permits.

ENVIRONMENTAL REMEDIATION FEE - GRANT FUNDING

The Environmental Remediation Fee (ERF) was established by KRS 224.43-500. This statute requires all generators of waste in Kentucky to pay \$1.75 per ton of solid waste disposed in a municipal solid waste disposal facility and is to be collected by municipal solid waste facilities or transfer stations. ERF fees are deposited into the Kentucky PRIDE Fund and used to fund grants for the cleanup of illegal open dumps, recycling, and household hazardous waste management. A portion of the funds are also used by the SWB Closure Section to characterize, remediate and close old historic residential landfills that never underwent proper closure (see Historic Landfill Sites section below).

ERF Amounts Collected By Quarter:

- 2nd Q 2019 – \$2,957,336.42
- 3rd Q 2019 - \$2,875,109.62
- 4th Q 2019 - \$2,753,045.73
- 1st Q 2020 - \$2,328,270.63

Compliance rates for submission of the ERF continue to be high, see chart below.

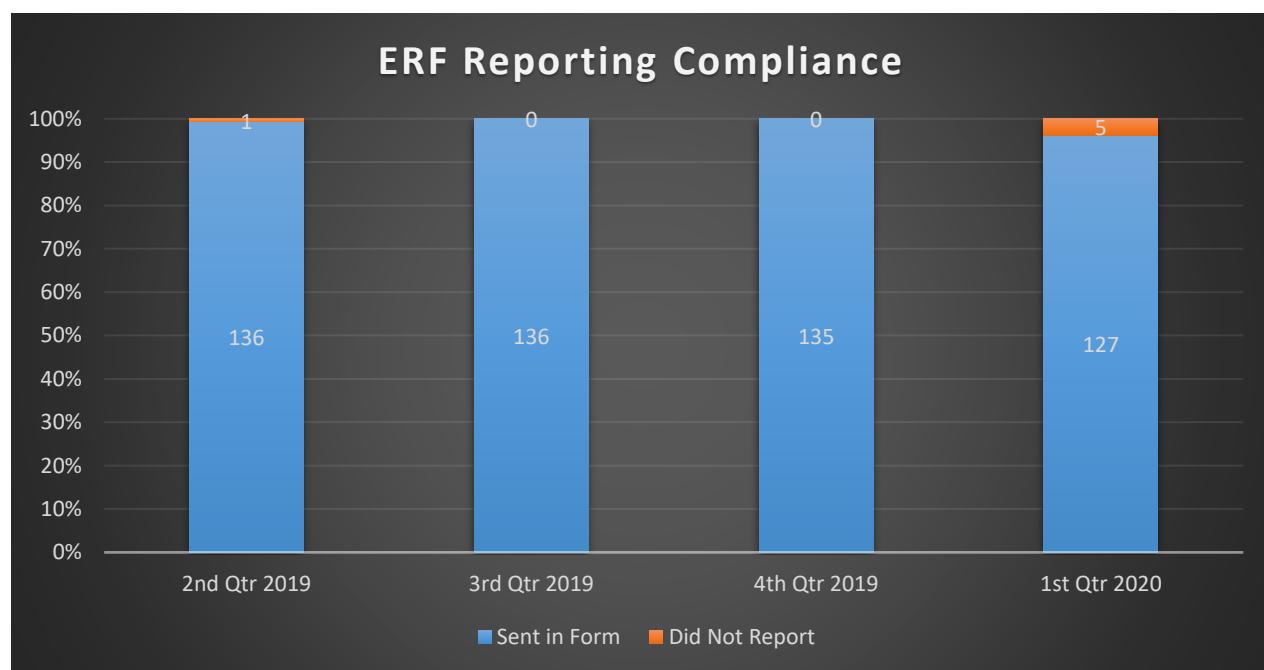


Figure 6: Environmental Remediation Fee Reporting Compliance

BRANCH ACTIONS

Regulatory Time Frame (RTF) is the legal allowed amount of time that the Branch is given to complete permit actions.

- There were 64 pending actions at the end of FY20. Of these, 5 (8 percent) exceeded the RTF.
- In FY20, of the 115 solid waste branch permit review approvals issued, 108 (96 percent) were within the RTF. For the past 5 years, this branch has completed an average of 93 percent of permit application reviews within the Regulatory Time Frame.
- Branch personnel issued 9 denials and 8 withdraw final actions and approved documentation for the closure and termination of 25 permitted activities.

The branch implements and oversees public information procedures. The branch coordinated the issuance of 22 public notices and scheduled 3 public hearings.

In addition to the ERF discussed herein, the branch assesses other fees. In FY20, branch personnel collected \$728,500.00. Of that, \$173,250.00 was assessed for 50 specific solid waste and special waste permitting actions in accordance with 401 KAR 47:090 and 401 KAR 45:250, respectively. The other \$555,250.00 corresponded to the 185 payments for the annual reoccurring fee for CCR facilities and solid waste facilities, in accordance with 401 KAR 46:120 and 401 KAR 47:090, respectively. Compliance is very high for both types of fees since only about \$2,000 remained past due at the end of FY20.

GROUNDWATER MONITORING

Groundwater assessment requires the owner or operator of a facility to determine the existence, extent, and depth of groundwater degradation, as well as the rate and direction of migration of contaminants in the groundwater. Groundwater assessment is triggered if the analysis of groundwater at the facility indicates one or more parameters exceeding the maximum contaminant levels (MCL) specified by regulation, or an increase over the naturally occurring background levels of parameters lacking promulgated MCLs. Of the 77 facilities required to monitor groundwater, 18 are in groundwater assessment (23 percent).

Corrective action requires the owner or operator of a facility to abate groundwater contamination, prevent further groundwater contamination from the facility, and restore or replace public or private water supplies affected by contamination from the special waste facility. Groundwater corrective action is currently being carried out by 6 facilities (8 percent).

HISTORIC LANDFILL SITES

A total of 98 historic landfills have been closed through construction and remediation projects, or by no further action decisions based on extensive site studies. Total costs associated with the closure projects exceed \$70 million, excluding branch personnel direct and indirect expenses.

The Butler County Force main MOA was completed during FY20. The project was completed for \$216,100 under budget. SWB continues to monitor the construction of the Cadiz Water Treatment Plant, which should be completed during FY22. SWB is providing \$500,000 per fiscal year



towards the construction of the treatment plant. Well abandonment projects were completed in Marion County and Bullitt County during this fiscal year.

Landfill Closure Projects:

Four (4) historic landfill closure projects are in the design phase and will be scheduled for construction once the design has been completed. Construction and engineering oversight costs are estimated to be approximately \$13 million.

1. Johnson County Landfill – Contractor bid has been awarded, in the process of scheduling pre-construction meeting(s)
2. Bullitt County Landfill – 90 percent of the plans have been submitted and reviewed by the Division of Waste Management
3. City of Covington Landfill – Continuation of Design
4. Butler County Landfill – Phase 2 – Continuation of Design

Nine (9) historic landfill projects are in the site characterization phase.

1. McCracken County Landfill
2. Mercer County Landfill
3. Harlan Drum Site
4. Henderson Drum Site
5. Goodridge Avenue
6. Foothills Sanitary Landfill
7. Mount Sterling Landfill
8. Northwest-Central Kentucky Area (Breckinridge, Grayson, Hancock, Meade, and Ohio Counties)
9. South Central Kentucky Area (Adair, Allen, Barren, Cumberland, Green, Hart, Metcalfe, Monroe, and Taylor Counties)

The approximate cost for the initial site characterization of these sites is \$4.1 million. There are 523 historical landfills remaining to be closed.

COVID-19 RESPONSE

The SWB adapted to the challenges COVID-19 presented it with relative ease. The solid waste staff quickly transitioned into telecommuting where inspections, permit reviews, and public information procedures continue to be performed.

SOLID WASTE BRANCH HIGHLIGHT

By: Derek Polly

The Division of Waste Management (DWM) recently completed a project through a Memorandum of Agreement in partnership with the City of Bowling Green to provide a force main for leachate transport at the Butler County Historic Landfill. The new leachate force main allows for the

elimination of the land application of leachate on the landfill surface and reduces the amount of required maintenance the city must perform at the landfill.

The City of Bowling Green initially partnered with DWM to provide characterization of the North portion of the historic Butler County landfill located near Morgantown, KY. The southern portion of the landfill was addressed in a separate 2013 project with DWM, which included the installation of 6 concrete leachate containment tanks. Since the time of that project, these tanks have stored leachate until Bowling Green employees could apply said leachate to the landfill surface through a land application permit with DWM. As of 2014, it was discovered the tanks had begun to leak. In preparation for the placement of the new force main, the leachate tanks were inspected and

manifold together so that leachate entering any of the 6 tanks would make its way into the leachate lines running to a tank on the South landfill surface. During the construction of the tank manifold, a broken seal was located between 2 of the leachate tanks. This broken seal was determined to be the cause of the leak mentioned previously, and the seal was repaired.



Photo 5: Leachate Tank Location and Zoon View. Map by Galen Smith, PE.

In preparation for the new force main line, 2 proposed paths were presented through the adjacent Owl's Head property to KY-70 and the tie-in to the Morgantown sewer system manhole. The selected "Western Route" involved numerous creek crossings and a highway bore operation. To prevent damage to the creeks on the landfill property, creek crossings were completed by Infinity Construction Company using a device

called "the mole". The device uses an impact hammer to drive a mobile rod through soil beneath the base of the stream drawing the new leachate line through behind it. Using this technology, the project was completed with no damage to streams on the property. The highway bore operation

was completed by Clay Pipeline Inc. using directional drilling and involved no change to the normal traffic flow or damage to the stretch of KY-70 near the project site.

The new leachate force main line will carry approximately 2,300,000 gallons of leachate per year from the historic Butler County landfill to the Morgantown Sewer System, which leads to the wastewater treatment plant.

There, the leachate will be treated to remove contaminants.

The project was completed under the supervision of DWM and the City of Bowling Green. The project was initially estimated at a cost of \$450,000. Through the excellent work of all parties involved, DWM and the City of Bowling Green are proud to announce that the Butler County leachate force main was completed at a cost of \$234,000 for a total savings of \$216,000.



Photo 6: Leachate Force Main Path. Map by Galen Smith, PE.

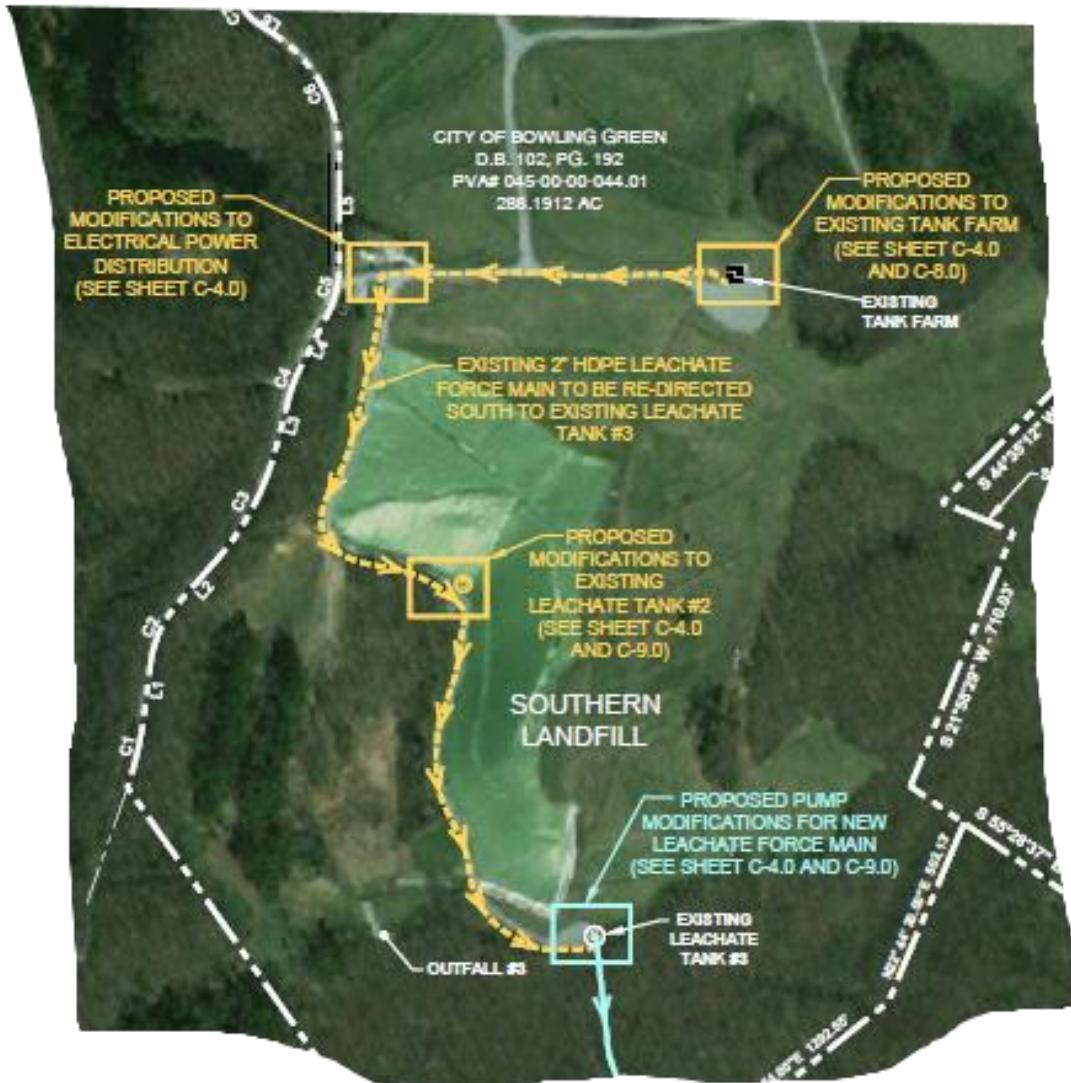


Photo 7: Leachate Force Main Path on the Landfill. Map by Galen Smith, PE.

SUPERFUND BRANCH

The Superfund Branch (SFB) seeks to ensure that contaminated sites are evaluated and cleaned up in a timely manner in order to reduce risks to human health and the environment. Usually this is accomplished by overseeing companies or individuals who have taken responsibility for cleaning up contamination found on their property. In cases where a responsible party cannot be found or is unable to act, the SFB may take a direct role in cleaning up a site. This program handles oversight of cleanup of hazardous substances, pollutants, and contaminant releases and non-UST petroleum releases across the commonwealth.

The SFB maintains a list of sites in which releases are managed on-site through some form of engineered control; a cap or structure and/or institutional control, such as an environmental covenant or deed restriction. There are currently 268 sites where releases to the environment are managed on- and off-site. These sites require inspections and reporting such as an annual report or five year review as established by statute. For sites that are being managed by using institutional and/or engineering controls, the obligations to continue to manage the releases are indefinite. Therefore, the amount of total managed sites in Superfund have and will continue to increase as new sites are approved for closure under this option. The only way a site can be removed from the managed site list is if additional cleanup is performed to restore the site to safely allow for unrestricted (residential) use of the impacted land(s). A total of 50 closures were issued by SFB in FY20. These consisted of 16 State Closures, 26 Petroleum Closures, and 8 Methamphetamine (Meth) Closures (Figure 7).

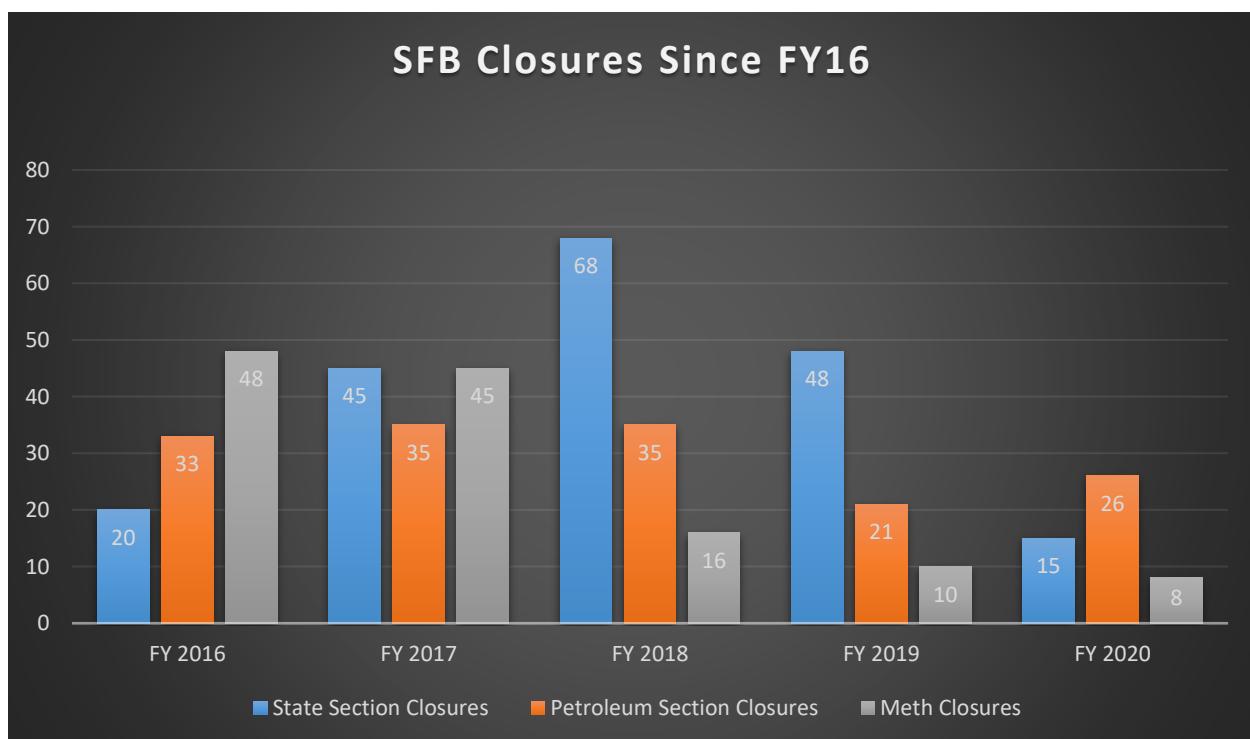


Figure 7: Superfund Program Closures

In FY20, the SFB remediated 16 state Superfund sites with 500 pending review and/or actions, and 26 new state sites. The branch did not close out any state-lead site using the HWMF, but are actively working on 28 sites with the goal of achieving a *de minimus* clean up threshold or to achieve a stable condition that will allow for protective use of the property. A few sites on the hazardous waste management fund (HWMF) list are for long-term stewardship of National Priority List (NPL) sites.



There were 26 sites in FY20 with a release of petroleum or a petroleum product remediated from a source other than a petroleum storage tank, with 115 pending review or actions. There were 21 new petroleum sites registered.

PETROLEUM SECTION

The primary tasks of this Section are to provide oversight of petroleum releases from a source other than a petroleum storage tank (UST) and to administer the Methamphetamine Cleanup Program. This Section also provides oversite of an ever-increasing number of non-petroleum Superfund Sites. In FY20, 20 petroleum sites and 12 State Superfund sites entered the Section's workflow. This Section closed 27 sites in total; including 13 of the new sites and 14 historical sites. Twenty-three (23) of the sites received clean, unrestricted closures while 4 sites were closed as managed. The current active site load of the section is 63 active petroleum sites and 20 non-petroleum sites.

As mentioned previously, the Petroleum Cleanup Section administers the Division's Methamphetamine Cleanup Program. The Section also provides technical expertise in Vapor Intrusion assessment and remediation to the rest of the Branch, spearheads auditing of 415 Brownfield Sites, and assists other staff with sampling and other site work.

During FY20, the Petroleum Cleanup Section developed and initiated a program for performing “boots on the ground” site visits to managed State Superfund Sites. Some of these sites had been managed for 20 years without an in-person site visit. Eighteen (18) Managed Site Audits were carried out by Petroleum Section Personnel before the audits were transitioned to new State Section employees. Seventy-nine (79) total audits have been carried out in FY20.

Methamphetamine Lab Cleanup:

The Division works in conjunction with law enforcement and health departments to remediate structures and homes contaminated with illicit meth waste through the division's Methamphetamine Lab Cleanup Program. Due to meth waste being toxic, especially to small children, and its ability to absorb into home surfaces and structures, it must be remediated by certified contractors. Since the SFB initiated this program in 2007, 791 meth properties have been remediated out of 2,170 reported properties. In FY20, there were 5 contaminated residences reported and at present, 8 residences have been decontaminated through the Program.

FEDERAL SECTION

The Federal Section oversees all federal Superfund projects in Kentucky. Federal projects include NPL sites, oversight of and work conducted under federal cooperative grants such as pre-remedial assessments and EPA's Hazard Ranking System evaluation, NPL sites' five year reviews, and Phase I and Phase II environmental assessments for Targeted Brownfields applications in coordination with KDEP's Division of Compliance Assistance (DCA).



Under CERCLA (aka Superfund), a total of 20 sites in Kentucky were placed on the National Priorities List many years ago. Seventeen (17) of these sites are housed in the Federal Section. As part of ensuring long-term protectiveness, the Lee's Lane Landfill and A.L. Taylor (aka Valley of the Drums) NPL sites received the most attention over the past year. The assessment of the Lee's Lane Landfill gas collection system is nearly at completion, projected to result in long-term operations and maintenance savings. For the A.L. Taylor NPL site, the Federal Section resolved long standing site property challenges, laying the foundation to decrease long-term site expenditures. In addition, two sites have been evaluated to potentially be listed on the NPL based on recent federal fiscal years' pre-remedial assessment activities.

During the ongoing federal FY20, the Federal Section has been conducting 4 pre-CERCLA/preliminary assessments, 1 preliminary assessment, and 1 site inspection (SI). These 6 sites are Rank 1 KDEP Superfund Site Ranking Initiative sites with a focus on former RCRA permitted facilities. The Leitchfield Cleaners SI involved passive soil gas testing and an indoor vapor intrusion study of the apartment at the former dry cleaner. After the VI study confirmed elevated levels of chlorinated solvents in the indoor air, the residents of the apartments were temporarily relocated and a remediation system was installed.

Targeted Brownfields applications involve either review of technical reports submitted by consultants or by conducting Phase I or Phase II environmental site assessments in-house in cooperation with DCA. The following Phase I environmental site assessments were performed in-house by the Federal Section: Heritage West and Cumberland Elkhorn Coal, both in Louisville. Also reviewed for DCA was a Quality Assurance Project Plan (QAPP) and Phase II environmental site assessments reports for the Madison Street Warehouse site in Louisville.

In addition, Federal Section employees have been essential in providing GIS, field technologies implementation and research support for the Superfund Branch and the Division of Waste Management. The Urban Background Study Expansion project and GIS in the Field implementation are two examples (highlighted below).

STATE SECTION

The Superfund State Section consists of 4 Kentucky Registered Professional Geologists and 4 Environmental Scientists. The section oversees all non-federal superfund projects in Kentucky. There are over 200 state Superfund sites. Overseeing these sites includes ensuring regulatory compliance and guidance of responsible party lead investigations, remediation, and management of contaminated sites. In FY20, the State Section closed 7 sites. Five (5) of the sites received clean, unrestricted closure and 2 were closed as managed.

Parties found under Kentucky Superfund statutes to be responsible for contamination are required to investigate the extent and to remediate or manage the contamination according to regulatory guidance. The State Section provides oversight and guidance for these sites and their environmental activities.

Sites requiring action to address contamination that are not associated with a financially viable responsible party are eligible to become state-lead sites. State Section project managers will allocate resources to collect environmental samples and use that information to develop a strategy to remediate and/or manage the contaminants to restrict harmful exposure. In FY20, the section took over finance project management responsibilities from DECA (Division of Engineering and Contract Administration) on state lead sites. This additional responsibility will assist in streamlining project implementation and work flow on state lead projects.

State Section staff process and review Brownfields Redevelopment and Reuse applications, commonly referred to as 415 applications. These applications have a specific set of requirements for eligible prospective purchasers or owners. If the purchaser provides appropriate documentation and an approvable property management plan, the purchaser will receive an assurance that environmental liability will not be sought against them so long as the applicant adheres to what has been approved and the guidelines set forth under regulation

In addition, the State Section is responsible for the maintenance and utilization on the equipment necessary for conducting environmental investigations and operation and maintenance at selected sites.

BROWNFIELDS

Brownfields are abandoned, idled, or underutilized industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas. There are 2 types of Brownfield programs implemented by KDEP.

The first program is the Targeted Brownfield Assessment where the Division of Waste Management and the Division of Compliance Assistance (DCA) work jointly to provide grant assistance and environmental assessment for redevelopment of properties for non-profit entities. Both DCA and SFB staff are trained to conduct environmental assessments known as phase I assessments. These assessments are provided without charge to the non-profit. SFB staff can also provide further assistance in either performing or contracting phase II work, which relies on verification sampling of environmental media.

The second program is for Brownfield Redevelopment. This allows prospective purchasers of property to utilize brownfield property that is environmentally impacted or perceived to be impacted, but not be held liable for cleanup of the property as an owner of an existing release. The redevelopment program requires the purchaser to certify that it has never been affiliated with prior property owners or caused or exacerbated releases on the property. If the owner or corporation can certify these criteria, then the property is assessed equivalent to standards of 40 C.F.R. Part 312. Based on that assessment, a property management plan can be submitted by a P.E or P.G. to establish productive safe reuse of the brownfield. Once SFB concurs with the plan, the participating entity is not subject to being responsible for prior releases as long as the plan is followed. SFB periodically audits sites within the program.

In FY20:

- Three (3) Targeted Brownfields Assessments were conducted, and 1 is awaiting review. Multiple other sites have been reviewed and technical assistance was provided for recipients of various EPA 128(a) Brownfields Grants.
- Thirty-nine (39) Brownfield sites were reviewed in accordance with KRS 224.1-415, 20 Notice of Eligibility letters issued, 29 Notification of Concurrence letters issued, and 4 sites were pending review at the end of FY20.

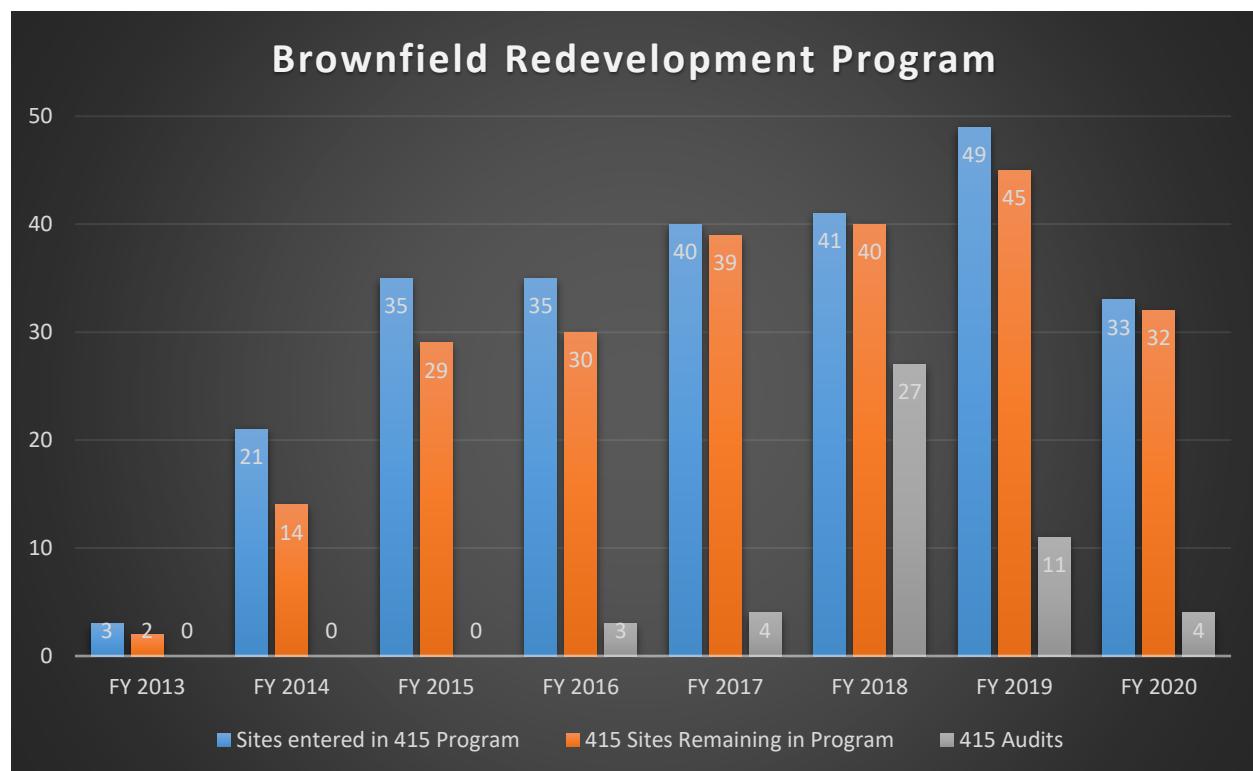


Figure 8: Brownfield Redevelopment Program

SUPERFUND SITES NEAR YOU

Typical historical Superfund sites are primarily perceived to be sprawling industrial complex sites, vast 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 potential 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. More common types of sites that are entering into Superfund are smaller and have geological, technical, or chemical/contaminant characteristics that are complex and financially difficult to address. There is a consensus among practicing



remediation professionals in government and private industry that this substantial population of sites (which are being recognized throughout the United States) are unlikely to achieve restoration within the next 50 to 100+ years. These types of sites pose the greatest, increasing threat to human health and Kentucky's natural resources. They encompass the largest growing number of sites entering the state Superfund program.

The human health and natural resource concern for the impacts from these sites is increased by the close proximity of these contaminated properties to areas people live, eat, and play; in commercial urban, suburban, and rural settings throughout the state where controlled or restricted access that is common to larger industrial locations is not available. Because of the smaller lot sizes of many of these sites, contamination often extends off-site under neighboring properties, including residential homes, schools, recreational areas, and other locations that a person would not normally consider to be an environmental problem.

A few years ago, the Superfund program was directed to assess rank and field screen 4 high priority categories of Recovery Conservation and Recovery Information System (RCRIS) generator sites in Kentucky, based on their likelihood of having had a release. The additional 4 RCRIS priority category sites included Wood Treaters, Battery Operators, Plating Operations, and Dry Cleaners. This evaluation effort revealed that over 11 percent of these 1,000 plus sites (also included existing SFB sites in ranking) were within 0 to 0.25 mile of a residence, day care, school and/or domestic, public, or municipal well field. Moreover, approximately 57 percent were within 0.25 to .05 mile, 8 percent were situated within .05 to 1.0 mile, 5 percent within 1 to 2 miles, and 28 percent over two miles from these same types of land uses.

This project had not been attempted before, because SFB had never actively pursued sites without a prior knowledge of a release or a probable release. Based on professional articles and professional experience, it was determined that these sites had probable releases and the project was within the scope of existing statutes and regulations.

To date, 37 of the RCRIS generator sites have been visited by staff to evaluate actual site conditions. During FY20, 10 sites have been field screened to determine if releases are present. In most cases, releases have been observed by the field screening. At one site, unacceptable levels of vapors potentially exposing residents at an apartment building were detected in indoor ambient air. The site had formerly been a dry cleaners, but had been converted into a residence.

FY20 Update – Most of the sites were ranked in previous years, but SFB ranks all new sites and will begin to re-rank sites as land use changes.

- 1) Three (3) newly discovered dry cleaners were ranked and considered highest priority (Rank 1).
- 2) Twelve (12) additional sites were ranked and determined to be (Rank 2). Of these sites, 11 were recommended for field screening.
- 3) Field screening – 10 sites screened.
 - One (1) completed (Leitchfield, under Federal Section oversite, remedy installed under emergency action).



- Nine (9) completed or underway – most of these sites have been assessed under the pre-remedial program with EPA grants.
- Twenty-two (22) sites have been assigned to staff with 19 access requests sent, 10 granted access not including sites already accessed this year.

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 property value combined. The ranking project is now a perpetual aspect of SFB oversight. Only sites verified not to have releases during field screening will be removed from the ranking list.

SUPERFUND ADVANCING GIS TECHNOLOGY IN THE FIELD

In 2016, the SFB partnered with EPA Region 4 and their contractor, Tetra Tech, to collect soil samples as part of a Regional Urban Background Study. Tetra Tech utilized iPads, Bluetooth GPS and an app-based form to enter field data and site photographs for each of the sample locations per city. Realizing the potential, SFB sought to bring that technology to their staff for more effective and efficient field data collection.

It took several years to overcome numerous hurdles, such as mobile capability for staff (GPS enabled tablets, laptops), licensing requirements for ESRI's ArcGIS platform, logistical issues including data storage, and training. SFB persisted through all the challenges and in the spring of 2019, when a potential emergency situation arose the team working on utilizing GIS in the field put together online locations of known drinking water sources pulling from DOWs database. They set up data collection forms to record details about the water source and sampling parameters, as well as adding the capacity for the field teams to locate and enter in new domestic use locations if necessary.

This trial run of using GIS in the field was a success. Not only were the separate sampling teams able to readily locate water sources, they were able to enter in important information on the spot, geo-tagged in GIS format for quick map-making to display results to management for decision making. Rather than collecting the information in the field and then downloading it into a report in the office, the collection and report building were done in real-time. Further good news was the local residents' water supplies were not adversely affected.

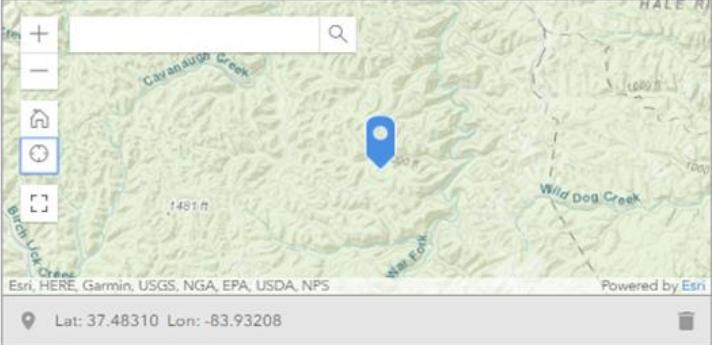
To proof the system on a larger scale, the GIS team used the field technology in the Urban Background Study Expansion, which is also featured in this issue. The team mapped out probable sampling locations, pre-determined most efficient routes between sampling points, and created consistent field log entries to compile all the necessary sampling information for the project. Doing this created a much more effective and efficient use of field teams while collecting 150 samples per city in 2-3 days. Essentially, the reports were written in real-time to be downloaded and entered into a final report without redundant data entry, with spatial location data ready for statistical manipulation and map-form or interactive representation.



Based on the success of these 2 trial runs, SFB is incorporating the field-mobile GIS data collection format for other large scale projects, such as the Ranking Initiative, wherein hundreds of former waste handling sites are being assessed for potential environmental impact; generating a massive data set that will be easily managed and depicted using this technology. Other Branches are beginning to use the field forms for data collection as well.

Using GIS in the field is considerably more efficient in terms of staff time and fieldwork conducted while stepping reporting and data collection consistency up to the next level. These overall workflow and field effort documentation improvements would not have been possible without the long-term dedication of the informal workgroup, comprised of SFB staff Sheri Uhlenbruch, Chad Von Gruenigen, Larry Tackett, Will Godsey, & Scout Munday; OAS staff Melissa Miracle; and COT's Mike Nielsen. Likewise, the management support provided by Larry Hughes (former Branch Manager), Christoph Uhlenbruch, Cliff Hall, and Commissioner Hatton helped make advancing KDEPs technology capacity a successful reality.

Location



Map showing a location in Hale, KY. The map includes labels for Cavanagh Creek, Wild Dog Creek, West Fork, Birch Creek, and Bear Creek. A blue pin marks the location at approximately Lat: 37.48310 Lon: -83.93208. The map is powered by Esri.

Sample Identification 

Sample Number*
Sample number consists of the city abbreviation, cell number (e.g. ASH157 for samples and ASH157-D for duplicates).

Sample Team*

Sample Date*

Sample Time*

Photo 8: Survey 123 Form with Locator. Photo by Sheri Uhlenbruch.

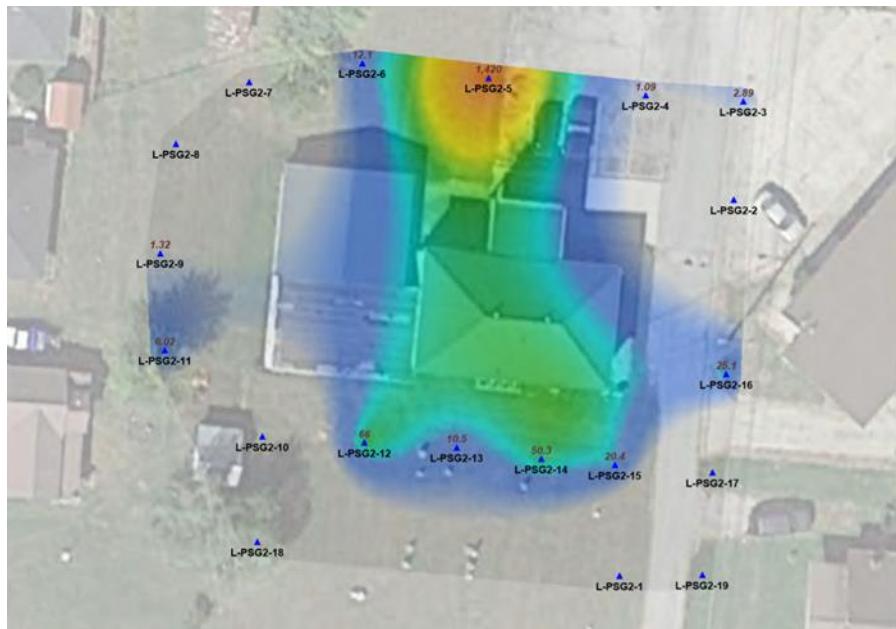


Photo 9: GIS Mapping Tools Using Field Collected Data. Map by Sheri Uhlenbruch.

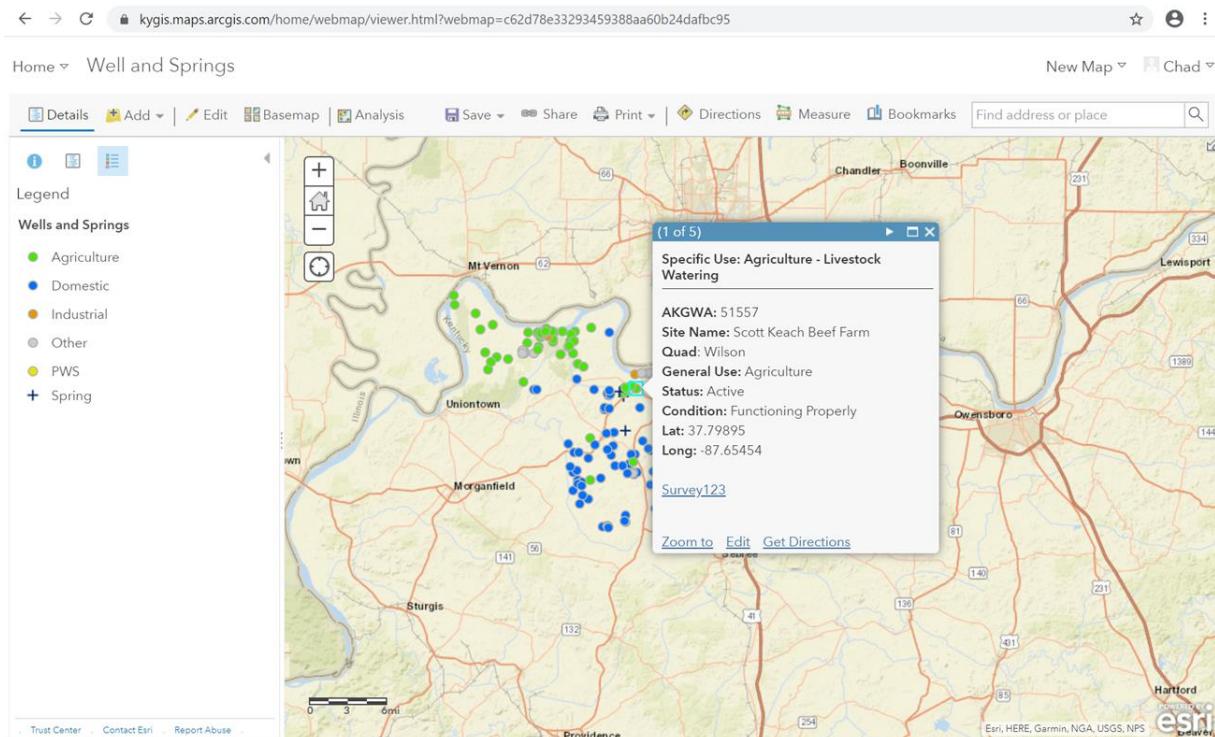


Photo 10: Water Well Survey and Sampling GIS/database Information. Photo by Sheri Uhlenbruch.



KENTUCKY'S URBAN BACKGROUND EXPANSION STUDY

The original Urban Background study was initiated through an EPA Office of Research and Development (ORD) research grant proposal submitted by the Superfund Branch (SFB) Environmental Scientist Consultant, Sheri Uhlenbruch, to investigate anthropogenic (non-specific release) contaminant background levels in urban environments across the southeast region.

The project was designed so that the development of the study would result in a sampling protocol that could be easily utilized by various sampling teams across differing geographical regions. Other Regions, States, or communities could conduct their own study, and contribute consistently collected, truly comparable data sets of urban background numbers across the US. In addition to sampling protocols being developed, the project analyzed PAH and RCRA 8 metals concentrations from 50 randomly selected locations, within 1 to 2 cities per state. The ORD study was completed early spring 2020 and can be accessed here: <https://www.epa.gov/risk/regional-urban-background-study>

In the summer of 2019, the SFB began an expanded sampling beyond the 2 cities EPA/SFB tested during the initial study, testing 3 additional cities in Kentucky and scheduled to sample 3 more. These additional sample locations are needed to for appropriate statistical analysis of the data, to support development of state-wide urban background guidance. The 3 scheduled sampling events were put on hold due to the pandemic, as the specific sampling procedures would make social distancing difficult. The Urban Background Study Expansion also allowed SFB to test using advanced digital technology in the field, which you can learn more about in this issue.

When social distancing guidelines are lifted to where sampling can be conducted safely, SFB will finalize sampling, then conduct the statistical analysis and draft updated urban background guidance. This guidance will assist regulated entities in making better clean up decisions backed by science, and is anticipated to play a role in helping communities across the Commonwealth by allowing more informed redevelopment decisions that encourage growth while remaining protective.



Photos 11 and 12: Urban Background Study, Sampling Technique and resulting sample. Photos by Sheri Uhlenbruch.

MAXEY FLATS PROJECT

Maxey Flats Disposal Site (MFDS), a NPL site, includes the original 280 acres acquired to create the commercial operation and approximately 725 acres of surrounding land purchased during the remediation as a buffer zone. Current operations are secured within a 60 acre fenced perimeter that encloses the disposal area, office complex, site laboratory, and maintenance facilities. The 55 acre disposal area is covered by a multilayer protective cap.

From 1963 to 1977, the Commonwealth of Kentucky, under authorities granted by the U.S. government, licensed private operators to dispose of low-level radioactive wastes. Primary sources of this waste was hospitals, universities, the US Departments of Defense and Energy. During commercial operation, an estimated 4.7 million cubic feet of material was buried in shallow unlined trenches. This included approximately 242,000 kilograms of source material (uranium and thorium or ores containing them), 2.4 million curies of byproduct materials, and 431 kilograms of special nuclear material (plutonium and enriched uranium). The Commonwealth owns and maintains the site since commercial operations were discontinued in 1977. This ensured proper closure, remediation, and control in perpetuity.

For a full summary of the site history, please select the following link.

<https://eec.ky.gov/Environmental-Protection/Waste/superfund/maxey-flats-project/Pages/MaxeyFlatsSection.aspx>

In FY20, effective January 1, 2020, the MFDS received permission from EPA to implement the Institutional Controls Work Plan, and Sampling, Analysis and Data Evaluation Plan (SADEP) and the O&M Inspection Program. Approval of the full plan is still pending. The SADEP and O&M

Inspection Program were designed as the basis for environmental monitoring and evaluation of the remedy. Since completion of the Final Cap in 2017, there have been no performance concerns regarding the cap and its components. The vegetative cover increases in density each year, erosion in the adjacent drains is stable as it relates to storm water management from the cap, and seepage contamination levels remain below the conservative screening levels. Additionally, the MFDS laboratory is establishing new procedures for the analysis of gross alpha and gross beta. This will ensure effective contamination mobility monitoring as tritium naturally decays and becomes a less representative indicator.

Remedial work completed at MFDS has been under the guidance of the EPA Region IV headquartered in Atlanta, GA, and in accordance with the 1996 consent decree. Environmental monitoring and site maintenance is the responsibility of the Commonwealth and is overseen by the Division of Waste Management.



Photo 13: Maxey Flats 2020 looking southwest. Photo taken by drone.

STATUS OF SUPERFUND, HAZARDOUS WASTE MANAGEMENT FUND, AND COMMONWEALTH OF KENTUCKY'S LIABILITY

Collection of a soil vapor sample from a soil vapor probe. The Summa canister is under vacuum that is used to extract soil vapor from the probe via the flexible tubing.

As mentioned in past annual reports, SFB will incur more environmental liability as the lifetime of the superfund projects exceed that of the responsible parties (business or person). Responsibility for actions remaining, whether that be operations and maintenance (O&M) of a managed remedy or continuation of long-term closure activities, will become solely SFB's. Only after a remedy is executed and the cleanup has achieved the *de minimis* remedial concentrations, can a site be truly considered closed. If *de minimis* concentrations are not achieved immediately, a remedy will continue in operation until *de minimis* levels are achieved. Under the latter scenario long-term management, maintenance, and operations continue, for all intents and purpose, in perpetuity, thus costs continue.

The state's *sole source* of any long-term O&M at sites, expired NPL RODs, and other cleanup actions, is the HWMF. This fund is applied to all Superfund related activities, initial ERT and state-lead emergency cleanups/actions, and non-emergency/non-NPL remedial actions.

The HWMF was created to provide the Division with the necessary funds to implement its omnibus 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 Division uses this fund to provide for technical reviews, oversight of responsible party driven actions, and contracted state-lead investigations and remediation projects. This fund finances regulatory oversight, emergency responses, state-lead, and time-critical remediation projects at sites across the commonwealth. These projects range from large industrial sites, medium sized sites, to persistent dry cleaners' plumes, and small projects such as roadside drums, orphan wastes, and transformer releases. Presently, there are no other available funding sources to conduct emergency response, NPL responsibilities, state-lead cleanup actions, or regulatory oversight.

Presently, the remaining HWMF balance available to actually perform state lead work is estimated to be \$450,000 per year. This is barely enough funding to address a handful of small-to-medium cost state lead actions. Recent emergency cleanup actions have exceeded this balance by tenfold. Moreover, it is evident that funding levels will challenge the abilities to meet long term monitoring and O&M at NPL ROD reversion sites and other state long term monitoring and O&M sites, let alone initial remedial costs at sites in which responsible party(ies) no longer exist or are financially incapable of funding cleanup.

COVID-19 RESPONSE

Despite the transition into telecommuting, SFB has remained productive as documented by daily and weekly reports of activity. All staff are able to be reached by email and phone, so customer service continues as normal. All SFB staff have remote access to their workstation computers, software, network drives and database. Meetings with staff and the regulated community, which were once face-to-face, now occur over the internet. Correspondence that was previously mailed in hardcopy is now printed to pdf and emailed to the regulated community if possible.

Brownfield Redevelopment application submittals and reviews are continuing at the same pace as before the pandemic. These applications are required to be submitted by hardcopy. Therefore, at



least one staff member goes to the central office weekly to process, scan and forwarded the applications to the appropriate staff. Most correspondence from the regulated community occurs through email or SFB's e-forms website. A few hardcopy mailings occur each week and these are also sorted and scanned by the staff coming into the office on a weekly basis.

Due to travel restrictions, the SFB's ranking project, pre-remedial grant commitments, managed site audits and all field work were delayed for a short time. With EEC policy/guidance, these issues have been largely overcome. At sites where the state serves as the responsible party for managed closures, site visits are continuing to occur to perform operations and maintenance work. Maxey Flats Disposal Facility (MFDS) staff alternate between telecommute and onsite work to perform the routine tasks of maintaining the large NPL site. When outside work is occurring, at least 2 staff are present for safety reasons.

There have been minimal requests for leniency with regard to KRS 224.1-400 required actions by responsible parties. At some responsible party lead sites, SFB has allowed delay or postponement of groundwater monitoring for the spring quarter of 2020. These requests have been rare and do not conflict with permitting or regulatory requirements. The pandemic has changed SFB's Frankfort's central office into 22 satellite offices; however, the goals and the effectiveness of the branch remain largely unchanged.

SUPERFUND BRANCH HIGHLIGHTS

Leitchfield Cleaners and Rentals:

Due to the change in land use to multiple domestic living units (apartment complex) and the high potential risk to human receptors, the Division of Waste Management's (DWM) Superfund Branch in cooperation with the EPA conducted a preliminary site assessment of soil vapors adjacent and around the on-site apartment complex and other buildings at Leitchfield Cleaners and Rentals on August 16, 2019 and December 2, 2019. The findings of this preliminary analysis discovered high levels of Tetrachloroethene (PCE) and Trichloroethene (TCE) in soil vapor across the property. Based on the results from the EPA and DWM SFB proceeded to an initial site investigation concerning the high level impacts to soil and soil vapor.

The site investigation was conducted on January 13, 2020 and consisted of sub-slab and indoor air sampling of the apartment complex living spaces. Analytical data revealed sub-slab vapor intrusion levels as high as 180,000 µg/m³ with indoor air levels in excess of 73 µg/m³ for PCE, and 1,700 µg/m³ for sub-slab vapor intrusion with indoor air levels of 2.7 µg/m³ for TCE—with detections of cis-1,2-Dichloroethene and trans-1,2-Dichloroethene. Regional Screening Levels for Residential Air exposures to PCE and TCE are 11 µg/m³ and 0.48 µg/m³ respectively.

PCE is the most frequently used solvent in the dry cleaning industry. When releases have occurred by spillage or by other means during operations, PCE travels to the soil, groundwater, soil vapor, air, and drinking water supplies where it also degrades further into more toxic COCs over time. Additionally, PCE, TCE, and other degradation products (including Vinyl Chloride) are the



primary COCs associated with vapor intrusion that can be emitted and accumulated into structural spaces from releases to the subsurface.

As a result of these findings concerning significant impacts to soil, sub-slab, and indoor air vapor, and their associated observed levels, it was necessary for SFB to implement emergency abatement procedures to mitigate the immediate vapor exposures to residence living in the apartment building and eliminate any further on-going human health exposures from this release. The financial viability of the responsible party was not known at the time, so emergency abatement procedures at the 4 unit apartment complex housing 10 people were implemented by SFB.

On February 17, 2020, SFB staff informed the residences of potential exposures and provided them per diem to leave the residences while SFB took steps to mitigate the apartments. The residences were out of their apartments for less than one month, as SFB contracted vapor mitigation professionals to install a system (similar to a radon system). The newly installed mitigation system actively vacuums the sub-slab vapors routing it away from the residents.



Photo 14: Leitchfield Cleaners Vent Line and Vacuum Routing Vapors Through the Attic. Photo by Chad Von Gruenigen



Former Henry Vogt Machine Company:

By: Nathan Hancock

Former Henry Vogt Machine Company was a large industrial facility in Louisville that started operating in the early 1900s. The facility primarily produced industrial valve equipment. In the 1990s, an environmental site assessment was conducted to determine if the operations resulted in releases to the environment. The assessment determined that the chlorinated solvent trichloroethylene (TCE) and other associated compounds were present in the groundwater beneath the property. Although Vogt's production slowed until it ceased during 2007, the groundwater investigation continued until 2011.

During early January 2012, Vogt developed a site management plan that was approved by SFB. An environmental covenant was recorded on the affected property during late 2011 as part of the plan. The approved plan required annual groundwater monitoring as well as the maintenance of the property's engineered surfaces and institutional controls. At the time of the plan's approval/implementations, vapor intrusion was not considered to be an issue.

During 2012, Vogt entered bankruptcy. The Vogt property was divided and sold to 2 private entities as part of the proceedings. Both parties acquired their property in accordance with the Brownfields Redevelopment Program KRS 224.415. Each owner developed a site-specific property management plan as required by the Brownfield program.

During late 2017, a new party was interested in purchasing part of the former Vogt property. As part of their environmental due diligence, soil vapor samples were collected beneath certain buildings located above the groundwater contamination. Elevated levels of TCE and associated compounds were detected in the samples. The prospective purchaser decided not to purchase the property but shared the soil vapor data with SFB. SFB directed the 2 owners to reassess their property management plans in order to address any potential for soil vapor intruding into their buildings.

The historic groundwater monitoring indicates that the TCE plume extends north and beyond the former Vogt properties. Most of the properties at the edge of the plume were vacant or industrial in nature. However, 2 off-site parcels contain structures used for residential purposes. Vogt is no longer a viable responsible party, and the Brownfield owners are not viable under KRS 224.1-400 for additional investigation or cleanup. SFB created a capital construction account so HWMF funds could be used to determine if the off-site residences are at risk of vapor intrusion.

GeoScience Consultants, Inc. (Geoscience) was contracted through a Master Services Agreement. Geoscience developed and implemented a plan to install 6 subsurface soil vapor probes on the offsite properties. GeoScience sampled the probes during March 2020. The analytical results did not detect the presence of TCE or any associated chlorinated solvent compounds.

Status: Although the March 2020 sampling did not indicate a risk for soil vapor intrusion, the vapor probes will be resampled during 2020. The additional sampling will determine if any seasonal variation results in an increased potential for vapor intrusion.



Photo 15: Aerial View of the Two Residential Structures and the Soil Vapor Probe Locations. The Former Henry Vogt Facility is Located to the South. Photo marked by Nathan Hancock.



Photo 16: Drilling Company Installing the Soil Vapor Probes. Photo by Nathan Hancock.

UNDERGROUND STORAGE TANK BRANCH

The mission of the Underground Storage Tank (UST) Branch is to provide for the prevention, abatement, and control of contaminants in regulated USTs, contaminants that may threaten human health, safety, and the environment. This branch regulates the registration, compliance, closure, inspections, and corrective actions of UST systems. Through cleanup, former UST sites become assets to their communities. Vacant UST properties in cities and towns are often on busy street corners and main roadways, making them potential opportunities for economic and community development, and neighborhood revitalization.

The Administrative Section oversees the registration of tanks, the annual invoices for tank fees, and collects tank fees. In 2020, a total of 659 new and amended registrations were received. Invoices were mailed resulting in the collection of \$275,400 in annual tank fees.



The Compliance Section continues to focus on building relations with the regulated community to provide ongoing support to field inspectors with data input into the cabinet's database. Compliance staff continues to assist trained operators with Kentucky Underground Storage Tank Operator Online Learning System (KY TOOLS), the online compliance training program.

KY TOOLS has been utilized as a UST operator training course since it began in May of 2013. Currently, an estimated 2,849 of Kentucky's 3,164 active UST facilities have successfully designated a trained operator and completed online training to fulfill state and federally mandated training requirements for UST personnel. Successful completion of the training is required annually. In accordance with federal law, states are to ensure that UST operators are trained according to state-specific requirements. Currently, 90 percent of Kentucky's UST facilities have at least 1 employee who is responsible for compliance that has completed the KY TOOLS online training.

The Claims and Payments Section, which manages the Petroleum Storage Tank Environmental Assurance Fund (PSTEAF), obligated \$17,216,939.70 for small owner tank removal account (SOTRA), Financial Responsibility Account (FRA), Petroleum Storage Tank Account (PSTA), and State Lead corrective actions. Claims are reviewed and approved within an average of 15 days upon report approval. Reimbursements totaled \$10,864,508.55 from all accounts.

The UST Branch also includes 2 sections that are responsible for cleaning up UST sites. Both sections review and process closure assessment reports, site characterizations and site remedies, and phase II reports upon request. In FY20, they reviewed 80 closure assessments; 13 site checks and phase II reports; issued 581 directives for site investigation/corrective action activities; and issued 184 No Further Actions (NFA) letters. This work was performed by their 14 geologists and scientists.

Overall, while the number of NFAs has been decreasing in the past few years, these totals are drawn from a smaller total number of ongoing cleanups. The surge of NFA letters issued in FY08 and FY13 were due, in part, to regulatory changes in FY07 and FY12. The slight increases in FY16, FY17, FY20, are associated with database cleanup efforts for pre-2006 closures.

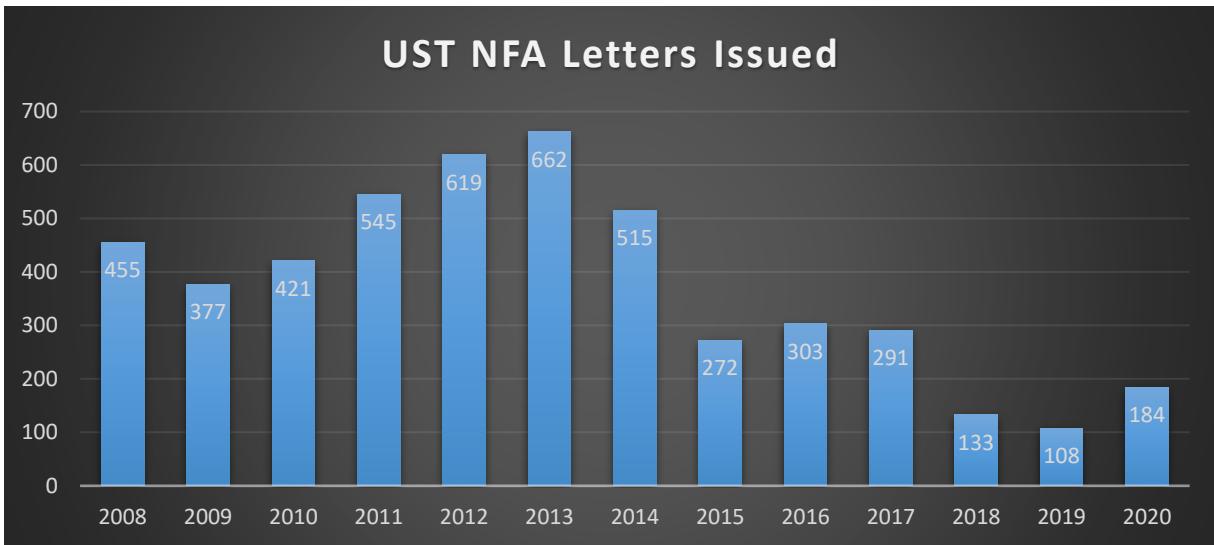


Figure 9: Underground Storage Tank No Further Action Letters Issued

As a direct result of changes in the regulatory process in 2006 and 2011, the total number of UST cleanups remaining has decreased substantially. There were 497 UST cleanups requiring additional work at the close of FY20.

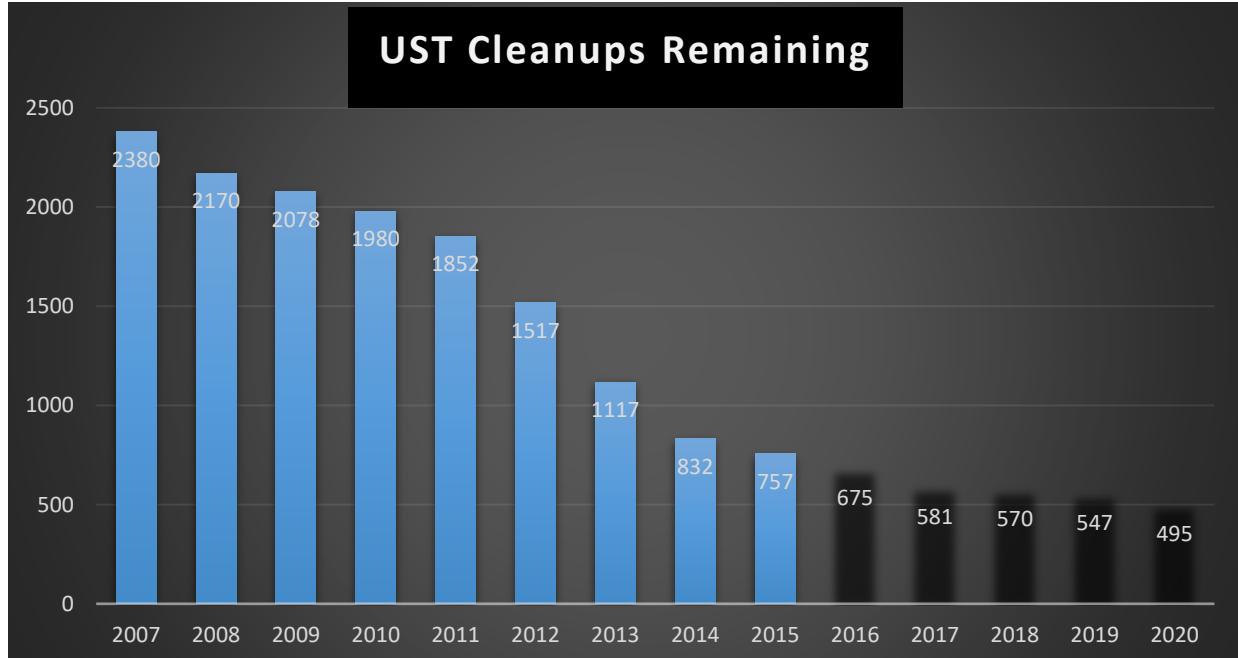


Figure 10: Underground Storage Tank Cleanup Remaining



COVID-19 RESPONSE

The COVID-19 pandemic has created unique challenges for all of EEC. The UST Branch continued via telecommuting to issue directives, review compliance tests, approve registrations, and reimburse claims. However, the first few weeks were a struggle to get staff the proper equipment and internet access to work from home. Once that hurdle was overcome, section supervisors and staff found new and creative ways to continue to offer the same level of service and process workloads without being in the office. Within 30 days of the branch staff telecommuting, their workloads returned to a normal rate. Essential job duties, such as processing standard mail, continued by rotating in 1 or 2 staff into the office. The electronic submittal process has allowed for the major regulatory submittals such as registrations, compliance tests, obligation and claim requests, and technical reports to be processed by staff while telecommuting from home.

UNDERGROUND STORAGE TANK BRANCH HIGHLIGHT

Sammy's Market (AI 1688):

By: West Johnson, P.G.

The Sammy's Market underground storage tank site (Sammy's) is a 2.5 acre property located in Hardin County Kentucky that operated as a convenience store, restaurant and gas station since 1981. Sammy's historically operated 9 UST's in 3 separate tank pits that released nearly 7,000 gallons of fuel (mostly gasoline) into the environment between 1981 and 2015 (Photo 17). Line and tank leaks were detected as early as 1987, and, by 1995, three (3) USTs were closed and removed from Tank Pit 1 with over 4 feet of gasoline measured above the water-table in nearby recovery wells. Between 1987 and 2015 (when the remaining 6 USTs were removed from Tank Pits 2 and 3), approximately 3,000 gallons of gasoline and over 10,000 gallons of gasoline-contaminated groundwater had been recovered at Sammy's; however, gasoline – also known as light non-aqueous phase liquid (LNAPL) - continued to impact subsurface soil and groundwater.

During the 2015 tank removals, Kentucky's UST Branch used Laser Induced Fluorescence and the Ultra-Violet Optical Screening Tool (LIF/UVOST) to better delineate the horizontal and vertical extent of LNAPL in the subsurface at Sammy's. After 3 separate LIF/UVOST events and dozens of additional soil and groundwater analyses, the residual LNAPL plume at Sammy's continued to impact more than 5,000 tons of soil and groundwater across a quarter acre to a depth of 25 feet below ground surface (ft bgs) (Photo 18). While early remediation efforts used suction pumps to physically recover LNAPL at Sammy's, pumping became inefficient and ineffective. By 2018, it was time to redesign the remedial technology at Sammy's.

The most recent site investigations indicated intrusive remediation technology was the best option for mitigating the petroleum impacts at Sammy's. After months of investigating and evaluating the feasibility of large-scale remediation technologies with large-scale costs (dig-and-haul, electrical resistance heating, etc.), Kentucky's UST Branch teamed with Southern Environmental Services and AST Environmental to develop a corrective action design that involved soil-mixing, application of an activated carbon amendment, and stimulation of natural biodegradation. The



combination of soil-mixing, activated carbon, and active biodegradation looked to be equally as effective as any of the large-scale technologies at about half the cost.

For soil-mixing and amendment application, the LNAPL plume-area was divided into 12 cells—each 27.5' x 27.5' in size (Photo 19); and, for each cell, the vertical zone from 15 to 25 ft bgs was divided into 2-foot lifts. Since the LNAPL was primarily located from 15 to 25 ft bgs, the top 15 feet of soil was stockpiled for later use as backfill material. After stockpiling the top fifteen feet of soil, the BOS 200 solution (activated carbon + facultative bacteria) was sprayed into each cell with powdered gypsum applied throughout each cell with the excavator bucket. Starting with the bottom 2-feet of each cell (23 to 25 ft bgs), the BOS 200 solution and gypsum were thoroughly mixed throughout the interval using a special mixing-head mounted to an excavator. To ensure contact between the contaminant mass and the amendment, this process was repeated for each 2-foot lift of each cell from 15 to 25 ft bgs. Additionally, the repeated mixing and stockpiling of soil aerated the material for added volatilization of contaminant mass. Prior to excavation and soil-mixing activities, underground utility location discovered an active AT&T fiber-optic line beneath the 2 westernmost cells; therefore, soil-mixing was not feasible for these cells, and a BOS 200 and gypsum solution was injected under high pressure from 15 to 25 ft bgs at these locations.

The soil-mixing fieldwork took place November 2019 through February 2020, and the team recently installed soil borings and monitoring wells within the soil-mixing and injection cells to sample soil and groundwater for at least the next 4 quarters to evaluate long-term success of the application. After turning the Sammy's site upside down by soil-mixing, initial laboratory results indicate significant reduction in contaminant mass at a number of the post-mixing locations tested.

Thanks to Division of Waste Management drone pilot Belle Thomas for weekly photo- and video-documentation of the project status. Photo 20 is drone imagery of the site prior to soil-mixing, and Photo 21 is the same view during soil-mixing activities. A time-lapse video of amendment application and soil-mixing can be found at the following link <https://youtu.be/j6h6peaOyrQ>.



Photo 17: Map of Sammy Market's UST System. Map by West Johnson, P.G.

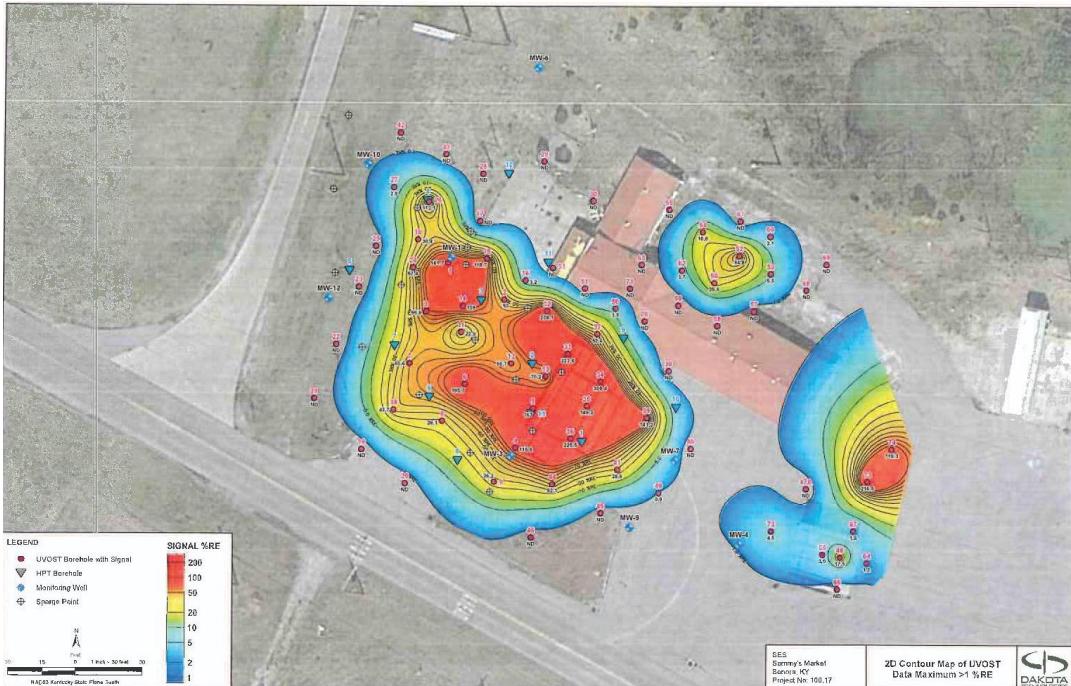


Photo 18: Map of Sammy's Market LNAPL footprint (from LIF-UVOST investigations). Isocontour graphic by Dakota Technologies.

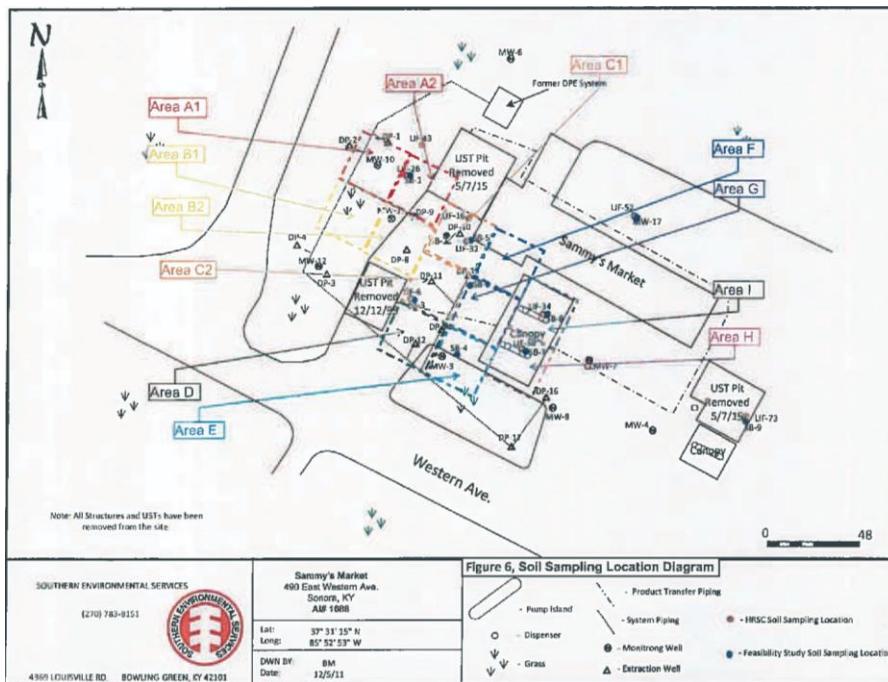


Photo 19: Map of soil-mixing and injection treatment areas. Map by Southern Environmental Services and AST Environmental, Inc.



Photo 20: Drone photo of Sammy's Market UST site immediately prior to soil-mixing. Photo by Belle Thomas.



*Photo 21: Drone photo of Sammy's Market UST site during soil-mixing.
Photo by Belle Thomas.*

Claims & Payment Section Conducts Site Inspections to Verify Proper Monitoring Well Abandonment:

By: Brenda Harlow & Jill Stoltz

The UST Branch has become aware of improper monitoring well abandonments conducted as part of work directed by the branch due to an investigation or cleanup of a petroleum release from a regulated UST. As the majority of work directed by the branch is eligible for reimbursement utilizing the Petroleum Storage Tank Environmental Assurance Fund (PSTEAF), it is essential the UST Branch is good stewards of the funds while also ensuring the work completed meets regulatory requirements in order to adequately protect human health and the environment.

As part of the claim evaluation process for post- no further action well abandonments, the Claims and Payment Section of the UST Branch are verifying monitoring wells are being properly abandoned in accordance with Title 401 Kentucky Administrative Regulation (KAR) Chapter 6. Section scientists are performing visual inspections of monitoring wells that have previously been abandoned and site inspections while well abandonments are being performed. This offers the scientists first-hand knowledge of the work that was or is actually performed.

The development of the claim evaluation process included working closely with the Division of Water staff who have assisted in the interpretation of Kentucky's well and driller regulations, research into standard operating procedures for well abandonment, and guidance from UST Corrective Action project managers.



Based on the information learned, the section has established a standard operating procedure (SOP) for monitoring well abandonment claim evaluation and review. The SOP encompasses a list of elements that are required as part of the well abandonment report, examples of well abandonment records, including potential red flags, and a claim review checklist to verify all regulatory requirements have been met. The checklist and site inspection reports are then used during the claim review process to authenticate the well abandonment report that is submitted by the contractor on behalf of the applicant. Based on the claim review, if the work performed is not in accordance with regulations, reimbursement may be adjusted to reflect the work actually completed or delayed until regulatory requirements are adequately met. Violations to 401 KAR Chapter 6 are being referred to the Field Office Branch for review for possible enforcement actions.



Photo 22: Improper Surface Completion Following a Well Abandonment. Photo by Mitch Hughes.



Photo 23: Well Casing, Pad, and Manhole Collar Still in the Ground Following a Well Abandonment. Photo by Mitch Hughes.

EMERGENCY RESPONSE BRANCH

The Emergency Response Branch's (ERB) was established in 1980, and has been housed in different parts of the Cabinet throughout the years. The Branch has 6 staff to operate and coordinate the activities of the Emergency Response Team (ERT). The tasks include:

- Responding to environmental emergencies
- Overseeing the many training needs and requirements and making sure they are met
- Conducting time critical removal projects
- Assisting the Department as needed with other projects
- Purchasing, maintaining, and calibrating all equipment
- Reviewing and revising ERT procedures and plans

The ERT is comprised of personnel from the Division of Waste Management (DWM), Division of Water (DOW), and Division for Air Quality (DAQ). The ERT's main responsibility is to respond immediately to any and all emergency events that threatens the public health or the environment.



RESPONSES

The ERT responded to 354 emergency responses for the fiscal year. There were a couple of large events this year that required many personnel, staff time, and equipment. Those events include, on July 3, 2019, the Jim Beam Warehouse Fire in Woodford County, that resulted in a release of 2.2 million gallons of alcohol to the environment. The release impacted Glenn Creek and the Kentucky River, and killing over 120,000 aquatic species. On February 13, 2020 a CSX train derailed in Pike County due to a mudslide impacting the railroad tracks. The derailment caused a fire that involved 4 ethanol tankers and 3 locomotives that caused a release of approximately 38,000 gallons of ethanol and 11,000 gallons of diesel fuel. The release impacted several water treatment systems whose intakes where downstream of the spill. The ERT was heavily involved in the COVID-19 pandemic during the early months of its entry into the United States. The ERT assisted at the Kentucky Emergency Operations Center and the Department for Public Health Warehouse assisting with logistics, packing and moving medical supplies, and leading donations management.

TRAINING

On-Scene responders and coordinators are required to complete training courses regarding many different safety and environmental topics. Many of these training courses also include hands-on technical training and practice exercises. Due to the pandemic, the ERT suspended trainings and is working on developing online training for the remainder of the year. ERT Staff completed 19 training courses for the fiscal year.

EQUIPMENT

Supplies and equipment needed to be kept available for emergency response is a huge undertaking. Many of the supplies are utilized completely during a large emergency, so these must be replaced as soon as possible to prepare for the next emergency. Equipment must be kept operational and calibrated so that it is also ready to be used at a moments notice. While the pandemic impacted staffs procedures on maintaining equipment, staff continued to maintain equipment while practicing social distancing. The ERT was able to upgrade and replace some monitoring equipment that included replacing single point monitors with an upgraded model. The ERT was able to acquire more communications capability for air monitoring equipment that allows the team to see real-time data from the monitors without being onsite. ERT also upgraded some communication equipment that allows better communication between field staff and the emergency operations center.



Photo 24: Staff Conducting Monitoring Using a Mobile GC/MS. Photo by Robert Francis.

DRONE USAGE

The ERT has access to multiple drones outfitted in unique ways. The drones can carry cameras, hazardous air pollutant monitoring equipment, and/or water sampling equipment.

Camera drones give personnel the ability to see events occurring in potentially dangerous locations in real time without putting people in harm's way. They also give incident coordinators a big picture view of the event area to allow for better decision making.

The camera drones can also record video and photos for later analysis. The hazardous air pollutant monitoring drone carries a hazardous air pollutant sampling pump into contaminated air. The results can be analyzed within minutes to identify the contaminants and their concentrations. This information allows for informed decisions to be made to keep the public and first responders safe.

The water sampling drone carries bailers to remotely collect water samples from locations where people cannot safely, or timely, access. Multiple samples can be quickly collected from remote or unsafe locations without putting people in hazardous conditions.

MULTIPLE RESPONSE TYPES

ERB responds to many types of emergencies. In each case, ERB must determine the best way to handle a situation to protect public health and to mitigate impacts to the environment. These emergencies may be caused by natural phenomena or manmade. Emergencies range from hazardous materials released from a train derailment caused by a mudslide to a fire at a bourbon distillery, caused by a lighting strike, which burned 2.1 million gallons of bourbon.

An example of such an emergency occurred near Elkhorn City in Pike County. In Photos 25 and 26, team members are using drone technology to view the site of a train derailment that had limited access due to the geography and location near a river.





Photos 25 and 26: Aerial Assessment of the Fish Kill in the Kentucky River from the Jim Beam Warehouse Fire Alcohol Spill. Photos taken via drone by Robert Francis.

COVID-19 RESPONSE

The ERT was heavily involved in the COVID-19 pandemic during the early months of its entry into the United States. The ERT assisted at the Kentucky Emergency Operations Center and the Department for Public Health Warehouse assisting with logistics, packing and moving medical supplies, and leading donations management. Due to the pandemic, the ERT suspended trainings and is working on developing online training for the remainder of the year. While the pandemic impacted staffs procedures on maintaining equipment, staff have continued to maintain equipment while practicing social distancing.

ACRONYMS

ADC	Alternate Daily Cover
ADD	Area Development Districts
AIP	Agreement in Principle
BAG	Brownfields Assessment and Cleanup Grant
BGAD	Bluegrass Army Depot
CCR	Coal Combustion Residuals
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DAQ	Division for Air Quality
DCA	Division of Compliance Assistance
DECA	Division of Engineering and Contract Administration
DoD	Department of Defense
DOE	Department of Energy
DOW	Division of Water
DPT	Direct Push Technology
DSMOA	DoD and State Memorandum of Agreement
DWM	Division of Waste Management
EDT	Explosive Destruction Technology
EEC	Energy and Environment Cabinet
EI	Environmental Indicators
EISB	Enhanced In Situ Bioremediation
EPA	Environmental Protection Agency
ERB	Emergency Response Branch
ERF	Environmental Remediation Fee
ERT	Emergency Response Team
FFA	Federal Facilities Act
FOB	Field Operations Branch
FRA	Financial Responsibilities Act
FY20	Fiscal Year 2020
FYR	Five-Year Review
GIS	Geographical Information System
HB	House Bill
HHW	Household Hazardous Waste
HWB	Hazardous Waste Branch
HWMF	Hazardous Waste Management Fund
KDEP	Kentucky Department of Environmental Protection
KYTC	Kentucky Transportation Cabinet
LIF/UVOST	Laser Induced Fluorescence and the Ultra-Violet Optical Screening Tool
LNAPL	Light Non-Aqueous Phase Liquid



LPG	LUST Prevention Assistance Agreement
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Levels
MFDS	Maxey Flats Disposal Site
MOA	Memoranda of Agreements
NFA	No Further Actions
NPL	National Priority List
O&M	Operations and Maintenance
ORD	Office of Research and Development
PASI	Preliminary Assessment/Site Investigation Cooperative Agreement
PDGP	Paducah Gaseous Diffusion Plant
PDS	Program Development Section
PPA	Program Planning & Administration
PRIDE	Personal Response in a Desirable Environment
PSTA	Petroleum Storage Tank Account
PSTEAF	Petroleum Storage Tank Environmental Assurance Fund
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RCRIS	Recovery Conservation and Recovery Information System
RLA	Recycling & Local Assistance Branch
RMA	Rubber Modified Asphalt
RTF	Regulatory Time Frame
SACA	Support Agency Cooperative Agreement
SADEP	Sampling, Analysis and Data Evaluation Plan
SFB	Superfund Branch
SI	Site Inspection
SOP	Standard Operating Procedure
SOTRA	Small Owner Tank Removal Account
SWB	Solid Waste Branch
TCI	Technical Compliance Inspections
TSCA	Toxic Substances Control Act
UBS	Urban Background Study
UST	Underground Storage Tank
USTMA	U.S. Tire Manufacturers Association
WTTF	Waste Tire Trust Fund
WTWG	Waste Tire Working Group

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Secretary Rebecca Goodman

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Commissioner Anthony R. Hatton, P.G.
Deputy Commissioner John Lyons II

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This annual report is intended to provide a concise set of facts and measurements to support environmental decision-making. We welcome your questions and comments to:

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