

WASTE TIRE PROGRAM



CY 2013

A REPORT TO THE GENERAL ASSEMBLY

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WASTE TIRE PROGRAM

A REPORT TO THE GENERAL ASSEMBLY

I. HISTORY OF THE WASTE TIRE PROGRAM

INTRODUCTION

This report has been prepared as required by KRS 224.50-872. The purpose of the report is to provide information related to the Kentucky waste tire program. Specifically, the report includes information related to the Commonwealth's amnesty and remediation program, markets in the Commonwealth, issues that have arisen in 2013 and recommendations for improvements to the program.

KRS 224.50-872 states:

The cabinet shall report to the General Assembly no later than January 15 each year on the effectiveness of the waste tire program in developing markets for waste tires, the amount of revenue generated and the effectiveness of the fee established in KRS 224.50-868 in funding the cabinet's implementation of the waste tire program, to include any waste tire amnesty program established by the cabinet as provided for in KRS 224.50-880(1)(b), whether the fee should be extended, comparative data on the number of waste tires generated each year, the number disposed of, the number of orphan tire piles, and the cost of tire disposal by counties in the Commonwealth.

BACKGROUND

In 1990, the General Assembly passed House Bill 32 creating the waste tire control program and establishing the Waste Tire Trust Fund for the elimination of existing waste tire piles and to prevent the creation of future waste tire piles. The original program imposed a \$1.00 fee on retailers of new motor vehicle tires sold in Kentucky, created requirements for tire accumulation and storage, and resulted in the removal of many tires from the environment. However, hundreds of thousands of tires continued to be stockpiled in anticipation that markets would develop in the future. In 1994, the General Assembly extended the program for four more years and added a prohibition on open burning of waste tires.

In 1998, the General Assembly repealed the existing waste tire control program and created a new program with a new approach. The revised statute retained the \$1.00 fee collected on new motor vehicle tires, the Waste Tire Trust Fund, and registration requirements for accumulators of waste tires. New

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additions to the waste tire management program included financial assurance requirements for accumulators, processors, and transporters of waste tires, grants for projects that manage waste tires, and a report from the Energy and Environment Cabinet (cabinet) regarding the effectiveness of the program. The 1998 legislation set an expiration date of July 31, 2002 for the collection of the \$1.00 fee on new motor vehicle replacement tires sold. Subsequently, the 2002 General Assembly extended the fee for an additional four years. The General Assembly extended the program for another four years during the 2006 legislative session. The provisions for collection of the tire fee were to have sunset on July 31, 2010, but the waste tire fee was extended in 2010 and again in 2012 during the legislative session as part of the budget bill. It is now set to expire on June 30, 2014.

The fee is collected from consumers by retailers and paid monthly to the Department of Revenue (DOR). The cabinet uses the fee to implement the waste tire program, including the waste tire amnesty and remediation program, and to fund grants to manage and develop markets for waste tires.

WASTE TIRE WORKING GROUP

In the 2011 regular session, the legislature passed House Bill 433 which established the Waste Tire Working Group (WTWG). According to KRS 224.50-855 the purpose of the WTWG is to review numerous aspects of the Kentucky waste tire program and to provide advice to the cabinet that could propose changes to the applicable statutes and regulations in hopes of improving the program. Currently the WTWG consists of the following positions:

- (1) The Director of the Division of Waste Management or his or her designee (Mr. Anthony R. Hatton, P.G., Director, Division of Waste Management or his designee, Mr. Tim Hubbard, Assistant Director); and
- (2) The Manager of the Recycling and Local Assistance Branch or his or her designee (Mr. Gary Logsdon, Manager, Recycling and Local Assistance Branch).
- (3) Mr. Harland Hatter, Deputy Director, Department of Agriculture;
- (4) Ms. Donna Fechter, Boyle County Solid Waste Coordinator; and
- (5) Mr. Keith Brock, Marion County Solid Waste Coordinator.
- (6) The Honorable James R. Townsend, Webster County Judge-Executive;
- (7) The Honorable Martin L. Voiers, Mayor of Flemingsburg; and
- (8) Mr. Joe T. Durkin, assistant manager of a tire retailer in Lexington.

During 2013, the cabinet held two business meetings for the WTWG familiarizing the new members with each other and ongoing waste tire issues. The meetings were held on July 2 and December 3, 2013. At the first gathering, the cabinet made presentations on the waste tire amnesty program and the 2012 Waste Tire Program Report. At the later meeting, the cabinet made presentations on the expiration of the tire fee, the gap between actual and potential fee collection, dangers of improperly repaired used tires for reuse on another vehicle, the Tire Derived Fuel (TDF) market and the rubberized asphalt pilot project.

The agendas, presentations and meeting minutes for the WTWG are available at <http://waste.ky.gov/RLA/Waste%20Tires/Pages/WasteTireWorkGroup.aspx>.

During 2014, the WTWG will conduct overviews of different aspects of the waste tire program.

II. FUNDING THE WASTE TIRE PROGRAM - EFFECTIVENESS OF THE FEE

The cabinet has removed waste tires from the environment, funded crumb rubber grant projects, and assisted in developing markets for waste tires. Recycling markets change periodically, therefore, occasional adjustments to improve the program are necessary.

The Waste Tire Trust Fund helps support the continued removal of waste tires from the environment, which can lead to fires and breeding ground for mosquitoes.

PROGRAM SUCCESS

1. Amnesties

Since 1998, the program has funded the removal and disposal of nearly 21.7 million Passenger Tire Equivalents (PTEs) at a cumulative cost of \$21.4 million. The tires were collected from 120 counties as part of the amnesty program and the remediation of numerous tire piles.

During FY2013, the cabinet conducted amnesties in the Bluegrass, Lincoln Trail and Lake Cumberland Area Development Districts (ADD). The fiscal year amnesties garnered 1,178,489 PTEs at a cost of \$1,338,174 or \$1.14 per PTE. During the last six months of CY 2013, which is covered by this report, the cabinet conducted tire amnesties in the Buffalo Trace and FIVCO ADDs netting 144,742 PTEs at a cost of \$164,355. The aforementioned amnesties netted a total of 1,323,231 PTEs for a cost of \$1,502,529.

Comparatively, tire amnesties have been effective in reducing the amount of waste tires in the environment as evidenced by a declining trend in the number of tires collected at each amnesty. For example, when the last amnesties were conducted in the ADDs mentioned above, the total PTEs were 1,587,530 compared to 1,323,231 in the most recent round of amnesties, representing a 17% reduction in PTEs collected. As a result of this trend in FY2010, the cabinet reduced the four year amnesty cycle to a three year cycle. The cabinet will continue three year cycle amnesties assuming the funding remains stable.

2. Grants to Counties

Reduced amnesty costs have allowed the cabinet to award funds directly to counties to assist them in addressing waste tires annually. Since FY2011, the cabinet has made \$3,000 per year available to counties to transport and dispose or recycle waste tires. The cabinet expended \$339,000 to 113 counties. Of the money the cabinet awarded, the counties spent \$256,889 to dispose or recycle 240,736 PTEs. Counties spent \$80,947 of their own money to help in this endeavor. Another group of counties also returned \$82,111 of unspent state funds. A total of \$337,836 of state and county funding was spent for an average cost of \$1.40 per PTE to the taxpayer. Notice that the cost is slightly higher than the state amnesty contract price of \$1.14 since counties must often remove these tires from roadsides and dumps.

3. Orphan Tire Piles

The cabinet used Waste Tire Trust Fund monies in FY 2013 to remediate ten orphan tire piles containing 160,085 PTEs at a cost of \$219,767 or \$1.37 per PTE. Notice that the cost is slightly higher than

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the normal contract price of \$1.14 since some waste tires were pulled from illegal dumps and not delivered to the amnesty site.

Adding the rotating amnesties cost to the remediation of tire piles and the King Tire Fire (which occurred in Fall CY 2012 but fell within FY 2013) brings the total FY 2013 expenditures to \$2,206,991. This amount does not match FY 2013 expenditures since time must be allowed for contractor invoice preparation and state bill payment. Payment for some late FY 2013 amnesty events are reflected early in the FY 2014 ledger. Also, some late FY 2012 amnesties work may have been paid for in early FY 2013. Therefore, \$2,206,991 is \$65,769 higher than the \$2,141,222 reported in the “Waste Tire Receipts and Expenditures” table elsewhere in this report.

Additional information regarding amnesties and grants to counties is included in Appendix C.

PROGRAM CHALLENGES

1. Fiscal Issues

The following is a list of challenges within the current waste tire program:

- It is highly likely that some percentage of retailers were collecting disposal fees and then stockpiling waste tires until the amnesty program was conducted in their areas.
- Some retailers were suspected of transferring tires to an unpermitted hauler who then illegally dumps them on a roadside or elsewhere. Discovery of such a pile required a response from county or state government to recover the tires at taxpayers' expense.
- Approximately 30 percent of the PTEs generated in Kentucky during 2013 were managed via the Commonwealth's waste tire amnesty program. The remaining 70 percent of the PTEs were processed through commercial scrap tire collectors and processors. If there is a significant decrease in the amount of waste tires managed by the commercial processors; the Waste Tire Trust Fund would be insufficient to manage the increase in the number of amnesty tires that would result.
- Individuals have chosen to retain their waste tires to avoid additional fees charged by tire retailers for waste tire disposal, taking these tires out of the recycling stream. Also, these tires, or a portion thereof, may have been later mismanaged and dumped into the environment which burdened counties with continued waste tire management issues. It was reported that some tire retailers charged a higher fee of \$3-3.50 to discourage individuals from leaving waste tires with the retailer, instead of the average \$1.50-2.00 tire disposal/recycling fee charged by most retailers. As an alternative, this situation could be improved by requiring the disposal price to be included in the sale price or list the actual state wide average disposal rate on a notice and let the free market handle the situation.
- KRS 224.50-868(3) gives the Department of Revenue the authority to collect the waste tire fee. The statute requires up to \$50,000 per year be transferred to DOR for collection of the fee. This neither provides enough money (\$65,000-70,000 is needed to employ one person per year) or incentive for DOR to enforce the collection. States that have specified a

percentage to be awarded to the collection agency have a higher collection rate. Cabinet field personnel could visit retailers and check fee submittal records, but EEC lacks the audit authority legally possessed by the Department of Revenue.

2. Tire Disposal

- Waste tires generated in salvage yards were sometimes brought to tire amnesties, dumped along roadsides or more often, up to five tires may be placed in the auto body before being sent to an auto shredder.
- Many tires collected by registered waste tire transporters are still being legally disposed of in landfills rather than being recycled. It is less capital intensive to cut or shred and landfill a tire than to install equipment required to produce a recyclable product. Some states have fixed this problem by banning all tire material, including cut or shredded tires, from landfills, except for pre-approved constructive civil engineering applications within landfills.

3. Tire Derived Fuel (TDF)

During calendar years 2012 and continuing into 2013, the cabinet, through its field inspections, noted an increased number of permitted tire accumulators and tire processors that were having difficulty in selling their recycled tire products. This was based on the fact that four permitted tire processors and accumulators were amassing a significantly higher number of PTEs than allowed under their permit. The cabinet assumed this to be the result of losses in the TDF and other shredded product markets for Kentucky processors in 2012 and 2013, but a current market survey indicates that product markets increased in 2013. The cabinet cannot quantify recent changes in the national TDF market. The inspection process has resulted in Notices of Violation issued to a number of processors primarily because of an over accumulation of tires that has led to:

- Exceeding the bond amount to cleanup and close the site; and
- Decreased space on-site, or a failure to maintain proper tire pile height and fire lanes.

A worst-possible outcome arising from this situation led to an emergency during 2012 at the King Tire Recycling facility located in Stearns, Kentucky. The cabinet contractor removed 1,151,087 PTE's (which included both whole tires and tire shreds) at a cost of \$649,050 to the Waste Tire Trust fund, less the owner's \$100,000 Letter of Credit. The burning of the tires resulted in a release of hazardous substances to the environment. The cabinet found it necessary to expend about \$350,000 from the



“Employees of King Tire Recycling work to move equipment away from a blaze which broke out in the processing facility” according to Janie Slaven of the *McCreary County Record*, August 23, 2012. Photograph courtesy of Janie Slaven of the *McCreary County*

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Hazardous Waste Management Fund to address these releases. The owner of a landfill 18 miles away in Tennessee was able to dispose of the chips which greatly lowered the price. If the nearby landfill had not been available and the cabinet had used its normal contract price, which includes recycling, the cost would have been \$1.55 per PTE instead of \$0.78 per PTE. For more information, please refer to “Cost Issues” in this section of the report.



The contractor placed soil over the tire fire at King Tire Recycling in an effort to extinguish the fire. (EEC Photograph)

The cabinet knows of three additional sites that pose a fire or safety threat. There are a total of 2.2 M PTEs stored at these sites with a potential clean-up cost, in the case of a fire, of \$3.5M. The current bonds total \$30,000, so the Waste Tire Trust Fund (taxpayer) would have to pay most of the costs. The new tire fee collections average \$2.6 M per year, so a fire at the largest site, which is estimated to cost \$3 million, would exceed one year’s receipts. Such a remedial action could end amnesties, crumb rubber grants and market development for one year or severely restrict funding availability over several years.

| Sites Exceeding Clean-Up Bond | | | | |
|-------------------------------|-----------|-----------------------------|--|-------------|
| Site # | # PTEs | Estimated Remediation Costs | Estimated Corrective Action Cost in Case of Fire | Bond Amount |
| 1 | 1,900,000 | \$2,000,000 | \$3,000,000 | \$10,000 |
| 2 | 214,000 | \$300,000 | \$450,000 | \$10,000 |
| 3 | 50,000 | \$50,000 | \$75,000 | \$10,000 |
| Total | 2,160,000 | \$2,350,000 | \$3,525,000 | \$30,000 |

The owner of Site # 1 signed an Agreed Order with the cabinet on July 8, 2013 requiring the owner to increase fire lanes and move:

- 1,000,000 PTEs before January 8, 2014; and
- Remaining tires by July 8, 2014.

A cabinet inspection on October 2, 2013 revealed that the owner of the site was not in compliance with the agreed order. The tallest pile of chips approaches 20 feet and exceeds the ten feet limit in the International Fire Code (IFC) for preventing spontaneous combustion.¹

Vapor rises off the compacted tire derived chips at Site # 1 in the morning hours. Left unabated, the heat could lead to spontaneous combustion. *Photograph courtesy of Charles B. Dickerson, EEC.*



A view of Site # 1 from atop one of the waste tire piles. The view is looking east, towards a sand quarry. The Ohio River is to the left. *Photograph courtesy of Terry Gray, TAG Resource Recovery. (below)*



The owner of Site # 2 collected Off-The-Road tires (OTRs). The large size of this type of tire dramatically increases shipping costs. The closest shear (on an excavator) capable of cutting these tires is over 280 miles away in Union County. The OTR must be cut before shredding. As a different approach, these tires could be disposed in a landfill by placing each in the bottom of a daily cell. The weight of the OTR should prevent them from rising through the waste to the surface such as an automotive or light truck tire. The cabinet issued Notices of Violations (NOVs) dated

July 11, 2012, September 20, 2012, and January 30, 2013 for this site to cease accepting tires, followed by an enforcement referral letter dated April 16, 2013.



A cabinet vehicle is parked next to some of the cut OTRs at Site # 2. *Photograph courtesy of James "Buck" McCloud, EEC.*

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A view of the scrap windrow at Site # 3.
Photograph courtesy of Larry Tichenor, EEC.

The cabinet issued NOVs to the owner of Site #3 on February 12, 2012 for exceeding the number of bonded tires and failing to meet required fire lane widths. On November 5, 2013, the cabinet issued another NOV for repeat violations plus exceeding tire pile size requirements. After receiving notification that a sizeable amount of shredded tires have been

delivered to the landfill, the cabinet granted Site # 3 an extension through January 30, 2014 become compliant. The cabinet received a document from the owner showing that he had removed 151,772 PTEs from the site during November and December of 2013.

One potential problem for tire processors is the reduction in national TDF markets in 2012. However, Kentucky's market is growing and this may help alleviate part of the problem. New markets include:

East Kentucky Power Cooperative (EKPC), Maysville:

- Cabinet submitted a letter to PSC in support of East Kentucky Power Cooperative (EKPC) use of a fuel adjustment clause for possible TDF use;
- EKPC could use 1.4-2.8 M PTEs per year based on 2-4% TDF; and
- EKPC averages 1.2 M per year at start-up.

Kosmos Cement (CEMEX-Lone Star Cement partnership) Louisville:

- CEMEX handled 1.3 M whole-tire PTEs in CY 2012 and is investigating adding a shredded tire supply line that could double this number.

The in-state TDF market for CY 2013 handled more than 100% of Kentucky's TDF needs. See the TDF market section in this report for more information.

4. Used Tires

Kentuckians buy up to 530,000 used tires each year (700,000 PTEs) based on the national average, 13.2% of all waste tires.² A recent tire industry survey showed that 88% of all tire repairs are performed incorrectly.³ One example of an incorrect repair is the failure to apply a patch from the inside of the tire when plugging a puncture. The Rubber Manufacturers Association (RMA) lists things to watch for when

reusing a used tire, such as inadequate tread (less than 2/32 inch), any repaired punctures, bulges, cuts or cracks, or defaced DOT identification number.⁴

The law exempts storage of waste tires for resale, if they are handled similar to new tires (see KRS 224.50-852(2)). Also, the law encourages reuse of waste tires "...for its originally intended purpose." (KRS 224.50-868(2)(c)). With such a high defective repair rate, this is a safety issue.

Kentucky could revise its transportation consumer tire law to adopt RMA suggestions for correct repairs. The Division of Waste Management could revise its Notice to Consumers to include such information. Division field personnel could inspect used tires for proper repairs, declare individual tires to be waste tires and request the owner to place defective tires in the waste stream. However, the first option may be the best of the three approaches.

FEE RECEIPTS

Kentuckians buy approximately 3,800,000 new replacement tires each year. Subtracting about 5% for internet sales, the Commonwealth could be collecting about \$3.6M per year.⁵ Kentucky is receiving on average of \$2.6 million per year, or approximately 72% of the money that could be collected. The table at the right shows tire fee receipts for the last seven years:

There are a number of possible explanations for the fact that not all of the fees are being collected, including:

- Not all retailers are collecting and remitting the proper amount of tire fees.
- No fee is being paid by trucking companies when purchasing large numbers of tires through fleet sales from wholesalers.
- Revenue is paid a flat fee of \$50,000 per year instead of a percentage as in other states providing inadequate resources and no incentive to pursue non-payers.

| Tire Fee Receipts | |
|--------------------------|-----------------------|
| Fiscal Year | Amount |
| 2006 | \$2,698,851.56 |
| 2007 | \$2,690,102.51 |
| 2008 | \$2,734,917.85 |
| 2009 | \$2,590,443.21 |
| 2010 | \$2,673,255.12 |
| 2011 | \$2,621,464.29 |
| 2012 | \$2,591,606.43 |
| 2013 | \$2,509,124.12 |
| Average | \$2,638,720.64 |

EXPENDITURES

During FY 2013 the cabinet expended waste tire funds to conduct amnesties, provide funding directly to counties for the removal of waste tires, and remediate tire piles. In FY 2013, the cabinet spent \$1,338,174 to recycle 1,178,489 PTEs for amnesty events. Counties spent \$337,836 on disposal or recycling of 240,736 PTEs from grant monies awarded by the cabinet. In addition, the cabinet spent \$219,767 to clean up 160,850 PTEs collected from tire piles. Overall, state and county government efforts represented 1,580,075 PTEs during FY 2013. Kentuckians generated 5.3 M PTEs as waste tires in CY 2013, thus the state and county handled 30% of the PTEs sent to market. The private sector handled the remaining 70% of waste tires.

The table outlines receipts and expenditures from the Waste Tire Trust Fund for FY2010 through FY2013. Please note that expenditures will not necessarily match receipts since the trust fund is allowed to carry forward any remaining receipts to the next fiscal year.

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| Waste Tire Receipts and Expenditures | | | | | |
|---|--------------------|--------------------|--------------------|--------------------|------------------------|
| Fiscal Year | 2010 | 2011 | 2012 | 2013 | Four-year total |
| Receipts | | | | | |
| Prior year carryover | \$496,193 | \$449,181 | \$1,049,173 | \$1,512,405 | Not Applicable* |
| Tire Fee | \$2,673,255 | \$2,621,464 | \$2,591,606 | \$2,509,124 | \$10,395,450 |
| Interest | \$11,390 | \$6,302 | \$21,417 | \$3,382 | \$42,491 |
| Prior year grant refunds | \$4,220 | \$19,337 | \$98,242 | \$94,955 | \$216,754 |
| Return from Cap Projects | | \$3,804 | | | \$3,804 |
| TOTAL | \$3,185,058 | \$3,100,088 | \$3,760,438 | \$4,119,866 | N/A |
| Expenditures | | | | | |
| DWM Administrative costs | \$917,224 | \$584,934 | \$563,474 | \$573,008 | \$2,638,639 |
| Reimbursement to DOR | \$50,000 | \$50,000 | \$50,000 | \$0 | \$150,000 |
| Amnesties | \$1,445,839 | \$660,642 | \$1,016,971 | \$2,141,222 | \$5,264,673 |
| Crumb Rubber Grants | \$299,954 | \$400,000 | \$269,547 | \$250,000 | \$1,209,501 |
| TDF Projects | \$20,941 | | | \$7,289 | \$28,230 |
| Tire Grants to counties | | \$351,000 | \$344,788 | \$339,000 | \$1,034,788 |
| Refunds to Revenue | \$1,919 | \$4,340 | \$3,255 | \$1,170 | \$10,684 |
| Expenditures TOTAL | \$2,735,877 | \$2,050,915 | \$2,248,034 | \$3,311,689 | \$10,346,515 |

*Does not include carryover.

COST ISSUES

Increasing costs to clean up facilities after tire fires is one of the biggest cost issues the cabinet faces. The King Tire fire in McCreary County cost the Waste Tire Trust Fund (WTTF) \$649,050. The burning of the tires resulted in a release of hazardous substances to the environment. The cabinet found it necessary to expend about \$350,000 from the Hazardous Waste Management Fund to address these releases during late CY 2012. Since the fund averages about \$2.6 million per year in receipts, this was a major expense and could have cut into crumb rubber grants and market development. Since the cabinet removed 1,151,087 PTEs and the company forfeited a \$100,000 Letter of Credit, this represented a cost to taxpayers of about \$900,000 or \$0.78 per PTE. If the nearby landfill had not been available and the cabinet had used its normal contract price, which includes recycling, the cost would have been \$1.55 per PTE.

Site #1 discussed in the TDF section has approximately 1.9 million PTEs in storage with the possibility of obtaining a TDF contract, if the processing meets specifications. The owner has an Agreed order to remove tires in excess of the \$10,000 storage bond. If this site were to catch fire, site remediation and tire removal costs could exceed \$3,000,000, essentially wiping out the WTTF for the year. To help

offset the expenditure of taxpayers’ monies on cleaning up any future sites that experience business problems leading to failure or a tire fire; a statutory bond amount increase could be considered. The bond amount in KRS 224.50-862 could be increased from \$1.00 per tire to \$1.50 to cover all clean-up costs. To include fire and release of hazardous substances, the legislature could consider raising the financial assurance requirement to \$1.50 to \$2.00 per PTE, or require a cost estimate and additional bond for corrective action as is done in some states.

A second issue involves handling Revenue costs for fee collection as an “administrative cost” under the statute. The law requires the WTTF be used to reimburse DOR for its costs incurred in assessing and collecting fees, not to exceed \$50,000 per year. Currently the payment to DOR is considered to be an administrative cost to the cabinet, and thus a portion of the cabinet’s 25% allotted for administration of the program. The statute could specifically exclude DOR’s reimbursement from being a portion of the cabinet’s administrative costs since this funding is not made available to the cabinet.

The cabinet should continue to receive 25% for administration of the waste tire program. Any future reductions of the administrative funding could negatively impact the program. Given the unknown future of this program, there may be a time when the 25% limit is a hindrance. This is especially true if enforcement continues to take a bigger role in the management of waste tires, as they have in 2012 and 2013.

III. WASTE TIRE MARKET DEVELOPMENT

WASTE TIRES GENERATED IN 2013

Kentuckians generated 5.3 Million PTEs in 2013. There is no known statistical database for waste tires generated in individual states, therefore this was an estimate drawn from national data prorated based on the Commonwealth’s population, gasoline consumption and number of motor vehicle registrations.

| 2013 U. S. Generation (Millions)⁶ | | | |
|---|-------------------|------|------------|
| Type | Replacement Tires | PTEs | Total PTEs |
| Auto | 200 | 1.0 | 200 |
| Light Truck | 29 | 1.5 | 44 |
| Medium/Heavy Truck | 16 | 5.5 | 87 |
| Subtotal | 245 | | 331 |
| Salvage (5%) | 12 | | 17 |
| Total | 257 | | 348 |

Statistics for actual CY 2013 replacement tires were not available at the time of creating this report, so estimated 2013 replacement tire sales were used as reported by the RMA. Similarly, statistics for CY 2013 gasoline sales, number of vehicle registrations and population were not available at the time of creating this report, so 2012 gas use, population and numbers of vehicle miles were used in compiling the Kentucky percentage of U.S. replacement tire sales.

A waste tire is generated for each replacement tire sold. A waste tire is most commonly measured in 20-pound units or Passenger Tire Equivalents (PTEs), which is the approximate average weight of a passenger automotive tire. A light truck tire is 30 pounds or 1.5 PTEs, while a medium truck tire, such as a tractor-trailer tire at 110 pounds, is 5.5 times heavier than an automotive tire, or 5.5 PTEs. Conversion of tire units into a uniform weight basis (100 PTE = 1 ton) allows comparison of waste tire generation to markets that are tracked in tons. The Kentucky Waste Tire

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Generation Calculations table defines the quantity of waste tires generated in 2013, expressed as tire units and as PTE.

Waste tires are also generated from vehicle salvage operations. Junked vehicles generally have tires, some of which are recovered and resold as used tires while others are eventually disposed of as waste. The quantity of vehicles removed from service is available in “Wards Motor Vehicle Facts and Figures”, but the assumed quantity of waste tires per vehicle is debatable. If two tires per passenger vehicle and three tires per truck or bus are considered waste, and salvage yard owners place a large amount of tires into car bodies before crushing, then waste tires from vehicle salvage operations represent approximately 5% of replacement tire sales. Therefore, total U.S. waste tire generation in 2013 was estimated to be 257 million units representing 348 million PTEs. Sales and generation data vary by year based on economic conditions. An average benchmark of one waste tire per person per year is often cited, but there was a 10-20% variation based on economic conditions. In 2013, actual U.S. generation was 18% below this citation on a unit basis and 11% above on a PTE or weight basis.

Waste tire generation is considered to be dependent upon population, gasoline consumption and vehicle miles. The quantity of waste tires generated in Kentucky can be estimated by calculating Kentucky’s percentage of each of these parameters. The sources are cited in each calculation.

| Kentucky Waste Tire Generation Calculations | |
|---|-------------|
| 2012 Gas Use (1,000s Barrels) ⁷ | |
| KY | 50,746 |
| U.S. | 3,177,687 |
| % | 1.63% |
| 2012 Vehicle Miles (Millions) ⁸ | |
| KY | 47,344 |
| U.S. | 2,968,815 |
| % | 1.59% |
| 2012 Population ⁹ | |
| KY | 4,380,415 |
| U.S. | 313,914,040 |
| % | 1.40% |

For Kentucky, the average percentage is 1.54% and the variation for the individual categories of 1.70 to 1.40 is plus 10% or minus 9% from the average. This is comparatively good agreement and provides a sound basis for the estimate.

| Number of KY Waste Tires based on U.S. Generation | | | | |
|---|------------------|------------|----------------|------------|
| | Tires (Millions) | | PTE (Millions) | |
| | U.S. | KY (1.54%) | U.S. | KY (1.54%) |
| Replacement | 245 | 3.8 | 331 | 5.1 |
| Salvage | 12 | 0.2 | 17 | 0.2 |
| Total | 257 | 4.0 | 348 | 5.3 |

The estimated number of tires generated in Kentucky in 2013, counting a heavy truck tire as one tire, is about **4.0 M** tires or **0.9** tires per person per year. The total quantity expressed as PTE is 5.3 million. The estimated number of replacement tires sold in Kentucky in 2013 was 3.8 M tires.

CY 2013 MARKETS

The statewide recycling rate for tires increased to 86.0% for 2013 compared to 80.5% for 2012. This figure is above the 81.6% in the U.S. for 2011, the latest available national data.¹⁰ The Commonwealth has increased its recycling rate in the short-term by working to increase the in-state Tire Derived Fuel (TDF) market and could increase the reuse percentage in the future through the diversification of markets.

TDF applications included use in boilers at paper mills, cement kilns, and utilities that use whole or processed tires as a supplemental energy resource, displacing a small percentage of fossil fuel usage. These facilities operated in full compliance with all applicable federal, state and local environmental regulations.

The largest ground rubber applications included playground safety cushioning, colored landscape mulch, and athletic fields.

The cabinet conducted several steps to gather information about the Commonwealth’s waste tire recycling markets, including:

- Obtained recycling market information from each major in-state processor;
- Compiled total tonnage of waste tire disposal from each landfill;
- Differentiated tires collected in Kentucky from those collected out-of-state based on the processors’ records and knowledge;
- Identified and contacted out-of-state processors believed to collect tires from Kentucky; and
- Contacted users of the tire products to verify the receipt of processed tires and the landfill owners to verify disposal amounts.

| KY Waste Tire Collections 2013 (Tons) | | | |
|---------------------------------------|-----------------|--------------|---------|
| | Tires Generated | | |
| | Kentucky | Other States | Total |
| In-State Facility Owners | 37,860 | 56,237 | 94,097 |
| Out-of-State Facility Owners | 155 | - | 155 |
| Amnesty | 15,800 | - | 15,800 |
| Total | 53,815 | 56,237 | 110,052 |

As the cabinet compiled the numbers in mid-December, a projected amount of tires for the final month of the year was projected by averaging the first eleven months.

Since the processors and landfill owners have no knowledge of open tire dumps, the cabinet did not include the number of waste tires at open dumps in the recycling report. However, the cabinet estimated about 2.1% of waste tires were illegally disposed based on the national average of unreported markets for waste tires.¹¹ Since the cabinet gives \$3,000 mini-grants to counties to assist in remediating tire piles, and the counties expend some additional funds cleaning up tire dumps, the percentage for tires remaining in dumps in Kentucky may be lower.

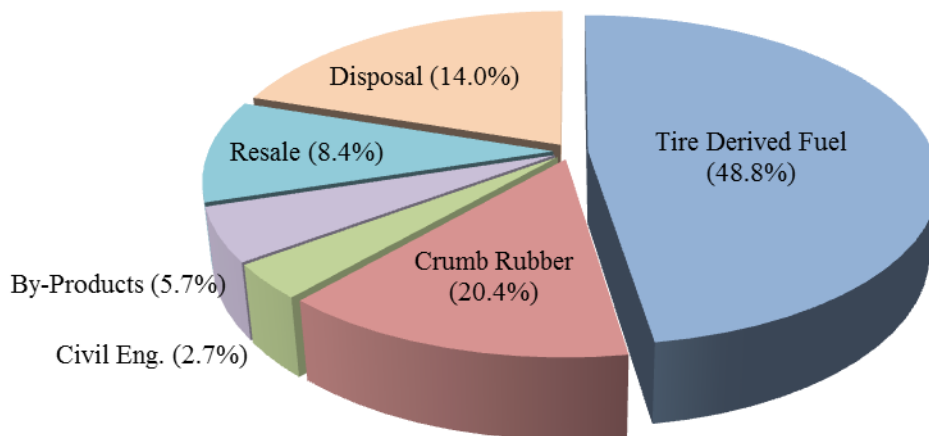
The 2013 Kentucky Waste Tire Market Report follows below:

| Kentucky Waste Tire Markets 2013 (Tons) | | | | | | | | |
|---|----------|--------|------------|-------------|--------|----------|----------|--------|
| | Recycled | | | | | | Disposal | TOTAL |
| | TDF | Crumb | Civil Eng. | By-products | Resale | Subtotal | | |
| In-State | 18,015 | 5,250 | 1,285 | 1,990 | 3,790 | 30,330 | 7,530 | 37,860 |
| Out-of-State | 0 | 0 | 155 | 0 | 0 | 155 | 0 | 155 |
| Amnesties | 8,265 | 5,705 | 0 | 1,095 | 735 | 15,800 | 0 | 15,800 |
| TOTAL | 26,280 | 10,955 | 1,440 | 3,085 | 4,525 | 46,285 | 7,530 | 53,815 |
| Percentage | 48.8% | 20.4% | 2.7% | 5.7% | 8.4% | 86.0% | 14.0% | 100.0% |

WASTE TIRE PROGRAM

The 2013 Kentucky recycling market was compared to the 2011 U.S. Market, the latest available, demonstrated in the chart below.¹² “Other” U.S. markets on the chart include: Used Tires 13.2%, TDF 32.7%, Ground Tire Rubber (GTR) 21.3%, Disposal or landfilling 11.3%, Exported 6.9%, Civil Engineering 6.8%, Other or unknown 7.7% (Note: Numbers are adjusted to add used tires as a market. The source article excludes resold used tires. The article gives 13.2% of all replacement tires as used tires, subtracts this number from the total, and counts the remainder of tires as 100%: TDF 37.7%, GTR 24.5%, Disposal 13.0%, Exported 8%, Civil Engineering 7.8% and other 8.9%).

CY 2013 KY Reuse and Recycling Markets:



When comparing Kentucky to other national markets, comparisons show the following:

- Higher state reliance on TDF, which is typical for the Southeast which is 71%¹³;
- About the same reliance on playground mulch and ground rubber;
- Less use in civil engineering applications;
- Slightly less reselling of used tires;
- Almost no exporting to other countries; and
- Slightly more landfill disposal.

The ground tire rubber market is a higher-end market than TDF, as the properties of the original tire is carried forward to the new product rather than using the one-time energy value of the waste tire as TDF.



A screen in the left foreground sorts tire chips. Then a conveyor dropped product into a pile at Liberty Tire in Jefferson County. “Fluff” from shredding tires, the fabric material, is in the right foreground. The muddy chips in the background were from the Simpson County tire fire remediation.



Two belt magnets to the right of the picture removed loose wire at Liberty Tire in Jefferson County. Liberty Tire is the largest supplier of tire derived products in the Commonwealth. (Photographs courtesy of Terry Gray, TAG Resource Recovery, November 2012).

TDF MARKET DEVELOPMENT

Kentucky has gone from no in-state markets in 2000 to a point where all of its TDF could be used in-state in 2013 due to market development and information sharing. In 2001, Kentucky spent \$454,276 on capital equipment to assist Owensboro Municipal Utility (OMU) in using TDF. Although the contract expired in 2004, OMU still used 298,000 PTEs in 2013. In 2006 NewPage, located in Ballard County, was granted \$750,000 to make improvements

| IN-STATE TDF USAGE (PTEs) | | | |
|---------------------------|------------------|------------------|------------------|
| Company | 2011 | 2012 | 2013 |
| Kosmos | 1,116,800 | 1,295,000 | 1,369,700 |
| OMU | 358,500 | 362,000 | 298,000 |
| NewPage | 218,200 | 410,000 | 325,000 |
| EKPC | 0 | 0 | 872,900 |
| TOTAL | 1,693,500 | 2,067,000 | 2,865,600 |

to its process infrastructure in order to use 3,750,000 PTEs by 2012. To date, NewPage has used 1,825,000 PTEs and requested an extension to the initial deadline to meet the goal. Since that time, NewPage has undergone bankruptcy and technically discharged its obligation to use tires. However, the company does continue to use TDF. Rubber fuel use capacity in the Commonwealth has increased from approximately 1.1 million PTEs per year in 2001 to approximately 2.9 million in 2013. In 2001, all Kentucky-generated waste tires went to out-of-state TDF markets. Currently, virtually all 2.0 million Kentucky annually-generated PTEs that are destined for TDF are used in-state.

Kosmos Cement is a whole tire TDF user in the manufacture of cement.

Major Benefits of TDF include:

- Incorporates metal from tires directly into clinker product;
- Supports Louisville Metro's green initiatives;
- Decreases Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂) and Particle Material, less than 10 microns (PM₁₀) coal emissions;
- Tire ash is incorporated in product.^{16, 17}

Kosmos Cement, a partnership between CEMEX and Lone Star Cement, used 83,100 PTEs in 2010 and has increased each successive year. Kosmos used 1,369,700 PTEs in 2013. The company uses a unique tire machine, similar to a baseball or softball pitching machine, to toss whole tires into the center of the kiln for a more efficient burning. The reinforcing wire in the tire is incorporated into the clinker. Compliance air emission testing revealed no significant change in emissions from using waste tires and coal as opposed to only coal. In fact, Nitrogen Oxide emissions, a major greenhouse gas, were reduced 37% when using TDF with coal.¹⁴ Kosmos desires to begin using chips in addition to whole tires to increase its capacity for recovering the energy from tires. This would double their TDF capacity.

Another progressive company using TDF is rural electric system's East Kentucky Power Cooperative (EKPC). The cabinet submitted a letter in support of EKPC's petition to the Public Service Commission (PSC) during 2012 to use the Fuel Adjustment Clause for TDF which was subsequently granted during 2013. Use of the provision allows for quicker recovery of TDF cost from the electrical customer and makes the use of alternative fuels more economical. EKPC used 872,900 PTEs in 2013. EKPC could use 1.4-2.8 M PTEs/yr if 2-4% of total BTUs were TDF. Kentucky already has a total TDF capacity that exceeds its TDF market production. Some of these tires would have to come from out of state, probably Ohio and Tennessee.

The use of TDF helps further the use of coal as it makes the fossil fuel more environmentally friendly. According to the U.S. EPA, Green House Gas (GHG) has been reduced as a co-benefit of the use of secondary materials—the GHG rate associated with the combustion of scrap tires is approximately 0.09 MTCO₂ E per million BTU of scrap tires combusted, while the GHG emissions rate for coal is approximately 0.094 MTCO₂ E per million BTU. Combined with the avoided extraction and processing emissions 0.006 MTCO₂ E/million BTU for coal, the total avoided greenhouse gas is 0.010 MTCO₂ E per million BTU. Also, substituting TDF for coal would avoid an estimated 0.246 Lbs/million BTU of particulate matter associated with the extraction and processing of the coal.¹⁵ Multiplying the annual use of 28,656 tons TDF with coal in Kentucky by these factors shows a savings of almost 9,700 tons carbon dioxide (CO₂) and 109 tons particulate matter not emitted each year.

GROUND RUBBER MARKET DEVELOPMENT

The ground rubber market has remained steady over time. Since 2004, the Commonwealth has awarded 330 grants totaling \$7.0 million, primarily to schools and municipalities, for crumb rubber uses. The

uses were crumb rubber spread on athletic fields to increase turf life and playgrounds to reduce injuries. A listing of crumb rubber grantees for FY 2013 is included in Appendix A.

Manufacturing of ground rubber and mulch from Kentucky tires increased from near zero in 1998 to 1,095,500 PTEs per year in 2013. Liberty Tire (formerly Martin Tire) in Union County manufactures a large quantity of colored mulch for outlets such as Lowe's, Home Depot and Wal-Mart. Dalton Tire Recycling in Boyd County produces ground rubber for playgrounds and horse arenas. Porter Tire in Carter County started producing crumb rubber this year.

Kentucky produced more TDF and ground rubber than the national average. However, it produced less ground rubber for synthetic turf, molded rubber products, and rubber modified asphalt. Eventually, the free market should direct waste tires to ground rubber manufacturing over TDF use. Kentucky could focus on two new emerging ground rubber markets while maintaining the playground mulch and athletic field grants:

1. Automotive Industry

In 2010, Kentucky ranked third in the U.S. for auto industry employment.¹⁸ The Commonwealth could assist the three major automotive manufacturers inside its borders in using waste tire ground rubber in molded automotive parts to broaden this important potential application.

2. Rubberized Asphalt

The Transportation Cabinet is considering the use of rubberized asphalt for those situations when the market for polymers experiences a shortage. See the article in Appendix E on the KY 8 pilot project involving the Plant Mix Asphalt Industry of Kentucky, Transportation Cabinet, Kentucky Department of Highways District 6, University of Kentucky Transportation Research Center and several other players.

Rubberized Asphalt

- Rubber asphalt is a “blend of asphalt cement, reclaimed tire rubber, and certain additives in which the rubber component is at least 15% by weight of the total blend and has reacted in the hot asphalt cement sufficiently to cause swelling of the rubber particles”.¹⁹
- Mixes can vary; a two-inch thick overlay of rubberized asphalt mix will use approximately 2,000 tires per lane mile.
- The reduced thickness of rubberized asphalt can save on the amount of aggregate required to resurface a road.

IV. FEE EXTENSION BEYOND JUNE 30, 2014

The waste tire program exemplifies the cabinet’s mission of protecting human health and the environment and encouraging waste reduction, reuse, and recycling. The Waste Tire Trust Fund allows statewide tire amnesties on a three year rotation, remediates large tire piles, and develops markets for TDF and ground rubber. If the waste tire fee is not extended, program funds will not be available to conduct amnesties or remove illegally dumped tires. The cabinet would no longer be able to provide assistance in

developing ground rubber and TDF market. Due to shortfalls in the general fund budget, it is unlikely that another source of funds would be available to operate the program.

Illegal waste tire dumps soon reappeared in states that have discontinued their waste tire programs. The states were faced again with a recurrence of the original emergency situation which necessitated the fee, including remediation of large tire piles and fires. Legislatures and governors were asked to remedy a problem that was previously solved.

A total of 36 states have some sort of tire fee²⁰. The median fee is \$1.00 per new tire sold. The highest fee is \$2.50 in Alaska, Illinois and New York State while the lowest fee is \$0.25 in Indiana. Some states that have or had no fee and their experiences include²¹:

- Minnesota: An increase in waste tire tipping fees and an increase in monofilling (landfilling of only tires in a disposal cell and a loss to the recycling market);
- Wisconsin: TDF market crashed without the state subsidy;
- Texas: Spent \$9.5 M in general funds to clean up two waste tire piles and buy TDF metering (feed) systems for industry. Saw an increase in land reclamation (disposal) using waste tires in conjunction with soil to fill excavated sites;
- Missouri: No fee for two years during which the state saw an increase in fires. The legislature reinstated the fee for five years in 2009; and
- Recycling rates dropped an average of 25% in seven states after discontinuance of the fee.

In addition to the repercussions discussed above, the following impacts could happen in Kentucky as a result of the fee expiring:

- Counties would not receive the \$3,000 annual grant to clean up dumped tires;
- Rural areas would be impacted by dumped waste tires on farms and roadsides;
- Counties would not be able to look to the state for large tire pile remediation;
- Playground crumb rubber grants would cease;
- Rubberized asphalt and extruded molding (auto parts) market development would stop.

The cabinet strongly recommends that the General Assembly extend the waste tire fee.

V. COST OF TIRE DISPOSAL BY COUNTIES

The cabinet learned from waste tire processors that their charge for tire pick-up is generally from \$1.00 for cutting and landfilling to \$1.50 for recycling.

To help the counties defray some of their expenses, the cabinet offered \$3,000 per county for waste tire disposal, somewhat similar to what had been offered for Commonwealth Clean-up Week. The cabinet gave \$339,000 from the Waste Tire Trust Fund to 113 counties to pick up and dispose or recycle an

additional 240,736 PTEs. Additionally, counties spent \$80,947 of their own money on waste tire remediation in conjunction with the cabinet grants.

The cabinet also allowed some use of the litter money from the PRIDE fund to be used to pick up waste tires along roads and highways.

VI. OTHER ISSUES

HB 433 in the 2011 session attempted to “close the loop” regarding accountability for waste tires placed into the disposal or recycling system. Before 2011, each transporter who picked up tires from a retailer merely left a copy of the waste tire receipt with the tire retailer. Then, the processor left a copy of the receipt with the transporter. There was no requirement that the processor return a receipt to the tire retailer showing that the waste load had reached its destination and that the retailer was receiving the service that it expected. The return of a final receipt or copy of a manifest from the processor is mandated by most states. The language in KRS 224.50-874(2) was amended as follows:

A retailer, an automotive recycling dealer, and a person required to register as an accumulator, transporter, or processor who transfers waste tires to another person shall obtain a receipt for the waste tires. The final processor or a transporter who arranges for disposal or recycling out-of-state shall return a copy of the receipt for disposal or recycling to the retailer within thirty (30) days of receiving the waste tires. If the retailer does not receive the receipt from the final processor or transporter showing proof of who took final custody of the waste tires and disposed of the tires in accordance with KRS 224.50-856(1) and (2), the retailer shall notify the Division of Waste Management.

The language could be interpreted to only close the loop for retailers sending their tires out of state for disposal. In order to clarify that the language “closes the loop” regarding accountability for waste tires, in-state processors could also be required to return a copy of the receipt to the original generator, the language could read (with inserted commas underlined):

“The final processor₁, or a transporter who arranges for disposal or recycling out-of-state₂, shall return a copy of the receipt for disposal or recycling to the retailer within thirty (30) days of receiving the waste tires.”

The free market handled 70% of the PTEs in Kentucky, with state-funded programs paying for 30%. Coverage of all areas by processors is necessary for the free market to work. Transportation distance translates into higher costs for certain areas if a good tire processor is not reasonably near. Appendix D contains a map showing the locations of waste tire processors in the Commonwealth.

WASTE TIRE PROGRAM

The reporting requirement in KRS 224.50-872 could be more efficient if the requirement was for a report every two fiscal years. This would allow for changes to the program to be realized before a report was due. It would also place reports in conjunction with the state budget cycle.

The Waste Tire Working Group could be expanded in order to examine more thoroughly how the program might be improved. The workgroup currently consists of the members required by statute: Two cabinet members, two SWaCK members, a representative of the Kentucky Department of Agriculture, one county Judge-Executive, one Mayor and one member of the tire retail establishment. Additional representatives might come from the Department of Revenue, tire wholesalers, scrap tire experts, Rubber Manufacturers Association, tire processors, tire accumulators, tire transporters, TDF users, Kentucky Trucking Association, County Clerks, salvage yards, school districts, and others as necessary. The trucking association is important because trucks use about half of all rubber, by weight, in the tire market. TDF users consume most of the waste tire rubber in the Commonwealth. School districts use crumb rubber on playgrounds and athletic fields.

A change to how the Department of Revenue is reimbursed could help close the gap between the possible \$3.6 million that could be collected and the \$2.6 million actually received.

Footnotes:

¹ Section 2505, Outdoor Storage, Tire Rebuilding and Tire Storage, Chapter 25, International Fire Code, 2006.

² Miles Moore, “Softening scrap tire market prodding industry to adapt”, *TireBusiness.com*, May 30, 2013, <http://www.tirebusiness.com/article/20130530/NEWS/130539985/softening-scrap-tire-mark>

³ “Tire Repair”, Tire Safety, Rubber Manufacturers Association, <http://www.rma.org/tire-safety/tire-repair/>

⁴ “Used Tires”, Tire Safety, Rubber Manufacturers Association, <http://www.rma.org/tire-safety/used-tires/>

⁵ U.S. Census Bureau News, November 22, 2013, http://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf

⁶ 2013 Shipments to Grow More Than 4 percent, Rubber Manufacturers Association, December 17, 2013, <http://www.rma.org/2013-tire-shipments/>

⁷ U.S. Energy Information Administration, State Energy Data System (SEDS): 2012 (Updates), TABLE F3: MOTOR GASOLINE CONSUMPTION, PRICE, AND EXPENDITURE ESTIMATES, 2012, http://www.eia.gov/state/seds/sep_fuel/html/pdf/fuel_mg.pdf

⁸ U.S. Department of Transportation, Federal highway Administration, Office of Policy Information, Highway Statistics Series, Highway Statistics 2012, FUNCTIONAL SYSTEM TRAVEL – 2012 (1), ANNUAL VEHICLE – MILES, <http://www.fhwa.dot.gov/policyinformation/statistics/2012/vm2.cfm>

⁹ United States Census State & County QuickFacts, <http://quickfacts.census.gov/qfd/states/21000.html>

¹⁰ Miles Moore, “Softening scrap tire market prodding industry to adapt”, *TireBusiness.com*, May 30, 2013, <http://www.tirebusiness.com/>

¹¹ Rubber Manufacturers Association, U.S. Scrap Tire Management Summary 2005 -2009, October 2011, p.2

¹² Miles Moore, “Softening scrap tire market prodding industry to adapt”, *TireBusiness.com*, May 30, 2013, <http://www.tirebusiness.com/>

¹³ Scrap Tire Markets in the United States: 9th Biennial Report, May 2009, Rubber Manufacturers Association, p. 67.

¹⁴ Cement Kiln Burns Scrap Tires, *The Courier-Journal*, November 26, 2012.

¹⁵ 76FR15494, 40 CFR Part 241, EPA, Identification of Non-Hazardous Secondary Materials That Are Solid Waste, Final Rule, March 21, 2011 *Federal Register*.

¹⁶ CEMEX Kosmos Cement Company, “Tire Derived Fuel Project Solid Waste Permitting Overview”, May 5, 2010

¹⁷ Particulate Matter less than 10 microns in size. Factor of 0.00192 lbs. per PTE derived from Section 2.2, “Test Report for the Kiln Tire-Derived Fuel Compliance Demonstration Test Performed at the Cemex-Kosmos Plant”, URS, Sept. 28-Oct. 1, 2009.

¹⁸ 2012 Kentucky Automotive Industry, Kentucky Cabinet for Economic Development, Office of Research and Public Affairs; http://thinkkentucky.com/kyedc/pdfs/KY_Auto_Industry.pdf

¹⁹ ASTM International (formerly the American Society for Testing Materials), D8-12 Standard Terminology Relating to Materials for Roads and Pavements.

²⁰ Rubber Manufacturers Association, 2011

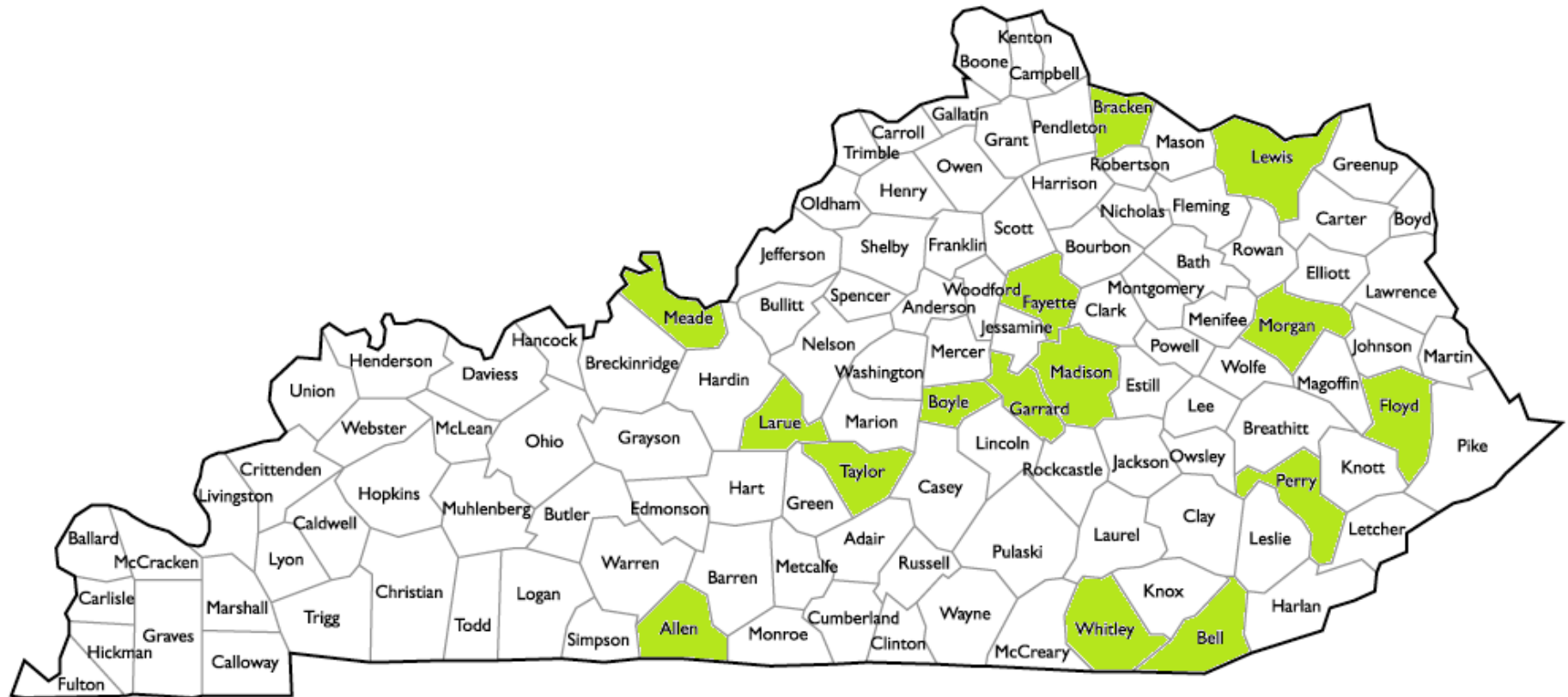
²¹ *Waste Tire Management Program Closure-Precedents/Experience in Other States*, Terry Gray, TAG Resource Recovery, Inc., Houston, TX 2011

WASTE TIRE PROGRAM

Appendix A: Crumb Rubber Grant Awards

| COUNTY | APPLICANT | PROJECT | PROJECT AREA | REQUESTED | AWARDED |
|--------------|--|--|--|-------------|-----------|
| ALLEN | Project C.A.M.P., Inc. | The Center for Courageous Kids | Access & Beautification to the Governor's Garden | \$10,695 | \$10,600 |
| BELL | Bell-Whitley Community Action Agency, Inc. | Frakes Playground | Playground | \$6,481 | \$6,400 |
| BOYLE | Boyle County Fiscal Court | Whites Park | Playground (9 play stations) | \$44,100 | \$43,900 |
| BRACKEN | Augusta Independent Schools | Augusta Independent Schools | Playground | \$28,151.50 | \$28,000 |
| FAYETTE | Blue Grass Baptist Church | Blue Grass Baptist School | Playground | \$10,990 | \$10,900 |
| FLOYD | Allen United Methodist Church | Wesley Christian School | Playground | \$18,935 | \$18,900 |
| GARRARD | Garrard/Lincoln Solid Waste Management Area | Jaycees Park | Playground | \$3,920 | \$3,900 |
| LARUE | Bullfrogs & Butterflies Child Development Center | Bullfrogs & Butterflies Child Development Center | Playground | \$5,000 | \$4,600 |
| LEWIS | City of Vanceburg | Scott Park | Playground | \$6,464.25 | \$6,300 |
| MADISON | Kentucky River Foothills Development Council, Inc. | Richmond Child Care Center | Playgrounds (2) | \$4,975 | \$4,900 |
| MEADE | Meade County Fiscal Court | Meade-Olin Park | Playgrounds (2) | \$59,600 | \$58,800 |
| MORGAN | Morgan County Fiscal Court | Heritage Park and Playground | Playground & Walking Trail | \$19,000 | \$17,900 |
| PERRY | Hazard Independent Schools | Roy G. Eversole Elementary | Playgrounds | \$29,921 | \$20,900 |
| TAYLOR | Taylor County School District | Taylor County Elementary School | Playground | \$4,985 | \$4,985 |
| WHITLEY | Bell-Whitley Community Action Agency, Inc. | Boston Park | Playground | \$9,100 | \$9,100 |
| GRAND TOTALS | | | | \$262,318 | \$250,000 |

Appendix B: FY2013 Crumb Rubber Grant Locations



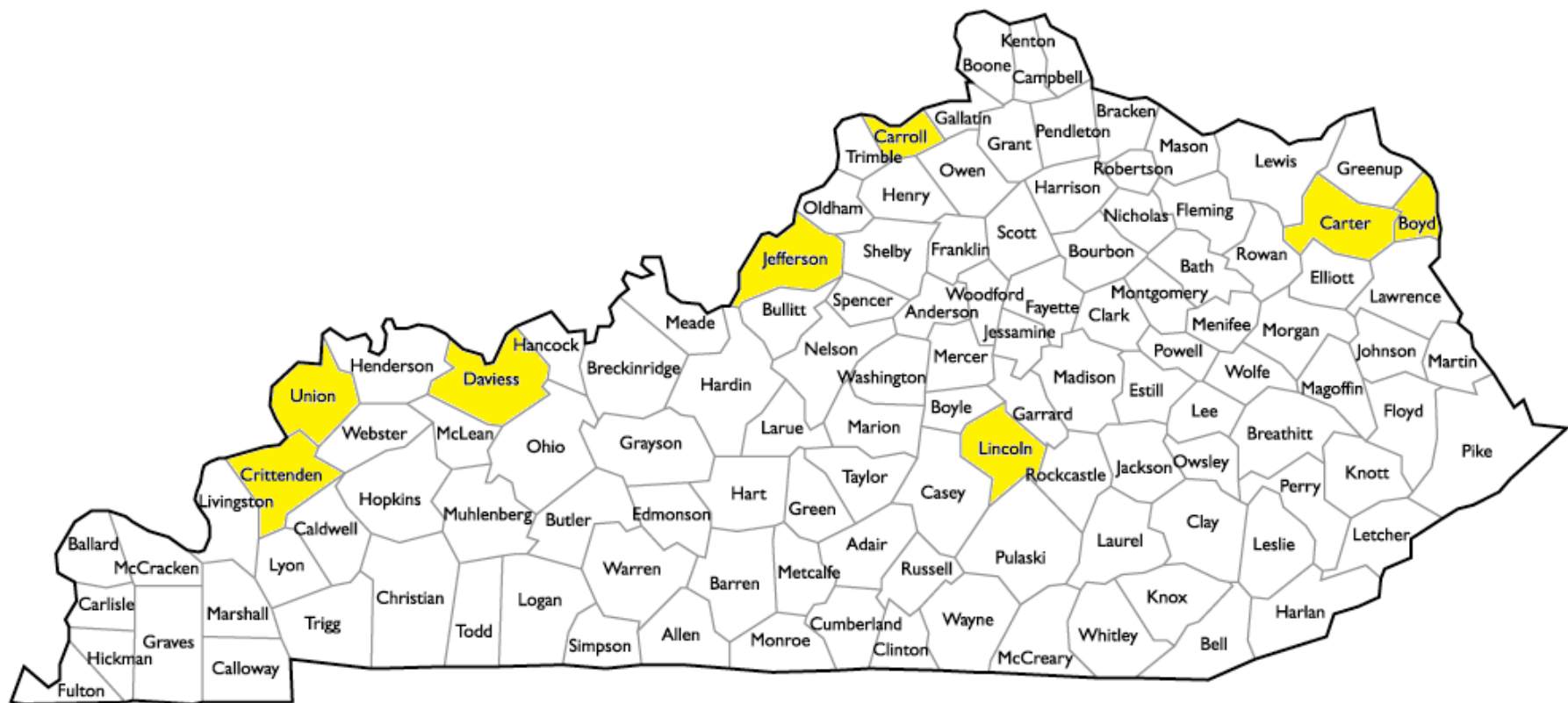
Appendix C: Waste Tire Amnesties and Other Remediation and Amnesty Schedule

| Waste Tire Amnesties and Other Remediation | | | |
|---|------------------|--------------------|---------------|
| Description | # PTEs | Cost | Cost/PTE |
| County Amnesties: | | | |
| Fall 2012 | 358,712 | \$407,317 | \$11.14 |
| Spring 2013 | 819,777 | \$930,857 | \$1.14 |
| FY 2013 Subtotal | 1,178,489 | \$1,338,174 | \$1.14 |
| Fall 2013 | 144,742 | \$164,355 | \$1.14 |
| Subtotal | 1,323,231 | \$1,502,529 | \$1.14 |
| FY 2013 Grants to Counties: | | | |
| Amount expended to 113 Counties | N/A | \$339,000 | N/A |
| Money Returned to State | N/A | \$82,111 | N/A |
| Net Waste Tire Trust Fund Money | N/A | \$256,889 | N/A |
| Counties Out-of-Pocket | N/A | \$80,947 | N/A |
| Total Spent by Counties and State | 240,736 | \$337,836 | \$1.40 |
| FY 2013 Pile Remediation: County: Site | | | |
| Laurel: Off-site | 20,598 | \$40,191 | \$1.95 |
| Metcalf: Off-site | 19,910 | \$22,607 | \$1.14 |
| Meade: London Branch | 16,901 | \$19,191 | \$1.14 |
| Powell: Off-site | 49,112 | \$62,163 | \$1.27 |
| Grant Co. Waste Tire Shredder | 4,382 | \$4,975 | \$1.14 |
| Madison: Off-site | 8,807 | \$10,000 | \$1.14 |
| Monroe: Off-site | 23,736 | \$40,878 | \$1.72 |
| Hardin: Off-site | 13,543 | \$15,378 | \$1.14 |
| Shelby: Off-site | 3,861 | \$4,384 | \$1.14 |
| Subtotal 2013 Remediation | 160,850 | \$219,767 | \$1.37 |
| FY 2013 Amnesties Subtotal | 1,339,339 | \$1,557,941 | \$1.16 |
| FY 2013 King Tire Fire (Fall CY 2012) | 1,151,087 | \$649,050 | N/A |
| FY 2013 Amnesties Total | 2,490,426 | \$2,206,991* | N/A |
| FY 2013 Grants to Counties Subtotal | 240,736 | \$256,889 | N/A |
| FY 2013 Amnesties and Grants (Without King) | 1,580,075 | \$1,896,941 | N/A |
| FY 2013 WTTF (Fund) Total | 2,731,162 | \$2,463,880 | N/A |

| Amnesty Schedule | | |
|---------------------------|----------------------------|----------------------|
| Time | Area Development Districts | |
| Fall 2012 (17 counties) | Bluegrass (17) | |
| Spring 2013 (18 Counties) | Lincoln Trail (8) | Lake Cumberland (10) |
| Fall 2013 (10 Counties) | Buffalo Trace (5) | FIVCO (5) |

* The amount totaled by Amnesty projects and FY expenditures never match since time elapses for contractor invoice preparation and 30 days are allowed for amnesty contractor bill payment. Some late FY 2013 amnesty event payments came later in FY 2014. Also, some late FY 2012 Amnesties may have been paid in early FY 2013. Therefore, the number is \$65,769 higher than the \$2,141,222 reported in “Waste Tire Receipts and Expenditures” table for FY 2013 in report.

Appendix D: Kentucky Waste Tire Processor Locations



Appendix E: Rubberized Asphalt Pilot Project Article

This is from the November 7, 2013 *Naturally Kentucky*, the blog for the Department for Environmental Protection and last year's waste tire report data:

Rubber Modified Asphalt Project Complete

Kentuckians generate 4.1 million scrap tires per year, or the equivalent of 5.6 million passenger tires when considering the weight of larger truck tires. We recycle 81 percent into various products such as playground mulch, or tire derived fuel which is burned in industrial boilers or used in cement kilns. Still, 17.5 percent of waste tires are disposed in landfills (Division of Waste Management 2012). Is there a better destination?

The Kentucky Transportation Cabinet (KYTC), in conjunction with the Energy and Environment Cabinet (EEC), reports the completion of the first rubber modified asphalt project in almost 20 years. The Department of Highways District 6, headquartered in Covington, is the construction manager for the paving of a 2.2 mile stretch of KY 8 running from I-471 to Dayton, Ky., on Sept. 25-29. I-471 connects downtown Cincinnati near Great American Ball Park, the home of the baseball Reds, and Paul Brown Stadium, the home of the football Bengals, with northern Kentucky. KY 8 runs by the Newport Aquarium and its surrounding shopping district. It is parallel to the Ohio River and includes many turn of the (last) century neighborhoods and shops. One contractor reports even uncovering the original street cobblestones while recovering the overlying asphalt!

Why pursue rubber modified asphalt? From the transportation sector, the use of rubber modified asphalt may help overcome any future shortages of polymer. Allen Myers, Director of the Division of Materials in the Transportation Cabinet, says, "In 2008 we suffered a shortage of polymer used in premium-grade asphalt binder. Because of this scarcity and other economic factors, Kentucky used unmodified binders on major highways for a time. These materials could potentially result in higher rutting susceptibility and lesser pavement durability. We want to investigate the use of rubber modified asphalt as a possible replacement for polymers in case the situation reoccurs."

From the side of the environment, the rubberized asphalt consumes about 2,000 waste tires per lane-mile according to CAL Recycle. Also, the crumb rubber market represents a higher end-use. The sale price for tire derived fuel is about \$20-40/ton while crumb rubber for asphalt brings \$100-400/ton for the scrap tire processor. Development of the fine rubber market in Kentucky would mean more profit for the shredding companies and consequently would attract more scrap tires. Tony Hatton, director of the Division of Waste Management which is co-sponsoring the project, says, "Rubber modified asphalt, extruded rubber automotive parts, and athletic field crumb rubber infills are examples of crumb rubber markets. Kentucky will not have these better uses unless we develop the markets."

Eaton Asphalt Paving Company is the first contractor to propose the crumb rubber asphalt project to the Department of Highways, District 6. Eaton President Tony Ogle says, "Our parent company has done several rubber modified asphalt projects around Dayton and Toledo, Ohio. We have the know-how and ability to do similar jobs in Kentucky, which is part of our service area." Brian Donnelly, District 6 materials engineer, likes what he hears: "If the use of rubber modified asphalt meets specifications and keeps waste tires out of landfills, I'm all for it."

The planning meeting was held July 24 at District 6. The group decision was that it is easier to modify an existing project rather than bidding a completely new one. The KY 8 endeavor, with an original price tag of \$651,000, fills the bill. The agreement calls for paving one lane and its parking spaces with

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polymer-modified asphalt as a control, and the other side with rubber-modified asphalt. Both types of asphalt binder satisfy the applicable specification. The EEC is paying the additional \$70,000 costs for the polymer and rubber modified asphalt as well as the \$15,000 for long-term testing by the Kentucky Transportation Center at the University of Kentucky.

Paving began on a temperate fall evening in downtown Dayton, Ky., near the Ohio River floodwall. The contractor used an additive to make the rubber modified asphalt handle similar to regular asphalt. The ingredient decreases the “stickiness” and rubber smell that normally come from rubberized asphalt. The use of warm-mix also decreases the temperature and assists with the odor.



Eaton paving train applying rubber modified asphalt in Dayton, Ky., near the Ohio River. Photo by Mark Belshe, Rubber Pavement Association (RPA).



Workers smoothing rubber modified asphalt around manholes. Photo by Mark Belshe, RPA.

The density tests completed soon after the project revealed that the contractor met the 100 percent pay standard set by KYTC. There was some settlement of rubber particles during construction, but KYTC believes that this may be minimized by controlling the distance from the plant and continually stirring the tanks. Mark Belshe, the observing engineer EEC contractor from the Rubber Pavement Association, says that it handles similar to regular asphalt.

The Kentucky Transportation Center is conducting long-term testing on the durability of the rubber modified asphalt as compared to the control section.

The pilot is considered a success so far. “With the test results, contractors in other parts of the state using regional aggregate can modify their asphalt mix design and proceed with confidence in the final product,” said Brian Donnelly of District 6. “I believe that the Transportation Cabinet will be better prepared if another polymer shortage occurs,” said Myers.



Can you tell which side is rubber and which is polymer? Photo by Brian Donnelly, Transportation Cabinet.

Sources for more information on rubber modified asphalt:

The Rubber Pavements Association (RPA): <http://rubberpavements.org/>

The Rubberized Asphalt Foundation (RAF): <http://www.ra-foundation.org/>

The Asphalt Rubber Technology Service (ARTS): <http://www.clemson.edu/ces/arts/>

National Center for Asphalt Testing at Auburn (NCAT): <http://www.ncat.us/>

Florida DOT: <http://www.dot.state.fl.us/>

Reference:

“Waste Tire Program CY 2012: A Report to the General Assembly”, Kentucky Division of Waste Management, Jan. 14, 2013,

<http://waste.ky.gov/RLA/Waste%20Tires/Documents/WasteTireRevisedReport129102.pdf>

The cabinet learned the following from the pilot project:

- Initial high voids content existed in the mix, but was quickly brought under control;
- Rubber particle settlement may have occurred at the plant. The contractor suspects that the rubber content, at 14%, may have been too high. For comparison, Florida uses 10% and Georgia 5%. The higher amount is currently necessary to meet Kentucky’s flexibility specification which is the highest in the nation;
- KTC permeability (resistance to water flow through the asphalt) meets normal specifications;
- In spring 2014, the KTC plans to do skid testing (braking) and pull more core samples for testing;
- The costs, only good for this project location, is an additional \$8.00 per ton of polymer and \$12 for waste tire crumb rubber;

Where do we go from here?

- Discuss the relatively 14% rubber specification with experienced asphalt rubber mix designers in other states. Discuss the 75% flexibility standard with TC (Ohio uses 70%, some states);
- Present the technical report, with help from the Transportation Cabinet (TC) and contractor, and obtain feedback at the February 2014 Annual Plant Mix Association of Kentucky meeting in Louisville; and
- Pursue additional pilot projects with the counties and TC.