TENNESSEE DEPARTMENT OF TRANSPORTATION

TO: **Mike Shinn, Chief of Administration**

FROM: **Ronnie Bowers, Director – Office of Environmental Compliance**

SUBJECT: **Waste Reduction & Recycling at TDOT Facilities**

DATE: **February 11, 2003**

TDOT Garage Facilities have made noteworthy and significant strides beyond regulatory environmental compliance accomplishments. Waste reduction and recycling efforts at over 100 facilities across the state have produced astounding results. Because one of the most effective means of reducing wastes is by recycling, waste reduction and recycling efforts are inter-related and necessitate collective discussion. In that light, both aspects are granted relatively equal regard and recognition throughout this document.

Environmental stewardship is the primary motivating factor for waste reduction and recycling. However, the benefits extend further as waste reduction and recycling are simply good business. Both waste reduction and recycling efforts share common goals as follows:

- Reduce waste generation rates,
- Reduce costs for handling wastes,
- Simplify waste handling procedures for garage personnel,
- Reduce risk and liability for waste handling and disposal,
- Reduce regulatory burdens (accomplished through reducing generator status), and
- Increase participation in recycling programs.

The Office of Environmental Compliance and TDOT Garage personnel accomplish waste reduction and recycling goals through a variety of initiatives including the following:

- Training and awareness, particularly in handling and waste segregation practices,
- Supporting efficient use of products to avoid excessive waste generation,
- Product substitutions to replace materials with environmentally preferred products,
- Centralized purchasing to reduce unintended hazardous material purchases,
- Process changes to reduce requirements for hazardous materials, and
- Internal recycling of unused materials and products.

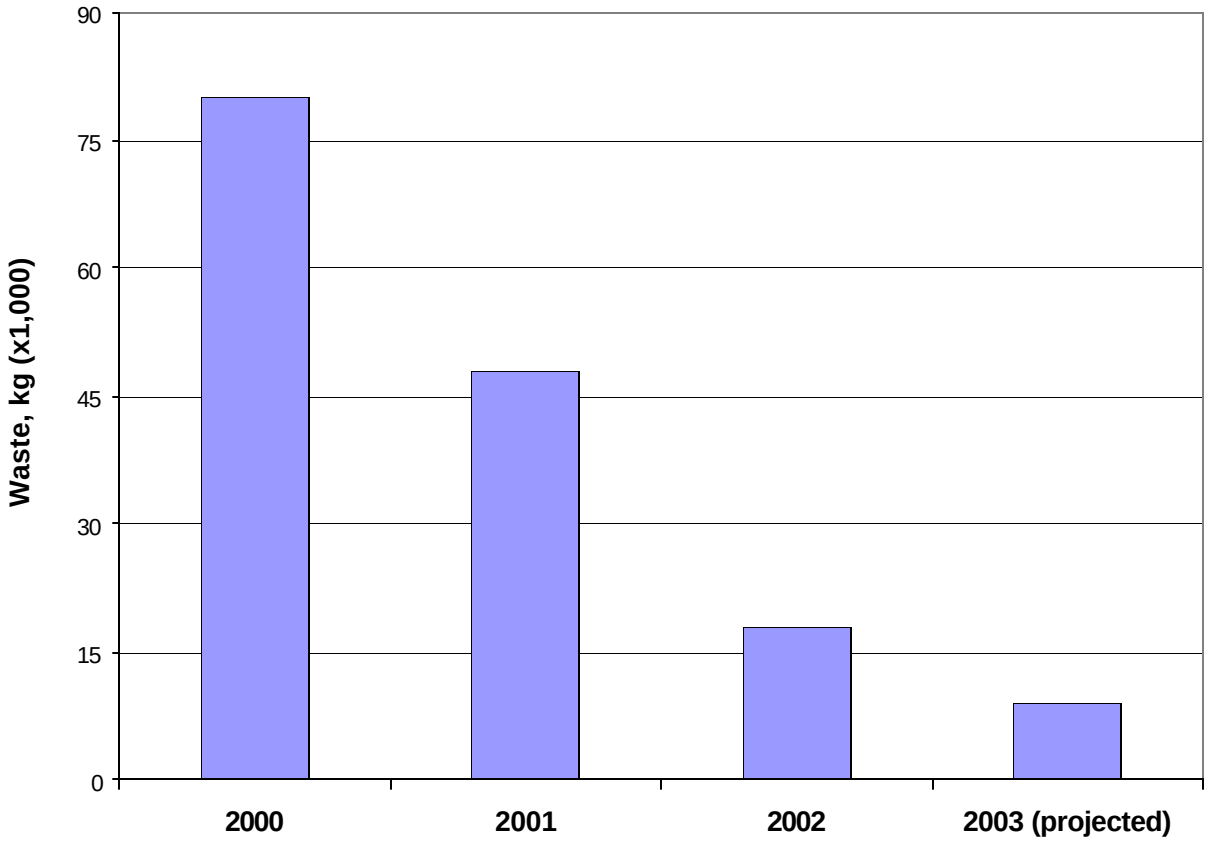
Many waste stream specific recycling initiatives have been successfully implemented at TDOT facilities. As determined from annual process reviews, the recyclable materials that are most commonly generated at TDOT garages include those below:

- Crushed oil filters – once hot-drained and crushed, these filters are not hazardous and are recycled.
- Punctured aerosol cans – when punctured to remove pressure, drained to remove residues, and crushed, these cans are also no longer hazardous and may be recycled.
- Circuit boards – circuit boards removed from dysfunctional flashers from service-related systems are recycled in place of hazardous waste disposal.

- Tire weights – used tire weights are collected to recycle lead values. Because lead weights are a high mass waste stream, recycling efforts will reduce regulatory status of most facilities.
- Brake turnings & other scrap metals – local vendors are contracted per facility to collect scrap metal.
- Automotive batteries – batteries are returned or swapped for recycling from local vendors.
- Used oil/hydraulic & transmission fluids – these waste oils are combined, transported by used oil haulers, and recycled by re-refining.
- Laundered rags – laundered rags are a recent policy change and will help eliminate hazardous and non-hazardous waste generation.
- Salt brine wastes – salt brine is recycled/reused as the brine wastes are returned to the salt pile.
- Antifreeze – antifreeze is no longer considered a hazardous waste at TDOT facilities as a result of negotiation with TDEC and successful adherence to TDEC specifications. Being a maintenance facility, antifreeze was a high-mass waste stream and negatively affected regulatory status.
- Spent parts washer solvent – new in-line filtering units are installed in TDOT garages to reduce the volume of waste generated during solvent changeout. As parts washer solvent was the largest contributor to regulatory status burdens during changeout months, discovering and implementing a recycling technology was of utmost priority.
- Unused products – another recent initiative promotes transferring unused products and materials to district and region facilities for redistribution.

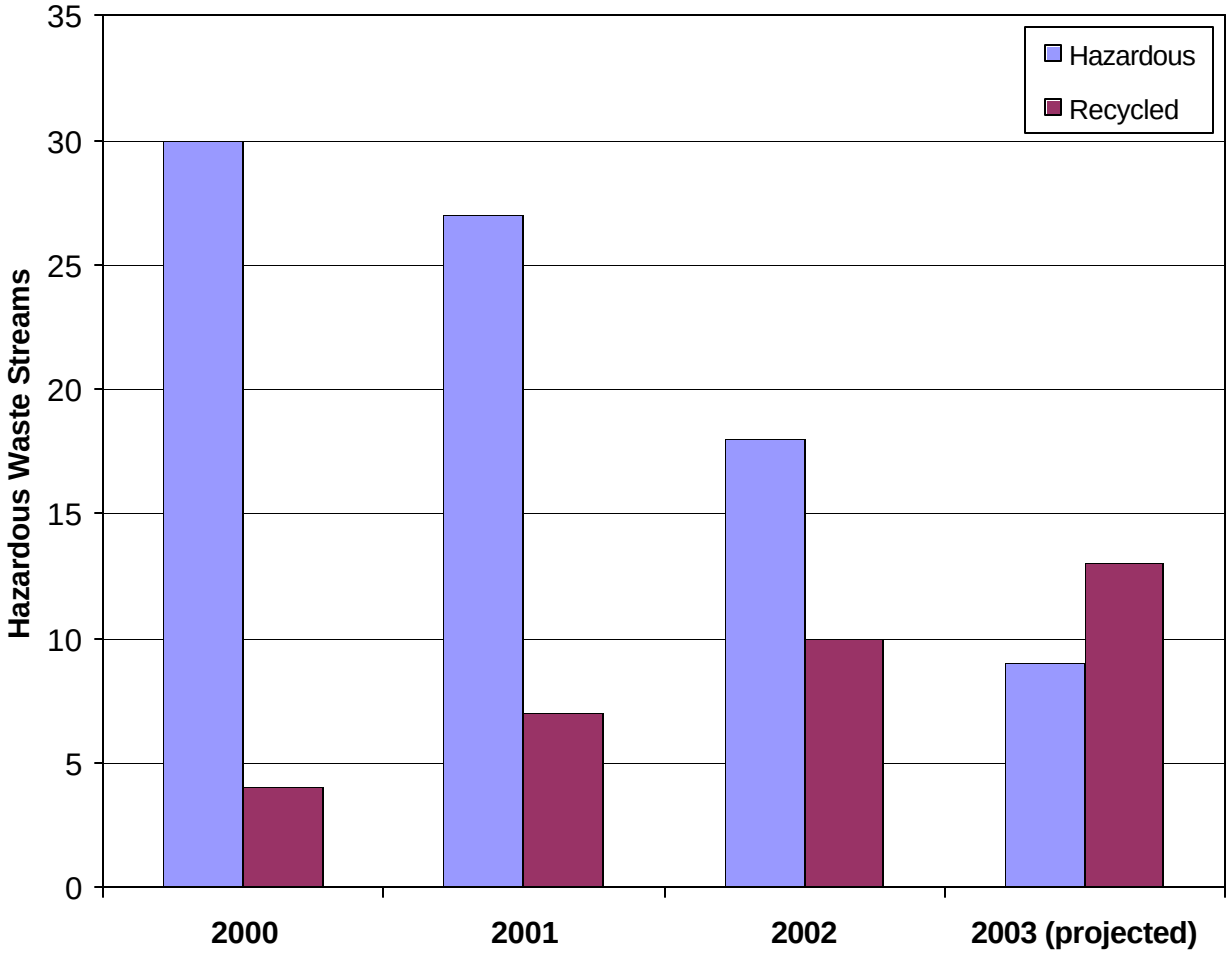
With at least one facility in all of the state's 95 counties, TDOT's waste reduction and recycling efforts have been a success, while challenging. On a statewide level, Figure 1 illustrates reported hazardous waste reductions from 2000 to 2003. Data for 2003 is based on projected expectations. Regional and district facility-specific reductions are presented in the attached Appendix, Figure A-1.

Figure 1. TDOT Hazardous Waste Generation



Individual material recycling figures for each facility across the state are not readily available at the present as that data is not required for compliance reporting. However, to help gauge the success of waste reduction and recycling efforts, hazardous wastes and recycled streams were referenced and are illustrated in Figure 2. As the result of multiple initiatives implemented over the last three years, the number of common hazardous waste streams generated across the state has dropped significantly, while the number of recycled items has increased. Waste stream reductions have not only resulted from recycling efforts, but also from process changes and product substitutions. Due to an aggressive and proactive approach to waste reduction, a number of waste streams have been completely eliminated. More detailed information regarding baseline (2000) and current (2003) comparisons of hazardous and recycled waste streams are provided in the Appendix of this document, Figure A-2.

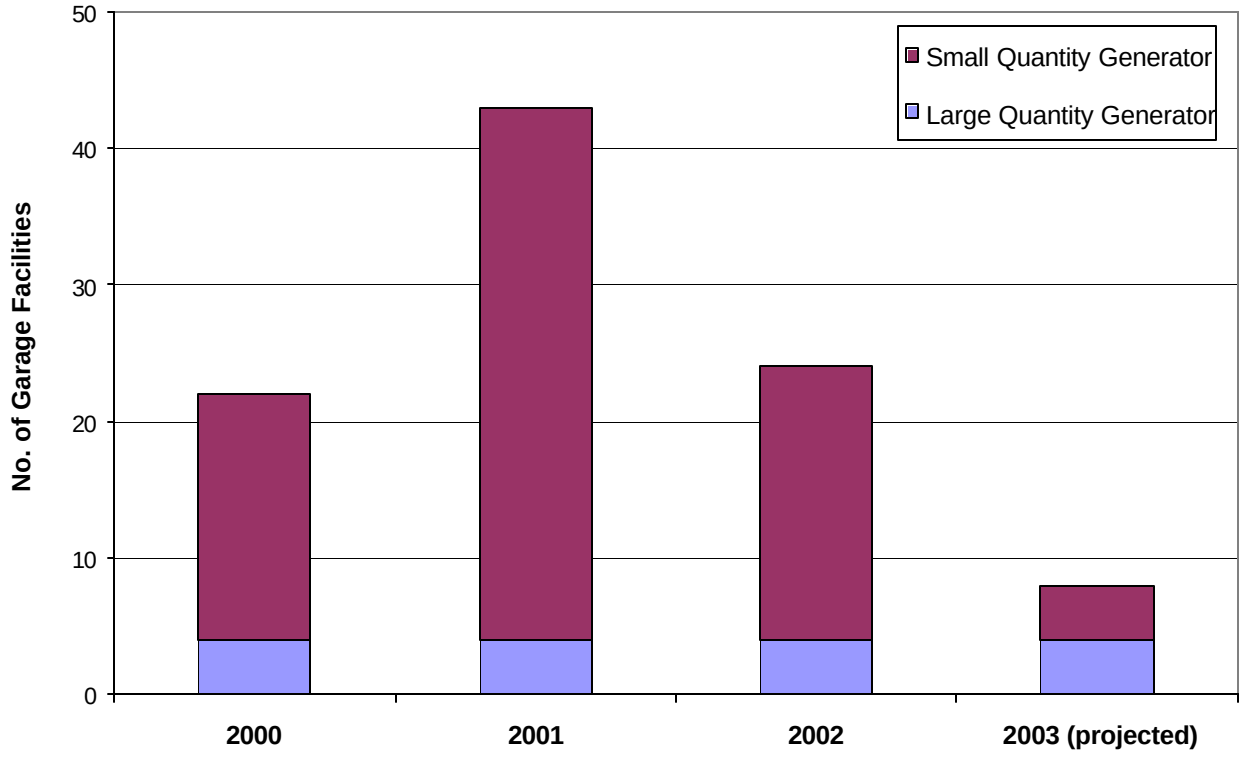
Figure 2. Common TDOT Hazardous and Recycled Wastes



Large quantity hazardous waste generators must adhere to more stringent RCRA regulations than small quantity generators (SQG). Furthermore, as the name implies, conditionally exempt small quantity generators (CESQG) are exempt from extensive RCRA regulations. Thus, the operative goal is to convert as many facilities as possible to the reduced regulatory status of CESQG. By means of reducing the amount of hazardous waste generated at facilities, paperwork and inspection requirements are greatly reduced and are simpler for field personnel. Additionally, Consent Order-mandated inspections are not required for CESQGs.

Figure 3 demonstrates the success of TDOT's waste reduction efforts on regulatory burdens, particularly after an aggressive housekeeping campaign in 2001. Because many of the 2001 wastes were not typical operational wastes, many facilities were able to convert back to CESQG status shortly after the housekeeping event. As illustrated in the figure below, projections for 2003 indicate an additional 16 facilities will reduce their generator status to CESQG for 2003. Worth noting, the 2003 projection of CESQG conversions includes most District facilities.

Figure 3. TDOT Generator Status



SUMMARY

Waste reduction and recycling goals are important to TDOT as operations are under annual review and, as such, the advantages have been realized. As this document has previously detailed, the reduction in generation rates, reduction in cost, simplification of handling procedures, reduced risk and liability, minimized regulatory burdens and recycling delineations were key goals in this valiant effort. The implementation of proactive and aggressive initiatives in support of these goals has been and continues to be essential. As described and illustrated in this document, recognized results demonstrate success.

Appendix

Waste Reduction by Garage Facility

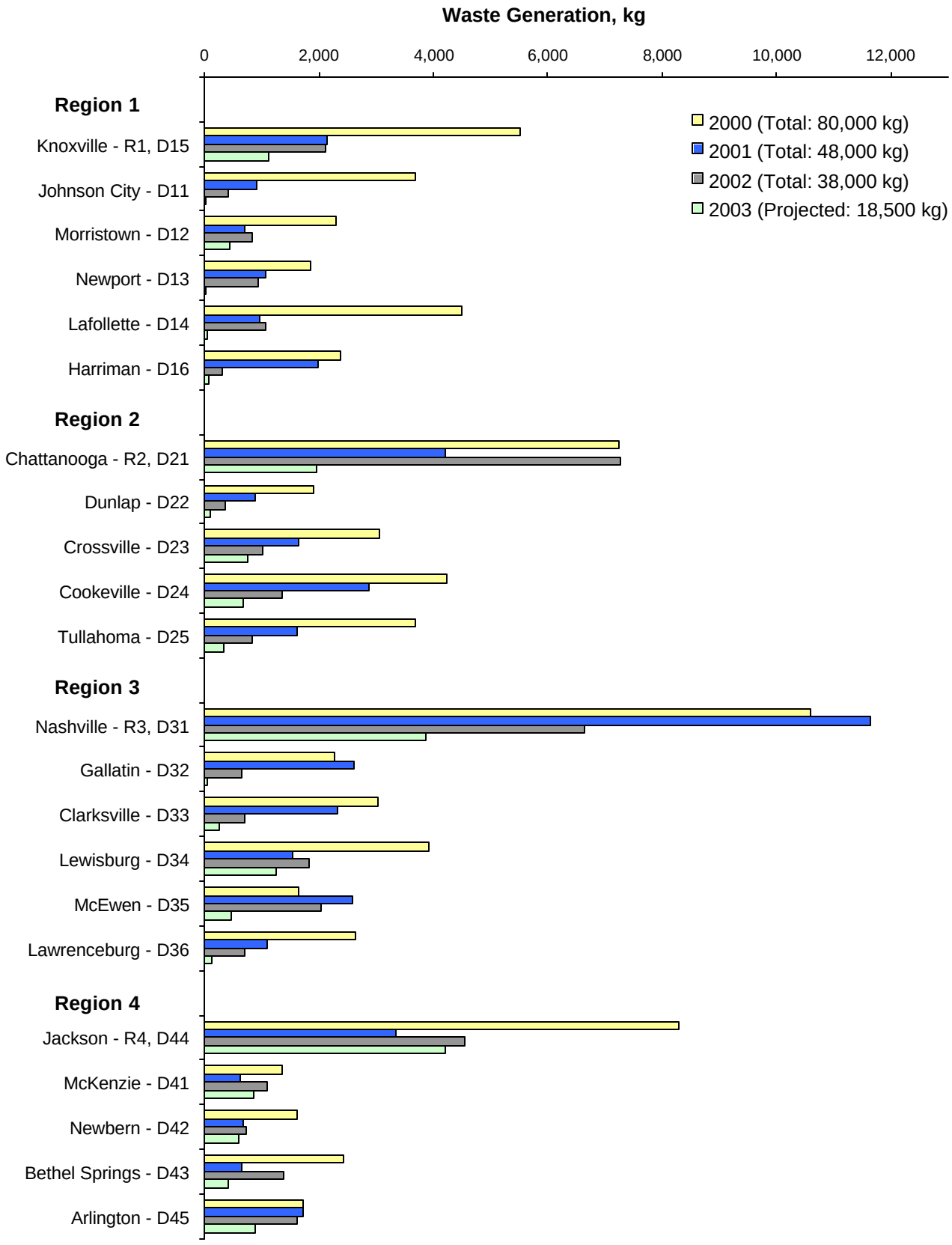


Figure A-2. TDOT Garage Facilities - Hazardous Wastes and Recycled Wastes 2000 to 2003

	Common Hazardous Waste Streams			Recycled Wastes
2000	Absorbents Oil Based Paint Aerosol Residues & Carbon Filters (from aerosol can recycling) Carburetor Cleaner Parts Washer Solvent Spray Tip Solvent Toluene Solvent Waste Adhesives/Glues Contaminated Used Oil Methyl Ethyl Ketone Mixed Fuel Waste	Distillation Cleanup Waste Asphalt Extraction Screen Printing Inks Terpene Solvent Herbicides Rust Inhibitor Road Flares Waste Explosives Denatured Alcohol Epoxy Paint Cleanup Solvent Radiator Flush Waste	Antifreeze Rags Aerosol Cans Mercury Lamps Tire Weights Oil Filters Vehicle Lamps Circuit Boards	Used Oil Fluorescent Bulbs Scrap Metal Automotive Batteries

Product Substitution and Process Changes eliminated many Hazardous Wastes

Recycling Initiatives transferred Hazardous Wastes into Recyclable Wastes

	Common Hazardous Waste Streams		Recycled Wastes	
2003	Aerosol Residues & Carbon Filters (from aerosol can recycling) Carbon Filters (from aerosol can recycling) Oil Based Paint (limited amounts)	Mixed Fuel Waste (limited) Distillation Cleanup Waste Asphalt Extraction Screen Printing Inks Terpene Solvent Parts Washer Solvent Filters	Antifreeze Rags Aerosol Cans Mercury Lamps Tire Weights Oil Filters Parts Washer Solvent	Vehicle Lamps Circuit Boards Used Oil Fluorescent Bulbs Scrap Metal Automotive Batteries