

Cost Data" survey<sup>63</sup> (HWRC). The HWRC data present the results of a survey of the Environmental Technology Council (ETC). All costs were inflated to 2003 dollars for this estimate using the Consumer Price Index. Incineration costs for shipment quantities less than ten tons were estimated using jumbo sack disposal costs and 55-gallon drum disposal costs for dry sludges/solids and pumpable sludges, respectively. Costs for small quantities of non-pumpable sludge was estimated using a 30 percent markup over the bulk incineration unit cost to account for additional handling costs. The markup for small quantities was approximated using the unit cost increase between jumbo sack and bulk Subtitle C landfill (approximately 37 percent).

Onsite incineration (rotary kiln) costs were estimated from several workbook methodologies.<sup>64</sup> Costs were inflated to 2003 dollars using the Chemical Engineering Plant Cost Index for capital costs and the Consumer Price Index for O&M costs.

Incineration cost estimates are as follows: Onsite Rotary Kiln Incineration of non-pumpable sludge: 147.2 \* (tons) + \$927,503, Offsite Bulk Incineration of non-pumpable Sludges: \$560.14/ton, Offsite Bulk Incineration of pumpable Sludge: \$1,033.2/ton, Offsite Small Quantity Incineration of non-pumpable Sludges: \$728.2/ton, and Offsite Bulk Incineration of pumpable sludge (drummed): \$1,947.5/ton.

#### f. Compliance Waste Management Procedures and Unit Costs

Compliance with the proposed rule may include one or more of the following incremental cost elements: alternative waste management procedures, additional waste sampling and analysis requirements, alternative waste transport procedures and patterns, manifest requirements, RCRA Part B permit requirements, administrative requirements, and corrective action requirements. Compliance with the waste management procedures for affected sludge quantities may be disposal in a composite lined Part 258 or equivalent Subtitle D

landfill, or hazardous waste incineration, depending upon option analyzed. Unit costs for these procedures are identified above.

The annual cost for sampling and analysis of non-aqueous waste streams is estimated to range from \$10,509 to \$10,858.<sup>66</sup> This estimate includes costs for sample collection, development of procedure, feasibility studies, five annual samples of each analysis for mass loading determination, and 15 samples for characterization of the wastes. Feasibility studies, procedure development, and characterization are annualized over five years at a 7 percent rate for borrowing capital (0.24389). A feasibility study is assumed for all CoCs without a prescribed method in the EPA document SW-846 at an estimated cost of \$1,559. Four of the eight CoCs do not have standard methods listed in SW-846. Procedure development is required for these CoCs. Procedure development consists of performing the analysis multiple times (to develop calibration curves, identify spike and dilution rates, etc.). Three laboratories are assumed to develop methods and procedures for analysis of constituents without methods and procedures already established. Costs incurred by the laboratories are divided across all 37 generating facilities.

Hazardous waste shipments are tracked through the use of a hazardous waste manifest which accompanies each waste shipment. Manifesting costs were obtained from the "Hazardous Waste Manifest Cost Benefit Analysis," prepared by the Logistics Management Institute in October 2000. Costs were inflated to 2003 dollars using the Consumer Price Index. An average cost of \$122 (2003 dollars) per manifest was assumed to be incurred by any generator shipping hazardous waste. The transporter and generator costs were combined to estimate a total manifesting cost per shipment of \$239. Costs for shipping papers for nonhazardous wastes are also estimated. These include, costs to prepare, carry, and retain shipping papers. These costs were derived from the "Hazardous Waste Manifest Cost Benefit Analysis." Total costs are estimated at \$90.40 per shipment for the transporter and generator, combined. This covers costs to prepare, carry and retain all nonhazardous shipping papers. Cost for disposal of wastes in unregulated or Subtitle D landfills include costs for shipping papers. All other methods of

offsite disposal include costs for hazardous waste manifest.

Hazardous waste transportation costs (excluding manifesting costs) were estimated based on van trailer (small quantity) and roll-off bin (bulk) trucking unit costs reported in RACER. Costs are based on distance and maximum truck load size of 18 tons.<sup>67</sup> A minimum of four loads per year is assumed based on the maximum accumulation period of 90 days. Otherwise, the number of loads per year is calculated by dividing the total annual generation quantity by the assumed maximum truck load size of 18 tons. For small businesses, a truck load size of 5 tons was assumed. The ECHOS minimum shipment fee of \$730 was used to determine transportation unit costs below 200 miles for hazardous waste. The distances presented in the EPA report: "Evaluation of Cost and Economic Impacts of F006 Recycling Rulemaking Options" from December 2001 for landfill disposal of electroplating wastes (based on a sample of 75 facilities) were utilized as a proxy for the transportation distances for sludge disposal. Nonhazardous waste transportation costs (excluding manifesting costs) also were estimated based on bulk hazardous waste transportation costs reported in RACER. Costs are based on distance and a maximum load size of 18 tons. Due to the relatively close transportation distances estimated for Subtitle D landfills, a unit cost of \$2.21 per mile (\$0.12 per ton-mile) was used. The transportation cost is estimated to be less than the hazardous transportation unit cost due to the regularly scheduled, full 18-ton, bulk nonhazardous waste shipments. For nonhazardous waste and post rule product recovery, no minimum number of loads is assumed. The number of shipments per year is calculated by dividing the total annual generation quantity by the assumed maximum truck load size of 18 tons.

The weighted average hazardous waste transportation unit cost to a Subtitle C landfill was estimated at \$3.81/mile with a weighted average distance of 338 miles. The average hazardous waste transportation unit cost to an incineration facility was estimated at \$3.26/mile, with an average distance of 577 miles. The assumed average nonhazardous waste transportation unit cost to a Subtitle D landfill was \$2.21/mile and an average distance of 50 miles.

Cost for administrative duties were derived using hour estimates for each administrative task based on "best

<sup>63</sup> Hazardous Waste Resource Center <http://www.etc.org/costsurvey6.cfm>.

<sup>64</sup> Vogel, Gregory A., MITRE Corporation, "The Estimation of Hazardous Waste Incineration Costs," sponsored by U.S. EPA, January, 1983.

<sup>65</sup> K. Lim, R. DeRosier, R. Larkin, and R. McCormick, Acurex Corporation, Energy & Environmental Division, "Retrofit Cost Relationships for Hazardous Waste Incineration," prepared for the U.S. EPA, Office of Research and Development, Industrial Environmental Research Laboratory, Incineration Research Branch, January, 1984.

<sup>66</sup> See "Economic Assessment for the Proposed Loadings-Based Listing of Non-Wastewaters from the Production of Selected Organic Dyes, Pigments, and Food, Drug, and Cosmetic Colorants."

<sup>67</sup> RACER indicates a maximum truck load size of 18 tons.