
Section IV - REFERENCE YEAR POPULATION, WASTE GENERATION, AND WASTE REDUCTION

A. REFERENCE YEAR POPULATION AND RESIDENTIAL/COMMERCIAL WASTE GENERATION

1. Population

As discussed in the previous sections, the planning period is 17 years (from 2006 through 2022) with the reference year being 2003. Table IV-1 presents the District's population and generation rate for Mahoning County Solid Waste Management District for 2003.

The Ohio Department of Development, Office of Statistical Research (OSR) population projection determined the 2003-reference year population of [254,620](#).

2. Generation Rate

The District's waste generation rate (pounds/person/day) was determined by comparing the suggested Franklin Associates per capita waste generation values of 4.39 lb./person/day for 2003 and 4.43 lb./person/day by 2012 to the actual available data concerning the quantity of solid waste received at the sanitary landfills utilized by the District based on the data obtained in Tables III-1 and III-2. A more realistic waste generation rate for the District was calculated as follows based on actual disposal plus recycling:

RESIDENTIAL/COMMERCIAL WASTE DISPOSED IN 2003

LANDFILL	2003 (tons)
BFI CARBON LIMESTONE LANDFILL	123,347
WM MAHONING LANDFILL	127,867
CENTRAL WASTES LANDFILL	9,180
AMERICAN LANDFILL	25
RW COUNTYWIDE LANDFILL	6
AMERICAN TIRE MONOFILL	385
KIMBLE SANITARY LANDFILL	23
LIBERTY TIRE	940
EVERGREEN RECYCLING. & DISPOSAL FACILITY	10
TOTALS	261,783

261,783	Tons Residential/Commercial Waste Disposed
<u>36,370</u>	Residential/Commercial Waste Reduction and Recycling
298,153	Total Tons Waste Generated

Population in 2003 = 254,620

$$\frac{298,153 \text{ tons} \times 2,000 \text{ lbs./ton}}{254,620 \text{ persons} \times 365 \text{ days/year}} = 6.42 \text{ lbs./person/day}$$

A comparison of the results can be made to the Franklin Associates value of 4.39 lbs./capita/day and a resulting calculated waste generation amount of 201,624 tons/year for the residential/commercial waste stream.

Utilizing a generation rate based on the Franklin Associates U.S. averages, this would establish 201,624 tons, which is 33% less than the reported disposal plus recycling amounts. Utilizing the 5.33 lbs./person/day generation rate established by the previous SWMP results in 244,796 tons per year, which is also less than the reported amount of waste disposal. Therefore, this generation rate is considered reliable. The District has confidence in the numbers reported for the residential/commercial sector. This value is based on reported disposal plus recycling numbers. Waste generation rate has increased by 22% from 1996 to 2003.

Table IV-1 indicates a 6.42 lbs/person/day, residential/commercial generation rate for Mahoning County. This rate was calculated from recorded data. Future waste generation rate is assumed to increase proportionally to the increase projected by US EPA.

The District makes every effort to keep accurate track of Mahoning County waste disposal. There is no current data to provide a basis for an estimation of open dumping (However, Litter and Illegal Dumping Enforcement strategy, commencing in August of 2005 is being implemented to better enforce open dumping laws and catch violators. This program may provide a basis of data to quantify the tonnage of open dumping.) The District is aware of the possibility of mischaracterization of waste disposal; however, the District accepts the recorded amount of 298,153 tons as the most accurate information available. Therefore, the "Disposal plus Recycling" method is utilized for residential/commercial waste generation values.

B. INDUSTRIAL WASTE GENERATION

The District examined two methodologies for estimation of industrial waste generation:

1. The Tons per Employee Method, which utilizes data from a 2004 Industrial Waste Generator Survey in conjunction with Statewide values (Table JJ-2 of OEPA Format Version 3.0); and
2. The Recycling Plus Disposal Method utilizes data from Ohio EPA Facility Data Reports for Industrial Disposal and industrial recycling data as reported in the District's Annual District Reports. The District's Annual District Reports are based on a detail Industrial Recycling Survey conducted by the CERTT program in 2000.

Tons per Employee Method

The District conducted an industrial survey in 2004 to determine the quantity of industrial solid waste generated and recycled in the District in 2003. The survey, conducted by the Mahoning County SWMD from June 2004 through June of 2005, solicited information regarding waste generation amounts, composition, disposal methods, recycling and minimization activities. The survey forms are included in Appendix F.

Table IV-3 illustrates District industrial generation rates based on the generation of survey respondents. For example, in SIC 20, the reported 184 tons of waste generated is divided by the responding number of employees, 190. The calculated generation rate is 0.97 tons/employee. Ideally, this value is then multiplied by the number of non-responding employees, 940, to obtain a waste generation for non-responding industries. However, due to the low response rate, the survey responses are not likely to be representative of all Mahoning County industry. Therefore, the State generated averages per SIC code from Table JJ-2 of Ohio format Version 3.0 are utilized for the non-responding industries. Total industrial waste generation from the survey respondents plus the industrial waste generation of the non-respondents yields a total industrial waste generation for the District shown on Table IV-3 of 211,444 tons.

Recycling plus Disposal Method

The District then examined the total industrial waste disposal recorded from the *2003 Ohio Solid Waste Facility Data Report*, plus the amounts reused and recycled in the industrial sector found in the materials exchange program and CERTT Program surveys data reported in the 2003 ADR (The YSU CERTT program conducted a detailed industrial recycling survey in 2000. The results from the 2000 CERTT survey were utilized in ADR reporting for several years in accordance with OEPA guidance.) It was determined that in 2003: 78,867 tons of industrial wastes were disposed in landfill; 8,240 tons were reused through the Material Exchange Program; the 43,535 tons that were recycled through brokers based on the CERTT Survey. Using this method, a total District industrial waste generation for 2003 was calculated to be 130,642 tons.

Method Selection Justification

The difference between 211,444 tons of the first method and the documented 130,642 tons derived by the second method is 80,802 tons. If the numbers generated by the first method (the tons per employee method) are presumed to be accurate, then the 80,802 tons would represent the unreported reuse and recycling by industry. The limited responses to the 2004 industrial waste generator survey identify a range of 50% to 80% of the industrial waste is recycled for the individual responding industries. By examining the 78,867 tons of landfilled industrial waste, the total industrial waste generation of the first method 211,444 tons, and assuming that waste which is not disposed is recycled, reduced, or reused, a 62% recycling rate was calculated. (i.e. this calculation of the 62% rate assumes the 80,802 tons of unaccounted for industrial waste is being reduced / reused / recycled by industry.)

Any source reduction measures implemented by industry (particularly the larger facilities with ISO 14001 certification) are not reflected in the Format version 3.0 values of Table JJ-2. Table JJ-2 values were generated based on industrial survey results from throughout Ohio in the early 1990's; ISO 14000 standards were only beginning to be implemented in the mid 1990's. The 80,802 tons may be the product of source reduction efforts by industry in the late 1990's and early 2000's. There may also be substantial amount of undocumented industrial recycling activity occurring.

This plan update is an "access" plan and State acceptance of the plan is based upon satisfying Ohio access goals. As such, this plan is not required to meet any specific industrial recycling percentage goal. However, in the future, the District may be required to meet specific industrial recycling percentages as set by the State Plan.

The 80,802 tons is undocumented and therefore it cannot be counted toward the industrial waste reduction goal. In consideration of this, the District will utilize the "Disposal plus Recycling" Method for industrial waste generation with the documented 130,642 tons of industrial waste generated (landfill, plus materials exchange, plus CERTT) in 2003 as the basis for the industrial waste generation projections, identified in Section V. Table IV-3B utilizes the documented industrial waste generation tonnage and allocates portions to various SIC categories based on the proportional distribution developed in Table IV-3.

C. EXEMPT WASTE

This category of waste includes all waste disposed in landfills within the District which is not characterized as solid waste, such as construction and demolition debris and non-toxic foundry sand.

The *2003 Ohio Solid Waste Facility Data Report* shows that 2,128 tons of exempt waste was disposed from the District in 2003. This is slightly down from previous years but the value fluctuates year to year. The average annual disposal of exempt waste for years 2000 to 2003 is 4,473 tons.

The enactment of regulations for construction and demolition debris (CDD) landfills likely resulted in more accurate reporting of disposal of this type of waste. The ban on pulverized CDD at CDD landfills will likely increase the CDD being disposed of in Solid Waste Landfills. However, as pulverized CDD is indistinguishable as CDD it is therefore considered solid waste and will not be reflected in the tons of exempt waste disposed in solid waste landfills. For this plan, in the absence

of any reliable indicator other than the Ohio EPA Facility Data Reports, it is assumed that the average of 4,473 tons of exempt waste (CDD) disposed in landfill will continue for each year of the planning period. Table IV-4 illustrates the generation rate of 0.0458 lbs/person/day of exempt waste disposed of in publicly-available landfills.

D. REFERENCE YEAR WASTE REDUCTION

The status of the solid waste reduction and recycling efforts of the District (based on the strategies employed for waste reduction/recycling) are reviewed. This section will also present estimates of the amount of yard waste, waste tires and other restricted waste stream items generated in the District.

1. Residential/Commercial Sector

The amount of solid waste reduced through recycling, reuse, incineration, composting and land application of yard waste in the Residential/Commercial Sector is presented in Table IV-5. All values presented in Table IV-5 are actual, and have been checked for double counting. Elimination of values from "other District Programs" in Table III-5 prevents double counting. The Table III values exclude non-qualifying materials such as auto bodies, radiators and trucks, as well as industrial recycling pursuant to District's reporting requirements placed on brokers.

The sources of residential/commercial recycling are curbside, drop-off, recyclers/brokers, and commercial sources. To eliminate double counting from the residential/commercial sector, the District only recorded recyclable materials from curbside (4,318), drop-offs (1,971 tons) and recyclers/brokers (13,101 tons). Possible double counting would occur in commercial entities reporting recyclables that recyclers/brokers may have reported. Therefore, by excluding the commercial entities who handle or process District curbside and drop-off materials; and whose final destination of reported recycling cannot be verified; the District was able to avoid double counting.

A review of the recycling programs and the amounts of recyclables generated during the baseline year of 2003 were presented in Section III, Tables III-4 and III-5. From all indications, the buy-back/drop-off centers will continue to be successful. These centers will continue to operate into the future and will play as a major contributor in the residential reduction efforts.

The District adopted a recycling plan as recommended by the Recycling Subcommittee in a meeting held on April 27, 1990. The District-wide recycling plan to be implemented consists of the following elements: an *Opportunity to Recycle* program that incorporates recovery of recyclable materials in each area of the District; an *Education and Awareness Campaign* to advise District residents on how to participate in the recycling programs; a recycling informational and educational campaign to advise residents and businesses on environmentally sound purchasing decisions; and a long term plan to provide opportunities for the development of recycling businesses and industries in the District.

The following list describes all of the activities and programs that are currently being operated or planned within the District as a result of the District-wide recycling plan. For planning purposes all programs and strategies implemented prior to 2003 are considered existing. Programs and strategies implemented during or after 2003 are considered planned.

Recycling Activity

Initiation Date

Opportunity to Recycle Program

The Opportunity to Recycle Program offers strategies to each municipality and township in the District. The types of recycling strategies are:

- 1) Drop-off Recycling Sites

- 2) Curbside recycling
- 3) Various Drives and Collection Events

Drop-off Recycling Sites

1991

Program: The Drop-off program is an existing strategy that continued demonstrating growth during 2003. A total of twenty-two recycling drop-off sites were in operation in most municipalities during the reference year. Materials accepted in 2003 were glass bottles & jars, aluminum & bi-metal beverage cans, plastics #1 & #2, corrugated cardboard, magazines, catalogs, phone books, newspaper and metal food containers.

In Boardman Township, renovation to the fire station at 1200 Shields Rd. caused the site to relocate to 8299 Market St, behind the Government Center. At the conclusion of the renovation, the Shields Rd site re-opened in 2004 and the Market St. location remained as a permanent recycling center. For the purpose of this plan update all three site will be referenced even though only two at any given time were operational during the reference year. The District was also able to expand the drop-off program to add two full-time centers within Canfield Township early in 2004. This brought the total District drop-off sites to twenty-five by the beginning of 2004.

Funding: The District provides every community with financial support to maintain recycling operations within its boundaries. This support provides for: a recycling coordinator, maintenance of site cleanliness, and provides local survey on recycling activities. The District enters into an agreement with each municipality or township to provide funds for the programs. A summary of projected costs can be found aggregated under “Other Services Contracts” in table VIII-8. Physical site maintenance, scheduling and the hauling remain the responsibility of the District.

Costs in 2005 increased due to the manufacture and paint of seventeen new, 30-yard roll-off bins. These bins will be deployed to ten (10) new recycling sites and some existing ones during 2006. Another ten (10) bins will be purchased in late 2006 and placed at sites in the following year. The District estimates the purchase price will average around \$92,000 for the last ten roll-off containers.

Future hauling rates are calculated by determining the average annual cost of single bin sites (\$4,144) during 2005. This amount was multiplied by the intended number of new and existing locations for 2006 (35) and 2008 (45). Three percent inflationary costs are included every three years afterward. Based on bidding cycles these contracts are re-bid every three years.

A sample calculation for 2006 is	Single Bin Sites (29*4,144) =	\$120,177
	Largest 6 Sites (2005 Costs) =	\$131,227
	10 New Roll-offs =	\$ 92,000
	Paint and Maintenance =	<u>\$ 10,000</u>
	Totals	\$353,404

Reporting: Consideration for double counting has been mitigated by determining the weights of each load prior to and after the contents of the roll-off bin have been emptied. Most of the collected recyclables are being processed by Pittsburgh Recycling, of which these commodities are the only material from Mahoning County being handled. Some of the fiber composition is recycled by Alliance Recycling. These weight receipts are separated from amounts listed under Alliance Recycling in the Table III-5a

In 2003 reports from municipal coordinators, referred to as “**Overflow**”, brought in substantial weighs from recycling. These numbers largely reflect community clean ups, local surveys and small reuse/recycling programs. Smith Township in particular is responsible for obtaining all recycling numbers from Alliance Recycling. These numbers were included with drop-off amounts in the 2003 Annual District Report (ADR) Implementation Schedule. This method was utilized to maintain consistency in reporting with previous ADR’s. However, all line items detailed in Table VI.1 of the ADR provide a true reflection of the data.

For purposes of this plan update we have separated these values between drop-off recycling and recycling brokers whenever appropriate.

Assumptions: The District assumes an increase in drop-off recycling on several levels. First, the materials accepted has been increased for manifested in 2005. Specifically, the collection of all paper publications and the addition of #3 through #5 plastics. The additional plastics are now accepted by Pittsburgh Recycling whom processes all drop-off materials. The additional fiber materials are a result of Phoenix Disposal securing agreement with Alliance Recycling Center and Pittsburgh Recycling for these additional materials. Secondly, an increase the number of recycling drop-off centers will occur during 2006 and 2007. This will be done with deployment focused on relieving some burden on the more heavily trafficked sites and introducing new sites around recently developed neighborhoods.

Future participation is projected by determining average recycling amounts for all existing sites during 2005 (102.2 tons) and extrapolating this number by the intended number of new sites for 2006 and 2007. Using this metric 102.2 (2005 average) \times 35 (expected total sites in 2006) = $3,577$ tons. The same measurement was used for 2007. A 3% increase throughout the remainder of the planning period was used subsequently. The District feels this number is attainable when utilizing previous and present recycling as a gauge.

Impact: In 2003 1,971 tons of recyclables were collected from drop-off recycling sites. Another 4,870 tons of material were reported by municipal coordinators (*Overflow*). All drop-off recycling centers are available to both the residential and commercial sectors of Mahoning County.

Curbside Recycling

1991

Program: The District's Curbside Program is a non-subscription program. The program does not expect any major coverage changes throughout the planning period with the exception of outreach to condominium associations and new developments.

An expanded materials list is regarded as the paramount catalyst that may reverse the trend of declining weight. In 2005, the District worked with Allied Waste to expand the type of fiber-based material accepted to magazines catalogs and ad slicks. This is in addition to the traditionally accepted materials: newspaper, metal food and beverage cans, and glass and plastic bottles.

The District also worked with the Allied to insure faster response times to complaints, and for the delivery of new bins to new and preexisting homeowners in the incorporated areas. Concentrated advertising & educational efforts will be the tools employed to increase participation.

Funding: The District negotiated a contract with the Allied Waste (formally Browning Ferris Industries) for free curbside recycling within the major populated areas. The contract, valued at approximately \$900,000, allows the District to provide free bi-weekly curbside service to 94,730 households. This contract is in place for the active lifetime of Carbon Limestone Sanitary Landfill. As of this writing, Mahoning County expects at least twenty-one years of service based on existing permitted capacity.

Reporting: Allied is solely responsible for providing weights associated with this program. All material is being processed by Uni-Paper in Pittsburgh. No other material other than residential curbside recycling from Mahoning County is processed by this facility, thus double counting has been eliminated.

Assumptions: Projections are based on the increased fiber expected during 2006, utilizing a 2003 ODNR waste characterization study as a guide. In the study it was determined that 20% of paper waste composition was newspaper. An additional 28% was determined to be magazines and other forms of publications. This would constitute a 140% increase if the district can capture these paper forms at the same participation rate of its current newspaper collection. The District collected 1,493 tons of newspaper in 2005. Adding 140% amounts to an expected yield of 2,091 lbs. The District is

expecting modest increases in curbside from the newly added materials and education. Incremental rates of 1% have been projected throughout the planning period.

Impact: 4,318 tons of recyclables was collected from curbside recycling in 2003.

Christmas Tree Collection

1992

Program: The Christmas tree collection ran from December 26th through January 31st. Trees were received at sixteen locations located within the District. All of the trees must be free of ornaments which are then shredded with a chipper. The mulch is then offered back to the local resident and public sector entities for use in parks and landscaping projects.

Funding: The District is responsible for implementing and funding this program. Financial support is provided through labor services provided through a contract community services group. Additional support is provided through advertising. These costs are combined with other blanket strategies

Reporting: Weights are calculated by determining the amount of trees collected and multiplying this number by 50 lbs. per tree. Since there is only one source and outlet, the District maintains past and future figures are accurate.

Assumptions: Projections are calculated at a flat rate of 53,092 lbs annually. This was derived by taking previous years data and determining an average. Tree recycling fluctuates considerably from year to year there is no discernable trend.

Impact: Approximately 17,000 lbs of Christmas trees were diverted from area landfills in 2003.

Magazine/Catalog Recycling Drive

1991

Program: The District, in cooperation with the City of Youngstown's Division of Recycling & Litter Prevention sponsored six (6) magazine, catalog & phonebook drives. These materials can also be taken year round to any recycling drop-off location within the District.

Funding: Financial support is met by providing the City of Youngstown with a contract for recycling and litter clean-up and prevention strategies.

Reporting: Reports from this strategy are provided by a City of Youngstown Litter/Recycling Coordinator. Most material was sent to Alliance Recycling for processing. The amount listed for Alliance Recycling, shown in Table III-5a does not reflect this amount.

Assumptions: This program will be discontinued in its present form beginning in 2006. The District intends on greatly increasing the amount of drop-off sites located in the City of Youngstown beginning in 2006. This will accommodate the need for access to publication recycling, year-round.

Impact: 29,080 lbs of magazines and catalogs were collected from these collection drives.

Appliance Drive

1996

Program: The District conducts a once-a-year collection of appliances. Items range from refrigerators and stoves to air conditioners and water coolers. Residents can bring their old appliances to participating drop-off locations throughout the county. Freon and oil from the appliances are recovered at the site, and the steel recycled. White goods diverted from the landfill will be recorded as recycled product.

Funding: This program is funded by the District, ranging from the outsourcing of the Freon recovery or to provide certified District employees to perform the service. All proceeds from the

sale of white goods returns to the hosting community to offset the cost of the labor provided to facilitate the collection. Additional costs are ancillary to our advertising campaign.

Reporting: Tonnage is provided by pursuing the weight receipts and invoices provided to each community. These amounts are historically were the only values provided by scrap metal processors in the residential sector and therefore remain accurate. In the future, due to forthcoming strategies, these numbers will be extracted from other reports of white goods from affected processors.

Assumptions: Projections are calculated at a flat rate of 269,050 lbs annually. This value was derived by taking six years worth of data and determining the average. Since appliance recycling fluctuates considerably from year to year there is no discernable trend.

Impact: In 2003 the total white goods diverted from landfills was 186.5 tons.

Office Paper Recovery

1990

Program: For the reference year, this program encompassed all participating Mahoning County and City of Youngstown public offices. Originally, the Mahoning County Commissioners passed a resolution encouraging all department heads to engage in the practice. A resolution was recently reissued in 2005 to stimulate efforts and increase participation.

In 2005 an expanded program was established to reach out to the commercial sector. The District provides technical assistance and personnel that will result in the collection of commercial high grade, mixed low-grade paper, shredded documents, computer paper and most other paper publications. Participants in the private sector are required to provide their own containment. A subsequent pull schedule is created and maintained based on volume patterns.

Funding: All containment and support is provided by the District for government offices and non-profits. The office paper is then collected through several contracted services (Community Corrections Association (CCA), Docu-shred, District staff, Youngstown Litter Control and Recycling staff and other community recycling coordinators. Bins are provided for office paper and publications (blue) and beverage containers (brown) to government and non-profit agencies.

The expanded strategy for private sector involves District staff establishing relationships to provide collection and recycling service to the commercial sector. Large private sector accounts are eventually transferred to a private contractor. The District awards these contracts conforming to Mahoning County Commissioners' purchasing guidelines and procedures.

Reporting: Tonnage is provided by pursuing the weight receipts and invoices provided by the paper brokers.

Assumptions: The District hopes to enlist one hundred (100) commercial companies the first year and one hundred fifty (150) additional companies every year after, for the duration of the planning period. Utilizing existing data from 2005, an average of nine (9) tons per business per year is the expected yield. Projections are then drafted by adding 9 tons per expected recruitment compounding each year for the planning period.

Rural Recycling & Awareness Program (RREAP) 1994

Program: This USDA grant was awarded to supply and address specific needs of rural residents with outlets for specialized recycling markets. Examples include animal bedding, landscaping nurseries and material exchanges not listed through the CERTT program. 20 waste assessments and 301 presentations were performed by RREAP affecting 7,401 attendees in the reference year. These assessments were not included with the CERTT industrial assessments.

Funding: In 1994, the District received the first grant awarded to a District in Ohio under the USDA Rural Development Administration, Rural Recycling Education and Awareness grant. The

\$113,600 grant was approved in September of 1994, and funds a solid waste education program concentrating on youth, adults and businesses located in the District's rural communities.

This program continued to receive ample funding from USDA through September 31, 2005. Every year the District expended all of the grant funds received.

Reporting: The majority of the RREAP programs are education based. Weight reporting is not a major component of this service. Most recycling is recorded as Overflow from drop-off coordinators.

Assumptions: The District continues to aggressively seek external contributions to augment any applicable strategies. However, there is a reasonable amount of uncertainty over the future sustainability of this program's grant funding. Nevertheless, the District expects to financially support this agenda and its curriculum throughout the planning period.

School Fiber Program

2003

Program: This new program collects high grade paper, mixed low grade paper, shredded documents, computer paper, most paper publications and cardboard, generated from area schools. A four (4) yard recycling container is situated at participating schools. Teachers collect the paper products from the classrooms and stage them to be taken to the recycling bin. Once filled, they are reported to the District for scheduled pull and recycling.

Twenty-two Schools participated in 2003 in a two-stage rollout. The program integrated thirty-two (32) additional schools at the end of 2004, and a total of 81 schools were members in 2005. The remaining District schools are scheduled to join (84 in total) by the conclusion of 2006.

Funding: This program's funding is encompassed within the District Drop-Off Recycling program. The contract is bid out state guidelines as prescribed in the Ohio Revised Code. The cost and maintenance of the 4 yard-front load bins remains the responsibility of the District. This service is also bid out with the roll-off bins. The contractors market their own material.

Reporting: The material inside the front loading containers is co-mingled with other stops along the haul route. Consequently, the weight yields are derived from volume to weight conversion provided by the US EPA. The District associates 600 lbs. of weight per cubic yard of loose uncompacted paper when applying this metric.

Assumptions: Future yields are projected by determining average recycling amounts for all participating schools during 2005 (16.78 tons) and extrapolating this number by the intended number of new schools for 2006. Using this metric, $16.78 \text{ (2005 average)} \times 84 \text{ (expected schools)} = 1,409 \text{ tons}$. A flat projection is then utilized since the District doesn't expect much growth after all remaining schools enroll.

Impact: A total of 199,110 lbs was collected for the reference year. This number will increase significantly over the course of the next few years.

Yard Waste Recycling (Composting)

1991

Program: Private entities and local governments conduct yard waste composting activities in the District. In 2003 Boardman Township Composting reported 16,500 tons of composting. This value was reported in the 2003 ADR. Subsequent follow-up identified an error in reporting. After correction of the monitoring procedure, 2004 ADR reported a total District composting value of 5,076 tons. Therefore, this explains the anomaly of Composting tonnage change between 2003 and 2004. District Staff coordinated tonnage reports from the various composting entities prior to 2004.

Beginning in 2004 with licensure of facilities, Ohio EPA now coordinates reporting from licensed composting facilities and provides these values to the District. For 2004 reports, only three of the eight licensed facilities reported values. To account for the future reporting of these non-reported values, a conservative 1,000 ton increase is assumed for 2005 and a subsequently conservative 3% increase per year.

Funding: There is no District expense associated with this program.

Assumptions: Based on these previously non-reported values and assuming these facilities will comply with their reporting requirements a 1,000 ton increase and 3% percent increase each year thereafter is presumed to account for the increased tonnage from the remainder of these facilities.

Reporting: The tonnage 5,076 reported in the ADR is the sum of the Ohio EPA reported values received from licensed composters plus the composting credit the District receives from the Backyard composting workshop. In 2004, the District's 45 ton credit for Backyard composting is calculated based on workshop attendance, specifically the number of composting unit distributed. The District held five workshops and distributed 150 backyard composters in 2004. Each composter has a one cubic yard volume, at 600 pounds per cubic yard of finished compost the District's calculates a 45 tons of yard waste composting (150 units x 1 cu.yd / unit x 600 lbs /.cu. yd x 1 ton / 2000 lbs = 45 tons) out this program in 2004.

Waste Tire Removal & Disposal

1991

Program: A central collection point at the Mahoning County Engineers office is provided to collect discarded tires littered on Mahoning County's public roadways. All county, township and municipal street departments are encouraged to utilize this free benefit. This program is slated to remain a District strategy throughout the planning period.

During 2004, the District partnered with the City of Youngstown Street Department to recycle 1,695 tons of accumulated tires. The tires were de-rimmed, transported and recycled by Liberty Tire. This amount was not initially listed in the 2004 Annual District Report since the data was not available prior to the reporting deadline.

In 2005, Mahoning County's first Tire Amnesty Day was conducted. This program was established to augment the small tire grants program that was in operation during previous years. The intent is to offer tire recycling to all residents of Mahoning County and not just within the communities that opted to participate in the grant program.

Funding: The District funds this program by servicing the trailer located at the Engineer's office. Once full, a licensed private contractor is required to take the tires to be recycled.

Additionally, in 2003 the District continued its grant program that provided funding and advertising (upwards of \$3750 per community) for tire collections. These collections were only available to the residents of each participating community. Eight townships and the City of Youngstown took advantage of this program. In all, 180,860 lbs of scrap tires were collected and recycled with grant awards totaling \$14,344.25 in 2003. This grant strategy will cease to exist in its present form and will only be dispersed after budgeting for the countywide Tire Amnesty Day and Waste Tire Removal are complete. All remaining funds allocated to tire disposal in sections VIII-8 will then be offered in the form of tire grants.

No cost was associated with the Tire Amnesty Day in 2005. This was due to joint venture between the District and a local tire recycler. Mahoning County residents were provided the opportunity to recycle up to four tires per vehicle. Approximately 19,780 lbs. of tires was collected at this event.

Reporting: Double counting has been eliminated since weight receipts supplied for billing are the only source of recycled volumes allocated.

Assumptions: Projected tire recycling is estimated by applying a 2.79% increase annually throughout the planning period. Support of this was provided by Ohio EPA documenting national trends for tire recycling.

New light was also shed on additional data to corroborate these amounts in 2005. Most tires associated with monofill disposal in the reference year went to Liberty Tire. Subsequent follow-up calls to Liberty Tire revealed that the majority of the tires collected were designated for recycling. The applicable uses were categorized as technologies in tire derived fuels, municipal solid waste liners or crumb rubber applications. The District intends to follow these trends closer and provide reporting that is more reflective of these activities

Competitive Funding Program

1999

Program: This program provides funding to local governments, educational institutions, and non-profit organizations for solid waste reduction and buy recycled programs through a grant application process. The Policy Committee reviews all grant applications and makes a formal recommendation to the Board of Directors. All awards must include a component of recycling and reuse initiatives as well. The District requires a 20% match from the agency or entity applying for the grant, documentation of project's expenses, and a timeline of the projects activities. The following are types of projects that the District will consider funding:

- Establishing or expanding waste reduction or recycling programs;
- Purchasing products made from recycled materials;
- Increasing participation in recycling programs by District residents;
- Encouraging backyard composting or the proper management of different types of yard waste; and
- Developing other projects that will result in significant waste reduction or utilize hard to recycle materials.

An example of strategies funded through this program is the commercial-duty in-vessel compost system for Youngstown State University (YSU). This venture seeks to minimize food waste produced at YSU by composting anywhere from 20,000-30,000 lbs of prep waste, post-consumer plate scrapings and napkins.

Funding: The District awarded thirty (30) projects totaling \$298,184 during the reference year. This included Buy Recycled and Recycled Content grants for this program. The grant guidelines did not place limits on lifetime nor annual award by community. The current program guidelines for 2006 have changed significantly and are included in Appendix L.

Future funding levels are projected to level off at around \$50,000 commencing in 2007 and throughout the planning period. This strategy's funding is discretionary in nature. Therefore, the District has decided to provide limited continuation of this strategy in light of the new emphasis on strategies that directly increase recycling tonnage levels. Continuation of grant levels will be based on adequate District revenue to be applied towards recycling percentage goals.

Reporting: Reports are only required on new recycling programs. Since the majority of funding went towards market development no weights were credited to this program in the reference year.

Assumptions: Beginning in 2007, the District intends to narrow funding to recycling and recycling initiatives only. The program will be available to the same entities but should spur additional reporting for recycling. Some grants may include recycled plastic containers for public recycling or supplies required for education purposes. Since there is no available data to support possible recycling yields no amounts have been ascribed to this strategy.

Competitive Paving Program

1999

Program: Like its sibling program (Competitive Funding) the Competitive Paving Program provides funding to local governments, educational institutions, and non-profit organizations for crumb rubber paving projects through a grant application process.

The District requires a 20% match from the agency or entity applying for the grant, documentation of project's expenses, and a timeline of the projects activities.

Funding: The District awarded eleven (11) projects totaling \$355,504 during the reference year. Grant guidelines did not place limits on lifetime nor annual award by community. The current program guidelines for 2006 have changed significantly and are expanded upon below.

Reporting: Since the origin of the crumb rubber feedstock is not known, no weights were credited to this program.

Assumptions: Beginning in 2005 the District will conclude funding for this program. Being a discretionary program, the District has decided to invest principally in strategies that will increase the District recycling percentage.

Build America Beautiful

1997

The district worked to promote the Build America Beautiful concept. The goals were...

- To persuade contractors and their subs to abide and observe an eco-friendly approach to construction.
- To promote the minimization of environmental impact concerning; material waste, excavation, indigenous wildlife and the reduction of virgin materials by implementing recycled products.
- To introduce consumers and event attendees to the Build America Beautiful concept and introduce the use of recycled building materials.
- Get as much publicity and participation in the event as possible.

Goals were met by:

- 1) Maintaining clean job sites by placing waste disposal containers at each construction site and at convenient sites along the streets including lunch and rest areas. Recycling trailers were placed on site for the collection of cardboard and other materials for recycling.
- 2) Recycling and waste minimization: Cardboard and other items were recycled and serviced by the Community Corrections Association. Boardman Township Street Department, using a tub grinder, turned all wood waste into usable mulch; of which a portion was used on site.
- 3) Educational outreach and green philosophies were discussed during routine meetings with the local chapter of the Home Builders Association.
- 4) Consumer exposure came by way of local trade shows and home exhibits. Recycled products and District recycling infrastructure are spotlighted during these expositions.
 - 15 tons of material was recycled from this endeavor in 2003.

Funding: Program Costs supporting the local Home Builders Association are budgeted at \$10,000 per year throughout the planning period.

Health Department Enforcement Program/Well Testing

1991

Program: The District continued its financial assistance to the Mahoning County District Board of Health; an Ohio EPA approved Health District. This strategy enforces Ohio Environmental Protection Agency and Board of Health regulations governing solid waste disposal and construction and demolition debris disposal, infectious waste, composting, and scrap tire management and illegal dumping activities.

Additionally, funds are also distributed to conduct well water testing in and around District landfills to determine if water is safe for human consumption.

Funding: During the reference year the District disbursed \$277,930 for Health Department enforcement and an additional \$177,694 for well testing to be conducted around all three active District landfills and a few closed facilities. This level of funding is expected to remain constant with small incremental changes throughout the planning period.

Reporting: The Health District provides a range of reporting/administrative tools to the Solid Waste District. Examples are; findings of well water testing, annual waste hauler surveys, licensed compost activity, illegal dumpsites and landfill disposal findings. These are just a sample of the fundamental information blocks the District relies on to make sound waste management decisions.

Assumptions: The Solid Waste District sees no major changes with the Health District in funding or function throughout the planning period.

County/Municipal Assistance

1991

Program: This strategy provides financial assistance to the County Engineers to defray the added cost of maintaining roads and other public facilities from the location and operation of the Districts' approved Municipal Solid Waste Facilities. Additional funding was provided to Hazmat to defray to cost of providing emergency services District wide.

Funding: For the planning period the District will continue to fund the County Engineers in the amount of \$250,000 annually. Hazmat/Emergency Management is also scheduled to remain funded at \$20,000 annually.

Reporting: Annual meetings with the County Engineers are held to discuss strategies and engineering projects on roads around and leading to District landfills. Hazmat and Emergency Management also conduct annual training exercises to prepare for overturned trucks and debris management incase of natural disaster.

Assumptions: The Solid Waste District sees no major changes with this strategy in funding or function throughout the planning period

Household Hazardous Waste Programs

Household Hazardous Waste Collection

2000

Program: The District continued its HHW collection strategy with one collection event in 2003. The program continued to collect the following materials; paint, flammables, aerosols, pesticide liquids/solids, antifreeze, cleaners, reactives, mercury, propane cylinders, lead acid batteries, asbestos, R-22/12 Freon, oxygen cylinders, and oil. The Canfield Fairgrounds is utilized for its central location providing convenient accessibility to all Mahoning County residents. The District anticipates continued activity throughout the planning period.

Funding: Mahoning County partners with a coalition of northeast Ohio Solid Waste Districts, through a joint use agreement, to negotiate the best prices exploiting volume discounts. During 2003, 1,034 cars participated in the annual collection at a cost of \$45,274.35. Local television and print advertising was also used to promote the program. (Note: Due to billing cycle timing, sometimes invoices incurred in one year, are not paid until the following calendar year. Program costs presented in Section VIII Tables for past years reflect actual disbursement for that calendar year.)

Reporting: Reports are provided by the contracted hazardous waste management service. No other resource for hazardous waste disposal was referenced in 2003.

Assumptions: Mahoning County intends to reduce the number of collections from two (2) held in 2004 and 2005 to one (1) annual event. Projections are calculated at a flat rate of 197,341 lbs annually. This was derived by taking six years worth of data and determining an average. Since HHW recycling fluctuates considerably from year to year there is no discernable trend.

Impact: 120,157 lbs of HHW was collected in 2003. From this amount, 43,867 lbs was recycled.

Household Battery Collection

2001

Program: The Household Battery Collection uses many locations as battery collection points. Some include Mahoning County's Public Libraries, schools and government offices. The dry cell batteries are sorted by District staff and shipped to Battery Solutions in Wayne, Michigan for recycling. Rechargeable batteries are sent to Inmetco located in Ellwood City, PA.

Funding: Program costs are attributed to shipping and the recycling process. \$16,829 was spent towards this program in the reference year. The district anticipates modest increases in cost (1%) due to the growth of high-drain portable electronic equipment. (Note: Due to billing cycle timing, sometimes invoices incurred in one year, are not paid until the following calendar year. Program costs presented in Section VIII Tables for past years reflect actual disbursement for that calendar year.)

Reporting: Weights associated with battery recycling are derived directly from the invoices.

Assumptions: The District assumes a one (1) percent increase in recycling throughout the planning period. Historical values place this at a much higher number but much of this is due to added participation, not necessarily increased volume. It can be assumed that by now, in its fifth year, most of the actively involved audience has been captured.

Impact: 13,345 lbs. of household batteries was recycled during 2003.

Electronics Collection

2003

Program: Mahoning County held its first Electronics Drive in the reference year. The program was operated in the same manner as our other one-day collection events. District residents were able to transport all electronics with circuit boards to the Canfield Fairgrounds. Newer computers and usable electronics are donated to area schools and non-profit social programs. Obsolete items are de-manufactured and recycled.

In 2006 a change in frequency may provide increased tonnages as well as convenience. The District intends on conducting sixteen (16) smaller collections in participating municipalities.

Funding: In the first year this program was conducted at a \$1 cost to the District. That proved to be an anomaly as subsequent years have placed the collection around \$25,000 annually. Contracts bid in 2006 will see costs decrease to around \$18,500 and should hold through 2009.

Mahoning County anticipates this strategy will be privatized within the next few years and therefore associates no cost from 2010 through the remaining of the planning period

Reporting: The amounts associated from this strategy are separated from any additional electronics recycling conducted by the contract provider. Trailers are measured with and without their contents to provide accurate weights. Recycling is further categorized into isolated component values.

Assumptions: The District plans to expand the electronics recycling operation with weekly collection events for a minimum of 4 months per year commencing in 2006. A one percent (1%) increase has been projected due to increased collection frequency.

Impact: 80,550 lbs. of electronics was collected during our inaugural drive.

Lead Acid Battery Programs

Township LAB Collection **1993**

Program: Both Milton & Berlin Twp drop-off sites continued to accept limited quantities of LAB during the reference year. The batteries are brought to either of the recycling centers and then are taken for free by a local battery recycler.

Funding: The funding provide to the townships for recycling coordinators is used to fund this program. No additional costs are associated with this program.

Reporting: A battery count is given to the District after each pick-up. An average of 10 lbs. per battery is then applied to the overflow for each township.

Assumptions: The District places the projected values of this strategy at a flat rate. This was determined by reviewing five years worth of data and determining an average. Since the amounts fluctuate greatly from year to year, there is no discernable trend.

Residential Sector Education & Awareness Programs

Recycling Promotional Campaign **1992**

The “campaign” is an umbrella program name over many other subordinate programs. Primarily, it is the public relations vehicle that the District utilizes to convey its message. It involves the combined use of advertising, presentations, promotions, pamphlets, appearances, print and broadcast media features. The elements of the campaign are targeted to the appropriate recycling strategy. The individual program strategies are listed below.

Institutional Promotional Activities

- a. Cash for Cans – This program encourages local schools to compete against one another for fun & prizes. This endeavor reinforces recycling at a young age and benefits the school districts financially. All monies received from the collection of cans are returned to the participating schools.
- b. Design a Placemat Contest – Students between grades 1-8 are invited to design a placemat with an environmental theme. Awards and certificates for each grades winner are granted and recognized at a Mahoning County Commissioners’ board meeting. The placemats are replicated and distributed to area restaurants.
- c. Litter Prevention and Recycling Education - Two District staff members work with teachers, administrators, school officials, and students in recycling and litter prevention. The list of school presentations in 2003 are as follows; pre-schools 70, elementary Schools 154, secondary Schools 86
- d. Environmental Workshops - The Division’s education staff conducts “Windows on Waste” (WOW) and “Investigating Solid Waste Issues” (ISWI) workshops for educators within the county. The Division held two WOW workshops and two ISWI workshops reaching 100 educators. Workshops are held by presenting prepared workbooks, CD-ROMs, teaching agendas and field trips to educators who in turn take the material and develop classroom programs. State recognized educational credits and daily stipends are awarded to the attendees.

Public Education & Awareness

- e. Public Presentations – District educational staff instruct on recycling markets and opportunities to civic and social groups. District staff also participate in Regional Chamber events on a regular basis to address commercial and industrial concerns and promote District activities to membership. District representatives also attend township meetings to address local concerns and keep communities abreast of waste reduction strategies and recycling rates in each community. The Industrial Information Institute serve as liaison between the District education program and Mahoning County Schools for science fairs.
- f. Promotional Activities - A new promotion conducted in 2003 was our "Get Caught Recycling" campaign. Twenty (20) area businesses sponsored the program by donating gift certificates to the District. If a person was "caught" recycling while a District representative was visiting a drop-off site, they received a free gift certificate. Thirty-nine (39) gift certificates were awarded in all. In 2005 and expected throughout the next 10 years, the Get Caught Recycling Promotion will be extended to curbside participants in the month of October. One business per year will be donating several gift certificates for this promotion. Donated prizes range in value from 15.00 to 25.00.
- g. Advertisement - The Districts media campaign has had great success in establishing the presence of the District and the many services it provides to county residents. The media campaign continues to focus on curbside and drop off recycling opportunities, as well as special collections, educational opportunities for residents, and the hazards of unsafe disposal methods. Currently, the Division contracts with four local broadcast stations and a cable station for airtime. Beyond the use of commercials, the Division engages in morning show live remotes on local TV stations. These remotes feature special collection drives, new drop off site unveilings and shows featuring the education occurring in county schools. In addition, beginning in 2005, the Division has made greater use of local cable channels with shows centered on recycling programs and educational opportunities. The Division has also begun to make use of radio advertisement, particularly for the promotion of special collection events. Print ads are used in most area papers and include use of PSA's. Fliers are printed and distributed at all public events and meetings. The District also publishes Mahoning Matters Newsletter in collaboration with County Soil and Water District. A similar educational publication is distributed in the schools "EZ to be Green". The District has upgraded and maintained its website as a constant source of information on the recycling program as well as special collections.
- h. Backyard Composting Program - This program is mostly educational. The District held five instructional composting seminars in 2003. Registered participants received Home Composters, a 40# bag of compost and a "Composting Cookbook" or "Compost Made Easy" booklet. Approximately, 400 attendees were recorded and 150 composters were given away.
- i. Resource Library - The District maintains a resource library containing environmental books, magazines and video content. This library is open to the public. The District promotes internet use for the most accurate and timely environmental information network.
- j. Pay-as-you-throw – District staff will continue to reinforce the correlation between less trash generation and cost savings through a variable rate system. PAYT is available through many local refuse haulers.

District Web Site

2001

Program: The District maintains a comprehensive web site to keep local residents, businesses and industry informed of upcoming news and events. Information presented includes recycling opportunities, recycling alternatives database, grant opportunities, breaking news and education programs. The website is serves as an integral part of our overall advertising and educational strategies.

Funding: \$ 600 is budgeted annually to pay for web hosting services and domain name registration. The cost associated with the maintenance of this strategy is bundled with departmental salaries. Updates are performed in-house.

Reporting: The District intends to further develop the website so that Annual District Reports may be viewed and parsed online.

Assumptions: Mahoning County intends to continue this strategy throughout the planning period. As technology advances, so will too our web presence.

Litter Programs

Litter Collection and Adopt-A-Road Programs 1986

Program: The District contracts with a local correctional rehabilitation facility that assigns crews of non-violent inmates to pick up roadside litter and recyclables throughout the county. We also collaborate with community-based organizations like CityScape, a non-profit group, dedicated to clean-ups and beautification.

The District also sponsors an Adopt-A-Spot program where individuals, groups or businesses volunteer to keep a specified section of roadway litter-free in exchange for roadside signs acknowledging the participants. Six (6) new groups formed in 2003 in addition to our existing 70-80-group membership for our roadside adoption program. Mahoning County will continue and expand its keep America beautiful affiliation.

Funding: Partial funding for this program, in the reference year, was incurred under an ODNR grant opportunity. There is a reasonable amount of uncertainty over the future sustainability of this program's partial grant funding. Nevertheless, the District expects to financially support this agenda and its curriculum throughout the planning period.

Reporting: Required monthly reporting is generated by Community Corrections Association that demonstrates compliance with all parameters of the ODNR grant. Additional activity is detailed to inform the District of other recycling strategies that may arise. Examples include the transport of batteries from public libraries to District headquarters or the delivery of recycling trailers to special events.

Assumptions: Mahoning County intends to continue this strategy throughout the planning period. No weights are associated with this program as they are collected and recorded within other strategies.

Impact: During 2003 Community Corrections Association and volunteers picked up approximately 281,518 lbs of litter from roadside and illegal dumpsites, of which, 224,070 lbs were recycled.

Industrial & Commercial/Industrial Hybrid Programs

CERTT Program 1992

The District implemented an industrial waste minimization project in January 1992. The District has contracted with YSU's Center for Engineering Research and Technology Transfer (CERTT) to perform waste audits on Mahoning County Industries.

The primary objective of the project is to urge industries to utilize waste minimization practices and make improvements to reduce waste. These objectives can be achieved through source reduction by product substitution, product conservation, and change in product composition. Waste minimization can also be secured through technological changes in equipment, piping, layout and additional automation, input material changes such as purification and substitution, and good operating practices such as loss prevention and waste stream segregation. The costs

associated with the disposal of industrial solid waste have been traditionally higher than those for residential and commercial waste have. Therefore, industries will be encouraged to minimize their generation of waste to avoid disposal costs.

The Youngstown State University's Center for Engineering Research and Technology Transfer (YSU – CERTT) targeted both large and small generators of industrial solid waste. Unlike many large industries which have separate offices for handling environmental and solid waste issues, small industries often do not have the resources and access to information. Therefore, YSU – CERTT made efforts to reach smaller industries by meeting their special needs for information.

The CERTT Program is evaluated annually to estimate the amount of waste reduced by the District industries. YSU – CERTT maintains a database where records of waste minimization practices are kept to monitor the progress towards achieving the goal of reducing additional tonnage of industrial waste annually. This program was terminated at the end of 2004.

Materials Exchange Database

1996

Program: Through a small grant from the District, YSU will hire a full time re:CREATE manager who will be responsible for maintaining the materials exchange newsletter and online database. A searchable database developed by Youngstown State University provides access for over 1,009 registered companies. Participants can list as available or wanted any surplus inventory that may result from overproduction, production waste or surplus stock for exchange. The database is openly available not only to Mahoning County residents but surrounding areas as well. The information was also disseminated through the quarterly Material Exchange Newsletter.

Funding: This strategy was bundled with the CERTT program. In the future, the cost associated with this program is included in the grant provided to the YSU re:CREATE program. The title "re:CREATE" originated in 1999 at YSU for a small, experimental reuse initiative, and existed on minimal funding from the university prior to the District's assistance. Technological assistance from the District will be provided on the maintenance of the database. Updates will be performed in-house.

Assumptions: A flat projection is associated with this strategy based on six years of historic data. An average of 5,633 tons will be applied throughout the planning period.

Impact: 8,240 tons of material from Mahoning County was reused from this service in 2003. An additional 8,697 tons of material were exchanged from outside the District.

E. TOTAL WASTE GENERATION

Using the information generated in the previous sections, Table IV-7 presents the 2003 reference year's total waste generation for the District. This amount includes residential/commercial, industrial, and exempt solid waste quantities totaling 430,983 tons in 2003.

In Table IV-7, the amount of solid waste generated in the residential/commercial sector was determined from the results of the landfill disposal records of Mahoning County during 2003 plus the recycling amounts collected by the various buy-back, drop off, curbside recycling activities and other programs in the District during 2003.

The landfill disposal records determined the "exempt" waste and "other" waste quantity for 2003. A comparison to previous years' amounts reveals that the quantity of 2,188 (2,128 tons of exempt + 60 tons other) tons identified in Table IV-7 is not consistent year to year. The tonnages of "exempt" and "other" waste reported in Ohio EPA's FDR do vary widely from year to year. The average (2000-2003) tonnage of exempt and other waste disposed in Mahoning County landfills is 4,473 tons.

F. TOTAL WASTE GENERATION: HISTORICAL TRENDS OF DISPOSAL PLUS WASTE REDUCTION

Table IV-8 presents the waste generation and recycling amounts from 1997 to 2003, with 2003 being the reference year. Comparison of values or changes in values from year to year shown in Table IV-8 are not necessarily “true” indicators of change. Differences in reporting procedures implemented over time, additions of programs collecting new data that was not available in previous years can all serve to produce substantial anomalies in an examination of percentage of change from year to year. This is most evident with the trends in Industrial waste which are broken out in Table IV-8 IND and summarized in Table IV-8B.

Despite declining population, and plummeting employment, industrial waste appears to have doubled in a five year period if one only examines landfill disposal record from Ohio EPA Facility Data Reports. And industrial recycling appears to exhibit a huge decline between 1999 and 2000 when one examines the Annual District Report values. Prior to 1999, the industrial recycling values reported in annual district reports were all based on the results of the 1996 industrial waste generators survey. In 2000, the CERTT program industrial recycling survey provide a new basis at a much lower tonnage due to the discovery of one facility previously reported all recyclables processed regardless of whether the material was originally generated in Mahoning County or elsewhere.

In 2000, the Materials Exchange Program began serving as a clearinghouse for industrial exchange both serving to document activities that had been occurring as well as promote new exchange but the large increase around 2001/2002 is attributable to the program change going to internet based clearinghouse. Comparison of change from 1999 to 2000, and 2001 to 2002 are not valid for these reasons, but it can be seen for other years that the total industrial waste generation changes fluctuate from +4% to -8% year to year. Given the base surveys (1996 or 2000) for industrial recycling are re-reported each year also tends to skew such an analysis.

G. RECONCILIATION OF WASTE GENERATION

Examining the Tables provided in the previous plan, the District saw less recycling occurring in the reference year than projected for 2003 by the previous plan. This is directly attributable to previous discrepancies in industrial recycling reporting. These discrepancies were discovered during the industrial recycling survey in 2000, which was conducted by the YSU CERTT program.

Any recycling and reuse measures implemented by industry (particularly the larger facilities with ISO 14001 certification) are not reflected in the Format version 3.0 values of Table JJ-2. Table JJ-2 values were generated based on industrial survey results from throughout Ohio in the early 1990’s; ISO 14000 standards were only beginning to be implemented in the mid 1990’s. Industrial waste generation based on a tons/employee method (from Format version 3.0 Table JJ-2) appears to be much higher than data on recycling plus disposal would indicate. This is quite possibly due to in house waste reduction measures such as the ISO 14001 certification process undertaken by industry as a whole. The basis for the standard statewide tons/employee values were generated in the mid 1990’s.

Thus, it is concluded that using recycling plus disposal basis for industrial projections as well as for the residential/commercial waste projection is a better representation of activity within the District. The reference year data presented in Table IV-7 most accurately represents actual waste disposal, therefore Table IV-9 of the Format version 3.0 is not utilized.

This plan update is an “access” plan and State acceptance of the plan is based upon satisfying Ohio access goals. As such, this plan is not required to meet any specific industrial recycling percentage goal. However, in the future, the District may be required meet specific industrial recycling percentages as set by the State Plan.

H. WASTE COMPOSITION

1. Residential/Commercial Sectors

Waste stream composition for the residential/commercial sector was estimated by using the statewide averages of waste composition presented in the Ohio Department of Natural Resources Waste Characterization Study (2003) and by adding the District's recycling data. In this study, the ODNR examined the content of waste going to landfill at various counties throughout Ohio. The district's total residential/commercial waste landfilled tonnage was multiplied by the percentages of each component of the waste stream to yield the approximate tonnage of each waste stream component going to Mahoning County landfills. Then the component content values for District recycling values were added to each line item to achieve a total waste generation by component. Each component's percentage of the total was calculated based on component tons divided by total tons.

Table IV-10 presents the resulting total residential/commercial solid waste composition.

2. Industrial Waste Sector

The solid waste composition for the industrial sector was estimated based on composition percentages obtained from the 1996 Industrial District surveys. The percentages from the survey are shown in Table IV-11 of this report. The percentages were modified based on industrial recycling composition percentages. Table IV-11 presents the resulting industrial solid waste compositions. (The 2003 Industrial survey had a small percentage of responses with limited information on composition in those responses. Therefore the 2003 industrial waste generators survey is not considered representative of the Industrial sector.)

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-1
REFERENCE YEAR POPULATION AND RESIDENTIAL/COMMERCIAL
GENERATION (2003)**

COUNTY NAME	POPULATION	GENERATION RATE (lbs/person/day)	TOTAL DISTRICT GENERATION
MAHONING	254,620	6.42	298,153

Sample Calculation: $(298,153 \text{ tons/year} \times 2000 \text{ lbs/ton} \times 1 \text{ yr}/365 \text{ days}) / 254,620 \text{ persons}$
= 6.42 lbs/person/day

Assumptions: 2003 Population interpolated between 2000 Census data and ODOD OSR 2005 population projection.

Source of information: Waste Generation = Disposal + Recycling

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-3
INDUSTRIAL WASTE GENERATION (2003)
SURVEY RESPONDENTS vs NON-RESPONDENTS**

SIC	SURVEY RESPONDENTS				SURVEY NON-RESPONDENTS				TOTAL WASTE GENERATED TONS	PERCENT OF TOTAL
	NO. OF INDUSTRIES	NO. OF EMPLOYEES ¹	WASTE GENERATED TONS	GENERATION RATE: TONS / EMPLOYEE ²	NO. OF INDUSTRIES	NO. OF EMPLOYEES ¹	GENERATION RATE: TONS / EMPLOYEE ³	WASTE GENERATED TONS ³		
20	2	190	184	0.97	20	940	13.92	13,085	13,269	6.28%
21	0	0	-	-	0	0	-	0	0	0.00%
22	0	0	-	-	3	26	9.99	260	260	0.12%
23	0	0	-	-	12	327	2.80	916	916	0.43%
24	3	125	1,930	15.44	22	346	51.62	17,861	19,791	9.36%
25	0	0	-	-	15	27	1.79	496	496	0.23%
26	2	186	217	1.15	5	484	17.50	8,470	8,684	4.11%
27	8	115	233	2.03	72	1,041	6.70	6,975	7,208	3.41%
28	1	70	42	0.60	39	912	12.43	11,336	11,378	5.38%
29	0	0	-	-	2	547	7.33	4,010	4,010	1.90%
30	0	0	-	-	23	513	7.29	3,740	3,740	1.77%
31	1	27	45	16.67	0	0	3.41	0	450	0.21%
32	1	15	62	4.10	35	651	10.55	6,900	6,961	3.29%
33	5	1,705	2,387	1.40	63	2,162	36.93	79,843	82,230	38.89%
34	10	190	54	0.28	135	2,824	11.11	31,516	31,570	14.93%
35	12	250	203	0.81	109	1,872	17.2	10,708	10,911	5.16%
36	1	145	109	0.75	9	725	2.98	2,161	2,269	1.07%
37	2	25	104	4.16	18	443	3.21	1,422	1,526	0.72%
38	2	50	267	5.34	17	466	1.74	811	1,078	0.51%
39	4	36	37	1.03	59	1,009	4.62	4,662	4,699	2.22%
TOTAL	54	3,129	6,276	2.01	677	15,568		205,168	211,444	100.0%

Note: This method of estimating Industrial waste generation was examined but it is not selected methodology.

- Number of employees generated from the 2003 OPLIN Search / Harris Ohio Industrial Directory
- Generation rate determined from reported total generation in the 2003 Survey. Due to low response, Table JJ-2 generation rate was used to calculate tonnage for non-responding industries.

Sample Calculation

SIC 27 = survey respondents:
 $233 \text{ tons} / 115 \text{ employees} = 2.03 \text{ tons/ employee}$
survey non-respondents:
 $6.70 \text{ tons/employee} * 1,041 \text{ employees} = 6,975 \text{ tons}$
 Total SIC 27 waste generation = 233 tons + 6,979 tons = 7,208 tons

- Table JJ-2 Ohio Industrial Waste Generation by Standard Industrial Category

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-3B
INDUSTRIAL WASTE GENERATION (2003)
DISPOSAL + RECYCLING + REDUCTION**

SIC	DISPOSAL + RECYCLING + REDUCTION			
	NO. OF INDUSTRIES	NO. OF EMPLOYEES ¹	WASTE GENERATED TONS ³	PERCENT OF TOTAL
20	22	1,130	8,198	6.28%
21	0	0	0	0.00%
22	3	26	160	0.12%
23	12	327	566	0.43%
24	25	471	12,228	9.36%
25	15	277	306	0.23%
26	7	670	5,365	4.11%
27	80	1,156	4,454	3.41%
28	40	982	7,030	5.38%
29	21	547	2,477	1.90%
30	23	513	2,311	1.77%
31	1	27	278	0.21%
32	36	669	4,301	3.29%
33	68	3,867	50,806	38.89%
34	145	3,014	19,506	14.93%
35	121	2,122	6,741	5.16%
36	10	870	1,402	1.07%
37	20	468	943	0.72%
38	19	516	666	0.51%
39	63	1,045	2,903	2.22%
TOTAL	731	18,697	130,642	100.0%

1. Number of employees generated from the 2003 OPLIN Search / Harris Ohio Industrial Directory.
2. Generation rate determined from reported total generation in the 2003 Facilities Data Report + 2003 Annual District Report (Recycling + Reduction)

MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT SOLID WASTE MANAGEMENT PLAN

TABLE IV-4

EXEMPT WASTE GENERATED IN THE DISTRICT AND DISPOSED IN PUBLICLY-AVAILABLE LANDFILLS

TYPE OF WASTE STREAM	GENERATION RATE (lbs/person/day)	TOTAL EXEMPT WASTE GENERATION (TPY) 2003
Asbestos	0	0
Exempt	0.0458	2,128
Other	0.0013	60
Totals	0.0471	2,188

Population taken from Table IV-1.

Sample Calculation: $(2,128 \text{ TPY} * 2,000 \text{ lbs/ton}) / (365 \text{ days/yr} * 254,620 \text{ population})$
 $= 0.0458 \text{ lbs/person/day}$

Assumptions: Total Exempt Waste Generation (TPY) values were obtained from the 2003 Facility Data Reports.

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-5
REFERENCE YEAR RESIDENTIAL/COMMERCIAL
WASTE REDUCTION IN THE DISTRICT (2003)**

TYPE OF WASTE SOURCE REDUCED	TPY	TYPE OF WASTE RECYCLED	TPY	INCINERATION, COMPOSTING, RESOURCE RECOVERY		
				TOTAL WASTE RECEIVED	RESIDUAL LANDFILLED	NEW WASTE PROCESSED
		Appliances	187	Incineration	Ash	
		Lead Acid Batteries	10			
		Dry Cell Batteries	7			
		Food	-	0	0	0
		Glass	1,839	Composting		
		Household Hazardous Waste	22			
		Ferrous Metals	55	Resource Recovery		
		Non Ferrous Metals	752			
		Non Exempt Foundry Sand				
		Corrugated Cardboard	6,032			
		All other Paper	6,793			
		PETE Plastic	-			
		HDPE Plastic	-			
		Mixed Other Plastic	328			
		Rubber (excluding Tires)	-			
		Scrap Tires	-			
		Textiles	-			
		Used Oil	3			
		Wood	14,118			
		Yard Waste	5,980			
		Other ¹	245			
SUBTOTAL	0		36,370	0	0	0
GRAND TOTAL						36,370

Notes:

1. Other comprised of Christmas Trees, Christmas Wrapping, and Electronics/Computers collected during special District Events and quantified in aggregate on the 2003 ADR.

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-6
REFERENCE YEAR INDUSTRIAL
WASTE REDUCTION IN THE DISTRICT (2003)**

TYPE OF WASTE SOURCE REDUCED	TPY	TYPE OF WASTE RECYCLED	TPY	INCINERATION, COMPOSTING, RESOURCE RECOVERY		
				TOTAL WASTE RECEIVED	RESIDUAL LANDFILLED	NEW WASTE PROCESSED
Industrial Source Reduction	0	Recyclers/Brokers <i>Detailed records from CERTT program not available</i>	43,535	Incineration	Ash	
				0	0	0
		Material Exchange Database	8,240	Composting		
				0	0	0
				Resource Recovery		
				0	0	0
						0
SUBTOTAL	0		51,775			0
GRAND TOTAL						51,775

Notes:

Recyclers/Brokers reported recycling has been adjusted for autobodies and demolition activities.

Recyclers/Brokers Tonnage is from 2003 ADR based CERTT Program Survey (2000).

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-7
REFERENCE YEAR TOTAL WASTE GENERATION
FOR THE DISTRICT (2003)**

TYPE OF WASTE	GENERATION RATE (lbs/person/day)	TONS/YEAR
Residential / Commercial	6.42	298,153
Industrial	2.81	130,642
Exempt & Other	0.05	2,188
Total Waste Generation	9.27	430,983

Notes:

2003 District population 254,620

Sample Calculation:

$$\text{Generation rate} = \frac{(298,153 * 2000)}{254,620 * 365} = 6.42 \text{ lbs/person/day}$$

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-8 IND
INDUSTRIAL WASTE GENERATION BASED UPON
DISPOSAL PLUS WASTE REDUCTION**

YEAR	SOURCE REDUCTION & RECYCLING ³	MATERIALS EXCHANGE	YARD WASTE LAND APPLICATION	INCINERATION	MSW COMPOSTING	(INDUSTRIAL) LANDFILL DISPOSAL ⁴	TOTAL WASTE GENERATED
1997	186,527 ¹	-	0	4,749	0	34,264 ²	225,540
1998	186,527 ¹	-	0	4,749	0	43,573 ²	234,849
1999	186,527 ¹	-	0	4,749	0	24,063 ²	215,339
2000	46,944 ¹	508	0	0 ⁵	0	60,229 ²	107,173
2001	43,778 ¹	4,643	0	0	0	55,475 ²	99,253
2002	42,778 ¹	6,776	0	0	0	75,231 ²	124,785
2003	43,535 ¹	8,240	0	0	0	78,867 ²	130,642

Note:

1. Reported in Annual District Reports, 1997-1999 based on 1996 Industrial Surveys, 2000 - 2003 based on 2000 CERTT industrial Survey w/ annual adjustment.
2. From Ohio Facility Data Reports.
3. Industrial Tons.
4. Excludes asbestos, exempt, and other wastes. Value taken from "Industrial" reported in Table 14 of OEPA FDRs.
5. Based on 2000 FDR although 2000 ADR reported 7,438 tons.

TABLE IV-8 B
INDUSTRIAL WASTE GENERATION BASED UPON
DISPOSAL PLUS WASTE REDUCTION

YEAR	INDUSTRIAL WASTE RECYCLED¹	INDUSTRIAL WASTE LANDFILLED AND INCINERATED²	TOTAL
1997	186,527	39,013	225,540
1998	186,527	48,322	234,849
1999	186,527	28,812	215,339
2000	43,778	60,229	104,007
2001	43,778	55,475	99,253
2002	50,311	75,231	125,542
2003	51,775	78,867	130,642

1. Value taken from the ADR Table IV.1 Solid Waste Management District Waste Recycled Industrial Grand Total.
2. Value taken from the calendar year FDR Table Solid Waste Flows to Landfills and Incinerators in OH.

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-8
TOTAL WASTE GENERATION BASED UPON
DISPOSAL PLUS WASTE REDUCTION**

YEAR	MANAGEMENT METHOD USED IN TPY						TOTAL WASTE GENERATED
	SOURCE REDUCTION & RECYCLING ³	YARD WASTE COMPOSTING	YARD WASTE LAND APPLICATION	INCINERATION	MSW COMPOSTING	LANDFILL DISPOSAL ⁴	
1997	529,683 ¹	4,100 ¹	0	4,913 ¹	0	268,559 ²	807,255
1998	222,591 ¹	4,057 ¹	0	7,436 ¹	0	292,572 ²	526,656
1999	207,925 ¹	7325.5 ¹	0	7,438 ¹	0	304,440 ²	527,128
2000	71,652 ⁵	10,200 ¹	0	0 ⁵	0	316,076 ²	397,928
2001	74,708 ¹	12,300 ¹	0	0 ¹	0	306,356 ²	393,364
2002	70,690 ⁵	15,027 ¹	0	0 ¹	0	313,039 ²	398,756
2003	71,165 ¹	16,980 ¹	0	0 ¹	0	342,838 ²	430,983

Note:

1. From Annual District Reports, 1997-2003 & Recycling Surveys.
2. From Ohio Facility Data Reports.
3. General & Industrial Tons.
4. Includes asbestos, exempt, and other wastes reported in Table 14 of OEPA FDRs.
5. Based on 2000, 2002 FDR.

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-10
ESTIMATED RESIDENTIAL/COMMERCIAL WASTE STREAM
COMPOSITION FOR THE REFERENCE YEAR (2003)**

Waste Stream Type	Percentage of Weight Generated 2003 ¹	Tons of Res/Com Waste 2003
Paper and paperboard	35.2%	104,972
Glass	5.3%	15,713
Ferrous metals	5.3%	15,687
Aluminum	1.5%	4,417
Other Non-Ferrous	0.6%	1,832
Plastics	10.0%	29,909
Rubber and Leather	2.5%	7,592
Textiles	4.0%	11,780
Wood	9.8%	29,301
Other materials	1.6%	4,695
Food Wastes	10.3%	30,629
Yard Trimmings	12.6%	37,656
Misc. Inorganics	1.3%	3,968
Total	100.0%	298,153

1. 2003 Based on Percentages from ODNR's 2003 Waste Characterization Study plus adjustment for District Recycling Data. (ODNR only studied waste going to landfill).

**MAHONING COUNTY SOLID WASTE MANAGEMENT DISTRICT
SOLID WASTE MANAGEMENT PLAN**

**TABLE IV-11
ESTIMATED INDUSTRIAL WASTE COMPOSITION
FOR THE REFERENCE YEAR (2003)**

WASTE STREAM TYPE	% ¹	TONS	WASTE STREAM TYPE	% ¹	TONS
ALUMINUM	4.65	6,075	MIXED WASTE	0.00	0
ASH	0.03	39	NON-HAZ CHEMICALS	0.52	679
BARK	0.00	0	OIL	0.00	0
BATTERIES	0.00	0	PAPER, OFFICE	0.00	0
CARDBOARD	3.60	4,703	PAPER, MISC.	9.32	12,176
CONCRETE	0.26	340	PAPER, NEWSPRINT	0.00	0
DRUMS	0.00	0	PLASTER	0.00	0
DUST COLLECTOR FINES	0.00	0	PLASTICS	0.32	418
FABRIC / TEXTILES	0.06	78	REFRACTORIES	0.00	0
FOOD WASTES	0.38	496	RUBBER	0.02	26
GLASS	0.07	91	SAWDUST	0.00	0
INK	0.00	0	SILICA / ALUMINA	0.00	0
LITHO / PHOTO FILM	0.00	0	SLAG	0.00	0
LUBRICANTS	0.00	0	SLUDGE	1.07	1,398
METAL DUST	0.00	0	STONE / CLAY / SAND	2.64	3,449
METALS, FERROUS	73.89	96,531	WOOD	1.68	2,195
METALS, NON-FERROUS	0.66	862	OTHER, MISCELLANEOUS	0.83	1,084
SUBTOTAL	83.60	109,217	SUBTOTAL	16.40	21,425
			GRAND TOTALS	100.00	130,642

1. Due to low response rate of 2003 industrial survey, % distribution of waste stream is based on 1996 SWMP Report.