

**NEWSPAPERS - A MAJOR CONTRIBUTOR TO THE MUNICIPAL
SOLID WASTE STREAM**

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Each year Americans must deal with over 160 million tons of municipal solid waste. This material (the stuff we throw away with very little concern as to where it goes) is a pollutant in itself and no matter how well managed, will have some measure of environmental impact. Integrated solid waste management techniques reduce the adverse impact and minimize the risk that may be incurred by relying on only one disposal alternative.

In order to manage heterogeneous garbage in a safe and sane manner, local governments must use all solid waste management options available. They include: waste reduction (volume or toxicity); recycling or reuse; treatment for volume reduction, organic destruction, and recovery of energy; and land disposal. While each option can be used to manage a different materials in the municipal waste stream, none can do the job alone. All have the potential for causing environmental harm and must be performed carefully to minimize the adverse impact. For example, reducing the volume of food packaging could increase the potential for bacterial and viral exposure; recycling uses energy and releases waste products into the environment that could contaminate ground and surface waters and contribute to regional air pollution; waste-to-energy plants must control air emissions to safe levels and ensure proper management of ash so as not to endanger water supplies.

Landfills, which have the greatest potential for contamination, must control disease vectors, air emissions (fugitive dust and organic vapors) and leachates generated during the decomposition of the waste.

Ogden Projects, Inc., (OPI) is involved with integrating all solid waste management options. Although the company's primary focus is designing, building, and operating waste-to-energy facilities, it also operates landfills and manages recycling programs. Since the most important aspect of municipal solid waste (MSW) management is public health protection, non-management of waste is as much a cause for concern as the AIDS epidemic. If MSW is not collected or just dumped at the edge of town, there will be health incidents arising from the bacteria and virus contained in the trash that is spread by wind, rain, and rodents. While integrated solid waste management will mitigate these kinds of adverse health incidents, no one method will eliminate all potential problems.

One of the most controversial problems with MSW management is the trace toxic constituents of everyday, short-lived, consumer products. From a management perspective, decreasing the large volume of material is a priority. However, from the perspective of long-term environmental impact, toxicity is much more important.

Keeping this in mind, OPI studied the potential impact of newspapers, an item that is discarded daily. Newspapers represent the single largest item in the daily waste stream, accounting for 10-20 percent of municipal waste. In New York City, newspapers account for 15 percent of all municipal solid waste. One daily newspaper admitted that it was responsible for 20 percent of municipal waste generated on Long Island.

Newspapers are the most readily recycled commodity in municipal solid waste. They have the potential to release about 8,000 British Thermal Units (BTUs) per pound if burned in a waste-to-energy facility. Unfortunately, when placed in a landfill, they biodegrade very slowly, producing organic acids that have the potential of carrying toxic constituents to water supplies. By performing a simple chemical analysis, it is evident that the amount and the type of toxics released into the environment from this short-lived product is alarming.

OPI chose a major metropolitan newspaper with one of the 10 largest circulations in the United States. In January 1988, newspapers were purchased at a convenience store for a one-week period and sent to two separate laboratories for chemical analysis. The daily newspapers were shredded, composited, and subjected to a series of organic and inorganic analyses. Likewise, the Sunday edition was treated and processed and, additionally, a second Sunday edition was analyzed for dioxin. Versar, Inc., of Columbia, Maryland (metals, organics, EP Tox, etc.), and Triangle Labs, Research Triangle Park, North Carolina (dioxin, furan), participated in the analyses.

The newspaper reported that it used eight percent recycled "fiber". Although it was assumed that each roll of newsprint contains eight percent recycled fiber, this could also be taken to mean the eight percent of the time the paper is printed on recycled newsprint. The chemical analysis showed that the newspaper contained a number of toxic, carcinogenic, mutagenic and teratogenic elements and chemical compounds. While the presence of these trace constituents is low, the amount of toxics flowing into the ecosystem is noteworthy.

Circulation data is as follows:

	<u>DAILIES</u>	<u>SUNDAY</u>
Circulation	641,000 per issue	682,000
Weight	5.87 lbs.	3.16 lbs. *
Tons/Year	97,829.42	56,033.12

* A Sunday issue published in December 1987 weighed 4.98 lbs. That equates to 88,174.88 tons of Sunday issues per year. This number, however, is somewhat high given the extraordinary amount of advertising in holiday editions.

The following generation rates (rounded to the nearest 1,000) were used to calculate the flow into the ecosystem annually: 100,000 tons/year for dailies; 70,000 tons/year for Sunday; 170,000 tons/year total.

Organics

The trace organic compounds found in the newspapers are listed in the following table. The majority (5) of these compounds are solvents and are most likely associated with the inks as vehicles and/or press cleaners. Hexachlorocyclohexane is a pesticide and is probably a residual from the papermaking process. The phenol is also a probable residual. The data is quantified in parts per billion and pounds per year.

<u>Organics</u>	<u>Daily*</u>	<u>Sunday*</u>	<u>Daily</u>	<u>Sunday</u>	<u>Total</u>
Methylene Chloride	94	69	18.8	9.66	28.46
Acetone	230	630	46	88.2	134.2
Toluene	130	1800	26	252	278
Ethylbenzene	22	480	4.4	67.2	71.4
Xylenes	130	2300	26	322	348
Hexachlorocyclohexane	23	23	4.6	3.22	7.82
Phenols	1100	1000	220	140	<u>360</u>
					1,227.88

* PPB. All other - pounds per year.

Dioxins

Because of the high cost of analysis, only one dioxin/furan analysis was performed on the Sunday edition. The analysis showed the presence of dioxin/furan at the same levels, and with the same isomer profile, as many other paper products analyzed. Therefore, it was assumed that the dailies also contained the same levels. The dioxin/furan releases to the ecosystem are based on the 170,000 tons/year figure.

Interestingly, paper contains the most toxic isomers of

dioxin/furan in the highest concentrations. In comparison, ash and air emissions from resource recovery facilities have low relative concentrations of the most toxic isomers.

The total concentration of dioxin/furan in the newspaper was 248.49 parts per trillion (ppt). Converted to a 2,3,7,8 TCDD toxic equivalent basis (US EPA method), the amount is 11.158 ppt. This results in more than a gram (.004 lbs) of 2,3,7,8 TCDD equivalents entering the ecosystem each year. By comparison, Ogden Martin's Marion County facility, which burns an equivalent tonnage of waste each year (170,000), emits 20 times less dioxin/furan to the environment.

PCDD/PCDF ANALYSIS

Concentration and Toxic Equivalents (EPA Method) (ppt)

<u>NAME</u>	<u>CONCENTRATION</u>	<u>MULTIPLIER</u>	<u>TOXIC EQUIVALENT</u>
2378-TCDD	3.915	1.0	3.915
Other-TCDD	ND	0.01	-
2378-Sub-H _x CDD	ND	0.04	-
Other-H _x CDD	2.181	0.0004	0.00087
1234678-HpCDD	12.841	0.001	0.0128
Other-HpCDD	25.747	0.00001	0.000257
2378-TCDF	69.504	0.1	6.95
Other-TCDF	131.381	0.001	0.131
23478-PCDF	1.472	0.1	0.147
Other-PCDF	<u>1.449</u>	0.001	<u>0.00145</u>
ppt	248.49		11.158

Heavy metals

Two types of heavy metals analyses were conducted. The EP Toxicity test, which was the first, is a leaching test that attempts to simulate what occurs in a landfill. It indicated the newspaper did not exhibit hazardous waste characteristics and metals did not leach out at levels above the regulatory threshold. There are, nevertheless, heavy metals present in the newspaper that were detected as a result of a chemical analysis procedure. The following table lists the metals detected in parts per million and in pounds/year to the ecosystem.

<u>HEAVY METALS</u>	<u>DAILY*</u>	<u>SUNDAY*</u>	<u>DAILY</u>	<u>SUNDAY</u>	<u>TOTAL</u>
Barium	14.0	17.0	2800	2380	5180
Cadmium	0.021	0.1	4.2	14	18.2
Chromium	0.68	0.94	136	131.6	267.6
Copper	4.9	13.0	980	1820	2800
Iron	7.10	44.0	1420	6160	7580
Lead	0.43	1.8	86	252	338
Manganese	38.0	50.0	7600	7000	14,600
Mercury	<0.0014	0.0066	0.28	0.924	1.204
Silver	0.032	0.14	6.4	19.6	26
Zinc	2.8	11.0	560	1540	2100
					<u>34,113.8</u>

* PPM All other - pounds per year.

Newspaper disposal results in seventeen plus tons of heavy metals, for which primary and secondary drinking water standards have been established, being released into the environment each year. In comparison, Ogden Martin's Bristol, Connecticut, facility, which burns an equivalent amount of trash each year, emits only one sixth as much lead.

Additional Impacts

If all of these newspapers were placed in landfills, there would be the potential for generating 699,125 (350 tons) of toxic hydrogen sulfide gas from the biological decomposition of the sulfur contained in the paper each year. On the other hand, if all were burned, 658 tons of sulfur dioxide, 105 tons of hydrogen chloride gas, and 127.5 tons of nitrogen oxide would be produced.

Newspaper (newsprint) is a readily recycled material. When recycled, the organic solvents and metals in the inks become waste. This particular newspaper prints their product on ninety-two percent virgin stock and eight percent recycled paper stock. During the recycling operation, in order to produce 13,600 tons of recycled newsprint, at least 1,360 tons of waste are generated. This waste consists of short unusable fibers and ink.

If any paper other than newsprint is used to produce recycled news, additional waste in the form of fillers and coatings is generated. All of this waste is contained in the pulping liquids and removed as a sludge in a complex wastewater treatment system. This sludge is often managed as a RCRA hazardous waste under Subtitle C of the Resource Conservation and Recovery Act.

Most volatile organics contained in the incoming paper flow into the receiving body of water. While the levels of organic compounds and metals detected in the newspaper do not represent an imminent threat to public health, their presence is of concern.

Because all of these compounds contribute to the environmental loading of toxic compounds, the toxicity of newspapers should be reduced. There are less toxic inks, vehicles, and solvents available for substitution.

The American Newspaper Publishers Association (ANPA), which represents approximately 1,400 daily and weekly newspapers in the US and Canada, established a set of voluntary standards for inks containing no lead, chromium, or cadmium.

ANPA has also developed standards for black ink, which has very low levels of aromatic hydrocarbons, and uses only carbon black as the pigment. In addition, ANPA has developed a water-based ink printing process. Approximately 40 newspapers have started using this new low environmental impact process. Although ANPA's efforts represent a significant first step, they are non-enforceable and address the newspaper printing process only, and not the "slick" advertising and weekend supplement inserts.

Heavy-metal based pigments are often used to produce these "slick" supplements as well as the colored ads that appear on newsprint. This fact raises questions regarding newspaper advertising. Given our free enterprise system, it is highly unlikely that newspaper publishers would eliminate advertising. If such a revolutionary idea were implemented, it would result in a weight reduction of as much as ninety-five percent, and a significant reduction to the flow of toxic compounds into the environment.

Because a newspaper is dependent on advertising revenue to continue publication and maintain high circulation, eliminating advertising in Sunday or daily editions is not highly likely in the near future.

Although it is unrealistic to expect newspapers to totally eliminate advertising, they could contribute to solving America's solid waste crisis by taking steps to reduce the toxicity of their product, and exercising discretion with respect to "slick" advertising supplements.