The Charleston County Incinerator in 2008

Introduction

20 Years ago, Charleston County began burning its garbage. At that time, it was a national trend, and considered to be a good way to deal with garbage. Since then many incinerators across the nation have been decommissioned and dismantled due to the toxic emissions including dioxins, particulate matter, and mercury. The incinerator burns everything we throw away, and much of our garbage is regulated by the federal government as hazardous waste.

The emissions from the Charleston County Incinerator are unacceptable. Incinerators are an extremely dangerous public health threat, and inappropriate for Charleston County. The toxic emissions from incinerators include:

Dioxins: A group of chemicals created by incinerators which have been linked with: cancer, IQ deficits, disrupted sexual development, birth defects, and immune system damage. There are no safe levels of dioxins.

Particulate Matter: Fine particles released from incinerators which have been linked with: asthma, decreased lung function, other respiratory ailments, disruption of heart function, and increased mortality rates. There are no safe levels of particulate matter.

Mercury: This potent neurotoxin released by the incinerator has been linked with: birth defects, nerve disorders, heart failure, autism, mental retardation, seizure disorders, cerebral palsy, blindness and deafness. Mercury builds up in the food chain and in people.

Other Toxics: Additionally, the incinerator leads to the releases of: acidic gases, lead, cadmium, arsenic and can lead to toxic groundwater pollution.

Currently, the company that operates the incinerator, "Montenay/Veolia" is negotiating another 20 year contract with the County while offering some pollution control improvements. However; Montenay/Veolia's plans to reduce pollution do not impress, as they are only designed to simply meet new EPA guidelines. While Montenay/Veolia's plans may meet legal requirements, the result will still be an incinerator which will continue to poison Charleston County's residents, waterways, farms and air for at least two more decades. Charleston County should instead craft a vision for solid waste management in step with modern strategies that are being used across the country to replace this outdated dirty technology.

This paper offers a brief outline of the health threats associated with incinerators, and tries to shed some light on a technology more fitting for the dark ages.

The Incinerator is an outdated and dangerous source of pollution

Background on the Incinerator

- The Montenay/Veolia Incinerator is a waste to energy plant located near Spruill Avenue and has been in operation since 1989. This is the only incinerator operating in all of South Carolina, and at least 80 percent of the municipal solid waste from Charleston County goes into the incinerator converting 230,000 tons of trash a year into smoke, steam and a thick black ash. The incinerator generates electricity which is sold on the grid out of state to North Carolina.1[1]

The Incinerator is a Dying Technology

- The Incinerator is an outdated dying technology. Across the nation, incinerators are being shut down and dismantled because of their harmful and deadly emissions. Very few large cities still burn trash in incinerators, and many incinerators that are coming up for contract renegotiation are being rejected in favor of more state of the art waste management strategies.2[2]
    - The incinerator does not make Charleston County's trash disappear, as there are still 47,000 tons a year of toxic ash which must be lanfilled.3[3]

The Incinerator Burns Everything but the Kitchen Sink

- The incinerator burns residential household waste. Our garbage is often spiked with toxic chemicals, and when they are burned in the incinerator it pollutes our air, water and food with some of the most dangerous manmade chemicals known to science. The incinerator burns anything that people throw out in their trash, and the list of hazardous waste coming out of peoples homes includes
    - Oven cleaners; Drain cleaners; Wood and metal cleaners and polishes; Toilet cleaners; Tub, tile, shower cleaners; Bleach (laundry); Pool chemicals; Motor oil; Fuel additives; Carburetor and fuel injection cleaners; Air conditioning refrigerants; Starter fluids; Automotive batteries; Transmission and brake fluid; Antifreeze; Herbicides; Insecticides; Fungicides/wood preservatives; Ant sprays and baits; Cockroach sprays and baits; Flea repellents and shampoos; Bug sprays; Houseplant insecticides; Moth repellents; Mouse and rat poisons and baits; Adhesives and glues; Furniture strippers; Oil or enamel based paint; Stains and finishes; Paint thinners and

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1[1] Tony Bartlelme, "County Incinerator No Longer Adds Up," The Post and Courier (Feb 1, 2008) http://www.charleston.net/news/2008/feb/01/county_incinerator_no_longer_adds_up29288/

2[2] Noah Ovshinsky, "Detroit Faces Decision on Trash Incinerator," National Public Radio (Jun. 5, 2008) http://www.npr.org/templates/story/story.php?storyId=91208902&ft=1&f=1001

3[3] Stratton Lawrence, "County Poised for 20 More Years of Burning Garbage," Charleston City Paper (May 14, 2008) http://www.charlestoncitypaper.com/gyrobase/Content?oid=45227

turpentine; Paint strippers and removers; Photographic chemicals; Fixatives and other solvents; Batteries; Mercury thermostats or thermometers; Fluorescent light bulbs; Driveway sealer; and Propane tanks and other compressed gas cylinders4[4]

Signing another 20 year contract may be a missed recycling opportunity

- The current incinerator contract that the county is negotiating with Montenay/Veolia could prevent the County from creating a modern day solid waste management plan. The contract has a minimum tonnage agreement that assures Veolia-Montenay 175,000 tons of garbage each year. The county's cost to incinerate decreases after meeting that goal, creating an economic incentive to burn as much as possible. Additionally, the value of recyclables continues to rise, as does the cost of waste disposal.5[5]
- Charleston County currently spends 10 million dollars a year to operate this incinerator.6[6] However, the recycling process creates more jobs than landfills or incinerators, and recycling can frequently be the least expensive waste management method for cities and towns.7[7]

The Incinerator spews out a plume of dangerous chemicals day and night, Which poisons our air, water and food

Dioxins

- Incinerators are a major source of dioxins which are often formed after incineration has occurred.8[8]
- In terms of dioxin release into the environment, waste incinerators (solid waste and hospital waste) are often the worst culprits (according to the World Health Organization)9[9]

4[4] United States Environmental Protection Agency, List of Common Household Hazardous Waste (HHW) Products, http://www.epa.gov/garbage/hhw-list.htm

4[4] Michelle Allsopp et. al., Incineration and Hum

5[5] Stratton Lawrence, "County Poised for 20 More Years of Burning Garbage," Charleston City Paper (May 14, 2008) http://www.charlestoncitypaper.com/gyrobase/Content?oid=45227

6[6] Charleston County of South Carolina, FY 2008 Budget Detail" 274 (2008) http://www.charlestoncounty.org/Departments/Budget/budgetpdfs/2008_Budget_Detail.pdf

7[7] United States Environmental Protection Agency, "Reduce, Reuse, Recycle, Buy Recycled," http://www.epa.gov/region09/waste/solid/reduce.html

8[8] The Parliamentary Office of Science and Technology of the United Kingdom, "Incineration of Household Waste," (2000) http://www.parliament.uk/post/pn149.pdf

9[9] World Health Organization, "Dioxins and their effects on Human Health (2008) http://www.who.int/mediacentre/factsheets/fs225/en/index.html

- The health effects of exposures to relatively high levels of dioxin became widely publicized due to the use of the herbicide called Agent Orange in the Vietnam War.10[10]

Dioxins are a Serious Public Health Threat

- According to the EPA, there appears to be no "safe" level of exposure to dioxins.11[11]
- The science indicates a wide variety of health effects in humans and animals, including the following12[12]
    - Cancer
    - IQ deficits
    - Disrupted sexual development
    - Birth defects,
    - Immune system damage,
    - Behavioral disorders (such as hyperactivity),
    - Diabetes and
    - Altered sex ratios.
    - Endocrine Disruption
        - One form of dioxin is a known carcinogen and endocrine disruptor, meaning that it interferes with the human body's hormonal system.13[13]
- Additionally, Animal and human studies demonstrate that dioxins and dioxin like compounds might contribute to the following14[14]
    - Thyroid dysfunction
    - Lipid disorders
    - Neurotoxicity
    - Cardiovascular disease
    - Metabolic disorders.

Particulate Matter

- Incinerators are a major source of particulate matter (PM).15[15]

10[10] The National Academies, "Health Risks from Dioxin and Related Compounds, Evaluation of the EPA Reassessment," Public Summary (Jul. 2006) http://dels.nas.edu/dels/rpt_briefs/dioxin_brief_final.pdf

11[11] United States Environmental Protection Agency, "Dioxin Homepage," http://www.ejnet.org/dioxin/

12[12] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

13[13] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

14[14] The National Academies, "Health Risks from Dioxin and Related Compounds, Evaluation of the EPA Reassessment," Public Summary (Jul. 2006) http://dels.nas.edu/dels/rpt_briefs/dioxin_brief_final.pdf

- PM is made up of fine particles frequently with metals and organic compounds on their surfaces.16[16]
- Charleston County has a well documented PM problem. The American Lung Association's State of the Air Report 2008 was released May 1, 2008, giving the county an "F" grade.17[17]

Particulate Matter is a Serious Public Health Threat

- There is no safe level of exposure to particulate matter.18[18]
- The overwhelming weight of evidence to date orients PM pollution among the most harmful and pervasive ambient environmental contaminants to threaten human health.19[19]
- Fine PM matter sourced from incinerators are dangerous because of their ability to evade the natural filters of the human nasal passages and lodge deep in the lungs.20[20]
    - Particulates from incinerators carry heavy metals, dioxins and related compounds on their surfaces. Fine particulates have been linked to the following21[21]
        - Asthma
        - Decreased lung function
        - Other respiratory ailments
        - Disruption of heart function
        - Increased mortality rates
- Short-term increases (over hours to days) in particle pollution have been linked to the following
    - Death from respiratory and cardiovascular causes, including strokes;22[22]

15[15] United Nations Environment Programme, "Municipal Solid Waste Management, Sound Practices, Incineration," http://www.unep.or.jp/ietc/estdir/pub/msw/sp/sp5/sp5_4.asp
16[16] The Parliamentary Office of Science and Technology of the United Kingdom, "Incineration of Household Waste," (2000) http://www.parliament.uk/post/pn149.pdf
17[17] American Lung Association: State of the Air: 2008 http://www.lungusa2.org/sota/SOTA2008.pdf
18[18] Environment Canada, "Particulate Matter: A Critical Environmental Health Issue," The Canadian Government (2008) http://www.ec.gc.ca/Science/sandejulaug/article1_e.html
19[19] World Health Organization. *The World Health Report: 2002. Reducing Risks, Promoting Healthy Life*
(2002); 68-69 ("Particulate air pollution (i.e. particles small enough to be inhaled into the lung) is consistently and independently related to the most serious [acute and chronic health] effects, including lung
cancer and other cardiopulmonary mortality").
20[20] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf
21[21] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf
22[22] Dominici F, McDermott A, Zeger SL, Samet JM. *On the Use of Generalized Additive Models in Time-Series Studies of Air Pollution and Health.* Am. J. Epidemiol 2002; 156:193-203. *See also* Hong, Y.-C., Lee J.-T., Kim, H., Ha, E.-H., Schwartz, J., and Christiani, D.C. *Effects of Air Pollutants on Acute Stroke Mortality. Environ*. Health Perspect. Vol. 110, pp. 187-191, 2002. *See also* Tsai SS, Goggins

    - Increased numbers of heart attacks, especially among the elderly and in people with heart conditions;23[23]
    - Inflammation of lung tissue in young, healthy adults;24[24]
    - Increased hospitalization for cardiovascular disease, including strokes;25[25]
    - Increased emergency room visits for patients suffering from acute respiratory ailments.26[26]
- Longer term (year-round) exposures to particle pollution have been linked to
    - Significant damage to the small airways of the lungs;27[27]
    - Increased risk of dying from lung cancer;28[28]
    - Increased risk of death from cardiovascular disease.29[29]

Mercury

- Incinerators are a major source of mercury.30[30] The Charleston County incinerator currently pumps out an unacceptable 128 pounds of mercury each year into our air and water.31[31]
    - South Carolina, according to some studies, has one of the worst mercury hotspot problems in the nation.32[32]

WB, Chiu HF, Yang CY. *Evidence for an Association Between Air Pollution and Daily Stroke Admissions in Kaohsiung, Taiwan*. Stroke. 2003; 34: 2612-6.

23[23] Zanobetti A, Schwartz J. *The Effect of Particulate Air Pollution on Emergency Admissions for Myocardial Infarction: A Multicity Case-Crossover Analysis*. Environ Health Perspec 2005; 113:978-982.

24[24] Ghio AJ, Kim C, Devlin RB. *Concentrated Ambient Air Particles Induce Mild Pulmonary Inflammation in Healthy Human Volunteers.* Am J Respir Crit Care Med. 2000; 162(3 Pt 1):981-8.

25[25] Metzger KB, Tolbert PE, Klein M, Peel JL, Flanders WD, Todd K, Mulholland JA, Ryan PB, Frumkin H. *Ambient Air Pollution and Cardiovascular Emergency Department Visits in Atlanta, Georgia*, 1993- 2000. Epidemiology 2004;15: 46-56. *See also* Wellenius GA, Schwartz J, Mittleman MA. *Air Pollution and Hospital Admissions for Ischemic and Hemorrhagic Stroke Among Medicare Beneficiaries.* Stroke 2005; 36:2549-2553.

26[26] Peel JL, Tolbert PE, Klein M, Metzger KB, Flanders WD, Todd K, Mulholland JA, Ryan PB, Frumkin H. *Ambient Air Pollution and Respiratory Emergency Department Visits.* Epidemiology 2005; 16:164-174.

27[27] Churg, A Brauer, M, Avila-Casado, MdC, Fortoul TI, Wright JL. Chronic Exposure to High Levels of Particulate Air Pollution and Small Airway Remodeling. Environ Health Perspect 2003; 111: 714-718.

28[28] Pope CA, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, Thurston GD. Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution, JAMA 2002;287:9.

29[29] Pope CA III, Burnett RT, Thurston GD, Thun MJ, Calle EE, Krewski D, Godleski JJ. Cardiovascular Mortality and Year-round Exposure to Particulate Air Pollution: epidemiological evidence of general pathophysiological pathways of disease. Circulation. 2004; 109:71-77.

30[30] Tony Barltelme, "The Mercury Connection," The Post and Courier (Oct. 28, 2007) http://www.charleston.net/news/2007/oct/28/the_mercury_connectionwe_know_mercury_ta20361

31[31] Tony Bartlelme, "County Incinerator No Longer Adds Up," The Post and Courier (Feb 1, 2008) http://www.charleston.net/news/2008/feb/01/county_incinerator_no_longer_adds_up29288/

32[32] Tony Barltelme, "The Mercury Connection," The Post and Courier (Oct. 28, 2007) http://www.charleston.net/news/2007/oct/28/the_mercury_connectionwe_know_mercury_ta20361

- Like dioxins, mercury is a toxin that can be transported far from where it is emitted into the environment. Once in the environment, it builds up or "bioaccumulates" in living organisms (including humans). Since it is an element, mercury cannot be broken down.33[33]

Mercury is a Serious Public Health Threat

- Mercury is linked to the following34[34]
  - Birth defects,
  - Nerve disorders,
  - Heart failure.
- Mercury is a potent neurotoxin, which means it attacks the body's central nervous system, resulting in the following35[35]
  - Disturbances in sensation (tingling and numbness)
  - Impaired vision, speech, and motor control
  - Spasms
  - Loss of memory
  - Mercury also attacks the heart, kidney and lungs
- Mercury is extremely hazardous to children
  - It is particularly hazardous to developing unborn children, infants and young children, with effects including36[36]
    - Delayed development of motor functions like walking, talking and speaking
    - Mental retardation
    - Seizure disorders
    - Cerebral palsy
    - Blindness
    - Deafness
  - Mercury transfers from women to unborn children across the placenta and to infants through breastfeeding, resulting in exposure at critical stages of development.37[37]
  - Young children are particularly vulnerable because mercury can damage their developing brains and nervous systems, causing lifelong learning problems and other disabilities.38[38]

33[33] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

34[34] Tony Barltelme, "The Mercury Connection," The Post and Courier (Oct. 28, 2007) http://www.charleston.net/news/2007/oct/28/the_mercury_connectionwe_know_mercury_ta20361

35[35] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

36[36] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

37[37] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

38[38] Tony Bartelme, "'Mercury is a poison. People only begin to show symptoms when enough cells die," The Post and Courier (Oct. 28, 2007)

- Mercury has been linked with autism rates
    - A newly published study of Texas school district data and industrial mercury-release data, conducted by researchers at The University of Texas Health Science Center at San Antonio, indeed shows a statistically significant link between pounds of industrial release of mercury and increased autism rates. It also shows—for the first time in scientific literature—a statistically significant association between autism risk and distance from the mercury source.39[39] The incinerator releases over 120 pounds of mercury each year.40[40]

Other Toxic Releases

- Acidic gases: Hydrogen chloride, hydrogen fluoride and sulphur dioxide and other gases such as nitrogen oxides, carbon monoxide and carbon dioxide.41[41]
- Lead: Causes nervous system disorders, lung and kidney problems, and decreased mental abilities in children exposed in utero and early in life.42[42]
- Cadmium: Causes kidney disease, lung disorders; high exposures severely damage the lungs and can cause death.43[43]
- Arsenic: Arsenic damages many tissues including nerves, stomach, intestines and skin, causes decreased production of red and white blood cells and abnormal heart rhythm.44[44]
- Chromium: Chromium damages nose, lungs and stomach.45[45]
- Beryllium
    - Causes chronic lung problems.46[46]
- Groundwater Pollution
    - Once the garbage at the incinerator is burned, there are still 47,000 tons of ash which must be landfilled.47[47]

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http://www.charleston.net/news/2007/oct/28/mercury_poison_people_only_begin_show_symptoms_whe/

39[39] University of Texas Health Science Center at San Antonio, "Autism Risk Linked To Distance From Power Plants, Other Mercury-releasing Sources," ScienceDaily. (Apr 28, 2008) http://www.sciencedaily.com /releases/2008/04/080424120953.htm

40[40] Tony Bartlelme, "County Incinerator No Longer Adds Up," The Post and Courier (Feb 1, 2008) http://www.charleston.net/news/2008/feb/01/county_incinerator_no_longer_adds_up29288/

41[41] The Parliamentary Office of Science and Technology of the United Kingdom, "Incineration of Household Waste," (2000) http://www.parliament.uk/post/pn149.pdf

42[42] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

43[43] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

44[44] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

45[45] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

46[46] Global Anti-Incineration Alliance, "Waste Incineration, A Dying Technology," (2003) http://www.no-burn.org/resources/library/wiadt.pdf

- Incinerator ash can contain concentrations of heavy metals such as lead, cadmium, mercury, arsenic, copper, and zinc. Organic compounds such as dioxins and furans have also been detected in incinerator ash.48[48]
- The metals and organic compounds can leach (i.e., dissolve and move from the ash through liquids in the landfill) and migrate into ground water or nearby surface water.49[49]

There are sensible, economically viable alternatives to the incinerator

- A study, by the Centre for the Biology of Natural Systems in New York, US in 1996, to examine the costs and benefits of eliminating dioxin sources from all combustion processes in the Great Lakes region of North America. The study found that replacing all municipal waste incinerators in the region with intensive recycling programmes would result in approximately US$530 million annual savings.50[50]
- The consequences of closing all the 52 Great Lakes garbage incinerators and creating programs of intensive recycling capable of diverting the same tonnage of waste that is currently burned involves an increase in collection costs and an increased education cost to the municipalities. But this is balanced against the net income from processing and marketing collected recyclables, the savings from avoiding disposal costs and paying off the debt for the incinerator.51[51]
- The study estimated that 6,100 jobs would be created from additional collection and processing jobs after deducting job losses at incineration closures. Further job increases of 21,000 are predicted if the additional recycled materials are used by current and new manufacturing firms within the region.52[52]

47[47] Stratton Lawrence, "County Poised for 20 More Years of Burning Garbage," Charleston City Paper (May 14, 2008) http://www.charlestoncitypaper.com/gyrobase/Content?oid=45227

48[48] United Nations Environment Programme, "Municipal Solid Waste Management, Sound Practices, Incineration," http://www.unep.or.jp/ietc/ESTdir/Pub/MSW/SP/SP5/SP5_4.asp

49[49] United Nations Environment Programme, "Municipal Solid Waste Management, Sound Practices, Incineration," http://www.unep.or.jp/ietc/ESTdir/Pub/MSW/SP/SP5/SP5_4.asp

50[50] Greenpeace, Alternatives to Incinerators, http://www.greenpeace.org/international/campaigns/toxics/incineration/alternatives-to-incineration

51[51] Greenpeace, Alternatives to Incinerators, http://www.greenpeace.org/international/campaigns/toxics/incineration/alternatives-to-incineration

52[52] Greenpeace, Alternatives to Incinerators, http://www.greenpeace.org/international/campaigns/toxics/incineration/alternatives-to-incineration

- A 1991 study by the Worldwatch Institute calculated the number of jobs per one million tonnes of waste processed in New York City.53[53]
    - Type of waste disposal/Number of jobs
      Landfill - 40-60
      Incinerators - 100-290
      Mixed waste composting - 200-300
      Recycling - 400-590
- Recycling is not the answer to waste reduction however. We need to reduce our use of packaging and products and advocate reusable, returnable packaging and better product design for durability and reparability.54[54]

53[53] Greenpeace, Alternatives to Incinerators, http://www.greenpeace.org/international/campaigns/toxics/incineration/alternatives-to-incineration

54[54] Greenpeace, Alternatives to Incinerators, http://www.greenpeace.org/international/campaigns/toxics/incineration/alternatives-to-incineration