SIERRA CLUB
LONE STAR CHAPTER

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October 22, 1997

Mr. Steve Jones, Chairman
Policy, Research, and Technical Assistance Committee
California Integrated Waste Management Board
8800 Cal Center Drive
Sacramento, CA 95826   By Fax (916) 255-2228

RE: Comments on Hazards related to Tire-Derived Fuel use in Cement Kilns

Dear Mr. Jones,

Attached are comments submitted on behalf of the West Valley Citizen's Air Watch regarding Resolution 97-425 for tire disposal in cement kilns and utility boilers for energy recovery. Please enter these comments into the hearing record concerning the above proposal. Members of West Valley Citizen's Air Watch will present them at the public hearing on October 22, 1997 at Sacramento, California.

<u>Background</u>

My background is having served as a Texas Air Control Board Regional investigator for 12 years (1980-92) with technical experience in synthetic rubber plants making rubber for tires. As a TACB official, I conducted state air pollution inspections in one of the largest synthetic rubber plants in the US.

Many inspections were performed at the facility for compliance purposes (1980-92) and they lead to three state enforcement actions, including a major lawsuit by the State Attorney General's Environmental Protection Division, in which I served as the state's chief investigator on the case. I became knowledgeable with toxic air emissions being released and their relationship to plant problems in the synthetic rubber process.

Community complaints and state investigations identified: 1) burning rubber odors and smoke attributed to improper operations of an industrial solid waste rubber incinerator that disposed of more than 1 million pounds of waste rubber per year and was shut down based on its inability to maintain continuous compliance with its permit conditions. More than 300 citizen complaints were also traced to toxic air emissions from diverse facilities such as: 2) process areas, 3) chemical storage, 4) waste storage and 5) waste disposal operations.

My work on the synthetic rubber enforcement case did not end in 1992, because the company attempted to alter the court ordered Agreed Final Judgment of 1991 early in 1992. Fortunately, a revised Agreed Final Judgment was granted by Ector County district judge Tryon Lewis (161st judicial district) in 1993 and resulted in even stronger public health protection requirements as a result of Sierra Club's technical input and work on behalf of the community and the Texas State Conference of the NAACP.

During my tenure as a state air pollution control official, I also inspected a large cement manufacturing facility with two large kilns that produced portland cement, and based on my state experience and knowledge of these facilities, I offer technical grounds to oppose the disposal of wastes such as Tire-Derived Fuel (TDF) in cement kilns. It is a fact that high levels of particulate matter emissions are authorized from cement kilns due to the inherently dusty nature of the manufacturing process as well as the economic cost of controlling such emissions, and particulate emission rates and annual volumes tend to be significantly higher from cement kilns as a result than that allowed from any kind of commercial incinerator facility. I base this on direct experience and observations in the field in addition to regulatory knowledge over the past 18 years.

In addition to other state enforcement case work at incineration facilities including lawsuits by the State Attorney General, my capacity with Sierra Club since 1992 has involved preparing technical evaluations of commercial waste disposal plants in a broad variety of facilities including medical waste incinerators, municipal waste incinerators, hazardous waste incinerators, hazardous waste burning cement kilns, waste burning light-weight aggregate kilns and industrial waste incinerators operating in Texas and numerous states. Based on this extensive experience and knowledge, I maintain a skepticism about these facilities to operate in continuous compliance during waste treatment operations and have serious concerns about the public health impacts that these toxic air emissions have had on communities living downwind of these plants.

The attached comments should assist in providing a balanced perspective on the Resolution 97-425 proposal pending before the Board. Let me know if I may be of further assistance.

Respectfully yours,

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LONE STAR CHAPTER SIERRA CLUB
ON BEHALF OF
THE WEST VALLEY CITIZEN'S AIR WATCH

COMMENTS ON RESOLUTION 97-425 TO
AUTHORIZE TIRE-DERIVED FUEL USE IN CEMENT KILNS AND UTILITY BOILERS FOR ENERGY RECOVERY

Submitted October 22, 1997 to the
California Integrated Waste Management Board
Sacramento, California

Public comments are being submitted on behalf of the West Valley Citizen's Air Watch to the California Integrated Waste Management Board on a proposed plan to authorize scrap tire disposal in cement kilns and utility boilers for energy recovery.

These comments were prepared by Neil J. Carman, Ph.D., Clean Air Program Director for the Lone Star Chapter of the Sierra Club.

A. HAZARDS ASSOCIATED WITH SYNTHETIC RUBBER USED IN MODERN TIRES

1. <u>Hazardous Chemicals used in Synthetic Rubber Manufacturing are Regulated under the Federal Clean Air Act Title III as Hazardous Air Pollutants (HAPs)</u>

Tires are often made from petrochemical feedstocks including two organic chemicals: styrene and 1,3 - butadiene. Substances used to produce synthetic rubber (i.e., styrene- butadiene rubber or SBR) for tires contain several hazardous chemicals as the primary constituents, which may be emitted into the air during high temperature incineration of tires in cement kilns, for example, depending upon combustion conditions. Styrene- butadiene rubber has four major components, including but not limited to:

* <u>Styrene</u> is a benzene derivative (i.e., vinyl benzene) and is a suspected human carcinogen (listed as a HAP under Title III in 1990 FCAA Amendments).

* <u>1,3 - butadiene</u> is a suspected human carcinogen and known to cause cancer in laboratory animals (HAP under Title III, FCAA).

* <u>Extender oils</u> (fraction of the crude oil) contains many benzene-based compounds that cause cancer in laboratory animals and is the chief reason that every bale of SBR rubber is required to display a

yellow cancer-causing warning label due to their contents; the three types of extender oils used are naphthenic, aromatic and highly aromatic. Crude oil also contains heavy metals including but not limited to lead, chromium, cadmium, mercury, nickel, and others; chlorine is also present; these substances are present in the oil in varying concentrations.

* Carbon black --- varying grades of a fine particulate matter manufactured at carbon black plants by incomplete combustion of fossil fuels, and contains numerous chemical products of incomplete combustion that may be harmful to human health. The chemistry of carbon black includes many organic compounds.

SBR rubber (which is used in tires) is basically composed of four major components and is made up of approximately:

* 25% Styrene
* 25% 1,3 - butadiene
* 25% Extender oils
* 25% Carbon black

A basic principle is that the incomplete combustion of tires may yield dozens of organic compounds, with some not naturally occurring in coal, but the technical issue is that tires contain several hazardous constituents and inadequate combustion may result in the release to the air and the creation of new compounds forming downstream of the combustion devices. As a result of benzene contained within the styrene and aromatic extender oils in tires, thus benzene and related compounds may be readily become released into the atmosphere in varying concentrations during combustion depending upon incineration parameters.

Benzene is part of the structure of dioxins, furans, PCBs, and other highly toxic aromatic hydrocarbons including polyaromatic hydrocarbons (PAHs). The large volume of benzene present in the TDF waste stream and its high temperature requirement for complete combustion provides a pathway for creation of more highly toxic species such as dioxins, furans, PCBs and PAHs.

2. Additional Chemicals used in Synthetic Rubber

Other synthetic rubbers used less often in tires today (but used more in the past in tires) that may be used in specialty rubber products include: 1) polybutadiene (derived from 1,3 - butadiene by polymerization), 2) chloroprene, and 3) acrylonitrile, and each are chemicals or are derived from monomers recognized as either suspected or known human carcinogens and HAPs under the FCAA. Additional organic chemical not listed as HAPs that are used to make synthetic rubber are 4) isobutylene, 5) propylene, and 6) ethylene. SBR rubber is one of the more common synthetic materials in tires today. Butadiene and acrylonitrile are made into a specialty rubber through much the same process as SBR.

Metals such as zinc, lead occur in tires. Sulfur is added in significant quantities to the synthetic rubber during vulcanization to produce the tire.

a) Reactant monomers not typically found in coal and some of the most common ingredients used in synthetic rubbers. Chloroprene is generally not produced in the US anymore, but there may be millions of old tires laying around made of this chlorinated rubber and some foreign facilities may use it.

1) Styrene (HAP) 5) Propylene
2) 1,3 - Butadiene (HAP) 6) Ethylene
3) Acrylonitrile (HAP) 7) Chloroprene (HAP)
4) Isobutylene 8) Isoprene

b) Inhibitors used in synthetic rubber manufacturing not found in coal to prevent premature polymerization. P-tertiary Butyl Catechol (TBC) is a basic inhibitor.

c) Soaps used in synthetic rubber manufacturing not found to be naturally occurring in coal.

1) Mixed Acid Soap 2) Rosin Acid Soap
3) Fatty Acid Soap 4) Potassium Hydroxide

d) Catalyst, Activators, Antioxidants, and Short stops used in synthetic rubber that are not naturally occurring in coal. Trace amounts of one or more of these may occur as residual substances in synthetic rubber.

1) Sodium Dimethyl Dithiocarbamate Short stop
2) Polyamine "H" Short stop
3) Rosin Acid Soap Short stop
4) Sodium Nitrite Short stop
5) Diethylhydroxyamine Short stop
6) Tall Oil Short stop
7) Trisodium Phosphate Soap 8) Condensed Alkylaryl Sulfonate
9) Ferrous Sulfate Activator
10) Sodium Formaldehyde Sulfoxylate Activator
11) Sodium salt of Ethylene Diamine Tetra Acetic Acid - Activator
12) Tertiary Dodecyl Mercaptan Modifier
13) Aromatic Hydrogen Peroxide Catalyst
14) Pinane Hydrogen Peroxide Catalyst
15) Tris Nonyl Phenyl Phosphite Antioxidant
16) N-phenyl-p-phenylenediamine Antioxidant

e) Miscellaneous chemical additives used in synthetic rubbers. These are typically not naturally found in coal.

1) Extender Oils Coagulation additive
2) Carbon Black Coagulation additive
3) Nitroal Phenyl Hydroalamine Recovery

f) Additional chemicals that have been found in synthetic rubber analyzed from samples collected from waste SBR and that are not all naturally occurring in coal.

1) Toluene (HAP), Benzene (HAP), Xylenes (HAP), Benzene C3 alkylated and other aromatic hydrocarbons (HAPs)

2) Trichloroethane
3) Trichloroethylene (HAP)
4) Carbon Disulfide (HAP)
5) Methylene Chloride (HAP)
6) Numerous multiunsaturated hydrocarbons including some cyclic species (C3, C4, C7, C8, C5-C10, C18)
7) Saturated hydrocarbons (C3, C4, C5)
8) C6 oxygenated species

Information above comes from sources including experience and knowledge in synthetic rubber facilities; Texas Air Control Board Lab reports from 1987-1991 along with agency files; Environmental Protection Agency documents; Chemical Process Industries, R. Norris Shreve, 3rd edition, McGraw-Hill; and Industrial Process Profiles for Environmental Use: Chapter 9, The Synthetic Rubber Industry, Feb. 1977.

In summary, synthetic rubber tires contain significant concentrations of toxic and hazardous chemicals. Incineration of tires has the clear potential to produce toxic emissions of numerous carcinogenic, mutagenic and teratogenic chemicals. The fact that the synthetic rubber industry utilizes large volumes of so many toxic chemicals in their processes is testimony to the issue that burning tires even in relatively well controlled combustion devices may result in harmful emissions and cause undesirable impacts in neighboring communities.

B. CEMENT KILNS: HAZARDS ASSOCIATED WITH TIRE INCINERATION

1. Engineering Design, Construction, and Operation of Cement Kilns

Cement kilns are not designed, constructed, operated, or intended to be used as scrap tire incinerators, or as municipal waste incinerators, medical waste incinerators, hazardous waste incinerators and industrial waste incinerators, since they are designed to produce cement. Also, they are initially permitted and regulated as cement manufacturing facilities under different rules, regulations and regulatory policies with respect to BACT (best available control technology) review, air modeling, and public health evaluation.

US EPA performed tire incineration in a dual chambered incinerator possessing an afterburner, but since this type of facility is designed and operated rather differently than a cement kiln, direct comparisons of stack test data during tire trial burns are not appropriate due to basic technology differences and air pollution control systems.

Retrofitting cement kilns with certain air pollution control systems required of modern incinerators tends to be economically prohibitive, and so cement kilns will not burn waste including TDF unless they are authorized to use fewer control systems and emit more air pollution.

2. Cement Kilns are lacking in a Second Burn Unit, or Afterburners

Cement kilns are not designed or required to have major fail-safe combustion devices such as large afterburners that all state-of-the-art incinerators must have by federal law today (all medical, municipal, and hazardous waste incinerators can not operate without their afterburner or secondary combustion chamber in normal operation).

Afterburners are required due to the potential for flame outs and total combustion failure in the primary burn chamber, but which is all that the universe of 120 U.S. cement kilns possess. Afterburners also help to insure and attain the highest combustion efficiency an incinerator can achieve. Cement kilns have no such fail-safe combustion devices which is unthinkable today in all modern incinerators. Requiring cement kilns to install afterburners is economically prohibitive.

Afterburners generally operate at somewhat higher temperature regimes than the primary chambers since the first burn is primarily to promote volatilization (from solid/liquid to gas state) because it is in the vapor state that combustion occurs, and thus the majority of combustion in an incinerator takes place in the afterburner chambers. Early dual-chambered incinerators possessed large primary kilns and small afterburner units, but today, afterburners are typically much larger than the primary kilns.

Do cement kilns actually offer higher combustion temperatures, higher residence times, improved turbulence, and higher oxygen than incinerators? This is the technical argument used by cement kilns to promote waste disposal in their facilities.

These are complex process questions that can be debated by different technical experts to give very different sets of answers, and partly because there are generally two different types of cement kilns such as: 1) old, energy inefficient wet process kilns and 2) newer, more energy efficient dry process cement kilns.

Generally cement kilns run at higher combustion temperatures than incinerators at least in the hot end of the cement kiln (which is a short zone), but this ignores the cold end of the cement kiln and this fact may be ignored by cement companies presenting testimony in public. Cement kilns with preheaters/precalciners offer several locations for TDF disposal, but some locations may not necessarily be hotter than an incinerator. But temperature is not the only requirement for good combustion, since residence time, turbulence and oxygen must be available all together. Without all parameters working together, poor combustion will result. In terms of heavy metals in TDF and coal, the higher cement kiln temperatures may be operating too hot as they will result in higher stack pollutant gas and particulate concentrations since the higher temperatures encourage more metal volatilization and emission rates compared to an incinerator's temperatures.

With respect to the report that cement kilns provide longer residence times and adequate oxygen (i.e. as excess air) to yield complete combustion, this is suspect for several technical reasons. Why?

a) Cement kilns when stack tested show products of incomplete combustion (various PICs: dioxins, furans, PCBs, PAHs, benzene, etc.) just like incinerators and other waste combustors demonstrating that perfect combustion is certainly not being achieved. PICs are typically always observed during trial burns in cement kilns, and this implies that combustion conditions are not able to totally destroy organic compounds. So complete combustion is not necessarily achieved even in cement kilns.

b) Turbulence for good combustion may not be as efficient as cement company experts claim in cement kilns due to the extraordinarily large volumes of solid materials in the kiln being used to make clinker and then cement product, in part since a cement kiln is a giant oven used to bake rock and turn it into clinker. Observers have reported unmelted hazardous waste pails exiting the kiln as evidence of poor combustion conditions, and high levels of PICs further demonstrate that cement kilns are far from perfect in combustion of complex waste materials.

c) Cement kilns typically run on the lower limits of excess air for good combustion due to the huge quantities of air required to be heated from ambient temperatures to 3,000 degrees F, and to heat this much air to such high temperatures requires tremendous energy and high fuel costs. So every single pound of air heated in a cement kiln exacts a certain operating cost in fuel use and thus cement kilns try to keep the excess air (and oxygen) at the borderline of safe combustion.

d) A major problem that cement kilns may experience is solid ring formation and build up across the diameter of the kiln when the solid material fuses into a wall blocking movement of clinker material down the kiln. Cement kilns have to break the solid ring formation down by shooting (with turret mounted shotguns) large shotgun blasts into the ring to collapse it. Ring formation does not promote good combustion conditions particularly in the presence of hazardous waste and TDF, and yet this routinely occurs in many cement kilns. A cement kiln may shoot hundreds of shotgun blasts into the giant, thick solid rings built up inside the cement kiln in order to break it down.

But during stack tests of TDF cement kilns will do several things to make emissions and combustion look good-to-decent for such facilities:

a) run at higher excess air to improve combustion efficiency;

b) control kiln parameters more precisely;

c) prevent kiln solid ring formation and buildup that creates havoc for good combustion of any fuels;

d) burn lower TDF levels during stack tests than they may be seeking to burn operationally;

e) operate and maintain their ESPs or baghouses in top condition to keep particulate emissions to a reduced level; and

f) operate at slightly higher kiln temperatures and other factors.

3. <u>COMBUSTION UPSETS</u>

This is a significant public health issue near cement kilns. Cement kilns certainly do have combustion upsets and smoke particles as well as other unburned waste may be emitted during such events. Different operating problems and fluctuating conditions in the cement kiln may trigger a combustion upset. Higher rates of toxic emissions will be more probable during a combustion upset and malfunction.

Other kinds of upsets. Cement kilns are subject to a variety of other problems, including a type of meltdown of the kiln when the ID fans lose power or fail to operate; without adequate air flow to control kiln temperatures at or below 3,000 degrees F, the kiln temperature may skyrocket quickly to more than 4,000 degrees F and the kiln is so hot that the steel shell sags toward the ground effectively destroying the kiln or major sections of the kiln. Kiln meltdowns are not rare events and have happened in many states at cement plants in the last ten years. Cement companies prefer not to talk openly about this problem.

These indicate just a few of the technical issues surrounding combustion problems observed in cement kilns. The bottom line is that they are not designed, not built and not operated as state-of-the-art incineration devices, but are basically old model-T versions (especially old wet process kilns) of first generation incinerators of the 1950's-mid 60's which had no afterburners

4. Stack Flow Rates are usually Higher in Cement Kilns compared to Incinerators and Mass Emission Rates in Cement Kilns are typically Higher than Incinerators

Cement kilns tend to be larger than incinerator kilns and larger volumes of air move through a cement kiln to control temperature and other kiln conditions. Stack flow rates of air may be 6-10 times higher than an incinerator's flow rate, and this means that equal concentrations of a pollutant (like PM10) would result in greater emission volumes by mass calculations from the cement kiln. Mass emission rates typically are much higher in cement kilns and this is a major public health concern, since it means that cement kilns are being allowed to pollute more than incinerators operating under normal conditions.

5. Cement Kilns have more Limited Air Pollution Control Systems than Incinerators

Cement kilns are not required to install and operate as many air pollution controls as waste incinerators such as acid gas scrubbers and other devices. Without such equipment, cement kilns will probably emit more harmful air contaminants over time in both pounds per hour and tons per year emission rates.

6. Continuous Emissions Monitoring Systems in Cement Kilns are usually more Limited than Incinerators

Cement kilns are not required to install and operate as many continuous emissions monitoring systems (CEMS) as incinerators are. Effectively this means the potential for less pollutant information and compliance assurances.

7. Oxygen Conditions in Cement Kilns may be Lower than Incinerators

8. Metal Content

TDF does contain metals especially zinc and these amounts vary somewhat. They may be cleaner that dirty coals or they may be worse than some low sulfur, slightly less dirty types of coal. One also has to be skeptical about self-reported metal levels in coal, such as mercury, because coal users want to show less mercury emissions than is the case.

9. Pollution Hazards of Tires: Criteria and Air Toxic Pollutants.

It is highly inaccurate to state that TDF does not contain hazardous materials. Numerous criteria and air toxics including hazardous air pollutants such as dioxins/dibenzofurans may increase during TDF fuel use.

A. Sulfur dioxide - stack test data at Holnam Cement Plant, Midlothian, Texas in October 1991 showed 5% higher rates of SO_2 during TDF + coal than during 100% coal firing (see attached test summary).
B. Carbon monoxide - 15% higher CO suggested less well controlled TDF combustion when firing TDF + coal versus 100% coal (see attached test summary).
C. Particulate Matter - 22% higher PM suggested less well controlled TDF combustion when firing TDF + coal versus 100% coal (see attached test summary).
D. Chlorine - 11% higher chlorine emissions suggested that TDF yields more Cl when firing TDF + coal versus 100% coal (see attached test summary).
E. Total Reduced Sulfur Compounds emitted - 18% higher TRS suggested less well controlled TDF combustion by firing TDF + coal versus 100% coal (see test summary).

F. Benzene - 12.5% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
G. Dioxins - 29.87% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
H. PCBs - more sensitive test is needed at Kaiser Cement.
I. PAHs - 88.24% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
J. Hexavalent chromium - 837% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
K. Copper - 31.25% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
L. Lead - 603.3% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
M. Manganese - 1.85% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
N. Mercury - 14.81% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
O. Zinc - 54.55% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
P. NOx - 6.08% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.
Q. PM_{10} - 14.29% increase during TDF + coal than 100% coal at Kaiser Cement test burn at Cupertino, California.

The above stack test results that show increases in toxic emissions are consistent with a variety of stack test results at other cement kilns burning TDF.

For example, air pollution problems from tire burning in cement kilns supports that air pollution is a chief community concern in whole tire burning. Edward W. Kleppinger, PhD, concluded in a scientific paper that tire burning is likely to increase carbon monoxide, particulate, zinc and/or PAH emissions; higher zinc emissions are due to the typically higher content of the metal in tires compared to coal. He recommends that whole tires not be burned (E. Kleppinger, Ph.D., "Tire Burning by Cement Kilns: An Approach to a Policy.")

In another paper, Dr. Kleppinger compared tire burning to coal in the cement industry for the Ash Grove Cement Co.'s proposal to burn tires as fuel. Dr. Kleppinger concluded that tire burning increases:

* Chromium emissions by almost 500%
* Nickel emissions by over 450%
* Lead emissions by an astonishing 7 to 91 times
* Cadmium emissions by 5 to 10 times

"Preliminary Evaluation of RMC Lonestar Davenport Cement Plant: Proposal to Conduct Testing on the Use of Whole Rubber Tires as a Supplementary Fuel in the Cement Mfg Process." (May 1, 1992). Study found that burning 30% tires in cement kiln with coal increased toxic emissions over burning 100% coal.

Toxic chemical emissions increased when burning tires together with coal rather than 100% coal at RMC Lonestar Davenport Cement Plant included:

a) Tetrachlorodibenzofuran (TCDF): 2,230% increase
b) Tetrachlorodibenzodioxin (TCDD): 1,432% increase
c) Total polychlorinated biphenyls (PCBs): 2,608% increase
d) Chromium (hexavalent): 727% increase
e) Lead: 388% increase
f) Naphthalene: 23,938% increase
g) Acenaphthylene: 18,836% increase
h) Phenanthrene: 1,824% increase
i) Anthracene: 2,775% increase
j) Pyrene: 1,089% increase
k) Flouranthrene: 291% increase
l) Total toxic PAH's: 2,190% increase
m) Benzene: 126% increase

This study also concluded that the cancer risk from the cement kiln when burning tires would be approximately 5 in a million. Even so, the RMC report admits that the 5 in a million estimate omits consideration of noninhalation cancer risks from the highly toxic chemicals arsenic, cadmium and PCBs. Serious health concerns need to be raised over Kaiser Cement's plan to burn scrap tires and potentially other waste. Tire burning may put toxic byproducts into air and thereby endanger residents. Tire burning is the worst possible way to dispose of scrap tires.

10. <u>Toxic byproducts of tire burning that no community should endure</u>

Burning of scrap tires (whole tires are worse) in cement kilns creates an array of toxic byproducts such as dioxins, furans, PAHs, PCBs (polychlorinated biphenyls), arsenic, hexavalent chromium, and cadmium.

These chemicals are recognized by health officials as causing cancer or reproductive toxicity. Other toxic byproducts from tire burning include mercury, lead, nickel, beryllium, xylene, toluene, phenol, mono-chlorobenzene, naphthalene, formaldehyde, acetaldehyde, and dozens of more products of incomplete combustion. A chief health issue is the fact that chlorinated chemicals (dioxins, furans, and PCBs) emitted from burning waste are linked to the increase incidence of breast cancer.

11. <u>Dioxin, the Environmental Protection Agency and body burdens</u>

Dioxin (family of 75 congeners) was recognized by the EPA in 1985 as the most potent manmade carcinogen known. Daily intake of 14 trillionths of an ounce represents a lifetime cancer risk of one in a million. Yet average US intake is probably high enough to produce an additional 50 to 1,000 cancer cases per million people. And recently EPA acknowledged dioxin's harmful effects on reproduction and development as well. Dioxins, moreover, are stable compounds that persist in the environment and bioaccumulate in the food chain, concentrating in meat and dairy products. Sadly, the ultimate outcome of bioaccumulation is that dioxin passed from mother to child in breast milk typically amounts to 4 to 12% of a person's lifetime exposure. The fetus is at grave risk of dioxin exposure due to its ultrasensitive developmental process and breast feeding babies even more at risk.

I believe that tires are a toxic waste when they are burned. Tires are made out of materials that are considered toxic when they are in a liquid form. These are released when they are burned. The legal and "technical" exemption of tires from the definition of hazardous waste is not protective of public health when they are burned.

Cement plants have inadequate pollution control equipment for tire disposal. Cement kilns are designed to bake rock until it makes cement "clinker," not to burn wastes. Many of these kilns use old and outdated cement making technology. All rely on only one air pollution control device to filter stack emissions - the same device they use whether they are making cement or burning waste. This device, designed to remove particles, does not remove heavy metal vapors like mercury or other toxic gases released from burning tires. Nor does it remove all dioxins, PCB's, or furans which tend to be created when tires are burned in cement kilns and for which many scientists say there is no safe level of exposure. (US EPA's draft Scientific Reassessment on Dioxin, September 13, 1994)

Health problems from heavy metals, hydrocarbons, products of incomplete combustion, and newly created substances like dioxin emitted when burning tires are magnified when combined with dust emissions that are part of cement production process. (US EPA's draft Scientific Reassessment on Dioxin, September 13, 1994)

No matter what kind of waste or fuel is being burned in them, cement kilns are large air polluters. They are a major source of Particulate Matter (soot and dust) which has been found to be toxic to human health in its own right, even at the smallest measurable levels of exposure.(Breath Taking: Premature Mortality due to Particulate Air Pollution in 239 American Cities, Natural Resources Defense Council Report May 1996) When waste is burned in cement kilns, this

Particulate Matter acts a magnet for unburned toxic metals such as lead, arsenic, cadmium and chromium and Products of Incomplete Combustion emitted from their stacks. (Breath Taking report) This "toxic enrichment" of the tons of Particulate Matter these cement kilns release into the atmosphere when waste is burned creates a major public health hazard which we believe should not be imposed upon us or our children.(Breath Taking report)

Cement kilns are one of the largest source of dioxin emissions in the U. S. (US EPA's draft Scientific Reassessment on Dioxin, September 13, 1994) The most toxic dioxins have been found only in cement plant emissions where synthetic substances are burned. (US EPA's draft Scientific Reassessment on Dioxin, September 13, 1994) If they are allowed to burn wastes that could result in the creation of dioxin, we believe that cement kilns should be required to install continuous dioxin monitoring and control equipment.

Incineration plus chlorine makes dioxin. (US EPA's draft Scientific Reassessment on Dioxin, September 13, 1994) Dioxin is a potent toxin capable of a variety of adverse health effects, including hormonal disruption, decreased sperm count, decreased testis size, altered male sexual behavior, cancer, endometriosis, ovarian dysfunction, reduced fertility, immune system suppression, spontaneous abortion, birth defects, impaired child development, thyroid changes and diabetes, according to EPA's draft reassessment on dioxin. The average person currently carries a body burden of 15-20 parts per trillion of dioxin. (Arnold Schecter, MD, Dioxins and Health, 1994) Even a single, minute exposure to dioxin can cause irreparable harm to unborn children. Evidence that body burdens are increasing or decreasing conflict and are inconclusive. There are significant reservoirs of dioxin already in the environment. We don't want any more created. We believe cement kilns should not be allowed to use wastes that contain chlorine (or other halogens like bromine) without continuous dioxin emission monitoring and control equipment.

Many people who live downwind of cement plants already carry unhealthy body burdens of toxic heavy metals and/or synthetic chemicals many of which mimic hormones and have other toxic effects. The slightest additional exposure will cause these people harm.

12. <u>Hazards of scrap tire/waste burning and dioxin pollution</u>

Whole and chipped tire burning is dangerous due to increased dioxin pollution. Why be concerned over cement kilns and dioxin pollution? Here is a summary of recent scientific concerns stating why dioxin is a significant public health threat.

A. Reduction in sperm count by 40-50% and increased sterility among men in industrialized countries since the 1930's with introduction of chlorinated chemicals (dioxin is unwanted byproduct);
B. Immune system compromised in wildlife and human populations;
C. Increases in cancer of the testicles in many industrialized countries;
D. Increased incidence of undescended testicles in humans and in wildlife;
E. Increased incidence of hypospadias -- a birth defect of the male genitalia;

F. Reduced fertility and increased sterility in birds, fish, shellfish, and mammals;
G. Decreased hatching success in birds, fish and turtles;
H. Demasculinization and feminization in male fish, birds, and mammals;
I. Defeminization and masculinization of female fish and birds;
J. Gross birth deformities in birds, fish and turtles.

Summary

Tire incineration in cement kilns is not recycling. For obvious reasons cement kiln allow 100% of the metals to be returned to the environment as air pollution, cement kiln dust, or cement product. This is not recycling.

Cement kilns are not designed to be incinerators and do not have to meet the same stringent standards of performance and emission limits required of commercial incineration facilities.