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November 14, 1995

Mr. Richard Toshiyuki Drury
Staff Attorney
Citizens for a Better Environment
500 Howard Street, Suite 506
San Francisco, CA 94105

RE: Proposed Permit No. 1003026(J) to Burn Tire Derived Fuel
California Portland Cement Company

Dear Mr. Drury:

As requested by Southern Kern Residents Against Pollution, Desert Citizens Against Pollution, Tehachapi Residents Against Pollution, Stormy Williams, and Citizens for a Better Environment (collectively "Desert Citizens", I have reviewed the proposal by California Portland Cement to begin burning tires. These comments are prepared on behalf of Desert Citizens as objections to the tire burning permit. Cal Portland plans to burn whole scrap tires and made a permit application to burn 20 percent tire derived fuel (TDF) to the Kern County Air Pollution Control District on March 24, 1994. Desert Citizens seeks public participation in the cement kiln's permit through a full California Environmental Quality Act review process to assess the health and environmental hazards posed by the project.

CUMULATIVE ENVIRONMENTAL IMPACTS IN MOJAVE-ROSAMOND AREA:

Relevant to Cal Portland's TDF application and the review by Kern County Air Pollution Control District (KCAPCD) is the cumulative environmental impacts in the Mojave-Rosamond area due to existing toxic sites, but the applicant apparently chose not to submit evidence to confirm or deny the existence of cumulative pollution in the eastern Kern County area. The applicant's failure to provide critical data and discuss evidence of potential area-wide impacts is definitely a major deficiency in Cal Portland's TDF application. KCAPCD has similarly preferred not to perform its own technical review of area-wide pollution to confirm or deny these impacts. In order for KCAPCD to reach a conclusion that there are no "significant" impacts for regulated pollutants or toxic substances warranting public health concern, this analysis of cumulative environmental pollution should have been done.

Accurate assessment of the Mojave-Rosamond area's cumulative pollution is not practical here since the applicant chose to use a "zero" background calculation without a valid technical justification in both its air modeling and risk assessment. The result of this major deficiency within the application I believe is that major data base problems may arise to conclude that the data used by Cal Portland is grossly inaccurate. Transport of air pollutants is scientifically confirmed as a global issue, and it is inappropriate to use a technically baseless assumption that the theoretical pollutant background is "zero" in the Mojave-Rosamond area.

Desert Citizens have stated in petitioners' trial brief that the Mojave-Rosamond area is already heavily polluted and contains 24 other toxic sites identified by the California Environmental Protection Agency, Department of Toxic Substance Control, with eight in Mojave alone. (RP 001665) In addition, National Cement at Lebec is one of three polluting cement kilns in the area and is the only site in California authorized to burn commercial hazardous waste, which is within 20 miles of Cal Portland's kiln. (RP 001620) National Cement has burned at least 138,800 tons of hazardous waste in five of six reporting years from 1989 - 1994. Another pertinent issue is that in Rosamond, 12 miles South of Mojave, the childhood cancer rate between 1975 and 1984 has been found to be six times greater than the rate in other areas of California, being the worst childhood cancer rate in the state. (RP 001622) These relevant issues should have been evaluated by KCAPCD in reviewing Cal Portland's application since they should have been required.

USE OF TDF BY CAL PORTLAND INHIBITS EFFECTIVE COMBUSTION:

The burning of whole scrap tires in cement kilns creates a broad range of toxic byproducts including dioxins, furans, polyaromatic hydrocarbons (PAH's), polychlorinated biphenyls (PCB's), and heavy metals such as arsenic, hexavalent chromium and cadmium.

Stack tests confirms these emissions; test burns of coal vs. TDF + coal by Southwestern Portland Cement Company's Victorville plant (Application, Appendix C, RP 000471 et seq.) documents toxic byproduct emissions. Most of these pollutants and other harmful byproducts were emitted from the cement kiln stack exhaust, including heavy metals, which were present in the fuels (TDF and coal), kiln dust, clinker dust and raw mill feed. (RP 000482 - 490) PCB's were not tested for specifically by Southwestern Portland. (RP 000640)

Stack testing at Southwestern Portland further confirms elevated rates of toxic byproducts including dioxins, furans, PAH's and heavy metals such as arsenic, beryllium, hexavalent chromium as total chromium, cadmium and mercury were released from the kiln stack. (RP 000483 - 486) The tests were made with TDF replacing 24.6% of total Btu requirements for the kiln system (kiln plus calciner), and 12.83% came from tire chips and only 11.84% from whole tires. (RP 000479)

The vast range of toxic byproducts including PCB's has already been described in publications and other relevant examples of TDF test burn data according to the following articles and sources with most already submitted by Desert Citizens:

1) EPA report "Burning Tires for Fuel and the Tire Pyrolysis: Air Implications" (RP 000026 et seq.); identified dioxins, furans, PAH's, PCB's and heavy metals including arsenic, hexavalent chromium and cadmium.

2) "Estimates of Organic Emissions TDF for RMC Lonestar and Southwestern cement kilns burning tires as fuel" (RP 001414 - 1418). Increased emissions of beryllium, cadmium, chromium, lead and mercury were released in some cases by

one or more orders of magnitude in TDF/coal firing vs. 100% coal firing at Southwestern Portland Cement Company's Victorville plant; (RP 000483) Kiln stack emissions indicated that burning TDF/coal compared to 100% coal produced higher emission levels of six furan congeners and total furans. (RP 000484) Higher kiln stack emissions of total furans under TDF/coal firing increased 129%. (RP 000484) Kiln emissions indicated burning TDF/coal produced higher emission levels of three dioxin congeners including the most toxic form (2,3,7,8-tetrachlorodibenzo-p-dioxin) by 151%. (RP 000485)

RMC Lonestar stack test data of TDF/coal burning resulted in elevated annual heavy metal levels: 379% (12/90 test) and 620% (9/92 test) higher lead emissions; 94% increased arsenic emissions (9/92); 29% higher mercury emissions (9/92); and 96% more zinc (9/92) (RP 000967, 969). Annual toxic byproducts were elevated: 2230% (12/90) and 58% (9/92) increased total TCDF emissions (RP 000967, 969); and 1425% (12/90) and 398% (9/92) higher total TCDD emissions (RP 000968, 970). Ten PCB congeners increased annually in 12/90 by 10%, 21%, 30%, 31%, 32%, 82%, 88%, 111%, 143% and 211%, and annually in 9/92 tests increased by 39%, 406%, 548%, 658%, 743%, 975%, 985%, 2955%, 4530% and 44,250% (RP 000968, 970). Benzene was higher by 124% in 12/90 and formaldehyde increased by 1041% in 9/92 (RP 000968, 970). Methylene chloride increased by 84% annually in 9/92 and vinyl chloride increased by 79% annually in 9/92 tests. (RP 000970)

3) Test burns in incinerators by the California Air Resources Board in which burning tires released dioxins, furans, PCB's, and other toxic byproducts (RP 001625 - 1628).

4) "Dioxins, furans, arsenic, mercury, cadmium, nickel, PAH's, and PCB's" are released when burning tires (RP 001442, 001444, 001634).

5) "It has been documented that copper, manganese, mercury, napthalene, phenol, toluene, xylene, chlorobenzene, arsenic, beryllium, nickel, lead, hexavalent chromium, formaldehyde, acetaldehyde, PCB's, dioxin and furan are released into the atmosphere from tire burns" (RP 001634).

6) Tire burning creates numerous toxic organic compounds such as polynuclear aromatic hydrocarbons (150 micrograms/gram of bottom ash; 294-420 micrograms/gram in fly ash), including naphthalene and others, as well as toxic metals such as cadmium. Prof. Ja-Kong Koo and Seol-Wan Kim of the Department of Civil Engineering, Korea Advanced Institute of Science and Technology conducted a detailed analysis and published an article concluding that tire burning produces numerous byproducts of incomplete combustion. "Characteriziation of Combustible Products and Residue from Full Scale Gasification Processing of Waste Tires."

7) Edward W. Kleppinger, Ph.D., concluded in a scientific paper that tire burning is likely to increase carbon monoxide, particulate, zinc and/or PAH emissions. He recommends that whole tires should not be burned. E. Kleppinger, Ph.D., "Tire Burning by Cement Kilns: An Approach to a Policy."

8) Dr. Kleppinger also issued another paper comparing tire burning to coal in the cement industry for the Ash Grove Cement

Company'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 extraordinary 7 to 91 times, and cadmium emissions by five to ten times. EWK Consultants, Inc., E. Kleppinger, "Comments on Ash Grove Cement's Proposal to Burn Tire Derived Fuel." (October 25, 1990); see also, EWK Consultants, Inc., Letter from Dr. E. Kleppinger to Assistant Director for Air Quality Regarding Proposed Operating Permit No. 0381-95 Phoenix Cement Co. (August 10, 1992).

9) Study by RMC Lonestar Davenport Cement Plant, May 1, 1992 - "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 Manufacturing Process." The RMC study concluded that burning 30% tires in a cement kiln with 70% coal significantly increased toxic emissions over burning 100% coal. Toxic chemical emissions found to increase when burning tires together with coal rather than burning 100% coal 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 report concluded that potential impacts from long-term tire burning warrant "a more extensive review of health and environment impacts under the California Environment Quality Act (CEQA)." Elevated cancer risk was estimated from the cement kiln when burning tires to approach approximately 5 in a million, a risk far higher (by 77 times) than the KCAPCD estimate of 0.065 in a million, and 5 times higher than the CAPCOA and KCAPCD significance threshold of one in a million. The RMC report further states that the 5 in a million estimate omits consideration of noninhalation cancer risks from the highly toxic chemicals arsenic, cadmium and PCBs.

10) "U.S. EPA Draft Chapter on Dioxin Risk Characterization" (May 2, 1994). The EPA's draft report, compiled after three years of exhaustive review of existing scientific literature and important new laboratory and epidemiologic studies, concludes that dioxins (polychlorodibenzodioxins or PCDD's) and related compounds such as PCB's and polychlorodibenzofurans (PCDF's) are definitely much more dangerous than scientists previously believed. The EPA study further establishes that dioxin not only causes cancer in humans, but that it also exhibits reproductive effects at even lower thresholds than for cancer. This information is highly significant because it means that the cancer risks and other health risks from increased dioxin emissions during cement kiln tire burning may be much more serious than previously believed, and that the Cal Portland risk

assessment may have significantly underestimated these health risks. The KCAPCD has itself failed to adequately assess the cancer risks and other health risks associated with increased dioxin emissions during tire burning.

11) "U.S. EPA Health Assessment Document for 2,3,7,8 - Tetrachloro-dibenzo- p-Dioxin (TCDD) and Related Compounds" (August 1994) is a 2,400 page draft compendium reassessing the toxicity of, and human exposure to, dioxin. A team of thirty-nine scientists were appointed to the EPA's Dioxin Reassessment Review Committee to assemble and analyze data on dioxin sources, environmental levels, exposures, and human body burdens. The team of scientists worked three years to compile the most comprehensive scientific study to date of the health effects of chlorinated dioxins (PCDD), chlorinated furans (PCDF), and chlorinated biphenyls (PCB). The study concludes that these chemicals are indeed highly carcinogenic, and that they display disturbing reproductive toxicity at even lower levels than for cancer. The study further concludes that cement kilns and "incineration of ... used tires for power/energy generation" are among the major sources of the release of the highly toxic dioxins and furans. Id. at 9-9 and 9-10.

12) EPA, "A Science Advisory Board Report: A Second Look at Dioxin" (September 1995). The SAB committee concludes the report by emphasizing it ... "agrees that the scientific evidence strongly indicates that current levels of dioxin-like compounds in the environment derive from anthropogenic sources and that the air-to-plant-to-animal pathway is most probably the primary way in which the food chain is impacted and humans exposed" (p. 97). The point is that, if Cal Portland burns tires, it and other anthropogenic sources in the Mojave-Rosamond area will certainly be the most important contributors to dioxin-like compounds in eastern Kern county.

The SAB's report concludes that cumulative impacts is a significant issue for dioxin-like compounds and this type of holistic review is scientifically relevant. "In addressing a broad range of dioxin-like compounds having the common property of binding to the Ah receptor, and producing related responses in cells and whole animals, it creates opportunities for a holistic assessment of the cumulative impacts of these broadly distributed anthropogenic pollutants [emphasis added]. Thus, while the environmental concentrations of each compound alone may be too low to produce effects of concern, the combined exposures may be producing effects that warrant concern" (p. 98) [emphasis added]. The SAB report clearly supports source and exposure reduction and not the creation of new dioxin and dioxin-like emissions. The report succinctly demonstrates why Cal Portland inappropriately excluded cumulative impacts of air pollutants from its application and why the KCAPCD needs to require a holistic assessment of the cumulative impacts of dioxin-like compounds and all other toxic substances emitted by Cal Portland's TDF proposal.

13) Joe Thornton, Greenpeace report, "Chlorine, Human Health and the Environment: The Breast Cancer Warning." (1993) Chlorinated dioxins, PCB's, chlorinated furans and other organochlorines cause significantly increased risk of cancer -- especially breast cancer. (As noted in other studies, cement kiln tire burning increases chlorinated dioxin, chlorinated furan, and PCB emissions). This information is important because it strongly suggests that Cal Portland has seriously

under estimated health risks posed by the tire burning project, and its releases of dioxins, furans and PCB's. The KCAPCD has failed to conduct an adequate review of the Cal Portland project by ignoring the relevant health risks correlated with the Cal Portland TDF project.

14) Memo from Pat Costner, Ph.D. to Emilia Guglielmi (June 14, 1994). Tire burning at a Modesto incinerator released quantities of polychlorinated dibenzo- dioxins (PCDD's) and polychlorinated dibenzofurans (PCDF's) at the rate of 0.0236 grams per year of the most toxic isomer -- 2,3,7,8 - tetrachlorodibenzo-p-dioxin. This amount of dioxin exceeds the acceptable lifetime intake for 2 million people, based on U.S. EPA risk calculations.

Dr. Costner also concluded that annual emissions of polycyclic aromatic hydrocarbons (PAH's), which include compounds that metabolize to carcinogenic chemicals, increased from 30.35 pounds per year when a cement kiln was burning 100% coal to more than 11,000 pounds per year when 10 - 18% of the coal was replaced by chipped tires -- an increase of 362 times (36,244%). The replacement of 10 - 18% of coal with chipped tires was accompanied by the release of dioxins and furans that were equivalent to 19,790,000,000 picograms of 2,3,7,8 - TCDD (the mosttoxic dioxin congener) per year. This quantity of dioxin exceeds U.S. EPA's estimated acceptable lifetime intake, for cancer effects alone, for more than 1.8 million people. Emissions increased by 30% in 2,3,7,8 - TCDD equivalents during the same tire substitution. The dioxin increase of 0.0198 grams TEQ per year exceeds the acceptable lifetime intake for more than 1.8 million people, based on the U.S. EPA's risk specific dose estimate.

15) "Report of Air Pollution Source Testing of a Cement Plant Rotary Kiln Fired on Rubber Tires and Coal at Mitsubishi Cement Company, Lucerne Valley, California" with 20% TDF burning (October 21 - 23, 1993). Particulate emissions significantly increased by 419% with TDF use, and recent epidemiologic studies by the Harvard School of Public Health and other researchers conclude that particles (PM10 equal to or less than ten microns) at levels well below the existing EPA and California PM10 standards cause increased mortality rates in a study of over 8,000 adults living in six U.S. cities (D. W. Dockery et al. 1993, "An Association between air pollution and mortality in six U.S. cities," New England Journal of Medicine vol. 329, 1753 - 1759). Linkage was made of ambient air pollution data from 151 U.S. metropolitan areas with individual risk factors on 552,138 adults who resided in these areas in which the investigators concluded that particle air pollution was associated with cardiopulmonary and lung cancer mortality (C. A. Pope et al. 1995, "Particulate air pollution as a predictor of mortality in a prospective study of U.S. adults," American J. of Respiratory and Critical Care Medicine vol. 151, 660 - 674)

Increases during TDF use were measured in kiln baghouse exhaust stack emissions of PAH's including napthalene, phenanthrene, fluoranthene, benzo-a-anthracene, chrysene, benzo-a-fluoranthene, benzo-k-fluoranthene, benzo-e-pyrene, and benzo-ghi-perylene. Increases occurred in more than eleven dioxin congeners including TCDD and total dioxins. Several dibenzofuran congeners increased. Metals increased in one or more samples including arsenic, barium, beryllium,

cadmium, hexavalent chromium, lead, manganese, mercury, nickel, selenium, thallium and zinc.

16) Dr. Jerome Nriagu is a leading researcher on the vapor phase chemistry of trace metals including hexavalent chromium, mercury and arsenic. Currently he is at the University of Michigan's School of Public Health where some of his twenty-one scientific papers have been published. Dr. Nriagu has concluded that significantly higher concentrations of three heavy metals than expected (chromium, lead and arsenic) remain preferentially entrained in the vapor phase during combustion of fuels and waste derived fuels containing these metals.

Stack sampling trains may not adequately collect samples to account for total vapor phase metals using current sampling protocol. Dr. Nriagu's research demonstrates that test burns of TDF may under estimate emissions of chromium, lead and arsenic. Atmospheric pollution of chromium, lead and arsenic from Cal Portland's cement kiln during tire burning may have under estimated by failing to adequately collect metal samples during test burns.

The combustion of hazardous substances including many chemicals in tires is simple in theory but difficult in practice as Cal Portland's and other kiln stack testing demonstrate with TDF/coal firing. Theoretically, if an organic hazardous substance is heated enough (temperature), for long enough (residence time), with thorough mixing (turbulence), and enough oxygen, complete combustion will occur. The problem with Cal Portland's proposal is that they are trying to take a very complex piece of process combustion equipment which was designed to burn powdered coal and use it to burn a cheaper fuel.

While chemically coal and TDF are somewhat similar, there are two basic differences in how they each are handled at Cal Portland. First, coal is finely pulverized before being blown by hot air into the kiln. TDF is to be fed as whole tires. (RP 000025) It is well known that finely divided organic powders mixed with air will combust so rapidly as to be explosive (i.e. grain elevator explosions due to grain dust spontaneous ignition). Cal Portland's application is to burn up to 20% whole tires.

A second difference is that most of the coal feed is to the front end (hot end) of the kiln where residence times and temperatures are higher (thus more efficient combustion), than with the TDF feed into the kiln exit. (RP 000024, 000025) In fact, the TDF is not really even fed into the kiln but is introduced into the preheater riser duct of the precalciner/preheater system via a tire slide and two air lock flap gates. (RP 000025) A receiving conveyor system, elevator and final conveyor with weigh bridge rollers transport the whole tires into the tire slide chute. (RP 000025)

The point is simply that with its use of TDF, Cal Portland is degrading the combustion efficiency of its system. In my view, it is not good public policy to allow this to happen.

<u>CAL PORTLAND'S SYSTEM IS NOT DESIGNED TO BURN WASTES:</u>

A clinker production system such as that run by Cal Portland is designed to get as much of the heat value (Btu) of the fuel into the

product as is possible. It is a common misconception that this design goal means that all (100%) of the fuel is combusted so that there are not environmentally harmful byproducts. In fact, in order to achieve the system's design goal, the amount of air entering the system must be kept to a minimum. This lowers the effective oxygen concentration. Cement kilns typically run at very low excess oxygen levels, contrary to environmentally good combustion. The reason for this is very simple. In order to get a unit of oxygen into the kiln combustion process, you also take four units of inert material like nitrogen. All five units take up heat energy in order to heat up to the combustion temperature. The result is it leaves less heat for clinker production. Adding excess air to get more oxygen also causes the air pollution control equipment performance to degrade, if clinker thru put is not decreased, and puffing of combustion gases from the kiln, as fan capacities are typically limited.

The point is very simple. The Cal Portland kiln system was not, and is not, designed as a combustion device to destroy hazardous substances containing wastes placed in it. The original Cal Portland kiln system is being utilized for this project. Cal Portland emphasizes, under "Control Equipment Design Details," that "this project does not involve the installation of any new air pollution control equipment or the modification of existing air pollution control equipment." (RP 000013)

The Cal Portland kiln system was designed to efficiently make a product. It was not designed to burn hazardous substance containing wastes even if TDF is not designated as a hazardous waste. In my view, it is not good public policy to allow hazardous substance containing wastes to be burned in a device simply because of its availability.

COMMENTS ON CAL PORTLAND'S MODELING AND RISK ASSESSMENT

A review of California Portland Cement's proposal in its Application for Authority to Construct, No. 1003026J, was performed without recalculating ISCST2 (Industrial Source Complex Short-Term impacts) Air Dispersion Modeling Input or the Multi-source, Multi-pollutant, Multi-pathway Risk Assessment. Stack results of December 16, 19-21, 1994 and January 4, 1995 TDF test burns were also reviewed. The review, however, demonstrates that the Application to Construct contains major deficiencies which I consider significant enough to warrant a legitimate challenge to Cal Portland's conclusion of insignificant environmental impacts from tire-derived fuel use. More deficiencies may be uncovered in the Application to Construct, since neither the ISCST2 Air Dispersion Model or the Multi-source, Multi-pollutant, Multi-pathway Risk Assessment were rerun.

The air modeling and risk assessment assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants including the above trace metals. (RP 000640) Technically this assumption of a zero 1-hour and annual pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support this theoretical background.

For example, lead is typically the most frequent heavy metal of concern in communities with or without industrial sites and it is definitely inappropriate to assume a zero lead background. The

inappropriateness of zero for the lead background is even more significant in areas with multiple industrial or toxic sites that may emit lead such as the Mojave-Rosamond area in eastern Kern county. Lead emission increases in stack tests up to as much as 379%, 388%, 620%, 787%, 7 - 91 times, and its persistence in the environment are critical reasons that excluding the lead background is a serious deficiency in Cal Portland's application.

In view of the fact that from 8 to 24 toxic sites exist in the area including several other cement kilns which may have similar metal emissions, the air modeling and risk assessment may not be conservative as Cal Portland suggests and significant errors may have occurred involving one or more orders of magnitude. Lead emissions are probably produced by all of the other cement kilns.

Another major flaw in Cal Portland's application is failing to account for the hysteresis effect (temporary retention of organic compounds) during test burns of TDF which may have introduced another significant source of error into the modeling and risk assessment. The hysteresis effect is defined as: "the retention of POHCs [principal organic hazardous constituents] within the combustion system leading to their continued appearance in stack gases for prolonged periods of time after their flow into the combustion system has been stopped" by Costner and Thornton. Complete combustion or destruction removal efficiency of organic compounds may be seriously flawed by this discovery. POHC emissions of two surrogate compounds, carbon tetrachloride and chlorobenzene, have been measured two hours after stopping the flow into a pilot-scale boiler, since the two POHCs were still present in stack gases at concentrations 121 % and 388 %, respectively, of their concentrations in the stack gas samples taken during feeding into the boiler.

In a report "Playing with Fire" by Pat Costner and Joe Thornton, Greenpeace, 1990, they conclude that hazardous waste incinerators are prone to experience a hysteresis effect during trial burns, and propose that cement kilns may be even more prone to hysteresis effect due to the large surface within the furnace and pollution control devices to make POHC retention. Several other studies have confirmed the hysteresis effect as being real and measurable in boilers.

Cement kilns may be particularly susceptible since they typically require seven days or more to reach materials input/output equilibirum according to Southwestern Portland Cement Co. Hysteresis was first reported in a study by Mason in 1988 stating that "stack concentrations of waste species continued for several hours after waste firing was curtailed" during trial burns of a boiler.

Dr. Kleppinger also concludes that "the nature of the clinker kiln system results in a significant hysteresis effect. When changing fuels, it takes days for the system to fully equilibrate." (RP 001608) The hysteresis effect was completely ignored by Cal Portland's application to burn tires and by KCAPCD in reviewing the application. The conclusion is that the levels of dioxins, furans and polyaromatic hydrocarbons emitted by Cal Portland during tire burning may be significantly under estimated in the air modeling and risk assessment.

My recommendation is that Cal Portland not be permitted to burn wastes including tires in its cement kilns. Further, only gas should be used to fire the precalciner/preheater. A fail safe and tamper proof opacity and CO continuous emissions monitor should be required for all kiln operation and available to the community for inspection at any time.

These comments do not necessarily include every potential concern regarding Cal Portland's application, but they do constitute the principal basis of the major deficiencies in the TDF proposal.

It is my conclusion that the whole scrap tire burning proposal submitted by California Portland Cement Company to the KCAPCD may have a significant environmental impact. It is my recommendation to Desert Citizens and the Kern County Air Pollution Control District that a public environmental review process as mandated by the California Environmental Quality Act be conducted on Cal Portland's tire burn proposal.

Sincerely yours,

Neil J. Carman, Ph.D.
Clean Air Program Director
Lone Star Chapter of the Sierra Club
(512) 472-1767 Fax (512) 477-8526

Enclosure - resume

SWPC Victorville plant tests.

1. Deficiencies in TDF sample protocol during TDF stack test

Stack test deficiencies involve a failure to sample TDF/coal for two toxic substances, fluoride and bromide, during TDF/coal firing as required by the TDF protocol. Bromide and fluoride samples from coal were collected during 100% coal firing and revealed <760 parts per million (ppm) bromide and 32 ppm fluoride. (RP 000489)

The ISCST2 air modeling and Multi-source, Multi-pollutant, Multi-pathway Risk Assessment (Modeling/MSMPMPRA) failed to properly evaluate bromide and fluoride impacts in spite of being present in the coal and unknown levels in the TDF.

2. Elevated trace metal levels in kiln stack emissions during TDF/Coal firing

Kiln 2 stack emissions indicated that burning TDF/coal compared to 100% coal produced higher emission levels of six trace metals. (RP 000483) Increased emissions of beryllium, cadmium, chromium, lead and mercury may be significant since they are toxic heavy metals released in some cases by one or more orders of magnitude in the TDF/coal firing compared to 100% coal firing.

Trace metal	Percent Difference	TDF/Coal Firing: in Lbs./Hour	100% Coal Firing: in Lbs./Hour
Beryllium	136%	9.98 x 10 -5	<7.35 x 10 -5
Cadmium	1041%	<3.02 x 10 -4	0.29 x 10 -4
Chromium (total)	3917%	5.17 x 10 -4	<0.132 x 10 -4
Lead	787%	6.47 x 10 -4	0.822 x 10 -4
Mercury	1900%	0.019	0.001
Nickel	1110%	<0.127 x 10 -4	1.41 x 10 -4

The Modeling/MSMPMPRA assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants including the above trace metals. (RP 000640) Technically this assumption of a zero 1-hour and annual pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support such a theoretical background.

For example, lead is typically the most frequent heavy metal of concern in communities with or without industrial sites and it is definitely inappropriate to assume a zero lead background. Lead increase of 787% and its persistent in the environment are critical reasons that excluding the lead background is a serious deficiency.

In view of the fact that from 8 to 24 toxic sites exist in the area including several other cement kilns which may have similar metal emissions, the Modeling/MSMPMPRA may not be conservative as Cal Portland suggests and errors may have occurred involving one or more orders of magnitude. Lead emissions are probably produced by one or more of the other cement kilns. Long distance transport is also increasingly recognized as a technical issue to be reviewed.

3. Elevated furan air emissions in kiln stack emissions

Kiln 2 stack emissions indicated that burning TDF/coal compared to 100% coal produced higher emission levels of six furan congeners and total furans. (RP 000484) Higher kiln stack emissions of total furans under the TDF/coal firing may be significant depending upon the background contributions because furans increase by 129%.

	Percent	TDF/Coal Firing:	100% Coal Firing:

Furan congener	Difference in Lbs./Hour		in Lbs./Hour
2,3,7,8 - Tetrachloro Dibenzo Furan	159%	4.61 x 10 -7	2.90 x 10 -7
1,2,3,7,8 - Pentachloro Dibenzo Furan	143%	1.81 x 10 -7	1.27 x 10 -7
2,3,4,7,8 - Pentachloro Dibenzo Furan	126%	2.40 x 10 -7	1.91 x 10 -7
1,2,3,4,7,8 - Hexachloro Dibenzo Furan	201%	1.68 x 10 -7	0.836 x 10 -7
1,2,3,6,7,8 - Hexachloro Dibenzo Furan	102%	5.72 x 10 -8	5.63 x 10 -8
1,2,3,7,8,9 - Hexachloro Dibenzo Furan	153%	<9.49 x 10 -9	6.19 x 10 -9
Total Furans	129%	<1.26 x 10 -6	0.978 x 10 -6

The Modeling/MSMPMPRA assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants including the above furans under the category of TCDD/TCDF. (RP 000640) Technically this assumption of a zero 1-hour and annual furan pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support such a theoretical background.

Dioxin and furan sites beyond Cal Portland definitely occur in the Mojave-Rosamond area indicating the inappropriate use of a zero background. Commercial hazardous waste incineration by National Cement at Lebec has been in progress for numerous years and probably releases detectable levels of dioxins and furans but no data was presented to evaluate this site to the background at Cal Portland.

4. Elevated dioxin air emissions in kiln stack emissions

Kiln 2 stack emissions indicated that burning TDF/coal compared to 100% coal produced higher emission levels of three dioxin congeners including the most toxic form (2,3,7,8 - tetrachlorodibenzo-p-dioxin). (RP 000485) Increased dioxin emissions of three congeners may be significant depending upon the background concentrations.

Dioxin congener	Percent Difference	TDF/Coal Firing: in Lbs./Hour	100% Coal Firing: in Lbs./Hour
2,3,7,8 - Tetrachloro Dibenzo-p-dioxin	151%	<1.96 x 10 -8	1.30 x 10 -8
1, 2,3,7,8 - Pentachloro Dibenzo-p-dioxin	184%	<3.31 x 10 -8	1.80 x 10 -8

1,2,3,4,7,8 - Hexachloro Dibenzo-p-dioxin 139% 2.24 x 10 -8 1.61 x 10 -8

The Modeling/MSMPMPRA assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants including the above dioxins under the category of TCDD/TCDF. (RP 000640) Technically this assumption of a zero 1-hour and annual dioxin pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support such a theoretical background.

Dioxin sites beyond Cal Portland definitely occur in the Mojave-Rosamond area indicating the inappropriate use of a zero background. Commercial hazardous waste incineration by National Cement at Lebec has been in progress for numerous years and probably releases detectable levels of dioxins but no data was presented to evaluate this site to the background at Cal Portland. National Cement has burned at least thousands of tons of hazardous waste for nearly a decade or more.

5. Elevated poly aromatic hydrocarbons (PAH) air emissions in kiln stack emissions

Kiln 2 stack emissions indicated that burning TDF/coal compared to 100% coal produced higher emission levels of six polyaromatic hydrocarbons (PAH's).
(RP 000486) PAH's emission increases may be significant depending upon the background concentrations.

PAH substance	Percent Difference	TDF/Coal Firing: in Lbs./Hour	100% Coal Firing: in Lbs./Hour
Acenapthene	8596%	3.00 x 10 -3	<0.0349 x 10 -3
Anthracene	4167%	1.00 x 10 -3	<2.40 x 10 -5
Benzo (a) Anthracene	257%	6.05 x 10 -5	<2.35 x 10 -5
Benzo (a) Fluoranthene	158%	6.17 x 10 -5	3.90 x 10 -5
Fluorene	834%	3.06 x 10 -4	<3.67 x 10 -5
Napthalene	450%	3.00 x 10 -3	6.67 x 10 -4

The Modeling/MSMPMPRA assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants including the above polyaromatic hydrocarbons under the category of PAH. (RP 000640) Technically this assumption of a zero 1-hour and annual PAH pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support such a theoretical background. PAH sites beyond Cal Portland definitely occur in the Mojave-Rosamond area indicating the inappropriate use of a zero background. Commercial hazardous waste incineration by National Cement at Lebec has been in progress for numerous years and probably releases detectable levels of PAH's but no data was presented to evaluate this site to the background at Cal Portland.

6. Elevated trace metal concentrations in kiln dust during kiln stack testing

Kiln dust pollutant levels indicated that burning TDF/coal compared to 100% coal produced higher concentrations of eight trace metals: (RP 000487)

Trace metal	Percent Difference	TDF/Coal Firing: parts per million	100% Coal Firing: parts per million
Arsenic	124%	11.333	9.15
Cadmium *	187%	2.333	1.25
Chromium VI *	857%	3.0	<0.35
Copper	121%	8.667	7.15
Lead *	263%	33.458	12.7
Manganese	244%	300.458	123.0
Mercury *	197%	0.067	0.034
Nickel *	115%	4.125	3.60

Cal Portland indicates that the kiln dust is recycled into the system allowing the elevated trace metal concentrations to be released as air emissions except for that which partitions into the clinker. Some metals tend to partition more into the clinker and kiln dust while others tend to remain as gaseous emissions.

* Indicates six trace metals in higher concentrations in kiln stack emissions. Mercury is a metal that is more typically entrained in the vapor phase and even in relatively low concentrations will show up in stack emissions. Mercury increases by 1900% in kiln stack emissions with TDF/coal where as it increases only by 197% in the kiln dust indicating that a higher percent of the increased mercury becomes airborne.

7. Elevated trace metal concentrations in clinker dust during kiln stack testing

Clinker dust pollutant levels indicated that burning TDF/coal compared to 100% coal produced higher concentrations of nine trace metals: (RP 000488)

Trace metal	Percent Difference	TDF/Coal Firing: parts per million	100% Coal Firing: parts per million
Arsenic	106%	11.792	11.1
Chromium (total)	117%	29.542	25.2
Chromium VI	183%	3.0	1.64
Copper	209%	20.5	9.81
Lead	1121%	11.208	<1.00
Manganese	194%	364.625	188.0
Nickel	130%	6.917	5.31
Phosphorus	102%	141.958	139.0
Zinc	503%	196.292	39.0

Elevated trace metal concentrations in the clinker dust is probably correlated to higher kiln stack emissions.

8. Differences in trace element concentrations in fuels during kiln stack testing

Trace element levels indicated that burning TDF/coal compared to 100% coal produced higher concentrations of seven trace elements: (RP 000489)

Trace element	Percent Difference	TDF/Coal Firing: parts per million	100% Coal Firing: parts per million
Sulfate	233%	5,500	2,360
Chromium (total)	„279%	2.792	<1.00
Chromium VI	„571%	<2.0	<0.35
Manganese	109%	6.792	6.23
Nickel	„342%	3.417	<1.00
Zinc	105%	4.167	3.95
Phosphorus	261%	41.0	15.7

The increase in hexavalent chromium using TDF is a principal reason for the need to fully evaluate background concentrations. The more than five fold increase in chromium VI is a cause for caution particularly if there is a low level background concentration, a scenario that is a certainty with 8 to 24 toxic sites in the Mojave-Rosamond area.

9. Differences in metal concentrations in raw mill dust during kiln stack testing

Trace element levels indicated that burning TDF/coal compared to 100% coal produced higher concentrations of six metals: (RP 000490)

Metal	Percent Difference	TDF/Coal Firing: parts per million	100% Coal Firing: parts per million
Chromium VI	571%	<2.0	<0.35
Manganese	187%	276.875	148
Mercury	382%	0.130	0.034

Cal Portland evidently intends to recycle the raw mill dust into the system where elevated air emissions may result from the higher concentrations of chromium VI, manganese and mercury. Mercury is well known to partition into the vapor phase rather than the particulate phase making it difficult to remove from Cal Portland's TDF operations as proposed.

PCBs not evaluated! The Modeling/MSMPMPRA assumed a 1-hour and annual pollutant background of basically zero, 0.000E+00, for 26 pollutants. (RP 000640) Technically this assumption of a zero 1-hour and annual furan pollutant background may be invalid since no evidence has been submitted in the Application to Construct to support such a theoretical background.

Toxic pollutant sites beyond Cal Portland definitely occur in the Mojave-Rosamond area indicating the inappropriate use of a zero background. Commercial hazardous waste incineration by National Cement at Lebec has been in progress for numerous years and probably releases detectable levels of highly toxic substances but for which no data was presented to evaluate area sites to the background at Cal Portland.

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