

Date: 19 October 2004

To: SBAPCD, SBCAG, County of Santa Barbara Board of Supervisors
Fm: Dr. Edward McGowan representing the Citizens Planning Association's Land Use Committee
Re: Synergistic adverse effects of road dust, impacts on human health. Is looking at ozone enough?

The Santa Barbara News Press was thoughtful enough to run an article by Terry Dressler discussing clean air. In that article, and its referenced documents, there is mention of the adverse impact of ozone on lung tissue and the respiratory system, hence health. Dr. Dressler also invited his readers to review the draft of the 2004 Air Quality Plan and its accompanying EIR.

Having read the noted documents, I would like to comment for the record. This comment memo opens with a summary and then supplies the interested reader with background information, thus allowing for further inquiry. I would be happy to assist any agency with a more advanced analysis or search for data. I also have large files that are available for the asking.

SUMMARY

While the engine emissions from certain vehicles may be going down, and this is good, the total number of vehicles is going up as well as the number of trips. Along with the increased trip volume will be increased tire dust. Entrained road dust acts synergistically with ozone. Thus while there may be attainment of ozone standards, this ignores the synergistic impacts between ozone and other materials. Accordingly, reaching a specified ozone level may have an insufficient beneficial impact on health. As these other synergistic constituents (some of which seem not to be considered) gain greater importance in human health, it may take less and less ozone to augment an acute or chronic impact on health. These impacts are potentially significantly adverse. Thus the EIR should provide a broader review of this synergistic interaction on health.

Within this entrained road dust are numerous constituents that may be considered as carcinogenic. Others are irritants. Then there are the various pathogens (bacteria, viruses, fungi, and protozoa) many of which may contain and thus could transfer antibiotic resistance. Other constituents of road dust also adversely affect the functioning of the respiratory system through allergic reactions. That the respiratory tissues are irritated merely opens those surfaces to increased risk from pathogens. The process here is cyclic.

Within the heading of road dust one finds, as mentioned above, tire dust. This is material that is removed from the tires as they contact the road. The average amount of tire dust lost annually through wear has been estimated at 2.5 pounds. Thus a 4-wheel vehicle will lose about 10 pounds of rubber per year. Estimates from Los Angeles put the aerosol load from tire dust at about 10,000 pounds *per day*. This is divided into microscopic latex particles, many of which will stay suspended for hours as they waif around and then move down wind. Many will reach the smallest recesses of the lung.

Much of this rubber dust is composed of latex and falls within the PM-10 to PM-2.5 or smaller range. These particles reach the deepest recesses of the lung and this exacerbates allergic reactions as well as asthma. The current medical literature indicates that this type of dust may actually be **initiating asthma** as well as exacerbating that condition. Asthma is a growing national health crisis. There is also, within the European medical literature, a sufficient number of papers to suggest that this type of dust becomes statically charged by exposure to the corona effect surrounding large power lines, lines that often parallel roadways. This remaining charge on dust particles causes them to preferentially adhere to moist lung tissue. Those living along transport corridors are subjected to heavy loads of this type of air pollution. Those affected most are children who, per body mass and metabolism, breathe about twice as much as adults. In addition the elderly are also amongst those most adversely impacted.

Of the school-aged children, those with asthma are at a significant adverse disadvantage academically. There are numerous studies in the medical and scientific literature to demonstrate this situation. Asthma affects their school performance and their behavior. These children are affected intellectually, emotionally, and physically, hence their academic accomplishments are diminished. If these children are atopic (prone to

allergic reactions) and then placed on the less expensive but more common first generation antihistamine medications, this merely adds to their inability to effectively compete in school because of drowsiness. Other medications taken by allergic and asthmatic children have similar impacts.

There is also a tendency to place low income--low cost housing along transport corridors because of the reduced property cost. Thus, the section of society that might most often utilize this type of housing may also overlap with that portion of society that relies heavily on publicly subsidized medical care. This would also include sections of society that lack insurance for medical coverage. This broad group of people, out of necessity, will often let a medical condition go until it reaches a crisis state, a state that is much more costly to treat and may leave lingering damage. **Thus, the impact is also one that should be of interest to land use planners and transportation planners.**

Here, I would also like to argue that transport corridors themselves are actually stationary sources, and thus could come under the purview of APCD. What, logically, makes a source stationary---versus mobile? A factory smokestack puffs out a pollutant, thus comes under scrutiny. The smokestack itself, if nothing is supplied to produce a pollutant, is merely an inert stack of brick and concrete. It is the material brought into the factory and combined within that factory that makes the smokestack an issue. The same logic can be applied to asphalt and concrete roadways. Asphalt itself is composed of rubber material, hence its wearing releases rubber as well as other materials that adversely impact health. Rubber is a complex mixture of toxins, reactive proteins and allergens. Other materials brought into the corridor contribute to the increased air risk.

For example, under the greening of government, the mandated procurement of composted biosolids (sewer sludge) for roadway maintenance and erosion control brings in large quantities of pathogens (many of which are antibiotic resistant) and respiratory irritants in the form of lipopolysaccharides (the cell wall of Gram negative bacteria which cause violent immune reactions and are a major portion of biosolids) and liming chemicals. Additionally, for areas irrigated with reclaimed sewer water, there is enough evidence in the scientific literature to raise questions about pathogen release and down-wind aerosols. These released pathogens, often containing resistant genes, can pass this genetic information to soil microbes. These soil microbes then become lending libraries for this genetic information. These become part of the road dust and are entrained to move down wind into adjacent areas.

Then there are the deposits from the vehicles themselves, tire wear, engine derived materials, dust from breaks, clutches, belt wear, and action of tires on the road surface. Added to this are the materials from the area that fall out as dust, bacterial and fungal spores or materials washed onto roadways, including right-of-way maintenance materials such as pesticides.

All these materials, which form a complex of irritants, are re-entrained daily. Thus this mix, which is unique to roadways, constitutes a stationary source of air pollution. Who is responsible for an evaluation of this source, and to whom does the regulatory responsibility fall? **This question should be answered within the EIR**—who is responsible and are there adequate safeguards, or is this something falling between the cracks?

As is noted above, the impacts from a variety of sources as well as their combination with ozone constitute air pollution and have adverse influences on health. What, if any, are the limits on the discussion of such combinations within the EIR? If the EIR is not able to discuss these issues, where is the forum?

SPECIFICS

Because of my limited time and resources, the specifics will be desegregated and merely supply the interested reader with some indicators of where additional information might be found. I would be most pleased to assist agency staff look deeper into these areas.

I'm working on the greening of government issue (see below) of selling composted biosolids as bagged potting soil and similar issues where government agencies will be forced to purchase it.

The State of California is a major user of composted materials for roadway maintenance and erosion control. This then ties back to the air quality issues of road dust interacting with ozone and tire dust which contains a large percentage of latex rubber dust, a dust in particulate sizes that can enter the inner-most portions of the lung tissue (PM-2.5). This borrows on David Lewis' theory of chemical irritants synergizing the adverse effect of pathogens. If the radioactive material from certain areas is also added, (refer to Hugh Kaufman's testimony) then the impact on lung tissue may see a rise in lung cancers--ozone already causes this, thus it is at least additive, if not synergistic. The fungi that are pathogens and are now developing increased resistance to antimicrobials are also another issue in this. Additionally, latex is a major allergin and causes both asthma (growing crisis in the U.S.) and exacerbates asthma. Tire dust is mainly PM-10 to PM-2.5 latex particles. Thus the synergistic effect of ozone, other exhaust gasses, latex, and pathogens and possibly radioactive materials will increase once sewer sludge is added to the roadway maintenance. Thus in cases of erosion control (this is done to help reduce water from getting on the roadway and causing cars to hydro plane as well washing out roadways) the use of sludge compost may see this material aerosolized and thus affect health of not only the transport corridor users but also those fall-out areas adjacent to the corridor.

This action may potentially affect those "procuring agencies"--a term defined in RCRA section 1004(17)--that purchase the following: composts made from manure or biosolids and fertilizers made from recovered organic materials. For purposes of RCRA section 6002, procuring agencies include the following: (1) Any federal agency; (2) any state or local agencies using appropriated federal funds for a procurement; or (3) any contractors with these agencies (with respect to work performed under the contract). The requirements of section 6002 apply to such procuring agencies only when procuring designated items where the price of the item exceeds \$10,000 or the quantity of the item purchased in the previous year exceeded \$10,000. Potential regulated entities for this rule are shown in Table 1.

APCD Response to Comments from Dr. Edward McGowan, Individual

Dr. McGowan expresses a concern that the 2004 Plan and SEIR did not assess the synergistic health impacts between ozone and other materials. In particular, he states that within entrained road dust, there are numerous constituents that may be considered carcinogenic while others are irritants and pathogens. As these other synergistic constituents gain greater importance in human health, it may take less ozone to augment an acute or chronic impact on health. He believes that transportation corridors are themselves actually stationary sources and thus could come under the purview of the APCD.

The APCD agrees with Dr. McGowan that there can be synergistic effects when ozone and other constituents of road dust are inhaled. However, neither the U.S. Environmental Protection Agency nor the California Air Resources Board have promulgated ambient air quality standards which specifically address the synergistic health concerns he raises. Additionally the mandated purpose of this 2004 Plan is to specifically addresses measures necessary to attain the state one-hour ozone. Consequently, the APCD believes that neither the 2004 Plan nor the SEIR are the proper venue to address his concerns.

In addition to our ozone planning requirements, we are also required to comply with Senate Bill 656 by developing a rule adoption schedule for particulate matter in order to attain the California ambient air quality standards for PM10 and PM2.5. This local effort, combined with the Air Resources Boards diesel risk reduction plan, will ensure that progress is made toward reducing toxic pollutant health impacts and attaining all applicable ambient air quality standards in Santa Barbara County.