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STATEMENT OF THE MARG DIESEL COALITION

BEFORE THE CLEAN AIR ACT ADVISORY COMMITTEE MOBILE SOURCE TECHNICAL REVIEW SUBCOMMITTEE NONROAD WORK GROUP

U.S. ENVIRONMENTAL PROTECTION AGENCY

JANUARY 16, 2001

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STATEMENT OF THE MARG DIESEL COALITION

The MARG Diesel Coalition is pleased to participate in the EPA's Nonroad Work Group, related to diesel issues associated with nonroad equipment. MARG is particularly interested in this issue as it affects the surface and underground mining industry. MARG is a coalition made up of a number of mining companies, with input and support from mining trade associations including the National Mining Association, the National Aggregates/National Stone Association and the National Lime Association.

Some of MARG's member companies and their employees are the subjects of ongoing research by the National Institute for Occupational Safety and Health and the National Cancer Institute, concerning the potential health effects of long-term diesel particulate exposure in underground miners. We look forward to providing information and recommendations related to nonroad sources and fuels to help EPA formulate effective regulations that are based on sound science and are technically and economically feasible.

Attached is a comment submitted by MARG to the EPA concerning its recent draft Health Assessment Document on Diesel Exhaust. It summarizes findings in the mining industry and we ask that it be made part of the record for this meeting. In addition, MARG submits the following summary responses to the questions posed in the EPA's invitation:

1. <u>How important is it to further control emissions from nonroad diesel engines and fuels to address National Ambient Air Quality Standards</u>?

   Response: Nonroad diesel engine and fuel emission control is a significant issue within the context of meeting NAAQS. There have been significant advancements in diesel engine emission control during the past decade, but the availability of these controls varies according to the type of engine and their applications. Technology that is feasible for small engines or stationary sources may not be available or affordable for large haul trucks or other equipment that operate at some metal/nonmetal mines. In addition, many mines have extensive inventories of older equipment and cannot afford to replace their entire fleet. Manufacturers are reluctant to make retrofitting available for equipment that is 15 or 20 years old. Thus, if replacement equipment is ultimately required based on sound science, this must be done gradually so that the mining industry is not placed in economic jeopardy. A sufficient "grandfathering" period must be provided to assist small mine operators[1] in any transition to more effective control technology. With respect to low sulfur fuel, MARG does not oppose such requirements but notes that some of the older mine equipment cannot operate on such fuel. Non-road diesel fuel is currently unregulated by the EPA and currently approaches 3000 ppm of sulfur. Highway diesel fuel, under EPA regulations, can contain up to 500 ppm sulfur. A grandfathering period sufficient to permit mine operators to recapture the value of their fleet will be necessary.

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[1] Small mining entities are defined by SBA as companies with less than 500 employees. 13 CFR § 121.201. Approximately 98 percent of mines fall within the SBA-established definition of "small business."

Doc. 581761

2. <u>How important is it to further control emissions from nonroad diesel engines and fuels to address toxic air pollution problems particularly carcinogenic risks</u>?

Response: The attached MARG statement to the EPA concerning the health effects of diesel summarizes the state of the science as it pertains to mining industry studies. A review of the scientific literature indicates that it is premature to classify diesel exhaust as a human carcinogen. Most of the human studies that yielded "positive" findings are flawed, either by failing to control for cigarette smoking and other confounding factors, or by the absence of a dose/response relationship. MARG members are fully cooperating with NIOSH and NCI in a major, multi-million dollar study of diesel health effects in the mining industry and the conclusions of this research should be published within the next few years. Any rulemaking predicated on the purported carcinogenicity of diesel emissions is premature.

3. <u>What are the issues regarding application of aftertreatment and diesel fuel sulfur requirements on nonroad diesel engines that are similar to those proposed for onroad diesel engines and fuels</u>?

Response: As noted in #1 above, low sulfur fuel requirements may not be realistic for large mining equipment that cannot operate on this fuel without total conversion of its operational systems. Replacements of a mine's entire fleet is unrealistic and economically infeasible. To the extent possible, however, MARG supports the use of aftertreatment and low sulfur fuel and it encourages equipment manufacturers to develop cleaner mining equipment and retrofit technology for purchase as fleets are gradually modified or replaced.

The fleet conversion costs are significant, however. In response to the Mine Safety & Health Administration's proposed diesel particulate standard for metal/nonmetal mines, MARG's consultant, Harding Lawson Associates, conducted an economic impact analysis. It found that the annual compliance cost to the metal/nonmetal sector alone of compliance with the MSHA proposed rule (which includes some fleet conversion, use of aftertreatment devices and lower sulfur fuels) would total at least $60.4 million, and could equal $424 million, computed as the present value of annual costs using a 10-year stream at a 7 percent rate of return.[2]

Even though MSHA has a mature diesel rulemaking in progress, available equipment and operating changes have not even been identified, much less demonstrated to be effective, to reduce diesel emissions and airborne carbon in such mining equipment to the proposed levels. There is simply insufficient evidence that existing technology can consistently reduce particulate emission levels by 85 or 95 percent, as is suggested by some federal agencies.[3] We encourage EPA to establish technological feasibility by determining and quantifying the number, type, sizes, and models of the diesel engines currently in use at surface and/or underground mines. Only after EPA understands the character and nature of current diesel use can it begin to determine whether compliance is feasible (both technologically and economically). Although EPA has suggested techniques for achieving diesel emission reduction, the efficacy of these approaches has not been

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[2] The cost projection did not include the significant economic burden of mine ventilation alterations, construction of new shafts and other measures that could be necessary at some underground mines in order to comply with an MSHA standard.

[3] The Manufacturers of Emission Controls Association ("MECA") noted in comments to MSHA that the agency's 95 percent reduction requirement for coal mine diesel equipment poses "serious technical challenges" and that the "ability and potential cost of doing this remains unknown for the variety of equipment" utilized in these mines. MECA concluded that "it cannot be guaranteed that these systems will achieve at least 95 percent filtration efficiencies at all times."

demonstrated in the mining environment. Technologies may not be easily transferable between various sectors of the mining industry, or between small and large engines.

Moreover, existing emission control technologies have inherent problems that require regulatory decisionmakers to balance lower dpm emissions against detrimental effects of achieving reductions.[4] For example, oxidation catalysts that lower volatile organics and gaseous hydrocarbon levels tend to increase levels of SOx and submicron particles. Similarly, selective catalytic reduction systems may reduce NOx by 70 to 90 percent, but they can increase formation of ammonia sulfate, which is an undesirable component of fine particulate matter, and they may also produce N_2O. Diesel engines which offer the best fuel economy also tend to have higher NOx levels.

More research and interagency coordination is needed to develop advanced systems that can reduce NOx and dpm emissions at mining operations, while maintaining fuel economy, low CO and hydrocarbon levels and the economic viability of the industry.

Respectfully submitted:

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[4] Decreasing total particulate levels through use of fuel injection and combustion chamber design can result in a net increase in nanoparticulate levels of up to 1200 percent.

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October 5, 2000

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VIA CERTIFIED MAIL

A. Robert Flaak
Committee Operations Staff Leader
US EPA Science Advisory Board and
Designated Federal Officer, CASAC
Mail Code 1400A
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Re: Draft Health Assessment Document for Diesel Exhaust

Dear Mr. Flaak:

Please find attached our submission of comments on behalf of the MARG Diesel Coalition, in response to the EPA's Draft Health Assessment Document for Diesel Exhaust, pursuant to the August 11, 2000, Federal Register notice (65 Fed. Reg. 49241). We request that you distribute these to members of the Clean Air Scientific Advisory Committee for review prior to the October 12-13, 2000, meeting in Alexandria, VA. Dr. Jonathan Borak will provide additional oral testimony on other issues, on behalf of the MARG Diesel Coalition, at that meeting on October 13, 2000. Please call me at 202-457-6476 if you require additional information.

We appreciate the opportunity to comment on this important document and welcome the opportunity to work with CASAC in the future on issues associated with diesel-powered equipment.

Sincerely,

Adele L. Abrams, Esq.

COPY

Comments of the MARG Diesel Coalition
To the Environmental Protection Agency
Concerning the Revised Draft Health Assessments
Document for Diesel Emissions
September 29, 2000

On behalf of the MARG Diesel Coalition,[1] we are pleased to submit the following comments in response to the Environmental Protection Agency's ("EPA") revised Health Assessments Document for Diesel Emissions, which was released for public review on August 11, 2000.

As it did with the November 1999 draft, EPA has provided an inadequate amount of time to review an extensive technical report that exceeds 600 pages. Moreover, although the preface states that the scientific documents referenced are current through January 1999, in fact a number of recently published reports are referred to which are new to the public and to the scientific reviewers. EPA has not provided sufficient time for the public to obtain these documents and subject them to rigorous scientific analysis. Therefore, we request that EPA extend the comment period to permit a full review of the EPA's findings and the underlying data and authorities. We also request that the Clean Air Scientific Advisory Committee ("CASAC") table its consideration of this report at the October 12-13, 2000, meeting until such time as the public is provided with a realistic opportunity to review this document and share their insights and concerns with CASAC.

Although EPA has added a great deal of new information to the previous report, it has made few substantive changes that would favorable affect the overall credibility of the document. Simply put, there is no scientific basis for EPA's selection of an inhalation reference concentration of 14

[1] Members of the MARG Diesel Coalition are FMC, General Chemical, Morton Salt, IMC Global, Tg Soda Ash, Solvay Minerals and other mining associations and companies that financially support MARG's scientific research efforts. MARG members are users of both on-road and off-road diesel powered equipment. As companies committed to the health and safety of their employees, MARG's members have closely reviewed the various existing epidemiological

ug/m^3 – just as there was no scientific basis for its earlier proposal of 5 ug/m^3. While EPA has added myriad new scientific studies and technical references in the report, the public and the scientific community cannot review these sources in the time provided or discern whether EPA's interpretation of the studies' findings are accurately represented.

Whether or not there are adverse effects from diesel exhaust exposure is a critical issue, both from a public health and from occupational health perspective. EPA's position with respect to the purported carcinogenicity of diesel exhaust continues to be based on selected animal studies and meta-analyses of studies that, taken alone, are either fatally flawed or do not have sufficient strength for conclusive findings. In addition, although EPA has computed its inhalation reference concentration by extrapolating findings from occupational studies, including those in the mining, rail and trucking industries – those studies are far from conclusive. Some have problems with confounding factors, others have been subsequently rejected by their authors or are undergoing reanalysis at present, and still others do not show any definitive trend with respect to adverse health effects.

Although the EPA notes that mining exposures are particularly high, there are numerous mining industry studies of diesel particulate exposure that show no adverse health effects or show effects that are not statistically significant. Significantly, the overwhelming majority of human studies conducted in the <u>mining</u> industry reveal a <u>negative</u> propensity for dpm-related adverse health effects.[2]

In particular, one recent study of underground coal miners found a less-than-average chance of dying from cancer (<u>and</u> the other illnesses that EPA suggests may possibly be linked to dpm

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studies that explore the link, if any, between serious illness and exposure to diesel exhaust, and have funded extensive sampling activities at their mines to determine whether diesel exhaust can be accurately quantified.

exposure). Christie et al., Mortality in the New South Wales Coal Industry, 1973-1992, 163 Medical Journal of Australia 19 (3 July 1995). Christie found that the cohort of 23,630 miners who entered the industry between 1973 and 1992 had a 24 percent lower mortality than did the general population, including a 27 percent lower mortality from respiratory disease and a 22 percent lower mortality from cancer. [3] The miners' standardized mortality ratio for all causes of death was 0.76. The researcher noted that the lower mortality rate, compared with some earlier studies of miners who began working in the 1930s or earlier,[4] was due to the extensive mechanization of mining techniques and dust control now prevalent in the modern mining industry. *Id.* at 20-21.

The Christie study, which reflects the latest and best scientific evidence, current technology, and the current health of miners, is a much more appropriate basis upon which to determine whether regulatory action is needed than any of the other studies cited by EPA. The Christie study dramatically contradicts the conclusions EPA has tried to draw from the earlier, flawed, studies. It simply is not rational to predicate environmental, safety and health regulations for the year 2000 and beyond upon older scientific studies that are flawed, inconclusive at best, and reflect outdated working conditions, ventilation systems and technology that are no longer in use.

The following mining industry-specific studies all reflect either negative health effects trends among miners or else failed to demonstrate a statistically significant positive trend correlated with dpm exposure:

- Ahlman et al. (1991) – Sulfide Ore Miners: This study found a "slight excess mortality" from lung cancer, but indicated that the result could be explained by exposure to radon

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[2] NIH-98-120 [FIOSH, unpublished cohort study in German]) (October 8, 1998).
[3] These workers also had a 33 percent lower mortality from heart disease.
[4] These include the United Mineworkers Health Fund study cited by Christie et al. *See* Rockette, H., Cause-specific mortality of coal miners, J Occup Med 1977 (1: 795-801).

daughters and by other confounding exposures. No relationship to diesel exhaust exposure was established.

- Ames, Reger and Hall (1984) – Coal Miners: The researchers studied chronic respiratory effects of exposure to diesel emissions and found that "the pattern of evidence did not support the hypothesis" that exposure to diesel emissions leads to chronic respiratory effects among diesel-exposed underground miners.
- Ames et al. (1983) – Coal Miners: This study evaluated the relationship between lung cancer mortality and coal mine dust. It found no evidence of a cancer risk from coal mine dust exposure, lung cancer risk. The expected increased risk for lung cancer in cigarette smokers was observed.
- Ames et al. (1982) – Coal Miners: This study looked at whether acute respiratory effects were related to diesel emissions. There were no significant differences in the ventilatory function changes between diesel-exposed miners and those not exposed, either in the aggregate or when controlled for smoking status.
- Armstrong et al. (1979) – Gold and coal miners: This study of Australian miners found that neither gold nor coal miners had a significantly higher mortality than expected compared with the general population. Lung cancer mortality was relatively high in gold miners, but "weakly and inconclusively related to the extent of their underground mining experience" and could be explained by their cigarette smoking. Coal miners had a lower-than-expected rate of lung cancer but a higher rate of other forms of cancer (not attributable to any one cancer site and not explainable). Diesel emissions were not found to be related to increased health risks.

- Attfield, Trabant and Wheeler (1982) – Potash Miners: This study of diesel fumes and dust at New Mexican potash mines found "no obvious links incriminating either dust or the diesel exhaust."
- Attfield (1978) – Underground Metal/Nonmetal Miners: This researcher conducted respiratory health surveys at 21 metal/nonmetal mines to study the effect of exposure to silica and diesel exhaust. Dust/quartz exposure was not clearly related to lung function, and findings for diesel exhaust were mixed. Four indicators of diesel use failed to show consistent trends with symptoms and lung function.
- Bofetta et al. (1988) – Miners and other Occupational Groups: This American Cancer Society study of men with known diesel exhaust exposure found that the overall relative risk ("RR") for all causes of death was 1.05 and the RR for lung cancer was 1.18. Miners in the study had an elevated RR for lung cancer (2.67), but of the 1,233 miners included in the cohort, only 14.4 percent reported that they had dpm exposure. Moreover, 44.2 percent did not state whether they were occupationally exposed to diesel, and 41.4 percent indicated an absence of dpm exposure. The report does not indicate what type of mining was involved, if there were other potential carcinogen exposures (e.g. radon), or whether any attempt was made to quantify the extent or duration of the few reported dpm exposures. The study obviously does not demonstrate risks from dpm exposure.
- Costello, Ortmeyer and Morgan (1974) – Coal Miners: This study of 3,726 U.S. coal miners revealed a low SMR of 0.67 for lung cancer, indicating agreement with previously published British data (Kennaway (1936) which showed a SMR of 0.55; Goldman (1965) which showed a SMR of 0.71; Stocks (1952) which showed SMRs ranging from 0.77 to 1.32; and Liddell (1973) which showed a SMR of 0.53 in underground miners and a SMR of 0.82 for surface workers).

- Gamble and Jones (1983) – Salt Miners: questionnaire, chest radiographs and air/He-O_2 spirometry assessed the respiratory health of miners. The researchers found a statistically significant association of diesel exposure with phlegm, but they found a non-significant trend for cough, and they found no association with spirometry. The dpm exposure levels were unknown.
- Glenn et al. (MSHA record cite undated) – Coal and Metal/Nonmetal Miners: This report reviewed results from several studies in the NIOSH program and concluded that "results were rather mixed . . . neither consistent nor obvious trends implicating diesel exhaust in the mining atmosphere were revealed . . . ." The report added that when elevated symptom levels were found, they probably were associated more with inhalation of mineral dust than with diesel fumes. The authors concluded: "There is little indication that prolonged exposure to diesel exhaust at the levels reported here lead to permanent deleterious effects on lung function. Further research on this subject is needed."
- Johnston et al. (1997) – Coal Miners: This British lung cancer study involved more than 18,000 coal miners and used NOx data and respirable particulate mass measurements to estimate dpm exposure (although no direct measurements of dpm concentration were made). Sixty percent of subject mines were dieselized. The study found a "weak association" between lung cancer and respiratory diesel particulate exposure (RR of 1.16, deemed non-significant by the researchers). No association was found among men with different exposures working in the same mines. The study does not support a health risk from dpm.

- Jorgensen (1970) – Iron Ore Miners: This study found smoking was linked to respiratory disease development; non-cancer health effects were linked to smoking but not to air quality.
- Kuempel (1995) – Coal Miners: In a quantitative study of coal dust, Kuempel found an increased standard mortality ratio (SMR) for pneumoconiosis, chronic bronchitis and emphysema, but not for lung cancer or stomach cancer. The report does not link dpm to a health effect risk.
- Lidell (1973) – Coal Miners: This study found that underground coal miners had increased rates of pneumoconiosis but lower-than-expected rates of lung cancer. The study does not provide evidence of a dpm-related health risk.
- Miller and Jacobsen (1985) – Coal Miners: In a study of dust exposure, pneumoconiosis and mortality, the researchers found that the general mortality rate of coal miners was 13 percent below that of the general population and that there was no increased risk of lung cancer.
- Morfeld (1997) – Coal Miners: In this mortality and lung cancer study, adjusting for the "healthy worker effect," the SMR for lung cancer was 0.70; the SMR for stomach cancer was 0.62 and the overall SMR for cancer was 0.65. In a further meta-analysis of 12 studies, Morfeld found no increase in cancer and lung cancer, but a 1.34 relative risk of stomach cancer. The study contradicts the assertion of health risks from dpm exposure.
- Reger (1982) – Coal Miners: In this diesel exhaust study, diesel-exposed miners were found to have more cough and phlegm, and lower pulmonary function, but the author found that factors other than diesel exposure may be responsible. He concluded that the sufficiency and consistency of the evidence would not allow for the rejection of the hypothesis of health equality between exposed and non-exposed miners.

- Rockette (1977) – Coal Miners: This study found a SMR of 1.02 for non-malignant respiratory disease, a SMR of 1.12 for respiratory cancers and a SMR of 1.40 for stomach cancer. The study does not establish a dpm-related health risk.
- Waxweiler (1972) – Potash Workers: This research examined whether miners had a predisposition to cancer development, and potash miners were studied because of the relatively few confounding factors in the potash mines (low silica, radon, arsenic, nickel, cobalt and chromium). No statistically significant excess of lung cancers was observed in the cohort. There was a marked deficiency of malignancies in sites other than respiratory. No major cause of death exceeded expectations among men working in the diesel-using potash mines.

Although MARG cannot possible conduct a thorough review of this 600-page technical report and its new references in a six-week period, our initial review indicates that EPA has proceeded in recommending an inhalation reference concentration of 14 $\mu g/m^3$ for diesel exhaust ("DE") utilizing animal data and disregarding much of the scientific evidence that shows minimal risk to humans. However, MARG agrees with EPA's decision that it is inappropriate, based on current scientific knowledge, to recommend a cancer unit risk or risk range for diesel exhaust. We strongly object, however, to EPA's "finding" that diesel exhaust is "likely" to be a human carcinogen. This finding is contrary to the results of many human studies, as well as the conclusions reached in the recent comprehensive report by the Health Effects Institute (1999).

It appears that none of the epidemiological studies cited by EPA includes published industrial hygiene measurements of diesel exhaust exposures for any of the study populations. Rather, exposure estimates were made based upon job classification or duration of employment, and the reported findings are supported by assumptions layered upon assumptions. There is no way to know whether the assumptions are accurate, or whether they even measure diesel exhaust (as compared with gasoline fumes). Even if the studies had demonstrated definitive health effects from diesel exposure (which they do not), they do not support the inhalation reference concentration advocated by the EPA.

MARG urges EPA not to precipitously finalize a document that will form the basis for stringent regulatory action concerning on-road and off-road diesel engine use. EPA should perform further evaluation of existing human scientific studies on both cancer and non-cancer health effects. EPA should also await the results of a comprehensive diesel health effects study now in progress in the mining industry,[5] which is being funded by NIOSH/NCI because those agencies have concluded: "Few mortality studies using quantitative measures of diesel exhaust directly to assess exposure-response exist. Those that do have defects and are incomplete." NIOSH/NCI Diesel Exhaust Study Protocol at 14 (1997). In 1998, NIOSH/NCI's lead diesel researcher, Dr. Debra Silverman, added: "The repeated finding of small effects, coupled with the absence of quantitative data on historical exposure, precludes a causal interpretation."[6]

Finally, we again ask EPA to consider in greater detail whether the current state of science permits accurate sampling and analysis for diesel exhaust and which substances are appropriate for use as surrogates for diesel particulate, in light of the many confounding factors present in most environments. The Desert Research Institute and NIOSH are both in the process of conducting research in this area that can be valuable in informing EPA's diesel rulemaking efforts. The results of these studies should be part of the EPA rulemaking record.

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[5] Some MARG members operate mines that are the subject of an ongoing diesel exhaust research project by the National Institute for Occupational Safety and Health and the National Cancer Institute. The EPA also has researchers

In summary, the EPA report suffers from several fundamental scientific defects:

(1) Contrary to the suggestions in the report, a link between diesel exhaust exposure and serious non-cancer health effects or cancer has never been established by reliable scientific evidence. The studies on which EPA relies are largely based upon assumptions about exposure to diesel exhaust, and they fail to control adequately for the effect of smoking and other risk factors. "Limited" and "weak" evidence that has "defects" and is "incomplete" does not meet the statutory requirement for the latest, substantial and credible evidence demonstrating a significant risk. The available epidemiological work has study design flaws, including uncontrolled, confounding and lack of exposure measures, leading to a lack of convincing evidence. Published reanalyses of data cited by the EPA conclude that there is no evidence of a positive dose-response relationship between dpm exposure and cancer.[7]

(2) EPA's August 2000 report, while expanded somewhat, does not differ substantively from its predecessor, which was deemed not scientifically adequate for making regulatory decisions concerning the use of diesel-powered engines in both 1998 and February 2000 by CASAC.

(3) There are currently no feasible methods of sampling and analysis for airborne carbon as a surrogate for diesel exhaust, and other substances are not proven as reliable surrogates. Therefore, as a practical matter, it would be impossible for regulated entities or the EPA to determine compliance with the recommended concentration limit in any scientifically valid manner.

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involved in this multi-year, multi-million dollar project, which is scheduled for completion in 2004. The project includes a case-control mortality study, historical exposure assessment facet and a biomarker phase.

[6] Silverman, DT, Is diesel exhaust a human lung carcinogen?, Epidemiology, 9:4-6, 1998.

[7] Crump KS. Lung cancer mortality and diesel exhaust: reanalysis of a retrospective cohort study of US railroad workers, 11 Inhalation Tox. 1-17 (1999). In their review of the Garshick railroad worker studies, Crump and colleagues found that lung cancer risk actually decreased with increasing cumulative exposure to diesel. Garshick's later, unpublished, analyses similarly do not find an increased risk associated with duration of employment (Garshick 1991).

(4) Regulations that limit or eliminate the use of diesel-powered equipment may create other, unanticipated, adverse health effects for workers and the general public. Therefore, EPA should coordinate its activities with those of other federal agencies (e.g., the Mine Safety and Health Administration, the Occupational Safety and Health Administration and the National Institute for Occupational Safety and Health) that are currently examining the issue of diesel exhaust and human health effects.

MARG thanks you for consideration of its comments. We again request that EPA continue work on this project because the present draft is inadequate to serve as the scientific basis for diesel particulate regulations. CASAC's vote on this document should be tabled until such time as the panel and members of the public and scientific community can fully evaluate a redraft of this document and determine its technical accuracy.

Respectfully Submitted,

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