TRANSCRIPT OF PROCEEDINGS

30 CFR PART 57)
)
DIESEL PARTICULATE MATTER)
EXPOSURE OF UNDERGROUND METAL)
AND NONMETAL MINERS; PROPOSED)
RULE)

Pages: 1 through 297

Place: Salt Lake City, Utah

Date: May 11, 1999

HERITAGE REPORTING CORPORATION

Official Reporters

1220 L Street, N.W., Suite 600

Washington, D.C. 20005-4018

(202) 628-4888

hrc@concentric.net

MINE SAFETY AND HEALTH ADMINISTRATION

30 CFR PART 57	)
	)
DIESEL PARTICULATE MATTER EXPOSURE OF UNDERGROUND METAL AND NONMETAL MINERS; PROPOSED RULE	)

Doubletree Hotel
Salt Lake City, Utah

Tuesday,
May 11, 1999

The parties met, pursuant to the notice, at 8:30 a.m.

PANEL:

THOMAS TOMB, Chief, Dust Division, Pittsburgh Health and Safety Technology Center

JON KOGUT, Office of Program Evaluation and Information Resources, MSHA

GEORGE SASEEN, Technical Support, MSHA

ROBERT HANEY, Technical Support, MSHA

SANDRA WESDOCK, Office of the Solicitor, MSHA

RONALD FORD, Office of Standards, Regulations and Variances, MSHA

PAMELA KING, Office of Standards, Regulations and Variances, MSHA

JAMES CUSTER, Metal and Nonmetal Division, MSHA

P R O C E E D I N G S

MR. TOMB: Good morning. My name is Thomas Tomb, and I'm the Chief of the Dust Division, Pittsburgh Safety and Health Technology Center, located at Pittsburgh, Pennsylvania, and I will be the moderator for this public hearing on MSHA's proposed rule addressing diesel particulate matter exposure of underground metal and nonmetal miners.

Firstly, and on behalf of the Assistant Secretary J. David McAteer, I'd like to take this opportunity to express our appreciation to each of you for being here today and for participating in the development of this rule.

With me on the panel today from MSHA are: John Kogut from the Office of Program Evaluation and Information Resources. Do you want to let them know who you are, Jon? George Saseen and Robert Haney of our Technical Support Center; Sandra Wesdock from the Office of the Solicitor; James Custer from Metal and Nonmetals Division in Arlington, Virginia; Ronald Ford and Pamela King from the Office of Standards, Regulations and Variances.

This hearing is being held in accordance with Section 101 of the Federal Coal Mine Safety and Health Act of 1977. As is the practice of this agency, formal rules of evidence will not apply.

We are making a verbatim transcript of this hearing. It will be made an official part of the rulemaking record. The hearing transcript, along with all of the comments that MSHA has received to date on the proposed rule, will be available to you for review. If you want to get a copy of the hearing transcript for your own use, however, you must make arrangements with the reporter.

We value your comments. MSHA will accept written comment and other data from anyone, including those of you who do not present an oral statement. You may submit written comments to Pamela King, who I've already introduced during this hearing, or send them to Carol Jones, Acting Director, Office of Standards, Regulations and Variances, at the address that was in the public notice.

We will include them in the rulemaking record.

If you feel you need to modify your comments or wish to submit additional comments following the hearing, the record will stay open until July 26, 1999. You are encouraged to submit to MSHA a copy of your comments on computer disk, if possible.

Your comments are essential in helping MSHA develop the most appropriate rule to foster safety and health in our nation's mines. We appreciate your views on this rulemaking and assure you that your comments, whether written or oral, will be considered by MSHA in finalizing this rule.

In April of 1998, MSHA published a proposed rule which addressed exposure to diesel particulate matter in underground coal mines. Hearings were held in 1998 and the rulemaking record closed on April 30, 1999.

The scope of this hearing today is limited to the October 29, 1998, proposed rule published to address diesel particulate matter exposure of underground metal and nonmetal miners. This hearing is the first of four public hearings to be held on a proposed rule. We will hold additional hearings on May 13th in Albuquerque, New Mexico; May 25th in St Louis, Missouri; and May 27th in Knoxville, Tennessee.

On October 29, 1998, in the Federal Register 63 FR 58104, MSHA published a proposed rule that would establish new health standards for underground metal and nonmetal mines that used equipment powered by diesel engines. The proposed rule is designed to reduce the risk to underground metal and nonmetal miners of serious health hazards that are associated with exposure to high concentrations of diesel particulate matter.

Diesel particulate matter is a very small particle in diesel exhaust. Underground miners are exposed to far higher concentrations of this fine particulate than any other group of workers. The best available evidence indicates that such high exposures puts these miners at excess risk of a variety of adverse health effects, including lung cancer.

The proposed rule for underground metal and nonmetal mines would establish a concentration limit for diesel particulate matter, and require mine operators to use engineering and work practice controls to reduce diesel particulate matter to that limit.

Underground metal and nonmetal mine operators would also be required to implement certain dust practice work controls similar to those already required of underground coal mine operators under MSHA's 1996 diesel equipment rule.

Additionally, operators would be required to train miners about the hazards of diesel particulate matter exposure.

Specifically, the proposed rule would require that the limit would restrict diesel particulate matter concentrations in underground metal and nonmetal mines to about 200 milligrams per cubic meter of air. Operators would be able to select whatever combination of engineering and work practice controls they want to keep the DPM concentration in the mine below this limit.

The concentration limit would be implemented in two stages: An interim limit that would go into effect following 18 months -- after 18 months of education and technical assistance by MSHA, and a final limit after five years.

MSHA sampling would be used to determine compliance. The proposal of this sector would also require that all underground metal and nonmetal mines using diesel-powered equipment observe a set of best practices to reduce diesel emissions, and that would be such as the use of low sulfur fuel.

The comment period on the proposed rule was scheduled to close on February 26, 1999. However, in response to requests from the public for additional time to prepare their comments, and with additional data added to the rulemaking record by MSHA, the agency extended the public comment period until April 30, 1999.

The agency welcomes your comments on the significance of the material already in the record and any information that can supplement the record. For example, we welcome comments on additional information on existing and projected exposures to DPM and to other fine particulates in various mining operation; the health risk associated with exposure to DPM; the cost to the miners, their families and their employers on the various health problems linked to DPM exposure; or additional benefits to be expected from reducing DPM exposures.

The rulemaking record will remain open for submission of post-hearing comments until July 26, 1999.

MSHA received comments from various sectors of the mining community and has preliminarily reviewed the comments it has received thus far. MSHA would particularly like additional input from the mining community regarding specific alternative approaches discussed in the economic feasibility section of the preamble.

As you might recall, some of the alternatives considered by MSHA included: An approach that would limit worker exposure rather than limiting particulate concentration; a lower limit; shortening the time frame to go to the final limit; more stringent work practices and engine controls; and requiring particulate filters on all equipment.

The agency is also interested in obtaining as many examples as possible of specific situations in individual mines. For example, the composition of diesel fleet; what controls cannot be utilized due to special conditions; and any studies of alternative controls you might have evaluated using MSHA's computerized estimator which was listed in the preamble of the proposed rule.

We would also like to hear about any unusual situations that might warrant the application of special provisions.

The agency welcomes comments on any topics on which we should provide initial guidance as well as any alternative practices which MSHA should accept for compliance before various provisions of the rule go into effect.

MSHA views the rulemaking activities as extremely important and notes that your participation is also a reflection of the importance you associate with this rulemaking process. To ensure that an adequate record is made during this proceeding, when you present your oral statements or otherwise address the panel, I ask that you come to the podium and clearly state your name, spell your name, and state the name of your organization that you represent.

It is my intend that during this hearing anyone who wishes to speak will be given an opportunity. Anyone who has not previously asked for time to speak needs to tell us of their intention of doing so by signing the sheet out in the hallway. And when you sign the sheet, we also need to know how much time you need to make the presentation.

Time will be allocated for you to speak after the scheduled speakers that we already have on the list. We are scheduled to go until five p.m. today. Of course, we will call a halt if we run out of speakers.

I will attempt to recognize all speakers in the order in which they requested to speak. However, as the moderator, I reserve the right to modify the order of presentation in order of fairness. I doubt that it will be necessary, but I also may exercise discretion to exclude irrelevant or unduly repetitious material, and in order to clarify certain points, the panel may ask questions.

Our first speaker today or our first presentation is being made by the National Mining Association, and I have Bruce Watzman as the key person to organize it.

MR. ING: Good morning. My name is Wes Ing. I work for ASARCO, Incorporated. This morning I am --

MR. TOMB: Could you please spell your name for the reporter, please?

MR. ING: Last name is spelled I-N-G.

I serve as the Chairman of the National Mining Association metal/nonmetal diesel task group. I and my colleagues, who I will introduce next, are pleased to be representing the members of the National Mining Association and the Nevada Mining Association.

Joining me this morning on the panel are: Chris Rose, Industrial Hygienist, Newmont Gold; Dr. David Drown, Utah State University; and John Head, Principal Mining Engineer, Harding Lawson Associates.

We appreciate the opportunity to appear and present the views of the collective members of the National Mining Association and the Nevada Mining Association on this most important regulatory proceeding.

Today we speak to three general areas. First, I will review the use of diesel-powered equipment in underground metal/nonmetal mines. Second, I will briefly comment on what we perceive to be serious deficiencies in the rationale underlying the proposal; namely, the agency's flawed and incomplete risk assessment. And, third, I will present some preliminary comments on particular technical aspects of proposed Part 57, Subpart D.

Following my presentation Chris Rose will comment on the analytic methodology that MSHA has recommended for characterizing diesel particulate exposures in metal and nonmetal mines and which we would assume would be used to determine compliance with the proposal; the so-called "NIOSH 5040" method. Chris will present documentation on an extensive sampling program adopted by several Nevada Mining Association members and others, which will demonstrate a number of inconsistencies and irregularities they have identified with respect to the NIOSH 5040 method.

Next, John Head will present the preliminary results of his review of the agency's economic feasibility analysis. John has been retained by the National Mining Association, the Salt Institute, The National Stone Association and MARG Coalition, so his work represents an analysis of the full spectrum of the underground metal and nonmetal mining industry potentially subject to this rule. The industry wide technical feasibility report is still under review.

We will be filing more detailed written comments by the close of the comment period and may supplement our testimony, if necessary. While we will be happy to answer any questions you have, we ask that, to the degree possible, that questions be held until the completion of the entire panel presentation.

It should go without saying that both the National Mining Association and the Nevada Mining Association have a keen level of interest in this proceeding as it will, in large part, determine what equipment and under what circumstances diesel technology will continue to be used in underground metal/nonmetal mines. Let us be clear at the outside, we are convinced that diesel-powered equipment is not only safe for use in underground metal/nonmetal mines but that it has significantly improved the safety in our mines.

As noted in the preamble to the proposed rule, diesel-powered equipment was first introduced into the underground metal/nonmetal mining environment 60 years ago, and its use continues to increase today. Today an excess of 6,000 pieces of equipment ranging from less than 50 to more than 650 horsepower are used to provide a variety of work tasks, and we maintain that these tasks are performed more safely because of diesel-powered equipment. This is significantly higher than the number contained in the agency's analysis.

Yes, it is true, as some will argue, that diesel-powered equipment is more productive and provides the operator with greater flexibility. And it is also true, however, that this added level of flexibility and productivity is what keeps some marginal mines operating in today's difficult economic climate.

This is not to say, however, that we should sacrifice miners' health for economic gain. Our employees are our most valuable asset. My employer will not ascribe to such a strategy nor will the other members of the organization we are representing today. A balance between ensuring the safety and health of miners and maintaining the economic viability of a mining venture can and must be established. We believe that we are achieving that balance today, but it is becoming more and more difficult to do so.

Regrettably, my company and others represented here have had to close operations that had existed for decades and we fear that excessive regulation of our industry will lead to a continuation of this trend. Let's be clear -- these jobs don't return once they are lost. We need to strike a balance -- a balance that is lacking in the proposal before us today.

Suffice it to say, if the proposed regulation takes effect as written, and if metal/nonmetal mining is forced to resort to trolley systems and trailing cables underground, our industry will not be able to compete in the world economy.

Rationale for the proposed rule: Inherent in the proposed rule is the belief that underground metal and nonmetal miners are exposed to unacceptable, unhealthful concentrations of diesel particulate matter. The belief is premised on the results of 25 underground mine surveys which concluded that the mean diesel particular matter, DPM, concentration in production areas and haulage ways was 755 micrograms per cubic meter and in travel ways the mean DPM was 307 micrographs per cubic meter. These levels are then compared to the range of exposures reported for other occupations and for ambient air. MSHA then concludes that since the miners' exposure to DPM is significantly higher than that of others, they face a significant health risk warranting regulatory action. MSHA's conclusion raises significant doubts and questions.

First of all, we are uncertain about the credibility of the exposure results contained in the 25 mine surveys . The preamble notes, "With two exceptions, dpm measurements were made using the RCD method (with no submicrometer impactor.)" The RCD method uses a pre- and post-weighed filter, which is subjected to a controlled burn of 500 degrees C. It is believed that these particles, which comprise the organic carbon fraction, are eliminated during the ashing process. The residue is then believed to compromise elemental carbo from diesel exhaust.

We have learned that many metal and nonmetal mines contain carbonaceous elements in their ore body, which require temperatures in excess of 900 degrees to burn. We therefore seriously question whether some of the exposures to diesel particulate matter might not be confounded by unincinerated material that has nothing to do with diesel exhaust.

Quite frankly, our awareness of the potential for error in the RCD and NIOSH 5040 methods as applied in non-coal mines is relatively new. Yet, is has raised significant questions regarding the validity of the exposure results presented.

MSHA has already admitted that these analytical methods cannot be used in coal mines due to the interference provided by the carbon content of coal. If, indeed, the ore bodies in some of the surveyed mines contain carbonaceous material that exerts a similar interference with sampling, we must question the accuracy of the DPM exposure levels asserted by MSHA.

Accordingly, since this problem has arisen in the midst of rulemaking, we call on MSHA to examine and resolve the matter before this comment period closes in order to permit us to review the underlying data and submit appropriate comments.

Lack of adequate scientific basis: Contained within the preamble to the proposed rule is a risk assessment which serves as the second prong forming the basis for the agency's conclusion that miners face a significant risk of material impairment of health because of exposure to diesel particulate matter.

The risk assessment represents a collection of evidence whose reliability is of questionable value. It cannot be considered a quantitative risk assessment for regulatory purposes because of its lack of exposure-response information. Rather, it relies upon the results of previously conducted animal exposure studies and human epidemiological data which have been rejected by other regulatory bodies as being of insignificant quality for purposes of strictly regulating diesel particulate matter.

For example, today it is generally agreed by most researchers that the production of tumors in rats exposed to diesel particulate matter is a result of lung overload, a phenomenon unique to the rat lung as compared to the lung of hamsters and primates. Moreover, contrary to the agency's belief, researchers today discount the overload phenomenon as masking the potential for carcinogenicity of diesel particulate matter for either rates or humans.

Just last year, the Clean Air Science Advisory Board, in reviewing the draft EPA diesel assessment documents, stated, and I quote:

"Current knowledge comprises compelling evidence that the species-specific, overload-related rat lung tumor response to high level exposures is not useful for estimating risk at environmental levels, and is of doubtful relevance to human risk from higher occupational exposures."

Similarly, the epidemiological data on the issue of diesel exhaust and health effect is, at best, inconclusive and inconsistent. They provide no convincing evidence as to whether there is an increased risk of cancer due to exposure to diesel exhaust. Indeed, the principal author, Garshick, of the study thought to be the most compelling in establishing the diesel exhaust/cancer relationship now agrees that the railroad worker data cannot be used for conducting a quantitative risk assessment.

Of the several epidemiological studies cited in the risk assessment, none can be taken as conclusive evidence of a causal relationship between diesel exhaust and lung cancer. Their collective failure to control for confounding raises serious questions regarding the reported results and they are insufficient for the purposes intended by the agency.

Looking beyond the risk assessment for establishing a diesel exhaust/lung relationship, the document fails to consider the non-cancer endpoints for conducting a quantitative risk assessment to establish an exposure limitation. Simply stated, dose makes the poison and the risk assessment fails to quantify a level at which this threshold is elipsed. The risk assessment is wholly inadequate for making cancer determinations and it is unfathomable to think that this will serve as the basis for the agency to render a non-cancer determination.

The agency is charged with the responsibility under the Mine Act to promulgate standards using the best available evidence. NIOSH, the agency charged with research for MSHA, currently indicates that diesel particulate matter cannot be linked with significant risks of material impairment of health in miners. Dr. Debra Silverman, the leading NIOSH/NCI diesel researcher notes, and I quote, "The repeated findings of small effects, coupled with the absence of quantifiable data on historical exposures, precludes a causal interpretation."

Therefore, the scientific study currently underway between NIOSH and the National Cancer Institute, upon which you will receive testimony, will resolve many of the shortcomings I just identified.

We support the evidence of the companies involved in that study and would again urge the agency to await until the results of that investigation before promulgating final rules. While seven years may be too long to await a final report, we understand that interim reports from the study will be made available. The study has the potential to fill in many knowledge gaps that exist regarding diesel exposure in mining. MSHA should recognize, as well as others within the rulemaking community, NIOSH and the EPA, that these gaps prohibit us from making reasonaBle decisions today.

Besides the technical and analytical feasibility requirements contained within the Mine Act, the agency also must take into account a concurring opinion from the Supreme

Court's Benzene Decision. Former Chief Justice Burger warned against economically destructive regulation achieving only a marginal or speculative benefits at best, and I quote:

"When discharging his duties under the statute, the Secretary is well admonished to remember that a heavy responsibility burdens his authority. Inherent in this statutory scheme is authority to refrain from regulations of insignificant or de minimis risks.... when the administrative record reveals only scant or minimal risk of material health impairment, responsible administration calls for avoidance of extravagant, comprehensive regulation. Perfect safety is a chimera; regulation must not strangle human activity in the search for the impossible."

The proposed rule and its shortcomings: Unlike the proposed rule on coal diesel particulate matter, the metal/nonmetal rule does not result from deliberations of an advisory committee, nor did it follow the promulgation of a diesel safety standard. Rather, it represents an attempt by the agency to package both aspects into one, so as to ease criticism from workers not covered by the coal rule.

In doing so, it incorporates concepts and practices commonplace to the coal sector, but also goes beyond that by injecting new practices whose utility is of questionable value. Rather than seeking to build upon the existing regulatory structure, of which all are familiar, the proposed rule follows a course, which will lead to confusion, controversy and unnecessary litigation.

By the close of the comment period we will file detailed comments on the proposal dealing with their potential application to the metal and nonmetal mining sector. While some provisions have equal application to the coal as well to metal/nonmetal sectors, others are inappropriate. They represent a dramatic and troubling expansion of the authority extended to our hourly workforce and could be abused by those seeking to achieve totally unrelated goals.

We remain committed to providing our employees with a safe and healthful workplace. Where problems exist or hazards are identified, we will commit the resources to remedy them. In this instance, however, we do not believe that the agency has adequately demonstrated, on the basis of the best available science, that miners are exposed to hazardous conditions. Moreover, we are suspect of the data underlying the proposal and must take issue with the agency's selective presentation of the epidemiological studies conducted on exposure to diesel exhaust.

Collectively we need to learn ore -- more about DPM generation, more about diesel particulate matter sampling and more about the health implications of exposure to diesel particulate matter.

Officials at the Health Effects Institute, who are widely considered to be the leading experts in this field, have reached this same conclusion. For these reasons, we recommended that MSHA stay this rulemaking proceedings and join in a coordinated effort with other agencies and nongovernmental experts to develop a scientific and feasible basis for regulating diesel particulate matter in the workplace.

Now I'd like to turn it over to Chris Rose for his remarks.

MR. TOMB: Is this going to be a presentation on the slides?

MR. ROSE: My name is Chris Rose. It's C-H-R-I-S-T-O-P-H-E-R R-O-S-E. And representing --

AUDIENCE: Turn on the make. I can't hear you.

MR. ROSE: I'm representing the National Mining Association, and also the Nevada Mining Association.

AUDIENCE: It's still hard to hear. Is it on?

MR. ROSE: How's that? Good.

Mr. Chairman and panel members, thank you for the opportunity to present testimony on this proposed rule. My name is Chris Rose. I am an Industrial Hygienist with Newmont Gold Company. I also chair the Industrial Health Subcommittee of the Nevada Mining Association.

I am here today to discuss a large study which was led by members of the Nevada Mining Association, which was conducted to investigate suspected flaws in MSHA's proposed sampling and analytical methods.

As you will see throughout this presentation, we have substantiated each of the concerns which we tested. We believe that MSHA's proposed sampling and analytical methods are so flawed that they cannot possibly measure diesel particulate exposures accurately in underground metal and nonmetal mines.

Again, I would like to make sure that all of your questions are addressed, but in the interest of time I request that we hold them until the end of the panel's presentation.

(Slide.)

This slide summarizes -- let's see, can we dim the lights? Would that help? Is that visible?

This slide summarizes our general concerns with the MSHA's proposed sampling and analytical methods. We will discuss each in detail and describe the data we have obtained which substantiates each of these concerns.

First, measurements of airborne carbon are not representative of diesel particulate matter. Airborne carbon, as they use the term today, refers to each of elemental carbon, or EC, organic carbon, or OC, and total carbon, TC, as determined by NIOSh 5040 analysis.

Number two, analytical laboratories have difficulty accurately measuring carbon deposited on filters.

And, third, MSHA's proposed sample collection method does not accurately measure a miner's exposure to airborne carbon, and therefore to DPM.

(Slide.)

This study was a very large and cooperative effort, which was conducted with the assistance of numerous mining companies and industrial hygiene experts.

The study was developed with the assistance of: Dr. Howard Cohen, Ph.D., CIH of Boston University; Dr. Thomas Hall, Ph.D., CIH of University of Oklahoma; and Dr. Edward Zellers, Ph.D., CIH of University of Michigan.

The sampling protocol and analysis of the results of the study were also reviewed and validated by Dr. David Drown, Ph.D., CIH of Utah State University. And Dr. Drown will be testifying after this presentation and will address this study in his comments.

Eleven metal/nonmetal mines in three states have collected a total of 512 samples to date. The samples were analyzed at DataChem, Clayton, and DCM Science Laboratories.

(Slide.)

In the preamble, MSHA claims that "The only potential sources of carbon in underground metal and nonmetal mines would be organic carbon from oil mist and from cigarette smoke..." MSHA then goes on to imply that oil mist sources are limited to poorly maintained diesel equipment: "Oil mist may occur when diesel equipment malfunctions or is in need of maintenance."

It is obvious that MSHA has not finished its homework. As I will demonstrate, these are not the only sources of airborne carbon in underground metal/nonmetal mines.

(Slide.)

In our first set of tests, we demonstrate that numerous non-diesel airborne carbon substances are found in underground metal -- I'm sorry -- which are found in underground metal/nonmetal mines erroneously show up as DPM when sampling with MSHA's proposed method.

We conducted a series of tests to substantiate these concerns, which we will now discuss.

The study confirmed significant levels, that is, with respect to s proposed exposure limit, of several sources of non-diesel airborne carbon.

First, carbon-bearing rock is found in numerous underground metal/nonmetal mines. Some commonly occurring forms of carbon include dolomite, calcite, graphite and bitumen, among others.

Although MSHA fails to recognize this as a source, oil mist from pneumatic drills commonly used in the industry interfere with the proposed method.

And while MSHA does recognize cigarette smoke as an interferant, it fails to recognize the difficulty that mine operators may encounter when trying to control it. In addition, we question whether MSHA has fully recognized the magnitude of this interference.

(Slide.)

In our first test we sought to prove that non-diesel airborne carbon will be found at significant levels where miners normally work and travel, and we've clearly proven this.

We have confirmed the presence of ubiquitous and significant non-diesel sources of airborne carbon in underground metal/nonmetal mines, again, in areas of the mine where miners normally work and travel, these are representative areas as MSHA proposes to sample.

Measurements of airborne carbon in underground metal/nonmetal mines are no solely measurements of DPM. While some DPM may have been included in these measurements, other confounders added significantly to the measurement.

(Slide.)

Sample pairs were collected, consisting of one sample taken open-faced and one with a 10 millimeter nylon cyclone pre-selector. These cyclones are designed with a median cut point of 3.5 microns.

The difference between the open-face measurements and the cyclone measurements represents a portion -- i want to emphasize that -- it represents a portion of the non-diesel airborne carbon that's included in the supposed DPM measurement.

On page 58,129 of the preamble, MSHA states that, "...the fraction of dpm particles greater than 1 micron in size in the environment of non-coal mines can be as great as

20%." Following this logic, a negligible portion of the actual DPM should be separated out by the cyclone while interfering carbon substances larger than respirable size would be selected out.

However, other testing we have conducted shows that this size selection criteria still allows for significant amounts of other non-diesel airborne carbon particles to be included even in the cyclone measurement. That would be non-diesel airborne carbon particles of respirable size.

(Slide.)

This table compares the ratio of paired open-face and cyclone measurements for organic carbon, elemental carbon and total carbon.

For example, an average total carbon ratio of 1.29 means that the open-face sample was 1.29 times higher on average than the cyclone sample.

Another way to look at it would be that the organic carbon measurements were 43 percent higher when sampled open-faced, as compared to sampling with a cyclone preselect. Likewise, elemental carbon measurements were 17 percent higher and total carbon measurements were 29 percent higher when sampled without a cyclone.

These differences are not due to DPM. They are measurements of some other interferant, a DPM would not be selected out with the cyclones we used.

The term "G. Mean," right here, in the table stands for geometric mean, which was used to account for the lognormal characteristics of the observed distribution. The actual average, the arithmetic average, was much higher; actually, 1.37, so 37 percent higher. This means the displayed -- sorry -- the means displayed above are statistically significant from 1.0 at the 95 percent confidence level, indicating the presence of non-diesel airborne carbon in areas of the mine where the samples were taken, which were areas of the mine where miners normally work and travel.

(Slide.)

Our sample results confirm that there is non-diesel carbon in underground metal/nonmetal mines. In-mine cyclone testing will not completely screen out these interferences.

This renders the sampling proposal not feasible and will result in erroneous enforcement actions.

(Slide.)

Our next two tests confirm that the rock we mine results in substantial airborne carbon measurements when using MSHA's proposed method.

Many underground metal/nonmetal mines work in carbon-bearing ore bodies. Again, common ore types and waste rock contain large amounts of carbon including calcite, dolomite, graphite and bitumen.

When using NIOSH 5040, these naturally occurring carbon-bearing compounds result in measurements of significant airborne carbon even when there is an absence of DPM.

(Slide.)

For the first test samples were collected in dusty area of laboratories which were processing underground ore samples. This dust would be of the same composition as the dust found in the underground miles. The samples were sent for NIOSH 5040 analysis as if they were DPM samples.

No source of DPM or any other recognized source of airborne carbon was present in the area where the samples were collected.

The results confirm our hypothesis that airborne carbon from underground ore bodies will cause non-zero results for both elemental carbon and organic carbon, and therefore total carbon, when analyzed using NIOSH 5040, even when there is no possible source of diesel particulate matter in the area.

(Slide.)

As indicated by this slide, the average results for total carbon is nearly six times MSHA's proposed exposure limit. This is in a lab where there was no diesel particulate matter present. These averages are substantially greater than zero at the 95 percent confidence level, confirming the fact that carbon-bearing ore strongly interferes with MSHA's proposed sampling and analytical methods.

Just take a look at the ranges here. We found from 40 to 7,450 micrograms per cubic meter of total carbon. Elemental carbon actually also showed some significant problems, ranging up to 5,810. Contrast this to a proposed limit of 160. This is rock dust.

These results definitely indicate that the presence of airborne carbon-bearing dust will result in measurements of DPM when analyzed using NIOSH 5040. Again, the samples were collected inside a laboratory, where there was no possible source of DPM> The results are due to the carbon contained in the underground ore samples being processed.

(Slide.)

In the preamble on page 58,129, MSHA states that, "The only potential source of carbon in underground metal and nonmetal mines would be organic carbon from oil mist and cigarette smoke."

As this slide shows, this is clearly not the case. Multiplying the average total carbon measurement, which was again 920, by the average elemental carbon percent gives a measurement of, or gives a measurement at MSHA's proposed exposure limit based on elemental carbon alone.

(Slide.)

The second test dealing with carbon-bearing rock consisted of collecting bulk samples at various ore and waste rock headings throughout the mines. The bulk samples were then pulverized and sent to the analytical laboratory where they deposited a measured amount of the dust onto the filters.

They then analyze those filters using NIOSH 5040, just as if they were DPM samples. And the results were reported as micrograms of carbon per gram of dust.

When the dust represented by these bulk samples is suspended in the air during normal mining activities, at acceptable airborne dust levels, significant levels of airborne cars would be measured, even in the absence of actual diesel particulate matter.

(Slide.)

To illustrate our methodology, I will now go through an example.

Sample X, which is a common ore type, was determined to result in a measurement of 159 milligrams of total carbon per gram of dust. That's the figure shown here in blue. Here and here in the calculation. MSHA's exposure limit for total dust is 10 milligrams per cubic meter, the number in red here and here. The resulting total carbon air concentration, if that type of dust were suspended in the air at MSHA's exposure limit for total dust, would be 1.6 milligrams per cubic meter of total carbon or 1600 micrograms per cubic meter total carbon. That's 10 times the proposed exposure limit for DPM, at a compliant dust level, in the absence of actual DPM.

The 10 milligrams per cubic meter was used because it's MSHA's exposure limit for total dust. If we were to use lower numbers, such as a typical respirable dust exposure limit, it will still result in total carbon measurements exceeding MSHA's exposure limit.

I'd like to note that in your handouts this character didn't come out when I put it on the computer. I believe it's -- that character right there in your handout it shows just a blank box. It's a mu for micrograms.

(Slide.)

Here again we have -- here we have again tested the potential for interferences from carbon-bearing rock, and have gain confirmed a strong interference. As described in the table, airborne carbon measurements could be well above MSHA's proposed exposure limit at acceptable dust concentrations. Our median measurement would be four times MSHA's proposed exposure limit for DPM, and eight percent of our measurements would exceed MSHA's proposed limit by 21 times. Eight percent exceeded the proposed exposure limit by 21 times at an acceptable dust level without DPM present.

Thus, while these conditions would be in compliance with MSHA's dust standard, NIOSH 5040 samples collected in this environment would be out of compliance with MSHA's proposed DPM exposure limit by a fourfold factor, all in the absence of DPM.

The median for each type is substantially greater than zero at the 95 percent confidence level, confirming a strong interference.

(Slide.)

These tests illustrate our concerns that when using MSHA's proposed method, underground metal and nonmetal mines will erroneously measure airborne carbon -- from EC and OC individually, and of course total carbon -- in excess of MSHA's proposed exposure limit. This will occur even in the absence of actual diesel particulate matter due to the presence of carbon-bearing rock.

This renders the sampling proposal not feasible.

This will result in erroneous enforcement actions. MSHA cannot accurately enforce any exposure limit on DPM as a result of these interferences.

(Slide.)

Pneumatic drills are used extensively in the mining industry for many uses, including rock bolting. They are lubricated by adding oil to the compressed air supply. These drills generate a fine mist of oil that spreads throughout the area. However, oil mist measurements indicate that exposures do not exceed MSHA's exposure limit for oil mist.

The pneumatic drills are commonly used -- many miners are required to use one during each of -- each shift during their normal cycle. These are commonly used.

The study confirmed that airborne carbon measurements are well in excess of MSHA's proposed exposure limit, again, in the absence of DPM and at compliant oil mist levels.

(Slide.)

For this section of the study, sample pairs were collected in areas where miners use pneumatic drills and no source of DPM was present. These were areas of the mine where fresh air was provided directly to the heading. There was no possibility for including of DPM, even from upstream air.

The sample pairs consisted of two open-face cassettes hung side by side. One of them was analyzed for oil mist and the other was analyzed as if it were a DPM sample per NIOSH 5040.

Sample results verified that all oil mist measurements were below MSHA's exposure limit for oil mist. The areas tested were typical of locations where pneumatic drills are used, and oil mist air concentrations were in compliance.

The oil mist and DPM samples were then compared to determine the relationship between airborne oil mist and measurements of airborne carbon.

(Slide.)

As this side demonstrates, total carbon measurements, as measured by MSHA, had a median value nearly 17 times MSHA's proposed exposure limit for DPM -- even with no DPM present. The median values presented here are substantially greater than zero at the 95 percent confidence level, indicating a strong oil mist interference.

Let's look at the ranges. Even the minimum measurement was well above the exposure limit. The maximum ranged to about 17 times the proposed limit. More importantly, let's look at elemental carbon. Even that one we did detect significant levels of elemental carbon in these oil mist headings, and I'll talk about why we believe that is oil mist and not something else in the next slide.

This is not a source of oil mist that we can eliminate by tuning our engines, as MSHA claims. This is not a rare occurrence. This is part of many miners normal work cycles and takes place in many areas of many mines every day.

(Slide.)

Again on page 58,129, MSHA states that "The only potential source of carbon would be organic carbon from oil mist and cigarette smoke. Oil mist may occur when diesel equipment malfunctions or is in need of maintenance."

As our study results show, we not only found substantial amounts of oil mist and organic carbon from a source not previously recognized by MSHA, but we also found elemental carbon present at high levels.

Not only was elemental carbon present, but it was tightly correlated with the oil mist measurements, which clearly shows that it is a response to the oil mist and not to some other confounder. We observed the same type of relationship to oil mist with organic carbon and total carbon levels. R^2 values for all three measures exceeded 0.9. That's a pretty tight correlation.

Again, this issue renders the sampling proposal not feasible and we are concerned that this will result in erroneous enforcement action.

(Slide.)

The next set of slides deal with cigarette smoke being an interferant with NIOSH 5040.

On page 58,129 of the preamble,

MR. ROSE: contends that "Cigarette smoke is under the control of the operators, during sampling times in particular, and hence should not be a consideration."

Smoking is common in our mines, and we do not believe that miners will refrain from smoking just because they are asked to stop for a day. With all the information available today on the health hazards associated with smoking, don't you think that if people could stop smoking if they could? Our mines are not typically staffed with the police force that would be necessary to ensure miners do not smoke. Nor will MSHA's typical sample observation practices be sufficient to ensure that the miners they sample stay out of environments contaminated with cigarette smoke.

(Slide.)

For this section of the study, area samples were placed in line-out rooms and smoking rooms during normal conditions. Again, there was no source of DPM present, and these are conditions seen every day at the mine site.

(Slide.)

Our results indicate that not only must the sampled miner refrain from smoking, he or she must completely avoid any second-hand cigarette smoke. Geometric means presented here are substantially greater than zero at the 95 percent confidence level, indicating a strong interference.

One-quarter of our samples exceeded 27,000 micrograms per cubic meter, somewhere in here, which indicates a particularly strong interference from ambient levels of tobacco smoke. As you can see, it doesn't take much cigarette smoke to interfere significantly with the proposed method. Because of this, not only would the individual being sampled have to refrain from smoking, but nearly everyone in the whole mine would not be able to smoke. It would not take much second-hand smoke to have quite an impact on the DPM sample.

Again, let's take a look at these ranges. They go up to quite high levels. This was just a line-out room where miners were getting lined out for the day and smoking.

(Slide.)

In summary, ambient levels of cigarette smoke in the absence of any source of DPM result in extremely high measurements of airborne carbon well above MSHA's proposed exposure limit.

This renders the sampling proposal not feasible and we are also concerned that this will result in erroneous enforcement actions.

(Slide.)

Our next major issue, after contamination of samples from non-diesel airborne carbon, regards problems with the analysis of the samples.

This slide presents an overview of our concerns, and we'll discuss each in detail.

First, we found serious inconsistencies in reported results when samples were split and analyzed by different laboratories. We found inconsistencies in all three measures of airborne carbon: EC, OC, and TC.

We then looked at blank samples from pooled samples and found a wide range of background carbon. This will result in problems with blank correction, which is a standard laboratory practice intended to account for background contamination on sample media and analysis. The end result will be inaccurate measurements of total carbon.

(Slide.)

Our first test regarding analytical deficiencies looked at how one analytical lab compared to the other.

With any type of industrial hygiene exposure monitoring, accurate analysis of samples is crucial. This same concept applies here.

MSHA should be well aware of the consequences of substandard analysis of air samples. As a result of the well known ASARCO dust case, the courts forced MSHA to vacate numerous health citations throughout the mining industry for dust as well as other analyses.

The labs we involved in our study are well established and have a good reputation in the industrial hygiene field. And even these labs had difficulty analyzing our samples accurately.

The wide variability represented by our samples, or renders the sampling method not technically feasible.

(Slide.)

Samples in this study were sent to Lab A for analysis. And Lab A took a punch from each sample and analyzed it. That leaves a large portion of the sample filter unused, and this is standard practice according to NIOSH 5040 method.

Lab A then repackaged the samples and sent them to Lab B for a second analysis. Lab B took a second punch from the filters and analyzed it. And then both labs reported results without knowing the result of the other lab's analysis.

The results reported here for the same sample by the two labs are consistently different. This difference is much greater than the variability presented by within-lab analysis of duplicate punches form the same sample filter.

(Slide.)

This table summarizes the differences we observed between the two labs. Two results were reported for each sample, one from each lab. The results were compared to each other by taking the ratio of Lab A's result to Lab B's result, where a ration of 1.0 would indicate that the results were equal. Ratios greater than one indicate that Lab A reported higher results than Lab B, and ratios less than one indicated that Lab A was lower than B. For example, if Lab A reported a total carbon result of 200 micrograms per cubic meter, and Lab B reported a result of 160 micrograms per cubic meter from the same sample, the ratio would be 200 divided by 160, or 1.25.

The mean ratios presented here for each measure of airborne carbon are significantly different than 1.0 with a 95 percent confidence level -- this column right here -- indicating that the labs report consistently different results from the same sample, even when considering total carbon. So mean ratio of total carbon is 0.93 or seven percent different, overall samples. When looking at the individual components of elemental carbon and organic carbon individually, the difference is even greater: 12 percent and 26 percent different.

Now, a periodic interlab deviation of seven percent may or may not be unreasonable. However, we observed consistent deviation across -- averaged across 55 separate samples. Individual measurements here varied by as much as 72 percent for total carbon.

The interlaboratory differences demonstrated here indicate that the method is not reliable in measuring carbon deposited on a filter. This compounds the problems I discussed earlier, that the carbon on the filter isn't even all diesel particulate matter. These deficiencies taken together make the method unreliable as a measure of DPM.

(Slide.)

These next slides show the actual differences we observed in the sampling. The bars indicate the ratio of Lab A to Lab B, the individual bars presented here. The dashed black line indicates the 1 to 1 level. That's where the bars would be if the labs had reported the same result from the same filter -- this line right here. The solid blue line indicates the average of the ratios, and that's this one right here.   Here you can see that the average, as well as the majority of the individual ratios, is clearly above the 1 to 1 line. Again, the 1 to 1 line here, the individual ratios, most of them are above 1 to 1, and the average is well above 1 to 1.

Lab A consistently reported organic carbon results that are higher than Lab B.

(Slide.)

Using the same format I described in the previous slide, you can see that the elemental carbon averages, as well as the majority of the individual ratios, is clearly below the 1 to 1 line, and here's the 1 to 1 line, here's the average of our individual samples, and our individual samples. Almost all of the individual samples were well below 1 to 1, and the average is well below 1 to 1.

So Lab A consistently reported elemental carbon results that are lower than Lab B. However, while Lab A is higher for organic carbon and lower for elemental carbon, the differences do not balance out to make the total carbon ratios equal. Again, the interlab total carbon measurements were consistently biased, varying up to 72 percent.

(Slide.)

Our study has demonstrated that different analytical laboratories arrive at consistently different results when analyzing the sam sample.

Without a method to accurately analyze airborne carbon samples, MSHA cannot correctly enforce any exposure limit on diesel particulate matter.

(Slide.)

Industrial hygiene air sampling methods typically require collection of blank samples along with the field samples to measure airborne contaminants. Blank samples are sample media that are handled similar to the field samples, but that have had no air drawn through them. Blank samples are used to determine background contaminant levels, in this case carbon, coming from the sample collection, media, and analysis.

Once the lab analyst determines the amount of background carbon on the sample, he or she can then subtract that background from the field samples and provide accurate results.

The pooled blank samples collected in this study have shown a very wide range of background carbon levels. Accurate blank correction will be impossible as a result.

(Slide.)

With each set of field samples, we also submitted blank samples to the analytical laboratory.

Blank sample results are typically reported as micrograms of carbon per sample. To make the results meaningful with respect to MSHA's proposed exposure limit, we determined what the air measurement would have been had that sample filter been used to sample clean air using the minimum sample volume allowed by MSHA, which is 142 liters.

Our test indicated that a wide variability in background carbon levels in this sampling and analytical method leaves it unreliable as a predictor of DPM levels and thereafter not technically feasible.

(Slide.)

To demonstrate this, I'll again go through another sample. The lab reported that they detected 15.9 micrograms of total carbon on one of our blank samples. This is shown right here in blue and again here in the calculation. This sample was collected properly, and the media was within its shelf life. And this particular sample was collected in a clean, a clean office environment.

If that sample had been used to collect a sample in carbon-free air at the minimum sample volume allowed by the method, that's shown here in red, .142 cubic meters -- sorry, 142 liters, the result would have shown 112 micrograms of total carbon per cubic meter.

The analyst would subtract this background carbon mass from the field samples included with the blank.

(Slide.)

As this table demonstrates, there is a wide variability in measurements of carbon on supposedly carbon-free blank samples. While the mere presence of background carbon on the media and analytical process may not present a problem, as that background could be subtracted from the field samples, the wide variability in this background does present a problem.

The background varies widely, and is skewed toward higher background levels from basically zero up to 170 micrograms per cubic meter, average being not in the middle but shifted to the left. Equivalent air concentrations on blank samples ranged from undetectable to 170 micrograms per cubic meter, average of 57.

This is variation in addition to the other deficiencies I've already discussed previously.

(Slide.)

Because of the wide variation in background carbon levels in the sample media and analysis, MSHA cannot accurately blank-correct air samples for total carbon.

Without a method to accurately measure DPM, MSHA cannot feasibly enforce any exposure limit on it accurately.

(Slide.)

Our third concern, after interferences in airborne carbon and analytical deficiencies, is the way MSHA proposes to collect their samples.

We intend to add substantial information to the record which will show that estimating exposure based on area samples and on single samples is not valid and is not standard industrial hygiene practice. Dr. Dave Drown intends to expand on this issue after this presentation.

To help make this point, we conducted a test to indicate just how widely the air concentrations in underground metal/nonmetal mines can vary over distances of only 10 to 15 feet in the same air stream.

(Slide.)

To conduct this test, we placed pairs of sample trains, as described in NIOSH 5040, in areas of the mine where miners normally work or travel. One of the pair was located on one rib and the other on the opposite rib, across only 10 to 15 feet of open drift. Both sample trains were supposedly sampling the same air and the same activities.

The locations where the samples were placed were typical of everyday conditions, locations were not selected to vive the greatest variability between the pairs.

Tests were conducted with both cyclone and open-faced sample trains, and then we considered those two separate tests differently.

(Slide.)

This table summarizes the differences that we observed between the paired samples. The ratios presented here indicate the higher sample of the pair divided by the lower in the pair. A ratio of 1.0 would indicate that the samples were equal, and a ratio above one indicates that the samples are not equal.

For example, if the left rib result was 200 micrograms of total carbon per cubic meter and the right rib result was 160, the ratio would be 1.25.

On average, open-faced samples were 12 percent different, open-face were 12 percent different, and the cyclone tests were about 10 percent different when they were supposedly sampling the same air in the same area. These average ratios are substantially different from 1.0 at the 95 percent confidence level. And we observed this high variability between sample pairs when looking at the average of a large number of samples. Single sample pairs differed by as much as 80 percent. So even when averaging a large number of samples, we find 12 and 10 percent difference. When looking at just one sample pair, the ratios were actually quite a bit higher, up to 74 and 80 percent.

We believe that comparing personal samples to area samples will result in far greater variability. That's due to the miners' work practices and their tendency to move from area to area. We intend to add additional information to the record that will further support this by the end of the comment period.

(Slide.)

Single samples and area samples do not accurately access a miner's exposure to a contaminate, and therefore, they bear no relevance to his or her risk.

A difference of only 10 to 15 feet to the left or right in the same drift can mean the difference between compliance and noncompliance, and neither one is an accurate measure of the miners' exposure. Single area measurements are meaningless.

MSHA should not rely on such a flawed sampling strategy to enforce their proposed rule. They may as well be throwing darts at a target blindfolded.

(Slide.)

We have confirmed serious problems with MSHA's proposed sampling and analytical methods. Specifically, these are:

Interfering airborne carbon, including rock dust, oil mist, and cigarette smoke.

Analytical deficiencies, including consistent differences between labs analyzing the same samples, and high variability in background carbon levels.

Reliance on single samples and area samples to estimate miners' exposure. These samples do not accurately measure a miner's exposure.

(Slide.)

We have demonstrated a number of deficiencies in MSHA's proposed sampling and analytical methods. Taken alone, each renders the method inaccurate, unreliable and not technically feasible.

We strongly suggest that MSHA fund a peer review feasibility and validation study to create a sampling mechanism that is accurate and appropriate for regulatory use.

(Slide.)

MSHA states in the preamble to the proposed coal rule that there is no reliable test for diesel particulate matter in coal mines because of the presence of organic compounds that may be mistaken for DPM.

In the preamble to the proposed metal/nonmetal rule, MSHA states, "For a method to be used for compliance purposes, it must be able to distinguish dpm from other particles present in various mines, be accurate at the concentrations to be measured, and consistently measure dpm regardless of the mix or condition of the equipment in the mine."

In other words, specific, accurate and consistent. It meets none of these criteria. We have shown that MSHA has not met their own criteria for a sampling and analytical method. MSHA has not provided a feasible method to measure exposures to DPM in underground metal and nonmetal mines.

(Slide.)

We've shown that the same fundamental problems MSHA identified in the coal sector exist in the metal/nonmetal sector. We have also identified that more complex -- that more complex problems with elemental carbon exist in metal/nonmetal mines.

Only one conclusion can be drawn: MSHA has no reliable method to test for diesel particulate matter in underground metal and nonmetal mines.

Again, thank you for the opportunity to share this information. Our next panel member, Dr. Dave Drown, of Utah State University, will address some related issues.

MR. TOMB: Are you going to use the slide projector?

MR. DROWN: No.

(Applause.)

MR. DROWN: My name is David Drown, spelled D-A-V-I-D, D as in "dog," R-O-W-N. I am representing today Nevada Mining Association and National Mining Association with regard to my comments to the panel.

Thank you Mr. Chairman and panel members for this opportunity to insert my comments into this rulemaking process concerning the exposure of underground metal and nonmetal miners to diesel particulate matter.

My name is David Drown. My credentials include a Bachelor's Degree in biology from the University of Wisconsin-Superior, an M.S. Degree in aquatic ecology, from Michigan Technological University, and a Master of Public Health and Ph.D. Degree in environmental health from the University of Minnesota.

I am certified by the American Board of Industrial Hygiene in the comprehensive practice of industrial hygiene and have been since 1980. I am currently a professor and director of the Utah State University Industrial Hygiene Program and have been on the faculty of that university for 20 years.

Utah State University supports one of the only five ABET accredited bachelor degree programs in industrial hygiene in the United States. I am happy to say that there are graduates of that program here today who are making inroads into the practice of industrial hygiene in mining; a relatively new venture for the mining industry. These young professionals have not been schooled in old theory but are current with regard to the modern approach to the practice of industrial hygiene.

My interest and involvement in mining stems from my days at Michigan Tech University during the late 1960s. And I am here today to address topics concerning the practice of industrial hygiene in underground mining as it relates to this proposed new rule.

I must first say that I am delighted to see reference to "generally accepted industrial hygiene practice" in the proposed rule. As I worked through the document and related materials, however, I found that the reference to "generally accepted industrial hygiene practice" is not consistent throughout and perhaps provides only lip services from those who drafted the document.

This presentation does not serve as an introduction to industrial hygiene since the proposed rule is far from elementary in scope. However, the basic approach of industrial hygiene includes the anticipation, recognition, evaluation, and control of workplace hazards, exactly what the proposed rule deals with. The mining industry, both regulators and operators, has long concentrated on the obvious physical hazards of mining and, for the most part, has put health concerns on the back burner with few exceptions.

I would like to address two concerns with regard to the proposed rule that relate to "generally accepted industrial hygiene practice." First, I am very supportive of the studies conducted and reported by members of the Nevada Mining Association and the National Mining Association concerning the applicability of NIOSH Method 5040 to the measurement of diesel particulate matter, DPM, in underground metal and nonmetal mines.

The findings that Mr. Christopher Rose spoke to have been well thought out and developed and have been carried out in sufficient detail to statistically address the hypotheses suggested. My confidence in mr. Rose's thoroughness and accuracy goes unquestioned.

Secondly, I want to talk about the assessment of worker exposures to DPM and other materials, for that matter, with regard to "generally accepted industrial hygiene practices;' and specifically, compliance-based versus comprehensive monitoring of mine exposure conditions.

The study results presented at this hearing are more than conclusive concerning the measurement of DPM in underground metal and nonmetal mines. As the data suggest, NIOSH Method 5040 does not adequately discriminate between DPM and other organically based matter in samples collected from exposure areas of the underground metal and nonmetal mines studied. If there is to be enforcement of a standard, then a reliable, unquestionable method of sampling and analysis must be established. This has not been accomplished and, therefore, cannot be considered as "good industrial hygiene practice" or, for that matter, good regulatory practice.

Field and laboratory studies conducted by NVMA and NMA members have shown the following:

Number one, non-diesel sources of airborne carbon in underground metal and nonmetal mines do, indeed, include materials other than oil mist and cigarette smoke. As the studies indicate, carbon-bearing ores contribute significant positive bias to DPM exposure estimates as a result of using the current NIOSH 5040 method.

The use of cyclone, pre-selective particle sampling methods will not totally eliminate the interference of airborne carbon as the 5040 method suggests. The method can, indeed, indicate an exposure without any DPM present. Consequently, this method in its current state cannot serve as a reliable referee method.

Item three: Oil mist from jacklegs and other mining equipment, although within MSHA exposure limits for oil mist, will confound the analytical results by giving false positives for DPM.

Four, cigarette smoke, even in areas devoid of DPM, shows up as a significant source of airborne carbon. This indicates another flaw in the 5040 method.

Number five, reliable, accredited laboratories have great difficulty in determining DPM concentrations. There is very poor interlaboratory agreement where the labs process split samples. Actually, there are few laboratories capable of using the NIOSH 5040 method.

Item six, the bottom line, in summary, of the studies conducted by NVMA and NMA members, is that MSHA Method 5040 is seriously flawed and is not usable, as currently proposed, for accurate determination of diesel particulate in underground metal and nonmetal mines.

The extent of miner exposures to offending materials in mines has long been a major concern of operators, regulators, labor unions, and occupational health and safety professionals, not to mention the miners themselves. In that regard, the MSHA publication, "Practical Ways to Reduce Exposure to Diesel Exhaust in Mining -- a Toolbox" is replete with excellent suggestions from knowledgeable individuals who address this very issue. Miners are, in fact, the core of any successful mining venture and protection of that valuable resource brings us here today.

The determination of the extent of miner exposure to health hazards has traditionally followed a compliance-based approach. This approach works well for physical safety hazards where the problems and subsequent solutions are, for the most part, obvious and perhaps stem from simple oversight of the operator or miner.

Health exposures, on the other hand, are much less obvious and in many cases not obvious at all until the after effects of exposure become apparent. In that regard, and with the health of the miner and economic consideration of the operator as key factors, the compliance-based exposure approach to miner exposure assessment has become archaic and must yield to a more comprehensive exposure assessment approach. This current, comprehensive exposure assessment rationale is certainly fitting for the complete evaluation of miner exposures to DPM. I'll briefly discuss these two approaches to exposure assessment as they relate to the proposed rule.

A compliance-based monitoring: The compliance-based monitoring approach to miner exposure assessment has long been the case. This is also called "worst case" sampling which focuses on the maximum risk employee or employees to determine whether exposures are above or below established limits during a given day or given shift. This is the simple approach, which is followed by regulatory enforcers, and can lead to a de facto compliance decision based on only one or a few measurements. Such measurements are virtually impossible to extrapolate to other unsampled days or shifts. What might be worst-case exposure one day might be average exposure the next.

In fact, in many cases it will be impossible to determine a worst-case exposure for the sampling day proper since a group of miners will seemingly be doing the same task but actually experiencing individual exposures that may be worst case or not.

Such a subjective approach to selecting the appropriate miner to be sampled implies that random sampling is not utilized. Thus, little or no confidence can be associated with the results of that sampling effort to be representative of the exposure group in question. Also, if these measurements indicate exposure below the standard based on 95 percent confidence, then the situation is acceptable. This approach provides little insight to the day-to-day variation in exposure levels and it's not amenable to the development of exposure histories for individual miners or exposure groups that accurately reflect exposure and associated health risk over time.

Regulators, due to simplicity of implementation, have long used the maximum risk approach. It is relatively easy for an inspector, with some degree of mining experience, to place sampling device on a miner, piece of equipment, or in an area of the mine suspected of higher allowable exposure. This method of sampling provides definitive results for the period of the sample collection but is most likely to be very nonrepresentative of the actual exposure conditions over time.

Since occupational exposure limits, such as PELs and TLVs, are developed from scientific data based on lifetime exposures, the simple, single sample compliance approach is seriously flawed and can result in over regulation of the operator, as well as questionable protection of the miner.

You might argue that the mine safety and health inspector has a great deal of work to accomplish during a health and safety inspection and cannot conduct extensive surveys to determine compliance or noncompliance. Granted this might be the case, but it is an invalid reason when "generally accepted industrial hygiene practice" is considered. A single, simple -- a single sample collected during a single shift does not establish the basis for compliance or noncompliance according to "generally accepted industrial hygiene practice." Nor does it provide adequate information needed to protect the miner and allow the mine operator to economically survive.

The studies reported here, as well as those reported throughout the literature, document the variability of sampling results based on sample location and sampler positioning. The NVMA/NMA data show significant differences in airborne concentrations of contracting of carbon from one side of a drift to the other. No obvious visual cues for worst-case sample positioning were apparent. This variability in itself could provide erroneous information, which could lead to over regulation of the operator or, perhaps, under protection of the miner. Cross-rib sample pairs, representing spacing of only 15 feet, provided significantly different results between the sample measurements in terms of airborne carbon.

Such differences between sampling results collected in similar areas or personal samples collected side-by-side, for that matter, are replete in the literature. There are significant environmental and work practice factors that greatly influence the efficiency and effectiveness of sample collection from one point to another. This is of particular importance when the collection of particulate materials is involved.

Consequently, the single sample compliance approach outlined in this proposed rule will do little or nothing to protect the health of the miner. This archaic approach of compliance-based sampling is not reliable since it does not address the short-term or long-term health considerations of the miner nor does it qualify as "generally accepted industrial hygiene practice." Certainly the importance of miner health protection and operator competitiveness cannot be decided by a single sample collected on a single day.

Comprehensive exposure assessment: The current comprehensive exposure assessment approach to workplace characterization is considered state-of-the-art, and I believe miners deserve state-of-the-art attention. Comprehensive exposure assessment emphasizes the characterization of all exposures, including variability, for all workers on all days. This approach to exposure monitoring provides insight to conditions on unmeasured days and unmeasured miners in similar exposure groups on exposure measured days.

In addition to assuring compliance with the standards, this strategy provides understanding of the day-to-day expectations of exposure groups and is extremely useful in determining actual exposure risk. Certainly this comprehensive approach to miner health protection cannot be decided by collection of a single sample on a single day.

It should be emphasized again that occupational exposure limits are expressed as time-weighted average exposure levels -- PELs and TLVs -- that take lifetime exposure into consideration as a most important factor. In that regard, day-to-day variations of exposure levels are expected. Essentially, a comprehensive approach to assessment of occupational exposure better positions the operator and regulator to understand the risks associated with the exposure, and better positions the operator to manage the risks.

Summary and suggestions: It is that a critique is not of any use without suggestions or recommendations. This has been my philosophy for 25 years of university teaching. I believe that the "Diesel Toolbox," developed by MSHA, is an excellent approach to the comprehensive management and control of DPM in underground mines. Contained in that document are numerous examples provided by mine operators, miners, labor unions, equipment manufacturers, and consultants, of different ways to control emissions from diesel equipment in mines. Many of these approaches and methods can definitely be considered "generally accepted industrial hygiene practice."

In summary, I am of the opinion that this rule, as proposed, is premature in light of the definitive health effects data -- NIOSH/NCI ongoing study -- and reliable sampling and analytical procedures. I am also of the opinion that you do not install an emission control device on a piece of mining equipment just because it can be done. The necessity must first be determined and based upon miner health effects of exposure as well as solid scientific and engineering principles including risk assessment and cost/benefit analysis.

I feel that the continuing use of the "Diesel Toolbox" for purposes of minimizing DPM in underground metal and nonmetal mines is an excellent starting point and the proper choice to assure the health of underground metal and nonmetal miners using "generally accepted industrial hygiene practice." This approach will allow further study of possible problems associated with exposure to DPM and will allow the "Toolbox" concept to be effectively tested and perhaps grow into a recognized, useful approach to the control of occupational exposures.

Thank you.

MR. TOMB: Thank you, Dr. Drown.

MR. DROWN: I'd like to next introduce Mr. John Head, principal mining engineer with Harding Lawson Associates.

MR. HEAD: My presentation will be by slides.

(Slide.)

Good morning. My name is John Head. I work with Harding Lawson Associates.

If we can have the next slide, please.

(Slide.)

My comments today are going to be on the preliminary regulatory economic analysis of MSHA's proposed rule on diesel particulate matter exposure in underground metal and nonmetal mines.

Next slide, please.

(Slide.)

This review of MSHA's preliminary regulatory economic analysis, the PREA, was undertaken by Harding Lawson Associates under the direction of the National Mining Association with contributions from the National Stone Association, the Salt Institute, and the MARG Diesel Coalition.

(Slide.)

Describe the review process: The first step was to survey all underground metal and nonmetal mines in the U.S. to determine their diesel equipment usage, diesel engine characteristics, horsepower, and so on, and age, ventilation characteristics, specifically ventilation flows through the mine, diesel fuel use and costs, and the unemployment -- the unemployment, forgive me -- the employment at each of the mines.

(Slide.)

The second process in the review involved discussions with mine operators and their associations, mining equipment manufacturers and suppliers, diesel engine manufacturers, exhaust after-treatment manufacturers, and other interested parties like the Canadian Diesel Exhaust Emissions Project, or DEEP.

We also conducted a review of published materials, most of which are available on the internet.

Next one.

(Slide.)

The discussions focused on costs of replacement engines, filters and catalytic converters, ventilation upgrades, and other issues covered in the economic analysis.

I will now go on to discuss the analysis. This is not consistent with the handout. You need to go to another presentation.

(Pause.)

Forgive me, gentlemen.

(Pause.)

That's the trouble with computers. You tend to rely on them and regard them as infallible and obviously they are not. This presentation will resume with one that you have in front of you.

(Slide)

The first step of the analysis was to computerize the survey data, input the cost parameters into a compliance cost model, and then develop annualized compliance costs using a model based on the format in the economic analysis that MSHA prepared. Run through that model to calculate initial compliance costs based on total costs per year, which includes both the annualized and the annual costs per year.

The second analysis step, it's important to remember that this analysis focused merely on the three standards, 57.5060, subsections (a) and (b), which deal with the diesel particulate matter exposure limits, and the engine replacements, which are 5067. The compliance of those three standards represents 96 percent of the economic analysis table of total compliance costs. About 18.5 million dollars for DPM and engine standards out of a total annual compliance cost of 19.2.

(Slide.)

Factors that we have not included in this preliminary cost estimate include things such as lost productivity, equipment down time during vehicle upgrades and other compliance efforts, manpower needs, both for protection and maintenance, training and recordkeeping costs, equipment resale costs, unusual one-time expenditures such as a new service shop for increased ventilation, maintenance costs associated with increased ventilation flows and pressures.

(Slide.)

Going on to the conclusion: MSHA underestimated the number of diesel units in use in underground metal and nonmetal mines. There are more diesel engines in use than shown in the economic analysis, and they are larger diesel engines in use than MSHA estimated.

(Slide.)

The second conclusion: MSHA's assumption of engine costs did not account for the difficulties of converting old equipment with old engines to new, clean-burning engines. The engineering and installation costs will be considerable: To allow for different engine configurations, cooling and electrical control systems, transmissions, drive trains and so on.

(Slide.)

The third conclusion: MSHA did not take into account the difficulties most underground mines will face in upgrading their ventilation systems.

Significant increases in ventilation quantities at many underground mines will involve more than just a new fan or a larger fan motor.

(Slide.)

Going on to the preliminary assumptions and some of the numbers: The number of diesel units in service in underground metal and nonmetal mines estimated in the economic analysis cited a title of 4,087. Those larger than 150 horsepower, 1,243.

Our survey almost reached MSHA's limit of total numbers at 3,952. About two-thirds of mines responding. If this is factored up with that ratio, you get to just one unit shy of 6,100.

Those larger than 150 horsepower, the actual responses from about two-thirds of the mines polled did significant exceed MSHA's number at 1,457. If that's factored up, it's almost twice the number that MSHA assumed.

(Slide.)

The next stage of the preliminary assumptions is the cost of engines. What you see in front of you is the estimates in the economic analysis; $21,000 for large engines, that's the plus 150 horsepower; 12,500 for smaller ones, that's less than 150; and $2,500 for the incremental cost for those engines bearing MSHA's approval. There is no additional cost in the economic analysis prepared by MSHA associated with engine conversion.

(Slide.)

These are the figures that we developed for the replacement cost of engines: $27,500 for the large engines; 15,000 for the smaller engines. The incremental costs simply for the approval we accepted at $2,500. However, and this is the big change, there will be substantial additional costs associated with new engine installation. In the analysis, on average we have applied $65,000 for the plus 150 horsepower engines, and based on the age and size of the fleet, we have estimated that 75 percent of those large units will need the reengineered engines.

Thirty thousand -- I'm sorry, stay with that one. Thirty thousand dollars is the cost of a replacement reengineered new engine in a smaller unit, that's the minus 150 horsepower, and two-thirds of the minus 150 horsepower engines that are to be replaced will need this more expensive reengineered replacement new engine.

Number three, please.

(Slide.)

Cost of filters: In the economic analysis, $10,000 and $5,000 were the assumed cost of filters for large and small engines with one-year life and 10 percent annual maintenance without regard to application.

We have increased the cost of the large filter to 12,500, stayed with the $5,000 figure for the smaller filter. There is significant questions in our mind as to whether the one-year life and the 10 percent annual maintenance fee is appropriate. It's untested in the underground mining environment. Particularly for those units that use three shifts a day, they can experience in excess of 5,000 hours per year.

But in this analysis we have stayed with the one-year life and the 10 percent maintenance figure.

(Slide.)

Going on to catalytic converters: We have stayed with MSHA's assumptions of $1,000 for the installed cost of filter, one-year life -- I mean, catalytic converter, one-year life and zero maintenance. However, there is some concern in our mind that the one-year life and zero maintenance is also unproven in this wide-scale application.

(Slide.)

Going on to vehicle cabs: The economic analysis assumed $7,500 for cabs installed on equipment with both large and small engines, with a 10-year life of that cab and a 10 percent annual maintenance. We feel that that cab cost is significantly understated and that a $20,000 installed cost for cabs on equipment that was not originally designed to have that cab installed is more appropriate.

(Slide.)

Going on to the ventilation upgrades: In MSHA's economic analysis a new fan was assumed to cost, an installed price of $230,000, $21,000 was the cost for a larger fan motor. Forty-one mines need a new fan, 117 mines need a larger fan motor; almost a quarter of the mines have sufficient ventilation of the 203 mines cited in the economic analysis.

(Slide.)

Going on to the revised costs of ventilation upgrades: We have stayed with the first two numbers of 230,000 for the cost of a new fan, 21,000 for a larger fan motor. However, we've inserted another cost of compliance with an upgraded ventilation system of $300,000. This takes into account vent raises, control devices, add doors, stoppings and so on, auxiliary ventilation in the face line, things of that nature.

We have estimated that 77 mines need a new fan, 98 need a larger fan motor, and 63 mines need major improvements. We don't believe that any mines presently have sufficient ventilation to dilute the DPM to the levels required by the standard.

(Slide.)

MSHA's compliance strategy took a four-pronged approach. Compliance with the interim and final DPM exposure limits can be achieved by installing new clean burning engines with low emissions; installing exhaust after-treatment systems, such as filters and catalytic converters; installing operator cabs and increasing ventilation flows.

(Slide.)

The compliance strategy that we have assumed in this preliminary analysis of the costs of compliance with the new rule, proposed rule, we have not changed the costs -- I'll start again.

We do not challenge the assumptions of compliance strategies, certain percentages of certain size motors, for example, that MSHA have used in their economic analysis. There is an ongoing review of the technical feasibility of compliance with both the interim and final DPM exposure limits. This review will determine if compliance can in fact be achieved by the methods claimed by MSHA.

(Slide.)

The final slide deals with the compliance costs.

MSHA's economic analysis, the total costs per year of compliance, including both annualized and annual costs, is 19.2 million. Our revised estimate of costs, total costs per year, just over three times that, 58.1 million. These two streams of annual costs can be reduced to a present value. MSHA's stream, taken over 10 years, result in a present value compliance cost of 134.8 million, and the revised compliance cost is $408 million.

Thank you, gentlemen, and ladies.

MR. TOMB: Thank you.

I would like to thank NMA and the Nevada Mining Association for a very comprehensive presentation. It looks like you have really done a lot of homework and put a lot of effort into it.

I know the panel has questions relative to this, but why don't we take a 15-minute break, okay, and come back afterwards and address the questions at that time. Okay?

Thank you very much.

(Whereupon, a recess was taken.)

MR. TOMB: Please take your seats.

I'm not sure the best way to handle this from the standpoint of whether to take one person at a time and ask questions or do you just want to ask questions of -- just ask questions. Okay.

Do we have any questions?

(Laughter.)

George, would you like to start?

MR. SASEEN: No, that's okay. I'll pass.

MR. TOMB: Okay. Jon?

MR. KOGUT: Yes. I have a question for Mr. Rose.

AUDIENCE: We can't hear you.

MR. KOGUT: Is that better?

In the analysis that you described -- first of all, are you going to be making this study along with its protocol and the data available to us?

MR. ROSE: We plan to put together a report and submit it with our final comments.

MR. KOGUT: So that will be prior to the close of the post-hearing --

MR. ROSE: Prior to the close of the post-hearing comments.

MR. KOGUT: -- comment period?

And will that report also include the data itself?

MR. ROSE: To some extent, yes, it will. As far as just a blanket, the actual -- you know, every -- as it was reported to us, we haven't really determined exactly how we're going to present that. There will be meaning, either the data itself or some representation of it.

MR. KOGUT: Would you have any problem providing us with the body of data if we thought it would be helpful to us?

MR. ROSE: Well, I cold present that to the members who submitted that data. Again, this was compiled from a number of companies, and I don't feel at this time that I can speak for them as far as whether or not they are willing to turn over actual numbers and identities and things. I'll present that as a question to the participating members though.

MS. WESDOCK: What about we also need copies of the survey, the economic analysis survey that was done regarding the equipment and the cost. Do you see any problem with providing us with that for the rulemaking record?

I mean, we will really much like that.

MR. HEAD: The individual responses of each mine was collected on the basis of confidentiality, their age and specific types of equipment and some of the information on their ventilation and things of that nature. It was given to us by the mines subject to confidentiality.

We can make a summary of that data available to you, which summarizes into five different mine types: limestone, lime, marble, gold and silver, base metals, evaporates including trona and salt, gypsum, and a miscellaneous category of various other mines that didn't fit into the other four categories. We can make that summary data available. It's broke out by both large and small mines, using the 20 employee cutoff. That data, I think, is something we could submit for the record.

The responses of the individual mines, it would be almost impossible for me to go back, as Mr. Rose will do, to those mines and ask them to release their seal of confidentiality on that data that they submitted to us.

MR. FORD: Excuse me.

Does that summary data, would that add up to the numbers of pieces of equipment you have here?

MR. HEAD: Yes, sir.

MR. FORD: Okay.

MR. HEAD: Yes.

MR. FORD: And is that summary data also broken down by horsepower?

MR. HEAD: Yes, sir, with the two sizes of engines split out, the plus 150, minus 150 category. In the summary data, we did not further subdivide the diesel equipment. That's available in the individual tables that the mines submitted, but that is not in the summary.

MR. FORD: Okay, so the summary data, the actual, the actual data we're talking now, we would have everything in that collection of data to substantiate the costs that you have here?

MR. HEAD: I believe so. Yes, sir.

MR. FORD: Okay.

MR. KOGUT: Can I ask a question along that line? Are you going to ask the same question?

MR. HEAD: Oh, I was told -- I just speak on -- there was an issue of data submittal, I think, that --

MR. KOGUT: Yes. Just to follow up my initial request for the data. Since there were just 11 mines that these data were obtained from, if there is a problem of confidentiality, I think we don't need -- we wouldn't need to know the identity of the particular mines involved. I think what we would like to see is just the raw data in order to do our own analysis, but we wouldn't need to have the names or identity of mines revealed, so perhaps that would help in getting us the data.

MR. ROSE: Right. Well, again, I'll present this to the participating companies. And to the extent that I can, we will provide whatever data we can in the most useful form we can.

MR. KOGUT: And that --

MR. FORD: Excuse me, Jon.

That will also go for the data to derive the cost. If we could get the raw data, you could hide the mine name that would identify the mine.

MR. HEAD: I understand, sir, but, again, let me get back to you on that. I can't answer that at this stage.

MR. FORD: I guess all I'm saying is that's -- that's what we would love to see, but we'll take what you can give us.

MR. HEAD: I understand, and yes.

MR. KOGUT: The other -- well, one reason that I would like to be able to see the data, and perhaps you could provide this in the record in any case, is do you have information on the -- any information on the size distributions involved in -- or the size distributions of the carbonaceous, non-diesel carbonaceous material that you were measuring?

MR. ROSE: You mean the particle size distribution of whatever interferences we may have in mine?

MR. KOGUT: Yes. In other words, you said that many of these samples were collected at locations where ther was no possibility of there being any diesel particulate at all, so you were seeing fairly large, I guess, filter loadings or large amounts of carbonaceous material. And what I'd like to know is whether you also compiled any information on the size distribution of that material.

MR. ROSE: That's a very complicated question, and we will address that, to the extent we can, in our post-hearing comments. Yeah, I can see how that would be valuable information, and we will address that.

Yeah, we did do open-faced and cyclone sampling to some extent.

MR. KOGUT: We would be particularly interested, I think, in the amount of submicrometer material.

MR. ROSE: Submicron. Yeah, testing is ongoing also, so we will submit a final report and we'll address that issue, to the extent that we can.

MR. KOGUT: And another related question is that in the interlaboratory comparison that you did in which you examined the results obtained on punches that were sent to the three different laboratories, you presented those results as ratios in results that you got for the different laboratories. I think we would be particularly interested in knowing what the filter loadings were that were associated with the distribution of ratios that you got.

And, in general, I think in all the data analysis, in some of the preliminary work that we've done we've seen some strong correlations between measurement variability and filter loading. So if you could -- you know, if you provide us with the raw data, of course, then we can look at that ourselves because we would have the -- I assume we would have the filter loadings expressed as micrograms per square centimeter of filter or some such measure.

But if you're not able to present us with the raw data in that kind of form, then I think we'd very much appreciate as part of the report that you -- that you give us an analysis that shows the relationship of the measurement uncertainty as it's related to the filter load.

MR. ROSE: Okay, so for the interlab information, you'd like to see the filter loadings from Lab A as compared to Lab B, is that what you --

MR. KOGUT: Well, the filter loadings presumably would be the same in the filter that you sent to both laboratories, but you presented some ratios in some of the, well, you had a minimum ratio and a maximum ratio or samples. You know, it wasn't hugely large sample sizes, but nine or 10. What I think would be important for us to know is how those different ratios that you observed relate to the filter loading in individual cases.

And as I said, if you can provide us with the raw data itself, you know, then -- without identifying the mines, we could do that kind of analysis ourselves.

MR. ROSE: Right.

MR. TOMB: I'd like to ask Mr. Rose. Maybe I missed it, you presented a lot of information, but did you take any of your diesel particulate samples and tried to amass balance on those samples for the different constituents?

So that out of a given -- you gave a lot of bore analyses and they ranged all over the place, but how -- what fraction of those are going to affect the diesel measurement process? I didn't see any data that was presented along those lines.

MR. ROSE: Well, we don't believe at this time that you can -- if you take an in-mine sample, the analytical method, as MSHA proposes to use it, does not allow you to say this portion of your total carbon came from ore, this portion of your total carbon came from oil mist.

MR. TOMB: How much did it affect the samples is what I'm asking. Do you have any of that kind of information?

MR. ROSE: I guess I don't understand the question.

MR. TOMB: Okay, the interference from other materials, from the ore body, what proportion of that affected a DP measurement?

Maybe Dr. Brown can answer that.

MR. DROWN: Drown.

MR. TOMB: I'm sorry. What's your name?

MR. DROWN: Drown.

MR. TOMB: Drown, D-R-O --

MR. DROWN: If you're swimming and you sink.

MR. TOMB: Okay. Okay, thank you.

MR. DROWN: Thank you.

I'm not sure I'm clear with your question either.

MR. TOMB: Okay. From what I thought I understood from the presentation if I take a diesel particulate measurement some place in the mine, whether it's on a person or in the environment, that's going to be composed from what your presentation showed, or I guess those specific mines, that you're going to have a carbon content from the ore body, a carbon content from cigarette smoke, a carbon content from oil mist, and carbon content from diesel particulate, right?

MR. ROSE: That's right.

MR. TOMB: Okay. So I'm asking that when you made that measurement, the other cigarette smoking, the oil mist from the pneumatic drills, what impact did they have on that DP measurement?

MR. ROSE: There is not a way to determine that because none of the analytical methods will separate them out one from the other.

MR. TOMB: Like sampling upstream from where you would sample with no diesel particulate compared to --

MR. ROSE: Well, with the mixing, you'd have to have an amazingly large number of samples to really get any competence in doing something like that.

MR. TOMB: You don't have that kind of information?

MR. ROSE: Currently, I -- looking at the data right now, I don't believe we could make that kind of a measurement. gain, that would be an incredibly complicated measurement to make where you could say upstream you've got this level and downstream with this piece of equipment you've got this level. There are some papers out --

MR. TOMB: Well, for instance, one sample, you have carbon-bearing rock, and you gave an example that it could be affected by 1600 micrograms per cubic meter, the measurement, all right. So that would mean that you had an average exposure for an area or a mine. Then you could conceivably have something like 3200 milligrams per cubic meter on that standpoint.

MR. ROSE: Which page in the presentation?

MR. TOMB: I'm on page 15. I just took the carbon-bearing rock example you presented.

MR. ROSE: That was -- that was an extrapolation. The sample methods, there is no way you can differentiate between DPM and other airborne carbon. And what this test did was we measured how much the rock will respond as DPM per gram. And so we measured that and made extrapolations up. Say if you had five milligrams per cubic meter of this --

MR. TOMB: Yes, I realized what you did, but I'm just saying how -- my question is how does that impact the sample that's going to be collected?

MR. ROSE: Well, if we had a background of --

MR. TOMB: I mean, is it reasonable to say that the sample that you're going to collect, okay, for diesel would be 3200 then?

MR. ROSE: We don't have any way of knowing how much diesel we're measuring because the method measures everything else, including diesel. So we don't have anywhere to even start.

MR. TOMB: Do you have any diesel measurements then?

MR. ROSE: Well, I assume some of these measurements in the mine does include diesel, but the method does not allow us to say this part is diesel and this part isn't. The method doesn't allow us to do that.

You get a carbon measurement.

MR. TOMB: Okay.

MR. ROSE: Some of that carbon is diesel.

MR. TOMB: Which one of these represent diesel measurements say at the location of --

MR. ROSE: We don't have anything that represents exclusively diesel because these interferences are found everywhere. Everywhere we sample in the mine, there will be some unknown portion of dust, an unknown --

MR. TOMB: Okay.

MR. ROSE: -- portion of cigarettes, an unknown portion of oil mist, and an unknown portion of diesel, and the method does not allow us as currently proposed, the method does not allow us to say how much of any one of those components is contributing. We get an overall measurement of carbon in the air from any number of different sources, including diesel and the other contaminants.

MR. KOGUT: Except that you said that some of your measurements you'd know -- have no diesel?

MR. ROSE: In some of the measurements, yeah, those were not typical in mine measurements. There was one that was in-mine. Rarely -- we might come across a heading where we've got a new vent raised, fresh air coming down to that heading and nothing upstream. And in that case we were able to take some measurements, oil mist versus airborne carbon, and in that rare case we were able to say, okay, we feel confident there is no oil mist here, or I'm sorry, there is no diesel here. That's rare.

The other ones were in a lab where that way we know there is no diesel. It's an indoor lab on the surface someplace. We did it in line-out rooms, and there is no diesel there. So those were not in-mine conditions.

The only samples we've got from in-mine conditions with the cyclone samples up front, and there we're saying the only way we know what isn't diesel is because diesel is not -- is going to be larger than respirable size, and so the difference between an open-faced measurement and a cyclone preselected measurement is not diesel. That difference is not diesel. Anything else, we don't know. And even in that cyclone measurement, the respirable size interferences are still interfering with the cyclone measurement.

Again, there is no way -- with this method as currently proposed, there is no way to say if I have a filter with carbon on it, X percent came from diesel, X percent came from dust, X percent came from oil mist, X percent came from cigarettes, et cetera.

MR. KOGUT: I'm sorry. All right, I think in your written remarks you said that using the cyclone would not totally eliminate the interferences. In the report that you're going to submit are you going to present an analysis of to what extend they do eliminate them?

MR. ROSE: To what extent they do eliminate them, again, if you don't know where the carbon on your filter came from, you can't know to what extent it's been changed. We measure carbon here with an open face. We measure carbon with a closed face.

As far as what percent is on that cyclone pre-selected sample, there is no way to say where it came from. Maybe I don't understand your question.

MR. KOGUT: Well, I was just responding to what you wrote here, which is that the use of the cyclone pre-selective particle sampling methods will not totally eliminate the interference if airborne carbons.

MR. ROSE: We know we have respirable sized dust. We know to some extent oil mist will have a respirable size component. We know cigarette smoke is very much respirable sized. Beyond that, it's hard to go any further.

MR. TOMB: For the samples that you used that were sent to the lab that had no diesel particulate on it, were labs asked to do an acid wash of the sample?

MR. ROSE: At least in a number of them acid washes were done. Beyond that, I'd have to review the data.

MR. TOMB: Are those numbers separated out here as far as --

MR. ROSE: I -- I'll have to look at that and --

MR. TOMB: I think that's important.

MR. ROSE: I can say that acid washing does not remove our interferences.

MR. TOMB: None of it?

MR. ROSE: Well, as far as none, I don't know. We haven't done that evaluation, but we know that in acid wash samples that we have taken there is still significant interference left after the acid wash.

MR. TOMB: We'd like -- can we see that? That would be very important data for us?

MR. ROSE: Yes. I want to emphasize, and I tried to present this in the slides.

MR. TOMB: Yes.

MR. ROSE: The acid wash really goes for the carbonate fracture. We have graphitic ore, bituminous ore, we have -- we did identify elemental carbon in oil mist, nd the acid wash is not going to go -- it's not going to remove the elemental fraction.

MR. TOMB: Right.

MR. ROSE: And it won't interfere, or it won't remove the organic fractions.

So, yeah, I'll present that information.

MR. TOMB: Okay. Also, I think it's important on some -- I don't know how many, but it would be good if we could have some of the thermograms from the laboratories because where they do their ramp temperature change for elemental carbon could be different, so those are also some things we would like to look at, if possible.

MR. ROSE: The thermograms for the interlab testing?

MR. TOMB: Right.

Any other questions?

MR. CUSTER: I'd like to direct my question to Dr. Drown. In your statement you said essentially a comprehensive approach to assessment of occupational exposure better positions the operator and regulator to understand the risks associated with the exposure and better positions the operator -- you know, the operator to manage the risks. So two questions that I have:

Are you, in effect, recommending that MSHA or the operator or both conduct comprehensive exposure assessment?

MR. DROWN: I think that would be -- yeah, I tend to imply that the agency as well as the operator, and maybe that the agency look with credibility on the operator's data that they do generate on a comprehensive basis.

MR. CUSTER: Okay. Second question: Would you be willing to submit to us a recommended sampling strategy, including task-based or whatever strategy you would recommend that either or both parties would use?

MR. DROWN: That I'd have to refer to the Nevada Mining Association --

MR. CUSTER: Sure.

MR. DROWN: -- to see if that would be okay to do.

MR. CUSTER: Sure. Thank you.

MR. DROWN: I might mention that my sampling strategy approach is simply textbook information, and recommended industrial hygiene practice, so it would be an easy task to do on your own or whoever was involved.

MR. CUSTER: I understand that, but I was trying to get at what your point is, and I can't make the judgment that you have made that it looks like you would want MSHA to do quite a bit of sampling in order to sustain a violation of the standard.

MR. DROWN: Well, certainly --

MR. CUSTER: And obviously we don't have resources to do that.

MR. DROWN: I realize that, but I also realize that a single sample is meaningless.

MR. HANEY: Mr. Rose, your 11 mines, were they -- what type of mining operations were they?

MR. ROSE: None of them were coal mines.

MR. HANEY: Okay.

MR. ROSE: And beyond that I'd really -- you know, MSHA classifies mining as coal and metal/nonmetal. All of these mines fit into the metal/nonmetal category.

MR. HANEY: Okay. You can't expand to say whether they were gold mines or limestone mines?

MR. ROSE: We had a variety of products they produced. You know, a lot of members were members of the Nevada Mining Association.

MR. HANEY: Okay.

MR. ROSE: But not all.

MR. HANEY: Did you have host rocks that were both salacious limestone and quartzite?

MR. ROSE: I don't know -- with all the participating mines, I don't know what other minerals they may have had.

MR. HANEY: Okay. And when you sampled, how long were your samples collected for?

MR. ROSE: That varied.

MR. HANEY: Two hours? Four hours? Eight hours?

MR. ROSE: Again, it varied depending on what type of measurement we were trying to make, whether we were testing just to determine does dust interfere. You know, we're not trying to make claims of shift-weighted average measurements. We're testing hypotheses which none of these had a whole lot to do with shift-weighted average.

MR. HANEY: Okay. You're familiar with the thermograms that are produced during the 5040 analysis?

MR. ROSE: Somewhat.

MR. HANEY: Somewhat. And you've seen the carbonate peak that comes out distinctly different from the organic carbon and the elemental carbon peak?

MR. ROSE: Yes.

MR. HANEY: And have you -- have the labs that you sent the samples to integrated that peak out?

MR. ROSE: Well, we talked about this a bit with the acid washing, and I know specifically of at least a few samples where -- and the fact that I know specifically of a few doesn't mean there are a lot. I just remember reviewing at least a few of them where they attempted to wash it out and it didn't come out.

And so as far as -- I'd need to review the data to find out exactly what they were doing.

MR. HANEY: What I was referring to is in the software that comes with that method you can integrate that carbonate peak out without going through the acid wash process, and have your labs attempted to do that?

MR. ROSE: I'll have to address that in the post-hearing comments.

MR. HANEY: Okay. Also, I saw that in your agreement with the total carbon measurements were much better than the elemental or organic carbon measurements.

MR. ROSE: They are not as flawed.

MR. HANEY: And did your labs -- when there is a high loading of elemental carbon, it shifts past the preset split point on the method.

Did your labs go in and do the manual setting of the split point --

MR. ROSE: I'll have to --

MR. HANEY: -- on the basis of the thermogram?

MR. ROSE: -- look at that a little bit more.

MR. HANEY: You chose for your intersample comparison a rib-to-rib comparison as opposed to a side-by-side comparison.

What was the reason for doing that?

MR. ROSE: We wanted to get what the variability might be in the same basic air stream. When MSHA comes out to collect samples, they are quite arbitrary on where they collect them. We chose -- we figured one side of the rib, the other side of the rib, and that's basically the same air sweeping through there, and we just wanted to see how much it varied from one side to the other.

MR HANEY: So your samples would include spatial variability also?

MR. ROSE: There was some spatial variability. Having samples directly side by side say on a person, it would probably result, if it were personal sampling, in much higher variability between samples.

MR. HANEY: But you didn't collect those samples?

MR. ROSE: We personally have not collected those samples in this study. There have been other studies done. The same results would probably apply. Dr. Drown referred to some of those studies.

We were testing MSHA's proposed area sampling also, not side by side but area sampling.

MR. HANEY: Dr. Drown, you mentioned in your statement that you would recommend going with the toolbox approach in controlling exposures?

MR. DROWN: I think it's a great approach.

MR. HANEY: Okay. What would you use as a means to level the playing field that all operators would have to come into some uniformity rather than what they picked and choose and decided was a nice low level for their mines?

MR. DROWN: I didn't think that's been proposed or developed at this point, and it certainly could be.

MR. HANEY: Okay, Mr. Head, you mentioned fuel consumption. Do you have any information on what the fuel consumption is at a typical mine?

MR. HEAD: Yes, sir, and that's in the summary data that we'll be making part of our post-hearing comments both in terms of total fuel consumption for industry group, average per mine, annual consumption of fuel of various types and the costs of those different types of fuel.

MR. HANEY: Okay. And would you address or will you be addressing the fuel savings due to the use of higher efficiency engines, the higher technology engines?

MR. HEAD: I don't believe we will.

MR. HANEY: Okay.

MR. HEAD: MSHA acknowledged in their economic analysis that the newer engines were essentially a wash; that possibly higher cost of maintenance may be offset by lower operating costs, and I don't really think we disagree with that statement.

MR. HANEY: Okay, thank you.

MR. TOMB: I have one more question for Dr. Head also.

Dr. Head --

MR. HEAD: You give me a little to which I'm not deserving, sir. Just Mr. Head.

MR. TOMB: Well, after I heard your presentation, it sounded pretty good to me.

(Laughter.)

Okay, Mr. Head. In your analysis -- I guess my question is over the time period you came up with higher costs, did you subtract out during that five-year period things that were going to be taking place in those mines anyway for upgrading equipment and upgrading ventilation and things like that?

MR. HEAD: In terms of upgrading ventilation, that was phased in in a similar fashion to the model in the economic analysis. In terms of phasing in engine replacements based on their life, I assumed 10 years, yes, we did take into account the phased in adoption.

MR. TOMB: Yes, but I mean, did you take that -- my question is just was that taken out over the costs you proposed for the rule?

MR. HEAD: No, the costs of normal mine operations continuing in the same fashion now, whether that be, you know, advancing --

MR. TOMB: This is above --

MR. HEAD: This is above those normal operating costs.

MR. TOMB: All right. In your estimation of the equipment that these mines had, was this mines that they had at the equipment -- I mean, was this equipment actually at the mine or was it -- and maybe not being used? Do you have a usage factor for the equipment that they gave you I guess is what I'm asking?

MR. HEAD: There is, and it's very difficult to show -- anybody that's worked with this massive data can appreciate, it's difficult making uniform assumptions across such a large mass of data. But yes, we did take into account some utilization factor of both the large engine and the smaller engine. And again, that will be submitted as part of our summary data.

And you had asked a previous question, I believe, the equipment in use in the mine? We worked off submissions from the mines, both in terms of responses to our survey, equipment lists similar to the ones that are presented in the mines' ventilation plans, and also discussions with some operators. And it's difficult to abstract from a mine's equipment list those pieces of equipment that are not used on a regular basis.

MR. TOMB: Yes, I --

MR. HEAD: If they are listed on the list, they go down.

MR. TOMB: That's a very important question though --

MR. HEAD: Of course.

MR. TOMB: -- from the difference between the factor that you used to escalate up for the two-thirds of the mines that you have information from.

MR. HEAD: I understand.

MR. TOMB: Yes.

MR. KOGUT: A related question to that, Mr. Head.

Did you compile or make any attempt to analyze the characteristics of the group of mines that responded as compared to the nonrespondents, especially with regard to diesel usage or mine size or any other factors that might be relevant?

MR. HEAD: We looked at mine size in particular in terms of employment versus the numbers of mines that responded, and we got a higher percentage if you look at employment figures than we did in terms of mines.

So the simple answer is we got more responses from bigger mines, so it's skewed towards the bigger operators, but not exclusively so. There was still a lot of responses from the relatively smaller operators, and some of the mines that we know did not respond are very significant users of diesel equipment underground.

MR. KOGUT: Is there any way of assessing, even qualitatively, whether the nonrespondents in general though as a whole would tend to use diesel less or more than the respondents?

MR. HEAD: I don't believe there is. It was fairly widely scattered. You know, you can't say we can take this out and multiply it by that and get a more appropriate number. The data just isn't there.

MR. KOGUT: What about comparison as far as the type of commodity, type of mineral?

MR. HEAD: As I mentioned, I split it out in the four categories and a miscellaneous category, so there is some differentiation in my data between limestone, lime, marble as one group, gold and silver as another group, base metals and then the evaporate mines, salt and trona and so on. So there is some distinctions that can be drawn, and there are some interesting parallels in that data, and, you know, we will be making some comparisons both within groups and between sizes of groups in our comments.

MR. KOGUT: Okay. What about as compared to the nonrespondents though?

MR. HEAD: They were also fairly widely scattered. There wasn't -- you know, like I say, there wasn't an identifiable group that didn't respond. We could say, okay, we'll make an estimate for those guys and plug them back in. It's just too widely scattered.

MR. SASEEN: Mr. Head, on your engine cost you stated that large engines was 27,500 and small engines was 15,000. For the large, was that an average cost from like 150 to -- an average cost of an engine from 150 horsepower to say 700 horsepower?

MR. KOGUT: Yes.

MR. SASEEN: Or was there some other factor you used?

MR. HEAD: No, and it can't be an average by definition almost, but this was an aggregation of those various engine sizes.

MR. SASEEN: And did you get that from costs of what the actual mine operators were paying for these engines?

MR. HEAD: Yes, sir.

MR. SASEEN: Okay, because I know that does vary widely in engine manufacturers from what they sell, you know, depending on volumes.

MR. HEAD: Of course.

MR. SASEEN: Let's see. You said -- okay, so the engine cost was 27.5 and 15,000. Then you said substantial additional cost, 65,000 for 75 percent of large engines, 30,000 for 67 percent of the small engine.

Was the -- was the 75/25 split just for large engines let's say, was that just the 25 percent would be a direct drop in?

MR. HEAD: Yes, sir, like for like.

MR. SASEEN: Okay, so that wasn't trying to say that 75 percent of the engines would have to -- or machines would have to be upgraded to meet the 160 microgram level?

MR. KOGUT: No. The compliance strategy, the percentage of engines would be replaced to meet the compliance strategy.

MR. SASEEN: The 160?

MR. HEAD: One hundred and sixty, whatever, and then the subsequent replacement of engines to meet the approved engine standard, 5067. It's that same strategy that is dropped in to the model, but with this cost data input.

MR. SASEEN: Okay. Can you provide us with like an average itemized or however your thought process was when you came up with that 65,000 and 30,000?

MR. HEAD: Yes, sir.

MR. SASEEN: Okay. Let's see. I think that's it for right now. Thank you, sir.

MR. TOMB: Ron.

MR. FORD: Mr. Head.

MR. HEAD: Sir.

MR. FORD: I'm sorry to go over this again, but you're going to supply us with the data that will get us to the numbers of your 6,000 and plus pieces, plus the actual cost to estimates?

MR. HEAD: Yes.

MR. FORD: Do you have any idea of when you can do that? I mean, can that be done like in the next couple of weeks?

MR. HEAD: Most unlikely, sir. It probably won't be until close to the close of the record some time in July.

MR. FORD: Okay, that's what I'm trying to get at. We can't get that any sooner before the close of the record? I mean, the analysis for the cost seems to be already done.

I don't understand why we couldn't get that very soon, this preliminary analysis that you did.

MR. HEAD: Right. One of the reasons is that this is preliminary. To return to Dr. Kogut's question, is that we are still getting responses from some mines, aggravating though it may be for my analysis. So we will be updating that data over the next month or so.

MR. FORD: Oh, I understand that. I understand that, Mr. Head. What I'm trying to say if we can get this preliminary analysis now.

MR. HEAD: Right.

MR. FORD: We understand that the actual numbers and figures may change.

MR. HEAD: Right.

MR. FORD: But how you got those figures and numbers, the mechanics of how you set it up and what you go through.

MR. HEAD: The model itself.

MR. FORD: The model itself --

MR. HEAD: Right.

MR. FORD: -- will be pretty much the same.

MR. HEAD: Yes.

MR. FORD: And it would be nice to be able to look at that now, and we wouldn't have to do so much analysis at the end of the period.

MR. HEAD: I understand. Let me get back to you on that, Mr. Ford.

Again, I have to go back to my clients and check that with them. Certainly I can understand validating the model that I used is an important part of your review process.

MR. FORD: Thank you.

Also, on one of your slides, I'm not sure how to detail it except by saying that it says "Analysis 3," and it had "factor/costs not included in the preliminary cost estimate."

MR. HEAD: Right.

MR. FORD: And it has six bullets below --

MR. HEAD: Yes.

MR. FORD: -- that are typed costs.

Is it my understanding that these six bullets are costs that MSHA did not include in their cost analysis?

MR. HEAD: No, some of them --

MR. FORD: Or are they costs which you at this time did not determine to make a -- did a review on?

MR. HEAD: The answer to your question is more complicated than a yes/no. As I stated that we concentrated on 5060(a) and (b), and 5067, as they represented 96 percent of the total costs. We assumed in our preliminary cost analysis that the remaining costs for the remaining standards would be unchanged. We did not challenge those. We did not revise those costs. We fixed them at MSHA's economic analysis level.

In demonstrating the relative de minimis cost of those, they dropped to about one percent when you included our increased costs for those other three standards.

MR. FORD: Sure.

MR. HEAD: So it seemed to us to be less important to look at that relatively small fraction of the cost analysis. However, some of them, in discussions with the mines, are probably not de minimis for individual mines. For example, substantial increases in air flows will result in dust generation. That's going to be another health hazard, another issue that has to be addressed. Other mines, when they increase air flows substantially will have to significantly increase air pressure. All the various control devices for the ventilation system will similarly then have to be upgraded and maintained.

So while we did not factor those into our analysis because we do feel they are relatively small fraction, they are not necessarily that small a fraction for any individual mine. So we felt it appropriate to highlight that there are some elements that were not considered in our review, although some of them, like for example training and recordkeeping costs, clearly are in the MSHA economic analysis. They are also in our analysis. We didn't revise them.

MR. FORD: Right, that's what I'm getting at. Like for the training and recordkeeping, you're not saying there is any additional that are not included in there. You're just saying that they were so small in relationship to the total costs you didn't attempt to address them?

MR. HEAD: Exactly.

MR. FORD: Okay. And I guess, for some of the others like -- did you make any attempt at all to do your own estimate of let's say lost productivity?

MR. HEAD: No.

MR. FORD: Okay. Did you do any estimate of your own of the -- do you have any idea at all at this time of the number of mines that would need to drive a new shaft, that's bullet No. 5?

MR. HEAD: There are some mines that have expressed to me that their shaft capacity is already maxed out, that significant increases in ventilation flow simply will not be practical through the existing airways, and they will have to drive new shafts. There are several of them. I'm not sure that I can give you an individual number.

MR. FORD: Okay. When you give us your data, can it include what you know of these types of cost?

MR. HEAD: Yes.

MR. FORD: Like for example, how many mines would need to drive a shaft from what you've been told?

MR. HEAD: I believe we can make that data available, yes.

MR. FORD: Okay, and also, if they have expressed to you what the costs would be.

MR. HEAD: Yes. Things like driving new shafts are relatively well known costs. We can drop in cost of a new shaft for 2,000 feet, for example. What becomes more difficult to calculate are some of the lost productivity costs --

MR. FORD: Exactly.

MR. HEAD: -- while a piece of equipment is pulled out of service for engine modifications. If it's a simple like for like swap out of an engine, it's only out for a few days possibly. If it's a major reengineering job, that piece of equipment may be lost for a month or more. That is a significant lost cost of production.

MR. FORD: Sure.

MR. HEAD: We have not made an attempt to factor it in and it's going to be, I think, very difficult to get that number.

MR. FORD: That's sort of what I'm getting at too --

MR. HEAD: I understand.

MR. FORD: -- is I think it's kind of difficult, but I wanted to know if you had that number in any way and how you derived it.

MR. HEAD: I do not, sir. government

MR. FORD: Okay.

MR. SASEEN: Tom. No, go ahead.

MR. TOMB: Do you have another one?

MR. FORD: Oh, yes.

When you did the original survey, it included two-thirds of the mines. Two-thirds of all underground metal/nonmetal mines, is that what the two-thirds is?

MR. HEAD: No. The two-thirds are the responses to the survey.

MR. FORD: But the response was sent out to all underground metal and nonmetal mines?

MR. HEAD: The survey we sent out to about 215 addresses.

MR. FORD: Okay.

MR. HEAD: Taken from a list that we got through a Freedom of Information Act from MSHA. We got, obviously, a number of nonreturns, nondeliverables and things of that nature.

We subsequently updated our list and we have now estimated that there are somewhere around 175 active underground operations in the U.S. We got responses from 104 of those mines.

Now, if you factor those numbers of pieces of diesel equipment by the 175 over 104, you will come up with a slightly different number, not significantly, but slightly different, because what we did was we factored up the numbers of pieces of equipment, depending on whether they were a large mine or a small mine. And as I said before, we got more responses from the large mines. So that enabled that number to go up a little bit.

MR. FORD: Okay. So of the two-thirds of the mines that replied --

MR. HEAD: Yes, sir.

MR. FORD: -- the one-third that didn't were, would you say, mostly employment, did not have a large employment, were not large mines?

MR. HEAD: No, it was very well scattered. In fact, there were a couple of very big mines that did not respond. And as I mentioned before, that data is widely scattered. We can't say that there was one particular type of mine or one particular size of mine that didn't respond.

What you can do is take the aggregate number of mines and we've got the 104 by the 75 in terms of the percentage response. We've got a slightly higher percentage of response if you take the employment figures. So from that step we deduced that we got more responses from slightly larger mines.

Did we identify which segment? No. It's scattered.

MR. FORD: Okay. So you got more responses from slightly larger mines.

MR. HEAD: Correct.

MR. FORD: Which, I guess, would mean that in the responses -- and the ones you did not get, they would be slightly smaller mines?

MR. HEAD: Correct.

MR. FORD: Okay. Can you explain, just help me understand why in two-thirds of the mines there is 3,952 pieces of equipment that you counted. That's the actual count that responded from those two-thirds, right?

MR. HEAD: Yup.

MR. FORD: Okay.

MR. HEAD: Yup.

MR. FORD: But yet for the one-third of the mines that didn't respond, of which more were small than large, why does the factor which increases the equipment go up by 54 percent?

MR. HEAD: That's because more larger pieces were used by more of the people that responded. There is a higher percentage of plus 150 horsepower engines in use than the ratio that MSHA assumed in the economic analysis.

Does that answer your question?

MR. FORD: No, I don't think so. Well, maybe it does but I don't understand it.

MR. HEAD: All right, the --

MR. FORD: What I'm trying to say is that if you subtract the 6,099 from the 3,952, you've estimated 2,147 pieces --

MR. HEAD: Right.

MR. FORD: -- in the one-third of the mines didn't responded.

MR. HEAD: Right.

MR. FORD: You've increased the numbers of diesel-powered equipment by 54 percent of what the actual survey showed of those mines that responded.

Again, I don't understand why it would increase by more than half if only one-third of the mines did not respond and in those one-third that responded, there were more small than largest.

MR. HEAD: I guess we're going to go around a mathematical argument here. I'm not sure that I'm following you.

MR. FORD: Okay.

MR. TOMB: You have any other questions?

MR. FORD: Yes.

MR. HEAD: If I could explain again. That factor of 175 over 104 is the aggregate. If you factor those two numbers up, the 3952 by the 175 over 104, you will not come to 6099, because that 6099 was derived from factoring up the large mine engines and the small mine engines, and then adding those two numbers together.

MR. FORD: Okay.

MR. HEAD: Similarly with the 150 horsepower engines, that was taken as a factoring up of the large mines and the big mines and the small mines, and then adding those two numbers together.

MR. FORD: On your -- except for the 2,000 --

MR. HEAD: Would you just hold on a second?

(Pause.)

MR. HEAD: Go ahead.

MR. FORD: On our $2,500 incremental cost for approve engines, you said you accepted MSHA's figure. But have you done your own analysis on what that cost would be?

MR. HEAD: No. There's an awful lot of detail here. Maybe we can talk about it after the meeting or in the post-hearing comments.

MR. FORD: Well, I've just got one more question.

MR. HEAD: Okay.

MR. FORD: It's detailed, but just one more.

MR. HEAD: I understand.

MR. FORD: The 300,000 for major system improvements for cost of ventilation upgrades.

MR. HEAD: Yes, sir.

MR. FORD: Okay. Sixty-three mines would need major improvements, so 63 mines would need -- that's an average cost, I guess, 300,000. Sixty-three mines would need 300,000?

MR. HEAD: Yes.

MR. FORD: Okay. Thank you.

MR. HEAD: Okay.

MR. TOMB: Jon?

MR. KOGUT: One last question from me to Mr. Rose. In the protocol for the study you described, was there any minimum requirements in protocol on the amount of --

MR. ROSE: The requirement was that the samples were collected according to NIOSH 5040, with the exception of MSHA's interpretation of the analysis.

MR. KOGUT: Okay. I believe that in 5040 there is no real minimum loading in the protocol, but there is a recommended minimum.

MR. ROSE: Minimum sample volume of 142 liters is, I think, what we stuck to.

MR. KOGUT: No, apart from the sample volume, your volume, there is also a recommendation, I believe, on the minimum loading of a filter. So was there anything in the protocol about the loading?

MR. ROSE: As far as did we require samples we included when we collected them, we make sure there is a certain amount of particulate in the air before we collected samples?

MR. KOGUT: No, I don't mean in the air. I mean on the filter itself before you did the analysis, before you did the carbon analysis.

MR. ROSE: On the analytical side of the thing, we sent these to labs, accredited laboratories, and they -- after the collection of the samples. AIHA accredited laboratories did the analysis. And how they did that, they did it according to the method.

MR. TOMB: I think what Jon is asking did you have a minimum target for deposit on the filter before you sent it to the lab.

MR. ROSE: Well, I don't think we could really predict what the particulate level would be in the air before we took the measurement.

MR. TOMB: I guess you're concerned were there low measurements.

MR. KOGUT: Yeah. I guess my concern is all these ratios you presented. Was there any --

MR. ROSE: Oh, if there were any extreme outliers, they were excluded.

MR. KOGUT: I'm not talking about extreme outliers. I'm talking about where you got these very large, relatively large interferences from carbonaceous, non-diesel particulate material, what I'm concerned about is whether there was an appreciable amount of the filter -- of material on the filter that you were doing the analysis on.

MR. ROSE: Are you referring to the tests with the open-face versus the cyclone measurement?

That was the only --

MR. KOGUT: No. Not just those, but your in-line tests and your laboratory tests.

MR. ROSE: The in-line and laboratory tests, the oil mist result, the airborne carbon result, the bulk test result and the cigarette smoke result were not expressed as ratios. They were expressed as what we measured. The only ratios were the cyclone tests. And if we were below the limited --

MR. KOGUT: Well, and the interlaboratory tests.

MR. ROSE: And the interlaboratory tests.

If we were below the lower limit of detection, it was excluded.

MR. KOGUT: Will you be providing us a copy of the protocol itself with your study?

MR. ROSE: A description of the method we followed, is that --

MR. KOGUT: You said that that the -- in the text it said that you submitted the protocol to various people to get their concurrence.

MR. ROSE: Well, I --

MR. KOGUT: -- the document you have for the protocol for the study.

MR. ROSE: Yes, we will. Yes, we will submit that, and the study was developed with the assistance of several professionals. As far as -- just to clarify what I stated earlier, I stated that the study was developed with the assistance of a number of people.

MR. TOMB: Okay, I think it's extremely important to emphasize that it's really -- it really would be most helpful to the committee if we can get raw data results --

MR. ROSE: I understand that.

MR. TOMB: -- back, you know, because there is a lot involved in looking at the data to see the -- the questions that you've raised, you know, we need to look at the data carefully.

MR. ROSE: I understand that.

MR. KOGUT: I also have a question for Mr. Ing.

MR. TOMB: Okay. Well, let me ask Mr. Rose one question. It might solidify questions for you.

Is it possible to get several of the filters that we could analyze that you ran where you got disagreement or differences from the different laboratories? Is there any sample left that we could get a punch?

MR. ROSE: The interlab samples -- well, basically, I don't know, and I would need to check into that.

MR. TOMB: Okay. I mean, it would be helpful to look at these interferences you're talking about, what they look like on a thermogram.

MR. ROSE: Oh, are you asking to get the thermograms or the actual samples?

MR. TOMB: No, I'm asking for the actual samples. Yeah, we'd like the actual samples.

MR. ROSE: And that is on the ones where we're showing an interference?

MR. TOMB: The ones -- you know, I'm specifically interested in looking at some samples where you say, "Hey, you can't use this method at all to get an analysis for DP sample." And I'd just like to see what these samples look like.

MR. ROSE: Yeah, we'll --

MR. TOMB: I'm not looking for 100 samples or anything.

MR. ROSE: Right.

MR. TOMB: Whatever you might be able to supply us with.

MR. ROSE: We'll look into that.

MR. TOMB: Okay. Bob?

MR. HANEY: Mr. Rose, when you collected your samples, did you use blanks to correct those examples?

MR. ROSE: We would submit a blank with each batch of field samples, and as far as how the analytical laboratory blank-corrected our samples, I'll need to take a look at that and find out exactly how they blank-corrected those samples.

MR. HANEY: Okay.

MR. TOMB: Wait a minute. I have Jon here.

MR. HANEY: Okay, go ahead, Jon.

MR. KOGUT: Who is your question to?

MR. FORD: Mr. Head.

MR. KOGUT: Why don't you go first.

MR. FORD: Go ahead. Go ahead.

MR. KOGUT: Mr. Ing, you spoke of striking a balance between protecting the health of miners and maintaining economic viability of the mining industry. And you also questioned the evidence available in the risk assessment or certain parts of it, especially those parts relating to lung cancer, I believe.

One thing you mentioned was -- I guess my very general question is can you give the committee some guidance beyond just saying that we need to strike a balance as to where the fulcrum of balance might be?

Assuming that we were able to resolve some of these, I think, very thorny measurement issues, and, you know, because in the epidemiological work that's been done certainly they -- you know, the measurements that were taken were subject to the same sorts of problems that we would have in enforcement, and yet there is, in the committee's opinion anyway, there has been fairly consistent results showing a -- showing adverse health effects in populations that have been exposed to diesel particulate after adjusting for things like healthy worker effects, and particularly if comparisons were made to -- internal comparisons were made within the same population of workers.

You mentioned that Eric Garshick, the principal author of the two studies on railroad workers, has said, you know, that his 1998 -- 1988 study, in his opinion, could not be used for quantitative risk assessment, which means that he didn't think that it -- doesn't think now that it can be used to establish a dose response relationship.

From private conversations that I've had with him, however, I think that he's still firmly of the opinion that it does show an increased risk of lung cancer associated with working in the environment of diesel particulate, diesel emissions. So it's not that he's saying there is -- you know, that there is no evidence of any association between diesel particulate exposure and an increased risk of lung cancer. What he's saying is that the data can't be used to establish a dose response curve, but there still does provide evidence that working in the environment of diesel emissions at the levels that we're seeing among the railroad workers still is associated with increased risk.

Now, given that those levels, and I admit that, you know, the measurements were certainly crude, but from all the evidence that we have the levels of concentrations of diesel particulate that those railroad workers were exposed to, and also the other workers that were involved in other epidemiological studies showing an association, are lower than the worst cases that we've seen in mines. In other words, at some mines, you know, we recognize that the concentrations are much lower than they are at other mines. But in some mines at least they are quite a bit higher than anything that was measured for these epidemiological studies.

So when you say "strike a balance," what do you have in mind there? I mean, do you have in mind something far higher than what the levels were in these epidemiological studies where there is an evidence of an increased risk of cancer?

Part of what we had in mind, I mean, part of what motivated the committee in setting the limits that we did was, and probably the primary factor was that we thought that was what was economically and technically achievable, but part of what we had in mind also was that we were trying to get something down that was as least roughly comparable to what workers in other occupations are exposed to and even comparable to what workers in these epidemiological studies were exposed to where there was evidence of association.

So when you take a balance, what do you think is a reasonable balance? And don't -- you know, you don't have to be very specific, you know, to the nearest 10 micrograms or something, but, you know, within an order of magnitude, what do you think a reasonable balance would be?

MR. ING: First, I don't think I can offer a number that can be -- to even begin to address to strike a balance on a PEL or a TLV.

Second of all, in our post-hearing comments Dr. Borak has addressed the epidemiological issues that we will submit for the committee to review. So I'd like to leave that question for him to answer on that.

I think also from everything -- people that I have talked to, I think the jury is still out on where that balance needs to lie. I think an important piece of the puzzle to understand where we need to go with it all is completing the NIOSH/NCI study on those miners using today's equipment, using today's methodologies, and doing the study that looks back at what the exposures were.

I think once that's done some kind of striking a balance, John completes the technological feasibility. I think that will be the striking the balance at that time when that information is available. I don't think we as an industry are ready to propose a true this is what the level ought to be. I think there is still too many unknowns out there to strike that balance.

I'm sorry. I can't answer your question any better than that.

MR. KOGUT: Okay. I also wonder -- I mean, you focused your comments really on the lung cancer part of the risk analysis, and I wondered whether you had anything more specific to say about the other two -- the other part of the risk assessment which involved health risks associated with diesel particulate insofar as it is a fine particulate, or most of it is a fine particulate, and there are fairly well established exposure response relationships that have been worked out for fine particulate in general, not specifically having to do with lung cancer, but without other adverse outlooks.

MR. ING: With lung overload, et cetera. I think we'll let the -- the best way to address those is with Dr. Borak along those risk assessment studies.

I thought I was going to get out of this without having to answer a question.

VOICE: You didn't.

(Laughter.)

MR. ING: My lawyers trained me well.

MR. TOMB: Bob has a question.

MR. HANEY: Mr. Head, on your slide dealing with your revised cost of ventilation you said that none of the mines would be able to meet the proposal through dilutional and I think --

MR. HEAD: If I may interject, that is -- that is not what I said.

Ventilation is one of four strategies proposed in the economic analysis, and ventilation was not considered necessary at 45 of the 203 mines as part of the strategy. I'm saying that ventilation is part of the strategy at every mine. There will be some ventilation costs at every mine.

MR. HANEY: Okay. That's not how I heard you say that. Okay. Because I heard you say that just looking at the dilution alone when you made your original presentation. Thank you for clarifying that.

MR. HEAD: Okay.

MR. TOMB: George, did you have any questions?

MR. SASEEN: No, I think I'm fine.

MS. WESDOCK: I have one.

MR. TOMB: Okay, Sandra.

MS. WESDOCK: Mr. Drown, I think that the testimony of the association is that you will prefer MSHA sticking with the toolbox approach for now until the NIOSH studies is completed; is that correct?

MR. DROWN: I don't think that's an unreasonable consideration.

MS. WESDOCK: I'm just trying to understand.

MR. DROWN: Yes.

MS. WESDOCK: Okay. In the preamble to the proposal, MSHA went in detail regarding the estimator and the impact of different control technologies with the levels of DPM.

To your knowledge, has any of your members used the estimator? Do you know?

MR. DROWN: I don't know. I don't know.

MS. WESDOCK: Okay, thank you.

MR. TOMB: I'm not going to ask for any more questions. I want to bring this particular session to a close now. We thank you for your input, and, again, I'd like to really stress that the more information that you can provide the committee with, we can make our deliberations a lot better to use your input.

Okay, thank you very much.

MS. WESDOCK: Thank you.

MR. TOMB: Mr. Blase, are you going to be using an hour, a full hour, that you have here?

MR. BLASE: I believe we will need less than that.

MR. TOMB: Okay. Why don't we take an hour break for lunch now, and be back here at 12:30 to continue.

(Whereupon, at 11:45 a.m., the meeting was recessed, to resume at 12:30 p.m., this same day, Tuesday, May 11, 1999.)

//

//

//

//

//

//

A F T E R N O O N   S E S S I O N

(12:40 p.m.)

MR. TOMB: Our next presenter is going to be from Kennecott Greens Creek Mining Company. And I'm sorry, sir, are you going to make the first presentation? Your name?

MR. WATSON: My name is David L. Watson.

MR. TOMB: Okay. Spell your name, please?

MR. WATSON: Watson, W-A-T-S-0-N.

MR. TOMB: Oh, Watson. Okay.

MR. WATSON: Just like Sherlock Holmes.

MS. KING: But spell it for the record, please.

MR. WATSON: W-A-T-S-O-N.

MS. KING: Thank you.

MR. WATSON: I am Director of Technical and Health, Safety, Environmental Quality for Kennecott Minerals Company here in Salt Lake City. Our company operates the Greens Creek Mine, an underground metal mine near Juneau, Alaska, which uses diesel equipment. I am a mining engineer r with 38 years of experience.

This morning Kennecott will discuss diesel particulate matter as it applies to Greens Creek. Besides my statement, there will be presentations by the Greens Creek General Manager, Mr. Marshall, who is on the telephone; and our Greens Creek Industrial Hygienist, Ms. Broschat; and our legal counsel, Mr. Blase; and Kennecott's Manager of HSEQ, Mr. Box.

We at Kennecott agree with MSHA that our goal is "to reduce underground miner exposure to attain the highest degree of safety and health protection that is feasible." That's from the Federal Register on page 58,104.

Mr. Marshall has just appeared.

My remarks today are concerned with the technical feasibility of the proposed rule at the Greens Creek Mine. We believe that Greens Creek is typical of many U.S. underground metal mines which have been designed for trackless operation using diesel equipment. Greens Creek is not similar to mines extracting coal, salt, trona or potash where there is a greater use of electrical equipment.

Kennecott believes that MSHA should recognize these differences in the proposed rulemaking and not lump all underground metal/nonmetal mines together.

Now, I've got a couple of drawings here to illustrate what Green Creek looks like.

The first drawing is a colored drawing which illustrates the geology of Greens Creek and the red portion is the ozone. As you can see, this is a highly irregular ore body. It's not uniform like a coal mine or a salt mine or salt bed. And I think you can understand that it requires a flexible mine. When I say "flexible," I mean something that is not tied to track or trolley line or some sort of electrical power. So the mine has been designed specifically for electrical power or diesel power.

This next isometric is mostly underground workings built by an attic. The mountain goes up like that and it illustrates the vertical extent of the mine from 1350 feet above sea level to just below sea level down here at the bottom.

MR. TOMB: Mr. Watson, excuse me one moment.

MR. WATSON: Yes, sir.

MR. TOMB: Could you use the separate mike so that the reporter can hear you.

MR. WATSON: Sure.

MR. TOMB: If you don't mind. Thank you.

MR. WATSON: Okay?

Let's see, where was I? The mine was developed by an attic, which is our intake airway for ventilation, and as you can see, it's developed by ramp going uphill and declines going down.

Let's see the next print.

This is a planned view of the underground workings of the mine. This distance is about six or seven thousand feet, and the point to illustrate here is the real extent of the mine and the location of the different shoots which we work, which shows the random nature, and again the need for a flexible system of exploitation.

Now, MSHA proposes a concentration limit for diesel particulate matter expressed in terms of total carbon, not DPM. This is problematical because the Greens Creek ore contains one to three percent elemental carbon in the form of graphite. Preliminary sampling using the NIOSH 5040 method indicates there are a number of interferences inherent with the method in obtaining an unbiased total carbon sample. If we cannot get a representative sample of DPM, we cannot measure our performance. This alone makes the proposed rule unfeasible. Kennecott Greens Creek Mining Company is testing instrumentation to measure DPM but we do not yet have a feasible method, and Mrs. Broschat will elaborate on this comment in her remarks.

On page 58,203 of the subject Federal Register, MSHA states, "....the agency....knows of no mine that cannot accomplish the required reductions in the permitted time...." However, MSHA does not identify any mine which is currently in compliance with the proposed DPM standards, much less a mine similar to Greens Creek in terms of geology and layout.

Instead, MSHA refers to their toolbox, which is a discussion of ways to reduce miners' exposure to DPM. However, there is no indication of the amount of reduction to be expected from the toolbox. Furthermore, two sections of the toolbox, use of enclosed cabs and respiratory protective equipment, are deprecated for compliance purposes.

Greens Creek has about 7,000 kilowatts of mobile diesel equipment available for underground, although not all is operated in the mine at the same time. Total ventilation is about 137 cubic meters per second. There are about 120 active working places on any workday. The equipment uses diesel fuel with a sulfur content currently averaging 0.02 percent by weight. Most of the equipment is fitted with catalytic converters and work is underway to evaluate soot filters on some of the larger pieces of equipment. We pay attention maintenance. Some of the equipment is just too years old.

Nevertheless, preliminary work indicates that it will be virtually impossible to meet an area DPM limit of 400 or 160 micrograms per cubic meter at all working places in the Greens Creek Mine, at all times, with existing diesel equipment, ventilation and fuels. Installing high efficiency ceramic filtration on all heavy-duty diesel-powered equipment is not practical, according to the Federal Register on page 58,117, due to variations in engine duty cycles and filter regeneration requirements. Retroftting the mine for all electric operation is not technically nor economically feasible.

In conclusion, Greens Creek will continue to reduce miners' exposure to DPM. However, at this time, we see no way to be in compliance with MSHA's proposed absolute area standard.

Now, let's take a look at this last visual. I would particularly call your attention to this visual because this illustrates our mining method. This is the entrance into the ore body in a typical stope. This is ore to be exploited. This is the equipment, and this is the ventilation which ventilates the piece of equipment.

Now, after the ore is extracted, the opening is backfilled with a combination of dewatered and cemented mill tailings and development waste rock. In order to get maximum ground support and safety the fill is jammed into the opening. The diesel-powered jammer works in a dead end and at the extreme of the diesel duty cycle. We do not believe that a measurement of 400, much less 160 micrograms per cubic meter of DPM is possible at this location. Therefore, we suggest that personal protective equipment be allowed for compliance purposes in those working places where a combination of ventilation, filtration, and engine maintenance is not sufficient to obtain the sustained DPM concentration of 160 micrograms per cubic meter.

We believe that the proposed rule fails the feasibility test for the Greens Creek Mine in terms of measurement of DPM and available technology.

Thank you, and now Mr. Marshall will continue with our remarks.

MR. TOMB: Are you willing to take a couple of questions while you have your --

MR. WATSON: Your pleasure.

MR. TOMB: Jon.

MR. KOGUT: Yes. You said that installing high efficiency ceramic filtration is not practical due to variations in engine duty cycles and filter regeneration requirements.

Could you explain that a little bit?

MR. WATSON: I believe that's right out of your book, page 58,117.

MR. KOGUT: Okay.

MR. MARSHALL: I will go into that in a bit more detail.

MR. KOGUT: Okay. And then one other question. Your suggestion is that personal protective equipment be allowed for compliance purposes in those working places where a combination of ventilation, filtration, engine maintenance and so forth are --

MR. WATSON: Um-hmm.

MR. KOGUT: So you're talking about cases -- you're saying that in some cases that the high efficiency ceramic filters --

MR. WATSON: Um-hmm.

MR. KOGUT: -- could not be used?

MR. WATSON: Are not practical.

MR. KOGUT: Yes.

MR. WATSON: Sure. So where we can't meet the -- where we can't meet the proposed regulation, then we should be allowed to use -- we should be allowed to use masks or something like that.

MR. KOGUT: Right. But you're saying --

MR. WATSON: Or enclosed cabs, whatever you want to do, but your methodology or your -- on page 58,117, you state specifically that you're going to measure any place you choose. So if you're going to do that, you know, if we can't meet it, putting people into enclosed cabs does not good at all. That's why I say you've deprecated your toolbox, two of your measures in your toolbox.

MR. KOGUT: But part of your proposal then is to use the ceramic filters in those instances where they can be used?

MR. WATSON: Well, I'm going to let Mr. Marshall talk about the practicalities of using ceramic filters. Okay?

MR. KOGUT: How many pieces of equipment are in that stope?

MR. WATSON: Well, in that particular case, I showed you one.

MR. KOGUT: Right.

MR. WATSON: But sometimes we'll have two or three.

MR. KOGUT: Okay.

MR. WATSON: Um-hmm.

MR. HANEY: How high is that stope?

MR. WATSON: Well, as I showed you on the geology section there, this ore body is sinuous and contorted at best. We might get in one location 45 - 50 feet of vertical extent in one place without moving to get another piece. It's not a -- it's not real thick in that particular place that I showed you.

We have another spot where it might be 200 - 300 feet.

MR. HANEY: Okay. And what is the air volume you have moving into one of your stopes?

MR. WATSON: Let's see, is it 30,000 CFM? Yeah, about 30,000 CFM.

MR. HANEY: Thirty thousand.

Does that equipment have cabs on it?

MR. WATSON: No.

MR. HANEY: It doesn't have them.

And is there anybody working in that stope that's not on a piece of equipment?

MR. WATSON: That's not on a piece of equipment?

MR. HANEY: Right, not an equipment operator.

MR. WATSON: Might be a sampler, geologist, someone like that.

MR. HANEY: Okay. And what's the horsepower of that backfilling machine?

MR. WATSON: One hundred fifty. About 150 - 175 horsepower.

MR. HANEY: Thank you.

MR. WATSON: Yeah.

MR. MARSHALL: My name is Keith Marshall, K-E-I-T-H M-A-R-S-H-A-L-L. I am the General Manager of the Kennecott Greens Creek Mine in Juneau, Alaska. I am a mining engineer with 20 years experience.

The Greens Creek mine is located on Admiralty Island, inside a National Monument. Admiralty Island is famous for having the largest density of grizzly bears in North America.

Operating within a National Monument brings special responsibilities, especially regarding the environmental impact of the mine. Greens Creek considers itself to be environmentally responsible with a proven track record of environmental excellence and compliance. The operation has constant dealings with numerous environmental regulating bodies as well as the Forest Service and MSHA through the Coeur d'Alene and now the newly established Anchorage office.

In 1998, the mine was awarded the prestigious Department of Labor Sentinels of Safety Award for being the safest underground metal mine in the United States of America.

We have five full-time employees working on environmental issues, three employees working in the safety department, and three paramedics.

Ms. Broschat, who is here with us today, is an industrial hygienist working as part of the safety department.

I mention these aspects of the operation because I wish to convey to you that Greens Creek considers itself to be a responsible operator. We consider the health safety and environmental quality of both our workers and our neighborhood to be of paramount importance to us.

We also agree wholeheartedly agree with the concept of improving the quality of the working environment underground. We have been and will continue to work towards that goal.

Our industrial hygiene work has included: noise control, dust and silica control, personal protective equipment, respiratory protection, and improvements in ventilation And during the last six months we have been concentrating on diesel particulate matter.

I would like to express Green Creek's willingness to cooperate with MSHA and NIOSH, in any way possible, to improve our understanding of both the health effects and the sampling procedures related to this issue.

I must also express concern over the current level of understanding of the science of this issue. There does appear to be some confusion over both the health effects and the sampling procedures related to diesel particulate matter underground.

Regardless of the debate on the validity of the science upon which this proposed legislation is based, I would like to outline to the panel the results of our sampling to date; the current steps being undertaken by

Greens Creek to improve the workplace environment; and the potential steps available to further improve the workplace environment.

Results to date: The results from our DPM sampling program, which was carried out using NIOSH recommended sampling techniques, will be covered in more detail by Ms. Broschat. The fact that sample results are considerably higher than the proposed MSHA limits, regardless of the validity of the sampling techniques, concerns me greatly.

The results were wide ranging; the fresh air intake -- the start of the ventilation cycle -- contained an average of 240 micrograms per meter cubed, and the backfill jamming process, as Mr. Watson has highlighted -- the end of the ventilation cycle -- contained an average of 1600 micrograms per meter cubed. Apart from being higher than the proposed standards, there are two other very worrying aspects of the results:

240 micrograms per meter cubed were detected in the intake air; and 260 micrograms per meter cubed were detected in non-diesel areas.

Both of these results are higher than the proposed standard and yet should not have seen any form of diesel particulate matter. This indicates some form of contamination, presumably from some non-diesel source of carbon. The footwall host rock at Greens Creek is a slatey Algellite containing elemental carbon.

The second point, improved ventilation. As you can see from the isometric drawing here, Greens Creek was designed and excavated over the last 10 years to comply with MSHA recommended standards of ventilation. Greens Creek is typical of a mid-life mine. There is some ongoing development. However, the principal mine infrastructure is already in place, including the ventilation airways.

Unfortunately, increasing ventilation capacity is not just a case of turning up the fans. The fresh air intake airways are also the main haulage routes and as such are subject to air velocity limitations. Increasing the velocity beyond 60 meters per second for example will increase dust and visibility levels, and in our case in the frozen north could result in severe freezing problems.

Greens Creek is currently upgrading the ventilation circuits with a target of a 40 percent increase in the air by the 1999, by the end of this year. The cost of this exercise will be over $1 million.

The third point is exhaust filtration. Greens

Creek is currently in the process of setting up a research program with DCL International, out of Toronto, Ontario, to investigate the feasibility of using ceramic soot filters on our underground fleet.

Each filter cost $16,000. It is estimated that we will need to put filters on all engines that are greater than 120 kilowatts. We have 30 such units; an initial expenditure of $480,000.

As it is currently understood, the duty cycle of our equipment is such that the temperature of the exhaust gasses will Passenger In-Flight Disturbance e insufficient to self-clean the filters. The filters will need to be removed from the units for cleaning. The principal units will therefore require two filters and a furnace or other cleaning facility will be required. It is estimated the total cost during the first year of implementation could be as much as $1 million.

Theoretically the filters should help to reduce the levels of DPM. However, to date the practicality of the option is unknown. I personally liken the use of ceramics in an underground situation to taking your best china on a picnic.

Point four is other measures. Greens Creek uses engines with computerized ignition control, and fuel and exhaust monitoring, resulting in some of the cleanest burning engines I have ever seen. The fuel is a NIOSH 5040 low sulfur fuel with a sulfur content of .02 percent by weight.

Greens Creek is also currently employing an opacity meter to determine the effectiveness of the routine engine maintenance and to rank the combustion efficiency of the various engines.

Conclusions: These measures mentioned will reduce diesel particulate matter but if the sampling results to date are correct, and we do have some questions about their accuracy, then it is doubtful if even a combination of all the measures mentioned above will reduce the levels of DPM sufficiently to meet the currently proposed standards.

The economic practicality of implementing all of the steps is unknown. With metal prices at their lowest levels for many years, we at Greens Creek have learned to carefully evaluate the validity of any proposal prior to undertaking large expenditures. We must have more time to evaluate the effectiveness of the remedial measures before we commit to the expenditure.

We do aim to do everything economically feasible to reduce the level of DPM exposure to our workers. However, I am concerned that even our best endeavors will not allow us to fully comply with these stringent proposed standards.

In summary, the aim of the Greens Creek Mine is to continue to improve the quality of the workplace environment, including diesel particulate matter, with our goal being the long-term health of our workforce.

Greens Creek is already carrying out research and implementation work with a third party regarding soot filters.

We will be contacting NIOSH to become involved in their sampling program.

Unfortunately, all of these studies take time. This is not procrastination on the part of Greens Creek, but it is a request for more time to fully evaluate this issue.

As far as I'm concerned, a part remedy that still leaves the mine out of compliance is no remedy at all, and that part remedy may have cost well over a million dollars.

I would like to suggest that MSHA consider the following short-term recommendations:

That mining companies are requested to demonstrate that reasonable measures have been taken to reduce the levels of diesel particulate matter. These measures can include: sampling and monitoring; ventilation improvements; mechanical and maintenance improvements; filtration; and operational changes.

Where mines identify areas underground with substantially higher levels of diesel particulate matter, personal protective equipment and administrative controls should be implemented to reduce individual exposure levels.

In the meantime further investigations are carried out to establish the real health risks associated with diesel particulate matter, and what are the correct sampling procedures.

I would like to thank the panel for the opportunity to express my points of view on this, and call on Ms. Broschat to talk about some of the sampling issues that we raised.

MS. BROSCHAT: Good afternoon. My name is Leslie Broschat. That's L-E-S-L-I-E B-R-O-S-C-H-A-T. I am the industrial hygienist for the Kennecott Greens Creek Mining Company in Juneau, Alaska. I have held that position since November of 1997, and I have 14 years experience in the health and safety field.

For the past year, in addition to addressing the other safety issues at Greens Creek, I have been studying the presence of diesel particulate material underground. To accomplish this, I have collected close to 100 samples which I have summarized into a series of tables which is in that handout that I gave you. I'll be making some reference to them.

At an early point in this endeavor, it became evident that samples collected in similar locations frequently didn't produce similar results. Review of the averages and standard deviations calculated for each sample set provide support for this observation.

Fred, can I have my first chart?

(Chart.)

In most cases, the standard deviations are one-half or more of the average, indicating a wide range of individual data points.

What I have done here is broken down the like groups of samples. For instance, we've got the mine headings, the muckers and the jammers, which was --

MR. TOMB: Is that table in here?

MS. BROSCHAT: No. This is a compilation of what I have in there. Those tables are broken into more detail.

This would be hour highest average concentration.

As you can see, the standard deviation is more than 50 percent of that.

Again, with vehicles that drive in and out of the mine as opposed to staying put in a heading, we've got 875 with a very high standard deviation as well.

I did the same thing with intake airway samples, exhaust airway samples, non-diesel equipment operations, such as electricians, mechanics, folks like that, and then non-diesel mine mill areas outside of the mine altogether. And in each case the standard deviation is quite high, showing that it was very difficult to reproduce numbers that were similar.

What I'd like to do now for the rest of my statement is just give you some examples of some of the things I experienced, more significant findings that I became aware of in the process of doing these samples.

At an early state of the project, I noticed a sample collected in the underground maintenance shop stood out from the others due to the extremely high organic carbon fraction. This sample is included in the non-mining and milling sample set contained in Table VIII.

Upon reviewing the circumstances associated with the activities going on while this sample was being collected, we determined that the sampler was located in an area where spray solvents are used generously. Consultation with the analytical lab confirmed that even small amounts of this organic hydrocarbon collected on the sampling filter will produce a high organic carbon number upon analysis.

It is a known fact that the Greens Creek Mine has areas where the ore has a very high graphite content. To attempt to quantify this, samples were collected on silver membrane filters and analyzed by x-ray defraction. Although this type of sampling was limited, samples were collected of the various mining activities and from intake and exhaust airways, as was the practice with the samples collected for MSHA analysis.

In all cases, the laboratory reported heavy carbon loading on the filters. The laboratory has requested samples of our ore in order to prepare suitable standards and give us more accurate and precise results. We have provided this to them and would appreciate the time to further pursue this line of analysis.

The lab report stated that the weight of graphite was clearly higher than diesel particulate. We believe, especially in the case of the samples collected in the headings, which are illustrated in Table I, the graphitic nature of some of the ore caused higher elemental carbon results, consequently biasing the total carbon number.

The proposed rule states, and NIOSH concurs, that diesel particulate matter is typically found in the one micron size range. With this thought in mind, we embarked on a sampling exercise co-locating pairs of samples in a variety of locations, equipping one sample with a cyclone designed to separate particulates greater than an average of 4.5 microns from those smaller than 4.5 microns and collecting only the smaller particulates on the sampling filter.

Eleven sets of co-located samples were collected and analyzed.

You can put the second chart up, Fred.

(Chart.)

The results of these samples are summarized in Table VI and VII in the handout and as well on Chart 2. In every case, the concentration of total carbon found in the sample fitted with a cyclone was lower than the concentration of total carbon found in the sample without a cyclone. On the average, the cyclone samples had a total carbon concentration 46 percent lower than those collected without a cyclone. And as you can see on the chart, you've got the percentages over to the right. Those average together is 46 percent.

NIOSH stated in the February 1999 issue of "Mining Safety and Health Focus" that most diesel particulate matter is smaller than one micron in size and other material found in conjunction with diesel particulate matter in air samples is mineral in nature.

They also stated that they are developing a personal sample that will select for particulate in the one micron and smaller size range, and will be making that available for commercial use.

We would appreciate the opportunity to collect samples using such a sampler because we believe, based on the results from using cyclones while sampling and NIOSH's statements concerning particle sizes, those samples may provide a more accurate picture of what the true concentrations of diesel particulate matter are in the Greens Creek Mine.

To further research the influence of particle size on analytical results, two six-stage Marple cascade impactors were purchased and sampling was performed. Unfortunately, sampling in this manner was found to be very problematic, especially due to the delicacy of the filters.

The two smallest stages of the cascade impactor have cut-points of .6 and 1.5 microns. We believe that successful results from samples collected using these samplers could provide us with more good information about the influence of particle size on diesel particulate material, and we, again, would appreciate the time to continue that sampling approach.

Table VIII contains results from non-mining and milling areas. Even in areas of the Greens Creek site, such as the sample prep laboratory and the safety office where diesel-powered equipment is not operating, sample results indicated appreciable levels of total carbon. This supports the theory that the NIOSH 5040 analytical method is nonspecific and factors such as cigarette smoke, graphite, organic hydrocarbons and large mineral particles are detected during analysis and reported as elemental and organic carbon, biasing the final results.

It is apparent to us that further analysis is necessary and we would certainly appreciate the opportunity to perform further sampling with more accurate methods prior to the finalization of the proposed diesel particulate standard.

To restate Greens Creek's position, Greens Creek welcomes the opportunity to work with MSHA, NIOSH and any other interested parties to develop DPM standards that are both feasible for operators and prevent a significant health risk to our underground miners.

And now I'd like to introduce Kurt Blaze, our attorney from Washington, D.C., who will summarize our statements for us. Thank you.

MR. BLASE: Good afternoon. My name Kurt Blase, K-U-R-T B-L-A-S-E. Again, that's K-U-R-T B-L-A-S-E. Kurt Blase is my name. I'm a partner in the D.C. office of the law firm Kilpatrick Stockton. I am here today representing Kennecott Greens Creek Mining Company.

I'd like to just very briefly summarize some of the things we've heard today and try to put them in a legal and analytical framework that we use in our written comments, which we submitted about two weeks ago.

I think the first point is that -- at least with respect to the analysis that we've performed to date -- this proposal is not feasible for metal mines. They are not like other mines where electric equipment can be cost effective. They are designed for diesel equipment. And to the extent that they are not able to use that, the very process that they are designed for is being taken away.

MSHA's feasibility analysis to date did not look closely at metal mines as a separate industry segment. We believe you must do so, that it's required by the applicable judicial decisions which we've cited in the written comments that we've provided.

My clients at Greens Creek have developed a feasible DPM reduction plan which they are pursuing now and will continue to develop. However, there is no evidence to date that it will achieve compliance with the proposed standards. Reasonably accurate sampling methods are not even feasible at the moment. We must develop these first before feasibility in metal mining segments can be assessed accurately.

These problems with the current feasibility analysis are compounded, we believe, by the proposal not in compliance with personal protective equipment where engineering controls are not feasible. This is the legal quid pro quo for not requiring MSHA to demonstrate now that feasibility -- that the proposal was feasible for each affected mine.

Under the applicable court decision, MSHA's decision creates presumption of feasibility which the operator of a specific mine can rebut in an enforcement case. If he is successful, he can then use protective equipment or other means to comply with the standards. The proposal not to allow operators to do that is not consistent with the applicable judicial or MSHA precedent, and it takes away a primary legal protection, especially whereas here, the available data show that the proposal is not feasible with engineering controls in many cases.

These problems with the feasibility analysis are compounded even further by the absence of evidence that the proposed standards are reasonably necessary to protect miners' health. We agree that feasible measures should be taken to reduce DPM exposures, and we are proceeding with a plan to do that without additional regulations. However, MSHA has agreed that the current risk assessments are subject to many uncertainties, and we do not believe it is possible at present to conclude with any reasonable degree of certainty that compliance with the standards MSHA has proposed, using only engineering controls, is truly necessary to protect miners' health.

As we've said several times, Greens Creek is not waiting for the results of additional research, and has been proceeding to develop and implement a feasible plan. However, we urge MSHA to wait for more accurate feasibility and health data before adopting mandatory standards.

We look forward to working with MSHA and others to develop an approach that is truly feasible and necessary to protect the health of our miners. Thank you for listening to us and we'd be glad to address any questions you have.

MR. TOMB: Thank you very much for your presentation.

Any questions? George?

MR. SASEEN: Mr. Marshall, you stated that you're looking at putting filtration systems on 30 of your units? Is that what you said in here?

MR. MARSHALL: That's correct.

MR. SASEEN: Is that all -- I'm George Saseen. Is that all your -- is that the total number of diesels you have in the fleet?

MR. MARSHALL: No. Under the -- when we gave you the written -- under our written notices, we have a list of all the units that we use on the ground, and I believe there are somewhere around about 55 units that we use.

MR. BLASE: It is in the written comments that we submitted for the record.

MR. SASEEN: Oh, okay.

MR. TOMB: Are those units all normally running in your operation?

MR. MARSHALL: I beg your pardon?

MR. TOMB: Are those units all normally running in your operation on a daily basis?

MR. MARSHALL: No, they're not running all the time. I would say that on an average day shift we would have at least 50 percent of those units running.

But I think the point to be made is that if one of the units that we are running breaks down and we need to replace it with another unit, then that unit has to have the same filtration --

MR. TOMB: Yeah. Yeah.

MR. MARSHALL: -- just to be maintained at the same standards.

MR. SASEEN: Then there are 30 units or more production type equipment?

MR. MARSHALL: Yes. We have loaders, we have about five different types of loader underground. We have five production trucks. We have seven production -- seven backfill trucks. We have diesel drill jumbos. We have diesel roof bolting jumbos, and we have utility vehicles.

MR. SASEEN: I know I looked at that, but are there model numbers of the engines in that list?

MR. MARSHALL: Yes.

MR. SASEEN: Okay. Then I'll be able to go back.

MR. MARSHALL: We've got a variation of Deutz, Perkins, Cat, Detroit Diesel, TCM and Kabolta.

MR. SASEEN: Okay.

MR. MARSHALL: Not all of them are of the large size. Some of the utility tractors are small engines, and we probably wouldn't be looking to put any filtration onto those, but we have identified around about 30 units that we think we would need to put filters on.

MR. SASEEN: Okay.

MR. MARSHALL: The thing I would just like to add is these filters are enormous units. They are about 30 inches by 15-inch diameter. So it's a very big unit and they are very, very fragile. Taking them off and putting them back onto a unit is not going to be easy. We will need a dedicated area. But if we have some good results, I would be very interested to see what the results are out of it. If we have good results, then it is probably the direction we would choose to go anyway.

MR. SASEEN: Have either you or Ms. Broschat, have you looked at our estimator to run any numbers knowing -- it looks like you've got a very clear picture of your ventilation and the units and knowing kind of what the efficiencies of these filters are. Is that how you came up with the 30 units or have you done any numbers you could share with us on --

MR. MARSHALL: No, we --

MR. SASEEN: -- how the estimator worked?

MR. MARSHALL: Just to start on the numbers, we chose the units that we considered will be the most -- generating the most diesel particulates. So we tackled the units that are producing probably 80 percent of diesel particulate matter.

As far as the estimator is concerned, no, we haven't looked at that yet. We received a copy of it over the last two weeks, and we haven't had a chance to look at it, but we will be quite happy to comment on it before the 26th of July.

MR. SASEEN: That would be interesting.

Do you have an electronic version of it?

MR. MARSHALL: Yes, we do.

MR. SASEEN: Okay. Yeah, it would be interesting if you could, you know, put some of those numbers for your ventilation and your engine. Usually if you go to the engine manufacturer, they can provide you some baseline engine data, and submit that. That may be interesting to see how the feasibility of that would work out.

Thank you.

MR. FORD: Mr. Marshall, again, the $16,000 filter per machine, is that purchase and installation cost?

MR. MARSHALL: No, that's just purchase cost.

MR. FORD: So do you have any idea what -- and that's an average cost?

MR. MARSHALL: No, that's the cost for the largest filter they do, which we would require on most of our units.

MR. FORD: That's not the cost for all the filters on all the 30 units?

MR. MARSHALL: No, it's the cost of one individual filter, and we haven't put any -- I haven't included in that cost the installation cost because we haven't got to that stage yet.

MR. FORD: If you ever get those numbers, can you provide them to us?

MR. MARSHALL: Yes, we will certainly provide those numbers.

MR. FORD: Okay, thank you.

MR. TOMB: In your ventilation, is that exhaust intake ventilation that you're using?

MR. MARSHALL: No, it's a --

MR. TOMB: It's blowing.

MR. MARSHALL: It's blowing from a fan down the tube and it blows across the face and then returns out through the main access.

MR. TOMB: In that heading that I saw there, what's your average velocity in that entry? That's not six meters a second?

MR. MARSHALL: No, no. The six meters per second would just be in the intake of the -- the main return airway. We don't really talk in velocities across the face. We're talking quantities, and there will be a minimum of 30,000 cubic foot a minute going through that stope.

MR. TOMB: And you have about two to three units in there?

MR. MARSHALL: Typically, we have one unit in there doing the jamming, and we would have anything of two to three trucks that will be feeding that unit. We would have a jammer in there and a bulldozer and the trucks coming in and out. The jammer and the bulldozer will be operated by the same operator who would turn off one unit before he turned on the other unit.

MR. TOMB: Thank you.

MR. HANEY: When you've sent your samples in for the 5040 analysis, have you had them acidify the samples or remove the carbonate from the samples?

MS. BROSCHAT: I don't have an answer for that question. I'd have to contact the lab, the particulars of how they proceed. I know they're -- it's Clayton Laboratories that we've used. They are accredited to do the analysis. But as far as the specific details of every step they take with the analysis, I haven't discussed that with them. I can certainly find out though.

MR. HANEY: Okay, thank you. Please do.

MR. TOMB: Jon?

MR. KOGUT: Am I right in assuming that all of the samples in your tables that are not identified in the other tables, the ones that are not the comparison of using the cyclone versus not using it, that all the other samples did not use a cyclone?

MS. BROSCHAT: That's correct.

MR. KOGUT: And so on the intake airway samples you said that most of the samples were four to six or six to eight hours. Is that true of the intake samples as well?

MS. BROSCHAT: Yeah. Most samples were collected between six and eight hours. I did take some specialized samples that were only collected for a few hours, but the goal in most cases was to collect from six to eight hours.

MR. KOGUT: Okay. And you also have the elemental carbon results for those samples?

MS. BROSCHAT: Yes, I do. I have everything.

MR. KOGUT: Can you provide us with the -- I don't think you listed any of the elemental carbon results here.

MS. BROSCHAT: No, I didn't.

MR. KOGUT: We would appreciate receiving those in addition to the total carbon.

MS. BROSCHAT: I have all that data.

MR. KOGUT: Yeah, if you have the load on the filter, we'd like to get that also, although I -- yeah.

MS. BROSCHAT: The load on the filter? The weight of the material on the filter?

MR. KOGUT: Right.

MS. BROSCHAT: I don't have that information. The Laboratory would probably be able to provide that, but I don't know that for sure. I don't --

MR. KOGUT: As an alternative to that, because we could back calculate it if you have the sampling time associated with the --

MS. BROSCHAT: I have all that as well.

MR. KOGUT: So I guess all you would need to provide us really is the sampling time associated with each sample and the elemental carbon result.

MS. BROSCHAT: Okay. All these results have been adjusted for eight-hour time weighted averages in these tables. But my raw data, of course, has my actual sampling times and elemental and organic carbon fractions.

MR. TOMB: What do you mean by adjusted? Do you mean you divided everything by eight hours?

MS. BROSCHAT: If it was a six-hour sample, I -- in my summary, I explain --

MR. TOMB: Oh, okay.

MS. BROSCHAT: -- that the shift grading is in eight hours. So the activities of the miner who is being sampled is essentially the same for the 10 hour - 11 hour period. So if the sample is collected for six hours or seven hours, I just adjusted based on micrograms per cubic meter per minute, adjusted it up to eight hours so that I had a -- you know, so we were comparing apples and apples in the summaries.

MR. KOGUT: Okay. Is there only -- there is only one sample that you collected in an intake airway with the cyclone; is that correct?

MS. BROSCHAT: No. I collected -- I did a series of side by side or co-located samples in the intake airways and in the exhaust airways. I also did a series of intake samples before I started doing the sampling with the cyclones. There are two separate sets.

MR. KOGUT: Okay, I only see one in the -- let's see, I guess it's Table VII. There is one intake airway sample here that I see that was done with a cyclone.

VOICE: Which take is that?

MR. KOGUT: Table VII. That's the only one I -- that's the only intake air sample that I see with a cyclone. Where are the other ones?

MS. BROSCHAT: Oh, I see what you're saying. I'm sorry.

Yeah, in the group of samples that I did, the area samples both in exhaust and intake airways, I only did one set of intake airway samples with the cyclone. That's correct. I focused on the exhaust airways because the numbers were much higher than the intake airways.

MR. KOGUT: What do you mean by one set?

MS. BROSCHAT: Co-located. One with the cyclone, one without.

MR. KOGUT: Oh, okay, I see what you mean.

MS. BROSCHAT: And then the rest of the intake airway samples are in, I think, Table III.

MR. KOGUT: Right, and those are all taken without a cyclone?

MS. BROSCHAT: That's correct.

MR. TOMB: Do you have any other questions?

MR. KOGUT: No. Thank you very much. I think this is very helpful, and I'm speaking on behalf of the committee that we really would appreciate getting the data that we asked for.

MS. BROSCHAT: That's fine. It's not a problem.

MR. TOMB: Just one comment. I understand that SKC is probably going to have those diesel particulate samples available at the IHA conference. They are going to be displaying them, so you might want to get some of those.

Oh, yeah, this would be ones with the impactor, or you can get them without the impactor also. Well, if you want the EI exchange, you will be able to see them. They will be available.

AUDIENCE: Excuse me, sir. What did you refer to by way of samples that will be available? Are they standard samples that we could use for comparison purposes?

MR. TOMB: -- there was mention during this presentation that NIOSH is having a commercial unit built for diesel particulate sampling, and SKC is the manufacturer doing that manufacturing under that contract.

AUDIENCE: I see.

MR. TOMB: Yes?

MS. KING: Excuse me. Could you come to the podium, please?

MR. PERKINS: I'm an official contractor with NIOSH for industrial hygiene chemistry.

They are not certifying that sampler. It has not been approved by NIOSH.

MR. TOMB: No, I realize -- I realize that. I don't think there is any requirement for approval. I just know that under the NIOSH contract a commercial unit was built.

MR. PERKINS: Well, they hammered me about that when I was back there, saying they're not approving it or anything because of part of the design they are trying to get them to change it to correct the design, and they said they might have it corrected by the conference.

MR. TOMB: Okay.

MR. CUSTER: For the record, sir, what is your name?

MR. PERKINS: My name is Jim Perkins. I'm from DataChem Laboratories in Salt Lake City, Utah.

MR. TOMB: Okay. I'll check with SKC when it's going to be available.

MR. MARSHALL: Could I just take this opportunity to invite any member of the panel or MSHA that wanted to come and visit the operation to do so at any time. And any of the information that we've provided to the Nevada Mining Association, as far as we're concerned, it's free information for anybody that wants to use it or look at it.

MR. TOMB: Is it true that they use Kodiak bears in their mining operation? That was a rumor that I heard from one of my co-patriots at the conference.

MR. MARSHALL: What sort of bears? Kodiak bears?

No, we only have grizzly bears on the island.

MS. KING: Could we repeat the invitation for the record?

(Laughter.)

MR. MARSHALL: I repeat the invitation and say that the salmon fishing is best in June and September.

(Laughter.)

MR. TOMB: Thank you very much for your presentation.

Is Wes Ing still in the -- Wes?

MR. ING: Yes.

MR. TOMB: Could you tell us if the risk assessment that you were talking about. a Doctor something?

MR. ING: Dr. Borak.

MR. TOMB: Is that what it was, Dr. Borak?

MR. ING: Yes.

MR. TOMB: Is this going to be presented at one of the hearings?

MR. ING: No.

MR. TOMB: No.

MR. ING: It will be part of post-hearing comments.

MR. TOMB: Okay. Thank you.

(Comment from audience.)

MR. TOMB: I made a record of that.

Our next presenter for Tg soda ash, Incorporated will be Mr. Pritchard.

MR. PRITCHARD: Is this loud enough? Can you hear alright?

Good afternoon, panel. My name is Christopher Pritchard. You have my card so I'll let it go at that. Thank you for giving me the opportunity to testify today.

Tg is the largest user of diesel face-haul equipment in the Wyoming trona operations with 124 units underground. We mine approximately 2.5 million tons per year and employ 350 people.

Tg agrees that the issue of diesel emissions in underground mines needs to be addressed, but the proposed MSHA regulations are premature and go well beyond what is necessary.

MSHA's conclusions are contradicted by over 20 years of experience at Tg and in excess of 50 years in other trona mining operations. There is no evidence of increased risk of serious health hazards due to diesel emissions, exposure in trona mining.

First, I'd like to talk about the scientific data and the subgroup here of the interpretation by MSHA.

MSHA quotes that "... the Secretary must promulgate standards based on the best available evidence," and cites multiple reports that admittedly find the weakest positive correlation with lung cancer. Tg contends that analysis of a better source of best available evidence is the actual workforce in the mining industry. This best available evidence indicates that there is not a problem with day-to-day exposure to present levels of diesel emissions.

MSHA states that the risk assessment was peer reviewed. Two individuals, Sammit and Burke, presented a joint report to MSHA, which was not published in any public forum as a formal peer review. Effective peer review in the scientific community involves multiple reviews by competent professionals with no conflicts of interest in a public forum, not a private in-house review.

So for MSHA to state that the proposal was peer reviewed is an exaggeration and gives a serious lack of credibility to MSHA's case.

Figure 3-2 of comparative exposures on page 58,149 of the proposal shows ranges of average exposures to diesel particulate matter, DPM, in various metal/nonmetal mines. Tg objects to this misleading figure for the following four reasons:

First, a graph of average exposure would more adequately represent overall exposure instead of extreme values.

Second, the data is not in the same units as data has been acquired since 1987 by different organizations utilizing different equipment and methods that cannot be compared.

Thirdly, Figure 2-1 on page 58,126 shows the size distribution of these particulates relative to other mining particulates, which are predominantly in the submicron range. MSHA's Pittsburgh Tech Support sample diesel emissions in Tg mining sections during June of 1998, they measured three levels of particulates: the submicron, respirable and total dust. MSHA analyzed the samples with the 5040 method and, for example, obtained total results of: for submicron, 224 micrograms; 430 micrograms for respirable; and 1,009 micrograms for total. Obviously the adopted 5040 method is in error as the diesel emissions total carbon values should be essentially the same for all size ranges because DPM is almost entirely submicron.

This contraction is very troubling as the total dust sampling method is proposed by MSHA to initiate the DPC plan and write violations.

The MSHA proposed method of using total dust measures over four times the total carbon levels as the submicron range for the same sample, which is correct. This discrepancy must be answered for our operation to actively determine the actual DPM levels in our operation. This cannot be done at the present time with the proposed method, invalidating the total framework of the proposal.

Fourth, the majority of information in the chart is represented in RCD units, which according to George Schmackenburg, overestimates total carbon exposures by 10 to 35 percent. Therefore, this table is not representative of the exposures of the different occupations shown or of the proposed total carbon levels.

The risk is overestimated due to using RCD units in comparison to total carbon units. RDC units confuse the issue of actual or proposed mine DPM members. The MSHA results shown on all the tables are very misleading.

Second, MSHA, the single sample proposal: It is not a reasonable practice to place a mine on a minimum three-year diesel particulate control plan or write a violation based on a single sample. Obviously, a single sample is not statistically significant or representative and cannot determine if the mine is out of compliance.

The proposal states, "The agency also has to be realistic about conserving the resources of its health professionals. Resampling mines as control lines have expired, takes resources away from other priorities."

Is it acceptable to have industry spend many hours of time, effort and expense, but not MSHA?

Later it states, "Documentation verifying the effectiveness of the plan in controlling diesel particulate to the required level would have to be maintained with the plan and submitted to MSHA upon request."

Tg questions why this is necessary as the information is available to the inspector every quarter. Also, mines are required to show compliance with air quality standards under the Subpart D, 5002, which states, "Dust, gas emission and fume surveys shall be conducted as frequently as necessary to determine the adequacy of the control measures."

Therefore, the DPC plan is not needed and provides an unnecessary burden on industry.

MSHA states, "Verification by operators is being proposed to ensure that primarily responsible, those primarily responsible for ensuring the DPM control plan is effective is not shifted to MSHA."

This responsibility is currently required by the above-quoted statute and does not require duplication.

MSHA contradicts its point that a single sample should result in a citation and enrollment in a DPC plan by saying, "It takes multiple samples to demonstrate that miners are protected under the variety of conditions that can be reasonably anticipated in the mine."

MSHA should abide by the same logic.

MSHA states on page 58,116 that the 5040 method meets NIOSH's accuracy criteria that measures -- come within 25 percent of the concentration at least 95 percent of the time. This standard is for a known particle size distribution in a laboratory setting; not in a mine environment.

Then on page 58,184 it states that, "The variability associated with the Method 5040 to be approximately six percent, one relative standard deviation."

These do not compare.

Then it states, "MSHA will issue a citation if the measured value was 10 percent over the established level."

There is a contradiction somewhere in the MSHA proposal. How can MSHA take a 25 percent NIOSH laboratory criteria and shrink it to six percent in a mining environment?

Recently MSHA lost the coal mine single sample ruling in court. A lesson should be learned and an equitable sampling method established. Scientific accuracy and statistical techniques should not be sacrificed for ease of enforcement.

Third, the 5040 method: MSHA quotes the NIOSH

5040 method as being validated, but only part of it has been and only in laboratory conditions. Considerable problems with the method, discriminating between other carbon-based mineralization, has been experienced by NIOSH in the '98-99 in-mine surveys, which required many samples to be rerun.

As previously discussed, MSHA conducted tests at Tg in June '98 that showed increasing total carbon with sample size, which is incorrect as DPM is primarily submicron.

Is the problem the method or the sampling technique?

MSHA relied on an unverified method in its proposal from NIOSH that was criticized by industry as "unverified" before it was put into use. Not only did NIOSH not test its own method, but MSHA did not check NIOSH. Tg will note this discrepancy here and let others familiar with the actual chemical analysis comment in detail on the specifics.

Tg suggests that with the significance of this proposed rule and MSHA's insistence on single sampling, that MSHA find a technique that is scientifically defensible first, as industry and the miners deserve.

Part 48 training: Required training may be addressed in existing Part 48 which presently covers health effects and is presently being done at our operation. To apply a separate requirement for diesel is redundant and sets a bad precedence. Other improvements, serious safety and health problems are presently adequately covered in Part 48.

Equipment examination and recordkeeping: Proposed equipment tag-out and recordkeeping can be met by existing mobile equipment examination standards and maintenance work order systems. Additional standards are not needed.

Tg suggests that by rigorous enforcement of existing TLB and air quality rules and by utilizations of recommendations in the diesel toolbox, adequate safety levels can be maintained per the requirements of the Federal Mine Safety and Health Act of 1977. Most complaints made at public hearings regarding diesel emissions are caused by mining situations that MSHA is well aware of, or should be, such as long-wall move, and should be addressed by spot inspections or miners' complaint investigations, not by new regulations.

MSHA should wait for the results of the NIOSH study that is still in progress which will offer definitive data on the actual mining population, offer best available evidence, not a biased view of various academic studies.

MSHA should parallel its efforts with OSHA, EPA and engine manufacturer testing that is in progress, upgrading available diesel engines, fuel and emissions control, not establish controls that will isolate the mining industry from future improved technologies.

Tg will submit additional comments on the proposal before the July 26, '99 deadline, and we also support the input from the members of MARG Group, and the National Mining Association, and would also like to raise a few points for the record.

MSHA has published five figures in the proposed metal/nonmetal rule, and the same materials in the coal rule that purport to describe mining industry DPM exposure and compare them to other industries. There is 1-1, 3-1, 3-2, 3-3, 3-4 on pages 58,147 to 58,151. The data appears wrong and should be withdrawn since MSHA cannot explain the following points:

How to reliably relate reported 1977 DPM exposures when the proposed NIOSH 5040 Method did not exist in 1977 and there is no correlation to any other method;

Why it took months to produce the underlying study and data in response to a Freedom of Information Act request and the ultimate response still did not identify precisely which studies and data were used and how they were used;

How can MSHA extrapolate data from 11 surface mines, 12 underground coal mines, 25 underground metal/nonmetal mines to the 15,000 mines that use diesels, or even to the 216 metal/nonmetal underground mines that include 35 to 40 commodity types with inherent laboratory analysis problems;

How can MSHA report any exposures without accounting for the known interferences from at least 175 carbonaceous ores, oil mist, cigarette smoke, the sampling cassettes and filters, all of which have been shown to preclude accurate and useful DPM exposure assessment;

How can MSHA use studies and data based on the results of respirable combustible dust sampling and submicrometer respirable particulate sampling that acknowledge that these methods are flawed and do not produce accurate, reliable results;

And last, how can MSHA use data from area sample studies that have no relationship to employee exposure to describe the exposure of individual miners.

And unless MSHA can answer these questions in detail and make the answers available for public comment, the flawed tables must be withdrawn from the public record.

Thank you for your time. I'll take your questions.

MR. TOMB: Thank you, Mr. Pritchard for your presentation.

Any questions?

MR. KOGUT: I was a little mystified by your reference to the 1977 data. What are you referring to?

MR. PRITCHARD: That probably 1987 since that's when the Bureau of Mines' numbers came. That's what I'm guessing. I don't know when the 1977 numbers would have been either. I remember reading that but I think it is -- 1987 is the stated date in the proposal that the sampling data was drawn from, that point onwards.

MR. TOMB: 1977?

MR. PRITCHARD: 1987.

MR. TOMB: Oh, '87.

MR. PRITCHARD: So that's probably the number referred to in the sheet.

MR. TOMB: Any other questions?

MS. WESDOCK: Can we have a copy of your testimony?

MR. TOMB: I have one.

MR. PRITCHARD: You have one.

MS. WESDOCK: Oh, you do? Okay.

MR. TOMB: I have a copy.

MR. FORD: Does it state in there the tag-in/tag-out relations that you say are sufficient, that are currently in use?

MR. PRITCHARD: I didn't make any reference to any tag-in/tag out.

MR. FORD: Okay.

MR. PRITCHARD: We have standards and procedures that are already required that will very well meet this requirement, the pre-shift examination of equipment plus existing maintenance work order systems that we presently use and work very well. As far as -- you're asking us to make records of all this separately, and we have a system that works well for us. Why duplicate it?

MR. FORD: I guess I'm getting at -- you're saying, you're saying that our tag-in/tag-out provision is not needed because I thought, maybe I misunderstood you, there are current existing standards that will cover that?

MR. PRITCHARD: Right.

MR. FORD: What are those existing standards? 75.360?

MR. PRITCHARD: I don't know the number but the operator is required to make a check of his equipment before it's operated and make a record of that.

MR. FORD: Okay. You're talking about under the diesel safety rule?

MR. PRITCHARD: Metal/nonmetal equipment operation. Yeah, equipment inspection.

MR. FORD: Okay, thank you.

MR. TOMB: Mr. Pritchard, we can make a copy of the reports that we have to make them available to you on this if you want to review that, the tables more thoroughly. We've gone through this from a lot of requests, and I haven't heard the same --

MR. PRITCHARD: Well, I'm specifically troubled by just the individual Tg numbers. I finally found out which mine we were in there, and they look entirely higher than the results we've seen. They're looking at around 800 to 1,000 micrograms, and the numbers I have seen in the last couple tests are in the submicron range around 200. So I don't know what numbers were used. Is it total? Is it -- so it seems like the numbers are either artificially high or some other -- I don't understand how they were derived.

MR. TOMB: Okay. We could go back and check that.

MR. PRITCHARD: Okay. I've understood last --

MR. TOMB: I know I've looked at the report from your mine several times to clarify questions that came into the office, and I thought we had them pretty much clarified.

MR. PRITCHARD: I'll go dig them out when I get home too.

MR. TOMB: Okay, we can get back to you on that one.

MR. KOGUT: It seemed as though the comments that you made just now diverge towards the end a little bit. You added some material from what you --

MR. PRITCHARD: I've got some additional things at the end. Yes, I don't have any spare copies of that.

MR. KOGUT: Okay. Could you submit a copy? Could you mail us a copy?

MR. PRITCHARD: Yeah.

MR. TOMB: Any other questions?

(No response.)

MR. TOMB: Okay, thank you very much.

MR. PRITCHARD: Thank you very much.

MR. TOMB: Our next presenter will be from FMC Corporation, Mr. Rowdy Heiser.

Did I pronounce that correctly?

MR. HEISER: I also have with me Terry Adcock of OCI and Kent Adamson from Solvay Mineral, and Henry Chajet.

MR. ADAMSON: Good afternoon. My name is Kent Adamson. I'm a Certified Industrial Hygienist and a Certified Safety Professional. That's K-E-N-T A-D-A-M-S-O-N. I am the Safety and Health Supervisor for Solvay Minerals Corporation. We operate a trona mine in Green River, Wyoming, which employs approximately 159 employees that are underground miners, and uses about 89 pieces of diesel equipment underground.

As Rowdy indicated today, we've got himself and FMC and Terry Adcock with OCI. Both of their companies also operate trona mines, and together we represent the MARG Diesel Coalition, and we are accompanied here today by the coalition's counsel, Henry Chajet.

The coalition will file written comments in response to the standards proposed by MSHA concerning workplace exposures to diesel particulate matter.

Our testimony today is intended to summarize our concerns.

The coalition's members include mine operators whose mines and employees are the subject of the collaborative study of diesel particulate exposure being conducted by NIOSH, which is the National Institute of Occupational Safety and Health, and NCI, the National Cancer Institute, and also an independent parallel study funded by the coalition.

The multimillion dollar NIOSH/NCI study addressed by the last two congressional appropriation reports is designed to measure current diesel exposure, estimate past exposures and evaluate past and current health effects. The study was undertaken because existing science is at best inconclusive. For this and other reasons that we will address, the coalition requests that this rulemaking be postponed until after the completion of the NIOSH study.

The coalition's members include producers of limestone, salt, trona and potash that utilize diesel equipment in their underground mines and compete on the world markets to sell their products.

MARG members are committed to the protection of their employees and to the environment. We are participating voluntarily in the NIOSH/NCI study because of the public concerns raised over the potential health effects of diesel exhaust. We recognize the concerns of employees that have been raised by the inflation of the NIOSH research and MSHA's proposed rules.

In response to these concerns, MARG commits to the following guidelines that will be utilized until the completion of the NIOSH study and during the requested postponement of this rulemaking.

During the period while the health effects of diesel exhaust are subject of research and regulatory review, we will take the following voluntary actions to protect our employees:

One, we will identify the source of diesel exhaust.

Two, we will identify the current methods that control exposure of miners to diesel exhaust.

Three, we will establish an employee and employer communication and training effort within the context of MSHA's Part 48 training sessions aimed at diesel exhaust exposure control.

Four, we will examine and adopt technically and economically feasible methods of further controlling diesel exhaust.

And, five, monitor gaseous diesel exposures as frequently as necessary to evaluate the adequacy of control methods and to assist in developing effective monitoring methods.

The coalition is uniquely qualified through its members experienced in diesel research and use to provide comments on these proposed rules. Based upon its expertise, the coalition believes that the proposed rules are not supported by substantial or credible evidence.

Diesel exhaust is a complex mixture of gasses and fine particulate matter emitted by diesel fuel engines. The composition of diesel exhaust can vary, depending upon many factors, including engine type, operating conditions, fuel consumption, the variety of lubricating oil that is used, and whether the engine is fitted with an emission control system.

There are many individual exhaust components that can be used as surrogates to estimate exhaust exposure levels. The gaseous fraction of diesel exhaust is composed of combustion gasses, including nitrogen, oxygen, nitrogen oxide, carbon monoxide, sulfur oxide, carbon dioxide and water vapor. These gasses are subject to current MSHA exposure limits and controls.

Unfortunately, MSHA has not conducted any scientific analysis to determine whether protection beyond current exposure limits is needed.

Diesel exhaust also contains elemental carbon which can range from .01 to .08 microns in diameter. Another carbon particulate, depending upon the type, condition and use of the engine, the contribution of organic particulate to the total diesel particulate matter ranges from 10 to 90 percent.

It is the total carbon content of the diesel exhaust which MSHA has proposed to regulate in its metal/nonmetal rulemaking as a surrogate for overall diesel exhaust exposure.

While MSHA concedes that it cannot measure diesel exhaust carbon in coal mines due to the interference of the carbon mineral, it ignores the same and other feasibility problems in metal and nonmetal mines that have carbonaceous minerals.

The coalition has taken over 1,000 samples in its mines that demonstrate the lack of feasibility of MSHA's proposed rule. We will be submitting for the record written comments which document this problem.

Existing science does not support MSHA's finding that diesel particulate matter is a human carcinogen. Neither the EPA nor OSHA agree with MSHA's findings, nor does current science support the proposition that diesel particulate matter exposures at or above the proposed concentration level in the metal/nonmetal rule are injurious to employees, or that exposures at or below the proposed concentration limit will be protective of workers' health.

Again, neither EPA nor OSHA agree with MSHA's unique interpretation of the science or with MSHA's determination of the need for such standards.

For the first time a federal regulatory agency has sought to place occupational exposure limits on the particulate matter produced by diesel engines. By this action MSHA has ignored the regulatory plans of EPA and OSHA; has gotten ahead of the public debate on diesel engines, propose to set two new national standards, a 95 reduction of particulate matter for coal industry diesels, and a 1.6 milligrams per cubic meter, eight-hour exposure limit for the rest of the mining industry.

By this precipitous action, MSHA bypasses the congressionally directed multimillion dollar study by NIOSH, which is the federal agency charged with determining whether diesel exhaust even poses an occupational hazard, and if so, at what level of exposure.

The lack of positive findings in the scientific literature is the very reason that NIOSH and NCI have invested millions of dollars this decade to conduct their definitive study of diesel exhaust. The purposes of the mining industry study are to determine whether or not a significant risk of adverse health effects exists, what those health effects are, if any, what they might be, and what level of exposure might cause health effects.

Simply stated, MSHA's proposal is premature, contrary to the scientific evidence, and inconsistent with the positions of the primary federal agencies charged with regulating diesel exhaust.

I would like to turn the time over to Terry Adcock.

MR. TOMB: Do you mind if we ask you questions of your part?

MR. ADAMSON: Not at all.

MR. TOMB: Okay.

MR. KOGUT: I have -- thank you. I have two questions.

First, on page 4 of your -- of the write-up of your presentation, 4 and 5, you say that we propose to regulate total carbon as a surrogate for overall diesel exhaust exposure. And I don't understand where you got that impression. My impression of the regulation is that it's a regulation of diesel particulate, so you might say that we're using total carbon as a surrogate for diesel particulate, but why are you saying as a surrogate for diesel exhaust?

MR. ADAMSON: Well, I guess that's just a matter of semantics there.

MR. KOGUT: But it's not just a matter of semantics because you are very specifically including in your definition of diesel exhaust all the gaseous components of diesel exhaust, so it makes it appear when you say that as though we're using total carbon as a surrogate for all of these gaseous components in addition to the diesel particulate, and I don't think we said anything in the proposal that ought to convey that impression.

MR. ADAMSON: Well, Henry, do you want to comment?

MR. CHAJET: We think your rule is aimed at regulating diesel exhaust. That's the way the rule reads to us, number one.

Number two, you're using diesel particulate matter as a surrogate to measure diesel exhaust.

And, number three, you're using total carbon as a surrogate to measure diesel particulate matter. You followed that three of analysis, the way we read it. Your scientific analysis of the literature is not based on elemental or total carbon. It's based on diesel exhaust. Your analysis of the exposure levels is not based on total carbon or elemental carbon. It's based on RCD or submicron or NO_2 samples or whatever else you had that was out there in the record that was old material.

So we believe what you're doing is trying to regulate diesel exhaust by setting up a surrogate, diesel particulate matter, which you also can't measure, and then setting up a secondary surrogate of measuring total carbon, which you also can't measure.

MR. KOGUT: Well, I think the some clarification is in order on this, I think, because the risk assessment, two of the -- two components or two parts of the risk assessment, two of the material impairments that we identify relate to fine particulate, of which diesel particulate is one type. That's particulate; it's not anything to do with the gaseous part of diesel exhaust.

And the portion of the risk assessment that deals with lung cancer or effects more generally, acute and chronic effects of diesel particulate, I think there was some effort made to identify diesel particulate -- there was evidence in rat studies and so forth showing that it's the particulate fraction of the diesel exhaust that's responsible.

So I think that some effort was made in the risk assessment to specify diesel particulate as being what we were aimed at regulating, not diesel exhaust in general.

MR. CHAJET: I think it's a matter of semantics and surely you're aware of the overwhelming science that says rat studies can't be extrapolated. Surely MSHA is aware of that science. I mean, there is no question about that. It's been alluded to by every reputable scientist in the world.

MR. KOGUT: Well, I think that that's --

MR. CHAJET: And you must be aware of it too.

MR. KOGUT: I think that's addressed in the risk assessment, and if you read the risk assessment, I think you'd see that we are aware of that part of the rat studies that, you know, we think are relevant, and that part which we think are not so relevant.

But anyway, just as a point of clarification, I don't think that there is really anything in the proposal as drafted that would indicate that our aim is to regulate total diesel exhaust.

MR. CHAJET: It certainly appears that way to us. In addition to that, we think it's also your statutory duty to make a determination that current standard so not provide the degree of protection required, and the current standards are the standards for the gaseous portion. The particulate matter is a very tiny fraction of the overall exhaust, and we think you have to make a determination that the current standards do not provide protection. We think that's part of your regulatory duty.

MR. KOGUT: Okay, I have one other question, which is that you mentioned you're undertaking -- MARG is undertaking a parallel study in parallel with the NIOSH/NCI study, and I'm wondering whether in doing -- the purpose of that is, I gather, also to do ultimately an epidemiological study based on the data that you collect; is that right?

MR. ADAMSON: Yes.

MR. KOGUT: And what sorts of measurements are you taking? NIOSH, for example, is taking total carbon and elemental carbon measurements and some other sorts of measurements. What measurements -- are you taking any measurements to -- that would specifically address the problem with interferences and so forth that I guess you're saying are potentially going to cause problems in the NIOSH/NCI study?

MR. ADAMSON: Yes, we're taking a whole gamut of them, from the SO_2, NOX, to elemental carbon, RCD. We have impactors that Kennecott referred to that we plan to use, looking at all different surrogates that NIOSH is proposing. We've went to the analytical laboratories, Clayton. We watched them process the samples. We've seen the thermographs. We've seen the problems that are inherent there.

You mentioned earlier today that -- the last one of the presenters if they have seen whether the chemist will put it into the manual mode based upon some of their observations. We have an issue with that.

Here you are requiring us to comply with the standard that you could issue citations on based on an analytical method that is, at the most part, at the analyst's discretion, whether he says, "Oh, I think it's burnt off 900 degrees, I'm going to mark it here." There is a lot of room for error there. So we've seen some of these things, and these are some of the concerns that we have with the method.

In addition to that, we've looked at the lack of a standard. How do you calibrate these instruments? There is no known standard.

MR. KOGUT: Well, I"m a little puzzled about what you're saying because you're telling us that on the one hand that we should wait until we get the results of the NCI/NIOSH study. On the other hand you're saying that the measurements that they're using -- the primary measurement that they are taking of diesel particulate is kind of hopelessly diluted by sources of interference.

MR. CHAJET: You're combining two problems. The first problem is that the NIOSH study will determine whether there is any excess risk of any end points of suspected disease, okay. That's the first part. That study will be available relatively soon: whether there is nay excess risk of any suspected end point of disease.

The second part of that study involves measurements and NIOSH is working very hard, as is the coalition, and examining the various methods of measurement that have been suggested be employed in measuring diesel exhaust or particulate matter from diesel exhaust. And in examining those methods, I believe both NIOSH and ourselves have verified the information that you heard from Mr. Rose earlier today.

But you're confusing two parts of the study, and two parts of MSHA's duty. The first part of MSHA's duty, is there a health risk. NIOSH wouldn't be doing this multimillion dollar study if they knew the answer to that. In all their published documents they recite that they didn't know the answer to that, and that's the very first part of the congressionally funded study.

MR. TOMB: Well, one point of clarification. I think NIOSH has come out on considering diesel exhaust a potential carcinogen. I don't think that's in doubt. They published that.

The premise for the study that you're conducting is to see if you can get a dose/response relationship so they can find or predict what a safe level would be for exposure, and that's the premise for the study.

MR. CHAJET: I'm very sorry, Mr. Tomb, I think you should read the protocol.

MR. TOMB: I have read the protocol.

MR. CHAJET: The premise for the study, number one, is to determine whether there is an excess risk of any known end point potentially suspected disease. That's why they are collecting health information, death certificates, and conducing an epidemiological study.

MR. TOMB: I totally agree, but that's just one small body of information that's going to be put in --

MR. CHAJET: Probably $20 million dollars worth.

MR. TOMB: -- with the others. Well, it's true. Are you done with your questions?

Mr. Adamson, also on page 4, could you provide a reference where you're stating that the ratio between organic particulate matter goes from 10 to 90 percent for diesel exhaust, if you could supply that.

MR. ADAMSON: We can provide that to you in our post-submission. You bet.

MR. TOMB: Okay. On page 5, is there something in writing that substantiates that neither EPA nor OSHA agree with MSHA's unique interpretation of the science or with MSHA's determination of the need for such a standard?

MR. CHAJET: Yes. Their absolute science in not proposing a similar rule.

MR. TOMB: No, I was asking of there was something in writing. That didn't answer my question.

MR. CHAJET: I think their absolute silence speaks very loud that MSHA is acting on its own. OSHA is the primary agency for safety and health in the United States. They've proposed no rule. They have tunneling at issue with substantially higher exposure levels than anything you have seen, and they are not proposing any rule.

MR. TOMB: Okay, so there is nothing in writing that states that is what you're saying?

MR. CHAJET: There is certainly is EPA material in writing postponing levels of diesel exhaust for non-road equipment, yes. There is that written material.

MR. TOMB: That wasn't my question. My question, again, let me clarify, Mr. Adamson. Is there something in writing from either EPA or OSHA with respect to your statement?

MR. ADAMSON: Yes, we'll provide the EPA written comments to you.

MS. WESDOCK: As well as OSHA's?

MR. ADAMSON: As well as OSHA's?

MR. TOMB: Whatever you have that states --

MR. ADAMSON: Yeah, whatever we have to support it, we will send it.

MR. TOMB: Yes, whatever you have --

MS. WESDOCK: Okay.

MR. TOMB: -- to support it; that's fine.

MR. ADAMSON: You bet. You bet.

MR. TOMB: That's all.

Any other questions?

(No response.)

MR. TOMB: Okay. You're next, sir. Your name for the record too. Could you state it or restate it, please?

MR. ADCOCK: My name is Terry, T-E-R-R-Y, Adcock, A-D-C-O-C-K. I am the Safety Superintendent for the OCI Mine located in Green River, Wyoming. It's an underground trona mine.

We employ approximately 140 employees underground at our operation, and we operate approximately 80 pieces of diesel equipment underground.

Similar to Mr. Adamson, I am also a Certified Safety Professional with over 20 years of underground mining experience split basically between underground coal and underground metal and nonmetal.

In promulgating a health standard, MSHA is bound by the statutory provisions of Section 101 of the Mine Act, which requires the agency to demonstrate that its standard, "(a) is needed to protect against a significant risk of material impairment of health; (b) is based upon the best available evidence; (c) is consistent with the latest available scientific data in the field; (d) is technically and economically feasible; (e) is based upon experience gained under the Mine Act and other health and safety laws; and (f) provides significant benefit."

The recent National Mining Association decision by the Eleventh Circuit Court of Appeals clearly sets forth MSHA's regulatory duties, and the coalition urges MSHA to follow the decision.

MSHA lacks a sound scientific basis for its proposed rule. As discussed in the comment of Dr. Jonathan Borak that will be submitted for the record by the National Mining Association, and adopted by the coalition, there is no evidence whatsoever in the record to support MSHA's proposed exposure limits.

Both the existence and the magnitude of health risk associated with occupational diesel exhaust exposure are currently the subject of scientific debate. The current scientific controversy involves whether animal studies or limited and contradictory epidemiological data can be used at all to establish risk. There is no doubt that there is no scientific basis to set an exposed standard.

When using available diesel epidemiological data for risk analysis, MSHA must consider: "(1) the changing nature of diesel emissions. Current exposures are not analogous to those in the 1950s; (2) the lack of actual exposure data in virtually all human studies; (3) the need to update and validate some of the key studies," again in parentheses, "(the current ongoing NIOSH/NCI study); and (4) the fact that a dose response assumptions in the current epidemiological studies are universally based upon questionable models."

Despite these problems, MSHA has relied selectively on some of the old and suspect research while ignoring the mining industry's specific studies and the latest scientific evidence that contradicts the suggestion of health effects from DPM exposure.

NIOSH has a specific statutory role in the MSHA regulatory scheme. The Mine Act mandates that the Department of Health and Human Services, acting through NIOSH, conduct research, including development of epidemiological information to identify and define factors involved in occupational disease of miners; and to improve mandatory health standards.

Through its collaborative diesel study within NCI, NIOSH is engaged in fulfilling this mandate for diesel exhaust. MSHA's proposal violates the Mine Act by ignoring the best available evidence and by preempting the NIOSH study.

MSHA must also comply with the requirements of the Small Business Regulatory Enforcement Fairness Act and the Regulatory Flexibility Act, which require initial and final regulatory flexibility analysis and consideration of alternatives to minimize the economic impact on small entities, including the establishment of differing compliance requirements.

These statutes are violated by MSHA's failure to analyze the protected nature of current standards that govern diesel exhaust gasses, MSHA's refusal to recognize alternative protective means, such as personal protective equipment, and the serious flaws in MSHA's economic and technical feasibility analysis.

We note that the agency has improperly minimized the true impact of the proposal on small business entities by failing to include many factors (such as fuel cost increase), the need to replace rather than retrofit most large diesel-powered engines, and the impact of the rule on equipment resale value.

The agency also masks the true economic impact on the mining industry by bifurcating the rule.

Ninety-eight percent of coal companies have fewer than 500 employees, and 96 percent of the metal and nonmetal mines fall within this classification of small business, protected by the statute.

MSHA acknowledges that 196 of the 203 metal and nonmetal mines covered by the proposal have fewer than 500 employees. MSHA's data, demonstrating a massive decline in the number of underground mines in the United States since the passage of the Mine Act, must be considered by the agency in the context of the large cost that will impose on the remaining segment of the industry by these rules.

These laws also provide for congressional review of federal agencies' regulations whenever a rule will have a major impact on an industry or will affect competition, productivity or international trade, and they specify that rules cannot go into effect until congressional review is complete.

The coalition believes that the diesel particulate rule, if adopted, will indeed have a major impact and must therefore be submitted by MSHA to Congress for review prior to implementation.

We also believe that this rule must be submitted to the Small Business Administration for that agency's review and comment.

Although MSHA estimates the cost of metal and nonmetal rule to be approximately 19 million per year, and the cost of the coal rule to be approximately 10 million per year, the coalition believes that the cost of the metal and nonmetal rule alone will exceed $100 million, making this a major rule subject to congressional review.

For the record, we and the National Mining Association will submit an economic analysis conducted by Harding Lawson Associates to demonstrate these flaws in the proposal.

Requiring the 95 percent reduction in DPM emissions for the coal industry and mandating a .4 milligram interim total carbon PEL, and a .016 milligram permanent PEL for metal and nonmetal mines may be laudable goals, but after establishing risk and benefits to justify these specific levels, MSHA must demonstrate technological feasibility through published facts and peer review studies, i.e., field tests. MSHA may not simply assume feasibility as it has in the proposal.

There are many technologies that have been proposed to address DPM reduction, but the efficiency of these technologies in the underground mining environment where technologies are not transferable between coal and metal and nonmetal mines and between small and large engines is unproven.

Most of the technological developments are being driven by the regulatory agenda of the Environmental

Protection Agency. However, EPA will not implement its revised emission reduction requirements for on-road diesel engines until 2004, and will not finalize tier two regulations for non-road diesel equipment until 2006.

OSHA, which like MSHA regulates diesel exhaust gasses, is not proposing DPM regulations at this time. It makes more sense for MSHA to coordinate its activities with those of the EPA and OSHA with respect to off-road diesel engines to ensure that the technology required of engine and fuel producers is consistent and rationally related to hazards.

The coal rule emphasizes on a mandatory percentage reduction in emissions is illogical since it has no uniform absolute benchmark. It actually creates a disincentive to reducing DPM or replacing a fleet with newer, cleaner engines since the mine operator's ability to reduce emissions by 95 percent becomes more difficult the lower the emissions are to start with.

The coal rule, as proposed, rewards those who have older, less clean engines, and penalizes the cleaner fleets. The metal and nonmetal proposal for total carbon concentration limits, not based on risk assessment, is equally flawed since the sampling methods will not distinguish between diesel-produced carbon and carbon from other sources, and the availability of equipment or operating changes have not been demonstrated to reduce exposure to proposed levels.

MSHA's approach could have other unforeseen hazards. One paradox is that the emission controls and technologies that lower CO and hydrocarbon levels tend to increase the NOX and particulate matter levels, particularly levels of submicron particles that are suspected of being greater hazards than larger particles.

Those diesel engines that offer the best fuel economy also tend to have higher NOX levels. More research is underway to develop advanced engine fuels, after treatment systems that can reduce NOX and DPM emissions while maintaining fuel economy and low CO and hydrocarbon levels.

EPA and OSHA's approach will permit this research, while MSHA's is on the verge of mandating nonproven technology to meet an arbitrary exposure level that cannot be measured.

There also is a concern that proposed efforts to reduce particulate emissions from diesel engines will have unanticipated consequences, such as increasing emission of other species.

Their presentation of diesel issues in April 1999, the Health Effects Institute, HEI, stated: "Despite a substantial reduction in the weight of total particulate matter, the number of particles emitted from new, heavy-duty diesel engines is actually higher than the number emitted from an older model engine due to an increase in the number of small nuclei mode particles. These results are of a concern because the smaller particles in emissions are more likely to be trapped and retained in the human lungs."

Again, this is from Kathleen M. Naus, Diesel Engine Emissions, Health Effects Issues, and it was presented at the 1999 Diesel Issues Forum, Pentagon City, Virginia.

HEI recommends that dialogue between health sciences, engineers and regulators is needed to determine whether characteristics of particles, such as number, density, surface area, shape and chemical composition, may be more relevant in causing health effects than measures of mass. In light of this latest scientific evidence, it is imprudent for MSHA to adopt a regulation on DPM emission reduction at this time.

Regardless of the percentage reduction or concentration limit that ultimately may be specified, the results of such an action from a health perspective are unknown and cannot be justified, explained or scientifically analyzed. MSHA has not adequately explained neither the benefits or the technological or economic feasibility of its mandated reductions.

And at this time I would like to turn it over to Mr. Rowdy Heiser from FMC.

MR. FORD: I've just got one question, I guess.

The study by Harding Lawson Associates that you referred to, is that the study that was given earlier today?

MR. ADCOCK: Yes, sir, it is the study.

MR. FORD: So when you say they are going to provide more when they finalize that study, that's what you're talking about?

MR. ADCOCK: Yes, sir.

MR. FORD: And one other question. Do you have any -- and that study will talk about fuel costs and fuel cost increases also?

You mentioned that a cost of the rule that was ignored was fuel cost increases. That study by Lawson will address the --

MR. CHAJET: We're not sure if it looks at that or not.

MR. FORD: Okay, thank you.

MR. SASEEN: On page 12, you talk about emission controls that -- it was CO, NOX particulate. Could you submit any of your evidence that supports those statements? Research that shows, you know, that these technologies are, you know, the trade-offs are the way they are from what you state in your document here?

MR. ADCOCK: Yes.

MR. SASEEN: Okay, thank you.

MR. TOMB: Okay, thank you very much.

MR. HEISER: My name is Rowdy Heiser. R-O-W-D-Y H-E-I-S-E-R. I'm with FMC Corporation. I will speaking on behalf of FMC and the MARG Coalition this afternoon.

FMC employees approximately 254 underground miners. We have approximately somewheres in the neighborhood of 250 pieces of diesel equipment.

The coalition believes that it is premature for MSHA to promulgate final DPM regulations given the current state of scientific research. As a threshold issue, MSHA has not identified any data or study that supports a finding of excess mortality or disease in coal and metal/nonmetal miners that is related to DPM exposure at the levels proposed for regulation.

MSHA has not conducted a comprehensive risk assessment, an assessment of risk at current or proposed regulatory levels or an assessment of potential benefits from the proposed standards. Instead, MSHA has used three types of evidence to identify possible relationship between occupational exposure to diesel particulate and illness.

The three types of evidence are: (1) the presence of suspected carcinogenic compounds in diesel exhaust; (2) the induction of lung cancer in rats, although not in mice or hamsters, in certain experiments; and (3) certain non-mining epidemiological studies with inconsistent results which do not quantity the amount or type of particulate matter exposure.

In fact, however, the mining industry specific studies demonstrate a lack of diesel-related health effects. And the latest, most reliable scientific literature contradicts MSHA's analysis and findings.

As California's EPA noted in 1998, "The uncertainty in the application of the rat findings to humans is substantial. Present lack of knowledge about how the carbon core of diesel exhaust particle contributes to the carcinogenicity also adds to the uncertainty about the scaling from rates to humans."

After reviewing animal research, MARG concluded diesel exhaust is a pulmonary carcinogen when inhaled chronically at high concentrations by rats. It is of questionable carcinogenicity in mice and is not carcinogenic in hamsters.

In a recent presentation, Dr. Kaplan M. Noss, of the Health Effects Institute, suggested that "...because prolong exposure to diesel emissions does not produce lung tumors in hamsters, and the results are equivocal, species-specific factors play a critical role in the induction of lung tumors by diesel emissions."

At this time, however, there is clearly a disconnect between animal studies and human experience, and the animal studies do not constitute credible, substantial evidence to support the proposed rule.

When reviewing the studies of diesel exposure in humans, the International Agency for Research on Cancer issued the strongest statement to date on the link of exposure to risk. "There is limited evidence by carcinogenicity of the whole diesel exhaust in humans. The Health Effects Institute and the World Health Organization also have evaluated the carcinogenicity of diesel exhaust and the epidemiological data show weak associations between exposure to diesel exhaust and lung cancer."

NIOSH, the agency charged with the Mine Act, with health study responsibilities, and NCI, note that the current human studies upon with MSHA relies to support its proposed rules have major weaknesses:

First, only one was able to adjust for smoking.

Second, most defined exposure based on job information and none had incorporated quantitative assessments of diesel exhaust exposure directly into the mortality analysis.

Third, exposure to the diesel exhaust appeared to be low generally.

Fourth, the latency in many studies may have been insufficient to detect excess lung cancer mortality.

Finally, the confounding from other exposures, such as asbestos, was an unresolved difficulty in a number of studies.

These weaknesses make it difficult to draw reliable conclusions from these findings.

NIOSH/NCI diesel exhaust study protocol: All of these prestigious health and research organizations fault existing research because of the absence of reliable exposure data, the inability to control for confounding factor and questions about the study's ability to estimate a dose/response relationship.

As NIOSH/NCI put it, "Few mortality studies using quantitative measures of diesel exhaust directly to access exposure response exists. Those that do have defects are incomplete."

NIOSH/NCI diesel exhaust protocol: "Limited and weak evidence has defects and is incomplete, does not meet the statutory requirements for the latest substantial and credible evidence demonstrating significant risk."

Significantly, the human studies conducted in the mining industry reveal a negative propensity for diesel particulate matter-related health effects.

Among the materials added to MSHA's rulemaking document following the completion of the public hearings on the coal rule was a recent study of underground coal miners, which found that these workers have a less than average chance of dying from cancer and other illnesses, which MSHA's preamble links to DPM exposure. See Christy, "Mortality in the North/South Wales Coal Industry 1973 through 1992," The Journal of Australia.

The study found that miners who entered the industry between 1973 and 1992 had a 24 percent lower mortality than the general population, including a 27 percent lower mortality from respiratory diseases, and a 22 percent lower mortality from cancer. These workers also had a 33 percent lower mortality from heart disease. The researcher noted that the lower mortality rate compared with that shown in some earlier studies of miners, who began working in the 1930s or earlier, was due to the extensive mechanization of mining techniques and to the dust control now prevalent in the modern mining industry. This study, which reflects the latest scientific evidence, the current state of technology, and the actual health effects on miners, is more appropriate basis upon which to determine whether the regulatory action is needed.

The other mining industry-specific studies in the rulemaking record do not demonstrate any health effects related to DPM exposure, and MARG will supply a written summary of these studies with its comments.

As noted in MSHA's preamble, over 30 general epidemiological studies have investigated the potential health effects of diesel exhaust. However, there were no published industrial hygiene measurements for the diesel exhaust exposures for any of these study populations. Even if the studies demonstrated health effects, which they did not, they do not support MSHA's proposed DPM levels.

Moreover, the pivotal studies upon which MSHA most heavily relied at best shows small effects and are fatally flawed, and even MSHA's analysis of the existing epidemiological studies shows only a weak association between diesel exposure and diesel etiology.

As noted by NIOSH/NCI's diesel researcher, Debra Silverman, "The repeated finding of small effects, coupled with the absence of quantitative data on historical exposure, precludes a casual interpretation."

MSHA has inappropriately and selectively presented research to support its conclusion that DPM is a workplace hazard while ignoring other studies that refute that conclusion. MSHA appears to have the question backwards. In rulemaking under the Mine Act, the issue is not whether there is overwhelming evidence proving that uncontrolled exposure to diesel exhaust poses no health risk. Rather, to support a rule of this magnitude from a statutory, financial, technological and public health perspective, MSHA must demonstrate through the best available evidence that a risk of material impairment exists under current conditions, and that the control of DPM exposure at the proposed levels will provide protection to the health of miners.

The science in the rulemaking record fails to satisfy this burden.

I will now turn it back over to Mr. Adamson.

MR. KOGUT: I have a couple of questions.

There is a statement here that we've ignored studies that refute our tentative conclusion that DPM is a workplace hazard, and one that you listed here was the study by Christy that you discussed.

Were there other ones that you had in mind besides that?

MR. CHAJET: Yes, and those will all be presented as part of the written comments.

MR. KOGUT: Okay, but I didn't miss one in your comments here. That was the only one you discussed here. Is that right?

MR. HEISER: Yes.

MR. TOMB: Okay, and you will be providing other ones.

MR. HEISER: The studies in the written comments.

MR. KOGUT: Okay. I'm sorry, do you have any -- I guess I missed the earlier part of your presentation where you were giving your background.

Do you have a background as an epidemiologist?

MR. HEISER: No, I do not.

MR. KOGUT: In your written comments, are you going to be providing an analysis by competent epidemiologists explaining the relevance of this Christy study and other -- the other studies that you talked --

MR. CHAJET: Yes.

MR. KOGUT: Are you aware that in this Christy study that there is no mention of any conclusions about the effects of diesel exhaust or diesel particulate?

MR. CHAJET: It's because there were none.

MR. KOGUT: How do you know that that's why there was no conclusion presented?

MR. CHAJET: Because they studied diesel-exposed miners for --

MR. KOGUT: How many of those miners were diesel exposed? Do you know?

MR. CHAJET: We believe all of them were diesel exposed.

MR. KOGUT: Where in the study does it say that?

MR. CHAJET: I believe it's in the text of the study.

MR. KOGUT: Could you point that out in your written response?

MR. CHAJET: I'd be happy to. Sure.

MR. KOGUT: Are you aware that in that study the departure of the SMR from one for lung cancer was based on 29 cases and was not statistically significant?

MR. CHAJET: We'll let the study speak for itself, and there will be Ph.D.s and M.D.'s providing comments on the record.

MR. KOGUT: Okay.

MR. TOMB: Any other questions?

MS. WESDOCK: I do.

MR. CHAJET: Let me just add to the overall answer to that. Again, we're not relying on any particular study, but we are relying on statements in the record in writing by NIOSH and NCI that were just read into this record regarding the validity of the evidence that MSHA has relied on and the inconclusiveness of that evidence, and those statements are very clear. They are in writing, and they are in the record.

MR. KOGUT: I think it's important to keep in mind the distinction between evidence supporting a definitive exposure response relationship and evidence regarding the existence of an excess risk that's associated with exposure to diesel particulate or fine particulate in general.

And I think that one thing in your comments, and maybe it would be a good idea for you to address this more fully in your post-hearing comments, is that you seem to focus exclusively on the evidence regarding diesel particulates specifically and lung cancer whereas in the risk assessment we go to some trouble to talk about risks associated with fine particulate in general.

MR. CHAJET: Those quotes are in reference to the NIOSH study which is studying, I believe, 17 suspected end points of disease.

MR. KOGUT: I'm not just talking about end points, but I'm talking about diesel particulate and its manifestation as a fine particulate.

You said that the EPA, for example, has not come out with a regulation on diesel particulate, but they have come out with a regulation on fine particulate, of which diesel particulate is an example.

MR. TOMB: Okay. Oh, you had a question. I'm sorry.

MS. WESDOCK: In your testimony you say that the mining industry -- that the mining industry-specific studies demonstrate a lack of diesel-related health effects and the latest and most reliable scientific literature contradicts MSHA's analysis and findings.

Those studies that you're referring to, are those the ones that you're going to be submitting for the record?

MR. CHAJET: Those and the studies cited by the NIOSH/NCI study.

MS. WESDOCK: Okay.

MR. CHAJET: Yes. And we will provide the protocol and all the attachments with it as well.

MS. WESDOCK: Okay. Thank you.

MR. TOMB: Okay, if you would like to continue.

MR. ADAMSON: Thank you.

MR. TOMB: Thank you.

MR. ADAMSON: We'd like to restate that MSHA should postpone its DPM rule until NIOSH/NCI's mining industry study is completed.

At approximately the same time as MSHA began its rulemaking effort in the early 1990s, NIOSH and NCI developed a protocol for health effects study of diesel particulate exposure at salt, trona, potash and limestone mines throughout the United States. They performed data collection and fill sampling at selected mines in 1998 and early 1999, and the results are now being analyzed.

While the MARG Diesel Coalition may disagree with certain points and aspects of the study protocol, and participated in its development and endorsed the study. MARG believes that this is important research and has cooperated with NIOSH and NCI in making information and personnel available for the study.

The goals of the NIOSH/NCI project are to: (1) evaluate mortality resulting from diesel exhaust exposure; (2) to determine whether mortality increases in relation to the level of exposure; and (3) to evaluate the association between measured levels of diesel exhaust components in the air, metabolites in the urine, and DNA adducts in bronchial and blood cells. All suspected disease end points are being studied, including lung cancer.

The study's three components are: (1) a retrospective mortality study; (2) a nested case control study; and (3) a bio-marker study.

The researchers will utilize information from extensive current industrial hygiene surveys at each mine, as well as data from past surveys and MSHA enforcement activities. The mines have provided NIOSH and NCI with records concerning exposure levels, equipment purchases and usage, fuel records, and employment duration and stratification.

This information will be used to construct estimates of personal exposure to DPM over time and to attempt to estimate health risks at various DPM levels. Such evidence is starkly lacking in the MSHA rulemaking record.

As NIOSH and NCI notes in its 1997 protocol, and I quote, "The risk of lung cancer from diesel exhaust in humans is not well defined. In particular, although 30 or more studies have examined lung cancer risk and diesel exhaust exposure, few have employed quantitative exposure measurements of diesel exhaust directly in their analysis."

NIOSH/NCI also stresses that the only previous study of underground nonmetal miners showed, "no clear evidence of excessive risk of lung cancer." It is because of the drawbacks in existing studies that NCI and NIOSH propose to conduct a cohort and nested case control study of lung cancer and other health effects among metal/nonmetal miners.

These are the same existing studies that MSHA is using to support its proposed DPM rulemaking. MSHA must act upon NIOSH's conclusion that existing science does not support a finding that DPM has been shown to have adverse health effects in miners.

Rather than describing the NIOSH/NCI effort as unimportant to its rulemaking, as it did in the rule's preamble, MSHA is required by the statute to postpone the rulemaking in light of the best and latest scientific evidence until its sister agency study is complete.

As previously indicated, there is no justification for establishing the concentration limit for total carbon contained in MSHA's proposed rule. Moreover, the proposed NIOSH Method 5040 for measuring compliance is: (1) not intended by NIOSH to measure total carbon; (2) not technically feasible for use to measure diesel exhaust in metal/nonmetal mines due to the interference of naturally occurring carbon materials; (3) not validated with an appropriate standard; (4) proven to create massive errors when unused blank control filters are analyzed; and (5) incapable of use as a surrogate to measure diesel exhaust for these and other reasons.

The comments of Dr. Howard Cohen, which will be submitted for the record, demonstrate these problems in detail based on over 1,000 samples collected at five underground mines.

It is undisputed that the composition of diesel particulate matter is highly variable and dependent upon a multitude of mine-specific factors, including engine type and number, load cycle, fuel and oil specification, maintenance, filtration devices, altitude, temperature, and ventilation. And as noted by Dr. Kathleen Naus of HEI, it has been difficult to obtain accurate estimates of human exposure to diesel engine emissions because of their complexity, the contribution of other pollutants to the ambient air and the changes in diesel emissions due to improved engine technology and fuel composition. Moreover, no single constitute of diesel exhaust serves as a unique marker of exposure.

Over the years MSHA, NIOSH and independent researchers have used a variety of substances as a potential surrogate, including submicron particles, NO, NO_2, CO, Co_2 and most recently, elemental carbon.

MSHA now proposes a new surrogate, total carbon, that is not supported by the literature and has been proven not feasible by extensive testing.

There is no constant relationship among diesel exhaust constituents since MSHA's proposed exposure level is based on total carbon, which may vary widely in its relationship to elemental carbon and exhaust gasses according to mine conditions and equipment.

MSHA's proposal may either underestimate or overestimate the miner's actual exposure to referable diesel exhaust.

Despite this lack of certainty, MSHA proposes to determine compliance with a single area sample measurement of total carbon. For support, MSHA quotes the NIOSH claim that the 5040 method for EC "...meets the NIOSH accuracy criterion, which is a plus or minus 25 percent of the true value 95 percent of the time."

This statement, however, refers to a measurement of elemental carbon, not total carbon, in the NIOSH lab, and does not reflect the interferences of other carbon contributions from the sampling cassette and the mine environment.

The developer of NIOSH Method 5040 recommends that elemental carbon be used as an exposure marker for DPM, not total carbon.

But MSHA has apparently concluded that the EC fraction of diesel particulate material is too variable to use to extrapolate diesel particulate mass. However, NIOSH cautions that its own total carbon data using NIOSH Method 5040, I quote, they say "....indicate a highly variable total carbon to DPM ratio as well, which should not be the case for DPM. Filter stability was a problem because quartz fiber filters must be used and these tend to lose fibers. Also, reference filters often do not reequilibrate to their initial weight, especially when taken in the field."

NIOSH concludes by urging MSHA to review and analyze currently available data from U.S. mines to determine their variability of elemental carbon to total carbon ratios.

MSHA recognizes that confounders for carbon sampling exist in coal mine atmospheres, and that they preclude establishment of a concentration limit because of their interference with sampling. Carbon coal founders also exist in metal and nonmetal mines, including naturally occurring minerals, oil mists from machinery, tobacco smoke and particulate matter associated with underground blasting. It is illogical to mandate a sampling regimen that is ill-fated from the start due to its lack of technical feasibility. It is arbitrary and capricious to hold mine operators legally responsible for complying with a concentration limit when neither MSHA nor the mine operators can accurately determine the exposure level or if it exists.

Even if an appropriate analytical methodology were available to accurately determine levels of DPM compliance with an occupational exposure limit, compliance cannot be determined based on a single sample or an area sample. Such sampling results have no relationship to a miner's actual exposure and have been proven to be highly variable. MARG will submit further written comments on the issue for the record.

In response to other issues raised by MSHA's proposal, MARG believes that Part 48, Training, covers health effects and no additional training regulations are needed.

We believe that the pre-shift mobile equipment examination standard should be applicable to diesel exhaust controls and another examination standard is not needed.

We also believe that any additional plan requirements are unnecessary since they add to the recordkeeping burden without contributing to the health and safety.

In conclusion, it is clear that sound science does not support a finding of diesel particulate health risks that meet MSHA's regulatory threshold, nor is there any scientific basis for the arbitrary concentration limit or percentage reduction in emissions set forth in the proposed metal/nonmetal and coal/diesel exhaust regulations.

Moreover, implementation of the proposed rules will both -- will be both technologically and economically not feasible.

For these reasons, and in light of the NIOSH/NCI study, and the need to take joint action with OSHA and EPA on this national issue, MARG suggests that MSHA stay the rulemaking proceeding until the completion of the study and coordination with these other critical agencies.

Thank you.

MR. TOMB: Thank you. Any questions?

MS. WESDOCK: I have one.

MR. TOMB: Okay.

MR. ADAMSON: I have just a couple more questions.

Regarding the laboratory analysis, I need to ask, has MSHA or any of its contract labs, have you guys conducted or participated in any quality control or round robin testing of the NIOSH 5040 Method? And if so, can you make that -- all such activities and documents part of the public record and permit comments on the materials?

MR. TOMB: Yes, we've done some comparative measurements of the laboratories, and we can make that available in the record.

MR. ADAMSON: Appreciate it. Thank you.

Also, since there is no standard for elemental carbon to calibrate the instrument when using this method, how does MSHA know that report results are really elemental carbon from diesel exhaust?

MR. TOMB: I'd have to go back and talk to our analytical chemist about that. I don't -- as far as I know, there is no standard for elemental carbon, okay. We only have a standard for organic carbon.

MR. ADAMSON: Okay.

MR. TOMB: All right. And the temperature, where we ramp off the temperature for getting off the organic carbon and take it back up and burn off the rest of it is considered to be elemental carbon.

MR. ADAMSON: Okay.

MR. TOMB: Yes, elemental carbon.

MR. ADAMSON: All right. One thing too you might want to look into is when we visited Clayton, particularly for limestone and trona, there is not a distinct peak for the carbonaceous materials. In fact, there was almost a bimodal peak, and so the acid wash wasn't effective there. So you might want to look into that, particularly for limestone and trona.

MR. TOMB: Okay. We've looked at some of that in a laboratory. We have seen, and maybe not -- they couldn't have been the same samples that you look like.

MR. ADAMSON: Sure.

MR. TOMB: But we do see a carbonaceous peak there that with the acid wash we could get rid of it.

MR. ADAMSON: Sometimes, yup.

MR. TOMB: And we've had a lot of discussion with NIOSH, Eileen Birch out of Cincinnati, and the assistance we've had, we do not know if there was a problem with the method, to the extent that you're talking about and from what some other people are talking about. So we will go back and talk to them and clarify with them.

We have somebody in the audience, I guess, from DataChem. I don't know, do you see these problems? Feel free to speak on that stuff too, if you have information on it.

MR. PERKINS: We've run thousands of samples of these elemental carbon samples that have been coming through from various individual mining companies, as well as NIOSH, because we are the national contractor for NIOSH for industrial hygiene chemistry.

When they first developed the acid mist procedure for removing carbonaceous materials, there was some problems with it, and it even shut down one of our instruments. We were able to correct that problem and we have performed hundreds so far, and the carbonaceous ore is removed.

Where some of the problems are seen, where there is variability in the data, it is generally because of uneven surface -- it appears to be I should say -- uneven collection on the filter when you take separate punches. If you're taking an excess amount of material as you're collecting, and you're not watching the volume and the loading as you take a punch from various portions, your data can vary, and we've seen that happen with the removal of the carbonaceous material, and sometimes we see negative results for total organic carbon because it's all carbonaceous and a very small amount of regular organic carbon. And then in the next run we'll have the organic carbon, carbonation ratio, and so therefore then we get a positive value.

So if there is an even sampling and appropriate sampling that's taken place according to 5040, we don't have that problem on any of the samples we've looked at. And we can remove both trona and limestone.

MR. TOMB: Okay. Thank you.

MR. CHAJET: We appreciate the comments, but it doesn't change the fact that when we send in spiked samples or blank samples to both DataChem Lab and to Clayton and other labs, they come back with total organic and elemental carbon reports when there was no diesel exhaust, so there is clearly something wrong here with that, you know.

And the other thing is that there is a very clear operator art involved in running these analyses as to where to set the peak on these machines, and that operator art, if you will, is an unquantifiable methodology at this point. It's a very disturbing art form, if you will, when viewed from the perspective of an enforcement scheme.

MR. TOMB: Okay. Well, I think we'll take a -- not I think -- we will take your comments into consideration and look into the analytical procedure and the analytical results that are coming out.

I might just add for your information that I think there is another round robin study that's being done between Germany, CANMET in Canada, and I think there is another lab in the United States that's also doing round robin, so there are a lot of labs -- I won't say a lot -- there are other laboratories that are out here using this method, comparing results, and from the data that I've seen the results are comparable. So that's the only information I have to date.

MR. ADAMSON: I have one question for the panel.

MR. TOMB: You mean the gentleman -- yes, may I ask you a question?

Do you routinely do an acid wash or do you only do an acid wash when you know that there is a carbonate contaminate on the sample?

MR. PERKINS: If it's requested by a particular individual who is submitting the sample. Some individuals do not care whether they have carbonaceous -- elemental.

MR. TOMB: Okay.

MR. PERKINS: It's only upon request.

MR. TOMB: Okay.

MR. PERKINS: We do not do it routinely.

MR. TOMB: That's what we asked for data on this morning, we asked for that. I don't know whether we asked Kennecott. Oh, you didn't know? Okay.

VOICE: You didn't specifically request an acid wash in the --

MR. TOMB: This information is important to us because we're concerned, you know, about the comments with respect to the method, and we'll take a close look at it. We appreciate your -- I'll tell you one thing we're really glad of, the people are out there getting data and trying to do an -- using this method to measure diesel particulate in their mines. There is going to be improvement in both the measurement, the sampling method, and as people become more familiar with the analytical method, I'm sure that some of the things you talked about, Henry, is -- you know, this fine art of where to cut off the -- to set the temperature ramp so that you identify the elemental carbon, as the procedure becomes more used and you have more round robin sampling being done and the results compared, that's going to solidify itself, I feel sure.

And I think the other thing is that is important here is the sample size that are sent to the laboratories too that has to be clarified from what you came up with.

I really appreciate -- do you have any other comments?

MR. HANEY: Is smoking permitted in the trona mines?

MR. ADAMSON: No. Gas mines.

MR. TOMB: Okay, I really appreciate --

MR. ADAMSON: We have one question.

MR. TOMB: Okay.

MR. CHAJET: We have two more questions.

MR. ADAMSON: Two more questions.

MR. ADCOCK: We understand that the former political deputy assistant secretary for MSHA, Andrea Rico, has been retained by MSHA on a consulting contract, and has worked extensively on the proposed diesel rules. We also understand that her husband, John Fornet, is involved in the efforts in California to ban diesels, and had a role in the two liter analysis that MSHA relies in for support of its risks findings.

Would MSHA place all such relationships and any documents related to either her or her husband's activities in this rulemaking in the public record to permit a determination as to whether a conflict of interest or bias exists?

MR. TOMB: Yeah. I guess we can do that. I know of no such things that you talk about.

MR. ADCOCK: Thank you.

MR. TOMB: You had two questions?

MR. ADAMSON: Yes, I've got one.

My question is, why does MSHA's proposal fail to acknowledge or take into account the latest and most reliable scientific evidence such as the study of the New South Wales coal miners, the Christy study, and other new studies such as Morgan and the Cambridge environmental of

1998?

MR. TOMB: I'll turn that over to Mr. Kogut if he can answer.

MR. KOGUT: We regard the study by Christy as being marginally relevant to the issue of whether there is an association of coal dust exposure to lung cancer, and we discussed it, to some extent, in that context in the rule.

As for relationship with diesel particulate, as I think you pointed out in discussing it, the SMR for lung cancer was lower than one, not just for lung cancer but for virtually every other health end point that was looked at. That indicates the presence of a substantial healthy worker effect. As a matter of fact, the miners that were included in that study seemed to be quite, quite a bit healthier than the general population. And for that reason really the appropriate comparison would not be to the general population but to other workers in the coal, or that were not exposed to diesel particulate. That wasn't -- there was no attempt to do that or to adjust for any kind of a healthy worker effect in that study.

The only -- the only health end point that was elevated for the workers in that study was -- the only risk that was elevated was risk due to accidents, deaths due to accidental mishaps, and that brings up another possibility, which is -- another issue, which is that there is an issue of competing risks from -- because those miners were subjected to premature death due to accidents, they may not have had sufficient time to develop things like lung cancer, which require a long-term exposure, at least more so than the general population would be, and that might account for part of the difference with the general population.

The most important consideration, I think, and the reason why I think it's not really relevant as a study that looks at an association for lung cancer with diesel exposure is that we don't have any idea really how many of those miners were exposed to diesel, first of all. And secondly, because the report includes lung cancers that were diagnosed only through 1992, but the cohort includes workers who entered the workforce as late as December 31 of 1992. So some unknown fraction of that workforce was only included in the cohort with no opportunity to be exposed to diesel exhaust at all. So there is a wide range of latencies or periods of exposure that -- among the people in the cohort, and there is no indication given, we don't really know what percentage of the people in the cohort were exposed to diesel for more than five or -- five - six years, or, you know, some of them were exposed for no period of time at all.

Now, it's normally assumed or taken for granted in a cohort study that's looking for a health end point like lung cancer, that in order to provide sufficient latencies, provide enough time for whatever the contaminate is to have an effect on increasing the incidence of lung cancer, that you have to have a period of at least 10 or maybe 10 years or longer before any effects of that contaminant would become apparent.

That doesn't seem to be the case in this study, and there is no indication by the authors that this study is even relevant to an investigation of lung cancer as associated with diesel particulates.

So it really seems like a -- I don't see that there is any relevance of this study in compiling a list of studies that are looking for an association between diesel particulate and lung cancer, and I don't think it would meet any minimal criteria that -- you know, if someone were constructing a list of criteria for studies to be included in a meta analysis or, you know -- you know, there is a lot more than 43 epidemiological studies out in the world, and, you know, you could pick any one arbitrarily and say that, well, we should have looked at that. But, you know, this doesn't seem to be much more relevant as a study linking -- looking for an association between diesel particulates and lung cancer than a lot of other arbitrarily selected studies that have nothing to do with it. And the authors made no mention of either looking for that or concluding that there was no association.

So we also received that study pretty late into the rulemaking. Initially we didn't put it in the record at all. When it was brought up during hearings for the California Air Resources Board, or the California Environmental Protection Agency, we became aware of it, and did look at it at that time, and concluded that, although it was relevant to the question of whether exposure to the carbon in coal is associated with lung cancer, we didn't see any relevance really or we didn't see that it was a useful study in assessing association between diesel particulate and lung cancer.

MR. ADAMSON: Thank you.

MR. KOGUT: The other study is -- the other study that you mentioned is not an epidemiological study. What was the other one you mentioned again?

MR. TOMB: Rieger and Morgan.

MR. KOGUT: Rieger and Morgan, that's a critique of the existing epidemiological literature, and so we did look at that and take it into account in our assessment, but we didn't include it as one of the 43 epidemiological studies that we considered because it's not an epidemiological study.

We did take the opinions expressed in that analysis into account however.

MR. TOMB: Do you have any other questions?

MR. ADAMSON: Thank you.

(Laughter.)

MR. TOMB: Thank you for your presentation.

We are going to take a 15-minute break.

(Whereupon, a recess was taken.)

MR. TOMB: All right, the next presentation is going to be made by Independence Mining Company. It will be made by Mr. Brent Chamberlain. Thank you.

MR. CHAMBERLAIN: Mr. Chairman, are you ready?

MR. TOMB: Yes.

(Slide.)

MR. CHAMBERLAIN: My name is Brent Chamberlain, B-R-E-N-T C-H-A-M-B-E-R-L-A-I-N.

Thank you, Mr. Chairman and members of the panel, for the opportunity to provide comments concerning the proposed diesel particulate matter regulations. With me I have Mr. Shane Owen who is responsible for our industrial hygiene, and together today we are representing or employer, Independence Mining Company, who is the operator for Jerritt Canyon Joint Venture.

We share MSHA's goal of providing a safe and healthy work environment for our miners. With this in mind, we have reviewed the proposed standard, conducted extensive testing in our mines and other work areas, and evaluated the estimated costs of achieving these proposed standards. Based upon these evaluations, we support the comments made here today by members representing the National Mining Association and the Nevada Mining Association.

(Slide.)

Based upon our test results and analysis, we believe that the proposed standards should not be adopted for the following reasons, which I will address in greater detail in a moment:

First, the proposed standards are premature considering the lack of medical and scientific evidence.

Two, the proposed regulations are based upon analytical methodologies and mitigation technologies which either may not be available at this time, or are not reliable or practicable under the conditions that exist in underground metal mines such as ours.

Number three, to cost estimates provided by MSHA are inadequate and do not accurately reflect the substantial adverse economic impact on a mine.

And, four, many of the provisions contained in the proposed standards ignore generally accepted industrial hygiene practices, and some may be subject to abuse or otherwise would be disruptive to mine operations with little or no actual improvement in miner health or safety.

The testimony we will provide today is intended to highlight some of our concerns with the proposed standards. We would like to reserve the right to provide additional comments before the close of the comment period.

(Slide.)

First, it is premature for the agency to propose these standards when reputable organizations and associations both within the industry and the scientific community are conducting studies on the effects of diesel emissions. These studies will focus on the very issues critical to development and implementation of effective new standards, such as reliable sampling methodologies and cleaner burning engine technologies.

The ongoing NIOSH/NCI study, which has been referred to previously, is just one example of the studies that are in progress at this time. The findings from these studies will be relevant in developing feasible approaches to addressing identifiable adverse affects on worker health arising from diesel exhaust exposure. To promulgate rules before these substantive studies are completed is inappropriate given the potential for ineffective standards and the unreasonable costs to the industry.

The Clean Air -- speaking to some of these studies refereed to by the agency, the Clean Air Scientific Advisory Committee of EPA' Science Advisory Board stated that the rat lung tumor response to high levels of DPM is of doubtful relevance to human risk. It also suggests that current evidence that lung tumor response may differ between rats and humans.

(Slide.)

The second point: Although we have meticulously followed the NIOSH 5040 method for sampling for DPM, our test results indicate interferences from the carbon-bearing host rock being mined. To date we have collected approximately 85 samples from our mines, the break room where miners gather during and beginning of work shifts, and in the assay lab. All of these samples were sent to and analyzed by DataChem Laboratories. DataChem then forwarded approximately half of the samples to Clayton Laboratories for a second analysis. Both labs are qualified to perform the NIOSH 5050 analysis.

The results of our testing using the NIOSH 5040 method demonstrates serious discrepancies in the methodology. According to the analytical laboratories, total carbon identified and reported as DPM is, at least in part, carbon and carbon compounds contained in the or itself, totally unrelated to diesel exhaust.

(Slide.)

It's difficult to see that picture. Perhaps I should have brought an actual rock. But as you can see from the picture, our ore,our host rock is black. It looks like coal. It has many of the same carbon constituency as coal. It's very high in carbon and it has an interference with the sampling method as we've done it so far.

(Slide.)

A total of 18 side-by-side samples using the NIOSH 5040 method were taken in our lab, isolated from any DPM. The cassettes were placed at the pulverizers while pulverizing underground ore and are not representative of employee exposures. They were then sent to DataChem Lab for analysis for carbon content using the appropriate method. Total dust samples were also taken.

(Slide.)

As you can see from this next slide, the results for organic carbon were over MSHA's proposed exposure levels. Organic carbon levels ranged from 440 to 2,662 micrograms per cubic meter. Now, if you add in the elemental carbon, the levels are even higher. Elemental carbon levels ranged from zero to 1,031 micrograms per cubic meter. These carbon levels are from carbon-bearing rock with no diesel particulate matter present. This proves that the NIOSH 5040 method is flawed as it is currently proposed and cannot differentiate between carbon-bearing rock and diesel particulate matter.

(Slide.)

Interestingly, MSHA recognized the potential interference with sampling results caused by cigarette smoke. Controlling cigarette smoking as suggested by NIOSH, or excuse me, MSHA on page 58,129 of the preamble is easier said than done.

This graph shows the results of a sample taken in the break room where employees are allowed to smoke. As you can see, the elemental carbon in the cigarette smoke was 128 micrograms -- that's this number -- hope we can figure this things out -- this number here, and the organic carbon, when you add that in, was 7,876 micrograms. The total carbon amount was 8,004 micrograms per cubic meter, 20 times MSHA's first exposure limit and 50 times higher than the final proposed exposure limit.

We conducted four samples to test the effect of oil mist and the NIOSH 5040 method in one of our developing underground mines. Only two employees were working in the mine at the time of the sampling. One employee was drilling with a jumbo drill, and the other was operating a jackleg. Now, the jacklegs are the drills that have been spoken of previously where oil is added to the air, and which does result in an oil mist. No diesel equipment was running at the time. As you can see here, the results for the elemental carbon ranged from 93 to 109 -- these results along the bottom. Organic carbon ranged from 2,517 to 2,832 micrograms per cubic meter.

Again, these are -- of course, the combined total of those are well over the proposed standards.

(Slide.)

NIOSH has mentioned the use of an impactor with submicrometer cut point may be used to minimize collection of coal dust in the underground coal mines. We conducted three sets of side-by-side tests to determine if an impactor would make a difference with our carbon bearing rock, one set in our lab where no DPM was present, and two in our underground mines.

The sets consisted of one open-faced cassette, one cyclone sampling train, and one impactor sampling train with a cut point of two microns. And actually at this point, as you may be aware, it's very difficult to find these submicron impactors. In fact, we haven't -- we did not have one available. Two micron was the smallest we could get.

In all three sets of samples, a reduction was achieved from the open-faced sample to the cyclone sample, indicating the cyclone eliminated some of the interfering carbon-bearing dust. This being the total and this being the cyclone. Two of the impactor samples were actually higher than with the cyclone samples. This being those -- the data that was collected with the impactor.

Now, this is the sample from the laboratory, but of the three tests that we have run with the smallest impactor that we can get our hands on, amazingly -- well, at least it did not cut and result in a lower total carbon reading than the cyclone. In one of the three, it did.

MR. TOMB: Were all of these in the same location?

MR. CHAMBERLAIN: No. One of them was in the laboratory where there was non diesel present, okay.

MR. TOMB: Was there smoking?

MR. CHAMBERLAIN: No.

MR. TOMB: Okay.

MR. CHAMBERLAIN: There is no smoking allowed in our laboratories.

And two of them were in-mine samples that were sampled, or that were collected when the train was side by side.

This one here is the one we demonstrate as being significant because there was no cigarette smoke, nor was there any diesel particulate matter.

The results were 47 micrograms total carbon. Our testing did not demonstrate that we can effectively size select to measure DPM with the existence of what's currently available.

(Slide.)

Third, the estimates of cost for compliance are grossly underestimated. MSHA suggests the cost for compliance for underground metal/nonmetal mines with less than 500 employees would be approximately $87,800. Until we are able to accurately measure DPM levels, the cost of compliance is impossible to determine because we do not know what may be required.

Assuming that we were required to install an exhaust filter system as suggested in the proposed regulations, our initial costs would be in excess of $1 million to retrofit our 80 pieces of diesel-powered underground equipment. Again, that is a very rough estimate with no estimate -- or no costs included for installation and maintenance of these filtering units.

Furthermore, the availability or existence of the technology to retrofit engines with the appropriate exhaust filters is uncertain. At our Jerritt Canyon operations, we use engines produced by five manufacturers, in a substantial variety of designs and applications. To date we're not aware of manufacturers that have developed and tested filtering devices for all of these varieties of engine applications.

Furthermore, our operating duty cycle do not generate temperatures high enough to support the operating parameters established by the manufacturers of some of these devices.

(Slide.)

Fourth, we have a lot of concerns with the proposed regulations in addition to the primary ones we've mentioned here of cost and inability to sample.

Sampling for compliance purposes should be personal sampling. Single shift sampling can in no way represent actual miner exposure to DPM. Relying on a single shift or an area sample using methods that have yet to be developed and tested is inappropriate and could not possibly produce reliable results for the purposes of determining compliance.

With regard to the proposed tag-out provisions, relying on a subjective determination of diesel emissions to initiate tag-out is questionable and subject to abuse by a disgruntled employee. It is also unreasonable to believe that a person can visually detect the amount of carbon being emitted from an engine under all operating conditions.

MSHA states in the preamble to the proposed standard that an idling engine may emit more -- may emit more than an engine operating under load. Yet to an observer, this typically may not appear to be the case. This subjective tag-out provision likely will lead to undue and unnecessary disruptions in production.

The standards concerning the training requirements: The training requirements and recordkeeping requirements are a significant additional burden and will do nothing to reduce emissions. Training under any final regulation should be incorporated in existing training required under Part 48.

The proposal in the standard to allow for only one extension to comply with final standards when the necessary technologies do not exist today is, without question, unreasonable. If the proposed standard is adopted, extensions for compliance must be made available while the technologies to meet the standards are being developed for implementation. If compliance means replacing existing equipment, economics would demand that a period of five to 10 years may be necessary, and again, in many mines it would be many times longer. It is a difficult process to change out all of your equipment or do the kinds of technologies that are being asked for here.

The proposed regulations do not allow for administrative controls or personal protective equipment. This is inconsistent with generally accepted industrial hygiene practices. The use of PPE has been proven effective in protecting miner health. Interestingly, MSHA, itself, listed respiratory protection equipment as an effective device to reduce miner exposure to DPM in the toolbox published by the agency in 1997.

We look forward to working with MSHA in its efforts to improve the health of miners. However, we do not believe that the proposed regulations for DPM is reasonable nor will it accomplish the intended goal.

As we continue to evaluate this proposed regulation and conduct additional testing, we may wish to provide additional comments prior to the close of the comment period.

Thank you for this opportunity.

Do you have any questions?

MR. TOMB: Thank you.

MR. KOGUT: How long were your samples taken? Over what period of time?

MR. CHAMBERLAIN: The time, the sampling time varied depending upon the area that we were collecting it in, and in some cases there was an intent to -- such as those taken in the lab -- to not overload a sample, so it was of a shorter duration.

But as far as an actual time frame, we would have to answer that in our written comments. I can't answer that today.

MR. KOGUT: Could you say roughly what a minimum time might have been?

MR. CHAMBERLAIN: Probably the shortest time frame was one hour in our laboratory.

MR. TOMB: Can you submit the data on these samples to us? Is that possible?

MR. CHAMBERLAIN: Yes, we will review all of the data that we have and certainly provide more information in our written comments.

MR. KOGUT: And did you request an acid wash?

MR. CHAMBERLAIN: We did not. That has been done by some with similar ores to our, with the reports or the results that have been reported seem to indicate that it doesn't solve the problem. It doesn't wash out all of the carbon that it's intended to. However, we have not specifically requested that. And based on what's being provided here today, they may or may not have been washed by acid. I don't know that.

MR. TOMB: Were these side-by-side samples, were they total -- taken in your lab, were they total samples?

MR. CHAMBERLAIN: Most of the samples that were taken were side by side for an open-face, and for a respirable sample with the cyclone side by side.

MR. TOMB: Okay.

MR. HANEY: Did you have a cyclone in line with your two micron impactor?

MR. CHAMBERLAIN: Yes, we did.

MR. HANEY: So you had both the cyclone and the two micron impactor?

MR. CHAMBERLAIN: That is correct.

MR. HANEY: Okay.

MR. SASEEN: Mr. Chamberlain, on your slide 11 you talked about 80 pieces of equipment that you would possibly have to put filters on.

Is that all 80 pieces of -- are we talking about one mine or several mines?

MR. CHAMBERLAIN: We are currently operating two mines at that property and developing a third. So the 80 pieces of equipment are all of the engines that are in operation in those mines.

MR. SASEEN: So in two mines.

Have you looked at our estimator to, you know, take into account your ventilation and the baseline emissions to see possibly how many engines the estimator would show you would need to add filters or other control devices to bring it down to levels that we -- you know, the 160 and 400 microgram levels?

MR. CHAMBERLAIN: We have looked at it. However, there has not been an extensive evaluation because we feel that the basis is flawed to begin with. The basis -- at this point in time until we know how to measure what we have, we have no idea what we would have to do to get there. And so we feel that that estimator has no meaning or no value in our current situation. So we did not use that as a basis.

MR. SASEEN: Thank you.

On those 80 pieces, what would the horsepower range be? Do you have an idea?

MR. CHAMBERLAIN: From less than 50 to about 400.

MR. SASEEN: Okay. Thank you.

MR. TOMB: Could you supply us with a couple examples of your mining operations? I don't know what -- sections, operating sections, the number of pieces of equipment and horsepower, so that we could take a look and see -- and your ventilation quantities and how you're ventilating, so we could do some calculations possibly and see what we think that those levels might be able to be achieved?

MR. CHAMBERLAIN: We could look at that information like that, that we may be able to make available in our written comments. You know, we have the numbers on our ventilation certainly, and we provide -- we provide a lot of air. We have a lot of ventilation into our areas. We are currently in the process of changing some of our equipment sizing right now and just in the process of taking delivery of some new equipment, and will not be able to evaluate that process until we get that new equipment in place and see what impacts it has on --

MR. TOMB: Is that equipment with new engine technology, low emissions?

MR. CHAMBERLAIN: It is.

MR. TOMB: Okay.

MR. FORD: You talk about the compliance time for -- that should be taken into account for replacing existing equipment.

At your mine, can you tell us what the change-out of existing equipment is, the period of time?

MR. CHAMBERLAIN: Well, again, it depends on duty cycle and operations, and that's something that is currently subject to reevaluation as we acquire new equipment and put it into application. So with our existing equipment and existing duty cycles, we would need at least a 10-year time frame before a lot of that equipment would be traded out, and beyond that for some of the smaller pieces or support equipment. But production pieces, you would need something like that, but, again, that's something that we have to wait until we get this new equipment in and evaluate our duty cycles.

MR. FORD: So at your mine for the higher horsepower pieces, 400 range, around there, it's a 10-year change out. And then for lower pieces, you say it's longer?

MR. CHAMBERLAIN: I couldn't answer that here today. We could look at whether we can provide it or what kind of information we could provide in our written comments.

MR. FORD: Thank you.

MR. SASEEN: Mr. Chamberlain, can you supply us with what model those new engines are going to be?

MR. CHAMBERLAIN: I don't know off the top of my head here, but we could consider including that in the testimony.

MR. SASEEN: Okay, because that would give us idea of what kind of engines, you know, you're going to.

MR. FORD: Can we also just get a breakdown of your "around $1 million range" and the 80 pieces?

MR. CHAMBERLAIN: To be honest with you, that's $12,000 times 80 pieces, which 12,000 --

MR. FORD: I know, I know that's the average, but can we get the horsepower and then the cost for filter?

MR. CHAMBERLAIN: I can't do that because so far as I know there is no filter system which has been tested on the horsepowers that we're talking about in the higher ranges. I have no idea what it's going to cost to equip those, so we just picked a low number and --

MR. FORD: Okay, so you just took an average number and applied that to the 80 pieces?

MR. CHAMBERLAIN: Based -- we took a number that I felt was conservative based upon the pieces we have, realizing that the technology may not be there for some of these pieces of equipment, and so I don't know what those costs would be. I feel that's a conservative number.

MR. FORD: Okay.

MR. CUSTER: Mr. Chamberlain, this is unfair to ask you, but I will anyway.

MR. CHAMBERLAIN: Thank you.

MR. CUSTER: There are those in the audience.

It's been a recurring theme through the hearing process today that obviously this is an area standard as opposed to a personal standard, and it's true, it is an environmental standard. And another recurring theme has been the roll-backs, the flexibility to permit the use of personal protective devices, for example, and therefore does not, or is inconsistent with industrial hygiene practice.

And I know you can't speak for those who spoke before, but would the rule be more acceptable to you if indeed the rule were patterned as a personal exposure rule?

MR. CHAMBERLAIN: At this point I'm not able to tell you what we could live with until I know how we can sample what we have, and that has to be the first basis, is how do we sample, what is the standard that we're trying to meet. If we knew what the standard that we're trying to meet or how we sample for that, then perhaps we could put together a suggestion of what the rule may look like, but I think first things have to come first, and right now I have no idea what kind of improvements, if any, I would have to make in my mine, so it's hard for me to guess what approach I would prefer.

MR. CUSTER: Thank you.

MR. TOMB: Do you have a question?

MS. WESDOCK: Um-hmm. Mr. Chamberlain, you say in your testimony that the training -- that you believe that the training and the recordkeeping requirements of the proposal are very burdensome.

Could you elaborate, I mean, as to why you feel the requirements in the proposal as regard to training and recordkeeping are burdensome?

MR. CHAMBERLAIN: Well, first of all, for our operation or any other metal/nonmetal mine, we already have training requirements that establish what we have to do. This seems to set out a training requirement which is separate from that and above and beyond what is already in place, so that in and of itself is a burden.

And similarly with the recordkeeping requirements. Currently recordkeeping requirement, we're not required to maintain the kinds of records that are required here and for the time frames that are required, and it could be very voluminous the records that may come under this proposed standard if it were adopted, and there would be a lot of effort and work into maintaining those kind of records for time frames up to five years.

MS. WESDOCK: Could you tell me what the training in your specific mine involves right now?

MR. CHAMBERLAIN: Well, I could take 40 hours and give it to you if you would like, but nonetheless --

MS. WESDOCK: In a summary.

MR. CHAMBERLAIN: In summary, it is designed to meet the requirements under the Act, Part 48 of the Act, which establish whether, you know, the conditions, whether it's a new miner, or an experienced miner, an annual refresher and those things.

MS. WESDOCK: Okay.

MR. CHAMBERLAIN: And beyond that. I mean, we're meeting the requirements of the Act.

MS. WESDOCK: Okay.

MR. CHAMBERLAIN: It would be whatever the final rule that is established, whatever training may be required with that should and must be a part of that ongoing training that we're doing anyway and not be an additional burden on top of that as far as time and additional requirements.

MS. WESDOCK: Thank you.

MR. TOMB: Could it be fit into the 48, Part 48 training, I mean, what you do in the 40 hours?

MR. CHAMBERLAIN: Again, until we know what the final rule is it's difficult to say that, but I'm going to assume that it can because we do that for every other health standard that we have. All of the other -- and many other things, of course, are covered by health standards, and that fits in Part 48 training that's required, and I'm certain that this would also.

MR. HANEY: Why do you think it would be necessary to apply exhaust filters to all of your equipment?

MR. CHAMBERLAIN: To be honest with you, I have no idea what I would have to do to all my equipment until I can measure it. However, that was one of the options that was provided by MSHA as a proposal. If I had to install those, that's what it would take. I don't know what I'll have to install until I can measure and see what levels I'm at.

MR. HANEY: When we were -- when I was at your mine, oh, maybe a year and a half ago, we noticed some things in ventilation, like the exhaust tubing or the blowing tubing down into the stopes had been turned and placed upwind of the diesel exhaust, then that wouldn't have gotten taken down into your stopes.

Have any of those changes been made?

MR. CHAMBERLAIN: There's been numerous changes made to our ventilation since you were out there, and significant improvements in that area. Whether that would help us meet the requirement, again, I don't know because I can't measure it, but we have continued to make great efforts in trying to provide adequate ventilation.

MR. TOMB: Any other questions?

(No response.)

MR. TOMB: Okay, thank you very much, Mr.Chamberlain.

MR. CHAMBERLAIN: Thank you.

MR. TOMB: Mr. Chamberlain, are you going to supply the slides, a copy of the slides to us?

MR. CHAMBERLAIN: Yes, we will.

MR. TOMB: You will. Okay, thank you.

Our next presenters are from -- if I have my list correct here -- Newmont Coal Mine. Okay, Mike Mauser.

MR. LEAVITT: Wes, my name is Wes.

MR. TOMB: And you're Wes Leavitt.

MR. LEAVITT: Yes.

MR. TOMB: Okay.

MR. LEAVITT: Let's see if I'm adequately wired here.

MR. TOMB: Just sing a little bit and we'll tell you whether --

MR. LEAVITT: I don't think you want.

(Laughter.)

MR. LEAVITT: Mr. Chairman, members of the panel, I appreciate being given the opportunity to present testimony regarding the proposed rule for controlling diesel particulate matter in underground metal/nonmetal mines.

My name is Wes Leavitt, and I am an Industrial Hygienist employed by Newmont Gold Company in Carlin, Nevada. Newmont currently operates three underground mines: the Carlin Mine, the Deep Star Mine, and the Deep Post Mine. We at Newmont are very troubled with these proposed regulations based on a number of factors, which include:

Current lack of consistent scientific data supporting evidence of risk; possibility of creating other hazards while trying to reduce DPM; lack of an adequate analytical testing method for diesel particulate matter; sample collection method proposed will not accurately represent exposures to miners; MSHA's economic and technologic feasibility study is vastly understated; and the concern that an enforcement strategy would improperly lead to mine closures.

A rush to regulate could lead to a loss of jobs in mining and mining-related industries without improving the health and safety of those miners still working in it.

Current lack of consistent scientific data supporting evidence of risk: The fact that several other federal regulatory agencies have found that the current scientific data does not support evidence of risk due to exposure to diesel particulate matter says volumes about whether or not the existing data supports MSHA's contention of occupational lifetime exposure risk. Further evidence that the existing scientific data does not support evidence of risk can be found in the multimillion dollar study being conducted by NIOSH and NCI. This study will help to determine if there is indeed a risk due to exposure to diesel particulate matter.

The scientific data used by MSHA has many different problems associated with it. Some of the specific problems are as follows:

One study showed prolonged exposures to diesel emissions produced tumors in the lungs of rats but not hamsters or mice. This suggests that the risk associated with DPM is species specific, and may not apply to humans.

It has been well documented that smoking causes lung tumors. Yet the studies cited by MSHA in its preamble indicate that smokers within the study were not accurately accounted for, and therefore the results of those studies is highly suspect due to this bias. Any increased risk in the study could have been due to smoking, not DPM.

Possibility of creating other hazards while attempting to reduce DPM: If we are required to increase ventilation in an attempt to lower DPM levels, we will also increase drying of roadways and therefore increase silica exposures. If this takes place, we will also need to increase watering of roadways, which will in turn increase the safety hazards such as runaway trucks on slippery declines. This particular problem poses an immediate and significant higher risk to miners safety.

MSHA has not analyzed these risks and compared them to those associated with DPM.

In addition to these concerns, there is also the potential for additional air slacking within the mine due to drying of the surrounding rock. When the clay materials present in our ore become excessively dry, they become unstable, causing ground control issues. Once again, MSHA has not analyzed these risks and compared them to those associated with DPM and I believe rushing to regulate could actually reduce the health and safety of miners.

Lack of an accurate analytical testing method for diesel particulate matter: MSHA states in the preamble for a method to be used for compliance purposes, it must be able to distinguish DPM from other particles present in the various mines. The Nevada Mining Association study clearly showed the analytical method does not distinguish DPM from other carbon or carbon compounds. Many of these carbon compounds are commonly found in the air in areas where miners normally work or travel. The Nevada Mining Association study demonstrated there were a numbers of non-diesel particles, which would be reported as DPM using the proposed analytical method. Cigarette smoke, oil mist, as well as the water and ore rock located within the mines participating in the study all were shown to interfere with the accuracy of the method.

MSHA does not believe that either oil mist or cigarette smoke in underground metal or nonmetal mines would pose a problem in using the method. Once again, clearly this simply not the case as both do interfere with the analytical method.

MSHA further states, operators can simply require no smoking in the mine while sampling is being done. First, if most smokers could quite, I believe they would, yet there is still a lot of smokers out there.

Secondly, I'm not sure MSHA's economic study did not address -- or I am sure MSHA's economic study did not address the police force needed to undertake such a compliance task during any sampling. Miners working gaseous mines continue to bring smoking materials into these mines knowing full well the potential for disaster, but when we require no smoking during sampling, will they stop? This is simply not realistic.

Regarding oil mist, MSHA assumes that when operators implement the proposal's maintenance requirement this will minimize any remaining potential for such interference. In-line oilers for pneumatic drills are major sources for oil mist in the mine which are not addressed by the proposed maintenance requirements. Therefore, oil mist will continue to be a problem with getting accurate results using this analytical method.

Mine operators are not able to control the makeup of the material they are mining. They must mine where the ore is located. These airborne carbon and carbon compounds were shown via the Nevada Mining Association study to contribute significant amounts of reported DPM, often many times above both proposed levels, without any diesel particulate matter being present. Because of this problem, the collection method is not feasible and will not represent a miner's exposure to DPM.

MSHA's use of the NIOSH 5040 analytical method does not meet the requirements they described in the preamble of these proposed rules and for that reason alone the promulgation of these rules should be stopped.

Sample collection method proposed will not accurately represent exposure to miners. The proposed sample collection method, area samples in areas of the mine where miners normally work or travel, will only serve to further compound the errors with the analytical method previously identified.

Consistent with MSHA's studies, the Nevada Mining Association study convincingly showed a high variability of the reported DPM results for samples taken within feet of each other in the mine. In addition, personal air samples are the only way to determine the actual exposure of miners as evidenced by good industrial hygiene practices, which even MSHA adopts. Simply stated, a single are sample does not accurately represent the diesel particulate matter a miner is being exposed to.

MSHA's economic and technologic feasibility study vastly understated. MSHA's economic land technological study, such as the one done for purposes of this regulation, is really a guess, and in our opinion, that is vastly underestimated. However, with no current technology available for the size of equipment that we are using, we are going to be asked to conduct experiments in high technology in an attempt to lower DPM levels.

With the price of gold dropping nearly $120 per ounce since 1994, the depressed gold market has forced many operators into dealing with downsizing. Despite being a leader in gold production, Newmont alone has experienced a reduction in force of nearly 1,000 employees in its Carlin, Valmy, and Mesquite mine sites in the past two years. This reduction in force can be directly related to falling gold prices. A technology forcing regulations such as this one will inevitably result in mine closures.

Concern that enforcement strategy will improperly lead to mine closures. Assuming none of the problems discussed earlier existed, MSHA samples and determines of violation of the standard occurred. The mine operator then must determine which pieces of equipment -- diesel-powered, its diesel-powered fleet is responsible for creating the excess diesel particulate matter. One must remember there is no direct method for determining DPM in engine exhaust, so this would be a very difficult task.

In addition, ventilation rates must also be investigated as problems with the ventilation system might be contributing to the problem. Meanwhile MSHA does not allow for the use of personal protective equipment, as suggested in its own DPM toolbox. So what does the operator do with its diesel equipment fleet?

Past experience with inspectors leads me to believe at least some inspectors might suggest shutting it down. The proposed rule actually gives anyone the authority to tag-out equipment they think might be exhausting excess DPM. The fact is it would be difficult to determine with available testing equipment which equipment is emitting excess DPM because there is no direct testing method for DPM.

The rules will allow for disgruntled employees and overzealous inspectors to subject mine operators to unwarranted and expensive down times. These kind of problems are not farfetched, the sky-is-falling type rhetoric. Rather they are problems both MSHA and mine operators alike must deal with on a regular basis such as unfounded complaint investigations.

All these things have economic impact on the industry and some mines will be forced into closure because they are no longer profitable. Not having a job has a negative and very large impact on miners' health and safety.

Because it is not supported by sound science demonstrating health effects, and is it technologically and economically feasible, the proposed rule should be withdrawn.

I'd like to introduce Mike Mauser. He's a mechanical engineer with our company, and he will offer supplemental comments.

MR. TOMB: Okay. Before Mike starts, maybe we have some questions.

MR. FORD: You talk about, on page 5, the sentence, "A technology forcing regulation such as this one will inevitably result in mine closures." And then on page 6 at the bottom, "All these things have economic impact on the industry and some mines will be forced into closure because they are no longer profitable."

Can you supply us with the information that you have concerning the mines that are going to close?

MR. LEAVITT: I can -- I could supply you with some information on the costs that may be associated as far as filters and that sort of thing, the technology that's not available currently for the size and type of equipment that we are using, and there are some estimates from vendors of what they may charge.

But Mike may be able to expand on this. He actually contacted some of the vendors, and they weren't able to give us an actual quote on a price for our equipment. In other words, we could not just call them up and order one. They would have to make it, and it's going to be very expensive.

MR. FORD: Okay, but I'm basically rather getting at the -- instead of getting at the actual prices put on after treatment devices on any particular machine, just the information that it seems like -- it's being suggested that mines will close down. I'm just wondering if you have any information or knowledge of what mines would close down.

MR. TOMB: You're asking for economic data?

MR. FORD: I'm looking for any data that supports the sentences that mines will be forced into closure.

MR. LEAVITT: What I'm trying to say there is that, in conjunction with the depressed gold market that we are currently experiencing and the economic burden that this standard would also add to that, I can't -- I can't supply you with another mine's margin of profit, if that's what you're asking for.

If you're asking for our mine's margin of profit, I may be able to submit that with our written comments.

MR. TOMB: I think that's what you're looking for, right?

MR. FORD: Well, basically I'm just looking for a list of those mines that would be forced to close down.

MR. TOMB: Well, he can only address his three mines.

MR. FORD: Right, and if he has any information at all for his mines or any others, we would like to see that. That's all I have.

MR. LEAVITT: Okay.

MR. TOMB: You understand he's looking for some supportive data that says that your margin of profit is this and you're going to have to put this amount of money into it over a five-year period or a 10-year period, and it's going to cause an economic hardship.

MR. LEAVITT: Not only that, but if we -- if we perhaps cannot even comply with the standard, then obviously what alternatives are there?

MR. TOMB: Okay.

MR. HANEY: You mentioned that there is no way of telling which engines would be the dirtiest ones.

MR. LEAVITT: Which engines would be?

MR. HANEY: Which engines would be the ones that are creating the excess diesel particulate matter.

MR. LEAVITT: Yes.

MR. TOMB: Why wouldn't you just look at your particulate index from that engine and just make that determination from the particulate index?

MR. LEAVITT: Well, what I was referring to there is if -- say if a piece of equipment was in an operator's mine malfunctioning or it was emitting more diesel particulate than it was yesterday when he was operating it, and that's what he says, but how do we quantify that? How do we tell? There is no direct exhaust measurement for DPM. You can measure the gasses, but you can't measure the DPM with a direct reading instrument.

MR. SASEEN: Just to kind of carry on from Mr. Haney's comments, first, though, I think, you know, to clarify it, I think I know what you're talking about with no direct method for measuring DPM, that obviously, if you're in a mine and the machine, but, you know, we do as engine manufacturers and any test lab measures diesel particulates very exactly and engine test labs could measure it very precisely diesel particulate matter.

But I know, I think you're coming from in-mine vehicle types.

But to kind of follow what Bob talked about, you know, from one day to another there was a NIOSH study that was done for MSHA for the coal side about the tune of diesel engines, and by doing a repeatable load test you can tell tune of engines from day to day, mostly by looking at carbon monoxides. So there are methods out there to judge, you know, how the engine's progressing. And I think, you know, from what you're saying here, I think some of those things could be used for your own evaluation of your fleet.

MR. KOGUT: Mr. Leavitt, you state that several other federal regulatory agencies have found that the current scientific data does not support evidence of risk due to exposure of diesel particulate matter.

Could you specify what federal agencies have so stated and where they have made such findings?

MR. LEAVITT: That, I believe we had some part of this discussion a little bit earlier, but that was referring to the EPA and OSHA being -- not taking any regulatory stance on that.

MR. FORD: Well, then that involved some inference on your part that by not taking regulatory action against diesel particulates, that they have found that there is no current risk, so you're drawing -- you're drawing an inference. Is that what you're doing? You're drawing an inference from the fact that they have not taken regulatory action specifically against -- on DPM to saying that they've found that there is no risk from exposure?

MR. LEAVITT: Essentially.

MR. TOMB: Any other questions?

(No response.)

MR. TOMB: Okay. Thank you.

MR. MAUSER: Mr. Chairman and members of the panel --

MR. TOMB: Do you want to give your name?

MR. MAUSER: I do.

MR. TOMB: Oh, I'm sorry. I didn't hear you. Okay. Okay.

MR. MAUSER: We can do it either way.

MR. TOMB: Okay, no, go ahead.

MR. MAUSER: I appreciate this opportunity to comment on the proposed standard for controlling diesel particulate levels in underground metal/nonmetal mines.

My name is Mike, M-I-K-E, Mauser, M-A-U-S-E-R.

MR. TOMB: Okay.

MR. MAUSER: My credentials include a Bachelor's Degree in chemical engineering, a Master's in environmental engineering, and a doctorate in mechanical engineering. I am a mechanical engineer for underground maintenance at Newmont Gold Company at Carlin, Nevada. Our department is responsible for the purchase recommendations and maintenance of all the underground diesel equipment at our three underground mines: Carlin, Deep Star, and Deep Post.

There is a definite financial advantage to a company to promote safety, but more importantly, underground miners live in small communities and are a small society within themselves. We get to know each other both at work and outside of work over the years and in different jobs. And this leads to a strong personal motivation, aside from company and MSHA rules and regulations, to not see anyone hurt. This attitude is the foundation for maintaining a safe environment. And this attitude can be the foundation for doing something meaningful about reducing diesel emissions.

Newmont has, in fact, been addressing diesel emissions for years; we burn .05 percent sulfur fuel. We have retrofitted equipment with catalytic mufflers and we buy electronically-controlled engines. When the proposed regulations came out last October, I was asked to see what else we could do about reducing diesel levels.

The first thing I did of course was to start to read the proposed regulations. I also called sales reps for our equipment and the catalytic converts we use. I searched the internet and had our librarian obtain copies of articles on diesel exhaust. I spoke with the authors and other researchers. I met with our health and safety personnel and met with people from other mines. I participated in initiating and coordinating testing. And I finally finished reading the proposed rule. Through all this my focus was not on whether we should do anything but on what was feasible and what would be the best way to achieve results.

One MSHA researcher and author I spoke with suggested a combined approach: decrease emission, increase ventilation, and use enclosed cabs. He was very helpful about technical issues but when I brought up cost he said something like "You people are always saying you can't afford it," and I dropped that topic. But I felt a bit stung and defensive about his comment. I certainly have never heard any managers at Newmont automatically dismiss something with a possibility of meaningful health and safety benefits. As I mentioned earlier, we voluntarily burn low sulfur fuel paying a premium of over $30,000 a year.

However, cost is a reality and when a cost is too high it isn't possible to pay it and continue to mine. Furthermore, if there is reason to think something may cost too much we cannot plan to mine. After doing all this reading and calling, I had to tell our management that we would not be able to meet the proposed diesel particulate levels with existing off-the-shelf technology. We would need to either make significant fundamental and potentially cost prohibitive changes in the way we mine, or we would need to buy future generations of particulate traps at a purchase and operating cost that could only be guessed at and with reliability and performance that could only be hoped for. I added that there were, however, things we could start to do now and I was given an immediate go ahead.

It took those of us working on sampling mine air only a few months to collect far more data in this area than MSHA had used as a basis for the proposed regulations. It will take those of us working on equipment a little longer, but I am confident that we will soon be in a similar position.

We have initiated emissions testing under load, we will be retrofitting filters, and we are hosting research funded by the Health Effects Institute at our Carlin Mine. Unfortunately, we do not have results at this time. When we do, we will be in a much better position to make meaningful contributions toward the effort of reducing diesel particulates, and we hope that we can then work with MSHA to address problems we see with the proposed regulation while focusing on the goal of improving conditions underground. We are motivated both personally and economically to do this aside from MSHA regulations.

As I mentioned earlier, I read the entire text of the proposed regulations, and I read it with the intent of finding out how we might -- how it might help to reduce diesel particulate levels. But I was of course alert to how the proposed regulations would unnecessarily divert attention and resources from other important issues or add burdens without doing anything meaningful toward reducing these levels. Here are some specific comments:

Idling of equipment: Paragraph 57.5065(c) states, "Idling of mobile diesel-powered equipment in underground areas is prohibited except as required for normal mining operation."

Since, and I quote from 30 CFR Part 57II, Supplementary Information Answer No. 24, page 58120, "MSHA recognizes that to administer this provision in a common sense manner may require the provision of examples to both the MSHA inspectors and to the mining community." I suggest eliminating this requirement.

I understand that MSHA's intent is to achieve the lowest possible DP levels, but the miners will be aware of the potential health concerns so they will be able to judge what constitutes unnecessary idling. The mine operator also will presumably have a policy in idling to help meet any DP standards. There is no need for an MSHA requirement specifically about idling, particularly as it will admittedly be a potential source of future dispute.

Tagging equipment: Paragraph 57.5066(b)(1) states, "A mine operator shall....require each miner operating diesel powered equipment...to affix a visible and dated tag to such equipment any time the miner notes any evidence that the equipment may require maintenance.,.."

We are concerned that this requirement may result in the operator or an individual miner receiving an MSHA violation for not tagging equipment that an MSHA inspector thinks should be tagged. We do not believe there is any need for this requirement. It is in our own best interest to maintain equipment at peak performance and we are better able than MSHA to determine how we can best accomplish this. It is possible that a mine operator may elect to adopt a policy whereby a miner is required to tag suspect equipment, although we already have inspection systems in place to ensure all perceived problems are promptly reported and dealt with and we presume other operators do also.

Recordkeeping on mechanic skills: Paragraph 57.5066(c) states, "An operaTor shall retain appropriate evidence of the competence of any person to perform specific maintenance tasks..."

We ensure our mechanics and miners are appropriately trained as a matter of our own self interest. Our equipment represents a very large investment and keeping it properly maintained is critically important to production. A recordkeeping requirement for mechanics' skills is an unnecessary burden on the operator. Also, if the intent is to ensure proper maintenance, it needs to be recognized that proof of training does not ensure proof that the job was done right. In the final analysis, proof that the job was done right is reflected in meeting applicable standards.

Decreasing emissions: I doubt we will be able to meet the proposed standards by purchasing new engines or retrofitting existing engines during rebuilts. Currently many of our engines are electronically controlled and equipped with catalytic converters. Adding particulate filters is not a realistic option at this time.

The majority of our equipment is diesel powered with sizes up to 335 horsepower for our 26-ton trucks, and 250 for our six-cubic yard loaders. Currently available and proven ceramic traps are not applicable to these sizes of engines for the duty cycles we have.

We do plan to install either ceramic trap or a Dry Systems Technology's Dry System control, but both will be experimental and costly. I anticipate difficulties in assessing the performance under actual conditions with anything we do. We are hoping that the research we are hosting will help us in this regard, but I remain skeptical.

Increasing ventilation: We believe that trying to meet the proposed standards by increasing ventilation rates for mines which are already in production may not be feasible. Even if additional fans and ventilation shafts could be economically justified compared to closing the mine, we would require much more dust control, which raises safety concerns. I believe we may be either increasing dust or increasing a sliding danger on our existing steep haulage declines to alleviate an unproven DP exposure danger.

Enclosed cabs: I do not believe adding enclosed cabs is an acceptable option. As a diesel particulate control strategy this would only work where the equipment operator would need to be present and this would only be the case in limited situations.

Unnecessary equipment down time: The proposed sampling and analytical method will result in at least some citations being written in areas where the actual DPM levels do not warrant them. The proposed regulation does not given operators any relief for elevated results caused by carbon or carbon compounds other than DPM. MSHA will simply expect improvements in areas such as equipment maintenance, after-treatment control devices, ventilation, or reductions in the amount of diesel equipment operating in the mine. The cost of erroneous enforcement actions could be tremendous. Some of these cost associated with these enforcement actions are as follows:

Downing the fleet to try and determine which pieces of equipment might be exhausting excess DPM -- very difficult to accomplish since there is no direct method for determining DPM levels in the exhaust of equipment.

Down time incurred while waiting for testing results because there is no direct method of testing exhaust systems for DPM.

Cost of installing, testing and maintaining after-treatment control devices which won't necessarily reduce the sampling results because the carbon and carbon compounds aren't coming from the equipment.

Increases in ventilation rates which might actually cause even higher sample results due to drying of the air and rock, which could increase the non-diesel carbon and carbon compounds in the air.

Cost of replacing engines while experimenting with new untested after-treatment control devices.

No reliable testing methods for equipment: Currently a seven-gas analyzer is used to determine engine emissions. However, it does not measure DPM. There is no standard method for measuring DPM and emissions will vary with the condition.

One of the first things I wanted to do was in-mine testing on selected equipment under actual conditions. I proposed we operate a loader over a period of several hours in an isolated section of the mine and try to measure actual emissions. I had hoped that we might develop an easy technique for evaluating the effectiveness of any measures we might wish to use for reducing DPM. I suggested this to management and there was no hesitation -- I got an immediate go ahead.

So I pursued this idea further. I read the reports and spoke with others who had done similar studies while identifying potential test sites within one of our mines. But I had to drop the idea for the time being when it became evident that it would not be practical as a means of evaluation. The data would be difficult and expensive to collect and the precision low. The best we could do at this time is to do weekly checks of carbon monoxide emissions on equipment while briefly loading the torque converter.

Then we can guess at what the DPM emissions might be when this equipment is operated in various ways in the mine such as unloaded going downhill into exhausting air when the engine will cool down rapidly, or uphill while loaded and moving with the air when the engine will heat up. But we cannot know how good our guesses are or whether that expensive soot trap we are trying out actually works as advertised.

I am hoping that we can either find a surrogate for DPM or develop a method for making exhaust gas measurements on equipment while it is in use. We are pursuing both ideas at this time. We need to be able to target our effort towards equipment that will result in the biggest reduction for our investment in time, money and effort.

No assurance we are doing the right thing: Cleaner burning engines reported create less total mass of DPM but more submicron particles, which could potentially be more hazardous to miners health because they may be deposited deep within the lung. When one considers the lack of consistent existing scientific data regarding the hazards associated with DPM exposure, is making changes which potentially could have a negative impact on the hazards really worth doing? Are we going to spend a lot of money, effort and time only to reverse course after a few years?

Potential for unexpected impacts: When regulations are technology forcing as these are, there is a high potential for very expensive equipment damage. We must meet the deadlines for meeting the standard or the ultimate alternative is to shut down. This standard does not permit the use of personal protective equipment or administrative controls even while developing strategies for controlling DPM, so we are forced to try different technologies without knowing the consequences. This creates the potential for very expensive equipment damage such as engine rebuilt or replacement. One such incident occurred at one of our mines when trying to reduce engine noise, which ultimately led to replacement or rebuilding of five engines at a cost of around $100,000.

I have found Newmont's management to be concerned and proactive about health and safety. The people employed at Newmont are considered the single most valuable resource we have. I believe there are problems with the regulations as currently drafted, but I think these can be cooperatively addressed.

MR. TOMB: Thank you.

MS. WESDOCK: I have a question.

MR. TOMB: Okay, questions? Sandra.

MS. WESDOCK: The research that you're hosting that is funded by HEI, when is -- when is it going to be completed? Do you know?

MR. MAUSER: They've been delayed on starting. They start next month, June.

MS. WESDOCK: Um-hmm.

MR. MAUSER: And we should be getting preliminary results from that time on, but the complete report probably won't be done for a year after that, and this is done by the

Desert Research Institute in Nevada.

MR. TOMB: What's the testing for?

MR. MAUSER: They are testing to come up with a chemical signature for diesel particulates. That's one of the objectives of the study. And I'm hoping that when they --

MR. TOMB: Within the environment?

MR. MAUSER: In the mine itself and on our equipment. They have an apparatus they have built that will do dilution of exhaust gas directly from a piece of equipment in a controlled fashion, and then they will sample the diluted gas, you know, after it's been diluted by a certain ratio, and do a chemical signature, a full spectrum analysis on that. And they are hoping to be able to, perhaps even be able to identify -- I mean, if everything just works like magic, I suppose, be able to go into a mine and say, okay, it's this piece of equipment that is the problem in this location, because you have a chemical signature from a different constituence in the rust.

MR. TOMB: If your management told you to control diesel particulates at the applicable -- to the proposed levels in the --

MR. MAUSER: One-sixty micrograms per cubic meter, yes.

MR. TOMB: Right. What would you do?

MR. MAUSER: Well, I was essentially --

MR. TOMB: Well, they told you to do it. I mean, you have unlimited resources, go do it. What would you do?

MR. MAUSER: Well, like I said, I'd like to target the equipment that would give me the most return for the investment, and so I would be doing the research I'm doing now, and I would start a program that we have started where we do weekly testing for our CO, so we keep our fleet up as best we can. And I don't think I'd be able to do it as the regulations are written now because of the problems we have with the testing itself.

I mean, you know, I've used this spreadsheet you've developed for coming up with the average. You know, it's a nice idea, but what it does is it gives you a particulate loading for the mine as a whole, and I think a lot of our problem is going to be things like we have to control traffic in the mine itself at certain headings. We have to look at these issues, and coupled with the problems with dust and oil mist, et cetera, we can still get hit with these violations. So I mean, I never felt that I could guarantee management that I could keep us from -- violation free, although, you know, there was a possibility with tripling our ventilation rates and --

MR. TOMB: Can you do that?

MR. MAUSER: I don't think it's feasible at this point. The problem as I see it is if I were to start out, were to work with a mine that's just being developed, we might put more ventilation shafts in as a matter of course for our development, or we might have lower grades so we don't have to worry about what we mentioned before with the sliding hazard where we have to water the roads. I mean, we've got places where we're got a pretty good wind going through our drifts now, and once you think about tripling that and even --

MR. TOMB: Does it go to the work areas?

MR. MAUSER: Well, see, that's another issue, is that we reventilate. I mean, we don't -- we don't ventilate just the face and its exhausted.

MR. KOGUT: Could you describe a little bit more, in a little bit more detail the data that you've collected --

MR. MAUSER: No.

MR. FORD: -- on DPM?

MR. MAUSER: Oh, throughout the mine?

MR. KOGUT: The data that you're referring to here you said in the last -- you said that after the proposal was put out, that you've --

MR. MAUSER: No, I've made some real rough calculations. I assumed .1 grams per cubic --

MR. KOGUT: No, I'm talking about -- I thought you were referring to -- well, what I'm referring to is on page 2 of your testimony. You said, "It took those of us working on sampling mine air only a few months to collect far more data in this area that MSHA had used as a basis for the regulation."

I assume you were talking about --

MR. MAUSER: I'm talking about the NIOSH 5040 samples that we've collected, and I was in on the early stages of setting up the program. I know we had literally hundreds of samples. I think Wes would be better able to address that.

MR. KOGUT: So you're talking about the samples that you've collected in conjunction with the NIOSH/NCI study?

MR. MAUSER: No, the samples we collected once these proposed rules were published. We immediately started sampling in our mine and coordinated with other mines to collect data, and just see how bad it was --

MR. KOGUT: Right.

MR. MAUSER: -- and how this method worked.

MR. KOGUT: Okay, that's what I was asking about. So are you going to be providing us with those data, or can you describe the results a little bit more than you have here?

MR. MAUSER: I couldn't any more than has already been done here today.

MR. KOGUT: Okay.

MR. MAUSER: No.

MR. KOGUT: Will you provide us with the data?

MR. MAUSER: I think that would be --

MR. LEAVITT: We could respond to some degree in our written comments. It was part of the Nevada Mining Association samples that were already presented today. Our data is included.

MR. KOGUT: Oh, so it's a subset of the data --

MR. MAUSER: Yeah.

MR. KOGUT: -- that were presented this morning?

MR. MAUSER: Yeah.

MR. TOMB: Okay. Any other questions?

(No response.)

MR. TOMB: Okay, thank you very much.

MR. MAUSER: Thank you.

MR. TOMB: Appreciate you coming and making your presentation.

Our next presenters will be from Barrick Goldstrike Mines Incorporated, Mr. Sheffield.

MR. SHEFFIELD: Good afternoon, Mr. Chairman, members of the panel. My name is David Sheffield, Superintendent of Safety and Health Services for Barrick Goldstrike Mines Inc. Also, for the record I am chairman of the Safety and Health Committee for the Nevada Mining Association.

Barrick is the largest gold producer in the State of Nevada, operating both surface and underground mines, with over 1700 employees. At all of our sites operating excellence includes a strong sense of responsibility to local communities, the environment, and the health and safety of our employees.

An effective safety and health program protects our employees, controls costs and increases productivity. More importantly, safety and health are fundamental values at Barrick because it is the right thing to do.

We share the agency's goal of protecting our company's most precious resource, the underground metal and nonmetal miner. Yet we find ourselves questioning the agency's approach to the control of diesel particulate matter and its conclusions based on incomplete and unsubstantiated data. As a grass roots stakeholder in the mining community, it pains us that an agency of the federal government would promulgate a proposed rule without first including in the developmental process the very industry for whom it claims to provide assistance and oversight.

Accepted organizational theory teaches us the best solutions are always created when everybody has been invited to the table for a common purpose.

We do not live in the dawn of the industrial era with irresponsible corporations, nor can we stand idly by while a minority faction within the mining community attempts to dictate the form and content of this national debate regarding diesel particulate matter issues.

The very government we support through service and our tax dollars, including the Mine Safety and Health Administration, is a government of the people, by the people, for the people. So therefore how can the Mine Safety and Health Administration claim that the agency unequivocally serves all people in mining, the mining industry, the mining support industries, and the manufacturers with all their associated employees, have not been involved from the beginning in this regulatory process.

Had these entities been involved from the beginning, we doubt that the irreconcilable flaws with the proposed rule would have occurred.

The mining industry provided one of the highest standards of living for its employees and their families in the United States. We are an industry that contributes favorably to the Gross National Product, and we are an industry that possesses positive net exports. We are the raw materials and backbone of our national defense, our telecommunications, and our global superpower status, not to mention a standard of living unsurpassed in the world's history.

If you cripple our industry with premature, unsubstantiated, unresponsible legislation, you will cripple our nation.

Barrick has already submitted to MSHA a written comment dated April 30th of this year on the proposed rule, and we plan on filing a final comment by the close of the record on July 26th. Barrick appreciates this opportunity to appear before you today, to communicate to you major concerns with several very serious flaws and deficiencies in the proposed rule.

For the record, let me state that Barrick fully supports the message and testimony of the National Mining Association, the Nevada Mining Association, and the individual grass roots stakeholders, that is, the mining companies who have testified before and after me, and at the subsequent hearings to come.

Specifically, we believe the proposed rule is a premature rush to regulation. As MSHA has substantially acknowledged in its preamble, the available evidence on the possible carcinogenic and non-carcinogenic health effects of exposure to diesel particulate matter is grossly deficient and does not support the propose standards.

This deficiency is especially troubling with respect to establishing any reliable linkage of adverse health effects to any particular exposure level and requires a more careful evaluation of an appropriate standard.

In its preamble to the proposed rule, MSHA has frequently cited to the Supreme Court's Benzene decision for the proposition that MSHA may proceed in the absence of absolute scientific certainty as to a significant risk of material health impairment. MSHA fails, however, to recognize that the Benzene decision struck down OSHA's Benzene regulation in part because it was not supported by appropriate findings of exposure-based risk -- a flaw shared with the proposed diesel particulate matter rule.

We fear that the agency is rushing to regulation with this standard that is not supported by the agency's own record. In the Benzene decision, the Supreme Court emphasized inadequacies in OSHA's findings concerning a "dose response correlation," a dose response correlation between adverse health effects and any realistic occupational exposure level.

Based on this precedent, we recommend that MSHA proceed in a technically supportable manner, especially in view of the fact, as noted by the agency, that NIOSH and the National Cancer Institute are presently collaborating on what is expected to be a more definitive study about the relationship between diesel particulate matter and disease outcomes than is presently available. Hopefully this study will be designed to avoid some of the structural flaws in existing studies purporting to show carcinogenic or other disease associations with diesel particulate matter exposure.

Second, we believe that the NIOSH 5040 method does not adequately discriminate between diesel particulate matter and other organically-based matter in samples collected from exposure areas of our underground metal mines. We have carbon-bearing rock in our underground mines that are creating tremendous interferences with our sampling. We have been unable in our NIOSH 5040 sampling to screen out interferences from carbon-bearing rock, oil mist and cigarette smoke through the use of cyclone pre-selective sampling methods. These interferences render our results completely unreliable as indicators of diesel particulate matter.

As you know, similar problems with interferences in underground coal mine sampling led MSHA to reject a PEL approach in that mining sector. The same problem exists at Barrick and other underground metal mines in Nevada, as evidenced with earlier presentations.

In addition, we fail to discern in the preamble MSHA's scientific basis for its asserted 80 percent ratio between total carbon and diesel particulate matter. While the NIOSH 5040 method performs its intended task of capturing total carbon levels, it cannot differentiate between total carbon and diesel particulate matter. In fact, it appears quite useless for measuring actual quantities of airborne diesel particulate matter that may be present relative to other sources of airborne carbon, such as from dust from our carbon-bearing rock.

In addition, the sampling methodology has not been proven for this purpose.

Similarly, our preliminary information indicates that existing laboratory sample determinations are questionable. This troubles us in view of MSHA's prior problems with reliable lab results.

In summary, we believe that there are no reliable methods to test for diesel particulate matter in Nevada underground metal mines.

Third, we find the cost estimates grossly understated and the economic feasibility of the proposed rule severely lacking in research and without adequate foundation. As MSHA acknowledges under the relevant provisions of the Mine Act, it must consider the feasibility of its proposed rule both from technical and economic perspectives.

MSHA's economic and technical feasibility analyses, along with its projected cost estimates, were not developed in collaboration with the mining industry. In addition, the technical feasibility of appropriate after-treatment control devices are not available on the market for the types and sizes of equipment used in our underground operations. This is due to a number of variables, including variations in duty cycles, exhaust temperatures required for filter regeneration, and inconsistences in performance of catalysts.

Accordingly, we strongly urge from MSHA the necessary time to explore and to continue development of viable approaches similar to those suggested in MSHA's toolbox instead of the agency rushing headlong with the regulations with inaccurate, unworkable and infeasible options.

Fourth, Barrick is highly concerned with several of the proposed rule's specific provisions and will address these areas more completely during our written comments filed at the close of the record. In general, the proposed rule is overcomplicated and duplicates very substantive areas such as miner training, maintenance standards, and recordkeeping.

Fifth and finally, Barrick endorses the Nevada Mining Association's criticism of the agency's continued downgrading of administrative controls and the use of personal protective equipment in favor of considerably more expensive, presently infeasible engineering controls.

Today's professional miners and mine operators reflect the safety and health conscious attitude prevalent in modern mining. Barrick believes that it makes more sense to reduce potential safety and health risk with an effective combination of engineering controls, administrative controls and personal protective equipment.

As our track record demonstrates, Barrick continuously involves our employees in finding viable protective solutions, helping to lead the metal/nonmetal mining industry in ensuring that we are on the cutting edges of new technologies.

We recommend the Mine Safety and Health Administration encourage flexible controlled approaches for diesel particulate matter exposure and allow mine operators to utilize every effective available means for the protection of their employees, including administrative controls and personal protective equipment.

The health and safety of employees cannot be ensured merely by passing of some mandatory regulation. Fundamentally the safety and health of employees are dependent upon personal responsibility and an organization's commitment to do that which is right.

It is the right thing for Barrick to provide health, dental and vision benefits with all premiums paid to our employees and their families. It is right for Barrick to provide a 401(k) plan with matching funds, and additional company-funded pension savings plan for our employees. It is right for Barrick to spend 1.25 million dollars per year for scholarships to college-age dependents of our employees. It is right for Barrick to spend 1.4 million in our local community per year where our employees and their families live. And it is the right thing for Barrick to protect their employees from demonstrated health risk and all physical safety hazards.

If MSHA is truly concerned about the health and safety of the miner, then Barrick invites MSHA and anyone else willing to participate to the table to discuss this or any other safety or health issue in a cooperative effort. We respectfully suggest that MSHA does not possess a monopoly on solutions to the diesel particulate matter issue or a monopoly on the concern for miners' welfare. Barrick will continue to do that which is right. We challenge MSHA to do the same.

(Applause.)

MR. TOMB: Thank you for your presentation.

Wait, we may have some questions. Sandra? Jon? Jim?

I'd like to ask one question.

MR. SHEFFIELD: Sure.

MR. TOMB: Do you have any data to support from your mind -- support what the levels are in your mind, and basically what you've done to clarify whether those levels are confounded with other problems or not?

MR. SHEFFIELD: Yes, we do have data. We were included in the Nevada Mining Association, compilation of data that we presented this morning, and we're in that test pool.

MR. TOMB: I'm specifically asking from your mind do you have individual occupational measurements of the people in those mines?

From the presentation I saw this morning, I didn't see any regular occupational measurements as to what levels people are exposed to, whether it's total carbon from all contaminants, or total carbon from diesel, and I haven't seen any of that data yet. I'm just wondering if you -- you know, you seem to have taken a very proactive role in your mind, and I'm just asking if you have that kind of information available.

MR. SHEFFIELD: We have a very comprehensive industrial hygiene program. We have three industrial hygienists on staff; one for the test pool services and then an overall director. And we continuously take sampling, not just -- and we have the same problems everyone else has mentioned today. We can't ascertain specifically any type of reading directly of diesel particulate because of the confounders, but we continuously monitor under the current law for all types of potential hazards for our miners, and we continuously do that across the spectrum. So this is just one more item that -- you know, that we will put into our --

MR. TOMB: Well, can you supply specific information relative to the measurements that you have made?

MR. SHEFFIELD: I will do that. I'll supply you an executive summary. But just like when MSHA comes out to do sampling on whether it's mercury or dust or whatever, we have a very extensive program. But, unfortunately, when we go to conference and we show two years, three years, five years worth of data and MSHA does one single sample, that's not taken into consideration. And so under the law we're not obligated to provide that data. I'll provide that data on behalf of the DPM and in a mass group setting, but I won't give you my individual data. No, sir.

MR. TOMB: Well, this is an opportunity for cooperative effort where the committee could look at some important date if you have it.

MR. SHEFFIELD: Well, before I've mentioned we're ready to sit down and chat, but I'm not going to have a rule thrown out first and then say, "Scramble and see what you can do. Come forward first. You know, Mr. McAteer came out to our site and he -- and mentioned technological advances that we have. So if MSHA is serious, we are willing to sit down, but we're not going to sit down on the down end, we want to sit as an equal partnership. We don't want to sit down where our hands are tied.

MR. TOMB: Okay. Thank you for your presentation.

MR. SHEFFIELD: You're welcome.

MR. TOMB: Our next presenter will be Homestake Mining Company, Bruce Haber -- Huber. I'm sorry.

(Slide.)

MR. HUBER: My name is Bruce Huber. I'm employed by Homestake Mining Company as the Director of Safety and Health at the Homestake Mine in South Dakota. Also with me today are Mr. John Mark, our Senior Ventilation Engineer, and Mr. Mike McGivern, our Industrial Hygienist, who I'm sure will be happy to answer any questions you may have following my comments.

Mr. Chairman, members of the committee, thank you for allowing us to be here today. We at Homestake agree with many of the concerns voiced by our colleagues, and while it is not our intention to reiterate everything you have already heard, we would like to underscore a few important points.

At the Homestake Mine we have collected a number of carbon samples using the MSHA 5040 method.

(Slide.)

A problem was evident when total carbon was detected in a sample collected in a crusher room with no diesel source.

Jon, I must be shooting directly at you.

(Slide.)

This thermogram run on the initial sample indicates 194 micrograms per cubic meter or meter tube of total carbon. It's difficult to read on the screen, but all of this carbon was organic. Realizing we had a problem immediately, Mr. McGivern went to Appendix C of the NIOSH 5040 method, and we requested our lab reanalyze the sample using the certification process. This process is supposed to eliminate carbon in the sample from carbonate naturally occurring in our rock.

As you can see, 50 percent of the organic carbon was removed using their certification process. More importantly, what remains, 50 percent of the original carbon amount, a significant level, 87.5 micrograms that is not diesel particulate matter and is not carbonate matter.

(Comment from the audience.)

MR. HUBER: So our question is what is the remaining carbon. We simply do not know. We can conclude that the NIOSH 5040 method does not accurately measure diesel particulate matter with this interference in our mine, gold mine.

(Slide.)

A couple of other points we'd like to underscore.

MR. TOMB: Could I ask a question on that, please, if you don't mind?

MR. HUBER: Yes.

MR. TOMB: What type of sample was that, was it particle, or submicron?

MR. MCGIVERN: It was an open-face.

MR. TOMB: Open-faced total, total sample.

MR. MCGIVERN: Right.

MR. HUBER: Should an accurate sampling method become available, we agree with our colleagues and would emphasize the point that MSHA's proposed area samples have no relevance to miners' exposures. For example, loaders currently being purchased by Homestake are equipped with pressurized and filtered cabs. If MSHA were to use area samples from outside the cab , true miners' exposure is not measured.

(Slide.)

An area of diesel particulate filters: Using these filters proved to be ineffective with several applications, specifically, light-duty vehicles, equipment with cooler running engines and equipment with light-duty cycles.

(Slide.)

Finally, in the area of controls should the sampling issue to be resolved and a TLV result, if engineering controls fail to bring compliance, we believe that respirators have been proven to be an effective -- to be effective as a means of protecting the health of a miner, and should be allowed as a method of compliance.

That's all I have, Mr. Chairman. Thank you.

MR. TOMB: Okay, thank you.

MR. MCGIVERN: Any questions?

MR. TOMB: We have a couple.

MR. MCGIVERN: A couple.

MR. TOMB: When you show data, we always like to see it. So that's one thing, can you supply us a little bit of information on the type of samples that were collected, if you can give us the mass on the filter, if we can get that. Maybe the sampling time like Mr. Kogut has asked for before; just to supply us with some information.

Do you have any idea how many measurements you made?

MR. MCGIVERN: Two.

MR. TOMB: Two? Okay. So we'd like to have that information if you can --

MR. MCGIVERN: We can supply that. We have written comments already explaining that data, but we can supply you the actual lab data, sure.

MR. TOMB: I think the other thing is you said your laboratory analyzed the samples or did you send them out?

MR. MCGIVERN: Sent them out to DataChem.

MR. TOMB: You sent them out?

MR. MCGIVERN: Yes.

MR. TOMB: Okay. DataChem, okay.

MR. HANEY: A couple questions.

First of all, where you have on the right half of your drawing where you have it marked "OC peaks," is that supposed to be EC peaks, elemental carbon?

MR. MCGIVERN: It was all organic carbon that showed up. We had no elemental carbon show up in the crusher building.

MR. HANEY: Okay. Okay, and do you have any idea what the concentration of dust in that building was?

MR. MCGIVERN: I don't. We had to run the sample for quite some time just to get some loading on it whatsoever, but we didn't go back and do another to try to make some comparison.

MR. HANEY: Okay. You also said that you had tested diesel particulate filters and that they were ineffective on light-duty vehicles.

By "ineffective," do you mean that they didn't work at all or was it just because they weren't reaching a temperature --

MR. MCGIVERN: Plugging.

MR. HANEY: They were plugging.

MR. MCGIVERN: Plugging and not reaching

temperature.

MR. HANEY: Okay. So they didn't regenerate. They worked, I guess they worked, but they plugged.

MR. MCGIVERN: For short periods of time, yes.

MR. HANEY: Okay. Okay, thank you.

MR. SASEEN: Just as a follow up, did you try a system to head off-board regeneration?

MR. MCGIVERN: Say that again, George.

MR. SASEEN: Did you try any systems that had off-board regeneration where you would take the filters off and put them in an oven?

I mean, it's a common knowledge that with the light duty you don't, you know, get the temperatures so you can get systems that you can regenerate off-board or even passive regeneration, like an oil burner. I just wondered if you tried any of those systems --

MR. MARKS: We haven't. We've investigated that.

MR. SASEEN: I'm sorry?

MR. MARKS: We haven't done that yet, but we've investigated it.

MR. SASEEN: Okay,

MR. MARKS: And we realize that we may have -- if we go to, you know, diesel particulate filters further.

MR. SASEEN: What size engines were these that you tried these on?

MR. MCGIVERN: Probably at that time 150 horsepower, and one of the filters plugged within 48 hours, and one we did have some success with.

MR. SASEEN: What kind of -- was it like a personnel vehicle or can you tell --

MR. MCGIVERN: Loader, two-yard loader.

MR. SASEEN: Oh, it was a loader?

MR. MCGIVERN: Yes. Three and a half yard loader. One of them was run with the Bureau of Mines and we were able to have some success with that. Others, we had no success with.

MR. SASEEN: Did you have a cost on what it cost you to equip that with a filter? Even though it didn't work, did you get a --

MR. MCGIVERN: It was 10 years ago.

MR. SASEEN: Oh, okay.

MR. MCGIVERN: Were six, seven, eight thousand dollars a piece at the time.

MR. SASEEN: Okay.

MR. MCGIVERN: There was an additional cost to install it with some fittings. Then we ran it.

MR. SASEEN: Okay, thank you.

MR. TOMB: Thank you.

MR. CUSTER: I have a question.

MR. TOMB: Oh, okay. I'm sorry.

MR. CUSTER: I noted in -- under your control side you mention that respirators are effective and should not be completely eliminated as a matter of compliance, if engineering controls are exhausted, and that's been a recurring theme obviously throughout this entire hearing. But you are the first to not have mentioned administrative controls.

Was that an oversight or you don't believe in the effectiveness of administrative controls?

MR. MARKS: Probably administrative controls would not work for us, not for reducing diesel, but productivity-wise it's -- in our mining method, we probably would not choose that as an option.

MR. CUSTER: Thank you.

MR. TOMB: One other question. Excuse me.

Did you happen to use the estimator at all to look at conceivably what your levels could be with different controls that you have available to you?

MR. MARKS: We haven't yet, but we'd like to.

MR. TOMB: Okay.

MR. MARKS: We'd like to try it.

MS. WESDOCK: If you try it, could you submit your results for the record?

MR. MARKS: Well, we'd like to try and see what we come up with.

MS. WESDOCK: Okay.

MR. SASEEN: Do you have an electronic copy of it or did you get, or do you just have -- do you have an electronic copy?

MR. MARKS: We don't.

MR. SASEEN: I could send you one.

MR. MARKS: I would appreciate it.

MR. MCGIVERN: Anything else?

MS. WESDOCK: Thank you.

MR. TOMB: Thank you very much.

That completes my list of people that have registered to speak. Is there anybody else in the audience that would like to make a presentation or give any comments?

(No response.)

MR. TOMB: Okay, I'd like to make a correction to, I guess, something that I said in my opening statement. I can't remember what it was.

(Laughter.)

But it had to do with the final date for comments for the record, and this is for both coal and for metal and nonmetal, and that's July 26, 1999. So if I misstated something in the record, just so you know that that's the final deadline for getting comments into us.

I want to take this opportunity to really thank all of you that took the trouble to come in and display data and to make presentations to us, because as some of you have insinuated -- I don't want to say insinuated, that might not be the right word -- but have conveyed to us that maybe we didn't collect sufficient data for the record, from making measurements, I want to say that anything that you can give us to help support the measurements that we do have is valuable information.

I want to caution you though that the data that you submit, we need to have it in a certain form from the standpoint that we've asked for. We need the baseline data. We just don't need a table that says that 15 measurements were made and these are the average. It's better if you can give us that data, like some of you have and some of you, I hope, can supply to us.

But I want to thank you for your presentations and the input that you've had here today. So thank you very much. This closes the meeting.

(Whereupon, at 5:05 p.m., the meeting was concluded.)

//

//

//

//

//

//

//

//

//

//

//

//

REPORTER'S CERTIFICATE

DOCKET NO.: N/A
CASE TITLE: Diesel Particulate Matter
HEARING DATE: May 11, 1999
LOCATION: Salt Lake City, Utah

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the hearing in the above case before the Mine Safety and Health Administration.

Date: May 11, 1999

Raymond Vetter
Official Reporter
Heritage Reporting Corporation
Suite 600
1220 L Street, N. W.
Washington, D. C. 20005