Mr. Marvin Nichols, Director
Office of Standards, Variances And Regulations
MSHA
1100 Wilson Boulevard, Room 2350
Arlington, VA 22209

Re: MSHA Diesel Particulate Matter (DPM) Standards For Underground M/NM Mines RIN 1219-AB29

Dear Mr. Nichols,

Stillwater Mining Company (SMC) appreciates this opportunity to submit comments in response to the re-opening of the rulemaking record on MSHA's diesel particulate matter (DPM) rules, announced in the Federal Register on February 20, 2004 (69 FR, page 7881). SMC is an active member of MARG, Nevada Mining Association, National Mining Association and has been an active participant in the ongoing NIOSH/NCI study efforts. We urge MSHA to conclude this proceeding as quickly as possible, including adopting the changes endorsed by the MARG Coalition, Nevada Mining Association and the NMA in prior comments.

Most importantly, we again urge MSHA to act, now, in this rulemaking, to delete and revoke the January, 2006, permissible exposure limit (PEL) of 160 ug/m3 total carbon (TC) and adopt the 308 ug/m3 elemental carbon (EC) "settlement" standard, as the permanent standard for the control of DPM in underground metal and non-metal mines.

This rulemaking results from the interim, partial settlement agreement, dated July 15, 2002 (Interim Settlement), of the legal challenge to the January, 19, 2001 DPM rule; a rule that was rushed to publication on the last day of an outgoing Administration. The Interim Settlement acknowledged the need to address the gross errors in the rule, including the selection of an invalid DPM measurement surrogate and the erroneous feasibility and validity determinations underlying the 2002 and 2006 standards.

As MSHA is aware, Stillwater Mining Company has been a leader in the cooperative good faith effort between labor, industry and the Agency to conduct research aimed at the development of DPM reduction technology. We are committed to the protection of the health and safety of our workforce and we welcome further opportunities to continue our cooperative research efforts. Consistent with our commitment, we have scheduled another joint research project with NIOSH for July 2004 to investigate further low sulfur fuels and we again invite MSHA's participation.

Stillwater Study – Phase 1 Report And Phase 2, Case Study Report Comments

Stillwater provided its facilities, personnel, and resources to the NIOSH Metal/Nonmetal Diesel Partnership, which includes MARG, and in which MSHA personnel participated. The Phase 1 report cannot be commented on without inclusion of the Phase 2 report, as

the two studies were a combined effort to determine filter feasibility and efficiency as well as attempt to determine effectiveness and functionality in actual mining activities.

> "The objective of the first phase was to establish the effectiveness of the selected technologies in reducing diesel emissions by using an isolated zone methodology. The objective of the second phase was to assess the effectiveness of diesel particulate filters in controlling the exposure of underground miners in actual production scenarios." *Phase 1 report, page 5*

As reflected in the report, the objective of the Phase 1 study, conducted in an isolated zone ("Isozone") of the Stillwater Mine, was to determine the "viability of DPF systems and establish confidence in their performance:"

> "This short-term study addressed some issues related to the selection and installation of filtration systems, but was not able to address other important issues related to the implementation and operation of DPFs, namely regeneration of DPF systems during the production cycle, their reliability and durability. Addressing these issues will require long-term studies with continuous monitoring of performance of the DPF systems and periodic emissions testing."- *Phase 1 Report, Page 6*

The first specific and detailed comments we submit for the record regarding this Phase 1 Report is the NIOSH March 26, 2004, Phase 2 Report (Case Study) (Attachment 1), which we provide for inclusion in the record.

The isolated-zone created for the Phase 1 test was an underground laboratory not reflective of actual mining conditions. The results obtained in the isolated-zone test are applicable to the limited equipment that could be fitted with DPFs and are not representative of actual mining conditions, or of the current fleet of equipment in use at Stillwater or in the metal/non metal industry. Yet, the Phase 1 study partially fulfilled its objective and demonstrated that, as tested in the isolated-zone setting on the limited equipment capable of using the DPF systems, the systems were capable of reducing DPM.

While the Phase 1 study was well suited for its initial objective; it provided no reliable data to indicate that the selected filter technologies would in fact provide the necessary control of DPM in an actual mining application. (Note that in the Phase 1 report, testing was mostly performed at ventilation rates above the MSHA nameplate requirements.) Thus, the Phase 2 Case Study was developed in an effort to provide this relevant information.

The isolated zone test demonstrated a possible control system, for a small fraction of the equipment in use, which remained to be tested during actual mining conditions. The results do not demonstrate that feasible controls exist to achieve compliance with the current or pending MSHA PEL, but provided the first steps towards examining actual

feasibility of compliance. This study work should have been completed long before the DPM rule was rushed to publication.

As reflected in the introduction of the Phase 1 Final Report, the partnership committed to a second phase of testing to "assess the effectiveness of diesel particulate filters in controlling the exposure of underground miners in actual production scenarios." The Case Study, Phase 2 report explains and applies the lessons of the Phase 1 Study and provides critical safety and feasibility information regarding the use of DPF systems in actual mining conditions. The Case Study Phase 2 report of the NIOSH Partnership, conducted with full participation by MSHA representatives, is essential to the completion of this regulatory proceeding and also should have been conducted prior to the adoption of the DPM rules.

The Case Study demonstrates the extreme difficulty of achieving compliance with the 308µg/m^3 EC PEL. Most importantly, the Case Study demonstrates the potential creation of severe hazards to miners by the implementation of DPFs (particularly if compliance experiments are mandated through field enforcement), and the lack of a feasible means to comply with the 2006, 160 ug/m3 TC PEL.

The Phase 2 Case Study also demonstrates the technological limitations that mines will encounter during attempted DPM reduction efforts in the actual mining cycle. Equipment failures and performance below that obtained during the isolated zone testing, and as advertised by manufacturers, were commonplace and will be repeated as these technologies are deployed elsewhere. Indeed, the report notes that:

> "… the efficiencies for the DPF systems achieved in the mining studies did not always agree with the efficiencies reported in the laboratory studies. These studies also demonstrated that considerable effort is needed to select and optimize DPF systems for individual underground mining applications."

Moreover, the Phase 2 test could only include those pieces of equipment for which a DPF system could be retrofitted, as also noted in the Phase 1 testing. Importantly, this category represented only a small fraction of Stillwater's underground diesel fleet, leaving the vast majority of the fleet to future controls that have yet to be developed or tested, or to premature replacement, an economic threat to the mine never intended, envisioned or analyzed by the DPM rulemaking.

The inherent assumption underlying the January 19, 2001, DPM rules, the MSHA feasibility analysis, and the MSHA "Estimator" used to analyze the rules, was that effective and inexpensive DPFs were available and could be readily retrofitted to the mining fleet. That basic assumption, severely criticized by independent engineering experts during the prior phase of this rulemaking, was proven wrong, again, by the Stillwater tests.

The Phase 1 Report and the Phase 2 Case Study prove the dangers inherent in promulgating rules and mandating technology changes, before feasibility and safety is

proven. As reported in the attached NIOSH Case Study Report, the very technology that justified MSHA's feasibility determination for rule, and appeared promising in the Isozone Phase One study, produced such high levels of NO_2 in actual mining conditions that the miners were withdrawn and the test stopped to prevent an imminent danger. This condition was also present during the Phase 1 study, which led to the premature ending of testing during one test and very close observation of NO_2 levels during others. As also indicated in the Phase 1 Report, Page 54, "*…a significant increase in the number of particles, approximately 80 percent, was evident for both cases when mufflers were replaced with DPFs. It was further hypothesized that these particles were primarily other known constituents of DPM although no data was collected to support this hypothesis.*"

The Stillwater Phase 1 Report and the Phase 2 Case Study demonstrate the need for adopting the proposed one-year, renewable extension process for mines that encounter feasibility problems in meeting the 308 EC settlement standard, as well as the proposed rule applying existing PPE standards and policy to the settlement PEL.
This critical work also reinforces the urgent need to delete the 2006, 160µg/m^3 TC PEL in this rulemaking.

Without action now, the 160µg/m^3 PEL will become effective in 18 months and there is no feasible compliance method on the horizon. Under controlled "actual mining" conditions in the Phase 2 Case Study, with NIOSH, Stillwater and MSHA experts overseeing the tests, area samples downwind from the equipment and personal samples were well in excess of the 308 EC "settlement" PEL and the 2006, 160µg/m^3 TC PEL (Page 18, Phase 2 Report, March 26, 2004).

Recent MSHA DPM sampling reported on the MSHA web site indicates that mine operations continue to struggle with compliance to the Interim Standard, with 51% of mines tested exceeding the Interim PEL and virtually all of the mines exceeding the 2006 PEL.

The experience gained in the NIOSH Case Study at the Stillwater Mine is extremely relevant to this rulemaking and the Phase One Isozone Study. The March 26, 2004, report provides information and comments on "latest scientific data" discussed in the Stillwater Phase One Report and throughout the rulemaking record. It reflects the experience gained under the MSH Act, led by the federal agency designated to conduct research for MSHA. It provides valuable information; particularly since there is no similar DPM rule or experience at any other federal agency regarding diesel exhaust exposures in underground construction tunneling, trucking, rail, or other diesel exhaust exposure conditions. The Phase 1 and Phase 2 reports in combination, provide the necessary information to allow MSHA to 1) quickly conclude this rulemaking and 2) delete the 2006, 160µg/m^3 TC PEL.

The breakdown of valuable information gained during the two studies includes several important factors. First, a "one size fits all" filtration system is not currently available for all mining equipment. Utilization of DPF's is dependent on equipment size constraints,

duty cycle and thermal cycles, mine opening constraints and even requirements for permissible equipment utilized in the metal/nonmetal sectors.

Second, the Phase 2 study demonstrates that durability and economic feasibility constraints, not previously analyzed by MSHA, exist regarding DPF use. For example, the Phase 2 study indicates a need to replace filters much earlier their operating cycle than previously believed necessary, (i.e. when a "smoke test" indicates filter efficiencies are beginning to deteriorate). A mine operator could have expected to change out a filter when the smoke test reads "8," but could not economically replace filters when the smoke test reads '2' or '3'.

Third, the Phase 2 Case Study confirms the failure and lack of feasibility of "off board" regeneration DPFs at Stillwater and their probable failure at many other mines. These systems require additional, new underground excavations to install the regeneration equipment and provide extensive parking areas for the hundreds of units of equipment that would have to travel great distances at the end of each shift. Mines with difficult ground conditions or those that design their underground tunnels based on a delicate balance of maximizing width and the safety of roof control, cannot sustain the increased risks of roof falls that these new excavations would pose.

Finally, and most importantly, significant secondary safety issues arise from the utilization of DPF's. NO_2 generation has been recognized as significant in both the Phase 1 and Phase 2 studies from the use of passive DPF's, to the extent that these units produce enough NO_2 to exceed the MSHA Ceiling limit of 5ppm requiring that the affected miners must be withdrawn from the mine.

In the Phase 2 testing, one test was aborted when NO_2 levels exceeded the Ceiling Limit in excess of 80,000 cfm in the main ventilation on the 35W Footwall Lateral as observed by all participants, including MSHA representatives. Two machines operating with fairly new, lightly wash-coated filters produced this elevated concentration. This scenario can occur many times with any production fleet. Consequently, one test was completely deleted from the study schedule since the test was not going to change any of the filters and was going to be performed in the same area, unnecessarily exposing miners to elevated NO_2 concentrations for a second day. Testing was also prematurely ended during the Phase 1 study due to NO2 concentrations above the MSHA Ceiling limit. Other issues involving safety would include runaway regeneration that would affect many more miners in the air split.

Secondary Research
Equipment Manufacturers

The Phase One Isozone Study and Phase 2 Case Study were conducted in combination with testing of emission control devices from the major manufacturers in partnership with those manufacturers and NIOSH. Engine manufacturers (Cat and Deutz) have partnered with Stillwater to conduct engine Dyno tests for the purpose of understanding the importance of application tuning. SMC is presently reviewing an LHD and Haul T who

have had engines replaced with Mercedes 904 and 906 engines, 33 of the 300 (13%) of the underground diesel fleet have received upgrades either in the form of electronic engines or electronic governors. SWC has entered negotiations in regard to a field trial of Caterpillar's new C7 ACERT engine. This trial is scheduled for fall of 2004.

Stillwater continues to partner with learning institutions and engine/trap manufacturers to find new technologies for emissions control While Stillwater is committed to the continuation of this research, the work conducted to date demonstrates that feasible controls are not yet available to meet the 308 EC PEL and are not even on the horizon for the 2006 160 TC PEL.

Ventilation

The Phase 1 Isozone Study and the Phase 2 Case Study must be put in perspective by commenting on the ventilation upgrades at the Stillwater Mine. The Mine upgraded its primary ventilation system in January and February 2003. The Upper West upgrade was commissioned January 6, 2003 and the Off-Shaft was commissioned February 19, 2003. Fine-tuning of these systems was completed by June 2003. The upgrade was necessary to increase overall ventilation from 620,000 cfm to 840,000 cfm. A third 400 hp fan is scheduled to be installed on the 48w FWL in early second quarter of 2004. This fan will provide an additional 150,000cfm of fresh air to the Off-Shaft West portion of the mine, bringing the total airflow to 1 million cfm. This additional ventilation will allow for a restructuring of airflow, and will allow each FWL in the Off-Shaft West to receive fresh air. Once the third fan is installed in the Off-Shaft West, the amount of primary ventilation using recycled air will be significantly reduced. The associated reduction in the use of recycled air is expected to lower exposure to DPM and mine gases (NO_2 and CO).

Even with these significant ventilation upgrades, and all of the other DPM control measures Stillwater has undertaken, a feasible means of compliance does not yet exist for the 308 EC PEL and the 2006 160 TC PEL would be impossible to comply with.

New technologies

Hybrid engines such as those that utilize hydrogen fuel cells in unison with electric traction motors are also possible solutions in lowering DPM emissions. Similarly, air cleaning systems that might clean air used underground and permit its reuse to reduce again DPM and gaseous exhaust levels, will be the subject of future tests with NIOSH. These technologies, however, are far from reality and do not constitute a feasible means of compliance with the 308 EC PEL or the 160 TC PEL.

Fuels

SMC is presently utilizing #2 Diesel and has located two sources considered to be low sulfur content. While this does not meet the 2006 diesel standard requiring ultra low sulfur fuel, a study will be conducted to determine the concentration of diesel particulate emission emitted from the low sulfur fuel. Some challenges that prohibit the testing of the ultra low as well as the low sulfur fuels is the lack of local distributors until 3Q2005 and transportation to the mine site.

Administrative Controls

Work practices, such as minimizing idling, spacing vehicles to limit area loading, tagging out poorly running equipment and performing planned engine PMs have become a scheduled occurrence at both mines. Employees have been trained on the appropriate protocols and reasoning during the Annual Refreshers and through best practice maintenance seminars conducted by Sean McGinn of McGinn Integrations.

Respiratory Protection Plan

Sampling indicates a more consistent operator over exposure to DPM during LHD mucking cycles at the East Boulder Mine, while sampling at Stillwater Mine overexposures are less consistent. At both properties, a mandatory respirator program has been implemented for those underground employees operating diesel LHD's and haul trucks. Respirators have been available and recommended for other underground occupations.

Financial Burden

Improvement/Study/Equipment	**Cost**
Mine Ventilation Upgrade	>$9 million
Soot Traps and Filters study	>$143,000
Engine upgrades, NIOSH/MSHA partnership studies, seminar participation, etc.	>$1.2 million
Test Equipment	>$280,000
Emissions expenditure	avg. $43,000
Grand Total	>$10.5 million

Conclusion from Studies

Through these studies and trials it has been determined that 67% of equipment in use at the Stillwater operations is not suitable to have either a passive or active filter installed. The passive filters have a platinum wash coat, which produces significant NO_2 concentrations, while the active filters are not feasible due to the inability to provide regenerating stations close enough to the work site to minimize the impact to ground control, traffic, and operations. The active filters would require the expansion of underground excavations to create regeneration and parking stations, increasing ground control hazards and creating unacceptable safety risks, delays and costs from the extensive movement of equipment at the beginning and end of every shift.

After expenditures of over $10 million we are still only attaining a 50% compliance rate with the 308 EC settlement PEL according to the November 2003 MSHA health inspections.

In conclusion, we again urge expedited action by MSHA in finalizing this rulemaking consistent with the Interim Settlement Agreement, including: (1) the deletion of the January, 2006 160µg/m^3 TC DPM standard: (2) the permanent adoption of the 308µg/m^3 EC settlement standard; (3) adoption of the compliance extension provisions for the 308µg/m^3 EC standard to permit yearly applications and approvals based on feasibility issues; and (4) adoption of personal protective equipment and administrative control options, to supplement engineering controls, pursuant to existing standards and policy.

Thank you for the opportunity to provide these comments on behalf of Stillwater Mining Company.