MSHA PUBLIC HEARING
ON
SEPTEMBER 7, 2005 PROPOSED RULE
FR VOL. 70, NO. 172 / DIESEL PARTICULATE MATTER

JANUARY 9, 2006
LITTLE AMERICA HOTEL
SALT LAKE CITY, UTAH

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KENNECOTT MINERALS COMPANY

- Overview of Kennecott Minerals Company's participation in DPM rulemaking
- Staggered effective dates for final limit
- Need for formalized procedure to grant special extensions

MARK GOOD
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- Summary of Feasible Engineering & Administrative Controls
- Conversion factor for final limit
- Greens Creek's 2006 DPM Control Plan

AB29- HEAR-7 submission

Fred Fox

KMC's Participation in DPM Rulemaking

On behalf of Kennecott Minerals Company and Kennecott Greens Creek Mining Company (Kennecott), Mark Good and I would like to thank MSHA and everyone involved for continuing to address this complex and challenging regulatory burden placed both on the Agency and the metal/nonmetal underground mines to comply with mandatory health standards for DPM exposures that were rushed into rule over 5 years ago, well ahead of the science and technology able to adequately define and address them.

Kennecott will be submitting written comments on the September 7, 2005 proposed rule (70 FR 53280) by the January 27, 2006 deadline.

Mark and I submitted testimony a little over 2 years ago here in Salt Lake City at the September 16, 2003 public hearing. Looking back into the record, it is unfortunate that our testimony today hasn't changed a great deal from that given then.

Because the regulations required and continue to require corrections and amendments, over the last 5 years there have been temporary postponements of the rules, industry petitions for review, delays, settlement discussions, joint studies, further rulemaking, and two partial settlement agreements, along with new information being published on the technical and economic feasibility in meeting the standards. And yet, there still is additional information, very important information, to be completed. I speaking of the massive DPM health effects study by NIOSH/NCI, yet to be concluded and disseminated.

Within this five-year period, Kennecott has actively participated in all aspects described above, but primarily focusing on implementing the DPM rules to reduce exposures to DPM emissions at the Greens Creek Mine. Mark Good will describe what has been done to comply with the DPM Rules at this mine, addressing the engineering and administrative controls that are deemed feasible and will continue into the future.

However, despite our best efforts, compliance with the interim DPM concentration limit at the Greens Creek Mine is considered feasible at best; we are unable to reach the final concentration limit and do not believe compliance with the proposed phased-in final limits on exposure to DPM (Sec. 5060) can be technologically or economically achieved at all times and at all locations in the mine. This was our position in January 2001 and unfortunately is our position today.

We have worked hard to implement the DPM Rules and I want to assure you that we will continue to work with MSHA & NIOSH and the industry-labor Metal-Nonmetal Diesel Partnership looking for new technology and implementing engineering and administrative controls that are deemed feasible for the site specific conditions at Greens Creek to meet the proposed limits. As you are aware, Greens Creek is not alone in its efforts to deal with this regulatory challenge.

Staggered Effective Dates for Final Limit

MSHA's position on feasibility does not reflect consideration of current complications with respect to implementation of controls. MSHA has acknowledged that it has limited in-mine documentation on DPM control technology. This has resulted in MSHA proposing revisions to the final limit on exposure to DPM, staggering the effective dates for implementation of the final limit phased in over a five year period and changing the phased-in limits from total carbon (TC) to elemental carbon (EC).

Kennecott is encouraged by the proposed changes in the final limit on exposure to DPM, but continues to be very concerned that it will not be technically or economically feasible to comply with these limits within the proposed timeframes, given the current state of DPM control technology and the site specific conditions at the mine; specifically the narrow openings, cascading ventilation and mining equipment and methods used.

Since Greens Creek believes it will not now be able to comply with the proposed final limit and because the overwhelming weight of the evidence submitted into the rulemaking record clearly supports a deletion of the final concentration limit as infeasible as applied to the Greens Creek Mine, we once again respectfully request MSHA to delete the final limit. Absent a deletion of the final limit, the process of obtaining a special extension for additional time in which to meet the final concentration limit established in the proposed rule is critical to continued compliance at Greens Creek. Special extensions will be necessary to enable continued compliance with the proposed rules.

Need for Formalized Procedure to Grant Special Extensions

Compliance with the DPM rules will be dependant upon Greens Creek receiving additional time through MSHA granting special extensions. The granting of extensions for compliance with exposure limits that are greater than the proposed final limit will allow Greens Creek to comply with the rules by taking actions during the extension period to minimize exposure of miners to DPM, such as maintaining controls and implementing a respiratory protection program.

The need for special extensions is evident and we agree that the decision to grant the special extension should be made by the District Manager but under more formal procedures that identify timeframes and documented reasons for approval/denial, means for appealing the decision to the Administrator and clarification that a special extension can be approved for each applicable DPM final limit and that the one year extension tolls the subsequent yearly limit. Without more formal procedures for granting the special extensions, we see potential problems addressing the applicability of the special extension (i.e. entire mine or parts of a mine) and having the burden of proof overwhelmingly placed on the operator without benefit of appeal or recourse.

Mark Good will now discuss site-specific issues on the feasibility of DPM controls at Greens Creek.

Mark Good

Summary of Feasible Engineering & Administrative Controls

Mr. Chairman and MSHA representatives, I will now summarize what has been done to comply with the DPM Rules at the Greens Creek Mine, addressing the engineering and administrative controls that are deemed feasible. As Fred has stated, over the past five years, on its own and with the cooperation of MSHA and NIOSH, the Greens Creek Mine has worked aggressively to reduce DPM exposures of its miners. Our effort has been difficult and costly. The use of DPM filters, in particular, posed substantial trial and error challenges. Through the application of a suite of engineering and administrative controls, however, progress in reducing the DPM exposures is being made. I have provided you with a graph **(Attachment 1)** showing DPM sample results by date.

Greens Creek is committed to achieving further reductions of DPM exposures, consistent with the DPM Rules. A summary of our efforts demonstrating Greens Creek's commitment to such reductions are provided in a second table **(Attachment 2)** and are summarized as follows:

Mining Equipment

The current diesel-powered underground fleet at the Greens Creek Mine consists of a total of 83 units of equipment as follows:

17 haultrucks
13 loaders
13 utility vehicles
6 graders/others
24 tractors
10 drills

DPM Filters

Since 2000, we have been installing and testing DPM filters on selected vehicles to ascertain the technological and economic feasibility of such filters. Our goal in this effort has been to identify "practical mine worthy filter technology," meaning DPM filters that are cost-effective and reliable in the rugged working conditions of underground mining.

Based on our assessment of commercially available DPM filters, we decided to utilize Engelhard and DCL ceramic soot trap filters (both of which are passive regeneration filters) for the larger horsepower production units. We have also installed a DCL "Blue Sky" active regeneration filter on a smaller horsepower utility loader with limited duty cycles. We continue to look for the potential to equip our medium- to low- duty cycle engines with the appropriate DPM filtration system.

The process of achieving reliability has been arduous, involving considerable delays between filter purchase and delivery to the mine and much discussion between Greens Creek personnel and filter manufacturer representatives. Based on our experience, we agree with MSHA's recent observation that "relying on filters to be installed on older, higher DPM emitting engines may also introduce additional implementation issues since filter manufacturers normally do not recommend adding filters to older engines." At the present time, however, we are increasingly confident that passive regeneration filter technology can be effective in our larger horsepower production units.

The feasibility of equipping medium-to low-duty cycle engines with passive and active regeneration DPM filter systems continues to be evaluated. The need for fixed locations for installation of equipment used for active filter regeneration poses serious logistical problems due to the nature of the mine's layout. Our current opinion is that active regeneration will only be practical in limited areas of the mine. However, we will continue to explore the use of active regeneration DPM filter systems in those areas of the mine where successful implementation can be achieved

Within the group of 13 utility vehicles, falling into the medium- to low- duty cycle range, six of the units have been re-powered with the latest clean engines available from Mercedes, and these run significantly cleaner than the engines that were replaced. Another two utility vehicle engines are scheduled for replacement before the end of this year. Most of the remaining engines in this medium- to low-duty cycle category, specifically the tractor fleet and the drill fleet, run for limited periods of time throughout the day, with typically less than 2 hours of operation per shift.

Fully Enclosed Environmental Cabs

Based on our DPM filter technology experience to date, we believe that both the purchase of equipment with fully enclosed environmental cabs and the replacement of engines in the existing fleet also have been (and will continue to be) very important in reducing our miners' exposure to DPM.

Purchase of enclosed cabs has essentially become standard where the application is practicable. Specifically, where cabs have been available as an option on the equipment and where the larger profile of the equipment is compatible with the heading size, we have purchased the equipment with the environmental cab option.

Engine Replacement

Replacement of old engines with new cleaner engines, where practicable, began in 2003. Such engine replacements have now become a primary focus of our efforts to control DPM. To date, nine units of equipment (six utility vehicles, two loaders, and one grader) have been fitted with new engines. Three additional units of equipment remain to be fitted with new engines. Most of the underground equipment fleet is already equipped with the cleanest engines available. After the conversion of the three outstanding engines, only five remaining engines will be of Caterpillar manufacture. We are

currently assessing the options for replacing these five Caterpillar engines. All other engines in the mine are MSHA-approved Deutz, Detroit, Mercedes models, or EPA-approved Kubota engines.

Ventilation

As can be seen on the attached Ventilation Diagram **(Attachment 3)**, the Greens Creek Mine has a cascading ventilation system, meaning that intake air flows from stope to stope, building up DPM contaminants as the air flows through the mine before being exhausted out a single level (1330 exhaust level).

Like many other underground metal mines built prior to the existence of the DPM Rules, the Greens Creek Mine has a relatively narrow opening and workings (generally 14 feet high and 16 feet wide). This physically limits the volume of ventilating air that can be circulated throughout the mine to sweep away DPM. The reason why the mine has such a narrow opening and workings is because, like virtually all existing underground metal mines, it was constructed to follow its ore body. Constructing the mine to make the opening and workings larger than necessary for extraction of ore would have been cost prohibitive.

In light of these constraints, while ventilation "upgrades" have been implemented since 2000, Greens Creek also relies on improved maintenance of the mine's ventilation system to maximize the ventilating air current underground. The ventilation upgrades consist of the installation of 17 new fans purchased since 2000, increased from 75 HP up to 100 HP ratings. These more powerful fans move more air to the mine's headings. Currently, we are evaluating boosting fan sizes even higher.

Because the mine was constructed long before MSHA's promulgation of the DPM Rules, and because the mine's location within the boundaries of a National Monument under the jurisdiction of the National Park Service poses additional extraordinary regulatory restrictions, significant ventilation solutions to reduce the exposure of miners to DPM are not currently economically feasible. Park Service limitations on surface disturbances for the development of additional ventilation airways to the surface are very restrictive, requiring lengthy and costly environmental impact studies before any increase to the "footprint" of disturbed lands is authorized.

As development of the mine takes place, ventilation upgrades, including the possible construction of additional boreholes, will continue. The resulting increase of airflow through affected portions of the mine should reduce miners' DPM exposures. However, the upgrades will not enhance greater flows of air throughout the mine entirely.

Administrative Controls

Administrative controls employed by Greens Creek include elimination of idling of diesel-powered equipment while waiting to load in confined areas underground and restriction of the number of operating engines in stopes.

Collaborative Study on the Efficiency of Ceramic Soot Filters

Over a two-week period in January 2003, Greens Creek personnel participated with MSHA at the mine in a collaborative study to determine the efficacy of ceramic soot filters in an operating mine setting. The study also examined the effectiveness of enclosed cabs in reducing the DPM exposure of miners. In addition, because of concerns that the use of ceramic soot filters resulted in production of excessive levels of nitrogen dioxide ("NO_2"), samples of NO_2 were taken during the course of this collaborative test..

In the most recent notice of proposed rulemaking to revise the final concentration limit in the DPM Rules (70 Fed. Reg. 53280 (Sept. 7, 2005)), MSHA has stated: "The applications, engineering, and related technological implementation issues [regarding practical mine worthy filter technology] that we believed would have been easily solved by now are more complex and extensive than previously thought." *Id.* 53283. Greens Creek's difficult and costly efforts, as summarized above, validate MSHA's observation. We appreciate MSHA's candor on this fundamental issue and remain committed to work with the Agency on key DPM Rules-related issues.

Conversion Factor for Final Limit

From the beginning of the rulemaking, Greens Creek has provided input through the rulemaking process and with site-specific joint studies to accurately sample and analyze DPM. Having a carbonaceous ore, it was important to be able to eliminate analytical interferences and confounding factors in reporting accurate results. Greens Creek believes use of elemental carbon as a surrogate for DPM is superior to the total carbon surrogate. Using elemental carbon as the analyte to represent DPM provides MSHA with more accurate, valid, and consistent measurements with much fewer restrictions on sampling locations caused by the presence of interfering substances of non-diesel origin.

Greens Creek was encouraged when MSHA admitted that total carbon cannot be measured reliably due to interferences and used the 1.3 conversion factor to convert the interim PEL of 400 ug/m3 (TC) to 308 ug/m3 (EC) [June 6, 2005 rule]. Yet, MSHA failed to delete or stay the corresponding January 19, 2006 160 ug/m3 TC limit as Greens Creek requested at the last public hearing held here in Salt Lake City (September 16, 2003).

Samples taken at the Greens Creek Mine during the Joint Study averaged 77% elemental carbon for acidified samples, equating to a 1.3 conversion factor for samples above 400 ug/m3 Total Carbon. However, Greens Creek agrees with MSHA that more work is required to develop an appropriate conversion factor from TC to EC for the proposed phased-in final limits with TC concentrations lower than the interim limit. It is reasonable to expect that sampling and analysis variability for EC to increase, and accuracy and precision to decrease, as lower EC levels are achieved and measured, as shown by the compilation of sampling results at Greens Creek **(Attachments 4 -Table & Graph)**. MSHA data demonstrate that no accurate conversion factor exists for the highly variable ratio of TC to EC at levels below the interim standard. This ratio becomes even

more unstable once diesel equipment is modified by installation of DPM filtering devices like those being implemented at Greens Creek. This once again, brings into question the technical basis for proposing a final limit at this time.

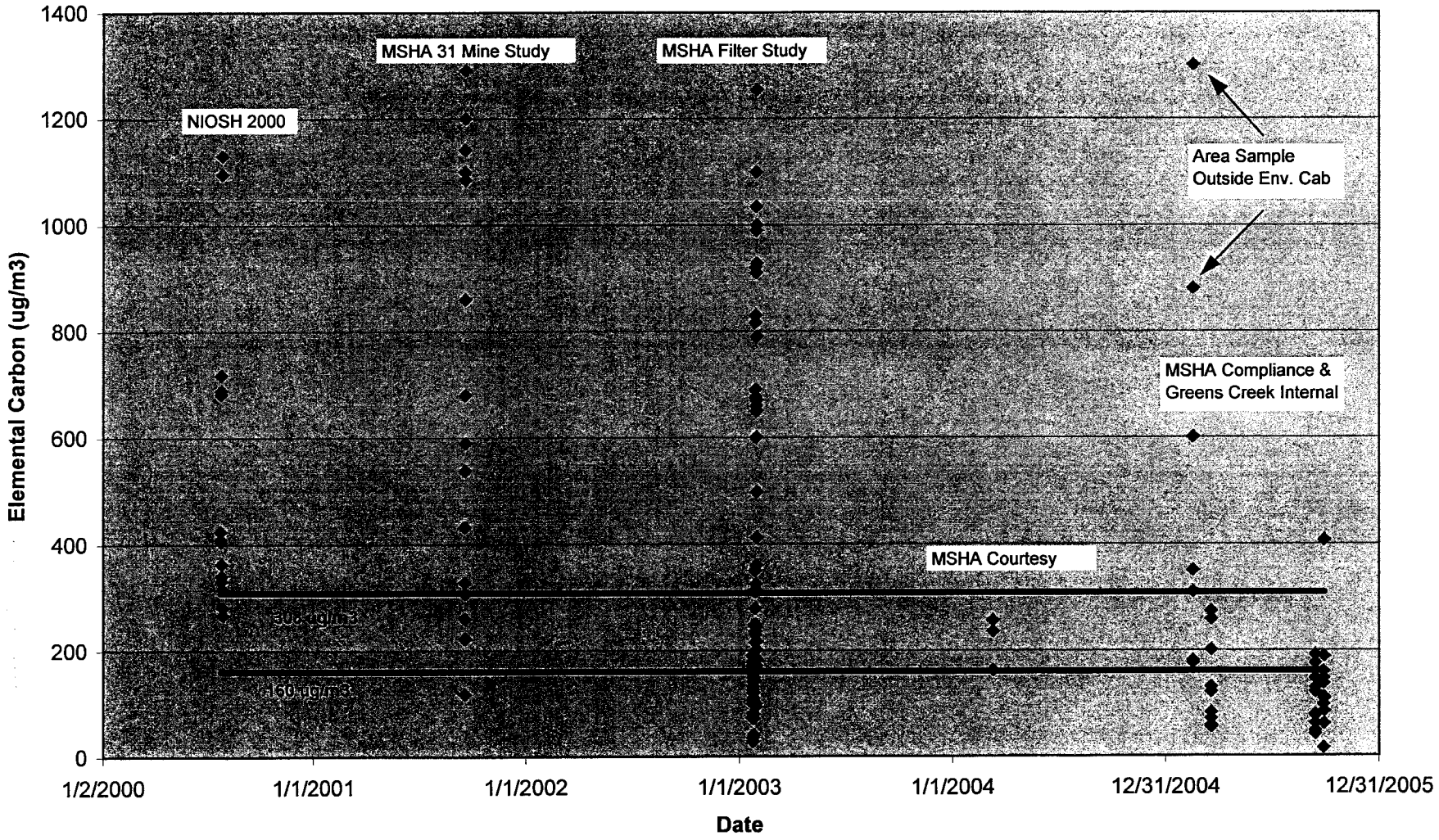
DPM Control Plan

In moving forward, Greens Creek's DPM Control Plan will take the form of a multi-pronged approach consisting of continued engine replacements, passive exhaust filter retro-fits, active regeneration filters on selected equipment, investigating bio-diesel fuel technology, increased mine ventilation flows and maintaining the existing respiratory program. A summary of the 2006 Diesel Particulate Control Plan is provided **(Attachment 5).**

I hope this summary of what Greens Creek is doing to comply with the DPM rules helps you recognize that we are committed to moving forward in reducing our miner's exposures to DPM but there still remain technical and economic feasibility issues to overcome in meeting the final limit being proposed.

Thank you once again for your attention to continuing to address the matters discussed today.

ATTACHMENT 1
DPM Samples by Date



ATTACHMENT 2

Summary of Feasible Engineering Controls Used By KGC on Mining Equipment to Reduce Miners' Exposure to DPM

	DPM Filters	Environmental Cabs	Engine Replacement
Haultrucks (17)	13[1]	10[2,3]	0[4]
Loaders (13)	2[5]	3[3]	2[4]
Utility Vehicles (13)	0[6]	0[7,3]	8[8,4]
Graders/Others (6)	0[6]	0[3]	1[4]
Tractors (24)	0[6]	0[9]	0[10]
Drills (10)	0[6]	1[3]	0[10]
TOTAL (83)	15	14	11

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1 The remaining four haultrucks are currently being evaluated for passive regeneration filter potential.

2 Of the seven haultrucks not equipped with cabs, two are slated for retirement. The remaining five are already outfitted with ceramic soot filters and run very clean.

3 As existing equipment is replaced, between five and eight units of the haultruck, loader, and utility vehicle components of the underground fleet may be amenable to application of fully enclosed environmental cabs. However, heading size and clearance issues make it impractical to use cabs.

4 Three additional units of equipment remain to be fitted with new engines. Most of the underground fleet is already equipped with the cleanest MSHA- or EPA-approved engines available.

5 One loader is equipped with a DCL "Blue Sky" active regeneration filter. The other is equipped with a passive filter. Potential exists for an additional five loaders to be equipped with passive filters.

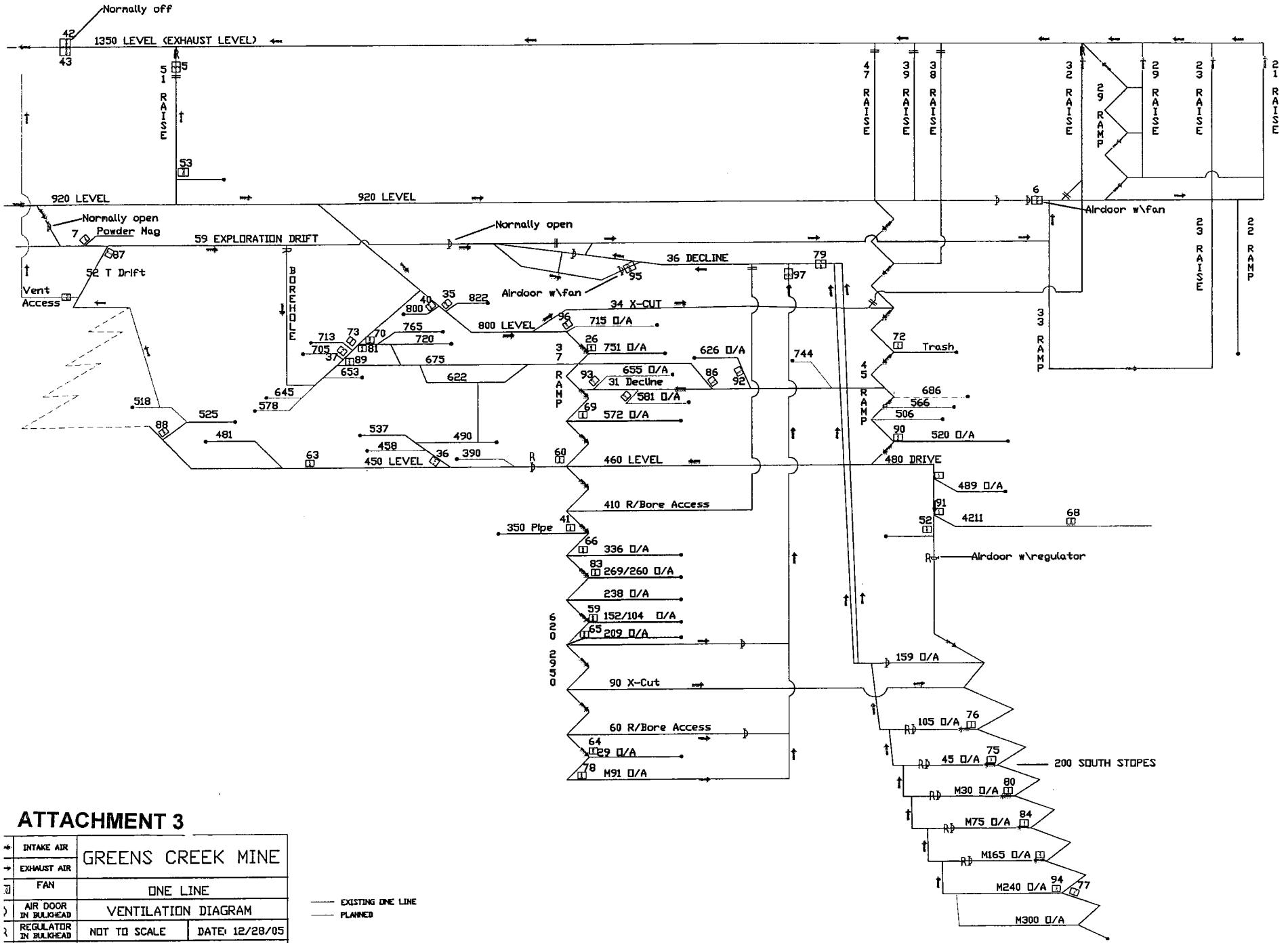
6 Temperature profiling has begun on these engines. Many are in the medium- to low-duty cycle range and have insufficient exhaust gas temperatures to regenerate accumulated carbon. Others are being re-powered with the latest clean engines available. The tractors and drills only run for limited times during a shift. However, the tractors, in particular, may be amenable to active regeneration systems. It may also be possible to fit the 13 utility vehicles and several other vehicles with active systems.

7 All of the utility vehicles have open operator compartments with ROPS protection. Furthermore, by the end of 2005, eight of these vehicles will be re-powered with clean engines.

8 Six units have been re-powered with the latest Mercedes clean engines. Another two are scheduled to be replaced by the end of 2005.

9 Cabs are not available on the model KGC is utilizing.

10 The tractors and drills only run for limited times during a shift.



ATTACHMENT 3

INTAKE AIR	GREENS CREEK MINE
EXHAUST AIR	
FAN	ONE LINE
AIR DOOR IN BULKHEAD	VENTILATION DIAGRAM
REGULATOR IN BULKHEAD	NOT TO SCALE — DATE: 12/28/05
BULKHEAD	G:\engr\services\vent\One Line\1105vent.dwg

EXISTING ONE LINE
PLANNED

Attachment 4
Compilation of Sampling Results - Greens Creek Mine

Date	Occupation	Location	Filter	EC	TC	EC:TC Ratio	Source
7/24/2000	Mucker Outside	Area	No	409	769	1.88	NIOSH - July 2000 Study
7/24/2000	Mucker Outside	Area	No	405	783	1.93	NIOSH - July 2000 Study
7/24/2000	Mucker Outside	Area	No	424	795	1.88	NIOSH - July 2000 Study
7/25/2000	Mucker Outside	Area	No	682	1066	1.56	NIOSH - July 2000 Study
7/25/2000	Mucker Outside	Area	No	689	1084	1.57	NIOSH - July 2000 Study
7/25/2000	Mucker Outside	Area	No	717	1103	1.54	NIOSH - July 2000 Study
7/26/2000	Mucker Outside	Area	No	331	613	1.85	NIOSH - July 2000 Study
7/26/2000	Mucker Outside	Area	No	362	657	1.81	NIOSH - July 2000 Study
7/26/2000	Mucker Outside	Area	No	340	567	1.67	NIOSH - July 2000 Study
7/27/2000	Mucker Outside	Area	No	1096	1553	1.42	NIOSH - July 2000 Study
7/27/2000	Mucker Outside	Area	No	1129	1606	1.42	NIOSH - July 2000 Study
7/28/2000	Mucker Outside	Area	No	315	677	2.15	NIOSH - July 2000 Study
7/28/2000	Mucker Outside	Area	No	267	563	2.11	NIOSH - July 2000 Study
7/28/2000	Mucker Outside	Area	No	280	496	1.77	NIOSH - July 2000 Study
9/19/2001	Backfill	Personal	No	1141	1402	1.23	MSHA 31 Mine Study
9/19/2001	Backfill	Personal	No	1100	1300	1.18	Greens Creek - 31 Mine Study
9/19/2001	Bolter	Personal	No	432	554	1.28	MSHA 31 Mine Study
9/19/2001	Bolter	Personal	No	538	690	1.28	MSHA 31 Mine Study
9/19/2001	Driller	Personal	No	328	433	1.32	MSHA 31 Mine Study
9/19/2001	Grader	Personal	No	222	293	1.32	MSHA 31 Mine Study
9/19/2001	Grader	Personal	No	260	340	1.31	Greens Creek - 31 Mine Study
9/19/2001	Mucker	Personal	No	118	187	1.58	MSHA 31 Mine Study
9/19/2001	Powderman	Personal	No	260	425	1.63	MSHA 31 Mine Study
9/19/2001	Powderman	Personal	No	260	390	1.50	Greens Creek - 31 Mine Study
9/20/2001	Driller	Personal	No	680	869	1.28	MSHA 31 Mine Study
9/20/2001	Mucker	Personal	No	1085	1295	1.19	MSHA 31 Mine Study
9/20/2001	Mucker	Personal	No	307	386	1.26	MSHA 31 Mine Study
9/20/2001	Mucker	Personal	No	1290	1620	1.26	MSHA 31 Mine Study
9/20/2001	Mucker	Personal	No	860	960	1.12	Greens Creek - 31 Mine Study
9/20/2001	Mucker Outside	Area	No	1200	1300	1.08	Greens Creek - 31 Mine Study
9/20/2001	Powderman	Personal	No	223	283	1.27	MSHA 31 Mine Study
9/20/2001	Stope Exhaust	Area	No	590	790	1.34	Greens Creek - 31 Mine Study

Attachment 4
Compilation of Sampling Results - Greens Creek Mine

Date	Occupation	Location	Filter	EC	TC	EC:TC Ratio	Source
1/23/2003	Mucker Outside	Area	Yes	73	140	1.92	Greens Creek - Filter Study
1/23/2003	Ramp Exhaust	Area	Yes	170	234	1.38	MSHA - Filter Study
1/23/2003	Ramp Exhaust	Area	Yes	100	210	2.10	Greens Creek - Filter Study - Duplicate
1/23/2003	Ramp Intake	Area	Yes	158	204	1.29	MSHA - Filter Study
1/23/2003	Stope Exhaust	Area	Yes	165	204	1.24	MSHA - Filter Study
1/23/2003	Stope Exhaust	Area	Yes	190	350	1.84	Greens Creek - Filter Study - Duplicate
1/23/2003	Stope Intake	Area	Yes	178	277	1.56	MSHA - Filter Study
1/24/2003	Mucker	Personal	Yes	28	57	2.00	MSHA - Filter Study
1/24/2003	Mucker Inside	Area	Yes	35	62	1.75	MSHA - Filter Study
1/24/2003	Mucker Outside	Area	Yes	156	229	1.47	MSHA - Filter Study
1/24/2003	Ramp Exhaust	Area	Yes	126	184	1.46	MSHA - Filter Study
1/24/2003	Ramp Intake	Area	Yes	120	178	1.48	MSHA - Filter Study
1/24/2003	Stope Exhaust	Area	Yes	148	215	1.45	MSHA - Filter Study
1/24/2003	Stope Intake	Area	Yes	132	193	1.46	MSHA - Filter Study
1/24/2003	Truck	Personal	Yes	106	159	1.50	MSHA - Filter Study
1/24/2003	Truck	Personal	Yes	82	273	3.35	MSHA - Filter Study
1/25/2003	Mucker	Personal	Yes	79	103	1.30	MSHA - Filter Study
1/25/2003	Mucker Outside	Area	Yes	140	187	1.34	MSHA - Filter Study
1/25/2003	Mucker Outside	Area	Yes	150	270	1.80	Greens Creek - Filter Study - Duplicate
1/25/2003	Mucker Inside	Area	Yes	41	62	1.52	MSHA - Filter Study
1/25/2003	Ramp Exhaust	Area	Yes	104	149	1.43	MSHA - Filter Study
1/25/2003	Ramp Intake	Area	Yes	103	140	1.36	MSHA - Filter Study
1/25/2003	Stope Ambient	Area	Yes	120	200	1.67	Greens Creek - Filter Study
1/25/2003	Stope Exhaust	Area	Yes	180	234	1.30	MSHA - Filter Study
1/25/2003	Stope Exhaust	Area	Yes	110	180	1.64	Greens Creek - Filter Study - Duplicate
1/25/2003	Stope Intake	Area	Yes	143	177	1.24	MSHA - Filter Study
1/25/2003	Stope Intake	Area	Yes	100	180	1.80	Greens Creek - Filter Study - Duplicate
1/25/2003	Truck	Personal	Yes	102	145	1.43	MSHA - Filter Study
1/25/2003	Truck	Personal	Yes	72	134	1.87	MSHA - Filter Study
1/28/2003	Mucker	Personal	No	142	173	1.22	MSHA - Filter Study
1/28/2003	Mucker Inside	Area	No	279	334	1.20	MSHA - Filter Study
1/28/2003	Mucker Outside	Area	No	830	926	1.12	MSHA - Filter Study

Attachment 4
Compilation of Sampling Results - Greens Creek Mine

Date	Occupation	Location	Filter	EC	TC	EC:TC Ratio	Source
1/28/2003	Mucker Outside	Area	No	920	1100	1.20	Greens Creek - Filter Study - Duplicate
1/28/2003	Ramp Exhaust	Area	No	816	738	0.90	MSHA - Filter Study
1/28/2003	Ramp Intake	Area	No	236	306	1.30	MSHA - Filter Study
1/28/2003	Ramp Intake	Area	No	310	470	1.52	Greens Creek - Filter Study - Duplicate
1/28/2003	Stope Exhaust	Area	No	676	781	1.16	MSHA - Filter Study
1/28/2003	Stope Exhaust	Area	No	690	890	1.29	Greens Creek - Filter Study - Duplicate
1/28/2003	Stope Intake	Area	No	310	418	1.35	MSHA - Filter Study
1/28/2003	Stope Intake	Area	No	350	520	1.49	Greens Creek - Filter Study - Duplicate
1/28/2003	Truck	Personal	No	215	267	1.24	MSHA - Filter Study
1/28/2003	Truck	Personal	No	230	290	1.26	MSHA - Filter Study
1/28/2003	Truck	Personal	No	249	340	1.36	MSHA - Filter Study
1/29/2003	Mucker	Personal	No	185	223	1.21	MSHA - Filter Study
1/29/2003	Mucker Inside	Area	No	185	211	1.14	MSHA - Filter Study
1/29/2003	Mucker Outside	Area	No	1035	1158	1.12	MSHA - Filter Study
1/29/2003	Mucker Outside	Area	No	910	1300	1.43	Greens Creek - Filter Study - Duplicate
1/29/2003	Ramp Exhaust	Area	No	314	394	1.26	MSHA - Filter Study
1/29/2003	Ramp Intake	Area	No	95	162	1.71	MSHA - Filter Study
1/29/2003	Ramp Intake	Area	No	100	200	2.00	Greens Creek - Filter Study - Duplicate
1/29/2003	Stope Exhaust	Area	No	1099	1279	1.16	MSHA - Filter Study
1/29/2003	Stope Exhaust	Area	No	990	1200	1.21	Greens Creek - Filter Study - Duplicate
1/29/2003	Stope Intake	Area	No	601	711	1.18	MSHA - Filter Study
1/29/2003	Stope Intake	Area	No	660	840	1.27	Greens Creek - Filter Study - Duplicate
1/29/2003	Truck	Personal	No	325	417	1.28	MSHA - Filter Study
1/29/2003	Truck	Personal	No	244	291	1.19	MSHA - Filter Study
1/29/2003	Truck	Personal	No	312	410	1.32	MSHA - Filter Study
1/30/2003	Mucker	Personal	No	185	229	1.24	MSHA - Filter Study
1/30/2003	Mucker Inside	Area	No	162	217	1.34	MSHA - Filter Study
1/30/2003	Mucker Outside	Area	No	1254	1438	1.15	MSHA - Filter Study
1/30/2003	Mucker Outside	Area	No	1000	1300	1.30	Greens Creek - Filter Study - Duplicate
1/30/2003	Ramp Exhaust	Area	No	498	578	1.16	MSHA - Filter Study
1/30/2003	Ramp Intake	Area	No	412	484	1.17	MSHA - Filter Study
1/30/2003	Ramp Intake	Area	No	360	520	1.44	Greens Creek - Filter Study - Duplicate

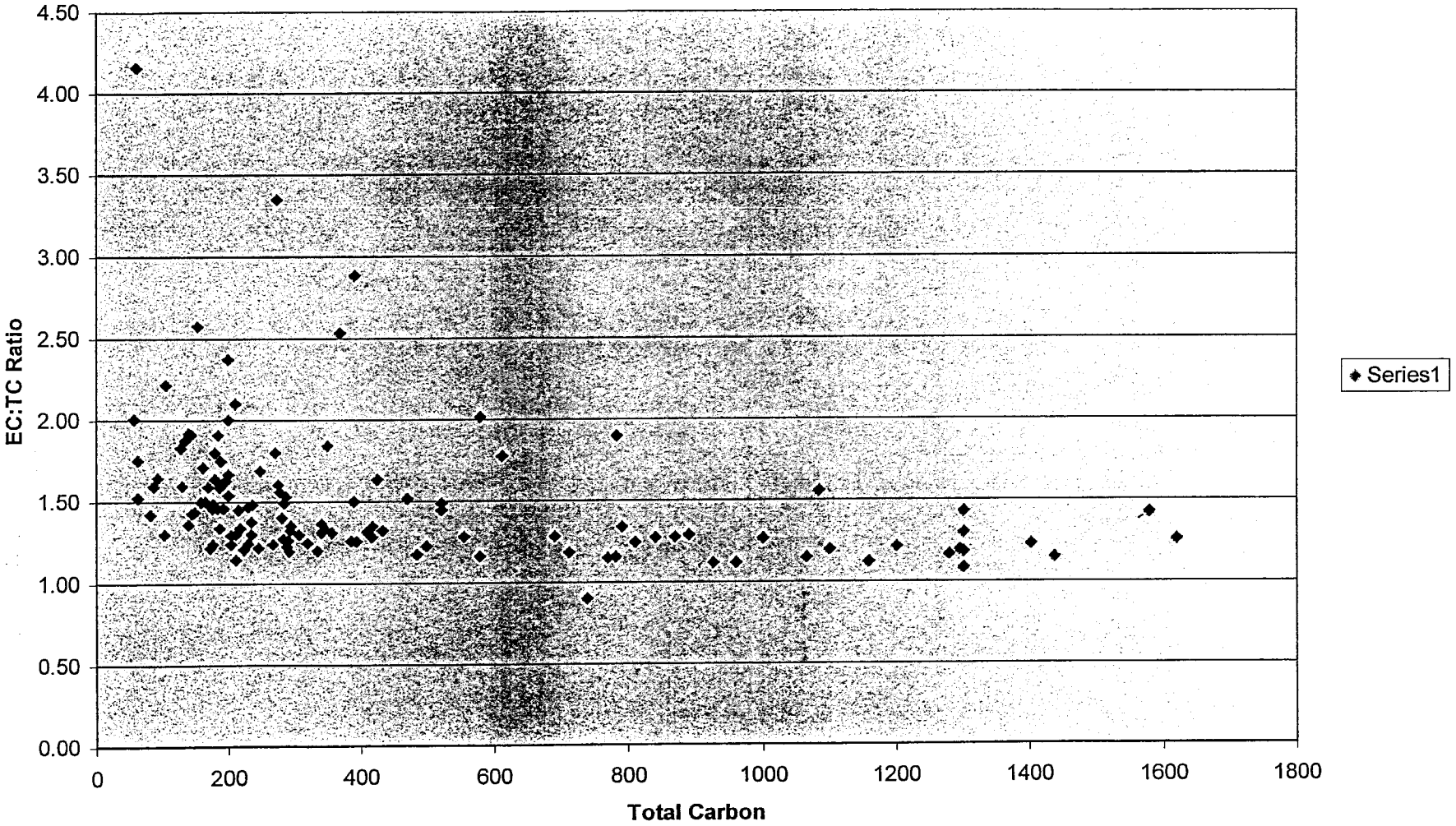
Attachment 4
Compilation of Sampling Results - Greens Creek Mine

Date	Occupation	Location	Filter	EC	TC	EC:TC Ratio	Source
1/30/2003	Stope Exhaust	Area	No	928	1065	1.15	MSHA - Filter Study
1/30/2003	Stope Exhaust	Area	No	790	1000	1.27	Greens Creek - Filter Study - Duplicate
1/30/2003	Stope Intake	Area	No	670	769	1.15	MSHA - Filter Study
1/30/2003	Stope Intake	Area	No	650	810	1.25	Greens Creek - Filter Study - Duplicate
1/30/2003	Truck	Personal	No	172	275	1.60	MSHA - Filter Study
1/30/2003	Truck	Personal	No	202	245	1.22	MSHA - Filter Study
1/30/2003	Truck	Personal	No	218	294	1.35	MSHA - Filter Study
3/11/2004	Mucker	Personal		256	319	1.25	MSHA - Compliance Assistance
3/11/2004	Truck	Personal		235	288	1.22	MSHA - Compliance Assistance
3/11/2004	Truck	Personal		162	211	1.30	MSHA - Compliance Assistance
2/16/2005	Mucker	Personal	No	600	740	1.23	Greens Creek - Internal
2/16/2005	Mucker Outside	Area	No	880	1000	1.14	Greens Creek - Internal
2/16/2005	Powderman	Personal	No	180	260	1.44	Greens Creek - Internal
2/16/2005	Mucker	Personal	No	310	390	1.26	Greens Creek - Internal
2/16/2005	Backfill	Area	No	176	320	1.82	Greens Creek - Internal
2/16/2005	Mucker Outside	Area	No	1300	1400	1.08	Greens Creek - Internal
2/16/2005	Mine Exhaust	Area	No	350	430	1.23	Greens Creek - Internal
3/19/2005	Backfill	Personal	No	258	345	1.33	MSHA - Compliance Sampling
3/19/2005	Backfill	Personal	No	130	200	1.54	G.C.- Compliance - Duplicate
3/19/2005	Bolter	Personal	No	70	128	1.83	MSHA - Compliance Sampling
3/19/2005	Bolter	Personal	No	54	86	1.59	G.C.- Compliance - Duplicate
3/19/2005	Driller	Personal	No	273	357	1.31	MSHA - Compliance Sampling
3/19/2005	Driller	Personal	No	200	280	1.40	G.C.- Compliance - Duplicate
3/19/2005	Mucker	Personal	No	82	130	1.59	MSHA - Compliance Sampling
3/19/2005	Mucker	Personal	No	56	92	1.64	G.C.- Compliance - Duplicate
3/19/2005	Truck	Personal	Yes	121	176	1.46	MSHA - Compliance Sampling
3/19/2005	Truck	Personal	Yes	57	81	1.42	G.C.- Compliance - Duplicate
9/13/2005	Driller	Personal	No	128			MSHA - Compliance Sampling
9/13/2005	Driller	Personal	No	120	196	1.63	G.C.- Compliance - Duplicate
9/13/2005	Mucker	Personal	No	78			MSHA - Compliance Sampling
9/13/2005	Mucker	Personal	No	190	283	1.49	G.C.- Compliance - Duplicate
9/13/2005	Truck	Personal	Yes	175			MSHA - Compliance Sampling

Attachment 4
Compilation of Sampling Results - Greens Creek Mine

Date	Occupation	Location	Filter	EC	TC	EC:TC Ratio	Source
9/13/2005	Truck	Personal	Yes	146	369	2.53	G.C.- Compliance - Duplicate
9/13/2005	Truck	Personal	Yes	61			MSHA - Compliance Sampling
9/13/2005	Truck	Personal	Yes	75	144	1.91	G.C.- Compliance - Duplicate
9/13/2005	Truck	Personal	Yes	41			MSHA - Compliance Sampling
9/13/2005	Truck	Personal	Yes	47	105	2.22	G.C.- Compliance - Duplicate
9/27/2005	Backfill	Personal	No	15	61	4.15	Greens Creek - Internal
9/27/2005	Dozer	Personal	No	146	247	1.69	Greens Creek - Internal
9/27/2005	Mucker	Personal	No	159	235	1.48	Greens Creek - Internal
9/27/2005	Powderman	Personal	No	136	391	2.88	Greens Creek - Internal
9/27/2005	Truck	Personal	Yes	97	184	1.91	Greens Creek - Internal
9/27/2005	Utility	Personal	No	108	189	1.75	Greens Creek - Internal
9/28/2005	Grader	Personal	No	110	166	1.50	Greens Creek - Internal
9/28/2005	Loader/Drill	Personal	No	406	498	1.23	Greens Creek - Internal
9/28/2005	Powderman	Personal	No	188	287	1.53	Greens Creek - Internal
9/28/2005	Truck	Personal	No	60	154	2.57	Greens Creek - Internal
9/28/2005	Truck	Personal	Yes	84	200	2.37	Greens Creek - Internal
9/28/2005	Utility	Personal	No	107	170	1.59	Greens Creek - Internal

ATTACHMENT 4
EC:TC Ratio



ATTACHMENT 5

Kennecott Greens Creek Mining Company
2006 Diesel Particulate Control Plan

The Control Plan will take the form of a multi-pronged approach.

- Engine Replacement
  - Complete the last 3 two cycle diesel engine replacements

- Passive Exhaust Filter Retro-fit
  - Complete the last 6 confirmed passive filter candidates
    - Investigate two additional passive filter candidates

- Active Regeneration Exhaust Filters on Selected Equipment
  - Test Active regeneration filters on utility and transportation fleet

- Diesel Engine Maintenance and Emission Training
  - Audit existing DPM maintenance program
  - On-site training (theory & hands on)
  - Training Manuals

- Investigate Bio-diesel Fuel Technology
  - Source supplies on the west coast and determine logistics
    - Determine fuel characteristics for cold temperature applications
    - Determine fuel characteristics in wet climates
  - Determine separate fuel stream requirements for underground equipment
  - Determine fuel specifications for lubricity
    - Determine lubricity additives required for injectors
    - Establish warranty issues for bio-diesel blends greater than 10%

- Increase Mine Ventilation Flows
  - Complete planned ventilation infrastructure development
  - Complete new main fan installation
  - Complete new ventilation door controls

- Respirator Program
  - Maintain existing respirator program
  - When it is determined use of respirators is appropriate, respirators will meet the criteria of 30 C.F.R. § 57.5060(d).