United Mine Workers of America

TELEPHONE
AREA CODE (202) 842-7200

UNITED MINE WORKERS' BUILDING
900 FIFTEENTH STREET, N.W.
Washington, D.C.
20005

June 8, 1989

HAND DELIVERED

Mr. Ed Huglar
Deputy Administrator for Safety
Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, VA 22203

Dear Ed:

The following outlines the technical studies your Agency has advised the UMWA that you intend to conduct at the Jim Walters Mines specifically the Jim Walters Number 4 Mine.

The results of these studies will be utilized by the Union to determine the hazards that exist at the Jim Walters Mines with existing longwall mining faces and longwall mining systems with extended faces.

We believe these studies will be important with regard to both the petitions for modifications that are affected and the mining plans utilized at the Jim Walters Mines.

The **studies** we understand your Agency intends to conduct particularly at the Jim Walters No. 4 Mine are as follows:

A Methane (CH_4) Survey

1. At least 3 one week visits at various stages of panel extraction will be surveyed.
2. Survey of 2 walls with faces in the 700 and 800 foot range.
4. Sensors will be spaced at 200 foot intervals across the face and the relationship between gas liberation and production will be evaluated.

AB 14- HEAR-5D
AB 18- HEAR-5D

B. Ventilation Survey

As part of the methane survey during the weekly surveys described, MSHA will conduct a ventilation survey to determ the

C. Dust Survey

1. Will consist of at least 3 - one week surveys.
2. 2 walls with faces i [illegible] foot range would be surveyed.
4. Sampling devices will be hung at the headgate, tailgate and mid-face.
5. In addition, all persons working in area would be personally sampled.

D. Tailgates and Face Travel and Escapeways

A study will be conducted on tailgate failures and closur which would prevent egress and to determine escape and travel capabilities across longwall face.

The following mining procedures would be identified during the dust, methane and ventilation surveys to determine the effects:

1. Direction of cut of longwall shearer
2. Depth of cut
3. Speed of cut (tram speed)
4. Cutting drum speed
5. Bit pattern
6. Water Spray pressure at tips
7. Water spray placement and types of sprays used
8. Frequency of activities along longwall face that relate to respirable dust or float coal dust contro i.e. washing down shields (how often), number of shields being pulled, etc.
9. Air quantity
10. Tonnage produced
11. Cutting drum design
12. Additives used in water

We understand there may be other studies conducted as well. If this does not reflect the Agency's intentions, please advise me specifically of any misunderstanding.

Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely yours,

Joe Main

Joseph A. Main, Administrator
Department of Occupational
Health and Safety

DOD - 1 14 JUN 15 1989

U.S. Department of Labor
Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, Virginia 22203-1984

14 JUN 1989

Mr. Joe Main
Administrator
Department of Occupational
Health and Safety
United Mine Workers of America
900 15th Street, N.W.
Washington, D.C. 20005

Dear Joe:

This responds to your letter of June 8 which recites the items of interest to the United Mine Workers of America (UMWA) in our upcoming technical surveys at Jim Walter mines.

As we discussed, the general purpose of the technical surveys is to evaluate the methane gas and respirable dust conditions experienced on longwalls with face dimensions in the range of 700 to 800 feet wide. These surveys will not include an assessment of the control of tailgate entries. This issue is being addressed by our District 7 personnel.

The gas and dust surveys will, I believe, include in some form all of the items described in your letter. However, several points should be clarified.

Four site visits for purposes of the surveys are currently contemplated. These visits are expected to involve about a week each, with an estimated three days underground. However, the visits will be expanded if necessary to accomplish our objectives. Current plans are for both gas and dust surveys to be conducted at the same time. At this stage, our intentions are to survey the longwall in the 700-foot range once, and the longwall in the 800-foot range three times at various intervals of panel extraction.

The dust survey will, as we discussed, involve sampling along the face, together with personal sampling. Our strategy at this stage is to place samples in the headgate and tailgate areas, and also the intake aircourse. Current plans do not include a mid-face sample, contrary to what I believe I said in our discussions. Personal sampling will be conducted for miners at the face.

The various mining procedures and other variables listed in your letter will be identified during the survey work, inasmuch as they are relevant to the environment and conditions being evaluated. I would point out, however, that the "effects" of these variables cannot be assessed in the sense of a comparison with different procedures and variables. Also as we discussed, the methane gas survey will involve measuring devices at intervals across the longwall face. The intervals between devices are expected to be approximately 200 feet, but equipment placement will be influenced by what is considered most effective and practical. As we also touched on in our discussions, the ventilation survey activities contemplated will be directed at the longwall sections being evaluated.

As of the date of this letter, I understand that Jim Walter and Mine Safety and Health Administration (MSHA) Technical Support personnel will meet the week of June 19 to briefly review the planned survey activities. Following this meeting, our final plans will be set. We will keep you advised of our progress, any elements of the surveys that may be of interest to you, and any material changes being considered.

Our purpose in conducting these surveys is, as I have said, to develop information for MSHA that will be useful in making decisions about mine plans and petitions for modification. Accordingly, it is our intention to do a thorough and professional job

Sincerely,

Edward C. Hugler
Deputy Administrator
for Coal Mine Safety and Health

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

Environmental Dust Survey

PHTC-DD-90-2C

Blue Creek No. 4 Mine
Jim Walter Resources Inc
Brookwood, Alabama
Mine I.D. No. 01-01247
September 18-20, 1989

by

Robert S. Ondrey
Mining Engineer

Objective

To identify dust sources on the longwall section and to make recommendations for reducing workers exposures to the identified dust sources.

Originating Office

Pittsburgh Health Technology Center
Thomas F. Tomb
Chief, Dust Division
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

INTRODUCTION

At the request of the District Manager, Coal Mine Safety and Health, District 7, a respirable dust survey was made at the Blue Creek No. 4 Mine, Jim Walter Resources, Incorporated, Brookwood, Alabama. The purpose of the survey was to identify dust sources on the longwall section and to make recommendations for controlling workers exposures to the identified dust sources. The block of coal outlined by the longwall panel was 850 feet wide and 5,100 feet long. At the time of the study, 3,750 feet of the panel remained. The longwall face was supported with 172 shields.

OPERATION

This study was conducted on the No. 2 Longwall Unit (MMU 017-0) which was developed as a four entry longwall section. Air was brought up the intake and belt entries on the headgate side, coursed along the face and exhausted into the return on the tailgate side. A schematic of the section is shown in Figure 1. The section employed an Anderson Mavor AM 500 double drum ranging arm shearer to cut coal. The mining cycle consisted of a unidirectional cutting sequence with the full cut from tailgate to headgate and a cleanup cut from headgate to tailgate. The shearer was operated manually by the two shearer operators. No remote control device was available to operate the shearer.

Two drum rotation speeds were available on this shearer, 34 and 44 rpm. At the time of the study the 34 rpm drum speed was being used. This particular shearer also employed reverse drum rotation (cutting from the bottom to the top). The shearer employed wet cutting drums and an external spray system consisting of five venturi sprays mounted on the head and tail splitter arms. There were no water sprays mounted on the top of the shearer body because of the rock and coal which constantly fell on top of the shearer.

Approximately 172 Thysson 2-legged 575-ton shields were used for roof control on the longwall face. The shields were manually advanced by four shield setters each responsible for advancing a group of 43 shields. Verbal instructions had been given, by company management, for each shield setter to return to the headgate area after advancing their groups of shields. No shield setter was to be on the return-air-side of the shearer when making its full cut.

The longwall face was ventilated by two intakes (the belt and haulage intake). Air quantities were measured at the headgate side and tailgate side of the longwall face each shift. Average air quantities at the headgate and tailgate of the face were 57,000 and 47,700 cfm, respectively.

The headgate dust controls consisted of two water sprays at the panline-to-stageloader transfer point, two sprays at the stageloader-to-section belt transfer point, six sprays within the stageloader itself, and six sprays inside the crusher (as per the methane and dust control plan). It was not possible to directly observe whether or not these sprays were functioning. The stageloader and crusher were completely enclosed with metal plates. Conveyor belting was attached to the inby end of the crusher to prevent the escape of dust from within the crusher.

SAMPLING PROCEDURE

Gravimetric respirable dust samples were collected to determine personal exposures and dust generating sources. Personal samples were collected on two shearer operators and four shield setters and operated from portal to portal. Fixed-point samples, used to assist in determining dust sources, were operated only on section. Fixed-point samples were collected in the haulage intake, belt intake and at six locations along the longwall face. These samples were positioned in the walkway near the shield controls. Four of the locations along the face were the midpoints of each group of shields. Samples were collected at these locations to approximate exposures if shield setters remained on the face during mining operations. All samples were analyzed for quartz. The gravimetric sampling results and quartz analysis are shown in Tables 1 and 2, respectively.

DISCUSSION

Personal sampling results are shown in Table 1. The head and tail shearer operator's respirable dust exposures averaged 2.9 and 3.5 mg/m^3, respectively. The four shield setter's respirable dust exposures averaged 0.2, 1.7, 4.2 and 2.2 mg/m^3. Only the No. 1 and No. 2 shield setter's exposures were below the 2.0 mg/m^3 respirable dust standard. These two shield setters advance the first two groups of 43 shields closest to the headgate. Consequently, they were not on the face very long and spent most of the time in the headgate area. The No. 3 and No. 4 shield setters advance the last two groups of 43 shields and were on the face for longer periods of time. This was due to two main reasons, double cutting the tailgate and breaking up rocks. At several times during the survey (particularly on the second shift), it was necessary to double cut the tailgate side of the face in order to keep the face straight. This required the No. 3 and No. 4 shield setters to remain on the face to advance their groups of shields several extra times. Also, the roof conditions were more difficult on the tailgate half of the face; with large chunks of rock caving ahead of the shields and falling onto the panline The No. 3 and No. 4 shield setters were required to remain on the face to break up these large chunks of rock.

The head and tail shearer operators operated the shearer manually using the controls mounted on the body of the shearer. This operating location exposed both operators to dust generated by the cutting drums. External water sprays and an air splitter arm were used in order to keep a clean split of air over the two shearer operators. However, their effectiveness was diminished by the inability to locate additional water sprays on top of the shearer body due to large amounts of rock and coal falling on top of the shearer. The top of the shearer was completely covered with rock and coal at all times. With only limited possibility of improving the shearer clearer system due to conditions on the face, the operators must be moved to the intake air side of the shearer.

Fixed-point samples indicate that the belt air and stageloader contribute to the high dust concentration at the headgate end of the face (1.6 mg/m^3 at Shield No. 4). From this point to Shield No. 64 the respirable dust concentration remains fairly constant. Then at Shield No. 107 the respirable

dust concentrations begin to increase for the reasons discussed previously (large portion of time downwind of shearer, double cutting the tail and breaking large rocks in the panline). Fixed-point face samples for Shield setters No. 3 and No. 4 exceeded the 2.0 mg/m^3 standard. This data emphasizes the need for shield setters to stay upwind of the shearer.

Results of quartz analysis shows quartz contents of personal samples ranging from five to seven percent. Fixed-point samples show that the quartz content of the dust increases along the face.

RECOMMENDATIONS

1. Employ a radio remote control unit in order to allow the shearer operators to operate the shearer from the intake air side.

2. On the cleanup pass (head to tail) let the tail drum freewheel and cut only with the head drum. Use only one operator positioned on the intake air side of the head drum.

3. The shearer must stop after cutting out at the tailgate to allow the No. 3 and No. 4 shield setters to go inby to set the shields

4. To reduce the headgate respirable dust concentrations, the number of internal water sprays inside the crusher/stageloader should be increased from the present 12 to at least 18. Also, the outside of the crusher/stageloader should be washed during the shift to remove accumulations of dry float dust.

DATE OF STUDY 9/18-20/89

MINE INFORMATION

MINE:	Jim Walter No. 4
ID NUMBER:	01-01247
MMU NUMBER:	017-0
LOCATION:	Brookwood, Alabama
PANEL WIDTH:	850 Feet
PANEL LENGTH:	5100 Feet
DESIGNATED OCCUPATION	Tail Shearer Operator
APPLICABLE STANDARD:	2.0 mg/m^3

OPERATION INFORMATION

SHEARER/PLOW MODEL	Anderson Mavor 500
TYPE OF SUPPORT:	172 Thysson 2 Leg Shields
WEB DEPTH:	30 Inches
MINING SEQUENCE:	Unidirectional Full Cut Tail-Head
DRUM DIAMETER:	54 Inches
DRUM SPEED:	34 Rpm
NUMBER OF BITS:	54 Per Drum

EXTERNAL WATER SPRAYS (TYPE AND NUMBER)

INTERNAL SPRAYS (WET DRUM) 54 Sprays Per Drum

WATER PRESSURE (STATIC): 125 psi
(OPERATING) Not Measured

APPROXIMATE WATER QUANTITY Not Measured

WETTING AGENT: None

BOOSTER PUMP Yes

TABLE 1. - GRAVIMETRIC SAMPLING RESULTS MRE EQUIVALENT CONCENTRATIONS, MG/M^3, AND VENTILATION DATA

GRAVIMETRIC SAMPLING RESULTS

PERSONAL SAMPLES	09/18/89	09/19/89	09/20/89	AVERAGE
TAIL SHEARER OPERATOR[1]	3.0	3.4	4.1	3.5
HEAD SHEARER OPERATOR	1.3	2.8	4.6	2.9
SHIELD SETTER NO. 1	0.1	0.1	0.5	0.2
SHIELD SETTER NO. 2	1.3	1.4	2.3	1.7
SHIELD SETTER NO. 3	2.4	4.4	5.7	4.2
SHIELD SETTER NO. 4	2.4	2.6	1.7	2.2
SHIFT AVERAGE	1.8	2.5	3.2	
FIXED-POINT SAMPLES				
BELT	1.1	0.6	0.6	0.8
INTAKE	0.1	0.1	0.1	0.1
SHIELD NO. 4	1.1	1.1	2.7	1.6
SHIELD NO. 21	1.5	1.4	1.5	1.5
SHIELD NO. 64	1.8	0.4	2.6	1.6
SHIELD NO. 107	2.0	1.8	3.8	2.5
SHIELD NO. 150	2.9	5.5	3.1	3.8
SHIELD NO. 169	7.0	7.8	5.0	6.6
TONNAGE	2.300	925	3,200	
VENTILATION DATA				
AIR QUANTITY (cfm)				
INTAKE	107,700	91,800	96,000	98,500
HEADGATE	63,900	52,600	55,100	57,200
TAILGATE	55,300	38,700	40,000	44,700
AIR VELOCITY (fpm)				
HEADGATE	910	950	1020	960
TAILGATE	1000	860	800	888

[1] DESIGNATED OCCUPATION

TABLE 2 PERCENT QUARTZ FOR SAMPLES ANALYZED

PERSONAL SAMPLES	09/18/89	09/19/89	09/20/89	AVERAGE
TAIL SHEARER OPERATOR[1]	5.7	9.5	5.3	6.8
HEAD SHEARER OPERATOR	4.1	7.3	3.1	4.8
SHIELD SETTER NO. 1	[2]	[2]	[2]	
SHIELD SETTER NO. 2	4.6	9.0	5.8	6.5
SHIELD SETTER NO. 3	6.8	8.4	6.4	7.2
SHIELD SETTER NO. 3	6.7	7.6	7.2	7.2
FIXED-POINT SAMPLES				
BELT	[2]	[2]	[2]	
INTAKE	[2]	[2]	[2]	
SHIELD SETTER NO. 4	[2]	6.1	3.8	5.0
SHIELD SETTER NO. 21	5.2	6.2	4.2	5.2
SHIELD SETTER NO. 64	4.6	[2]	7.1	5.9
SHIELD SETTER NO. 107	5.0	7.6	8.7	7.1
SHIELD SETTER NO. 150	7.0	11.5	8.3	8.9
SHIELD SETTER NO. 169	7.7	10.3	[2]	9.0

[1] DESIGNATED OCCUPATION
[2] INSUFFICIENT WEIGHT GAIN

TABLE 3. - ASSESSMENT OF MINE'S EFFORTS TO IMPLEMENT NEW TECHNOLOGY

	Technology	BOM Technology Newsletter Reference	Implementation
1.	Water Sprays Oriented to Move Dust Toward Face	No. 112	Yes
2.	Upgraded Water Supply System to Reduce Dust	No. 113	Yes
3.	Modification of Cutting Sequence	No. 116	Unidirectional
4.	Proper Location of Machine Cooling Sprays	No. 118	Yes
5.	Use of Gob Curtain at Intake End of Face	No. 119	No
6.	Use of Barriers on Shearer to Split Intake Air	No. 121	Yes
7.	Ventilation Curtain Used when Cutting Out at Entry	No. 137	No
8.	Airflow in Direction of Face Haulage	No. 145	No
9.	Use More Water on Upwind Drum to Reduce Exposure	No. 155	No
10.	Stage Loader Dust Controls in Effect to Reduce Intake Contamination	No. 156	Yes
11.	Utilize Remote Controls to Reduce Exposure	No. 203	No
12.	Work Practices to Reduce Shield Dust	No. 205	Yes
13.	Utilize Shearer Clearer System	No. 245	No
14.	Utilize Drum Sprays on Bits	No. 246	Yes
15.	Ventilated Drum on Shearer	No. 283	No
16.	Reverse Drum Rotation on Shearer	No. 284	Yes

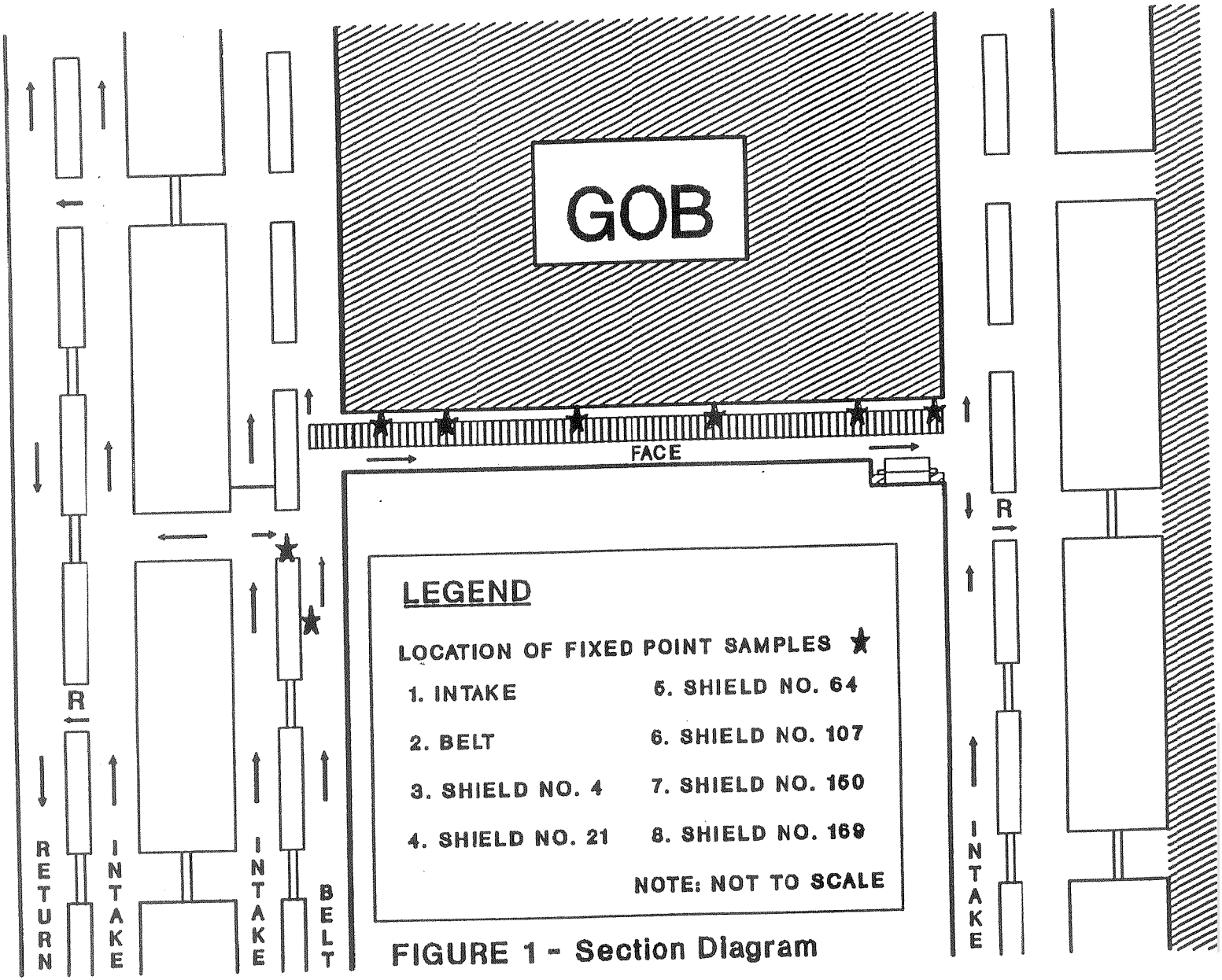


FIGURE 1 - Section Diagram

UNITED MINE WORKERS

TELEFAX

ATTENTION: Joe Main

OF: UMWA

MACHINE NUMBER: 202-842-7227

FROM: Thomas F. Wilson

OF: UMWA

NUMBER OF PAGES: 3 (Including Cover)

DATE: 5-13-91

TIME: 10:45 Am

If there is a problem with this transmission, please call (205)323-1555.

MESSAGE: Answer to 103 Please review

MACHINE NUMBER: (205)326-0630

In regard to your 103(g) request to conduct a respirable dust survey on all employees on Nos. 1 and 2 longwalls, we have completed the following:

1. The No. 2 longwall was out of compliance based on a MSHA respirable dust survey in March 1991, and a citation was issued. We requested a revised respirable dust control plan and the revised plan submitted by the operator was rejected by this office, requiring the operator to resubmit. Based on this, we will not conduct a respirable dust survey on the No. 2 longwall unit pending the approval of an acceptable plan.

2. A total of nine samples were collected on the No. 1 longwall which included management personnel. The results of the samples indicate a high of 1.7 mgm3 for the No. 1 jacksetter and a low of 0.7 mgm3 for both the electrician and headgate operator.

As to the AWC issue, that is in jurisdiction of headquarters personnel, and we have no comment in that regard.

Based on the results of this 103(g) request, a notice of negative findings on the No. 1 longwall will be issued by the inspector.

We thank you for your interest in the health and safety of the miners.

Very truly yours,

Joseph J. Garcia
District Manager
District 7

1986

H. Main Returns

Main returns which may carry methane up to two (2) per-cent volume shall be fire bossed by a certified person at least once every 24 hours. A separate fire boss book located on the surface will be filled out for each examination. No electrical equipment will be operated in any return where the methane content is 1.0% or more except for approved gas detecting devices. Air that is coursed up the return air shaft shall not exceed 1.0%. Tests for methane will be taken at the bottom of the shaft. Where multiple approaches intersect the shaft, test will be made at the bottom of the shaft where the air splits are joined.

I. Longwall Sections

Dust Control

The longwall shearer drums will be equipped with a fine water spray system. The type of spray will be of the following:

a) Conflow spray
b) Spraying Systems, Type BD
c) Jiffy Jet (Green and Bigham)
d) Cone Spray (Charles Phillip Tool Company)

There will be a minimum of 70% of the cutting drum sprays operative at all times. Any malfunction of the water spray system which renders less than 70% of the sprays operative will be corrected immediately if the location of the shearer and physical conditions of the roof and ribs are to be conducive toward a safe working place. Otherwise, the shearer will be located to the nearest point along the face where maintenance can be performed on the spray system in a safe work area. Incoming water pressure at the shearer will be maintained at a minimum of 125 p.s.i.

In addition to the drum sprays, the shearer will be equipped with the spray system described below:

a) Belting (at a suitable height) will be positioned on the top and in the middle portion of the shearer.

b) On the headgate end of the shearer body will be mounted a spray block with a minimum of two (2) sprays directed just downwind of the headgate cutting drum. A valve will be installed to control these sprays.

c) A spray block will be mounted on the tailgate end of the shearer body with three (3) sprays mounted on it, of which two (2) will be kept operative.

d) A pressure gauge will be mounted on the shearer to indicate spray water pressure.

A sprayblock with a minimum of two (2) sprays will be installed near the headgate discharge point. In addition, two (2) spray blocks, each containing a minimum of three (3) fine water sprays, will be located along the stageloader with a minimum water pressure of 200 p.s.i. at the main manifold.

Bleeder System

a) Bleeder entry support will be as stated in Part 1 of the Longwall Roof Control Plan.

b) Ventilation devices such as regulators, stoppings and bleeder connectors used to control air movement through gob bleeder entries are shown on the attached map.

c) 1.) When the mine operator deems that safe examination can be made such examination shall be made at least once each week by a certified person designated by the operator to do so and the results of such examinations shall be recorded in a book. The certified person shall place his initials, the time and the date at as many locations in the bleeder entries as are necessary to indicate that the entire length has been examined.

2.) When the bleeder entry travel is considered unsafe, the evaluation of bleeder entry performance through a system of checkpoints shall be adequate to indicate that the bleeder system is functioning and shall be made at least once each week by a certified person or persons and the results shall be recorded in a book. To protect the safety of the miners if bleeder entry performance evaluation require altering the normal airflow through the affected area, such alteration shall be made during idle shifts with power cut off from the affected area. Due precaution shall be taken so as not to endanger any other area of the mine and suitable examinations for methane shall be made at the edges of the pillar and such other places as may be required.

3.) The bleeder system shall be adequately maintained and free of water to permit safe travel.

4.) Bleeder entries from pillard areas shall be connected at strategic locations in such a way to control airflow through such gob area, to induce drainage of gob gas from all portions of such gob areas, and to minimize the hazard from expansion of gob gases due to atmospheric pressure change. If such bleeder entries cannot be traveled without exposing the mine examiner to undue hazard, a plan shall be submitted showing the design and maintenance of the bleeder system so that bleeder entry performance can be evaluated for adequacy and continuity by means approved by the Coal Mine Safety District Manager.

Walter resources, inc.
MINING DIVISION

MSHA
COAL MINE SAFETY & HEALTH
PLANS

JAN 25 1988

RECEIVED
JAN 25 1988
MSHA
COAL MINE SAFETY & HEALTH
BIRMINGHAM, ALABAMA

RECEIVED
BIRMINGHAM, ALABAMA

Mr. W. E. Querry
Manager, District 7
Mine Safety and Health Administration
P. O. Box 572
Barbourville, KY 40906

RE: VENTILATION SYSTEM AND METHANE AND DUST CONTROL PLAN
No. 4 MINE ID NO. 01-01247

Dear Mr. Querry:

The Ventilation System and Methane and Dust Control Plan for No. 4 Mine is re-submitted for your approval.

The discrepancies listed in your cover letter concerning our previously-submitted Ventilation Plan have been reviewed. Responses to these discrepancies are given below.

ITEM No. 1:

Statements are included in the plan which depict the location of line curtain in all areas inby the last open crosscut. See 1) No. 1, Page 7, 2) Note 2, Page 23, 3) pages 23A, 23B, 23C, and 4) Item Nos. 8, 9, and 10, Page 24.

ITEM No. 2:

This information has been added to Item No 10 on page 44

ITEM No. 3:

The additional information has been included

ITEM No. 4:

An updated map will be sent to you upon completion of the mine-wide survey.

ITEM No. 5:

The use of "Polystyrene Squeeze Blocks" was discontinued upon receipt of the Memo No. HQ-87-1029-S(6028). Presently, an evaluation is being made as to the quantity and locations of long-term brattices that have the Polystyrene Squeeze Blocks installed within. These blocks will be covered with an approved sealant.

H. Longwall Sections

Dust Control

The longwall shearer drums will be equipped with a fine water spray system. The type of spray will be of the following:

a) Conflow Spray
b) Spraying Systems, Type BD
c) Jiffy Jet (Green and Bigham)
d) Cone Spray (Charles Phillip Tool Company)

There will be a minimum of 70% of the cutting drum sprays operative at all times. Any malfunction of the water spray system which renders less than 70% of the sprays operative will be corrected once the shearer reaches the headgate. Incoming water at the shearer will be maintained at a minimum static pressure of 125 p.s.i.

In addition to the drum sprays, the shearer will be equipped with the spray system described below:

a) Belting (at a suitable height) will be positioned on the top and in the middle portion of the shearer.

b) On the headgate end of the shearer body will be mounted a spray block with a minimum of four (4) sprays directed just downwind of the headgate cutting drum. A valve will be installed to control these sprays. The ranging arm will extend at least one (1) foot past the headgate drum.

c) A spray block will be mounted on the tailgate end of the shearer body with three (3) sprays mounted on it, of which two (2) will be kept operative.

d) A pressure gauge will be mounted on the shearer to indicate spray water pressure.

A sprayblock with a minimum of two (2) sprays will be installed near the headgate discharge point. In addition, two (2) spray blocks, each containing a minimum of three (3) fine water sprays, will be located along the stageloader with a minimum static water pressure of 200 p.s.i. at the main manifold.

Bleeder System

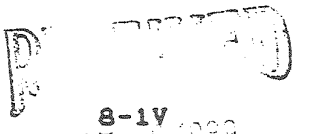
a) Bleeder entry support will be as stated in Part 1 of the Longwall Roof Control Plan.

b) Ventilation devices such as regulators, stoppings and bleeder connectors used to control air movement through gob bleeder entries are shown on the attached map.

OPERATOR'S COPY

U.S.

Mine Safety and Health Administration
HC 66 Box 1762
Barbourville, KY 40906-9206



September 26, 1989

Mr. Jesse E. Cooley, Mine Manager
No. 4 Mine, I. D. No. 01-01247
Jim Walter Resources, Incorporated
Route 1, Box 11650
Brookwood, Alabama 35444

Dear Mr Cooley:

The Ventilation System and Methane and Dust Control Plan for the above mine submitted in accordance with Subsection 75.316 of the Mandatory Safety Standards, Underground Coal Mines, has been reviewed and is approved provided:

1. Approval is not granted on the respirable dust control portion of the plan for the Nos. 1 & 2 Longwall based upon an investigation conducted by MSHA. An approvable respirable dust control portion of the plan shall be submitted by October 13, 1989.

When the methane content in a main return or bleeder entry exceeds 1.0 volume percentum of methane, mine management shall submit a plan for approval, detailing additional evaluation procedures and safeguards which will be utilized to insure safety.

This plan is the basic system followed at this mine, and should any major changes be anticipated, they shall be submitted to and approved by the District Manager before being adopted. Should any significant deficiencies be detected in the Ventilation System and Methane and Dust Control Plan during an inspection or investigation, this approval may be revoked.

UNLESS OTHERWISE NOTIFIED, AN UP-TO-DATE PLAN AND THREE MAPS SHALL BE SUBMITTED TO THE BIRMINGHAM SUBDISTRICT OFFICE BY March 26, 1990.

All provisions of published regulations and criteria pertaining to ventilation and methane and dust control must be followed unless a waiver has been granted in writing by the District Manager.

Very truly yours,

Joseph J. Garcia
District Manager
District 7

H. Longwall Sections

A. Longwall face equipment shall be equipped with dust suppression systems.

Shearer:

A. A minimum of 70% of the water sprays shall be in operation on each drum. Spray size and type shall be determined by efficiency of dust control. Any malfunction of the water spray system which renders less than 70% of the sprays operative will be corrected once the shearer reaches the headgate. Incoming water at the shearer will be maintained at a minimum of [illegible] p.s.i.

In addition to the drum sprays, the shearer will be equipped with the spray system described below:

On the headgate end of the shearer body will be mounted a spray block with a minimum of four (4) sprays (of which three (3) will be kept operative) directed just downwind of the headgate cutting drum. A valve will be installed to control these sprays. The ranging arm will extend at least one (1) foot past the headgate drum.

B. A sprayblock will be mounted on the tailgate end of the shearer body with three (3) sprays mounted on it, of which two (2) will be kept operative.

C. A pressure gauge will be mounted on the shearer to indicate spray water pressure.

A sprayblock with a minimum of two (2) sprays will be installed near the headgate discharge point. In addition, two (2) spray blocks, each containing a minimum of three (3) fine water sprays, will be located along the stageloader. Six (6) sprays shall be located inside the crusher. Incoming water pressure at the stage loader will be maintained at 70 p.s.i. at the main manifold. Minimum air volumes are on the next page.

Bleeder System

A. Bleeder entry support will be as stated in Part 1 of the Longwall Roof Control Plan.

B. Ventilation devices such as regulators, stoppings and bleeder connectors used to control air movement through gob bleeder entries are shown on the attached map.

OPERATOR'S COPY

U. S. Department of Labor

Mine Safety and Health Administration
HC 66 Box 1762
Barbourville, KY 40906-9208

1-1V

February 15, 1991

Mr. Jesse E. Cooley, Mine Manager
No. 4 Mine, I. D. No. 01-01247
Jim Walter Resources, Incorporated
Route 1, Box 11650
Brookwood, Alabama 35444

Dear Mr. Cooley:

The Ventilation System and Methane and Dust Control Plan for the above mine submitted in accordance with Subsection 75.316 of the Mandatory Safety Standards, Underground Coal Mines, has been reviewed and is approved providing:

Upon development of Stage 1 in the Southeast portion of the mine as approved on June 1, 1990, an evaluation will be completed before further approval is granted for the remaining two stages.

When the methane content in a main return or bleeder entry exceeds 1.0 volume per centum of methane, mine management shall submit a plan for approval, detailing additional evaluation procedures and safeguards which will be utilized to insure safety.

This plan is the basic system followed at this mine, and should any major changes be anticipated they shall be submitted to and approved by the District Manager before being adopted. Should any significant deficiencies be detected in the Ventilation System and Methane and Dust Control Plan during an inspection or investigation, this approval may be revoked.

UNLESS OTHERWISE NOTIFIED, AN APPROVABLE UP-TO-DATE PLAN AND THREE MAPS SHALL BE SUBMITTED TO THE BIRMINGHAM SUBDISTRICT OFFICE BY AUGUST 15, 1991.

Very truly yours,

John M Pyle for

Joseph J. Garcia
District Manager
District 7

RECEIVED: J Cooley MINE MANAGER
4 MINE, 2-26-91 DATE

Provisions in this cover letter not included in the attached approved plan, or conflicting with provisions therein, do not constitute a part of the approved plan.

Longwall Sections

A Longwall face equipment shall be equipped with dust suppression systems.

Shearer

A A minimum of 70% of the water sprays shall be in operation on each drum. Spray size and type shall be determined by efficiency of dust control. Any malfunction of the water spray system which renders less than 70% of the sprays operative will be corrected once the shearer reaches the headgate. Incoming water at the shearer will be maintained at a minimum of 125 P.S.I.

In addition to the drum sprays, the shearer will be equipped with the spray system described below:

A. On the headgate end of the shearer body will be mounted a spray block with a minimum of four (4) sprays (of which three (3) will be kept operative) directed just downwind of the headgate cutting drum. A valve will be installed to control these sprays.

B A spray block will be mounted on the tailgate end of the shearer body with four (4) sprays mounted on it, of which three (3) will be kept operative.

C. A pressure gauge will be mounted on the shearer to indicate spray water pressure.

A sprayblock with a minimum of two (2) sprays will be installed near the headgate discharge point. In addition, three (3) spray blocks, each containing a minimum of three (3) fine water sprays, will be located along the stageloader. Six (6) sprays shall be located inside the crusher. A barrel venturi spray will be located at the stageloader discharge spraying coal as it contacts belt. Incoming water pressure at the stageloader will be maintained at a minimum of 200 P.S.I. at the main manifold. Minimum air volumes are on the next page.

Bleeder System

A. Bleeder entry support will be as stated in Part 1 of the Longwall Roof Control Plan.

B Ventilation devices such as regulators, stoppings and bleeder connectors used to control air movement through gob bleeder entries are shown on the attached map.

A. Management had all long Wall Helper After they pulled there, Shield come off face Area.

B. Management Slowed Shear Speed.

C Management personal used Wash down Hoses to water down face on long Wall

D. Management reduce production during dust Survey

E Management assisted Shear orp during dust Survey to insure less production.

F. Management has orp. Shear daing dust Survey

G False Tonage Reports For Long Walls

H. The impact of increased tonnage and Work practices on respirable dust exposure Should be evaluated.

I Changing M.M.U Number on long Wall panels

J. Refused Safty Commitee Accesed ~~denied~~ to face during Dust Survery to Monitor Dust pumps

a

A. Bulk Heads Built on Belts Lines (Intake air)

B. Belt sweepers stoped from performing job duties. (Not Sweeping Long Wall Belt.)

C. Extra emphasis on plan requirment.

D. Man doors required to be Keep Shut during dust [redacted]. Survey

E. [redacted] Double Cutting tailgate of Long Wall face. Keeping People off face area.

F.

To: Joe Main

Joel

From: Thomas F. Wilson

9-91

12:45pm

# of pages counting cover 5

Dec 1987 Applied for Petition

During 1989, various discussions were held between United Mine Workers of America representatives and representatives of the Mine Safety and Health Administration and also with representatives of the Pittsburgh Health Technology Center, concerning respirable dust problems on longwall mining sections in underground coal mines.

On May 2, 1989, Joe Main (Administrator of the UMWA's Department of Occupational Health and Safety); Bob Scaramozzino (Deputy Administrator of the UMWA's Department of Health and Safety); Thomas Wilson (UMWA International Health and Safety Representative); and several UMWA Local Union Mine Health and Safety Committeemen, met with Joseph J. Garcia (District Manager, Coal Mine Safety and Health, MSHA District 7).

During this meeting, the UMWA discussed several concerns including concerns on respirable dust problems on longwall mining sections. In response to the concerns raised by the UMWA, Mr. Garcia requested that the Ventilation and Dust Divisions of the Pittsburgh Health Technology Center conduct longwall ventilation and environmental dust control investigations.

June 8, 89 letter to Ed
June 14 89 letter to ED

From September 1989 to March 1990, a three phase longwall ventilation and environmental dust control investigation was conducted by personnel from the Ventilation and Dust Divisions of the Pittsburgh Health Technology Center at the Blue Creek No. 4 Mine, Jim Walter Resources, Incorporated, Brookwood, Alabama.

The investigation was conducted as follows:

Phase I:	September 18-20 1989
Phase II:	December 6-12, 1989
Phase III:	March 12-14, 19[illegible]

PHASE I

During Phase I, management put special emphasis on items addressed in their approved Ventilation, Methane and Dust Control Plan (i.e.: water sprays working, etc., and extra pain was taken with washing the shields and shearer body. Also, when asked about normal production on the Longwall No. 2 section, management reported that three to four cutting passes of the shearer per shift was normal. Management claimed less production so that they could mine less during the survey and the samples would still be valid.

The reports show that while the Phase I survey was being conducted, two cutting passes of the shearer per shift was averaged. This is far less than normal; however, even with

this reduced production, the longwall proved not to be in compliance. Following are the results:

Personal Samples	mg/m^3
Head Drum Operator	2.9
Tail Drum Operator	3.5
No. 1 Shield Setter	0.2
No. 2 Shield Setter	1.7
No. 3 Shield Setter	4.2
No. 4 Shield Setter	2.2

Four of the six samples taken were out of compliance; with two of the six samples being almost doubled the allowable limits. One can only imagine what the results would be if samples were ran under actual conditions and practices.

PHASE II

During Phase II, every possible thing imaginable was done by management to effect the outcome of the survey. In one instance, over a three-day period, production was reduced to 1.3 cutting passes of the shearer per shift. In addition to the reduced production, several other things were done to affect the results of the survey. Environmental Dust Survey Report No. PHTC-DD-90-407C discusses some of the more obvious things that were being done. For example, the shearer was operated 1/3 to 1/2 the normal speed. The slower the shearer moves, the less coal is cut and less dust generated. The Face conveyor motors were observed drawing approximately 70

to 75 amps each, when normally they would draw 125 amps each; thus revealing that the conveyor was not being loaded down (the same was observed with the shearer tram motor). Additional supervisors were used downwind of the shearer to constantly wet down the coal face and the longwall shields.

The Environmental Dust Control investigation was totally sabotaged throughout Phase II, and practices observed during this phase reflected no resemblance to actual operation and/or practices.

Company Reported Higher Tonnage than Actually Mined According to MSHA

PHASE III

Phase III was a mirror image of Phase II. After Phase III was completed, Investigative Report No.'s P338-V242 and Dd-414S were published, setting down the findings, conclusions and recommendations.

Since were in the approved dust control plan was not adjusted the recommend have reviewed the reports, and since the went into non-compliance status will requesting that management It should be noted that this is not the *first* time the longwalls have gone into non-compliance status since the report was published.

U. S. Department of Labor

Mine Safety and Health Administration
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

Report =

PITTSBURGH HEALTH TECHNOLOGY CENTER
Dust Division

MEMORANDUM FOR JOSEPH J. GARCIA
District Manager, CMS&H, District 7, Barbourville, Kentucky

THROUGH: ROBERT G. PELUSO R. Peluso
Chief, Pittsburgh Health Technology Center

FROM THOMAS F. TOMB Paul S. Pawlucki (for)
Chief, Dust Division

SUBJECT: Respirable Dust Survey Conducted at Jim Walter Resources, Incorporated, Blue Creek No. 4 Mine, Mine I.D. No. 01-01247, Brookwood, Alabama

Attached is the report of the gravimetric respirable dust survey conducted in December, 1989, on Section 017 and Section 015 of Jim Walter Resources, Incorporated, Blue Creek No. 4 Mine, Brookwood, Alabama. Additional copies are included for distribution to both company and union personnel.

Attachments

3/9/90 cc: No. 4 Mine
UMWA - District 20
Duncytown
Meadows
Mize

cc E. Hugler
P. Turcic
W. Querry
K. Ely
R. Peluso
T. Tomb
K. Miller
R. Haney
R. Ondrey
DD Files, Code 6009A - Dust Survey - Jim Walter Resources, Inc. Brookwood, Alabama

Chron. Files No. 90-83

MT:ROndrey:ro:bk:01/23/90

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

Environmental Dust Survey

PHTC-DD-90-407C

Blue Creek No. 4 Mine
Jim Walter Resources Inc
Brookwood, Alabama
Mine I.D. No. 01-01247
December 6-12, 1989

by

Robert S. Ondrey
Mining Engineer

Objective

To identify dust sources on the longwall sections and to make recommendations for reducing workers exposures to the identified dust sources.

Originating Office

Pittsburgh Health Technology Center
Thomas F. Tomb
Chief, Dust Division
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

INTRODUCTION

At the request of the District Manager, Coal Mine Safety and Health, District 7, two respirable dust surveys were made at the Blue Creek No. 4 Mine, Jim Walter Resources, Incorporated, Brookwood, Alabama. The survey, conducted on the No. 2 Longwall Unit (MMU 017-0), was conducted as Phase II of a three phase project. Phase I was conducted in September 1989. The survey on the No. 1 Longwall Unit (MMU 015-0) was the initial survey on this section. The purpose of these surveys was to determine dust exposures and dust sources during three mining stages of an extended face longwall mining operation. Tentatively one additional survey is planned for the No. 2 Longwall Unit.

SAMPLING PROCEDURE

Similar sampling procedures were employed on both of the longwall sections. Gravimetric respirable dust samples were collected to determine personal exposures and dust generating sources. Personal samples were collected on two shearer operators and four shield setters and operated from portal to portal. Fixed-point samples, used to assist in determining dust sources, were operated only on section. Fixed-point samples were collected in the haulage intake, belt intake and at six locations along the longwall face. Longwall face samples were positioned in the walkway near the shield controls. Four of the locations along the face were the midpoints of each shield setters' group of shields. Samples were collected at these locations to approximate exposures if shield setters remained on the face during mining operations. All samples were analyzed for quartz. The gravimetric sampling results and quartz analysis for both longwalls are shown in Tables 1 through 8.

OPERATION

The two longwall units were similar, the primary difference being the length of the face. The length of the face on the No. 1 and No. 2 Longwall Units was 780 and 850 feet, respectively. Therefore, this description of operation will apply to both units. Both longwall units were developed as four entry longwall sections. Air is brought up the intake and belt entry on the headgate side, coursed along the face and exhausted into the return on the tailgate side. Schematics of the No. 1 Unit (MMU 015) and the No. 2 Unit (MMU 017) are shown in Figure 1 and Figure 2, respectively. The sections are mirror images of each other. Both sections employed an Anderson Mavor AM 500 double drum ranging arm shearer to cut coal. The mining cycle consisted of a unidirectional cutting sequence with the full cut from tailgate to headgate and a cleanup cut from headgate to tailgate. The shearer was operated manually by two shearer operators. No remote control device was available to operate the shearer.

The shearers employed wet cutting drums and an external spray system consisting of five venturi sprays mounted on the head and tail splitter arms There were no water sprays mounted on the top of the shearer body because of the rock and coal which constantly fell on top of the shearer. Also, on the No. 1 Unit, there was little or no clearance between the top of the shearer and the shields near the headgate end of the longwall.

Approximately 172 Thysson 2-legged 575-ton Shields were used for roof control on the No. 2 Longwall Face and 157 Thysson 2-legged Shields were used on the No. 1 Longwall. The shields on both faces were manually advanced by four shield setters each responsible for advancing a group of 40 to 43 shields. Verbal instructions had been given, by company management, for each shield setter to return to the headgate area after advancing their groups of shields. No shield setter was to be on the return-air-side of the shearer when making its full cut.

The longwall face was ventilated by two intakes (the belt and haulage intake). Air quantities were measured at the headgate side and tailgate side of the longwall face each shift. Average air quantities at the headgate and tailgate of the No. 1 Face were 76,750 and 79,600 cfm, respectively. Average air quantities at the headgate and tailgate of the No. 2 face were 26,850 and 37,000 cfm, respectively.

The headgate dust controls consisted of two water sprays at the panline-to-stageloader transfer point, two sprays at the stageloader-to-section belt transfer point, six sprays within the stageloader itself, and six sprays inside the crusher (as per the methane and dust control plan). It was not possible to directly observe whether or not these sprays were functioning. The stageloader and crusher were completely enclosed with metal plates. Conveyor belting was attached to the inby end of the crusher to prevent the escape of dust from within the crusher.

DISCUSSION

During the time of this survey, both longwalls were experiencing severe operational problems. These problems materially affected the outcome of the respirable dust survey. The sampling results for each longwall unit will be discussed separately, beginning with Unit No. 1. Personal sampling results for Unit No. 1 are shown in Table 1. The head and tail shearer operator's respirable dust exposures averaged 0.9 and 0.6 mg/m^3, respectively. The four shield setter's average respirable dust exposures were 0.4, 0.3, 0.3 and 0.1 mg/m^3. No single personal sample exceeded the respirable dust standard. However, as previously noted, the section was having operational problems. On two of the three shifts sampled, only one full cut was mined. On the other shift, two full cuts were mined. According to the face workers, five or six full cuts are mined on a normal shift. For the No. 1 Unit, a tonnage of approximately 470 tons per full cut can be calculated assuming a mining height of six feet, a web depth of 30 inches and a density of 80 pounds per cubic foot. Tonnage mined, as reported by the company, is shown on Table 1. This reported tonnage does not agree with the calculated tonnage.

The primary explanation for the low production was difficulty in the headgate area. The first three shields were sinking into soft bottom and had to be cribbed. This required each individual floor beam to be raised in order for the dirt to be dug out so that cribbing could be placed under the floor beam. This process was repeated for each floor beam, each time the shield was advanced. Also, the top in the headgate was sufficiently poor to require the use of additional roof support. This additional support consisted of used

40-pound rail which was placed on 1-foot centers to help support the roof in the headgate. The used rail required a wall of solid concrete crib against the longwall panel for support. Therefore, these concrete cribs had to be removed by hand in order for the shearer to cut out at the headgate. The removal of the concrete cribs and the installation of the wooden cribs under the shield floor beams was very labor intensive and required the use of most of the face workforce. Consequently, the shield setters and shearer operators, of necessity, spent most of their time in the headgate area carrying wooden cribs or removing concrete cribs.

For the cuts of coal mined on this longwall unit during the survey, the head and tail shearer operators were assisted by supervisory personnel. The shearer was manually operated using the controls mounted on the body of the shearer. This operating location exposed both operators to dust generated by the cutting drums. External water sprays and an air splitter arm were used in order to keep a clean split of air over the two shearer operators. However, their effectiveness was diminished by the inability to locate additional water sprays on top of the shearer body due to the minimal clearance between the top of the shearer and the shields. With only a limited possibility of improving the shearer clearer system due to conditions on the face (low clearance), the operators must be moved to the intake air side of the shearer.

The No. 2 Longwall Unit also had personal sampling results below the respirable dust standard. Personal sampling results for Unit No. 2 are shown in Table 5. The head and tail shearer operator's respirable dust exposures averaged 1.1 and 1.4 mg/m^3, respectively. The four shield setter's respirable dust exposures averaged 0.4, 0.9, 0.8 and 1.7 mg/m^3. No single personal sample exceeded the respirable dust standard. However, as previously noted, this section also was having operational problems. As during the previous survey of this section, there was difficulty with rock being cut and/or falling in near the tailgate end of the face. Also there were mechanical difficulties during this survey. The tail drive gearbox broke and had to be replaced and the head cutting drum had to be replaced. Consequently, only two full cuts were mined on each sampling shift. Face workers report that normally three or four cuts are mined each shift. For the No. 2 Unit a tonnage of approximately 525 tons for each full cut can be calculated assuming the same constants as before but with a face length of 850 feet. Tonnage mined, as reported by the company, is shown on Table 5. The reported tonnage for December 12, 1989, did not agree with the calculated tonnage.

As on the No. 1 Longwall Unit, supervisory personnel were used to assist on this face. One supervisor remained with the shearer at a location between the two shearer operators. At this location he controlled the speed at which the shearer moved. During this survey the shearer was reportedly operated at less than normal speed (1/3 to 1/2 normal speed according to face workers). The head and the tail face conveyor motors were observed to draw approximately 70 to 75 amps each. Face workers reported they would normally draw approximately 125 amps each. Likewise, the shearer tram motor was observed to draw approximately 25 to 50 amps. Normally this motor would draw approximately 100 amps according to the face workers.

Two supervisors followed behind the shearer as it cut from tail to head to hose down the shields and the face using water hoses located approximately every 20 shields along the face. They did an excellent job of keeping the face wet, but at the risk of exposing themselves unnecessarily to dust generated by the shearer. Also they risked injury by slipping on the wet floor beams of the shields. The task of keeping the face wet could be accomplished without anyone remaining downwind of the shearer by mounting one or more spray nozzles on the tail end of the shearer body and positioning them to spray onto the shields and face.

Results of quartz analysis shows quartz contents of personal samples ranging from one to four percent. As in the previous survey, fixed-point samples show that the quartz content of the dust increases along the face.

While overexposures to respirable dust were not measured during this phase of the study, the mining conditions observed during this study were not considered typical of the longwall operations. The impact of increased tonnage and work practices on respirable dust exposure should be evaluated. Upon completion of the next (final) phase of this study a final report with recommendations will be prepared.

DATE OF STUDY 12/6-8/89

No 1 Longwall

MINE INFORMATION

MINE:	Jim Walter No. 4
ID NUMBER:	01-012[illegible]7
MMU NUMBER:	015-0
LOCATION:	Brookwood, Alabama
PANEL WIDTH:	750 Feet
PANEL LENGTH:	5100 Feet
DESIGNATED OCCUPATION	Tail Shearer Operator
APPLICABLE STANDARD:	2.0 mg/m^3

OPERATION INFORMATION

SHEARER/PLOW MODEL	Anderson Mavor 500
TYPE OF SUPPORT:	157 Thysson 2-Leg Shields
WEB DEPTH:	30 Inches
MINING SEQUENCE:	Unidirectional Full Cut Tail-Head
DRUM DIAMETER:	54 Inches
DRUM SPEED:	34 Rpm
NUMBER OF BITS:	54 Per Drum
INTERNAL SPRAYS (WET DRUM)	54 Sprays Per Drum
WATER PRESSURE (OPERATING)	125 psi
WETTING AGENT	None
BOOSTER PUMP:	Yes

DATE OF STUDY 12/11-12/89

No 2 Longwall

MINE INFORMATION

MINE:	Jim Walter No. 4
ID NUMBER:	01-01247
MMU NUMBER:	017-0
LOCATION:	Brookwood, Alabama
PANEL WIDTH:	850 Feet
PANEL LENGTH:	5100 Feet
DESIGNATED OCCUPATION:	Tail Shearer Operator
APPLICABLE STANDARD:	2.0 mg/m^3

OPERATION INFORMATION

SHEARER/PLOW MODEL	Anderson Mavor 500
TYPE OF SUPPORT:	172 Thysson 2-Leg Shields
WEB DEPTH:	30 Inches
MINING SEQUENCE:	Unidirectional Full Cut Tail-Head
DRUM DIAMETER:	54 Inches
DRUM SPEED:	34 Rpm
NUMBER OF BITS:	54 Per Drum
INTERNAL SPRAYS (WET DRUM)	54 Sprays Per Drum
WATER PRESSURE (OPERATING)	125 psi
WETTING AGENT	None
BOOSTER PUMP:	Yes

TABLE 1 - Personal Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 1 Longwall (MMU 015-0), (mg/m^3) MRE Equivalent

OCCUPATION	12/06/89	12/07/89	12/08/89	AVG
HEAD DRUM OPERATOR	1.3	0.6	0.8	0.9
TAIL DRUM OPERATOR	0.5	0.3	1.0	0.6
NO. 1 SHIELD SETTER	0.3	0.4	0.6	0.4
NO. 2 SHIELD SETTER	0.3	0.5	0.3	0.3
NO. 3 SHIELD SETTER	0.2	0.2	0.5	0.3
NO. 4 SHIELD SETTER	0.2	0.2	0.1	0.1
SHIFT AVERAGE	0.4	0.3	0.5	
NUMBER OF PASSES				
REPORTED TONNAGE				
QUANTITY HEAD	74,500	85,100	70,700	76,760
TAIL	73,600	76,100	88,600	79,630
VELOCITY HEAD	1,120	1,450	1,490	1,350
TAIL	1,230	1,380	1.400	1,330

5 Passes
2820

TABLE 2 Personal Percent Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 1 Longwall, (MMU 015-0)

	PERCENT QUARTZ			
OCCUPATION	12/06/89	12/07/89	12/08/89	AVG
HEAD DRUM OPERATOR	1.0	1.7	3.2	1.9
TAIL DRUM OPERATOR	2.5	1.9	1.2	1.8
NO. 1 SHIELD SETTER	1.2	1.2	1.8	1.4
NO. 2 SHIELD SETTER	IWG	1.5	1.1	1.3
NO. 3 SHIELD SETTER	IWG	IWG	2.3	2.3
NO. 4 SHIELD SETTER	IWG	IWG	IWG	---

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 3 Fixed-Point Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 1 Longwall (MMU 015-0), (mg/m^3) MRE Equivalent

LOCATION	12/06/89	12/07/89	12/08/89	AVG
INTAKE	0.1	0.2	0.1	0.1
BELT	0.7	0.3	0.6	0.5
NO. 4 SHIELD	0.4	0.4	1.0	0.6
NO. 20 SHIELD	0.1	1.0	1.0	0.7
NO. 60 SHIELD	0.3	0.7	1.0	0.6
NO. 100 SHIELD	0.2	0.6	1.1	0.6
NO. 130 SHIELD	0.4	0.6	0.9	0.6
NO. 150 SHIELD	0.3	0.7	0.9	0.6

TABLE 4. - Fixed-Point Respirable Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 1 Longwall, (MMU 015-0)

	PERCENT QUARTZ			
LOCATION	12/06/89	12/07/89	12/08/89	AVG
INTAKE	IWG	IWG	IWG	---
BELT	0.7	IWG	1.5	1.1
NO. 4 SHIELD	0.8	0.3	IWG	0.5
NO. 20 SHIELD	IWG	4.3	2.2	3.2
NO. 60 SHIELD	6.2	3.1	IWG	4.6
NO. 100 SHIELD	6.6	1.7	3.5	3.9
NO. 130 SHIELD	1.5	2.2	4.0	2.5
NO. 150 SHIELD	9.2	3.5	4.4	5.7

IWG Insufficient Weight Gain

TABLE 5 Personal Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0),(mg/m^3) MRE Equivalent

OCCUPATION	12/11/89	12/12/89	AVG
HEAD DRUM OPERATOR	1.1	OSP	1.1
TAIL DRUM OPERATOR	1.5	1.4	1.4
NO. 1 SHIELD SETTER	0.3	0.5	0.4
NO. 2 SHIELD SETTER	0.9	0.9	0.9
NO. 3 SHIELD SETTER	1.0	0.6	0.8
NO. 4 SHIELD SETTER	1.5	2.0	1.7
SHIFT AVERAGE	1.0	1.0	
NUMBER OF PASSES	2	2	
REPORTED TONNAGE	1.139	1.608 (1	
QUANTITY HEAD	25,700	28,000	26,850
TAIL	32,100	42,000	37,000
VELOCITY HEAD	570	670	620
TAIL	730	875	800

4 Passes = 2,100

TABLE 6 Personal Percent Quartz Analysis, Jim Walter Resources No. 4 Mine, No. 2 Longwall (MMU 017-0)

	PERCENT QUARTZ		
OCCUPATION	12/11/89	12/12/89	AVG
HEAD DRUM OPERATOR	3.5	1.9	2.7
TAIL DRUM OPERATOR	2.7	4.0	3.3
NO 1 SHIELD SETTER	IWG	2.5	2.5
NO 2 SHIELD SETTER	3.3	3.9	3.6
NO 3 SHIELD SETTER	IWG	3.6	3.6
NO 4 SHIELD SETTER	3.8	4.3	4.0

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 7 Fixed-Point Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0), (mg/m^3) MRE Equivalent

LOCATION	12/11/89	12/12/89	AVG
INTAKE	0.3	0.4	0.3
BELT	0.3	0.6	0.4
NO. 4 SHIELD	0.5	1.2	0.8
NO 21 SHIELD	1.6	2.2	1.9
NO. 64 SHIELD	0.8	3.1	1.9
NO. 107 SHIELD	2.2	1.3	1.7
NO 150 SHIELD	2.6	2.3	2.4
NO. 169 SHIELD	2.5	3.5	3.0

TABLE 8. - Fixed-Point Respirable Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0)

	PERCENT QUARTZ		
LOCATION	12/11/89	12/12/89	AVG
INTAKE	IWG	IWG	---
BELT	IWG	1.4	1.4
NO. 4 SHIELD	0.8	4.1	2.4
NO. 21 SHIELD	3.2	4.4	3.8
NO. 64 SHIELD	6.9	1.8	4.3
NO. 107 SHIELD	10.7	2.4	6.5
NO. 150 SHIELD	13.9	8.1	11.0
NO. 169 SHIELD	10.8	9.3	10.0

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 9 ASSESSMENT OF MINE'S EFFORTS TO IMPLEMENT NEW TECHNOLOGY (MMU 017)

	Technology	BOM Technology Newsletter Reference	Implementatic
1.	Water Sprays Oriented to Move Dust Toward Face	No. 112	Yes
2.	Upgraded Water Supply System to Reduce Dust	No. 113	Yes
3.	Modification of Cutting Sequence	No. [illegible]	
4.	Proper Location of Machine Cooling Sprays	No. 1	Yes
5.	Use of Gob Curtain at Intake End of Face	No. 119	No
6.	Use of Barriers on Shearer to Split Intake Air	No. 121	Yes
7.	Ventilation Curtain Used when Cutting Out at Entry	No. 137	No
8.	Airflow in Direction of Face Haulage	No. 145	No
9.	Use More Water on Upwind Drum to Reduce Exposure	No. 155	No
10.	Stageloader Dust Controls in Effect to Reduce Intake Contamination	No. 156	Yes
11.	Utilize Remote Controls to Reduce Exposure	No. 203	No
12.	Work Practices to Reduce Shield Dust	No. 205	Yes
13.	Utilize Shearer Clearer System	No. 245	No
14.	Utilize Drum Sprays on Bits	No. 246	Yes
15.	Ventilated Drum on Shearer	No. 283	No
16.	Reverse Drum Rotation on Shearer	No. 284	Yes

U. S. Department of Labor

Mine Safety and Health Administration
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

PITTSBURGH HEALTH TECHNOLOGY CENTER
Dust Division

MEMORANDUM FOR JOSEPH J. GARCIA
District Manager, CMS&H, District 7, Barbourville, Kentucky

THROUGH: ROBERT G. PELUSO R. Bung
Chief, Pittsburgh Health Technology Center

FROM: THOMAS F. TOMB Paul S. Pawlowski (for)
Chief, Dust Division

SUBJECT: Respirable Dust Survey Conducted at Jim Walter Resources, Incorporated, Blue Creek No. 4 Mine, Mine I.D. No. 01-01247, Brookwood, Alabama

Attached is the report of the gravimetric respirable dust survey conducted in December, 1989, on Section 017 and Section 015 of Jim Walter Resources, Incorporated, Blue Creek No. 4 Mine, Brookwood, Alabama. Additional copies are included for distribution to both company and union personnel

Attachments

3/9/90 cc: No. 4 Mine
UMWA - District 20
Duncytown
Meadows
Mize

cc E. Hugler
P. Turcic
W. Querry
K. Ely
R. Peluso
T. Tomb
E. Miller
R. Haney
R. Ondrey
DD Files, Code 6009A Dust Survey Jim Walter Resources, Inc Brookwood, Alabama

Chron Files No. 90-83

MT:ROndrey:ro:bk:01/23/90
RM. D-312:PGH:Ext 250

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

Environmental Dust Survey

PHTC-DD-90-407C

Blue Creek No. 4 Mine
Jim Walter Resources Inc
Brookwood, Alabama
Mine I.D. No. 01-01247
December 6-12, 1989

by

Robert S. Ondrey
Mining Engineer

Objective

To identify dust sources on the longwall sections and to make recommendations for reducing workers exposures to the identified dust sources.

Originating Office

Pittsburgh Health Technology Center
Thomas F. Tomb
Chief, Dust Division
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

INTRODUCTION

At the request of the District Manager, Coal Mine Safety and Health, District 7, two respirable dust surveys were made at the Blue Creek No. 4 Mine, Jim Walter Resources, Incorporated, Brookwood, Alabama. The survey, conducted on the No. 2 Longwall Unit (MMU 017-0), was conducted as Phase II of a three phase project. Phase I was conducted in September 1989. The survey on the No. 1 Longwall Unit (MMU 015-0) was the initial survey on this section. The purpose of these surveys was to determine dust exposures and dust sources during three mining stages of an extended face longwall mining operation. Tentatively one additional survey is planned for the No. 2 Longwall Unit.

SAMPLING PROCEDURE

Similar sampling procedures were employed on both of the longwall sections. Gravimetric respirable dust samples were collected to determine personal exposures and dust generating sources. Personal samples were collected on two shearer operators and four shield setters and operated from portal to portal. Fixed-point samples, used to assist in determining dust sources, were operated only on section. Fixed-point samples were collected in the haulage intake, belt intake and at six locations along the longwall face. Longwall face samples were positioned in the walkway near the shield controls. Four of the locations along the face were the midpoints of each shield setters' group of shields. Samples were collected at these locations to approximate exposures if shield setters remained on the face during mining operations. All samples were analyzed for quartz. The gravimetric sampling results and quartz analysis for both longwalls are shown in Tables 1 through 8.

OPERATION

The two longwall units were similar, the primary difference being the length of the face. The length of the face on the No. 1 and No. 2 Longwall Units was 780 and 850 feet, respectively. Therefore, this description of operation will apply to both units. Both longwall units were developed as four entry longwall sections. Air is brought up the intake and belt entry on the headgate side, coursed along the face and exhausted into the return on the tailgate side. Schematics of the No. 1 Unit (MMU 015) and the No. 2 Unit (MMU 017) are shown in Figure 1 and Figure 2, respectively. The sections are mirror images of each other. Both sections employed an Anderson Mavor AM 500 double drum ranging arm shearer to cut coal. The mining cycle consisted of a unidirectional cutting sequence with the full cut from tailgate to headgate and a cleanup cut from headgate to tailgate. The shearer was operated manually by two shearer operators. No remote control device was available to operate the shearer.

The shearers employed wet cutting drums and an external spray system consisting of five venturi sprays mounted on the head and tail splitter arms. There were no water sprays mounted on the top of the shearer body because of the rock and coal which constantly fell on top of the shearer. Also, on the No. 1 Unit, there was little or no clearance between the top of the shearer and the shields near the headgate end of the longwall.

Approximately 172 Thysson 2-legged 575-ton Shields were used for roof control on the No. 2 Longwall Face and 157 Thysson 2-legged Shields were used on the No. 1 Longwall. The shields on both faces were manually advanced by four shield setters each responsible for advancing a group of 40 to 43 shields. Verbal instructions had been given, by company management, for each shield setter to return to the headgate area after advancing their groups of shields No shield setter was to be on the return-air-side of the shearer when making its full cut.

The longwall face was ventilated by two intakes (the belt and haulage intake). Air quantities were measured at the headgate side and tailgate side of the longwall face each shift. Average air quantities at the headgate and tailgate of the No. 1 Face were 76,750 and 79,600 cfm, respectively. Average air quantities at the headgate and tailgate of the No. 2 face were 26,850 and 37,000 cfm, respectively.

The headgate dust controls consisted of two water sprays at the panline-to-stageloader transfer point, two sprays at the stageloader-to-section belt transfer point, six sprays within the stageloader itself, and six sprays inside the crusher (as per the methane and dust control plan). It was not possible to directly observe whether or not these sprays were functioning. The stageloader and crusher were completely enclosed with metal plates. Conveyor belting was attached to the inby end of the crusher to prevent the escape of dust from within the crusher.

DISCUSSION

During the time of this survey, both longwalls were experiencing severe operational problems. These problems materially affected the outcome of the respirable dust survey. The sampling results for each longwall unit will be discussed separately, beginning with Unit No. 1. Personal sampling results for Unit No. 1 are shown in Table 1. The head and tail shearer operator's respirable dust exposures averaged 0.9 and 0.6 mg/m^3, respectively. The four shield setter's average respirable dust exposures were 0.4, 0.3, 0.3 and 0.1 mg/m^3. No single personal sample exceeded the respirable dust standard. However, as previously noted, the section was having operational problems. On two of the three shifts sampled, only one full cut was mined. On the other shift, two full cuts were mined. According to the face workers, five or six full cuts are mined on a normal shift. For the No. 1 Unit, a tonnage of approximately 470 tons per full cut can be calculated assuming a mining height of six feet, a web depth of 30 inches and a density of 80 pounds per cubic foot. Tonnage mined, as reported by the company, is shown on Table 1. This reported tonnage does not agree with the calculated tonnage.

The primary explanation for the low production was difficulty in the headgate area. The first three shields were sinking into soft bottom and had to be cribbed. This required each individual floor beam to be raised in order for the dirt to be dug out so that cribbing could be placed under the floor beam. This process was repeated for each floor beam, each time the shield was advanced. Also, the top in the headgate was sufficiently poor to require the use of additional roof support. This additional support consisted of used

40-pound rail which was placed on 1-foot centers to help support the roof in the headgate. The used rail required a wall of solid concrete crib against the longwall panel for support. Therefore, these concrete cribs had to be removed by hand in order for the shearer to cut out at the headgate. The removal of the concrete cribs and the installation of the wooden cribs under the shield floor beams was very labor intensive and required the use of most of the face workforce. Consequently, the shield setters and shearer operators, of necessity, spent most of their time in the headgate area carrying wooden cribs or removing concrete cribs.

For the cuts of coal mined on this longwall unit during the survey, the head and tail shearer operators were assisted by supervisory personnel. The shearer was manually operated using the controls mounted on the body of the shearer. This operating location exposed both operators to dust generated by the cutting drums. External water sprays and an air splitter arm were used in order to keep a clean split of air over the two shearer operators. However, their effectiveness was diminished by the inability to locate additional water sprays on top of the shearer body due to the minimal clearance between the top of the shearer and the shields. With only a limited possibility of improving the shearer clearer system due to conditions on the face (low clearance), the operators must be moved to the intake air side of the shearer.

The No. 2 Longwall Unit also had personal sampling results below the respirable dust standard. Personal sampling results for Unit No. 2 are shown in Table 5. The head and tail shearer operator's respirable dust exposures averaged 1.1 and 1.4 mg/m^3, respectively. The four shield setter's respirable dust exposures averaged 0.4, 0.9, 0.8 and 1.7 mg/m^3. No single personal sample exceeded the respirable dust standard. However, as previously noted, this section also was having operational problems. As during the previous survey of this section, there was difficulty with rock being cut and/or falling in near the tailgate end of the face. Also there were mechanical difficulties during this survey. The tail drive gearbox broke and had to be replaced and the head cutting drum had to be replaced. Consequently, only two full cuts were mined on each sampling shift. Face workers report that normally three or four cuts are mined each shift. For the No. 2 Unit a tonnage of approximately 525 tons for each full cut can be calculated assuming the same constants as before but with a face length of 850 feet. Tonnage mined, as reported by the company, is shown on Table 5. The reported tonnage for December 12, 1989, did not agree with the calculated tonnage.

As on the No. 1 Longwall Unit, supervisory personnel were used to assist on this face. One supervisor remained with the shearer at a location between the two shearer operators. At this location he controlled the speed at which the shearer moved. During this survey the shearer was reportedly operated at less than normal speed (1/3 to 1/2 normal speed according to face workers). The head and the tail face conveyor motors were observed to draw approximately 70 to 75 amps each. Face workers reported they would normally draw approximately 125 amps each. Likewise, the shearer tram motor was observed to draw approximately 25 to 50 amps. Normally this motor would draw approximately 100 amps according to the face workers.

Two supervisors followed behind the shearer as it cut from tail to head to hose down the shields and the face using water hoses located approximately every 20 shields along the face. They did an excellent job of keeping the face wet, but at the risk of exposing themselves unnecessarily to dust generated by the shearer. Also they risked injury by slipping on the wet floor beams of the shields. The task of keeping the face wet could be accomplished without anyone remaining downwind of the shearer by mounting one or more spray nozzles on the tail end of the shearer body and positioning them to spray onto the shields and face.

Results of quartz analysis shows quartz contents of personal samples ranging from one to four percent. As in the previous survey, fixed-point samples show that the quartz content of the dust increases along the face.

While overexposures to respirable dust were not measured during this phase of the study, the mining conditions observed during this study were not considered typical of the longwall operations. The impact of increased tonnage and work practices on respirable dust exposure should be evaluated. Upon completion of the next (final) phase of this study a final report with recommendations will be prepared.

DATE OF STUDY: 12/6-8/89

No. 1 Longwall

MINE INFORMATION

MINE:	Jim Walter No. 4
ID NUMBER:	01-01247
MMU NUMBER:	015-0
LOCATION:	Brookwood, Alabama
PANEL WIDTH:	750 Feet
PANEL LENGTH:	5100 Feet
DESIGNATED OCCUPATION	Tail Shearer Operator
APPLICABLE STANDARD:	2.0 mg/m^3

OPERATION INFORMATION

SHEARER/PLOW MODEL	Anderson Mavor 500
TYPE OF SUPPORT:	157 Thysson 2-Leg Shields
WEB DEPTH:	30 Inches
MINING SEQUENCE:	Unidirectional Full Cut Tail-Head
DRUM DIAMETER:	54 Inches
DRUM SPEED:	34 Rpm
NUMBER OF BITS:	54 Per Drum
INTERNAL SPRAYS (WET DRUM)	54 Sprays Per Drum
WATER PRESSURE (OPERATING)	125 psi
WETTING AGENT	None
BOOSTER PUMP:	Yes

DATE OF STUDY: 12/11-12/89

No. 2 Longwall

MINE INFORMATION

MINE:	Jim Walter No. 4
ID NUMBER:	01-01247
MMU NUMBER:	017-0
LOCATION:	Brookwood, Alabama
PANEL WIDTH:	850 Feet
PANEL LENGTH:	5100 Feet
DESIGNATED OCCUPATION	Tail Shearer Operator
APPLICABLE STANDARD:	2.0 mg/m^3

OPERATION INFORMATION

SHEARER/PLOW MODEL	Anderson Mavor 500
TYPE OF SUPPORT:	172 Thysson 2-Leg Shields
WEB DEPTH:	30 Inches
MINING SEQUENCE:	Unidirectional Full Cut Tail-Head
DRUM DIAMETER:	54 Inches
DRUM SPEED:	34 Rpm
NUMBER OF BITS:	54 Per Drum
INTERNAL SPRAYS (WET DRUM)	54 Sprays Per Drum
WATER PRESSURE (OPERATING)	125 psi
WETTING AGENT	None
BOOSTER PUMP:	Yes

TABLE 1 Personal Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 1 Longwall (MMU 015-0), (mg/m^3) MRE Equivalent

OCCUPATION	12/06/89	12/07/89	12/08/89	AVG
HEAD DRUM OPERATOR	1.3	0.6	0.8	0.9
TAIL DRUM OPERATOR	0.5	0.3	1.0	0.6
NO. 1 SHIELD SETTER	0.3	0.4	0.6	0.4
NO. 2 SHIELD SETTER	0.3	0.5	0.3	0.3
NO 3 SHIELD SETTER	0.2	0.2	0.5	0.3
NO. 4 SHIELD SETTER	0.2	0.2	0.1	0.1
SHIFT AVERAGE	0.4	0.3	0.5	
NUMBER OF PASSES	2	1	1	
REPORTED TONNAGE	2.244	1.631	1.488	
QUANTITY HEAD	74,500	85,100	70,700	76,760
TAIL	73,600	76,100	88,600	79,630
VELOCITY HEAD	1,120	1,450	1,490	1,350
TAIL	1.230	1.380	1.400	1.330

TABLE 2 Personal Percent Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 1 Longwall, (MMU 015-0)

	PERCENT QUARTZ			
OCCUPATION	12/06/89	12/07/89	12/08/89	AVG
HEAD DRUM OPERATOR	1.0	1.7	3.2	1.9
TAIL DRUM OPERATOR	2.5	1.9	1.2	1.8
NO. 1 SHIELD SETTER	1.2	1.2	1.8	1.4
NO. 2 SHIELD SETTER	IWG	1.5	1.1	1.3
NO. 3 SHIELD SETTER	IWG	IWG	2.3	2.3
NO. 4 SHIELD SETTER	IWG	IWG	IWG	---

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 3 Fixed-Point Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 1 Longwall (MMU 015-0), (mg/m^3) MRE Equivalent

LOCATION	12/06/89	12/07/89	12/08/89	AVG
INTAKE	0.1	0.2	0.1	0.1
BELT	0.7	0.3	0.6	0.5
NO. 4 SHIELD	0.4	0.4	1.0	0.6
NO. 20 SHIELD	0.1	1.0	1.0	0.7
NO. 60 SHIELD	0.3	0.7	1.0	0.6
NO. 100 SHIELD	0.2	0.6	1.1	0.6
NO. 130 SHIELD	0.4	0.6	0.9	0.6
NO. 150 SHIELD	0.3	0.7	0.9	0.6

TABLE 4 Fixed-Point Respirable Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 1 Longwall, (MMU 015-0)

	PERCENT QUARTZ			
LOCATION	12/06/89	12/07/89	12/08/89	AVG
INTAKE	IWG	IWG	IWG	---
BELT	0.7	IWG	1.5	1.1
NO. 4 SHIELD	0.8	0.3	IWG	0.5
NO. 20 SHIELD	IWG	4.3	2.2	3.2
NO. 60 SHIELD	6.2	3.1	IWG	4.6
NO. 100 SHIELD	6.6	1.7	3.5	3.9
NO. 130 SHIELD	1.5	2.2	4.0	2.5
NO. 150 SHIELD	9.2	3.5	4.4	5.7

IWG Insufficient Weight Gain

TABLE 5 Personal Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0),(mg/m^3) MRE Equivalent

OCCUPATION	12/11/89	12/12/89	AVG
HEAD DRUM OPERATOR	1.1	OSP	1.1
TAIL DRUM OPERATOR	1.5	1.4	1.4
NO 1 SHIELD SETTER	0.3	0.5	0.4
NO 2 SHIELD SETTER	0.9	0.9	0.9
NO 3 SHIELD SETTER	1.0	0.6	0.8
NO 4 SHIELD SETTER	1.5	2.0	1.7
SHIFT AVERAGE	1.0	1.0	
NUMBER OF PASSES	2	2	
REPORTED TONNAGE	1.139	1.608	
QUANTITY HEAD	25,700	28,000	26,850
TAIL	32,100	42,000	37,000
VELOCITY HEAD	570	670	620
TAIL	730	875	800

TABLE 6 - Personal Percent Quartz Analysis, Jim Walter Resources No. 4 Mine, No. 2 Longwall (MMU 017-0)

	PERCENT QUARTZ		
OCCUPATION	12/11/89	12/12/89	AVG
HEAD DRUM OPERATOR	3.5	1.9	2.7
TAIL DRUM OPERATOR	2.7	4.0	3.3
NO. 1 SHIELD SETTER	IWG	2.5	2.5
NO. 2 SHIELD SETTER	3.3	3.9	3.6
NO. 3 SHIELD SETTER	IWG	3.6	3.6
NO. 4 SHIELD SETTER	3.8	4.3	4.0

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 7 - Fixed-Point Respirable Sampling Results, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0), (mg/m^3) MRE Equivalent

LOCATION	12/11/89	12/12/89	AVG
INTAKE	0.3	0.4	0.3
BELT	0.3	0.6	0.4
NO 4 SHIELD	0.5	1.2	0.8
NO 21 SHIELD	1.6	2.2	1.9
NO 64 SHIELD	0.8	3.1	1.9
NO 107 SHIELD	2.2	1.3	1.7
NO 150 SHIELD	2.6	2.3	2.4
NO 169 SHIELD	2.5	3.5	3.0

TABLE 8. - Fixed-Point Respirable Quartz Analysis, Jim Walter Resources, No. 4 Mine, No. 2 Longwall (MMU 017-0)

	PERCENT QUARTZ		
LOCATION	12/11/89	12/12/89	AVG
INTAKE	IWG	IWG	---
BELT	IWG	1.4	1.4
NO. 4 SHIELD	0.8	4.1	2.4
NO. 21 SHIELD	3.2	4.4	3.8
NO. 64 SHIELD	6.9	1.8	4.3
NO. 107 SHIELD	10.7	2.4	6.5
NO. 150 SHIELD	13.9	8.1	11.0
NO. 169 SHIELD	10.8	9.3	10.0

IWG Insufficient Weight Gain
OSP Oversized Particles

TABLE 9 - ASSESSMENT OF MINE'S EFFORTS TO IMPLEMENT NEW TECHNOLOGY (MMU 017)

	Technology	BOM Technology Newsletter Reference	Implementation
1.	Water Sprays Oriented to Move Dust Toward Face	No. 112	Yes
2.	Upgraded Water Supply System to Reduce Dust	No. 113	Yes
3.	Modification of Cutting Sequence	No. 116	Unidirectional
4.	Proper Location of Machine Cooling Sprays	No. 118	Yes
5.	Use of Gob Curtain at Intake End of Face	No. 119	No
6.	Use of Barriers on Shearer to Split Intake Air	No. 121	Yes
7.	Ventilation Curtain Used when Cutting Out at Entry	No. 137	No
8.	Airflow in Direction of Face Haulage	No. 145	No
9.	Use More Water on Upwind Drum to Reduce Exposure	No. 155	No
10.	Stageloader Dust Controls in Effect to Reduce Intake Contamination	No. 156	Yes
11.	Utilize Remote Controls to Reduce Exposure	No. 203	No
12.	Work Practices to Reduce Shield Dust	No. 205	Yes
13.	Utilize Shearer Clearer System	No. 245	No
14.	Utilize Drum Sprays on Bits	No. 246	Yes
15.	Ventilated Drum on Shearer	No. 283	No
16.	Reverse Drum Rotation on Shearer	No. 284	Yes