

1345

FENIX & SCISSON, INC.  
ENGINEERS - CONTRACTORS

TIBBS

TO: Joe D'Luogo, DOE.

JOB: D/S 1664

FROM: H. Tibbs, F&S

MINING EXPERIENCE THROUGH FAULTED  
WELDED TUFF BEDS IN U12G TUNNEL  
RE: "ROCK MECHANICS" DRIFT

DATE: September 23, 1985

A 16.5' W x 16.5' H x 98' L horizontal drift was mined in the welded tuff beds in "G" tunnel between 10-7-81 and 2-18-82. The top slice was conventionally mined by drilling and blasting a 16.5' W x 11' H top slice to CS 0+98 prior to mining the bottom cut 16.5' W x 6' H.

As the top slice advanced, 7/8" x 8' rock bolts with resin anchors were installed on a 3' x 4' pattern. On 11-6-81, when the top slice face was at CS 0+41, 1-1/8" x 16' resin anchored hardening rock bolts were installed 5 each per row across the crown of the drift beginning at CS 0+10. Rows of hardening rock bolts were installed 5 per row with 4' between bolts in the row and 4' between rows at a pace that resulted in the hardening rock bolts being installed about 40' behind the face of the top slice drift which was already supported with 7/8" x 8' resin anchored "personnel protection" rock bolts.

The near vertical fault with about 3' of vertical displacement which transverses the drift at CS 0+60 was mined across on 11-19-81 without comment by the F&S mining inspector in his daily inspection log. On 12-2-81, when the face for the top slice was at CS 0+78, the F&S mining inspector commented in his daily log: "In drift back at CS 0+60, the formation changes from a welded red tuff to a light grey non-welded tuff on a 5° angle (fault). Non-welded grey tuff measures 3' thick in the back at CS 0+78." On 12-4-81 the non-welded grey tuff was reported as 2' thick in the top of face at CS 0+85 indicating about an 8° positive dip of the contact between the welded and non-welded tuff.

The inspection record shows that the area of the drift with the fault was initially mined on 11-19-81. Preliminary 7/8" x 8' rock bolts were installed in the faulted area 11-20-81 and then on 2-16-82, roughly 3 months later, 1-1/8" x 16' resin anchored hardening rock bolts were installed on a 4' x 4' pattern across the back in the area adjacent to the fault at CS 0+60. There was no record of the faulted area resulting in ground support problems, and no special bolting was installed in the area of the fault.

The conclusion drawn is that the crossing of the near vertical fault with 3' of vertical displacement did not result in the need for any special ground support in excess of the standard used in the drift where no faulting occurred.

HET:sjk

Enclosures:

1. Drift plan of rock mechanics drift containing faulted zone in the welded tuff beds.
2. Daily mining inspection logs for dates 10-7-81, 11-4-81, 11-6-81, 12-2-81, 1-5-82, and 2-16-82.
3. Summary mining Insp. logs 11-02-81 to 2-18-82

**F&S MINING INSPECTION RECORD**  
**EXCERPTS FROM DAILY INSPECTION LOG**  
**U12G ROCK MECHANICS DRIFT - 16.5'W X 16.5'H X 98'L**

<u>DATE</u>	<u>STATION</u>	<u>ACTIVITY</u>
11-03-81	0+33	Top slice mining 17'w x 11'h. Drilling 6' blast round; 88 each, 1-1/4" diameter holes.
11-04-81	0+41	6' round, pulled 8'.
11-06-81		Installed 17 each, 7/8" x 8' rock bolts with resin anchors, and drilled for <u>1-1/8" x 16' rock bolts on 4' x 4' pattern at CS 0+10.</u>
11-06-81	0+41	Installed 5 each, 1-1/8" x 16' rock bolts on 4' x 4' pattern in upper ribs and back at CS 0+10.
11-09-81	0+49	Blasted 8' round, 88 holes, 7 cases powder.
11-10-81	0+49	Installed 12 each, 7/8" x 8', resin anchor rock bolts in back and upper ribs. Also 9 each, <u>1-1/8" x 16' at CS 0+10 to CS 0+14.</u>
11-16-81	0+49	Drilling 8' round, 7 cases powder.
11-17-81	0+57	Drilled 14 each, 7/8" x 8', 4' x 4' pattern, resin anchor.
11-18-81	0+57	Drilling 8' blast round, <u>also drilling for 1-1/8" x 16', 4' x 4' at CS 0+16.</u>
11-19-81	0+65	Blasted 8' round. Installed 9 each, <u>1-1/8" x 16', 4' x 4', resin, CS 0+16.</u>
11-20-81	0+65	Installed 16 each, 7/8" x 8' on 4' x 4', <u>also 5 each, 1-1/8" x 16', 4' x 4', resin, CS 0+20.</u>
11-23-81	0+65	Drilling 8' round. <u>Also drilling for 16' rock bolts at CS 0+24.</u>
11-24-81	0+72	Drilling 7' round. Also installed <u>5 each, 1-1/8" x 16' rock bolts across back at CS 0+24.</u>
11-30-84	0+72	Installed 14, 7/8" x 8' rock bolts. Installed <u>1-1/8" x 16' rock bolts at CS 0+28.</u>
12-01-81	0+72	Blasted 6' round. Also installed 5 each, <u>1-1/8" x 16' rock bolts in back at CS 0+28.</u>
12-02-81	0+78	Installed 16 each, 7/8" x 8'.

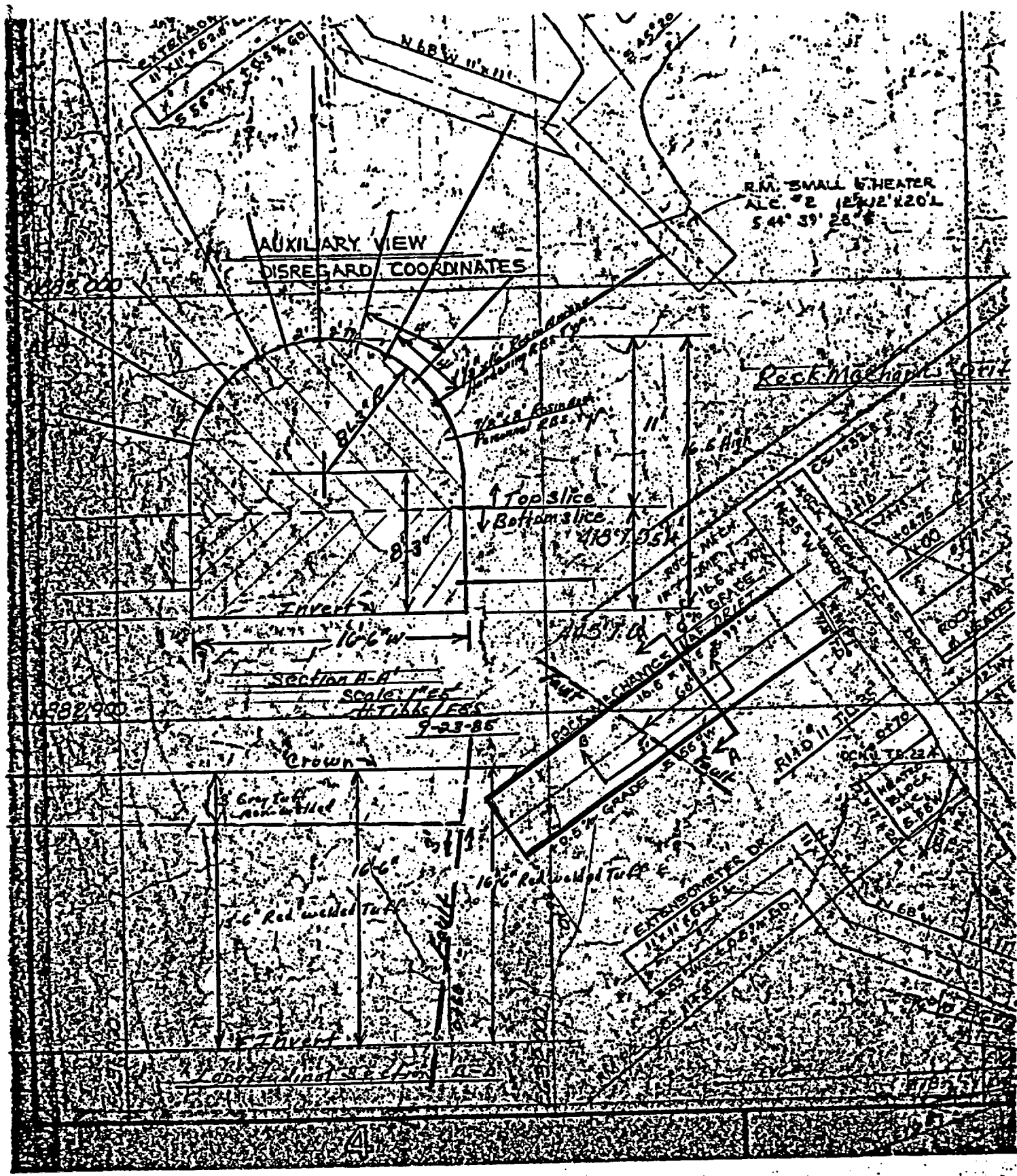
Formation changing in back at CS 0+60 (fault)

Back at CS 0+60 = Red Welded Tuff.

Back at CS 0+78 = Grey Tuff <sup>to</sup> 3' below roofline.

U12G ROCK MECH DRIFT

<u>DATE</u>	<u>STATION</u>	<u>ACTIVITY</u>
12-03-81	0+78	Drilling for 7' blast round top slice, 17'w x 11'h.
12-04-81	0+85	Blasted 7' round. Installed 14 each, 7/8' x 8' rock bolts in back with resin anchors. Drilling for 4' x 4' pattern <u>1-1/8" x 16'</u> at CS 0+80. Top 2' in arch, light grey tuff -- remainder of drift in red welded tuff.
12-07-81	0+85	Drilling for <u>1-1/8" x 16'</u> rock bolts at <u>CS 0+80</u> .
12-08-81	0+85	Installed 1-1/8" x 16' rock bolts at CS 0+80 to CS 0+68. 5 rock bolts per ring in back, 4' x 4' pattern.
12-09-81	0+93	Blasted 7' round.
12-10-81	0+93	Installed 5 each, 1-1/8" x 16' rock bolts in back at <u>CS 0+34</u> .
12-11-81	0+99	Blasted 7' round.
12-14-81	0+99	Installed 28 each, 7/8" x 8' rock bolts from CS 0+84 to CS 0+99.
12-15-81	0+99	Drilling <u>1-1/8" x 16'</u> rock bolts at <u>CS 0+95 toward CS 0+99</u> .
12-17-81	0+99	Installed <u>1-1/8" x 16'</u> rock bolts at <u>CS 0+95 toward CS 0+99</u> . <u>Drilling for 1-1/8" x 16' rock bolts from CS 0+40 to CS 0+50</u> .
12-18-81	0+99	Completed top cut. Installed 1-1/8" x 16' rock bolts at <u>CS 0+58</u> .
01-05-82		Began mining bottom bench at CS 0+10. 7' blast.
01-06-82	0+34 (btm) 0+99 (top)	Bottom slice at CS 0+34.
01-28-82	0+70 (btm) 0+90 (top)	Installed 5 each, 1-1/8" x 16' rock bolts at CS 0+42, CS 0+46, and CS 0+50, top slice face.
01-29-82	0+80	Bottom slice at CS 0+80.
02-02-82 to 02-08-82	0+98 (btm)	Removing 12" from RM drift invert.
02-11-82	0+98 (btm)	Began installing 7/8" x 8' rock bolts in lower ribs.
02-16-82	0+98 (btm)	Installed 10 each, 1-1/8" x 16' rock bolts from <u>CS 0+48 to CS 0+60</u> . ( <u>Std 5 ea per Ring</u> )
02-18-82	0+98 (btm)	Completed 7/8" x 8' rock bolts in ribs to CS 0+98. Rock mechanics drift completed to CS 0+98.



EXTENSION  
11' x 1' x 8' 2"

N 68° W 11' 11"

R.M. SMALL THEATER  
A.C. # 2 12' 1/2' x 20' L  
S 44° 39' 25" E

AUXILIARY VIEW  
DISREGARD COORDINATES

Rock Machine Lot 14

Top slice  
Bottom slice

Section A-A  
Scale 1/8" = 1'-0"  
9-23-85

Crown  
10'-6" Red walled Tuff  
10'-6" Red walled Tuff  
10'-6" Red walled Tuff  
10'-6" Red walled Tuff

EXTENSION DR  
11' x 1' x 8' 2"  
12' 1/2' x 20' L  
S 44° 39' 25" E

4

USER SANDIA

FENIX & SCISSON INC.  
DAILY MINE INSPECTOR REPORT

FILE \_\_\_\_\_

INSPECTOR: WALKER SHIFT 1 (2)

DATE WED. 11-7-81

JOB U12 G FROM 0830

FACE \_\_\_\_\_ + \_\_\_\_\_

TIME \_\_\_\_\_ LOCATION \_\_\_\_\_

TO 1500

LAST SET \_\_\_\_\_ + \_\_\_\_\_ NO. \_\_\_\_\_

WO # 3148-100

REMARKS & RECOMMENDATIONS	PERSONNEL	
<u>U12G-RM-EXPR. DRET. 16.5'W X 16.5'H X 140'</u>	SUPT	
	WALKER	
<u>COMPLETED DRILLING 8'D X 5'W X 17'H BLAST ROUND &amp; LINE DRILL</u>	SHIFTER	<u>1</u>
<u>RIGHT RIB ROCK MECH ALGIVE FOR SQUARING UP FACE IN PREP.</u>	OPER	<u>2</u>
<u>CEMININE RM EXPR DRET.</u>	MECH	<u>1</u>
	MINER	<u>2</u>
	ELECT	
	BULL GANG	<u>1</u>
	B. G. FORE	
	LABOR	
	HEMBREE	<u>W</u>
	ALGER	<u>S</u>
	TOTAL	<u>7</u>

DELAYS (TIME & REASON)

SPECIAL ITEMS (ACCIDENTS, UNSAFE PRACTICES, BAD GROUND CONDITIONS, ETC.)

ORTED TO \_\_\_\_\_ COMPANY \_\_\_\_\_ TIME \_\_\_\_\_ DATE \_\_\_\_\_

REPLY: \_\_\_\_\_

USER SANDIA

FENIX & SCISSON INC.  
DAILY MINE INSPECTOR REPORT

FILE \_\_\_\_\_

INSPECTOR: WALKER

SHIFT 1 @ 3

DATE WED. 11-4-81

JOB V12C

TIME

LOCATION

FACE

0+41

PREV

0+33

FROM 0830

TO 1700

BR+WM  
LAST SET

0+28

NO. \_\_\_\_\_

WC# 3408-100

REMARKS & RECOMMENDATIONS

PERSONNEL

MINING

V12C - RM EXP. DRIFT 16.5'H X 16.5'W X 140' (TOP SECTION)

SUPT

WALKER

BLAST ROUND PULLED 8' GOOD R.C. NO. 1030' 2 VOLUME BLASTED.

SHIFTER

1

OPER

DRILLED FOR & INSTALLED WITH RESIN ANCHORS 17-7/8" X 5'

MECH

ROCK BOLTS, HUNG LWRAP WIRE MESH 260' 2.

MINER

3

ELECT

1

DRILLING FOR 1 1/2" X 16' ROCK ~~BOLTS~~ BOLTS ON 3' X 4'

BULL GANG

PATTERN INCOMPLETE.

B. G. FORE

LABOR

HEMPTER

W

ALGER

S

DELAYS (TIME & REASON)

TOTAL

5

SPECIAL ITEMS (ACCIDENTS, UNSAFE PRACTICES, BAD GROUND CONDITIONS, ETC.)

ORTED TO

COMPANY

TIME

DATE

REPLY:

USER SANDIA

FENIX & SCISSON INC.  
DAILY MINE INSPECTOR REPORT

FILE \_\_\_\_\_

INSPECTOR: WALKER

SHIFT 1 @ 3

DATE FRI 11-6-91

JOB U12G

TIME

LOCATION

FROM 0830

FACE 0+41

PREV: 0+41

TO 1200

R8+WM  
LAST SET 0+35

NO \_\_\_\_\_

WO# 3408-100

REMARKS & RECOMMENDATIONS

PERSONNEL

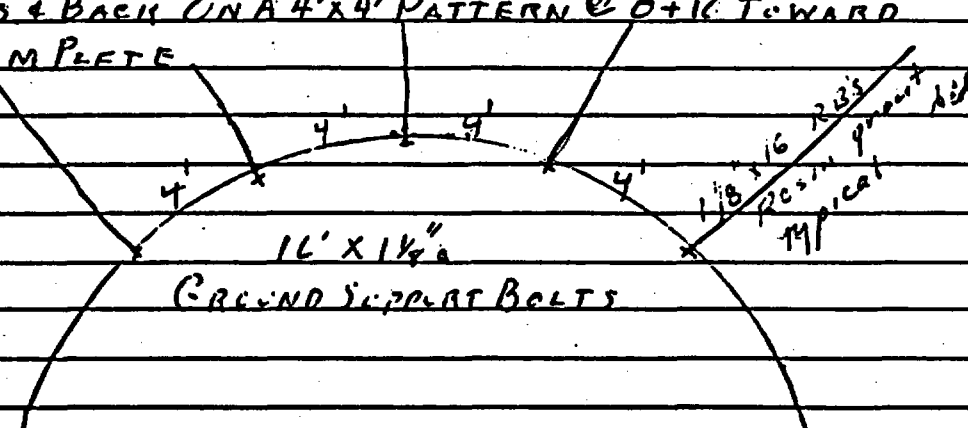
MINING

U12G-RM. EXPR. DRIET 16.5' W X 16.5' H X 140' (TOP SECTION)

MICKED OUT 11' CAR LEADS WITH EIMCO LEADER.

DRILLING 8' BLAST ROUND, INCOMPLETE.

DRILLING FOR & INSTALLING 1 1/2" X 16' BREINARD SUPPORT IN  
UPPER RIBS & BACK ON A 4' X 4' PATTERN @ 0+16 TOWARD  
FACE, INCOMPLETE



GROUND SUPPORT BOLTS

DELAYS (TIME & REASON)

SUPT	
WALKER	
SHIFTER	1
OPER	2
MECH	
MINER	4
ELECT	1
BULL GANG	
B. G. FORE	
LABOR	
HEMBREE	W
ALGER	S
TOTAL	8

SPECIAL ITEMS (ACCIDENTS, UNSAFE PRACTICES, BAD GROUND CONDITIONS, ETC.)

REPORTED TO \_\_\_\_\_ COMPANY \_\_\_\_\_ TIME \_\_\_\_\_ DATE \_\_\_\_\_

REPLY: \_\_\_\_\_

USER SANDIA

FENIX & SCISSON INC.  
DAILY MINE INSPECTOR REPORT

FILE \_\_\_\_\_

INSPECTOR: WALKER

SHIFT 1 (2)3

DATE WED. 12-2-81

JOB U12G

TIME

LOCATION

FROM 0930

FACE 0+78

PREV. 0+72

TO 1500

LAST SET RB&WM 0+76

NO. \_\_\_\_\_

Wp # 3408-100

REMARKS & RECOMMENDATIONS

PERSONNEL

MINING

U12G-RM EXP. DRIFT 16.5' X 16.5' X 140' (TOP SECTION) AREA  
BACK 14' X 12'

SUPT	
WALKER	
SHIFTER	1
OPER	2
MECH	1
MINER	4
ELECT	
BULL GANG	
<del>S. G. FORE</del>	
LABOR	

7' BLAST ROUND ADVANCED HEADING 6', VOLUME PULLED 1022' <sup>2</sup>

DRILLED FOR & INSTALLED 16 - 3/4" X 8' ROCK BOLTS IN BACK &  
RIBS WITH RESIN ANCHORS.

HUNG 1 WRAP WIRE MESH 200' <sup>2</sup>

MUCKED OUT HEADING LOADED 5 EARS MUCKING REMAINDER OUT  
OF #2 ALCOVE WHERE MUCK WAS STORED

HENDREX	W
ALGER	5

PREP TO START DRILLING 7' BLAST ROUND.

DELAYS (TIME & REASON)

IN BACK @ 0+78 FORATION CHANGING FROM RED WELDED TUFF  
TO LIGHT GREY NON WELDED TUFF ON APPROX - 5' NON WELDED  
GREY TUFF IN BACK @ 0+78 - 3' THICK

TOTAL 8

SPECIAL ITEMS (ACCIDENTS, UNSAFE PRACTICES, BAD GROUND CONDITIONS, ETC.)

1 HR DELAY - GOVT DIRECTED ACTIVITY

REPORTED TO

COMPANY

TIME

DATE

REPLY:



USER Sandis

FENIX & SCISSON INC.  
DAILY MINE INSPECTOR REPORT

FILE \_\_\_\_\_

INSPECTOR: Cauch SHIFT 1@3

DATE Thurs 2-16-82

JOB U12G TIME FROM 0930

FACE 0+98

LOCATION

TO 1500

LAST SET \_\_\_\_\_ + \_\_\_\_\_ NO. \_\_\_\_\_

WD 3408-100

REMARKS & RECOMMENDATIONS

PERSONNEL

Mining

R.M. Expan. D&T 17' x 17'

Install'd 10 1 1/8" x 16' rock bolts w/ resin

Type Anchors in back @ 0+48 & 0+60

Install'd 35 7/8" x 8' rock bolts w/ resin Type

Anchors in previous drill'd hole in ribs

6' + Grade from 0+20 To 0+70'

SUPT

WALKER

SHIFTER

OPER

MECH

MINER

ELECT

BULL GANG

B. G. FORE

LABOR

Hambree

W

Alger

S

DELAYS (TIME & REASON)

TOTAL

6

SPECIAL ITEMS (ACCIDENTS, UNSAFE PRACTICES, BAD GROUND CONDITIONS, ETC.)

REPORTED TO

COMPANY

TIME

DATE

REPLY: