

APPENDIX D

TECHNICAL DATA SHEET AND
MATERIAL SAFETY DATA SHEET
FOR HALLIBURTON'S ANHIB MATERIAL USED AS
A CORROSION INHIBITOR IN THE CASING ANNULUS



HALLIBURTON SERVICES

DRAWER 1431, DUNCAN, OKLAHOMA 73552

P.O. Box 418
Elkview, WV 25071-0418

Tel: (304) 965-3321
Fax: (304) 965-0971

September 17, 1992

MSES Consultants, Inc.
Al Anderson
P.O. Drawer 190
Clarksburg, WV 26302

Re: Island Creek Coal Company

Dear Mr. Anderson:

Please find attached a Technical Data Sheet and Material Safety Data Sheet for Halliburton's ANHIB Material.

Al, if you or any of your clients have any questions or need further assistance please let me know.

Sincerely,

Joseph E. Legenza
District Technical Manager
Halliburton Services



CS-5135

CHEMICAL SERVICES

TECHNICAL DATA SHEET

ANHIB Packer Fluid Corrosion Inhibitor

Halliburton Services ANHIB corrosion inhibitor is designed for use in aqueous fluids for placement in the annular space between tubing and casing or behind casing. As a multi-component system, ANHIB inhibitor can be used in place of high pH chromates used with bactericides. It is effective against oxygen, hydrogen sulfide and carbon dioxide corrosion.

Chemical Properties

Oxygen Scavenger	Requires a minimum concentration of 500 ppm (1/2 gal/1,000 gal) to completely remove all oxygen from air saturated water. It is somewhat slower to pick up oxygen than most scavengers and is therefore less prone to loss while mixing, however careful mixing procedures should be followed.
Bactericide	Excellent bactericide for sulfate reducing bacteria at 40 ppm, however, for quick kill 500 ppm is recommended.
Corrosion Inhibition	Reduces oxygen corrosion by removing the oxygen. Minimizes corrosion by CO ₂ and H ₂ S. (See Tables I and II)
Surface Tension	Reduces surface tension of sea water containing 1,000 ppm ANHIB inhibitor to 40.5 dyne/cm.
Compatibility	ANHIB is compatible with most Halliburton crosslinked gels which may be used as light weight annular, packer or completion fluids as well as Halliburton's Hykrowate fluid.
Stability	ANHIB is stable up to at least 300°F in brine solutions. (See Table III)

Benefits

- No pH adjustment required
- Reduced effect with hydrogen sulfide contamination
- Compatible with most brine or salt solutions
- Slow oxygen pickup
- Compatible with gels and crosslinked gels

Mixing Procedure

ANHIB corrosion inhibitor is readily soluble in most brines and easily soluble in a 2 percent KCl solution. This will help reduce mixing problems; however, it is an effective oxygen scavenger and will pick up oxygen from the air. It should be added with a minimum of agitation and preferably introduced below fluid level to minimize contact with air. It can be metered into the fluid as it is being pumped into the well.

Concentrations

ANHIB inhibitor can be used at a concentration as low as 500 ppm (1/2 gal/1,000 gal); however, the standard recommendation is 5 gallons per 100 bbls. (1,180 ppm). At temperatures above 200°F the use concentration should be 10 gal per 100 bbls. (2,380 ppm). (ANHIB contains a red dye and can be seen in tap water at a concentration of 200 ppm).

Special Application

Gelled fluids are sometimes placed behind the intermediate string of pipe rather than cement to allow pipe recovery at some later date. The gel will remain behind the long string for as long as the well is produced and should be properly inhibited to protect the pipe from corrosion. Most corrosion inhibitors are not compatible with the crosslinked gels recommended for this application. ANHIB was specifically designed to be compatible with these crosslinked gels used as annular fluids behind casing.

ANHIB inhibitor is a red colored liquid with the following physical properties:

Flash Point	81°F TOC 87°F TCU
Pour Point	-20°F
Specific Gravity @60°F	1.07
Density @60°F	8.9 lbs/gal
Odor	Pungent, alcohol
pH 10% solution in distilled water	8.4
Viscosity	64 cps @60°F

Table I
CO₂ Corrosion Tests

Type: Pressure bottle
Fluid: Tap Water*
Temperature: 72°F
Acid Gas: CO₂ @ 15 psig
Time: 7 days
Coupons: AISI 1020 carbon steel

ANHB Concentration ppm	Corrosion Rate MPY	Percent Protection
0 (blank)	11.3	0
5	0.8	93

* Contains a trace of oxygen when saturated with CO₂

Table II

Dynamic Corrosion Tests

Type: Wheel Test
Corrosive Fluid: 5% NaCl saturated with H₂S
Time: 1 day
Temperature: 100°F

ANHB Concentration	Percent Protection
20 ppm (1/50 gal/1000 gal)	93
50 ppm (1/20 gal/1000 gal)	93

Table III

High Temperature Corrosion Test

Type: Pressure bottle
Corrosant: Oxygen saturated brine*
pH: 9 to 9.5
Temperature: 300°F
Time: 5 days

ANHB Concentration	Percent Protection
2000 ppm (2 gal/1000 gal)	72
5000 ppm (10 gal/1000 gal)	76

* Brine contains 2% KCl adjusted to 10.2 lbs/gal with CaCl₂. It was air saturated at room temperature then heated in a closed system.

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rent, breach of warranty or otherwise) arising out of the sale or use of any products, supplies or materials is expressly limited to the replacement of such products, supplies or materials on their return to Halliburton or, at Halliburton's option, to the allowance to the customer of credit for the cost of such items. In no event shall Halliburton be liable for special, incidental, indirect, punitive or consequential damages.



CS-5158

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HALLIBURTON SERVICES

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ANNHIB INHIBITOR

PAGE 1

MATERIAL SAFETY DATA SHEET
HALLIBURTON SERVICES
DUNCAN, OKLAHOMA 73536

DATE: 09-17-88
REVISED DATE 06-18-91

EMERGENCY TELEPHONE: 405/251-3565 OR 405/251-3569
AFTER HOURS: 405/251-3760

***** SECTION I - PRODUCT DESCRIPTION *****

CHEMICAL CODE: ANNHIB INHIBITOR PART NUMBER: 070133-10
PREQTY: 5 GALLON CAN APPLICATION: CORROSION INHIBITOR
SERVICE USED: CHEMICAL SERVICES

***** SECTION II - COMPONENT INFORMATION *****

CONCENTRATION	PERCENT	TLV	REL
ISOPROPANOL	11-20 %	400 FPM	400 FPM
AMMONIUM BISULFITE	1-10 %	10 MG/M3	15 MG/M3

***** SECTION III - PHYSICAL DATA *****

PROPERTY	MEASUREMENT
APPEARANCE	RED LIQUID
ODOR	AMMONIA
SPECIFIC GRAVITY (H2O=1)	1.070
REL DENSITY	8.91 LB/OAL
PH	9.9
SOLUBILITY IN WATER AT 20 DEG C. GRAMS/100ML H2O	COMPLETELY
BIODEGRADABILITY	SLOWLY
PERCENT VOLATILES	13
EVAPORATION RATE (BUTYL ACETATE=1)	N/D
VAPOR DENSITY	N/D
VAPOR PRESSURE (MMHG)	97.00
BOILING POINT (760 MMHG)	N/D
FOUR POINT	- 20 F / 28 C
FREEZE POINT	N/D
SOLUBILITY IN SEAWATER	?
PARTITION COEF (OCTANOL IN WATER)	?

***** SECTION IV - FIRE AND EXPLOSION DATA *****

OSHA (204) RATING:
HEALTH 1 FLAMMABILITY 3 REACTIVITY 0 SPECIAL NONE
FLASH POINT 56 F / 13 C FLASH WITH FIRE
AUTOIGNITION TEMPERATURE NO F / NO C
FLAMMABLE LIMITS (% BY VOLUME) LOWER NO UPPER NO

EXTINGUISHING MEDIA:

USE WATER SPRAY, FOAM, DRY CHEMICAL, OR CARBON DIOXIDE.

SPECIAL FIRE FIGHTING PROCEDURES:

USE WATER SPRAY TO COOL FIRE-EXPOSED SURFACES.
FULL PROTECTIVE CLOTHING AND NIOSH/MSHA APPROVED SELF-CONTAINED BREATHING
APPARATUS REQUIRED FOR FIRE FIGHTING PERSONNEL.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

MAY BE IGNITED BY HEAT, SPARKS, OR FLAMES. FIGHT FIRE FROM A SAFE DISTANCE
ON FIRE - PROTECTIVE LOCATION. HEAT MAY BUILD PRESSURE AND RUPTURE CLOSED
CONTAINERS. SMOTHERING THE FIRE AND INCREASING THE RISK OF BURNS AND

INJURIES.

INCOMPLETE THERMAL DECOMPOSITION MAY PRODUCE CARBON DIOXIDE, CARBON MONOXIDE AND SULFUR OXIDES.

***** SECTION V - HEALTH HAZARD DATA *****

CALIFORNIA PROPOSITION 65:

PRODUCT OR PRODUCT COMPONENTS ARE NOT REGULATED UNDER CALIF. PROPOSITION 65.

CARCINOGENIC DETERMINATION:

PRODUCT OR COMPONENTS ARE NOT LISTED AS A POTENTIAL CARCINOGEN ACCORDING TO: "NTP, IARC, OSHA, OR, ACGIH".

PRODUCT TOXICITY DATA: NOT DETERMINED

PRODUCT TLV: NOT EST.

----- EFFECTS OF EXPOSURE -----

ROUTES OF EXPOSURE:

EYE OR SKIN CONTACT, INHALATION

EYE:

CONCENTRATED SOLUTIONS MAY CAUSE SEVERE BURNS

SKIN:

MAY BE ABSORBED THROUGH SKIN.

PROLONGED OR REPEATED CONTACT MAY CAUSE DERMATITIS.

CONCENTRATED LIQUID MAY CAUSE MODERATE TO SEVERE IRRITATION.

INHALATION:

HIGH CONCENTRATIONS MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. THIS MAY BE EVIDENCED BY GIDDINESS, HEADACHES, DIZZINESS, NAUSEA, VOMITING OR POSSIBLY UNCONSCIOUSNESS.

INGESTION:

IRRITATION OF THE MOUTH AND THROAT, ABDOMINAL PAIN, NAUSEA AND VOMITING, DIARRHEA, AND COLLAPSE MAY RESULT FROM INGESTION.

CHRONIC EFFECTS:

CHRONIC OVEREXPOSURE MAY CAUSE LIVER AND KIDNEY DISORDERS

OTHER SYMPTOMS AFFECTED:

BECAUSE OF ITS IRRITATING PROPERTIES, THIS MATERIAL MAY AGGRAVATE AN EXISTING DERMATITIS.

----- EMERGENCY AND FIRST AID PROCEDURES -----

EYE:

IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SEEK PROMPT MEDICAL ATTENTION.

SKIN:

IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. SEEK MEDICAL ATTENTION. WASH CLOTHING BEFORE REUSE. DISCARD CONTAMINATED SHOES.

INHALATION:

REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN. SEEK PROMPT MEDICAL ATTENTION.

INGESTION:

DO NOT INDUCE VOMITING. GIVE UP TO TWO (2) QUARTS OF WATER TO DILUTE. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. SEEK MEDICAL ATTENTION.

***** SECTION VI - REACTIVITY DATA *****

STABILITY: STABLE

CONDITIONS TO AVOID:

HEAT, SPARKS AND OPEN FLAME.

INCOMPATIBILITY (MATERIALS TO AVOID):

STRONG OXIDIZERS.

----- THERMAL DECOMPOSITION PRODUCTS -----

CARBON DIOXIDE AND/OR CARBON MONOXIDE. AMMONIA AND OXIDES OF NITROGEN.
HAZARD POLYMERIZATION: WON'T OCCUR
CONDITIONS TO AVOID:
NOT APPLICABLE.

***** SECTION VII - SPILL OR LEAK PROCEDURES *****

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

USE PROTECTIVE EQUIPMENT. ISOLATE SPILL AREA AND STOP LEAK WHERE SAFE.
REMOVE IGNITION SOURCES. CONTAIN AND ABSORB SPILL WITH SAND OR OTHER INERT
MATERIAL. SCOOP OR SWEEP UP USING NON-SPARKING TOOLS. IN ENCLOSED AREAS,
WEAR SELF-CONTAINED BREATHING APPARATUS.

WASTE DISPOSAL METHOD:

GET APPROVAL FROM HAZARDOUS WASTE DISPOSAL SITE AUTHORIZED UNDER EPA-RCRA
SUBTITLE C OR STATE EQUIVALENT. SHIP TO SITE.

***** SECTION VIII - SPECIAL PROTECTION INFORMATION *****

RESPIRATORY PROTECTION (USE NIOSH/MSHA APPROVED EQUIPMENT):

ORGANIC VAPOR CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE.

VENTILATION:

USE ONLY WITH ADEQUATE VENTILATION. LOCAL EXHAUST VENTILATION SHOULD BE
USED IN AREAS WITHOUT GOOD CROSS VENTILATION.
LOCAL EXHAUST VENTILATION MUST BE DESIGNED FOR EXPLOSIVE ATMOSPHERES (NEC
CLASS I EQUIPMENT).

PROTECTIVE GLOVES:

IMPERVIOUS RUBBER GLOVES.

EYE PROTECTION:

WEAR GOGGLES AND/OR FACE SHIELD. PROVIDE EYEWASH AND QUICK DRENCH SYSTEM.

OTHER PROTECTIVE EQUIPMENT:

RUBBER APRON TO PREVENT DIRECT SKIN CONTACT.

***** SECTION IX - SPECIAL PRECAUTIONS *****

PRECAUTIONARY LABELING ANHIB INHIBITOR

070-153410

WARNING!

MAY CAUSE HEADACHE, DIZZINESS AND OTHER CENTRAL NERVOUS SYSTEM EFFECTS
MAY CAUSE EYE AND SKIN IRRITATION.

FLAMMABLE!

FOR PRECAUTIONARY STATEMENTS, REFER TO SECTIONS IV-VIII.

OTHER HANDLING AND STORAGE CONDITIONS:

STORE AWAY FROM OXIDIZERS.
KEEP FROM HEAT, SPARKS, AND OPEN FLAME.
KEEP CONTAINER CLOSED WHEN NOT IN USE.
AVOID CONTACT WITH SKIN, EYES AND CLOTHING.
AVOID BREATHING VAPORS.

CONTAINER DISPOSITION:

IF EMPTY CONTAINER RETAINS PRODUCT RESIDUES, ALL LABEL PRECAUTIONS MUST BE
OBSERVED. STORE AWAY FROM IGNITION SOURCES WITH ALL URUM CLOSURES IN
PLACE. OFFER CONTAINER TO RECONDITIONER OR RECYCLER. ENSURE RECONDITIONER
OR RECYCLER IS AWARE OF THE PROPERTIES OF THE CONTENTS.

***** SECTION X - TRANSPORTATION INFORMATION *****

DOT SHIPPING DESCRIPTION:

FLAMMABLE LIQUID, N.O.S. (CONTAINS ISOPROPANOL)-FLAMMABLE LIQUID-(UN1993
(NOTE: MUST BE REPACKAGED FOR AIR FREIGHT IF IN 3YB)

ATA SHIPPING DESCRIPTION:

FLAMMABLE LIQUID, N.O.S. (CONTAINS ISOPROPANOL)-3-UN1993 (3YB)-11
(NOTE: MUST BE REPACKAGED IF IN DOT 3YB FOR AIR FREIGHT)

IMO SHIPPING DESCRIPTION:

FLAMMABLE LIQUIDS, N.O.S. (CONTAINS ISOPROPANOL)-3.2-UN1993-II (1P) (C)
 IMO PAGE 3230

CAN SHIPPING DESCRIPTION:

FLAMMABLE LIQUIDS, N.O.S. (CONTAINS ISOPROPANOL)-3.2-PIN1993-II

ADR SHIPPING DESCRIPTION:

FLAMMABLE LIQUIDS-(CONTAINS ISOPROPANOL)-3, 3, (B)-ADR

***** SECTION XI - ENVIRONMENTAL EVALUATION *****

EPA SUPERFUND(SARA) TITLE III - HAZARD CLASSIFICATION & ASSOCIATED INFORMATION

FIRE: Y PRESSURE: N REACTIVE: N ACUTE (IMMEDIATE): Y
 CHRONIC (DELAYED): N MIXTURE OR PURE MATERIAL: MIX

H. EPA - CERCLA/SUPERFUND, 40 CFR 302 (REPORTABLE SPILL QUANTITY)
 5170 GALS. - AMMONIUM BISULFITE.

G. EPA - SARA TITLE III, CFR 355 (EXTREMELY HAZARDOUS SUBSTANCES)
 PRODUCT CONTAINS NO EXTREMELY HAZARDOUS COMPONENTS

D. EPA - SARA TITLE III, 40 CFR 372 (LIST OF TOXIC CHEMICALS)
 COMPONENT NAME CAS-REG-NO PC1
 ISOPROPANOL 67-63-0 11-30 %

E. COMPONENTS LISTED ON FOLLOWING CHEMICAL INVENTORIES

TSCA YES CEPA NE EEC YES AQIN YES NPR NE DRSH NE

F. EXTRACTION METAL AND TRACE CONTENTS

ARSENIC:	IN LIQUID > 5 MG/L,	SOLID > 500 MG/KG	NOT EVALUATED
BARIUM:	IN LIQUID > 100 MG/L,	SOLID > 10000 MG/KG	NOT EVALUATED
CADMIUM:	IN LIQUID > 1 MG/L,	SOLID > 100 MG/KG	NOT EVALUATED
CHROMIUM(VI):	IN LIQUID > 5 MG/L,	SOLID > 500 MG/KG	NOT EVALUATED
CHROMIUM(III):	IN LIQUID > 500 MG/L,	SOLID > 2500 MG/KG	NOT EVALUATED
LEAD:	IN LIQUID > 5 MG/L,	SOLID > 1000 MG/KG	NOT EVALUATED
MERCURY:	IN LIQUID > 0.2 MG/L,	SOLID > 2000 MG/KG	NOT EVALUATED
SELENIUM:	IN LIQUID > 1 MG/L,	SOLID > 100 MG/KG	NOT EVALUATED
SILVER:	IN LIQUID > 5 MG/L,	SOLID > 500 MG/KG	NOT EVALUATED
ANTIMONY:	IN LIQUID > 15 MG/L,	SOLID > 500 MG/KG	NOT EVALUATED
BERYLLIUM:	IN LIQUID > 0.75 MG/L,	SOLID > 75 MG/KG	NOT EVALUATED
COBALT:	IN LIQUID > 80 MG/L,	SOLID > 8000 MG/KG	NOT EVALUATED
COPPER:	IN LIQUID > 25 MG/L,	SOLID > 2500 MG/KG	NOT EVALUATED
FLUORIDE:	IN LIQUID > 180 MG/L,	SOLID > 18000 MG/KG	NOT EVALUATED
MOLYBDENUM:	IN LIQUID > 330 MG/L,	SOLID > 3500 MG/KG	NOT EVALUATED
NICKEL:	IN LIQUID > 20 MG/L,	SOLID > 2000 MG/KG	NOT EVALUATED
THALLIUM:	IN LIQUID > 7 MG/L,	SOLID > 700 MG/KG	NOT EVALUATED
VANADIUM:	IN LIQUID > 24 MG/L,	SOLID > 2400 MG/KG	NOT EVALUATED
ZINC:	IN LIQUID > 250 MG/L,	SOLID > 5000 MG/KG	NOT EVALUATED
CYANIDE:	IN LIQUID > 250 MG/L,	SOLID > 250 MG/KG	NOT EVALUATED
H2S:	IN LIQUID > 500 MG/L,	SOLID > 500 MG/KG	NOT EVALUATED
ORGANO-TIN:	IN LIQUID OR	SOLID > 100 MG/L	NOT EVALUATED
ORGANO-PHOS:	IN LIQUID OR	SOLID > 100 MG/L	NOT EVALUATED
TIN:	IN LIQUID OR	SOLID > 100 MG/L	NOT EVALUATED
PERSISTENT ORGANO- HALOGENS:	IN LIQUID OR	SOLID > 100 MG/L	NOT EVALUATED

G. OTHER COMPONENTS

CONTAINS BENZENE	NO
CONTAINS TOLUENE	NO
CONTAINS XYLENE	NO
REPORTABLE SPILL QUANTITY FOR BENZENE, TOLUENE, XYLENE	NOT APPLICABLE

H. EPA - RCRA (HAZARDOUS WASTE), 40 CFR 261

IF PRODUCT BECOMES A WASTE, IT DOES MEET THE CRITERIA OF A HAZARDOUS WASTE BECAUSE OF:

IGNITABILITY

1. UNITED KINGDOM - DOE (CHEMICAL NOTIFICATION SCHEME)
TOXICITY LABELING

NOT EVALUATED

THE INFORMATION WHICH IS CONTAINED IN THIS DOCUMENT IS BASED UPON AVAILABLE DATA AND BELIEVED TO BE CORRECT. HOWEVER, AS SUCH AS IT HAS BEEN OBTAINED FROM VARIOUS SOURCES, INCLUDING THE MANUFACTURER AND INDEPENDENT LABORATORIES, IT IS GIVEN WITHOUT WARRANTY OR REPRESENTATION THAT IT IS COMPLETE, ACCURATE AND CAN BE RELIED UPON. HALLIBURTON HAS NOT ATTEMPTED TO CONCEAL IN ANY WAY THE DELETERIOUS ASPECTS OF THE PRODUCT LISTED HEREIN, BUT MAKES NO WARRANTY AS TO SUCH. FURTHER, AS HALLIBURTON CANNOT ANTICIPATE NOR CONTROL THE MANY SITUATIONS IN WHICH THE LISTED PRODUCT OR THIS INFORMATION MAY BE USED BY OUR CUSTOMER, THERE IS NO GUARANTEE THAT THE HEALTH AND SAFETY PRECAUTIONS SUGGESTED WILL BE PROPER UNDER ALL CONDITIONS. IT IS THE SOLE RESPONSIBILITY OF EACH USER OF THE LISTED PRODUCT TO DETERMINE AND COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE LAWS AND REGULATIONS REGARDING ITS USE OR DISPOSAL. THIS INFORMATION IS GIVEN SOLELY FOR THE PURPOSES OF HEALTH AND SAFETY TO PERSONS AND PROPERTY. ANY OTHER USE OF THIS INFORMATION IS EXPRESSLY PROHIBITED. REGULATORY AFFAIRS DEPARTMENT, HALLIBURTON ENERGY SERVICES GROUP

APPENDIX E
COAL SEAM WATER ANALYSIS

APPENDIX E⁽¹⁾

Appendix E

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SUMMARY OF RESULTS

COAL SEAM WATER
COLLECTED FROM THE
POCAHONTAS #1 COAL SEAM

Hole #	Cl (mpl)	pH	TDS (mpl)	T.Fe (mpl)	Mg (mpl)	Ca (mpl)	Na (mpl)	SpGr (mpl)	SO4 (mpl)	HCO3 (mpl)	T.HARD (mpl)
248	65,000	5.0		750	1,310	9,600		1.077	10		0
266	40,000	5.7	64,735	150	600	6,250	17,700	1.050	0	185	700
267	45,000	5.7	72,670	130	690	7,300	19,600	1.050	0	80	26,200
270	103,000	4.8	168,000	90	2,560	14,300	44,100	1.122	0	61	0
270	73,700	5.5	120,000	160	1,390	10,800	31,600	1.086	0	88	
270	61,000	6.5		120	1,310	8,320		1.070	10		
270	45,600	5.9		250	470	210		1.050	320	290	
271	44,500	6.1	73,100	200	329	7,590	18,800	1.055	0	183	
272	61,000	5.7	98,315	430	1,560	8,000	27,600	1.070	20	136	
303	47,000	6.2	73,940	60	900	6,900	21,000	1.062	0	140	
303	33,000	5.1	53,335	30	810	4,450	14,900	1.045	0	175	
AVERAGE	56,255	5.7	90,512	220	1,084	7,613	24,413	1.067	33	149	6,725

⁽¹⁾ Sampling and analysis information provided to MSES Consultants, Inc. by Island Creek Coal Company on May 2, 1991.

APPENDIX F

OCCIDENTAL PETROLEUM CORPORATION
1991 ANNUAL REPORT AND
1991 ANNUAL REPORT ON FORM 10-K

APPENDIX G
SURFACE OWNERS

APPENDIX G⁽¹⁾

SURFACE OWNERS

VP NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D926BBUC

<u>Surface Ownership⁽¹⁾</u>	<u>Reference Map Number</u>
VA DEPARTMENT OF CORRECTIONS General Delivery Vansant, VA 24656	144-2
WALTER PRICE P.O. Box 98 Vansant, VA 24656	144-3
JANET AND LONNIE BROWN Route 1, Box 97-A Vansant, VA 24656	144-4
DORIS P. AND WILLIAM E. RIFE Route 1, Box 97 Vansant, VA 24656	144-5
VP-5 MINING COMPANY Drawer L Oakwood, VA 24631	144-6 through 144-18
WILLIAM F. COX, ET. AL. Route 1, Box 179 Stuarts Draft, VA 24477	144-20
ISAAC PRICE Route 2, Box 536 Haysi, VA 24256	144-21 and 144-22
EUGENE AND BETTY YATES P.O. Box 616 Vansant, VA 24656	144-24 and 144-25
ALVERY AND MITZI TILLER Route 2, Box 386D Abingdon, VA 24210	144-23 and 144-26
ANITA PRATER P.O. Box 267 Vansant, VA 24656	144-27

APPENDIX G⁽¹⁾

SURFACE OWNERS

VP NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D926BBUC
(continued)

<u>Surface Ownership</u> ⁽²⁾	<u>Map Reference Number</u>
CARRIE AND MUNCY TILLER P.O. Box 267 Vansant, VA 24656	144-28
LAWRENCE JACKSON P.O. Box 116 Vansant, VA 24656	144-29, 144-30, 144-31
MARIE AND OMAR COX P.O. Box 274 Vansant, VA 24656	144-32 and 144-33
ALVIN COX P.O. Box 22 Vansant, VA 24656	144-34
HARRIS AND DEBORAH CRUMPTON P.O. Box 72 Oakwood, VA 24631	144-35
ALDEN COOK P.O. Box 36 Vansant, VA 24656	144-36 and 144-37
JOHNNY D. YATES, ET. AL. P.O. Box 1 Elkton, MD 21921	144-38
EVANS R. YATES, ET. AL. P.O. Box 785 Elkton, MD 21921	144-39
DONALD AND MOLLY RAMEY P.O. Box 405 Vansant, VA 24656	144-51

APPENDIX G⁽¹⁾

SURFACE OWNERS

VF NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D9262BUC
(continued)

<u>Surface Ownership</u> ⁽²⁾	<u>Map Reference Number</u>
EVELYN AND RONALD COOK P.O. Box 296 Vansant, VA 24656	144-52
NORFOLK AND WESTERN RAILROAD 8 North Jefferson Street Roanoke, VA 24042	145-15
MYRTLE STILTNER Route 2, Box 54 Grundy, VA 24614	145-16
ALICE AND GEORGE SNYDER General Delivery Vansant, VA 24656	145-42
PAUL AND JANICE BOYD P.O. Box 596 Newport, NC 28570	145-48
CECIL AND BLANCHE SHORTRIDGE P.O. Box 64 Vansant, VA 24656	145-49
ERNEST CHURCH Route 1, Box 3 Vansant, VA 24656	145-50
VERNON CHURCH Route 1, Box 94 Vansant, VA 24656	145-51
HENRY AND BEVERLY HAGY P.O. Box 369 Lindin, MI 48451	145-52

APPENDIX G⁽¹⁾

SURFACE OWNERS

VP NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D926BBUC
(continued)

<u>Surface Ownership</u> ⁽²⁾	<u>Map Reference Number</u>
DON AND VICTORIA HAGY P.O. Box 589 Vansant, VA 24656	145-53
ULESS AND EDITH KINSER P.O. Box 632 Vansant, VA 24656	145-54
FRED AND PATRICIA KINSER General Delivery Vansant, VA 24656	145-55
BILL AND MYRNA CAMPBELL P.O. Box 506 Vansant, VA 24656	145-56
CORBETT OWENS 2213 E. Long Lake Road Troy, MI 48098	145-57
RALPH RATLIFF AND JOHN WHITE Route 2, Box 249 Grundy, VA 24614	145-58
BILLY SHORTRIDGE Route 1, Box 95 Vansant, VA 24656	145-59
HARVEY SHORTRIDGE R.D. 1, Box 36N 23 Vera Crus Rd Reinholds, PA 17569	145-60 through 145-63
KENNETH AND JUDY LOONEY General Delivery Grundy, VA 24614	145-64

APPENDIX G⁽¹⁾

SURFACE OWNERS

VP NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D926BUC
(continued)

<u>Surface Ownership</u> ⁽²⁾	<u>Map Reference Number</u>
HASSELL AND MADELINE SHORTRIDGE Route 1, Box 95 Vansant, VA 24656	145-65 and 145-66
CECIL AND JENNIFER STREET General Delivery Vansant, VA 24656	145-69
ARCH AND JANICE BOYD P.O. Box 596 Newport, NC 28570	145-71
STELLA DUTY P.O. Box 3 Vansant, VA 24656	145-72
LAURA BALDWIN 5210 14th Street West, Lot 57 Bradenton, FL 33507	145-75
WILLIAM AND BETSY STILTNER Route 1, Box 350 Wilkesboro, NC 28697	187-3
RALPH THACKER Route 8, Box 449 Abingdon, VA 24210	187-5
JESSIE OWENS P.O. Box 506 Vansant, VA 24656	187-6
LILLIE BOYD P.O. Box 214 War, WV 24892	187-9

APPENDIX G⁽¹⁾

SURFACE OWNERS

VP NUMBER 5 MINE

PERMIT APPLICATION NUMBER VAS2D925BBUC
(continued)

<u>Surface Ownership</u> ⁽²⁾	<u>Map Reference Number</u>
ELMER AND POLLY CHURCH Route 3, Box 199 Abingdon, VA 24210	187-10
LONNIE AND GARNETTE MINTON P.O. Box 276 Vansant, VA 24656	187-15
JAMIE VADEN 309 Highway Street Madison, NC 27025	187-58
DON MCGLOTHLIN P.O. Box 909 Grundy, VA 24614	188-2
NANCY AND JOE JACKSON P.O. Box 563 Vansant, VA 24656	188-3

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- (1) Listing of surface owners provided by Island Creek Coal Company.
- (2) Surface owners located and identified by Drawing 91-56-5.
- (3) Listing of mineral owners provided by Island Creek Coal Company.
- (4) Mineral owners are identified by Drawing 91-56-5.

APPENDIX H
PLUGGING INFORMATION
EXPLORATION CORE HOLES

APPENDIX H⁽¹⁾

PLUGGING INFORMATION
EXPLORATION CORE HOLES
VF NUMBER 5 MINE
PERMIT APPLICATION NUMBER VAS2D926BBUC

<u>Well #⁽²⁾</u>	<u>Method of Plugging</u>	<u>Material Used</u>	<u>Plugging Date</u>
L-81	Through grout pipe	Cement - 37 SXS	8/20/59
L-83	Through grout pipe	Cement - 32 SXS	7/17/59
L-86	Through grout pipe	Cement - 50 SXS	10/7/57
L-87	Through grout pipe	Cement - 44 SXS	9/12/58
L-96	Through grout pipe	Cement - 40 SXS	4/7/59
L-108	Through grout pipe	Cement - 50 SXS	5/13/59
L-111	Through grout pipe	Cement - 31 SXS	2/28/59
L-114	Through grout pipe	Cement - 35 SXS	1/10/59
L-117	Through grout pipe	Cement - 49 SXS	6/15/59
L-199	Through grout pipe	Cement	5/26/71
L-201	Through grout pipe	Cement	7/29/71
L-206	Through grout pipe	Cement	10/1/71
L-221	Pilot hole for B shaft	- - - (3)	- - - (3)
L-222	Pilot hole for S shaft	- - - (3)	- - - (3)
L-223	Pilot hole for A Shaft	- - - (3)	- - - (3)
L-230	Through grout pipe	Cement	8/27/74
L-245	Through grout pipe	Cement	8/18/74

(1) Information for this appendix provided by Island Creek Coal Company.

(2) The locations of these exploration core holes are shown by Drawing 91-56-1 Rev. 1.

(3) "- - -": These holes are outside of the sealed portion of the mined out area intended as the storage area and have been converted to shafts.

APPENDIX I

CEMENTING AND PLUGGING INFORMATION
FOR VENTILATION AND OTHER HOLES

APPENDIX I¹²

CEMENTING AND PLUGGING INFORMATION
FOR VENTILATION AND OTHER HOLES
VE NUMBER 5 MINE
PERMIT APPLICATION NUMBER VAS2D926BBUC

<u>Well Number</u>	<u>Status</u>	<u>Casing</u>	<u>Cementing</u>	<u>Total Depth</u>	<u>Plug Date</u>
VVH-90	Venting	9 5/8", 7"	215' to 1839'	1852'	----(12)
VVH-91	Open unmined	9 5/8", 7"	Surface to Surface	2191'	----
VVH-92	Open unmined	9 5/8", 7"	Surface to Surface	2119'	----
VVH-93	Venting	9 5/8", 7"	545' to 2112'	2170'	----
VVH-105	Venting	9 5/8", 7"	Surface to Surface	2170'	----
VVH-105	Venting	9 5/8", 7"	---- to 1958'	2170'	----
VVH-105	Venting	9 5/8", 7"	---- to Surface	2170'	----
VVH-110	Located 5 miles away and should not have been included		---- to 1438'	1712'	
VVH-110	Located 5 miles away and should not have been included		---- to Surface	1712'	
VVH-116	Venting	12 3/4"	347' to Surface	1917'	----
VVH-187	Venting	12 3/4", 9 5/8"	680' to 1802'	2115'	----
VVH-187	Venting	12 3/4", 9 5/8"	Surface to Surface	2115'	----
SNIT 1	Venting	Full casing string cemented	to surface	1693'	----
SNIT 2	Venting	Full casing string cemented	to surface	2136'	----
SHLMR2	Active	Full casing string cemented	to surface	1391'	----
SH20BH	Active	Full casing string cemented	to surface	1429'	----
SRKDST	Active	Full casing string cemented	to surface	1416'	----

APPENDIX I⁽¹⁾

CEMENTING AND PLUGGING INFORMATION
FOR VENTILATION AND OTHER HOLES
VF NUMBER 5 MINE
PERMIT APPLICATION NUMBER VAS2D9268BUC
(continued)

<u>Number</u>	<u>TD</u>	<u>Cemented Casing Depth</u>	<u>Casing</u>	<u>Bridge Plug</u>	<u>Cement and Fill (top to bottom)</u>	<u>Vent Depth Above Ground</u>
VVH-104	1702'	1455'	8 3/4"	450'	30' cem, 320' fill, 100' cem	42'/10'
VVH-112	1787'	1533'	8 3/4"	450'	30' cem, 320' fill, 100' cem	42'/10'
VVH-113	1987'	1742'	8 3/4"	450'	30' cem, 320' fill, 100' cem	42'/10'
VVH-115	1945'	1635'	12 1/4"	450'	30' cem, 320' fill, 100' cem	42'/10'
VVH-168	1509'	1197'	12 1/4"	300'	Cemented to surface	-----

- (1) Information for this appendix provided by Island Creek Coal Company.
- (2) The locations of these ventilation and other holes are shown by Drawing 91-56-1 Rev. 1.
- (3) Holes are still active.

APPENDIX J
TO BE SUPPLIED BY
ICCC

PAGE: 1 OWNER NAME: ISLAND CREEK CORPORATION
ALL DEPTH/THICKNESS DATA IN FEET

SERIAL NUMBER: IC092686-003-3.00

LOG#1 1 EVMSMT 1 IVAD 1 2 1: 24000.1 10= 108

IDENTIFICATION SECTION

1. QUAD NAME: VMSMT
2. STATE LOCATION OF QUAD: VA
3. SCALE OF QUAD: 2
4. LOG ID #: 108
5.1 UNPUBLISHED RECORD. COMPANY OR AGENCY NAME: ISLAND CREEK CORP
6. DIVISION OR TRACT:
7. DRILL HOLE NUMBER: L-309
8. CONTRIBUTING COMPANY OR AGENCY: ISLAND CREEK CORP
9. CONTRIBUTING COMPANY DWH#: L-309

COORDINATES OF HOLE OR SECTION

12.1 STATE CODE: VAS
12.2 STATE PLANE N/S: 24497.00
12.3 STATE PLANE E/W: 29380.59
15.1 COMPANY GRID N/S: 24497.00
15.2 COMPANY GRID E/W: 29380.59

CIVIL DISTRICT WHERE LOCATED

17. STATE WHERE HOLE LOCATED: VA
18. COUNTY: BUCHARAN
19. TOWNSHIP, MAGISTERIAL DISTRICT, OR INCORPORATED PLACE: VANSANT
20. GROUND LOCATION DESCRIPTION: VANCE FORK

WELL OR SECTION DESCRIPTION

ELEVATION AT TOP OF HOLE OR SECTION: F 1800.35 DRILL ANGLE 0.
METHOD OF ELEVATION DETERMINATION: S
23. NAME OF PERSON LOGGING: DGL
24. YEAR DRILLED OR MEASURED: 1988
25. TOTAL DEPTH OF DRILL HOLE: F 1800.600
26. BED CODE REGION IDENTIFIER: NAPP
27. CODE OF UPPERMOST IDENTIFIABLE BED: XEN
28. CODE OF LOWERMOST IDENTIFIABLE BED: PC2
29.1 KIND OF RECORD: C
29.2 METHOD OF LITHO DESCRIPTION: 1(CODE)
30.1 UNITS OF MEASUREMENT: 1(FIF)
30.2 METHOD(S) OF MEASUREMENT: 3(CRM)

PERSON(S) LAST MODIFYING THIS LOG

31. PERSON SUBMITTING LOG FOR ENTRY: DGL
32. DATE OF LOG SUBMISSION (MM/DD/YYYY): 10/7/88
LAST MODIFIED BY: NCM
DATE: 6/3/91
USER DATA: 22.01' NET COAL == 1.5'

LOG# 1 1 (V)NINT 1 (V)A1 1 2 1: 24000.1 10= 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
1	001	CASING OR SURFACE			
2	543.5	GRY RIP SS W/SH STKS	FG, FS-FBN	20.000	20.000
3	323	DRK GRY SH W/SS STKS	TL	32.042	12.042
4	000	NO ROCK RECOVERED		34.958	2.916
5	323	DRK GRY SH+INTERBED SS	RIP STRK, TL-FL	35.375	.417
6	323	DRK GRY SH W/SS STKS	TL	37.500	2.125
7	324	DRK GRY MASS SDY SH	SID	40.000	2.500
8	323	DRK GRY SH W/SS STKS	FL	41.729	1.729
9	021	COMMON BANDED COAL	PYRITE STRK	42.000	.271
		* BED:KEN 10		42.896	.896
10	327	DRK GRY SDY FIRECLAY		43.313	.417
11	021	COMMON BANDED COAL	LOST CORE	44.021	.708
12	327	DRK GRY SDY FIRECLAY		44.242	.221
13	021	COMMON BANDED COAL		44.388	.146
		* BED:KEN 10			
14	547	GRY ROOTED SS		47.200	2.812
15	541	GRY CROSSBED SS	F-MG	60.000	12.800
16	541	GRY CROSSBED SS	F-MG	80.000	20.000
17	541	GRY CROSSBED SS	MG, OCC. COAL SPAR	100.000	20.000
18	541	GRY CROSSBED SS	MG, OCC. COAL SPAR	110.333	10.333
19	324	DRK GRY MASS SDY SH	BUR, SID	120.000	9.667
20	324	DRK GRY MASS SDY SH	SID	140.000	20.000
21	324	DRK GRY MASS SDY SH	SID	144.750	4.750
22	328	DRK GRY BURROWED SDY SH	SID	147.500	2.750
23	323	DRK GRY SH W/SS STKS	FL	147.896	.396
24	027	COAL W/SH LAYERS		148.292	.396
		* BED:ALY 10			
25	028	COAL W/SH STKS		148.552	.260
		* BED:ALY 10			
26	327	DRK GRY SDY FIRECLAY		149.750	1.198
27	547	GRY ROOTED SS		151.750	2.000
28	543.5	GRY RIP SS W/SH STKS	VF-FG, WAVY-FS, GB	153.667	1.917
29	324	DRK GRY MASS SDY SH	SID	157.563	3.896
30	324	DRK GRY MASS SDY SH	SID, CRNS UP	160.000	2.437
31	325	DRK GRY SH W/SS STKS	SID, FL	166.396	6.396
32	324	DRK GRY MASS SDY SH	SID	172.208	5.812
33	021	COMMON BANDED COAL		172.760	.552
		* BED:ALY 20			
34	034	BDNE		172.802	.042
35	021	COMMON BANDED COAL	PYRITE NOD AT 10	173.594	.792
36	034	BDNE		173.625	.031
		* BED:ALY 20			
37	327	DRK GRY SDY FIRECLAY		174.042	.417
38	547	GRY ROOTED SS	FG	175.875	1.833
39	541	GRY CROSSBED SS	FG, OCC. CL SPAR S	180.000	4.125
40	541	GRY CROSSBED SS	F-MG, OCC. COAL SP	190.438	10.438
41	543.6	GRY SS W/FLAT SH STKS	FG	192.135	1.697
42	541	GRY CROSSBED SS	F-MG, OCC. CL SPAN	200.000	7.865
43	541	GRY CROSSBED SS	F-MG, OCC. CL SPAN	205.083	5.083
44	749	GRY SS W/COAL SPARS	SID PEB	205.979	.896

LOG=1 1 IVNSHT 1 (VA) 1.2 1: 24000.1 10= 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
45	323	DRK GRV SH W/SS STKS	FL	207.625	1.646
46	324	DRK GRV MASS SDY SH	BUR, PLNT FOR	220.000	12.375
47	325	DRK GRV BURROWED SDY SH		226.958	6.958
48	543.5	GRY RIP SS W/SH STKS	VFG, FBH, CRSMS UP	231.083	4.125
49	323	DRK GRV SH W/SS STKS		231.417	.334
50	324	DRK GRV MASS SDY SH	BUR	234.375	2.958
51	322.5	DRK GRV SH+INTERBED RIP SS	WAVY, BUR	238.271	3.896
52	541	GRY CROSSED SS	FG	239.292	1.021
53	322.5	DRK GRV SH+INTERBED RIP SS	RIP STRK TL	239.583	.291
54	541	GRY CROSSED SS	FG	240.000	.417
55	543.5	GRY RIP SS W/SH STKS	FG, WAVY-FS, OCC. C	241.750	1.750
56	544	GRY MASS SS	FG, OCC. FLT SH ST	244.687	2.917
57	541	GRY CROSSED SS	FG, OCC. CL SPAR	246.634	1.989
58	543.5	GRY RIP SS W/SH STKS	VF-FG, FS-WAVY	255.167	8.517
59	314	BLK MASS SDY SH	R.TL	256.625	1.458
60	021	COMMON Banded COAL		258.417	1.792
* BED: RVN 20 RVN 20					
61	327	DRK GRV SDY FIRECLAY		260.000	1.583
62	327	DRK GRV SDY FIRECLAY	CL SPARS, IK FRAC	264.688	4.688
63	541	GRY CROSSED SS	F-MG	269.125	4.437
64	543.5	GRY RIP SS W/SH STKS	F-MG, FS-WAVY	272.625	3.500
65	541	GRY CROSSED SS	F-MG, OCC. CL SPAR	280.000	7.375
66	541	GRY CROSSED SS	M-CG, CL SPARS, OC	300.000	20.000
67	541	GRY CROSSED SS	M-CG, OCC. CL SPAR	310.500	10.500
68	749	GRY SS W/COAL SPARS		311.750	1.250
69	541	GRY CROSSED SS	M-CG, OCC. CL SPAR	320.000	8.250
70	541	GRY CROSSED SS	M-CG, CL SPARS	340.000	20.000
71	544	GRY MASS SS	MG	348.417	8.417
72	541	GRY CROSSED SS	MG	355.042	6.625
73	749	GRY SS W/COAL SPARS	FG, SCRD BASE	357.313	2.271
74	323	DRK GRV SH W/SS STKS	FL, PK 1P FRAC	358.583	1.270
75	324	DRK GRV MASS SDY SH		360.000	1.417
76	324	DRK GRV MASS SDY SH	STD	376.708	16.708
77	323	DRK GRV SH W/SS STKS		378.625	1.917
78	328	DRK GRV BURROWED SDY SH		380.000	1.375
79	328	DRK GRV BURROWED SDY SH		381.250	1.250
80	323	DRK GRV SH W/SS STKS	FL, BUR, STD, CO3	391.133	9.885
81	328	DRK GRV BURROWED SDY SH	STD	396.771	5.636
82	324	DRK GRV MASS SDY SH	STD	396.578	1.807
83	021	COMMON Banded COAL	SF TOP, ST BOT	397.042	.464
* BED: JAN 10 JAN 10					
84	014	SLUMPED SDY SH	CL SPARS	398.417	1.375
85	327	DRK GRV SDY FIRECLAY		400.000	1.583
86	324	DRK GRV MASS SDY SH		400.354	.354
87	543.5	GRY RIP SS W/SH STKS	F-MG, FS-FBW	407.792	7.438
88	541	GRY CROSSED SS	MG, CL BNDIS	420.000	12.208
89	541	GRY CROSSED SS	MG	427.250	7.250
90	543.6	GRY SS W/FLAT SH STKS	FG	429.417	2.167
91	541	GRY CROSSED SS	F-MG, CL SPARS	436.833	7.416
92	543.5	GRY RIP SS W/SH STKS	F-MG, FS-FB	440.000	3.157

LOG# 1 [VNSHT] 7 [VAI] [2 1: 24000.] ID# 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
93	543.5	GRY RIP SS W/SH STKS	VF-FG, FBW-WAVY	446.292	6.292
94	324	DRK GRY MASS SDY SH	CRSHS UP, GRAD TO	447.094	.802
95	021	COMMON BANDED COAL	FLT S CONTACTS	448.750	1.656
* BED: JAW 20 JAW 20					
96	123	DRK GRY SH W/COAL STKS		449.000	.250
97	127	DRK GRY FIRECLAY		449.875	.875
98	123	DRK GRY SH W/COAL STKS		450.896	1.021
99	327	DRK GRY SDY FIRECLAY	GRAD BASE	451.458	.562
100	547	GRY ROOTED SS	MG, GRAD BASE	456.000	4.542
101	541	GRY CROSSED SS	F-CG	460.000	4.000
102	541	GRY CROSSED SS	F-CG, CL SPAR	480.000	20.000
103	541	GRY CROSSED SS	F-CG, DEC. CL SPAR	482.813	2.813
104	021	COMMON BANDED COAL	UC IS, LG FLT S	484.052	1.239
* BED: TIL 10 TIL 10					
105	327	DRK GRY SDY FIRECLAY	SID	487.896	3.844
106	314	BLK MASS SDY SH		489.604	1.708
107	313	BLK SH W/SS STKS	FL, SID, CL SPARS	500.000	10.396
108	321	DRK GRY SH W/SS STKS	FL, SID	506.167	6.167
109	543.5	GRY RIP SS W/SH STKS	VFG-FG, FBW	507.333	1.166
110	322	DRK GRY SH+INTERBED SS	RIP STRK	508.125	.792
111	323	DRK GRY SH W/SS STKS	TL	520.000	11.875
112	323	DRK GRY SH W/SS STKS	FL	522.375	2.375
113	324	DRK GRY MASS SDY SH	SID	524.969	2.594
114	028	COAL W/SH STKS	PYRITE UC, FLT S	525.792	.823
* BED: TIL 20 TIL 20					
115	317	BLK SDY FIRECLAY	PYRITE CO3 STKS	526.167	.375
116	327	DRK GRY SDY FIRECLAY	SID	527.615	1.448
117	314	BLK MASS SDY SH	SID CL SPARS	528.604	.989
118	323	DRK GRY SH W/SS STKS	FL, RTD	528.917	.313
119	027	COAL W/SH LAYERS		530.094	1.177
* BED: TIL 30 TIL 30					
120	327	DRK GRY SDY FIRECLAY		532.792	2.698
121	547	GRY ROOTED SS	VF-FG	533.542	.750
122	543.5	GRY RIP SS W/SH STKS	VF-FG, CRSHS UP	534.292	.750
123	541	GRY CROSSED SS	FG	540.000	5.708
124	541	GRY CROSSED SS	F-MG, GRAD LC	553.083	13.083
125	749	GRY SS W/COAL SPARS	F-MG, SID, IREG IS	553.896	.813
126	323	DRK GRY SH W/SS STKS	FL, SID	560.000	6.104
127	323	DRK GRY SH W/SS STKS	FL, SID FINES UP	573.750	13.750
128	804	MASS FN GRND SHLY LS		573.906	.156
129	323	DRK GRY SH W/SS STKS	FL, SID, BUR	578.542	4.636
130	324	DRK GRY MASS SDY SH		579.729	1.187
131	322.6	DRK GRY SH+INTERBED FLAT SS		580.000	.271
132	322	DRK GRY SH+INTERBED SS	RIP STRK, TL, SID	580.542	.542
133	323	DRK GRY SH W/SS STKS	FL, SID	582.792	2.250
134	322.6	DRK GRY SH+INTERBED FLAT SS		584.333	1.541
135	018	SDY SH MUDFLOW	CONVLTD BEDS	585.604	1.271
136	543.6	GRY SS W/FLAT SH STKS	DISTURBED BEDS	590.063	4.459
137	323	DRK GRY SH W/SS STKS	FL, SID	599.354	9.291
138	804	MASS FN GRND SHLY LS		599.521	.167

LOG# 1 1 TVNSHT 1 INVT 1 2 1: 26000.3 70= 10M

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
139	323	DRK GRY SH W/SS STKS	FL, SID	600.000	.479
140	323	DRK GRY SH W/SS STKS	FL, SID, IS LC	607.333	7.333
141	322.6	DRK GRY SH INTERBED FLAT SS	SID	613.292	5.959
142	323	DRK GRY SH W/SS STKS	FL, SID	614.250	.958
143	804	MASS FN GRND SHLY LS	SID, GRAD, UC, IS LC	614.365	.115
144	323	DRK GRY SH W/SS STKS	FL, SID	620.000	5.635
145	323	DRK GRY SH W/SS STKS	FL	624.000	4.000
146	324	DRK GRY MASS SOY SH	SID	631.615	7.615
147	021	COMMON BANDED COAL	SH PYRITE LAYER	632.229	.614
* BED:USB 10 USB 10					
148	027	COAL W/SH LAYERS	FLT S CONTACTS	632.417	.188
149	327	DRK GRY SOY FIRECLAY	OCC CL SPAR PYRI	636.781	4.364
150	543.5	GRY RIP SS W/SH STKS	VF-FG, WAVY-FS	640.000	3.219
151	543.5	GRY RIP SS W/SH STKS	FG, FS	641.021	1.021
152	323	DRK GRY SH W/SS STKS	IRREGULAR SS STN	642.021	1.000
153	543.5	GRY RIP SS W/SH STKS	FG, WAVY-FS, GNV, BE	654.333	12.312
154	324	DRK GRY MASS SOY SH	SID	656.042	1.709
155	543.5	GRY RIP SS W/SH STKS	VFG, WAVY-FS	658.250	2.208
156	324	DRK GRY MASS SOY SH	SID	660.000	1.750
157	323	DRK GRY SH W/SS STKS	FL, FLT S LG	661.302	1.302
158	021	COMMON BANDED COAL	GRAD, LC	662.750	1.448
* BED:USB 20					
159	027	COAL W/SH LAYERS	GRAD, LC	662.979	.229
* BED:USB 20					
160	123	DRK GRY SH W/COAL STKS	FLT S LC	663.156	.177
161	322	DRK GRY SH INTERBED SS	RIP STRK FL	663.208	.052
162	021	COMMON BANDED COAL	FLT S CNCTS	663.240	.032
163	544	GRY MASS SS	MG	664.979	1.739
164	543.5	GRY RIP SS W/SH STKS	VF-MG, WAVY-FS, CL	666.188	1.209
165	544	GRY MASS SS	M-CG, US LC	673.083	6.895
166	543.5	GRY RIP SS W/SH STKS	VFG, WAVY-FS	680.000	6.917
167	543.5	GRY RIP SS W/SH STKS	VFG-FG, WAVY-FS	685.750	5.750
168	323	DRK GRY SH W/SS STKS	FL, SID, OCC, BUR	700.000	14.250
169	323	DRK GRY SH W/SS STKS	FL, SID	720.000	20.000
170	324	DRK GRY MASS SOY SH	SID, VR FL	740.000	20.000
171	323	DRK GRY SH W/SS STKS	FL, SID, OCC, BUR	759.250	19.250
172	543.5	GRY RIP SS W/SH STKS	WVY, FG, BUR	760.000	.750
173	543.5	GRY RIP SS W/SH STKS	VF-FG, WVY, BUR, US	766.479	6.479
174	324	DRK GRY MASS SOY SH	FLT S LC	766.729	.250
175	021	COMMON BANDED COAL		766.760	.031
* BED:GYC 10					
176	124	DRK GRY SH		766.813	.053
177	021	COMMON BANDED COAL		767.271	.458
178	327	DRK GRY SOY FIRECLAY		767.417	.146
179	021	COMMON BANDED COAL	IS LC	767.688	.271
180	123	DRK GRY SH W/COAL STKS	IS LC	767.792	.104
181	024	BULL OR CANNEL COAL	FLT S LC	768.271	.479
* BED:GYC 10					
182	547	GRY ROOTED SS	FG, FLT S LC	772.177	3.906
183	544	GRY MASS SS	F-MG	780.000	7.823

LINE=1 1 EVSNT 1 EVA1 1.2 1: 24000.3 TO= 908

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
184	541	GRY CROSSBED SS	MG	796.333	16.333
185	749	GRY SS W/COAL SPARS	MG, GRAD. L-UC	799.000	2.667
186	544	GRY MASS SS	MG	800.000	1.000
187	544	GRY MASS SS	MG, US LC	801.792	1.792
188	543	GRY SS W/SH STKS	F-MG, CL BNDS	803.542	1.750
189	322	DRK GRY SH+INTERBED SS	CL SPARS, SH FEB	804.021	.479
190	324	DRK GRY MASS SOY SH		804.950	.929
191	322.5	DRK GRY SH+INTERBED RIP SS	WVY, R. BUR	806.458	1.500
192	323	DRK GRY SH W/SS STKS	FL	808.000	13.342
193	323	DRK GRY SH W/SS STKS	SID, FL, GRAD. LC	827.250	7.250
194	322	DRK GRY SH+INTERBED SS	RIP STRK, FL, BUR	832.552	5.302
195	328	DRK GRY NARROWED SOY SH		833.708	1.156
196	324	DRK GRY MASS SOY SH	FLT S LC	834.365	.657
197	021	COMMON BANDED COAL	FLT S LC	834.469	.104
* BED:MSB 10					
198	124	DRK GRY SH	FLT S LC	834.500	.031
199	022	COAL W/BONE LAYERS	FLT S LC	834.792	.292
* BED:MSB 10					
200	327	DRK GRY SOY FIRECLAY	GRAD. LC	837.750	2.950
201	322.5	DRK GRY SH+INTERBED RIP SS	WVY, RTO, BUR	839.354	1.604
202	543.5	GRY RIP SS W/SH STKS	VFG, WVY	840.000	.646
203	322.5	DRK GRY SH+INTERBED RIP SS	WVY-FL, SID, R. BUR	850.417	10.417
204	543.5	GRY RIP SS W/SH STKS	VFG, FW	852.750	2.333
205	322.5	DRK GRY SH+INTERBED RIP SS	RIP STRK, WVY-FL	855.167	2.417
206	323	DRK GRY SH W/SS STKS	SID, FL-TL	860.000	4.833
207	323	DRK GRY SH W/SS STKS	FL, SID, FLT S LC	860.813	.813
208	324	DRK GRY MASS SOY SH	SID	862.792	1.979
209	021	COMMON BANDED COAL	FLT S ENTOTS	863.792	1.000
* BED:MSB 20 MSB 20					
210	327	DRK GRY SOY FIRECLAY	GRAD. LC	865.083	1.291
211	547	GRY ROOTED SS	VFG, GRAD. LC	868.000	2.917
212	544	GRY MASS SS	VFG	870.260	2.260
213	322	DRK GRY SH+INTERBED SS	RIP STRK, TL-FL, B	874.167	3.907
214	323	DRK GRY SH W/SS STKS	SID	876.750	2.583
215	322	DRK GRY SH+INTERBED SS	RIP STRK, FL	877.333	.583
216	323	DRK GRY SH W/SS STKS	FL, CL SPARS	880.000	2.667
217	323	DRK GRY SH W/SS STKS	SID, FL	893.938	13.938
218	324	DRK GRY MASS SOY SH	SID, FLT S LC	896.698	2.760
219	022	COAL W/BONE LAYERS	FLT S LC	896.854	.156
* BED:LSB 10					
220	123	DRK GRY SH W/COAL STKS	FLT S LC	897.083	.229
221	021	COMMON BANDED COAL	UC PYRITE STRKS	897.729	.646
* BED:LSB 10					
222	327	DRK GRY SOY FIRECLAY	GRAD. LC	898.021	.292
223	547	GRY ROOTED SS	VF-FG	898.458	.437
224	543.5	GRY RIP SS W/SH STKS	VF-FG	898.750	.292
225	544	GRY MASS SS	VF-FG	899.396	.646
226	322.5	DRK GRY SH+INTERBED RIP SS	WVY, RTO	900.000	.604
227	322.5	DRK GRY SH+INTERBED RIP SS	WVY, RTO	901.375	1.375
228	541	GRY CROSSBED SS	VF-FG	909.083	7.708

LOG#1 3 TVRNT 3 DIA (2 1: 24000.) 10# 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
229	544	DRY MASS SS	VF-FG	912.500	3.417
230	543.5	DRY RIP SS W/SH STKS	VF-FG,FW-FG	913.354	.854
231	544	DRY MASS SS	VF-FG,OC CL STM	920.000	6.646
232	544	DRY MASS SS	FG	923.083	3.083
233	541	DRY CROSSBED SS	FG,CL SPARS	926.417	3.334
234	749	DRY SS W/COAL SPARS	SH PEB	927.083	.666
235	544	DRY MASS SS	FG,N-ABED	931.604	4.521
236	323	DRK GRY SH W/SS STKS	FL TL,FM UP	932.646	1.042
237	544	DRY MASS SS	FG	932.958	.312
238	749	DRY SS W/COAL SPARS		933.417	.459
239	322.5	DRK GRY SH+INTERBED RIP SS	WVY,R-BUR	940.000	6.583
240	322.5	DRK GRY SH+INTERBED RIP SS	WVY,R-BUR	957.708	17.708
241	561	HARD CROSSBED SS	FG,STD PEB,SH ST	958.667	.959
242	322.5	DRK GRY SH+INTERBED RIP SS	WVY	960.000	1.333
243	322.5	DRK GRY SH+INTERBED RIP SS	WVY	966.865	6.865
244	328	DRK GRY BURROWED SOY SH		977.167	10.302
245	543.5	DRY RIP SS W/SH STKS	VF-FG,WVY	980.000	2.833
246	543.5	DRY RIP SS W/SH STKS	VF-FG,OC BUR	981.063	1.063
247	322.5	DRK GRY SH+INTERBED RIP SS	WVY,OC BUR	987.750	6.687
248	323	DRK GRY SH W/SS STKS	FL,FLT S LC	990.271	2.521
249	021	COMMON BANDED COAL	FLT S LC	991.271	1.000
* BED:UNP 10					
250	123	DRK GRY SH W/COAL STKS	FLT S LC	992.135	.864
251	027	COAL W/SH LAYERS	GRAD,LC	992.323	.188
252	021	COMMON BANDED COAL	FLT S LC	992.646	.323
253	327	DRK GRY SOY FIRECLAY	FLT S LC	996.427	3.781
254	021	COMMON BANDED COAL	FLT S LC	997.063	.636
255	024	DULL OR CANNEL COAL	FLT S LC	997.156	.093
* BED:UNP 10					
256	114	SLG SH	GRAD LC	997.188	.032
257	327	DRK GRY SOY FIRECLAY	US LC	997.479	.291
258	541	DRY CROSSBED SS	FG	1000.000	2.521
259	541	DRY CROSSBED SS	F-MG,CL SPARS RM	1008.167	8.167
260	324	DRK GRY MASS SOY SH	STD FLT S LC	1014.563	6.396
261	021	COMMON BANDED COAL	US LC	1016.833	2.270
* BED:UNP 20 UNP 20					
262	327	DRK GRY SOY FIRECLAY	SID	1020.000	3.167
263	323	DRK GRY SH W/SS STKS	SID,FL,RTD,GRAD	1022.417	2.417
264	541	DRY CROSSBED SS	FG,GRAD,LC	1029.250	6.833
265	544	DRY MASS SS	FG,CL SPARS	1033.896	6.646
266	322	DRK GRY SH+INTERBED SS	RIP STRK TL FL	1038.740	2.844
267	324	DRK GRY MASS SOY SH	SID	1040.000	1.260
268	324	DRK GRY MASS SOY SH	SID	1042.833	2.833
269	323	DRK GRY SH W/SS STKS	FL,BUR,SID	1049.396	6.563
270	032	BONE W/COAL LAYERS	PYRITE NODS	1049.708	.312
* BED:MNP 10					
271	123	DRK GRY SH W/COAL STKS		1050.366	.688
272	032	BONE W/COAL LAYERS		1050.656	.260
273	021	COMMON BANDED COAL	PYRITE SH STKS	1051.427	.771
274	124	DRK GRY SH		1051.479	.052

LOG# 1 DVSMT 1 [V4] 1.2 1: 24000.1 ID# 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
275	027	COAL W/TH LAYERS	FLT S LC	1051.521	.042
	* BED:MRP 10				
276	317	BLK SOY FIRECLAY	CL SPARS GRAD, LC	1053.606	2.083
277	327	DRK GRV SOY FIRECLAY	PHYRITE NOD. IS LC	1055.667	2.063
278	543.5	GRV RIP SS W/SH STKS	FG, FS-WVY, RTD UC	1060.000	4.333
279	543.5	GRV RIP SS W/SH STKS	FG, FS-WVY, CL BND	1073.969	13.969
280	323	DRK GRV SH W/SS STKS	FL, BUR	1080.000	6.031
281	323	DRK GRV SH W/SS STKS	FL, CRNS IM, PLNT	1100.000	20.000
282	323	DRK GRV SH W/SS STKS	SID FL	1120.000	20.000
283	323	DRK GRV SH W/SS STKS	SID, FL, R. BUR, PLN	1127.542	7.542
284	326	DRK GRV BURROWED SOY SH		1129.146	1.604
285	322	DRK GRV SH+INTERBED SS	RIP STRK, WVY-TL-	1140.000	10.854
286	322	DRK GRV SH+INTERBED SS	RIP STRK, TL-FL, B	1141.104	1.104
287	021	COMMON BANDED COAL		1141.844	.740
	* BED:WRC 10				
288	034	BONE		1141.906	.062
289	021	COMMON BANDED COAL	SH STRK LC	1143.958	2.052
	* BED:WRC 10				
290	317	BLK SOY FIRECLAY	GRAD, LC	1144.458	.500
291	547	GRV ROOTED SS		1149.654	5.396
292	123	DRK GRV SH W/COAL STKS		1150.302	.648
293	322	DRK GRV SH+INTERBED SS	RTD TL	1157.458	7.156
294	564	HARD MASS SS	MG, RTD, US LC	1157.833	.375
295	544	GRV MASS SS	FG	1158.854	1.021
296	324	DRK GRV MASS SOY SH	US LC	1160.000	1.146
297	324	DRK GRV MASS SOY SH	GRADED BEDS, FN U	1162.521	2.521
298	563	HARD SS W/SH STKS	F-MG, R. CL SPAR	1165.917	3.396
299	561	HARD CROSSED SS	F-MG, R. CL SPAR	1175.750	9.833
300	762	HARD SH PEB CGL	F-MG	1176.646	.896
301	561	HARD CROSSED SS	F-MG	1178.313	1.667
302	563.6	HARD SS W/FLAT SH STKS	VF-FG, CL BNDG	1180.000	1.687
303	561	HARD CROSSED SS	MG	1182.854	2.854
304	769	HARD SS W/COAL SPARS	FG	1184.353	1.479
305	564	HARD MASS SS	MG	1186.500	2.167
306	563.6	HARD SS W/FLAT SH STKS	FG	1189.052	2.552
307	021	COMMON BANDED COAL		1189.094	.042
	* BED:LHP 10 LHP 10				
308	317	BLK SOY FIRECLAY		1189.583	.489
309	327	DRK GRV SOY FIRECLAY		1193.250	3.667
310	324	DRK GRV MASS SOY SH	SID	1194.417	1.167
311	543.5	GRV RIP SS W/SH STKS	VFG, WVY	1195.646	1.229
312	324	DRK GRV MASS SOY SH	SID	1200.000	4.354
313	322.5	DRK GRV SH+INTERBED RIP SS	FRU-WVY, FN UP, US	1201.375	1.375
314	323	DRK GRV SH W/SS STKS	SID, FL, PLNT FOS	1209.083	7.708
315	324	DRK GRV MASS SOY SH	SID, PLNT FOS, GRA	1212.625	3.542
316	123	DRK GRV SH W/COAL STKS	SH STRKS, FLT S L	1212.675	.250
317	021	COMMON BANDED COAL		1213.344	.669
	* BED:LHP 20				
318	034	BONE		1213.385	.041
319	021	COMMON BANDED COAL	FLT S LC	1214.921	1.536
	* BED:LHP 20				

LOG# 1 1 (VNSM) 2 (VA) (2 1: 24000.1) 10= 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
320	317	BLK SOY FIRECLAY		1218.542	4.021
321	322	DRK GRY SH+INTERBED SS	RIP STRK, SID RTD	1219.625	1.083
322	534	XTLIZED MASS SS	RTD	1220.000	.375
323	551	XTLIZED CROSSED SS	FG, CL SPARS, SH S	1240.000	20.000
324	554	XTLIZED MASS SS	FG, CL STRKS	1252.281	12.281
325	551	XTLIZED CROSSED SS	FG, R, CL SPAR	1260.000	7.719
326	551	XTLIZED CROSSED SS	FG, SH PER, US LC	1261.771	1.771
327	113	BLK SH W/COAL STKS	FLT S LC	1264.094	2.323
328	023	COAL W/BONE STKS	IS LC	1265.719	1.625
* BED:PC9 10 PC9 10					
329	327	DRK GRY SOY FIRECLAY	SID, GRAD, LC	1269.000	3.281
330	324	DRK GRY MASS SOY SH	SID, GRAD, LC	1273.083	4.083
331	314.3	BLK SOY SH W/COAL STKS	FLT S LC	1277.958	4.875
332	023	COAL W/BONE STKS	IK LC	1279.875	1.917
* BED:PC9 20 PC9 20					
333	327	DRK GRY SOY FIRECLAY		1280.000	.125
334	327	DRK GRY SOY FIRECLAY		1280.792	.792
335	547	GRY ROOTED SS	VF-FG, GRAD LC	1281.300	.708
336	543.5	GRY RIP SS W/SH STKS	VF-FG, WYV	1283.083	1.583
337	544	GRY MASS SS	VF-FG	1287.115	4.032
338	543.5	GRY RIP SS W/SH STKS	WYV, VF-FG	1288.604	1.489
339	544	GRY MASS SS	VF-FG, CL BND	1300.000	11.396
340	544	GRY MASS SS	FG	1300.563	.563
341	742	GRY SH PER COL	FG	1300.956	.395
342	544	GRY MASS SS	FG	1309.063	8.105
343	322.5	DRK GRY SH+INTERBED RIP SS	WYV BUR	1320.000	10.937
344	322	DRK GRY SH+INTERBED SS	RIP STRK, TL, BUR	1328.188	8.188
345	323	DRK GRY SH W/SS STKS	FL, R, TL, SID	1331.250	3.062
346	324	DRK GRY MASS SOY SH		1332.979	1.729
347	324.3	DRK GRY SH W/COAL STKS		1334.656	1.677
348	021	COMMON BANDED COAL		1334.750	.094
* BED:PC8 10					
349	032	BONE W/COAL LAYERS		1335.583	.833
* BED:PC8 10					
350	123	DRK GRY SH W/COAL STKS		1338.135	.552
351	324	DRK GRY MASS SOY SH		1340.000	3.865
352	324	DRK GRY MASS SOY SH	SID	1350.500	10.500
353	018	SOY SH MUDFLOW		1360.000	1.500
354	018	SOY SH MUDFLOW		1369.833	9.833
355	324	DRK GRY MASS SOY SH	RTD	1370.604	.771
356	323	DRK GRY SH W/SS STKS	TL	1376.875	6.271
357	563.5	HARD RIP SS W/SH STKS	FS-WYV	1379.729	2.854
358	323	DRK GRY SH W/SS STKS	TL	1380.000	.271
359	323	DRK GRY SH W/SS STKS	TL	1381.177	1.177
360	322	DRK GRY SH+INTERBED SS	RIP STRK TL-FL	1384.583	3.406
361	324	DRK GRY MASS SOY SH	SID, IS LC	1385.667	1.084
362	327	DRK GRY SOY FIRECLAY		1392.833	7.166
363	018	SOY SH MUDFLOW		1399.021	6.188
364	324	DRK GRY MASS SOY SH		1400.000	.979
365	324	DRK GRY MASS SOY SH	SS LC	1402.792	2.792

LOG# 1 DWSHT 1 (VA) 1 2 1: 2000.1 ID# 100

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
366	322	DRK GRV SH+INTERBED SS	RIP STRK TL, GRAD	1404.375	1.583
367	553.5	XTLIZED RIP SS W/SH STKS	F-MG, FS-MVY	1409.190	4.823
	* BED:LOA 0				
368	322	DRK GRV SH+INTERBED SS	RIP STRK, FL, US L	1410.625	1.427
369	553.5	XTLIZED RIP SS W/SH STKS	FG	1414.875	4.250
370	551	XTLIZED CROSSBED SS	FG, BIG SH PEBB	1420.000	5.125
371	551	XTLIZED CROSSBED SS	FG, QTZ PEBB	1440.000	20.000
372	551	XTLIZED CROSSBED SS	FG, QTZ PEBB	1460.000	20.000
373	551	XTLIZED CROSSBED SS	FG, QTZ PEBB	1480.000	20.000
374	551	XTLIZED CROSSBED SS	FG	1500.000	20.000
375	551	XTLIZED CROSSBED SS	FG, QTZ PEB	1515.900	15.900
376	551	XTLIZED CROSSBED SS	FG, QTZ PEB	1518.150	2.250
377	554	XTLIZED MASS SS	FG	1520.983	2.833
378	551	XTLIZED CROSSBED SS	FG, QTZ PEB	1530.000	9.017
379	551	XTLIZED CROSSBED SS	FG, QTZ PEB	1539.771	9.771
380	554	XTLIZED MASS SS	FG, QTZ PEB CL SP	1543.100	3.333
381	754	XTLIZED QTZ PEB CGL	CL SPARS	1544.719	1.619
382	554	XTLIZED MASS SS		1550.000	5.281
383	554	XTLIZED MASS SS	GRAD. LC	1552.167	2.167
384	551	XTLIZED CROSSBED SS	GRAD. LC	1553.583	1.416
385	554	XTLIZED MASS SS	IS LC	1559.938	6.355
386	759	XTLIZED SS W/COAL SPARS	MG, QTZ PEB, IS LC	1560.583	.645
	* BED:LOA 0				
387	314	BLK MASS SOY SH	SID	1567.600	7.017
388	021	COMMON BANDED COAL		1568.800	1.200
	* BED:PCS 10				
389	327	DRK GRV SOY FIRECLAY		1569.029	.229
390	021	COMMON BANDED COAL		1569.083	.054
	* BED:PCS 10				
391	327	DRK GRV SOY FIRECLAY		1570.100	1.017
392	324	DRK GRV MASS SOY SH	PLNT FOS	1571.090	.990
393	314.3	BLK SOY SH W/COAL STKS	FLT S LC	1571.871	.781
394	023	COAL W/BONE STKS		1572.560	.689
	* BED:PCS 20				
395	114	BLK SH		1572.579	.219
396	027	COAL W/EN LAYERS	PYRITE NOD	1572.767	.188
397	023	COAL W/BONE STKS	FLT S LC	1573.683	.916
	* BED:PCS 20				
398	327	DRK GRV SOY FIRECLAY	FLT S LC	1576.017	2.334
399	547	GRV ROOTED SS	VFG, GRAD. LC	1577.600	1.583
400	564	GRV MASS SS	VFG, RTD UC	1578.871	1.271
401	561	HARD CROSSBED SS	MG FLT S LC	1581.058	2.187
402	324	DRK GRV MASS SOY SH	FLT S LC	1581.433	.395
403	561	HARD CROSSBED SS	F-MG, R-SH LAYER	1590.000	8.567
404	561	HARD CROSSBED SS	MG, CL SPARS	1610.000	20.000
405	561	HARD CROSSBED SS	MG	1618.104	8.104
406	761	HARD SH+DR IRNSTH PEB CGL	MG, CL SPARS	1622.412	4.313
407	561	HARD CROSSBED SS	MG, CL SPARS	1630.000	7.583
408	561	HARD CROSSBED SS	MG, CL SPARS LC	1643.875	13.875
409	763	HARD IRNSTH PEB CGL		1644.167	.292

LOG=1 1 [VMSHT] 1 [VAT] 1 Z 1: 24000.1 ID= 108

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
410	324	DRK GRY MASS SDY SH	SID	1649.166	4.979
411	323	DRK GRY SH W/SS STKS	FL	1649.667	.521
412	763	HARD IRNSTH PEB CGL	MG	1650.000	.333
413	564	HARD MASS SS	MG,CL SPARS	1651.604	1.604
414	760	HARD SS W/COAL SPARS	MG,SID PEB	1654.333	2.729
415	564	HARD MASS SS	FG,CL BNDS,US LC	1657.729	3.396
416	144	GRN SH	IS LC	1658.125	.396
417	564	HARD MASS SS		1659.167	1.042
418	144	GRN SH	IS LC	1659.667	.500
419	762	HARD SH PEB CGL	FG,US LC	1661.167	1.500
420	324	DRK GRY MASS SDY SH	SID,FLT & LC	1662.188	1.021
421	018	SDY SH MUDFLOW	CHVLTD RECS	1663.396	1.208
422	543.5	GRY RIP SS W/SH STKS	VFG, FS-MVY-FLT	1670.000	6.604
423	543.5	GRY RIP SS W/SH STKS	FG-FW,VFG	1677.750	7.750
424	644	GRY MASS DCS CMNTD SS	VFG	1680.333	2.583
425	644	GRY MASS DCS CMNTD SS	VFG	1680.833	.500
426	543.5	GRY RIP SS W/SH STKS	FG-FW,VF-FG	1688.521	7.688
427	322	DRK GRY SH+INTERBED SS	RIP STRK,FL,SID	1689.771	1.250
428	324	DRK GRY MASS SDY SH	SID	1690.479	.708
429	324	DRK GRY MASS SDY SH	SID	1691.281	.802
430	021	COMMON BANDED COAL		1692.531	1.250
		* BED:PC3 10 PC3 10			
431	123	DRK GRY SH W/COAL STKS		1692.646	.115
432	021	COMMON BANDED COAL		1696.083	3.437
		* BED:PC3 20 PC3 20			
433	114	BLK SH		1696.375	.292
434	021	COMMON BANDED COAL		1696.719	.344
		* BED:PC3 30			
435	036	BONE		1696.750	.031
		* BED:PC3 30			
436	327	DRK GRY SDY FIRECLAY		1700.583	3.833
437	327	DRK GRY SDY FIRECLAY	GRAB LC	1704.250	3.667
438	323	DRK GRY SH W/SS STKS	SID,FL,RTD LG	1705.375	1.125
439	324	DRK GRY MASS SDY SH	SID	1707.333	1.958
440	322	DRK GRY SH+INTERBED SS	RIP STRK YL	1717.583	10.250
441	543.5	GRY RIP SS W/SH STKS	VFG-FG,CL SPARS	1720.583	3.000
442	543.5	GRY RIP SS W/SH STKS	VFG-FW,IS LC	1722.146	1.563
443	324	DRK GRY MASS SDY SH	SID	1728.031	5.885
444	021	COMMON BANDED COAL		1728.114	.083
		* BED:PC2 10			
445	032	BONE W/COAL LAYERS		1728.156	.042
		* BED:PC2 10			
446	327	DRK GRY SDY FIRECLAY		1732.906	4.750
447	032	BONE W/COAL LAYERS		1733.406	.500
		* BED:PC2 20 PC2 20			
448	327	DRK GRY SDY FIRECLAY		1740.583	7.177
449	327	DRK GRY SDY FIRECLAY		1743.750	3.167
450	547	GRY ACOTED SS	FG,GRAB LC	1746.083	2.333
451	564	HARD MASS SS	FG,GRADED BD,CBS	1752.291	6.208
452	563.6	HARD SS W/FLAT SH STKS		1754.604	2.313

LOG#1 1 (VNSMT 1 (VA) 1 2 1: 24000.1 TO= 100

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT
453	563.5	HARD RIP SS W/SH STKS	FS,FG	1760.583	5.979
454	563.5	HARD RIP SS W/SH STKS	FS-FW,CL SPARS	1764.250	3.667
455	561	HARD CROSSBED SS	MG	1768.541	4.291
456	563.5	HARD RIP SS W/SH STKS	MG,FS-FW,CL SPAN	1773.729	5.188
457	322.5	DRK GRY SH INTERBED RIP SS	REP STRK,WOY-FL	1776.750	3.021
458	323	DRK GRY SH W/SS STKS	FL	1780.583	3.833
459	324	DRK GRY MASS SDY SH	SID	1787.698	7.115
460	323	DRK GRY SH W/SS STKS	FL,SID,ONV BEDS	1791.771	4.073
461	551	XTLIZED CROSSBED SS	FG,FLT S LC	1792.416	.645
462	323	DRK GRY SH W/SS STKS	FL	1795.583	3.167
463	554	XTLIZED MASS SS	FLT S LC	1795.896	.313
464	323	DRK GRY SH W/SS STKS	SID	1797.041	1.145
465	551	XTLIZED CROSSBED SS	FLT S LC	1797.312	.271
466	323	DRK GRY SH W/SS STKS	FL,SID	1799.479	2.167
467	324	DRK GRY MASS SDY SH		1800.583	1.104