

JEFFREY		MINING PRODUCTS	JEFFREY MINING PRODUCTS 274 EAST 1ST AVE. COLUMBUS, OHIO 43201			THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION AND IS THE EXCLUSIVE PROPERTY OF JEFFREY MINING PRODUCTS. NEITHER THE DRAWING OR ITS CONTENTS ARE TO BE USED, REPRODUCED, OR DISCLOSED IN WHOLE OR PART, WITHOUT PRIOR WRITTEN CONSENT FROM JEFFREY MINING PRODUCTS.														
DRAWING NO. 535A183			SHEET NO. 1	PART 36 MACHINE APPROVAL NUMBERS THAT USE THIS CHECKLIST. 31-73-2 thru -7 31-88-0																
DRAWN ROY McKIBBEN		DATE 6/4/85		R E V	A 3/21/86 JVT	B 4/18/97 KRT														
CHECKED ROY McKIBBEN		DATE 6/4/85																		

THIS BLOCK FOR MSHA USE ONLY
PS # _____
REV LEVEL _____

POWER SYSTEM CHECKLIST

SAFETY COMPONENTS SYSTEM FOR A MURPHY/MWM MODEL 916-6 ENGINE

LISTED BELOW ARE THE ITEMS AND FUNCTIONS THAT MUST BE MAINTAINED IN ORDER FOR THE POWER SYSTEM TO BE CONSIDERED PERMISSIBLE. FOR A COMPLETE EQUIPMENT PERMISSIBILITY EVALUATION, THIS CHECKLIST MUST BE IN CONJUNCTION WITH A MACHINE CHECKLIST AND, IF SO EQUIPPED, AN ELECTRICAL SYSTEM CHECKLIST.

ALL INSPECTIONS AND TESTS SHALL BE PERFORMED IN FRESH AIR

TEST SHEET TITLE: POWER SYSTEM CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA			
DISTR. CODE SEE DRG.	STD: B	SPECIAL:	ENG. SEC L.	PRINT LOCATION:	DRAWING NUMBER 535A183	SHEET NO. 1	OF 15 SHEETS	

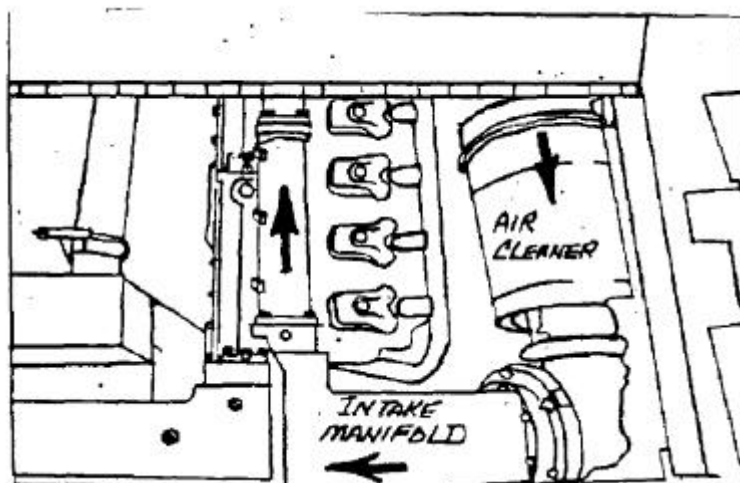
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DRAWN ROY McKIBBEN		DATE 6/4/85		R E V	A 3/21/86 JVT	B 4/18/97 KRT								
CHECKED ROY McKIBBEN		DATE 6/4/85												

1. () IT HAS BEEN DETERMINED THAT THE AREA IN WHICH THE TESTS ARE TO BE PERFORMED IS FRESH AIR.
2. () THIS MACHINE UTILIZES A MURPHY/MWM SIX CYLINDER MODEL 916-6 DIESEL ENGINE.

INTAKE SYSTEM

SKETCH 1 DEPICTS THE ASSEMBLED INTAKE SYSTEM.

- *3. () ALL COMPONENTS APPEAR TO BE THE SAME AS SHOWN IN THE SKETCH



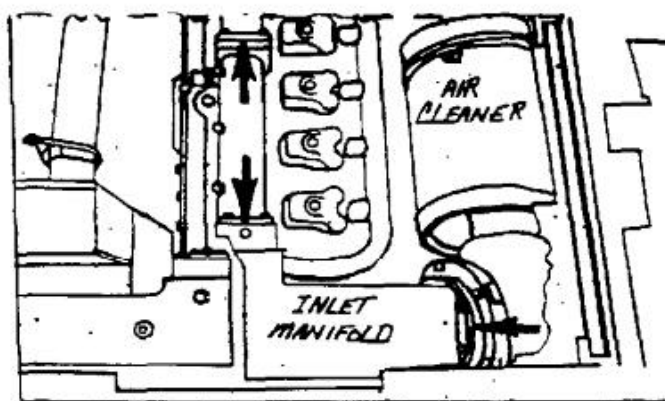
SKETCH NO. 1: ASSEMBLED AIR INTAKE SYSTEM

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

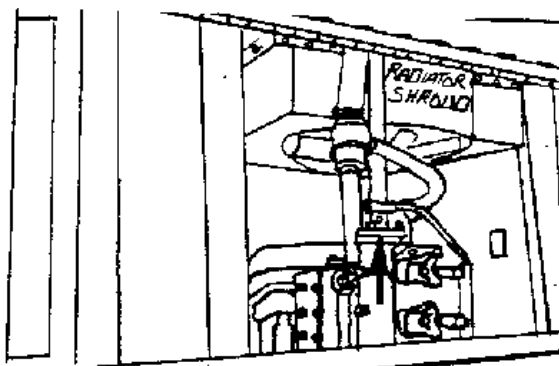
- *4. () COPPER GASKETS ARE INSTALLED BETWEEN THE INTAKE SYSTEM JOINTS IDENTIFIED IN SKETCHES 2 AND 3.

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DRAWN ROY McKIBBEN		DATE 6/4/85		REV	A 3/21/86 JVT	B 4/18/97 KRT								
CHECKED ROY McKIBBEN		DATE 6/4/85												



SKETCH NO. 2: INTAKE SYSTEM GASKETS



SKETCH NO. 3: INTAKE SYSTEM GASKETS

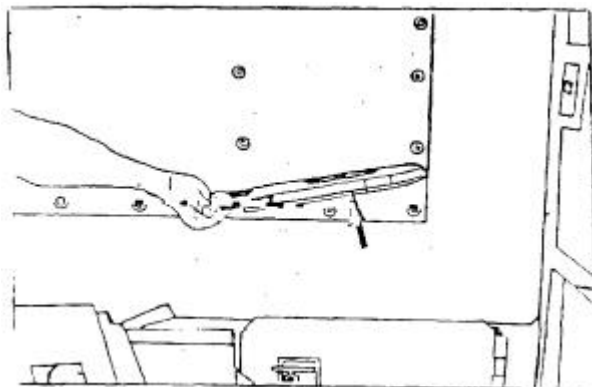
*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914

- *5. () THE BOLTS AND/OR NUTS SECURING THE JOINTS SPECIFIED IN ITEM 4 ARE IN PLACE AND TIGHT.
- *6. () CHECK THE GAP IN THE JOINT BETWEEN THE TWO SECTIONS OF THE FLAME ARRESTER HOUSING

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CHECKED ROY McKIBBEN		DATE 6/4/85																

WITH THE FLAME ARRESTER INSTALLED IN THE INTAKE SYSTEM (WITH BOLTS TIGHT). THE GAP DOES NOT EXCEED .004 INCHES. THIS JOINT IS DEPICTED IN SKETCH 4 ON A REMOVED FLAME ARRESTER.



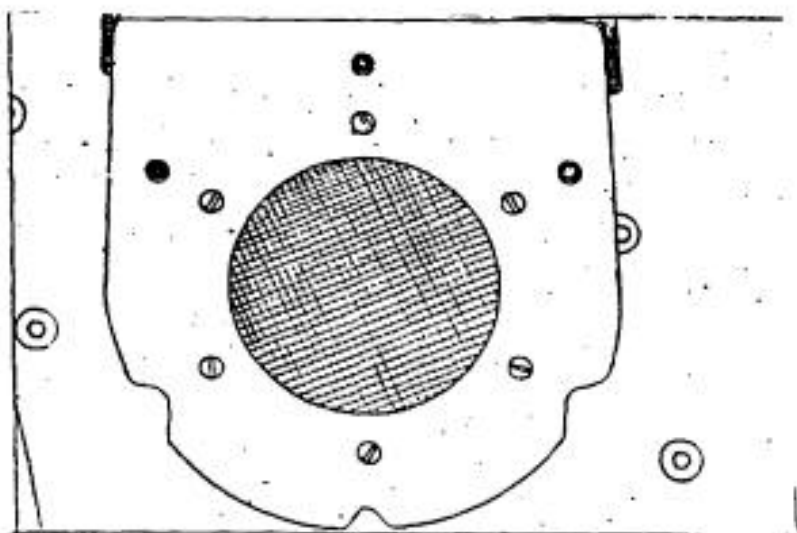
SKETCH NO. 4: JOINT IN THE INTAKE FLAME ARRESTER HOUSING

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

7. REMOVE THE INTAKE FLAME ARRESTER (SKETCH 5).
- () A. THE FLAME ARRESTER CORE IS CLEAN AND HAS NO APPARENT DAMAGE.
 - () B. THE SIX SLOTTED SCREWS ON THE FLAME ARRESTER ARE IN PLACE AND TIGHT.
 - () C. THE GAP BETWEEN THE CORE AND THE HOUSING DOES NOT EXCEED .004 INCHES.

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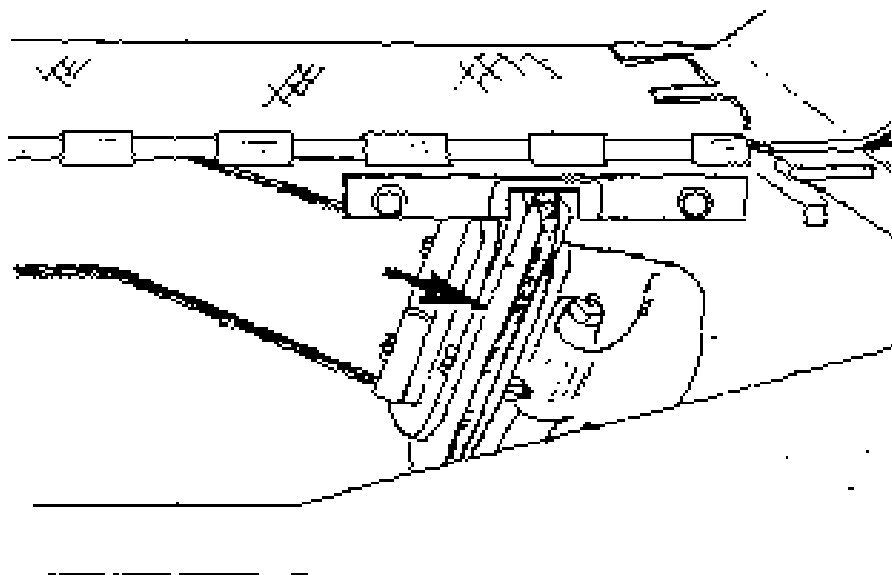


SKETCH NO. 5: INTAKE FLAME ARRESTER

- 8. () REINSTALL THE FLAME ARRESTER. THE SIX BOLTS SECURING THE ASSEMBLY TOGETHER ARE ALL IN PLACE AND TIGHT.
- *9. () THE GAP IN THE JOINT IDENTIFIED BY THE ARROW IN SKETCH 6 DOES NOT EXCEED .004 INCHES.

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CHECKED ROY McKIBBEN		DATE 6/4/85													



SKETCH NO. 6: CHECKING GAP IN INTAKE SYSTEM JOINT

- *10. () THE NUTS SECURING THE INTAKE MANIFOLD TO THE ENGINE HEAD ARE IN PLACE AND TIGHT.
- *11. () THE COMPLETE INTAKE SYSTEM SHOWS NO EVIDENCE OF DAMAGE. THERE ARE NO LOOSE CONNECTION(S), CRACKS, OR MISSING PORT PLUGS (OR CAPS).

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

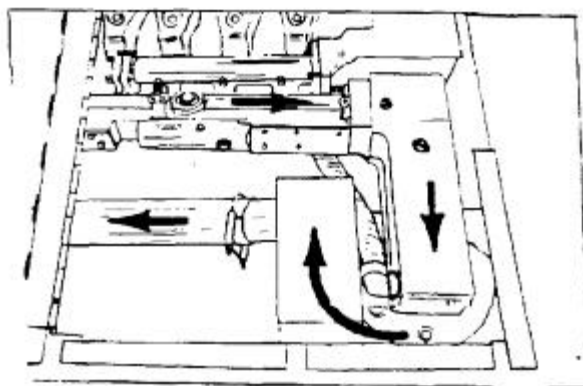
EXHAUST SYSTEM

TEST SHEET TITLE: POWER SYSTEM CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA		
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THE EXHAUST SYSTEM OF THE ENGINE INCLUDES A WATER-COOLED EXHAUST MANIFOLD, WATER-COOLED EXHAUST PIPE, AND A WATER BATH EXHAUST CONDITIONER (SCRUBBER). SKETCH 7 DEPICTS THIS SYSTEM.

*12. () THE NUTS SECURING THE EXHAUST MANIFOLD TO THE ENGINE HEAD ARE IN PLACE AND TIGHT.



SKETCH NO.7: EXHAUST SYSTEM

*13. () A GASKET (FIBER) IS INSTALLED BETWEEN THE FLANGE OF THE EXHAUST MANIFOLD AND FLANGE OF THE EXHAUST PIPE.

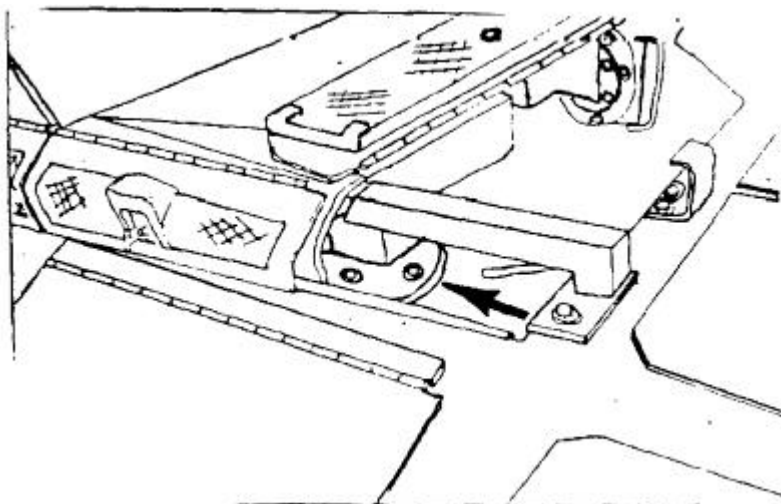
*14. () THE BOLTS SECURING THE EXHAUST MANIFOLD TO THE EXHAUST PIPE, AND HOLDING THE EXHAUST MANIFOLD TOGETHER ARE IN PLACE AND TIGHT.

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

*15. () THERE IS A COPPER GASKET BETWEEN THE FLANGE OF THE EXHAUST PIPE AND THE FLANGE OF THE SCRUBBER AS SHOWN IN SKETCH 8.

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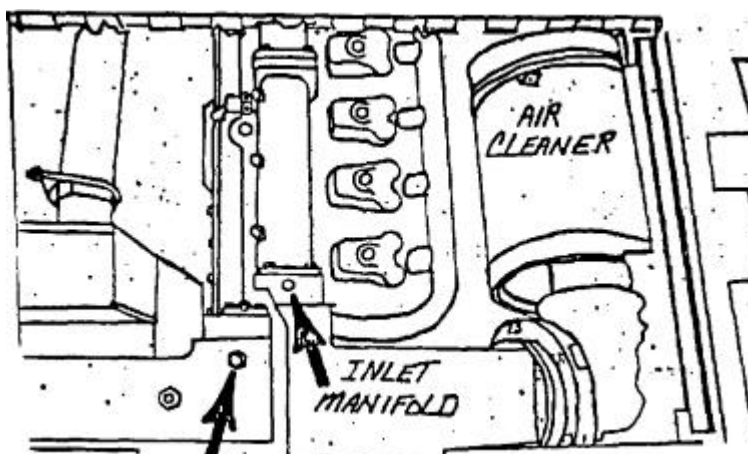
SKETCH NO. 8: EXHAUST PIPE TO SCRUBBER GASKET LOCATION

- *16. () THE BOLTS SECURING THE EXHAUST PIPE FLANGE TO THE SCRUBBER ARE ALL IN PLACE AND TIGHT.
 - *17. () THE SCRUBBER IS IN GOOD CONDITION WITH NO OPEN HOLES OR CRACKS DUE TO CORROSION, ACCIDENTS, MISSING PLUGS, ETC.
- *(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.
- 18. () CONNECT A MANOMETER OR MAGNEHELIC TO THE INTAKE VACUUM PORT SHOWN IN SKETCH 9. RUN THE ENGINE AT FULL THROTTLE WITH NO LOAD. THE INTAKE VACUUM DOES NOT EXCEED 20 INCHES OF WATER.

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- *19. () ENGINE SHUTS DOWN WHEN THE "PUSH TO STOP" BUTTON LOCATED ON THE INSTRUMENT PANEL IS HELD IN.
- 20. () REMOVE THE MANOMETER OR MAGNEHELIC. THE PLUG SEALING THE INTAKE VACUUM PORT IS SECURELY REINSTALLED.
- 21. () CONNECT A MANOMETER OR MAGNEHELIC TO THE EXHAUST BACKPRESSURE PORT SHOWN IN SKETCH 9. RUN THE ENGINE AT FULL THROTTLE WITH NO LOAD. THE BACKPRESSURE DOES NOT EXCEED 40 INCHES OF WATER.



SKETCH NO. 9: INTAKE VACUUM AND EXHAUST BACKPRESSURE PORT LOCATION

- *(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.
- 22. () REMOVE THE MANOMETER OR MAGNEHELIC. THE PLUG SEALING THE EXHAUST BACKPRESSURE PORT IS SECURELY REINSTALLED.
 - 23. () COOLANT TEMPERATURE SENSOR SHUTS ENGINE DOWN AT CORRECT TEMPERATURE. TEST THE TEMPERATURE SENSOR VALVE THAT IS INSTALLED IN THE ENGINE WATER OUTLET. SKETCH 10

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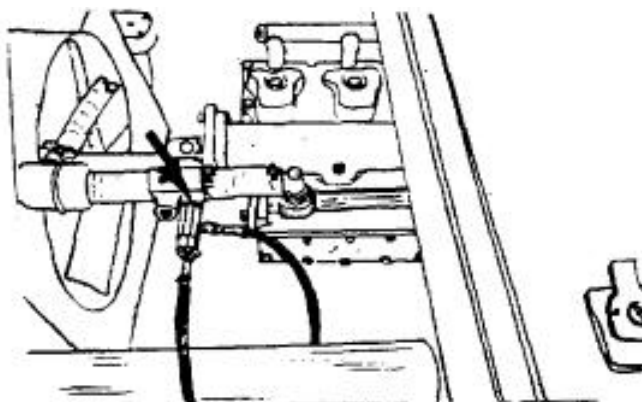
SHOWS THE LOCATION OF THIS SENSOR. ONE TEST METHOD IS OFFERED FOR INFORMATION.

CAUTION: ENGINE COOLANT MAY BE HOT!

METHOD 1:

TO TEST THE TEMPERATURE SENSOR VALVE, UNSCREW THE SENSOR VALVE FROM THE ENGINE WATER OUTLET AND INSTALL A PIPE PLUG IN ITS PLACE. REATTACH THE SAFETY SYSTEM HOSES TO THE SENSOR. START THE ENGINE AND IMMERS THE END OF THE TEMPERATURE SENSOR VALVE INTO A HEATED AND AGITATED WATER/ANTIFREEZE MIXTURE. THE SENSOR MUST OPEN AND EXHAUST THE SAFETY SYSTEM AIR PRESSURE AND SHUT DOWN THE ENGINE BEFORE THE TEMPERATURE EXCEEDS 212 DEG F.

SENSOR SHUTS ENGINE DOWN AT CORRECT TEMPERATURE

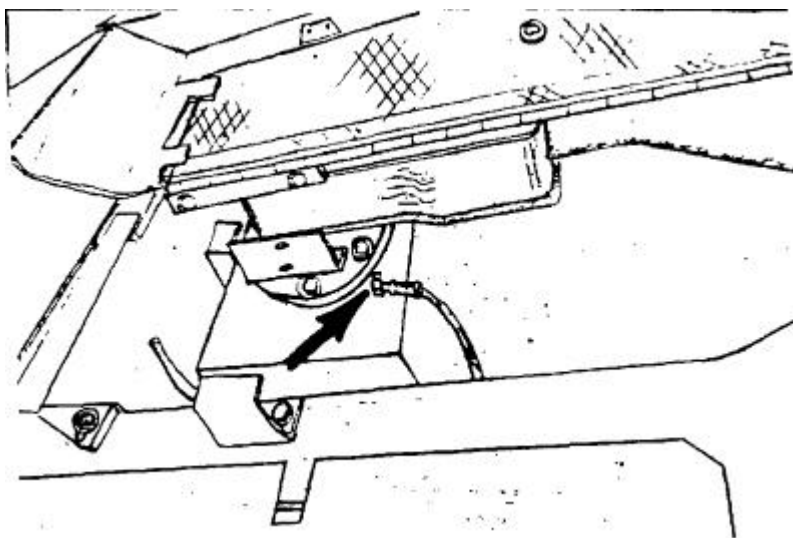


24. () SKETCH NO. 10: LOCATION OF HIGH COOLANT TEMPERATURE SHUTDOWN SENSOR THE TEMPERATURE SENSOR VALVE IS REINSTALLED AND THE AIR HOSES ARE ATTACHED.

*25. () TEST FOR PROPER SCRUBBER OPERATING WATER LEVEL. AFTER THE ENGINE HAS BEEN OPERATED FOR AT LEAST 5 MINUTES, SHUT THE ENGINE DOWN AND REMOVE THE SCRUBBER DIPSTICK PORT PLUG (SEE SKETCH 11). INSERT A LONG ROD THROUGH THIS PORT AND CHECK THE WATER LEVEL. THE LEVEL SHOULD BE 11 TO 12 INCHES.

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SKETCH NO. 11: SCRUBBER DIPSTICK PORT

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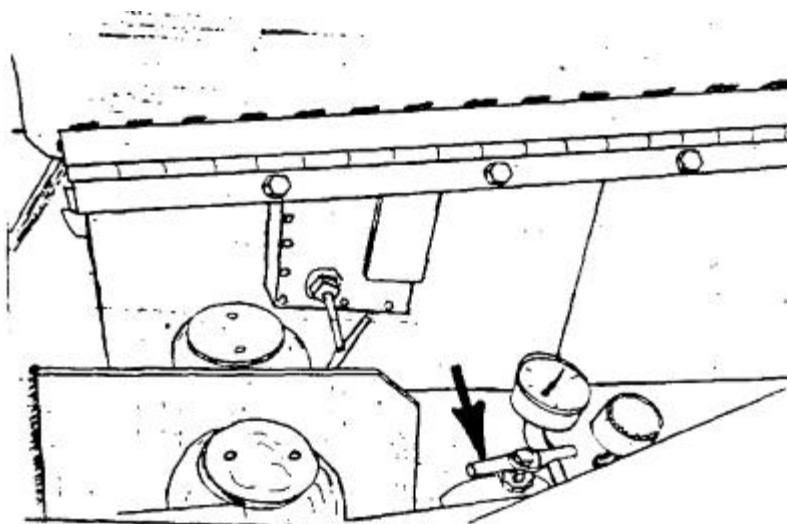
*26. () TEST FOR PROPER SCRUBBER LOW WATER SHUTDOWN

PROCEDURE

- A. CLOSE MAKE-UP WATER TANK AIR SUPPLY VALVE. THE LOCATION OF THE VALVE IS SHOWN IN SKETCH 12.

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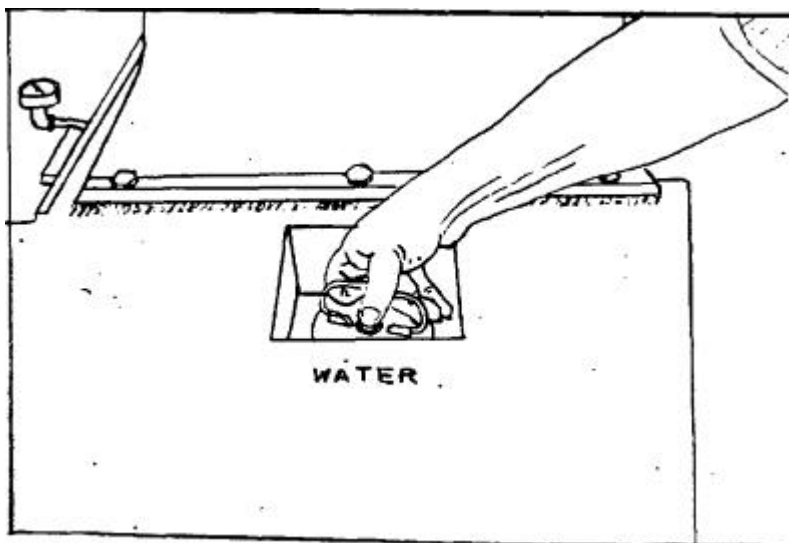
SKETCH NO. 12: MAKE-UP WATER TANK AIR SUPPLY VALVE

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- B. VENT AIR FROM THE MAKE-UP WATER TANK FILLER CAP AND REMOVE CAP (SHETCH 13).

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DRAWN ROY McKIBBEN		DATE 6/4/85		R E V	A 3/21/86 JVT	B 4/18/97 KRT												
CHECKED ROY McKIBBEN		DATE 6/4/85																

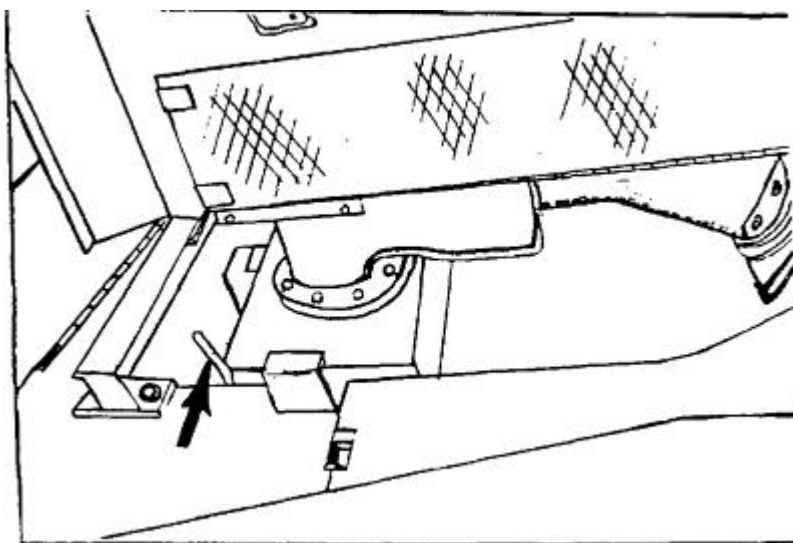


SKETCH NO. 13: MAKE-UP WATER TANK FILLER CAP

- C. START THE ENGINE AND RUN AT LOW IDLE. OPEN THE SCRUBBER DRAIN VALVE AND SLOWLY DRAIN SCRUBBER WATER. (NOTE: SCRUBBER DRAIN VALVE HANDLE SHOWN IN SKETCH 14). IMMEDIATELY AFTER THE ENGINE AUTOMATICALLY SHUTS DOWN, CLOSE THE SCRUBBER DRAIN VALVE AND CHECK THE SCRUBBER WATER LEVEL. THIS LEVEL SHOULD BE AT LEAST 7-3/4 INCHES.

TEST SHEET TITLE: POWER SYSTEM CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA			
DISTR. CODE SEE DRG.	STD: B	SPECIAL:	ENG. SEC L.	PRINT LOCATION:	DRAWING NUMBER 535A183	SHEET NO. 13	OF 15 SHEETS	

JEFFREY		MINING PRODUCTS	JEFFREY MINING PRODUCTS 274 EAST 1ST AVE. COLUMBUS, OHIO 43201		THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION AND IS THE EXCLUSIVE PROPERTY OF JEFFREY MINING PRODUCTS. NEITHER THE DRAWING OR ITS CONTENTS ARE TO BE USED, REPRODUCED, OR DISCLOSED IN WHOLE OR PART, WITHOUT PRIOR WRITTEN CONSENT FROM JEFFREY MINING PRODUCTS.													
DRAWING NO. 535A183			SHEET NO. 14		PART 36 MACHINE APPROVAL NUMBERS THAT USE THIS CHECKLIST. 31-73-2 thru -7 31-88-0													
DRAWN ROY McKIBBEN		DATE 6/4/85		R E V	A 3/21/86 JVT		B 4/18/97 KRT											
CHECKED ROY McKIBBEN		DATE 6/4/85																



SKETCH NO. 14: SCRUBBER DRAIN VALVE HANDLE

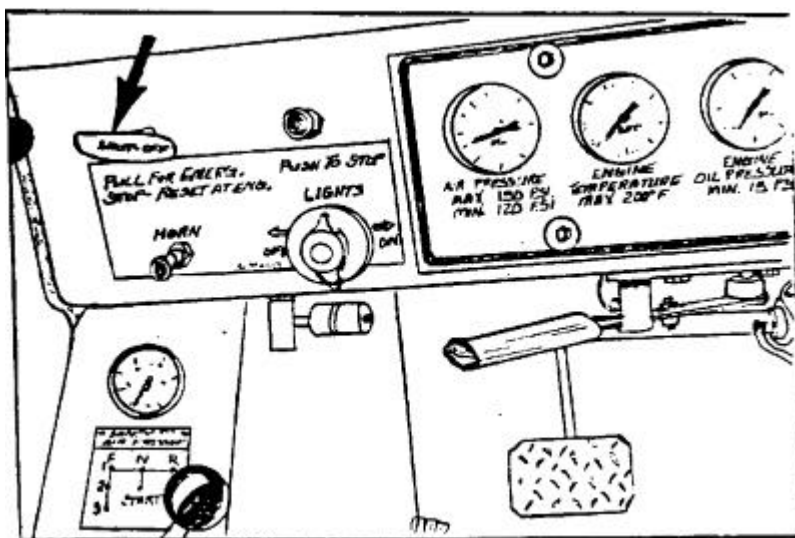
*27. () THE SCRUBBER DIPSTICK PORT PLUG AND THE MAKE-UP WATER TANK FILLER CAP ARE REINSTALLED. THE MAKE-UP WATER TANK AIR SUPPLY VALVE IS REOPENED.

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

*28. () START THE ENGINE AND OPERATE IT AT MEDIUM SPEED. ENGAGE THE EMERGENCY INTAKE AIR SHUTOFF VALVE HANDLE IN THE OPERATOR'S COMPARTMENT (SEE SKETCH 15). THE ENGINE MUST SHUT DOWN IMMEDIATELY.

TEST SHEET TITLE: POWER SYSTEM CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA			
DISTR. CODE SEE DRG.	STD: B	SPECIAL:	ENG. SEC L.	PRINT LOCATION:	DRAWING NUMBER 535A183	SHEET NO. 14	OF 15 SHEETS	

JEFFREY		MINING PRODUCTS	JEFFREY MINING PRODUCTS 274 EAST 1ST AVE. COLUMBUS, OHIO 43201		THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION AND IS THE EXCLUSIVE PROPERTY OF JEFFREY MINING PRODUCTS. NEITHER THE DRAWING OR ITS CONTENTS ARE TO BE USED, REPRODUCED, OR DISCLOSED IN WHOLE OR PART, WITHOUT PRIOR WRITTEN CONSENT FROM JEFFREY MINING PRODUCTS.									
DRAWING NO. 535A183			SHEET NO. 15	PART 36 MACHINE APPROVAL NUMBERS THAT USE THIS CHECKLIST. 31-73-2 thru -7 31-88-0										
DRAWN ROY McKIBBEN		DATE 6/4/85		R E V	A 3/21/86 JVT	B 4/18/97 KRT								
CHECKED ROY McKIBBEN		DATE 6/4/85												



SKETCH NO. 15: EMERGENCY STOP VALVE

*29. () RESET EMERGENCY INTAKE AIR SHUTOFF VALVE.

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

TEST SHEET TITLE: POWER SYSTEM CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA		
DISTR. CODE SEE DRG.	STD: B	SPECIAL:	ENG. SEC L.	PRINT LOCATION:	DRAWING NUMBER 535A183	SHEET NO. 15	OF 15 SHEETS