ENGINEERS
AND
BUILDERS

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

MORRISON-KNUDSEN PLAZA
P.O. BOX 58/BOISE, IDAHO U.S.A. 83707
PHONE: (208) 386-5000/TELEX: 368439

L-QTS-86-1

11-15946-01
30-10068

January 28, 1986

Mr. James Taylor
USNRC
1717 H Street
Washington, D.C. 20555

Dear Mr. Taylor:

Enclosed please find supporting documentation concerning a Reportable 10CFR Part 21 Condition discussed this date by Mssrs. Ed Baker of USNRC, and Dorsel Baden of MK-Ferguson Company.

The telephone conversation between Mssrs. Baker and Baden occurred within 24 hours of receiving information concerning this Reportable Condition from our diesel generator manufacturing facility in Rocky Mount, North Carolina.

We will be forwarding further information as it becomes available. You may call me at 208/386-7030 if you desire any further information concerning this subject.

Very truly yours,

M. D. Grayson

M. D. Grayson
Director Quality & Technical Support

MDG/DCB/bkw
1607q
Enclosure

cc: H. Falter (Rocky Mount - w/attachments)
F. Jones (Rocky Mount - w/attachments)
R. Kulchak (w/attachments)
D. Baden (w/attachments)
File

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CREATORS OF ELECTRICAL
POWER SUPPLY SYSTEMS

POWER SYSTEMS
A MORRISON-KNUDSEN DIVISION

101 GELO ROAD / POST OFFICE BOX 1928
ROCKY MOUNT, NORTH CAROLINA 27801
PHONE (919) 977-2720 / TWX: (510) 929-0725
TELEX 802507 PSD-RYMO

JAN 27 3 05 PM '86

SENT/REC. BY TELECOPY
SENT:
REC'D.:
DATE:
TIME:

TELECOPY

DATE: January 27, 1986

COMPANY: Morrison-Knudsen Company, Inc.

ADDRESS:

CITY & STATE: Boise, Idaho

ATTENTION: Mr. Murlin D. Grayson (Quality Dept.)

REFERENCE: 10CFR Part 21
M-K/PSD No. 10CFR21-0029

TELECOPY NO.:

MESSAGE

SUBJECT: EMD - Air Start Motor Lubricator Assembly

(REFER TO ATTACHED LETTER)

The attached letter is being sent to you for review and action in accordance with M-K policy.

Please acknowledge receipt of this notice and advise us of any notification to the NRC.

cc: W. Frank Jones

FROM: Harry W. Falter, Principal Engineer
POWER SYSTEMS
A MORRISON-KNUDSEN DIVISION

TRANSMITTED HEREWITH ARE (5) PAGES, INCLUDING THE COVER SHEET.

IF YOU DO NOT RECEIVE ALL PAGES LISTED, PLEASE CALL (919)-977-2720, EXTENSION NOS. 210 OR 212 FOR VERIFICATION.

MORRISON-KNUDSEN COMPANY, INC.
POWER SYSTEMS DIVISION

POST OFFICE BOX 1228
ROCKY MOUNT, NORTH CAROLINA 27802-1228
PHONE: (919) 977-2720 / TWX: (510) 929-0725
TELEX 802607 PSD-RYMC

January 27, 1986

Morrison-Knudsen Company, Inc.
Post Office Box 7808
Boise, Idaho 83729

Attention: Mr. Murlin D. Grayson
Quality Department

Reference: 10CFR Part 21
EMD - Air Start Motor Lubricator Assembly

Gentlemen:

We have just received a notification from our Field Service Engineer, who is checking the EMD 20-645E4 emergency diesels at the Toledo Edison Nuclear Plant, that the venturi hole in the lubricator for the diesel air starting motor was not drilled on two assemblies.

The blocked venturi holes will prevent lubricating oil (from the lubricator bowl) from reaching the starting air going to the air starting motor.

The lack of lubrication or inadequate lubrication could cause rapid wear of the air start motor vanes or cause the vanes to stick.

Improperly lubricated vanes could cause the air start motor to malfunction and prevent a qualified engine start.

This is a manufacturing defect which went undetected for quite a while. The air motors in this case did not appear to be defective. It is theorized that the check valve (item 2, C1079DR) did not seal properly and lube oil returned to the air through this valve.

Notice should be given to owners to check the sight glass in the lubricator to verify that oil is being furnished to the starting air going to the motors during the engine start sequence.

Very truly yours,

MORRISON-KNUDSEN COMPANY, INC.
POWER SYSTEMS DIVISION

1-27-86

Harry W. Falter, P.E.
Principal Engineer

HWF/voa

Attachments (3)

DUAL AIR STARTING MOTOR SYSTEM (INDUSTRIAL)

DESCRIPTION

The complete air starting system consists of two air starting motors, Fig. 14-7, air tanks, strainer, solenoid valve, air start valve, air line lubricator, shutoff valve, and a start button.

When the start button on the control panel is depressed, the solenoid valve is energized, allowing air from the tanks to pass through the solenoid valve to the pinion gear end of the lower starting motor. The entry of air moves the pinion gear forward to engage with the engine ring gear. Movement of the pinion gear uncovers a port allowing air pressure to be released to the upper starting motor which, in turn, engages its pinion gear with the ring gear. Both pinion gears being engaged, the air is released from the uncovered port in the upper motor. In addition to maintaining gear engagement, the air opens the air start valve, releasing the main starting air supply. Starting air passes through the air start valve and into the flexible hose assembly attached to each air starting motor. The multivane motors drive the pinion gears, rotating the ring gear, and cranking the engine.

Unless both pinion gears are engaged, the system is designed so that the engine can not be started with one motor. There is also a shutoff valve in the system which is manually operated. When maintenance is being performed, the shutoff valve is closed to prevent inadvertent cranking of the engine.

AIR STARTING MOTOR

DESCRIPTION

The engine air starting motor, Fig. 14-8, is a multivane type motor consisting of a rotor which is supported at each end by ball bearings, a planetary gear train, and a Bendix drive. Air striking vanes, which slide in the rotor, causes the rotor pinion to rotate and turn the Bendix drive through a set of planetary gears. The clutch drive pinion gear meshes with the engine ring gear and cranks the engine.

MAINTENANCE

The starting motor requires very little maintenance other than lubrication. Any noticeable loss of power can usually be attributed to worn or damaged vanes. Rapid wear of the vanes is usually caused by inadequate lubrication or the presence of rust, scale, dirt, excessive moisture, or other foreign matter in the air supply. New vanes can be easily and quickly installed by disassembling the motor as described in subsequent paragraphs.

LUBRICATION

Before putting a new air motor into operation, pour about two teaspoonfuls of engine oil into the air inlet so that it will be carried into the multivane motor with the live air. Before storage or lay up, the motor should be fully lubricated with a light oil containing a rust inhibitor.

Air enters the air motor passages through the lubricator, which is in the air line just ahead of the motor. An oil-air mist from the lubricator enters the air motor, providing lubrication. A small portion of the air passing through the lubricator enters the oil bowl of the lubricator through a ball check valve, creating a pressure. The remaining air passes through a venturi in the main air line, lowering its pressure at the venturi. The sight glass oil passage connects into the venturi passage, thereby providing a pressure differential, allowing oil in the bowl to be forced up to the lubricator needle valve. The needle valve controls oil drops entering the main air stream at the venturi, where it is mixed with air, forming an oil-air mist.

The needle valve should be adjusted (opened approximately one and one-half turns) to permit three drops of oil per minute to be deposited in the air line when the air is moving. If the exhaust air shows excessive oil, adjust the needle valve to reduce the amount of oil supplied to the air.

Oil is added to the bowl through a filler at the top of the bowl. For normal ambient temperature of 60°-120° F., an SAE No. 10 oil is recommended; however, a heavier oil may be used if operating conditions indicate it necessary.

AIR LINE LUBRICATOR

DESCRIPTION

The air line lubricator, Fig. 14-10, located between the air start valve and the starting motor, emits an oil-air mist into the starting system air to provide lubrication for the starting motor. The main components of the lubricator are the oil bowl, needle valve, siphon tube, and venturi tube.

As air enters the lubricator, the oil bowl is pressurized by way of the reversible venturi tube. The air flow creates a reduced pressure area as it passes through the venturi section causing the oil in the bowl to go up the siphon tube into the chamber above the drip gland. At this point, the quantity of oil entering the air line is controlled by a needle valve. As the oil enters the air line, it is diffused into a mist which is carried into the air starting motor. A sight glass below the needle valve gives visual indication of the flow rate of oil into the air line.

MAINTENANCE

The oil level in the bowl should be checked at intervals as specified in the Scheduled Maintenance Program. In addition to checking oil level, the needle valve should be checked to ensure that the flow rate is three drops per minute. This can be checked visually through the sight glass in the front of the lubricator.

If oil does not flow, remove top plug and drip gland. Clean parts and passages, using kerosene, and blow out with compressed air.

Replace any defective gaskets or packing. Reassemble, tightening drip gland firmly, but carefully.

Compounded oils containing graphites, soap, or fillers should not be used in the lubricator.

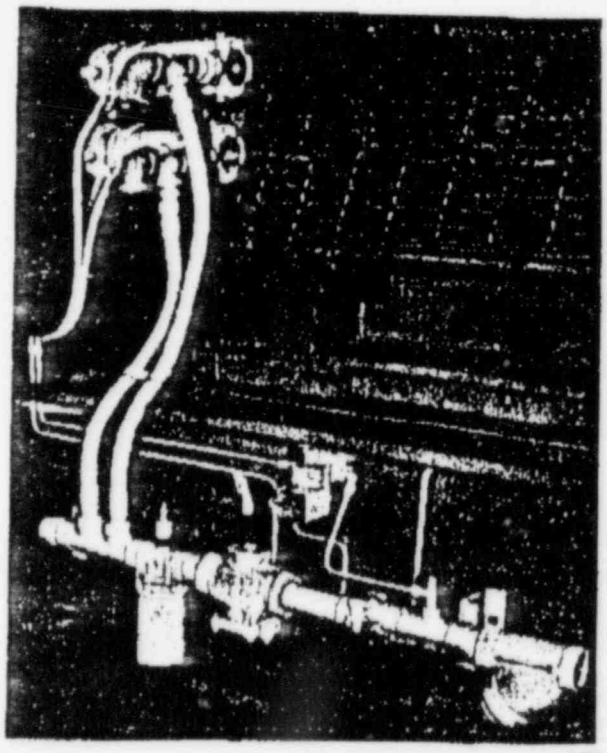

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Fig. 14-7 – Typical Dual Air Starting System

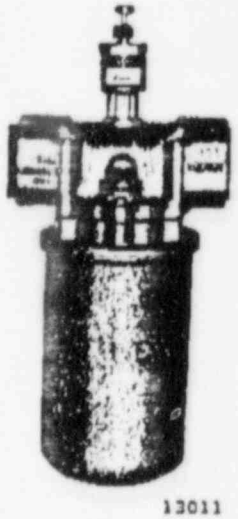

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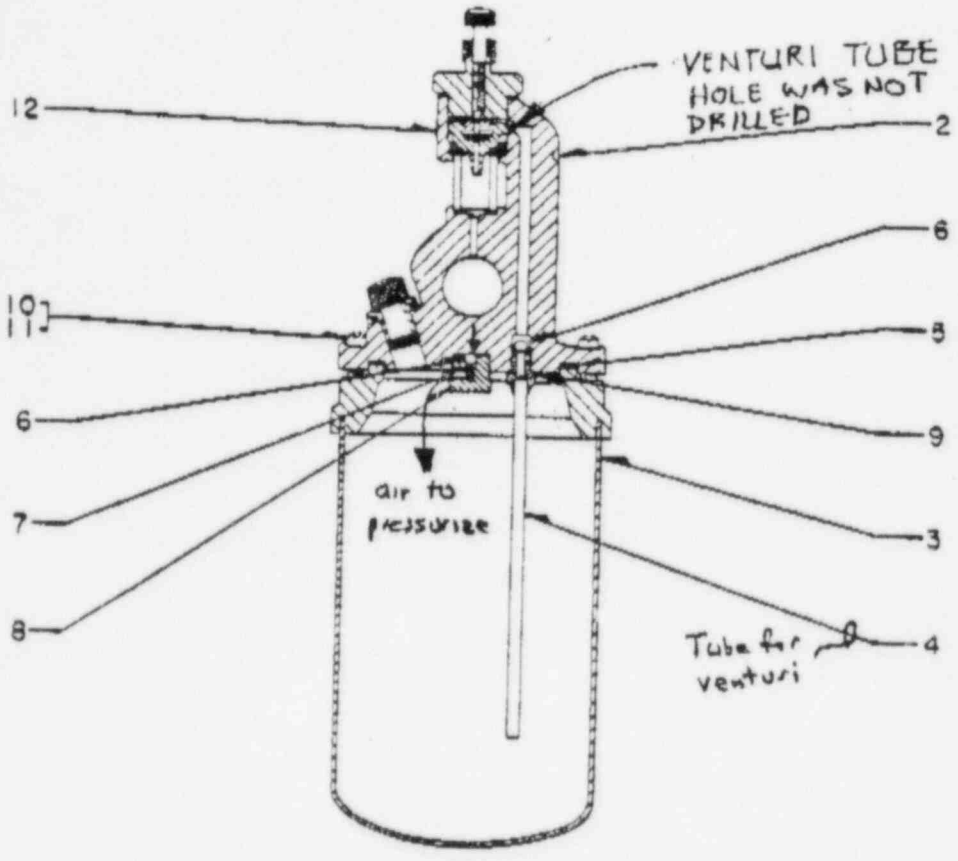
Fig. 14-10 – Air Line Lubricator

P.L. No. C1079-DR

AIR SYSTEM EQUIPMENT



Ref. No. 1
PLATE B1079-DR-5

Ref. No.	Part Number	Qty. Req.	Description

To order items not identified by a part number specify: Parts List Number, Page, Reference Number and complete description of the part.

LUBRICATOR ASSEMBLY . . Automatic - Air Line

1	8322844	1	LUBRICATOR ASSEMBLY .. Automatic - Air line - Replaces 3387780
2		1	HEAD ASSEMBLY .. Lubricator
3		1	BOWL .. Lubricator
4		1	TUBE .. Siphon
5		1	GASKET .. Lubricator head
6		2	BALL
7		1	SPRING
8		1	SEAT
9		1	GASKET .. Siphon tube
10		2	SCREW .. Head mounting
11		4	SCREW .. Head mounting
12		1	LABEL
*13		1	PLUG .. Used for shipping purposes only
*14	8487252	1	KIT .. Repair - Head Asy. lubricator