

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FULLER, R.E. Washington Public Power Supply System  
 POWERS, C.M. Washington Public Power Supply System  
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-030-00: on 890728, high pressure core spray inoperable  
 due to suppression pool pump suction valve failure.  
 W/8 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2
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	NRR/DEST/ICSB 7	1 1	NRR/DEST/MEB 9H	1 1
	NRR/DEST/MTB 9H	1 1	NRR/DEST/PSB 8D	1 1
	NRR/DEST/RSB 8E	1 1	NRR/DEST/SGB 8D	1 1
	NRR/DLPQ/HFB 10	1 1	NRR/DLPQ/PEB 10	1 1
	NRR/DOEA/EAB 11	1 1	NRR/DREP/RPB 10	2 2
	NUDOCS-ABSTRACT	1 1	<u>REG FILE</u> 02	1 1
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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Docket No. 50-397

August 25, 1989

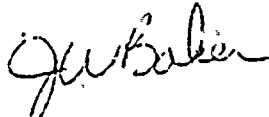
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Subject: NUCLEAR PLANT NO. 2  
LICENSEE EVENT REPORT NO. 89-030

Dear Sir:

Transmitted herewith is Licensee Event Report No. 89-030 for the WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

Very truly yours,



C. M. Powers (M/D 927M)  
WNP-2 Plant Manager

CMP:lr

Enclosure:  
Licensee Event Report No. 89-030

cc: Mr. John B. Martin, NRC - Region V  
Mr. C. J. Bosted, NRC Site (M/D 901A)  
INPO Records Center - Atlanta, GA  
Ms. Dottie Sherman, ANI  
Mr. D. L. Williams, BPA (M/D 399)

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1) Washington Nuclear Plant - Unit 2														DOCKET NUMBER (2) 0 5 0 0 0 3 1 9 7 1						PAGE (3) OF 0 8								
TITLE (4) High Pressure Core Spray System Inoperable Caused by Suppression Pool Pump Suction Valve Failure Due to Motor Operator Manufacturing Error																												
EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES						DOCKET NUMBER(S)													
0	7	2	8	8	9	8	9	0	0	3	0	0	0	0	8	2	5	8	9	0	5	0	0	0				
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																									
1			20.402(b)					20.405(c)					50.73(a)(2)(iv)					73.71(b)										
POWER LEVEL (10)			0 7 8					20.405(a)(1)(i)					50.73(a)(2)(v)					73.71(c)										
			20.405(a)(1)(ii)					50.36(c)(1)					50.73(a)(2)(vii)					OTHER (Specify in Abstract below and in Text, NRC Form 366A)										
			20.405(a)(1)(iii)					50.36(c)(2)					50.73(a)(2)(viii)(A)															
			20.405(a)(1)(iv)					50.73(a)(2)(i)					50.73(a)(2)(viii)(B)															
			20.405(a)(1)(v)					50.73(a)(2)(ii)					50.73(a)(2)(ix)															
LICENSEE CONTACT FOR THIS LER (12)																												
NAME														TELEPHONE NUMBER														
R. E. Fuller, Compliance Engineer														AREA CODE 51019 317171-1 215101														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	EXT. 2797																		
B	BIG	ISHV	L21010	Yes																								
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)					MONTH	DAY	YEAR											
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO																		

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On July 28, 1989, in accordance with the Supply System response to Notice of Violation "C" of Inspection Report 89-13, the reportability determination of an event which occurred on February 10, 1989, was changed from nonreportable to reportable per the requirements of 10 CFR 50.73. On February 10, 1989 at 0510 hours, the High Pressure Core Spray (HPCS) suction valve from the Suppression Pool, HPCS-V-15, failed to fully open during performance of a HPCS surveillance procedure because of the failure of the associated Limitorque motor operator.

At 0510 hours on February 10, 1989 the Technical Specification Action Statements were entered for Emergency Core Cooling (T.S. 3.5.1) and Primary Containment isolation (T.S. 3.6.3). The HPCS-V-15 valve was manually closed at 0900 hours on February 10, 1989. An Unusual Event (UE) was declared because closure of the valve could not be verified to satisfy Technical Specification isolatable penetration requirements. The closure was verified by leak testing and the UE was terminated at 1225 hours, February 10, 1989. The motor operator was then removed, rebuilt, reinstalled, tested for operability, and placed back into operation on February 11 and 12, 1989. The Technical Specification Action Statements were exited at 2130 hours on February 12 when the motor operator was declared operable.

The root cause of the inoperability of the HPCS-V-15 valve is that the motor operator (HPCS-MO-15) was not made per design by the manufacturer (Limatorque Corporation).

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Corrective actions include: 1) operability of all safety related valves with Limatorque motor operators of similar design was verified during the R4 maintenance outage; 2) revise Plant procedures for maintenance and repair of Limatorque valve motor operators; 3) appropriate Plant procedures will be revised to include cautions regarding disposition of valves found difficult to operate manually, and 4) Limatorque was notified of the 10CFR Part 21 Report.

There is no safety significance associated with this event because a single failure within the Emergency Core Cooling System (ECCS) has been assumed in the FSAR safety analyses and does not prevent the ECCS from performing its safety function in response to a DBA. Since an accident condition requiring HPCS injection and/or containment isolation did not actually occur, this condition did not threaten the health and safety of the public or Plant personnel.

Plant Condition

- a) Power Level - 78%
- b) Plant Mode - 1 (Power Operation)

Event Description

On July 28, 1989, in accordance with the Supply System response to Notice of Violation "C" of Inspection Report 89-13, the reportability determination of an event which occurred on February 10, 1989, was changed from nonreportable to reportable per the requirements of 10 CFR 50.73. On February 10, 1989 at 0510 hours, the High Pressure Core Spray (HPCS) suction valve from the Suppression Pool, HPCS-V-15, failed to fully open during performance of a HPCS surveillance procedure (HPCS System Transfer on CST Low Level - CFT/CC). Upon investigation of the motor operator condition, Plant operators observed the motor was running, but the valve was not moving. They also heard a gear-grinding noise coming from the motor operator gear box. The valve position indicator was at 14% open. The motor was subsequently turned off.

The HPCS system will initiate automatically on high drywell pressure or low reactor water level. The HPCS pump suction is automatically transferred to the Suppression Pool by opening of the HPCS-V-15 if the water level in the Suppression Pool exceeds 466-feet 8-inches Above Mean Sea Level (AMSL) or the water level in the Condensate Storage Tanks (CST) drops to 448-feet 3-inches AMSL.

The Reactor Operators invoked the Technical Specification Action Statements at 0510 hours to restore the inoperable Division 3 of the Emergency Core Cooling System within 14 days (T.S. 3.5.1) and restore the inoperable Primary Containment Isolation valve (T.S. 3.6.3) within 4 hours or be in at least hot shutdown in 12 hours and cold shutdown in 24 hours. Manual closure of the HPCS-V-15 valve was attempted at 0900 hours and the valve position indicator indicated the valve was closed. However, closure could not be assured because of gear slippage in the manual operator. As a result, an Unusual Event was declared at 0905 hours, and a Plant

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shutdown was then initiated. At 1225 hours, the results of a Local Leak Rate Test (LLRT) determined the leakage was within/Technical Specification limits which confirmed HPCS-V-15 was closed. At that time, the Unusual Event was terminated and the Reactor shutdown was discontinued at 72% power.

The HPCS-V-15 valve was clamped shut and the HPCS-MO-15 motor operator was removed on February 11, 1989 for rebuilding. Reactor power was at 78% and the Plant was in a three of four Main Steamline configuration with Main Steamline "A" isolated. At 0831 hours on February 12, 1989 the motor operator HPCS-MO-15 was reinstalled. The limit switches for HPCS-MO-15 were reset and Motor Operator Valve Acceptance Testing completed by 1335 hours on February 12, 1989. Leak rate testing of the valve HPCS-V-15 was completed at 1715 hours. Operability testing of the valve was completed and the valve declared operable at 2130 hours on February 12, 1989. The Technical Specification Action Statements in Sections 3.5.1 and 3.6.3 were also exited at this time.

#### Immediate Corrective Actions

The appropriate Technical Specification Action statements were entered and the HPCS-V-15 valve was manually closed. An Unusual Event (UE) was declared because closure of the valve could not be verified to satisfy Technical Specification isolatable penetration requirements. The closure was later verified by leak testing and the UE was terminated. The motor operator was then removed, rebuilt, reinstalled, tested for operability, and placed back into operation on February 11 and 12, 1989. The Technical Specification Action Statements were exited at 2130 hours on February 12 when the motor operator was declared operable.

#### Further Evaluation and Corrective Action

##### A. Further Evaluation

1. This event is reportable per 10 CFR 50.73(a)(2)(v) as a condition that alone could have prevented the fulfillment of the safety function of the HPCS. This event was reported as a 10CFR Part 21 Report on April 26, 1989.
2. There were no structures, components, or systems inoperable in addition to the HPCS-V-15 valve prior to the event which contributed to the event.
3. The root cause of the inoperability of the HPCS-V-15 valve is that the motor operator (HPCS-MO-15) was not made per design by the manufacturer (Limatorque Corporation). When the valve motor operator (HPCS-MO-15) was manufactured, the split spacer of the worm shaft clutch gear assembly was not installed, as required per design (See Figure 1).

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The failure mechanism is described as follows. With the split spacer not installed (See Figure 1), the set screws installed through the worm shaft clutch gear sleeve had no surface to press against and hold the worm shaft clutch gear assembly together. When the worm shaft clutch was positioned for manual operation the worm shaft clutch gear sleeve worked its way off the worm shaft clutch gear (See Figure 2). When the motor operator was re-engaged the worm shaft clutch gear sleeve would catch on the worm shaft clutch gear splines which forced the sleeve lugs against the clutch, and the clutch against the handwheel clutch pinion assembly. Because the clutch is spring loaded, both the motor and manual clutch lugs would slide over each other causing excessive wear. In addition, the worm shaft clutch gear was pressed against the split ring and split ring retainer. Eventually the split ring retainer failed and the split ring fell into the valve motor operator assembly. After this occurred, the clutch gear and clutch gear sleeve separated sufficiently to allow the sleeve to spin freely (i.e. not catch on the splines). In this condition the motor operator would not work. At the time the motor operator failed, the handwheel manual operation was sporadic due to the wear on the clutch/manual lugs.

4. The basic component which contained the defect is a Limitorque valve motor operator model SMB-2 with a "soft" worm shaft clutch gear assembly.
5. A review of WNP-2, vendor, and industry history of Limitorque operators found no similar failures; therefore, the current assessment is that this is a single isolated failure.
6. Even with the split spacer not installed this type of failure requires additional circumstances in order to occur. When positioned for motor operation the worm shaft clutch gear and sleeve are held together by the clutch spring pressure and cannot separate. Only when positioned for manual operation, when the spring pressure on the worm shaft clutch gear assembly is relieved, can the gear and sleeve separate. The safety related valves are normally positioned for motor operation and are only manually engaged during maintenance and ASME Section XI Valve Position Indication (VPI) testing. A characteristic of this failure was the degradation of the handwheel clutch pinion assembly which made manual operation difficult.

#### B. Further Corrective Actions

1. During the R4 Refueling and Maintenance Outage, the safety related valves with a Limitorque motor operator that potentially have and actually have a soft-clutch were manually operated.
2. The Plant procedure for maintenance and repair of Limitorque valve motor operators will be revised to include instructions for inspecting the worm shaft clutch gear assembly anytime a motor operator is disassembled.

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3. Cautions will be added to appropriate Plant procedures regarding disposition of valves found difficult to operate manually.
4. Limitorque was notified of the 10CFR Part 21 Report.

Safety Significance

There is no safety significance associated with this event because a single failure within the Emergency Core Cooling System (ECCS) has been assumed in the FSAR safety analyses and does not prevent the ECCS from performing its safety function in response to a DBA. Also, the Technical Specification (Section 3.5.1) Limiting Condition for Operation (LCO) for an inoperable Division 3 of the ECCS (i.e., HPCS) of 14 days was not exceeded. The LCO was established to allow continued operation with inoperable redundant safety equipment for a limited period of time. The operational safety analysis determined the Technical Specification LCOs to be acceptable, and therefore, there is no safety significance associated with this condition.

The HPCS-V-15 valve was manually closed and leak tested to verify closure within the Technical Specification LCO. This is the containment isolation safety function state of the valve. Therefore, there is no safety significance associated with unisolatable primary containment penetrations.

In addition, all piping and components of the HPCS are designed and built to the same quality standards as Primary Containment. Therefore, qualitatively, the probability of a breach occurring in the HPCS from a DBA is the same as one occurring in the Primary Containment from a DBA. Consequently, the level of assurance of HPCS integrity during a DBA is considered to be commensurate with Primary Containment. Therefore, the time during which HPCS-V-15 was not verified closed was not safety significant. During the event period, the Plant was configured to supply water to the HPCS from the CSTs via the HPCS-V-1 suction valve. Without a seismic event, this configuration would allow HPCS to perform its safety function. The CST is a non-seismically qualified water supply and its operation is not assured during a seismic event.

Another function of the HPCS-V-15 valve of opening on high Suppression Pool level (466'8" AMSL) is to prevent high water levels which could contribute to suppression chamber overpressurization during a Loss of Coolant Accident (LOCA). Any Plant condition which results in high Suppression Pool water level (466'-4 3/4" AMSL) requires Plant operator response in accordance with the Suppression Pool Level Control Emergency Procedure (PPM 5.2.4). This procedure is entered prior to reaching the HPCS-V-15 opening setpoint on high Suppression Pool level. Therefore, a failure of one of multiple Suppression Pool level controls caused by failure of the HPCS-V-15 valve could not alone prevent the fulfillment of the suppression chamber safety function.

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Since an accident condition requiring HPCS injection and/or containment isolation did not actually occur, this condition did not threaten the health and safety of the public or Plant personnel.

EIIS InformationText Reference

Suppression Pool System  
Condensate Storage and Transfer System  
(Condensate Storage Tanks)  
High Pressure Core Spray System  
High Pressure Core Spray System  
(HPCS-V-15 Valve)

EIIS Reference

System	Component
BT	
KA	TK
BG	
BG	SHV



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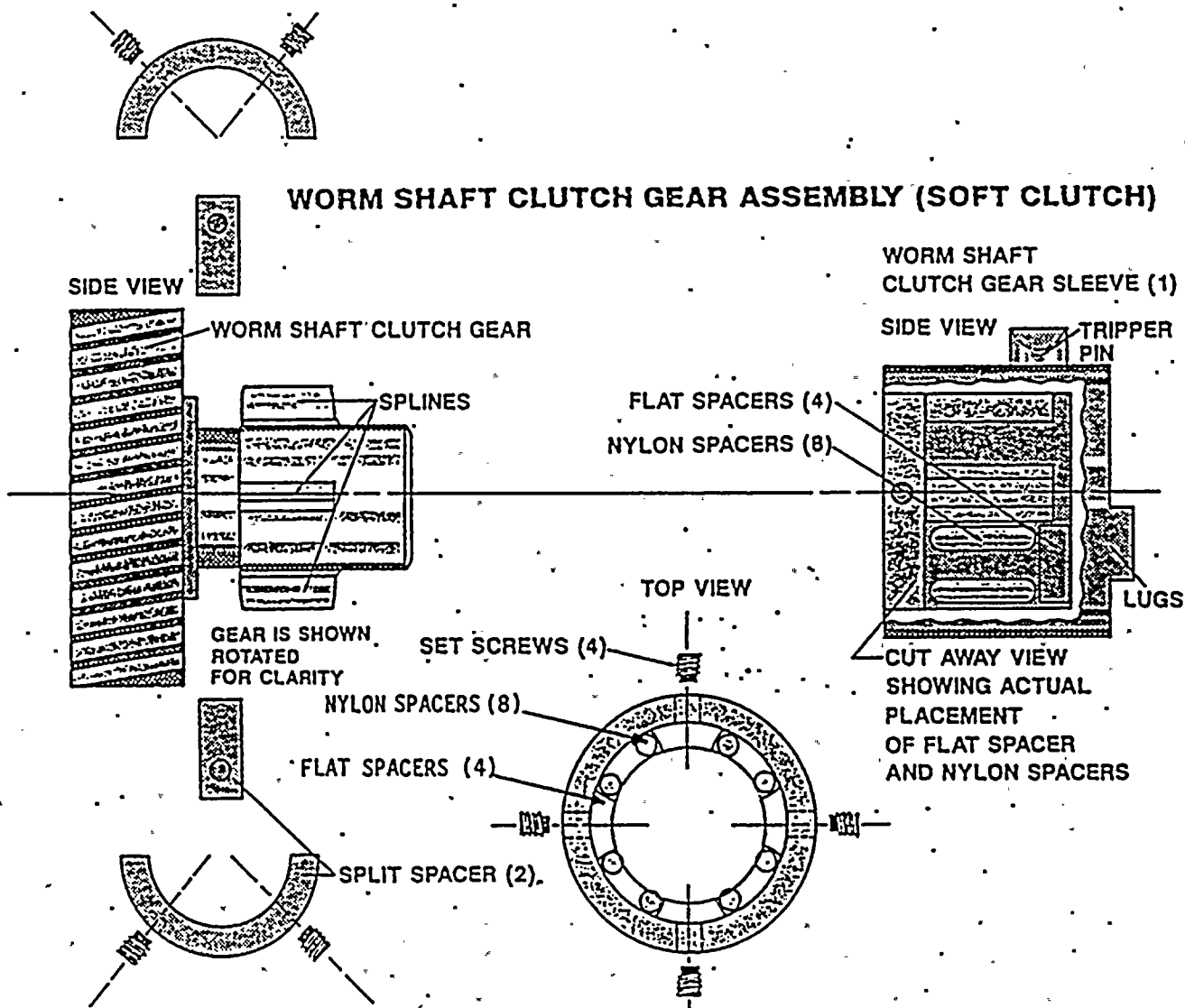


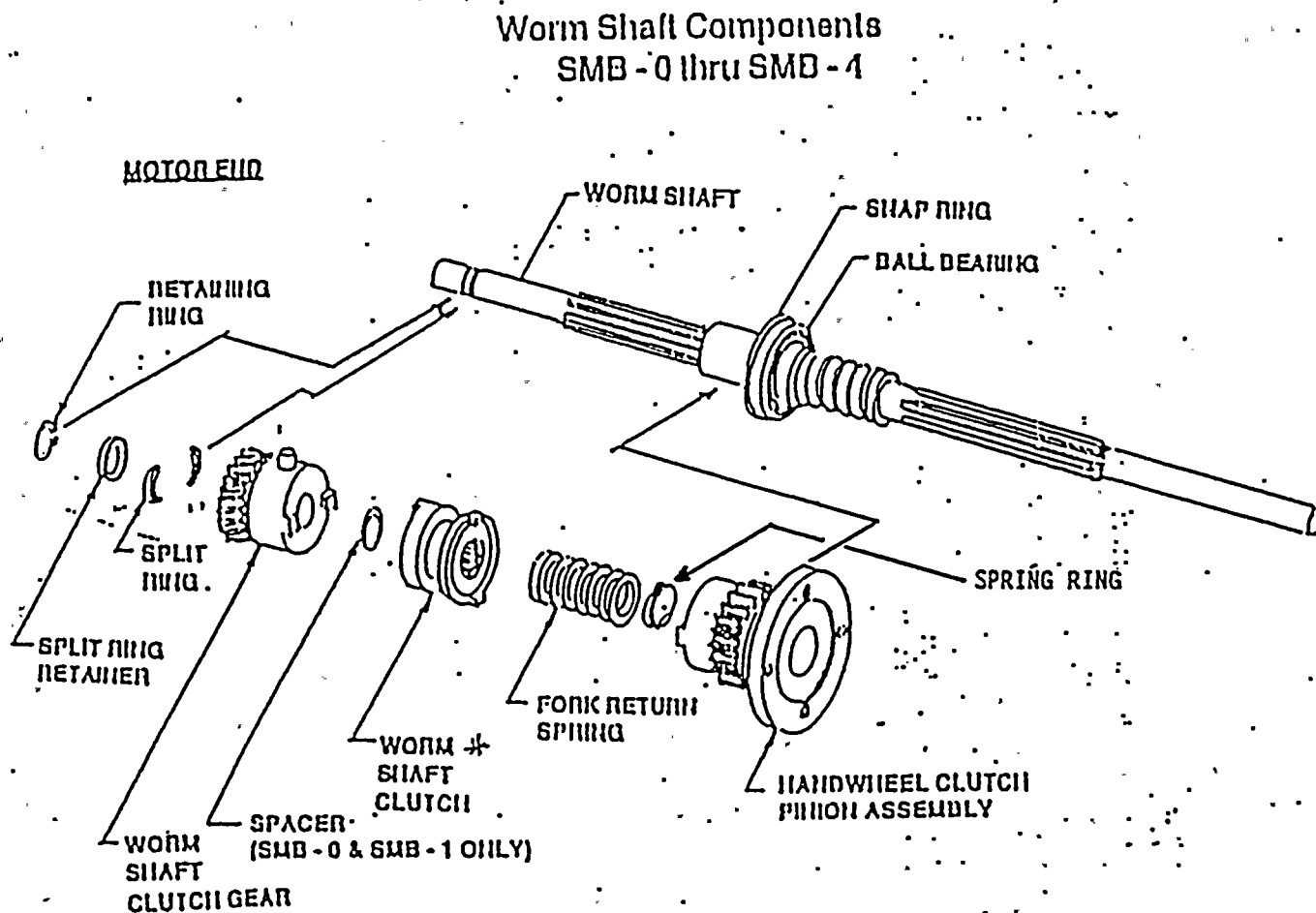
FIGURE 1

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\*Worm shaft clutch shown 180° out of position

FIGURE 2