

LICENSEE EVENT REPORT

UPDATE REPORT - PREVIOUS REPORT DATE 3/22/79
(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

CONTROL BLOCK: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

CON'T

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EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 With D/G 1B 00S of maintenance, D/G 1A manual speed control failed placing the facility

0 3 in excess of LCO TS 3.7.b.2. Controlled reactor shutdown was commenced until D/G 1B

0 4 could be returned to service allowing the unit to be returned to full power operation.

0 5 On 3-2-79 and again on 3-13-79 D/G 1A manual speed control failed in the same manner

0 6 placing the facility under LCO TS 3.7.6.2. In each case D/G 1B operability was

0 7 verified and D/G 1A was returned to service within the allowed time. There was no

0 8 effect on public safety.

0 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SYSTEM CODE: E E (11) CAUSE CODE: E (12) CAUSE SUBCODE: B (13) COMPONENT CODE: M E C F U N (14) COMP. SUBCODE: Z (15) VALVE SUBCODE: Z (16)

LER/RO REPORT NUMBER: 7 9 (17) EVENT YEAR: 7 9 (21) SEQUENTIAL REPORT NO.: 0 0 2 (24) OCCURRENCE CODE: 0 1 (28) REPORT TYPE: X (30) REVISION NO.: 2 (32)

ACTION TAKEN: A (18) FUTURE ACTION: X (19) EFFECT ON PLANT: B (20) SHUTDOWN METHOD: Z (21) HOURS: 0 0 0 0 (22) ATTACHMENT SUBMITTED: Y (23) NPRD-4 FORM SUB.: Y (24) PRIME COMP. SUPPLIER: N (25) COMPONENT MANUFACTURER: W 1 2 0 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 Excessive wear to the bronze pinion in the synchro-motor gear housing caused these

1 1 failures. Damage to this pinion was caused by improper gear alignment and the failure

1 2 of a governor limit switch to de-energize the synchro-motor before it reached its

1 3 end-of-travel. The pinion and limit switch were replaced and adjusted and the D/G

1 4 was tested and returned to service.

1 5 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

FACILITY STATUS: E (28) % POWER: 1 0 0 (29) OTHER STATUS: NA (30) METHOD OF DISCOVERY: B (31) DISCOVERY DESCRIPTION: Surveillance testing (32)

1 6 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

ACTIVITY CONTENT RELEASED OF RELEASE: Z (33) Z (34) AMOUNT OF ACTIVITY: NA (35) LOCATION OF RELEASE: NA (36)

1 7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PERSONNEL EXPOSURES NUMBER: 0 0 0 (37) TYPE: Z (38) DESCRIPTION: NA (39)

1 8 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PERSONNEL INJURIES NUMBER: 0 0 0 (40) DESCRIPTION: NA (41)

1 9 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

LOSS OF OR DAMAGE TO FACILITY TYPE: Z (42) DESCRIPTION: NA (43)

2 0 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PUBLICITY ISSUED: N (44) DESCRIPTION: NA (45)

NAME OF PREPARER: G. H. Ruiter/M. L. Marchi

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7905300399

Wisconsin Public Service Corporation
Kewaunee Nuclear Power Plant
Docket 50-305
Operating License DPR-43

Event Description

During steady full power operation, D/G 1B was out of service for scheduled maintenance and D/G 1A was in operation for the 4-hour run at full load per SP-109, Diesel Generators Manual Test, when a D/G load increase was detected by observing a D/G load and frequency change. When a load reduction was attempted manually from the control room the D/G would not respond. D/G 1A was tripped and taken out of service, placing the facility in a condition less conservative than allowed by LCO TS 3.7.b.2. A controlled power reduction to hot standby was commenced. Maintenance on D/G 1B was terminated and D/G 1B was started, paralleled to the emergency bus, and loaded to verify operability, and was left tied to the emergency bus. Reactor shutdown was terminated and the unit was returned to power operation. The governor control unit on D/G 1A was immediately inspected by a vendor representative on site for other repairs in progress. Based on his opinion that the governor would control the D/G in automatic control even though manual control had apparently failed, D/G 1A was returned to service in the normal standby mode until a synchronizing motor gear housing was obtained later the same day and installed on the D/G 1A governor. The following week replacement parts were received and the damaged pinion in the original gear housing was replaced. The repaired gear housing was re-installed on D/G 1A. On 3-2-79, during operation for testing of fuel consumption, D/G 1A manual speed control failed again. Since D/G 1B had been verified operable, the facility was under LCO TS 3.7.b.2. D/G 1A was repaired and tested back in service within 1 day. On 3-13-79 during operation for special testing, D/G 1A manual speed control failed again, placing the facility under LCO TS 3.7.b.2. Operability of D/G 1B was verified. D/G 1A was repaired under the supervision of a vendor representative and was tested and returned to service.

During the original failure of D/G 1A manual speed control unit, D/G 1B had been tested for operability and was left tied to the emergency safeguard bus because one of the redundant air starter motors had been removed for preventative

maintainance. An investigation was begun to verify that this was the most conservative action to take under the unique set of circumstances present. During the review it was determined that if the diesel tripped or was stripped from the safeguard bus an automatic reclosure of the diesel generator output breaker would not occur due to the D/G output breaker switch alligned in manual position. Manual action would have been required to tie the D/G to the safeguard bus in the event of undervoltage in the safeguard bus. Based on these considerations D/G 1B was promptly removed from supplying power to the safeguard bus and aligned in the auto mode such that it would respond to any emergency need. Further investigation has indicated that an undervoltage condition on a safeguard bus could cause all the supply breakers to the safeguard bus to be opened. A subsequent voltage restoring scheme would commence with loads sequencing on at predetermined time settings once a source of power was located. If all off-site power was lost, the diesel generator would supply power to the bus. However, with the D/G output breaker in the manual position automatic reclosure would not have occurred. Manual action would be required for the control operator to either place the D/G output breaker switch in automatic mode or to manually close in this breaker from the control room. It would have been readily evident to the operator what the situation was since the control room would have been in a blackened condition and a tripped signal on the D/G output breaker would have alerted him to the condition, so minimal time would have been required to remedy the situation.

Revised procedures are being prepared which will require the D/G output breaker switch to be returned to the automatic mode after the D/G has been paralleled with the bus. This will assure automatic reclosure of the D/G output breaker should an undervoltage condition occur while load testing the D/G's. A demonstration test has been performed which has verified that the switch can be returned to auto without affecting the ability to perform the required surveillance tests.

The potential for an undervoltage condition on the safeguard bus has also been evaluated postulating a loss of off-site power while load testing the diesel generators. Normal electrical alignment has one safeguard bus supplied by the reserve auxiliary transformer and the other by the tertiary transformer. Offsite feeds to these transformers are through different substation breakers. Depending upon the location of the fault causing the loss of power into the

plant one or both sets of protective relaying for the safeguard supply transformers would trip the output breakers from the affected transformer(s). The tripping of the output breaker would isolate the safeguard bus from the fault regardless of the D/G status.

If the D/G is in its normal standby condition a blackout sequence would begin with the D/G picking up the safeguard bus and sequentially supplying the required loads. For the situation described in this event where the D/G was already supplying the safeguard bus in parallel with the Reserve Aux Transformer the safeguard bus would be isolated from the fault and the D/G would simply assume the loads on the bus.

Cause Description and Corrective Actions

The first failure of D/G 1A manual speed control was caused by excessive wear to the pinion that mates to the worm shaft in the electric speed control (synchronizing motor) gear housing assembly. The synchronizing motor gear housing assembly was replaced and the D/G was tested and returned to service within the time period allowed by LCO TS 3.7.b.2. As recommended by the D/G vendor additional parts were added to the list of spare parts maintained at the plant to facilitate any future repairs that may become necessary. When parts were received, a new pinion was installed in the original gear housing assembly and this unit was re-installed on the governor for 1A D/G. Following the second failure of manual speed control the new pinion was found badly damaged. The apparent cause was attributed to misalignment of the new pinion during the repair process. Another new pinion was installed in the gear housing and aligned with the worm shaft. The D/G was returned to service for the fuel consumption test within 7 hours and was declared fully operable upon successful completion of this test. Following the failure on 3-13-79, investigation revealed that a limit switch on the 1A D/G governor was not activating properly and, therefore, was not de-energizing the synchronizing motor before the motor output shaft reached its end-of-travel. The failure of the limit switch resulted in damage to the pinion since it was being driven past its end of travel. A vendor representative installed and aligned a new pinion and the limit switch was replaced and adjusted. Following operation of D/G 1A the vendor representative inspected the synchronizing motor gear housing and found no indications of abnormality. The 1A D/G was returned to service.

Existing maintenance procedures will be changed to include inspection of D/G governor internals on a frequency intended to prevent similar occurrences in the future. This is the first failure of this type at the Kewaunee Plant.

Effect on Public Health and Safety

As described in the Event Description, the D/G in operation paralleled to the safeguard bus is isolated from offsite faults by protective relaying in the safeguard supply transformers. If a fault occurred, the safeguard bus would have been isolated from the fault and the D/G would automatically assume the safeguard bus loads. Therefore, at no time was the health and safety of the public threatened while operating with one D/G out-of-service and the second D/G operating in parallel with the offsite supply on the safeguard bus.