PRAIRIE ISLAND NUCLEAR GENERATING PLANT

ANNUAL REPORT OF OCCUPATIONAL EXPOSURE - 1978

WORK & JOB FUNCTION	NO. OF PERSONNEL (>100MREM) STATION EMPLOYEES	UTILITY EMPLOYEES	CONTRACT WORKERS	TOTAL MAN-REM STATION EMPLOYEES	UTILITY EMPLOYEES	CONTRACT WORKERS
SPECIAL MAINTENANCE						
MAINTENANCE PERSONNEL	67	73	30	41.03	20.09	15.31
OPERATING PERSONNEL	10	0	1	2.35	0.0	0.65
HEALTH PHYSICS PERSONNEL	11	0	13	3.31	0.0	4.25
SUPERVISORY PERSONNEL	1	3	10	0.38	1.13	2.49
ENGINEERING PERSONNEL	10	0	16	2.88	0.02	6.69
IN SERVICE INSPECTION						
MAINTENANCE PERSONNEL	2	2	7	0.78	0.38	1.82
OPERATING PERSONNEL	0	0	0	0.01	0.0	0.0
HEALTH PHYSICS PERSONNEL	2	0	3	0.67	0.0	0.67
SUPERVISORY PERSONNEL	1	0	11	0.25	0.02	5.64
ENGINEERING PERSONNEL	0	2	5	0.03	0.54	2.13
OPERATIONS AND SURVEILLANCE						
MAINTENANCE PERSONNEL	12	3	0	5.76	0.68	0.05
OPERATING PERSONNEL	38	0	0	15.87	0.0	0.0
HEALTH PHYSICS PERSONNEL	13	0	2	7.72	0.0	0.69
SUPERVISORY PERSONNEL	2	0	0	2.18	0.07	0.02
ENGINEERING PERSONNEL	13	1	4	4.19	0.17	0.73
REFUELING						
MAINTENANCE PERSONNEL	36	40	3	18.04	11.84	0.57
OPERATING PERSONNEL	7	0	0	2.35	0.0	0.0
HEALTH PHYSICS PERSONNEL	0	0	1	0.33	0.0	0.34
SUPERVISORY PERSONNEL	1	3	1	0.20	0.39	0.34
ENGINEERING PERSONNEL	1	1	0	0.40	0.10	0.14
WASTE PROCESSING						
MAINTENANCE PERSONNEL	12	1	0	4.80	0.49	0.0
OPERATING PERSONNEL	1	0	0	0.74	0.0	0.0
HEALTH PHYSICS PERSONNEL	1	0	0	0.79	0.0	0.04
SUPERVISORY PERSONNEL	0	0	0	0.0	0.0	0.0
ENGINEERING PERSONNEL	0	0	0	0.05	0.0	0.0
ROUTINE MAINTENANCE						
MAINTENANCE PERSONNEL	1	0	0	0.88	0.09	0.0
OPERATING PERSONNEL	0	0	0	0.01	0.0	0.0
HEALTH PHYSICS PERSONNEL	0	0	0	0.00	0.0	0.0
SUPERVISORY PERSONNEL	0	0	0	0.0	0.0	0.0
ENGINEERING PERSONNEL	0	0	0	0.01	0.0	0.0

TOTAL

MAINTENANCE PERSONNEL	130	119	40	71.30	33.57	17.75
OPERATING PERSONNEL	56	0	1	21.33	0.0	0.65
HEALTH PHYSICS PERSONNEL	27	0	19	12.83	0.0	6.00
SUPERVISORY PERSONNEL	5	6	22	3.02	1.61	8.49
ENGINEERING PERSONNEL	24	4	25	7.56	0.84	9.69
GRAND TOTAL	242	129	107	116.05	36.02	42.58

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
ANNUAL REPORT OF CHANGES, TESTS, AND EXPERIMENTS

1978

The following changes, tests or experiments have been completed under the provisions of 10 CFR 50.59(a)(1):

A. Unit 1 and Common Components

1. Unit 1, Cycle 4 Reload (Design Change 78L443)

The safety evaluation for Unit 1, Cycle 4 demonstrated that the core reload will not adversely affect the safety of the plant.

For Cycle 4 operation, Prairie Island Unit 1 replaced 40 region 6 assembles and one region 2 assembly. The core pattern for Cycle 4 is shown in Figure 1. All of the accidents analyzed and reported in the FSAR which could potentially be affected by fuel reload have been reviewed for the Cycle 4 design. No changes in the Technical Specifications are required to accommodate the Cycle 4 design. Nominal design parameters for Cycle 4 are 1650 MWT core power, 2250 psia system pressure, nominal inlet core temperature of 531°F and core average linear power of 6.2 KW/FT. The fuel assembly design parameters are presented in Table 1.

2. QA Reclassification of the N_2 Piping System (Design Change 76L214)

The miscellaneous gas system supplies nitrogen to various systems/components to reduce hydrogen concentration or to replace fluid that has been removed from them. The nitrogen piping, though classified Design Class III was originally given a QA Classification of I as a means of ensuring good quality and workmanship of installed piping during construction. The reclassification to QA Type III is consistent with other system/component classification.

3. QA Reclassification of the Sample System Piping (Design Change 76L242)

The sampling system provides samples for laboratory analysis to evaluate reactor coolant and other auxiliary system chemistry. The sampling system piping, though classified Design Change III was originally given a QA classification of I as a means of ensuring good quality workmanship of installed piping during construction. The reclassification to QA Type III is consistent with other system/component classification.

4. Reclassify Boric Acid Evaporators and Gas Strippers (Design Change 76L191)

The boric acid evaporators and gas stripper feed pumps were reclassified from QA Type I to QA Type III to facilitate maintenance. Type I systems and components were separated by the addition of check valves to insure system integrity in the event of a failure in the boric acid evaporator system. The reclassification to QA Type III is consistent with other system/component classification.

5. Refueling Cavity Supply Fan (Design Change 77L387)

A 20,000 CFM fan and ducting were installed in Unit #1 containment to supply cool air to the control rod drive mechanism area. The installation is considered a temporary measure to test the benefit of reduced temperature on cables and other components in the area of the reactor head. The installation resulted in the addition of galvanized material calculated to produce 0.77 ft^3/day of hydrogen during the design accident. This is $< 6.9 \times 10^{-5}$ volume percent of H_2 per day and is considered negligible.

6. Removal of Auto Start of Auxiliary Feedwater Pump (Design Change 77L397)

This design change removed the auto start from the logic when two (2) main feedpump breakers are open. This eliminated the requirement for installation of temporary jumpers during maintenance, yet does not restrict the auto start for other required functions. This is accomplished with a selector switch on the main control board for each unit.

7. Remove Sources from Unit #1 Core (Design Change 78L470)

The two source assemblies located in fuel assemblies were removed from the core because they became stuck within the assemblies. Reg. Guide 1.68 suggests that a neutron count rate > 2 cps is desired for startup. The count rate in the cold, refueling shutdown condition was 30 + cps on each source range channel. Dilution to cold shutdown should increase the count rate by a factor of 1.2. During heatup, the count rate should increase by a factor of 5. The prediction of neutron count rate increase during dilution to cold shutdown and heatup was close to prediction. The startup without the primary sources went very well. New secondary sources installed during the refueling will be activated thus providing additional neutrons for future startups.

8. Permanent Bypass on SCOTS Overspeed Trip (Design Change 78L446)

Failure of SCOTS turbine overspeed protection to function properly resulted in several lifted wires and temporary bypass controls necessary to prevent unwanted turbine trips. This design change effectively removed these temporary controls by making physical changes isolating the system from the turbine. Required overspeed protection is still provided by two other independent channels as required by the FSAR.

9. Remove Accumulator Pressure Transmitter Requirements from FSAR (Safety Evaluation 27)

Accumulator pressure channels (QA Type III) were deleted from Table 7.5-2 "Post-Accident Equipment Inside Containment" FSAR Section 7.5. The accumulator transmitters provide only Hi/Low alarms and do not actuate engineered safeguards equipment. Passive accumulators of the Safety

Injection System do not require signals to perform their function. The signals are used during normal operation only to ensure adequate pressure is available in the accumulators.

B. Unit 2

The following changes and evaluations which were discussed in Section A, Unit 1 and Common Components, are also applicable to Unit 2.

A.2	D.C. 76L214
A.3	D.C. 76L242
A.4	D.C. 76L191
A.6	D.C. 77L397
A.8	D.C. 78L446
A.9	S.E. 27

1. Unit 2, Cycle 4 Reload (Design Change 78L499)

The safety evaluation for Unit 2, Cycle 4 demonstrated that the core reload will not adversely affect the safety of the plant.

For Cycle 4 operation, Prairie Island Unit 2 replaced 40 region 6 assemblies. The core pattern for Cycle 4 is shown in Figure 2. All of the accidents analyzed and reported in the FSAR which could potentially be affected by fuel reload have been reviewed for the Cycle 4 design. No changes in the Technical Specifications are required to accommodate the Cycle 4 design. Nominal design parameters for Cycle 4 are 1650 MWT core power, 2250 psia system pressure, nominal inlet core temperature of 531°F and core average linear power of 6.2 KW/FT. The fuel assembly design parameters are presented in Table 2.

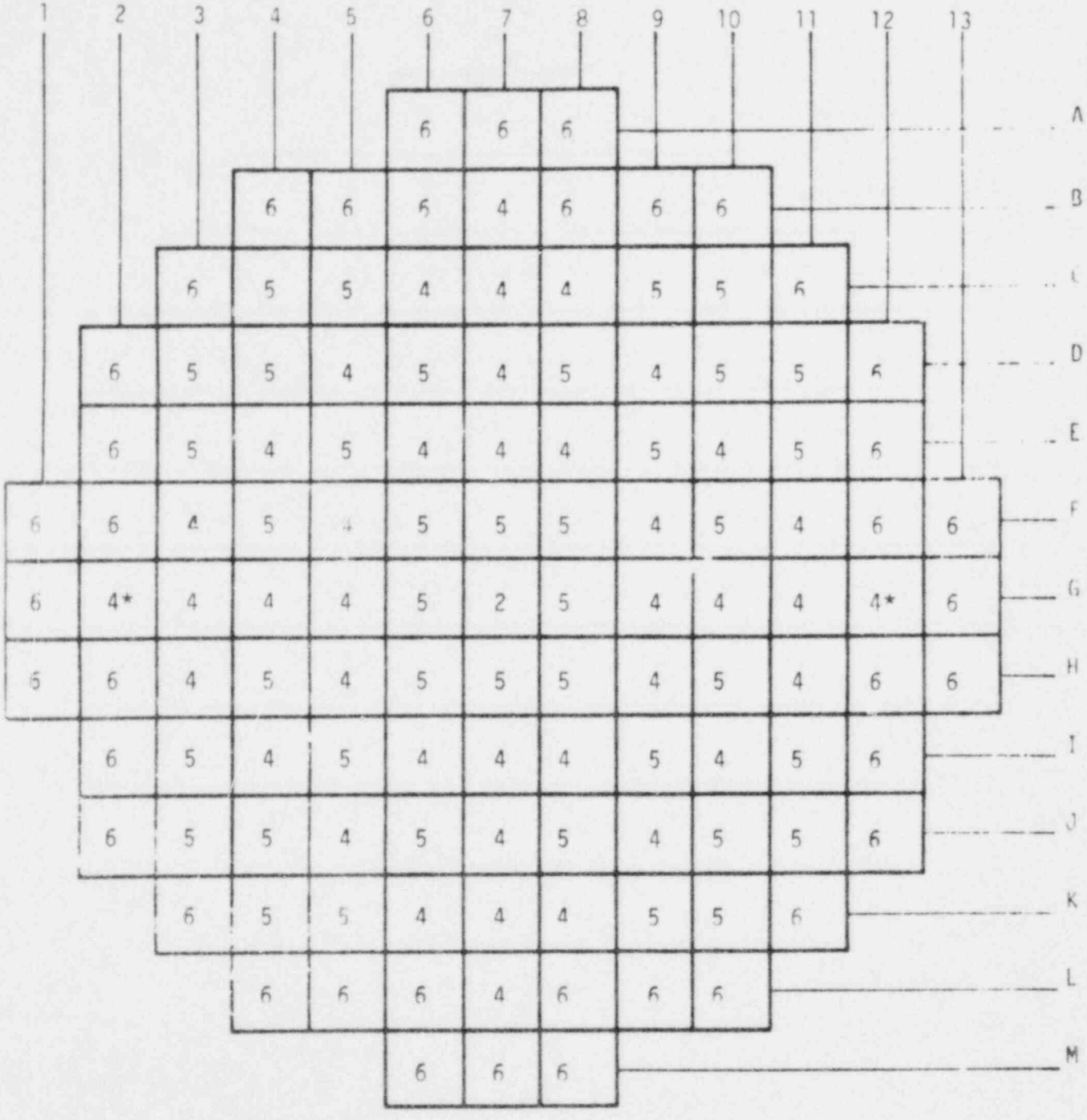
2. Removal of Part Length Rods (Design Change 77L395)

The four part length rod assemblies were removed from Unit 2 and replaced with thimble plug assemblies. The potential for undesirable core transients prevented the use of the part length rod assemblies. Anti-rotational devices were installed on the drive units to hold them out of the core.

FIGURE 1

CORE LOADING PATTERN

PRAIRIE ISLAND UNIT 1, CYCLE 4



* Assembly Contains 12 Depleted BP's

X Region Number

Table 1

Fuel Assembly Design Parameters
Prairie Island Unit 1 - Cycle 4

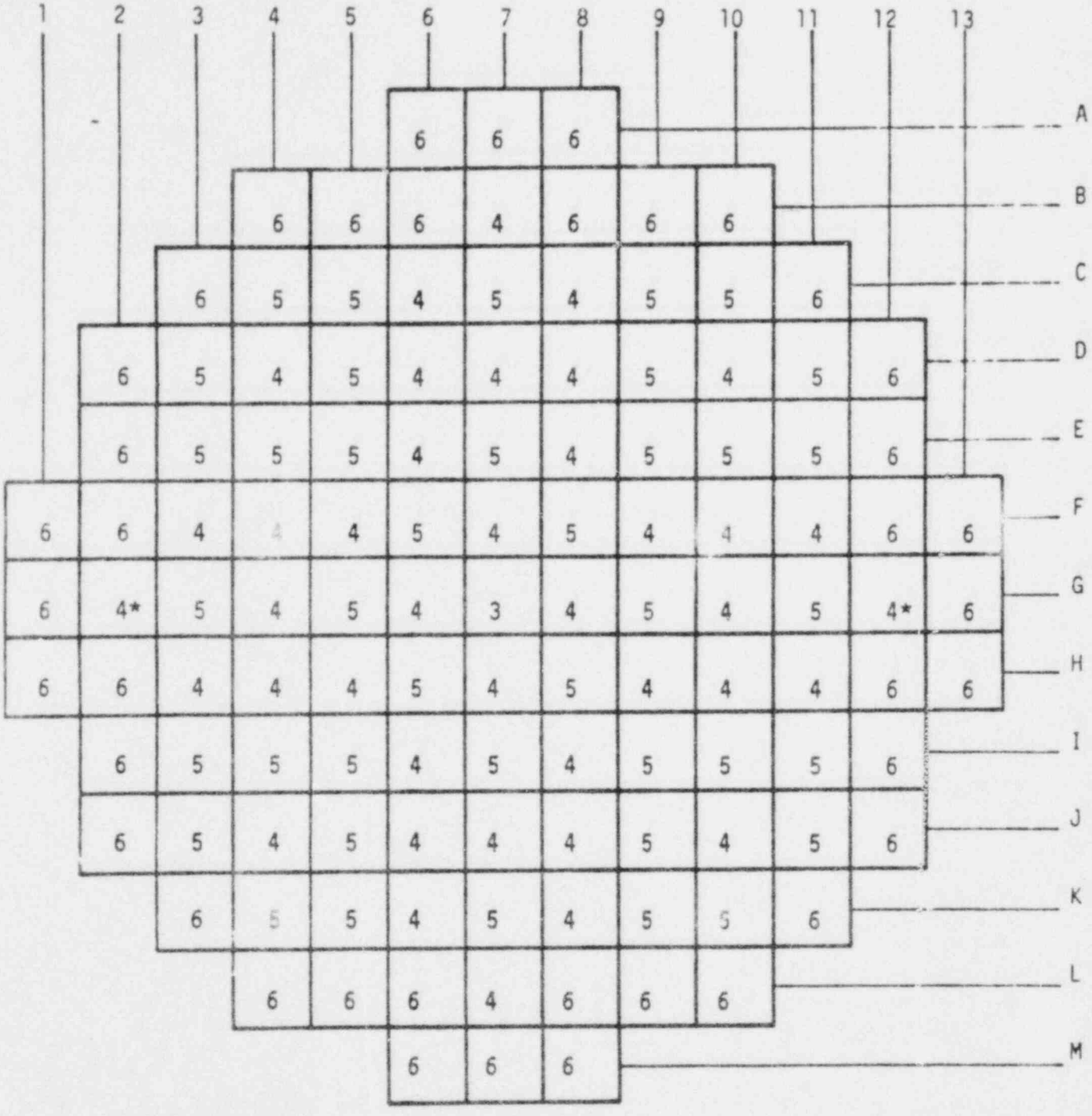
Region	2	4	5	6
Enrichment (w/o of U-235)*	3.034	2.781	3.303	3.30
Density (percent theoretical)*	93.1	94.4	94.4	94.5
Number of Assemblies	1	40	40	40
Fabricated Fuel Stack Height (inches)	144	144	144	144
Approximate Burnup at Beginning of Cycle 4 (MWD/MTU)	27,400	19,000	10,500	0

*Regions 2, 4 and 5 are as-built values. Region 6 values are designed. However, an average density of 94.5% theoretical was used for Region 6 thermal evaluations.

FIGURE 2

CORE LOADING PATTERN

Prairie Island Unit 2, Cycle 4



* - Assembly contains 12 depleted BPs and sources

X Region Number

TABLE 2

Fuel Assembly Design Parameters
Prairie Island Unit 2 - Cycle 4

Region	3	4	5	6
Enrichment (w/o of U-235)*	3.40	3.30	3.30	3.40
Density (percent theoretical)*	94.6	94.6	94.7	95
Number of Assemblies	1	40	40	40
Approximate Burnup at Beginning of Cycle 4 (MWD/MTU)	33,500	21,900	9,300	0

*Regions 3, 4 and 5 are as-built values. Region 6 values are nominal. However, an average density of 94.5% theoretical was used for Region 6 design evaluations.