COOPER NUCLEAR STATION

BROWNVILLE, NEBRASKA

ANNUAL OPERATING REPORT

JANUARY 1, 1984 THROUGH DECEMBER 31, 1984

USNRC DOCKET 50-298

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I. PERFORMANCE CHARACTERISTICS AND TESTS

FUEL PERFORMANCE

Off-gas activity in the January 1 through September 15, 1984 operational period showed no increases indicative of fuel failures. The off-gas activity level continued at essentially steady state levels from January 1 to September 15, 1984 with the release rates being well within the limits specified in the CNS Technical Specifications.

During the period from September 16, 1984 through December 31, 1984, the reactor was shut down and the reactor vessel disassembled for the scheduled refueling and maintenance outage. The core was completely unloaded in accordance with a spiral unloading plan. The complete defueling of the core was required to accommodate the recirculation pipe replacement project.

In concurrence with General Electric, sipping for leaking fuel assemblies was not warranted due to the low off-gas activity.

Comparisons of the actual control rod density during the period January 1 to September 15, 1984 to the control rod density predicted by computer programs at various core average exposures indicated reactivity anomalies less than 1% $\Delta k/k$.

MSV AND MSRV FAILURES AND CHALLENGES
(Ref: NUREG-0737, Action Item II.K.3.3)

There were two challenges to the relief valves during the January 29, 1984 scram. Both valve actuations were satisfactory.

There were two challenges to the relief valves during the August 8, 1984 scram. Both valve actuations were satisfactory.

There were no failures.

REPORTABLE SPECIAL PROCEDURES/SPECIAL TEST PROCEDURES

There were no reportable special procedures/special test procedures.

II. FACILITY CHANGES REPORTABLE UNDER 10CFR50.59

REPORTABLE MINOR DESIGN CHANGES (MDC) COMPLETED IN 1984

MDC 81-118

Component: Meteorological Monitoring Buildings

Description: This MDC authorized the installation of normal and emergency electrical power supplies to the two Meteorological Monitoring Buildings. This design change was made to ensure compliance with Regulatory Guide 1.23 and NUREG 0654.

Safety Analysis: The modification enhances the reliability of the meteorological monitoring capabilities of the plant by providing a redundant power source. The design change was analyzed to ensure there would be no degradation in equipment, personnel, or nuclear safety. The design change also complies with IEEE Standard 384-1981 for separation of Class IE Equipment and Circuits.

MDC 81-119

Component: Meteorological Monitoring Buildings

Description: This MDC authorized the installation of redundant signal cables to comply with NUREG 0654. The cables are suitable for microwave and digital communications signals for data transmission from the two meteorological monitoring systems to the communications cabinet in the Cable Spreading Room.

Safety Analysis: The cables will not meet IEEE Standard 383-1975 requirements for the fire test but will be installed in conduit in the Control Building and Turbine Building to prevent the cable from contributing to the fire loading and gassing potential to the rooms. This meets the requirements of 10CFR50 Appendix R and ensures that a cable fault in this system will not cause a fire in a Division I or II cable. The modification does not interface with or degrade any existing safety related equipment but does improve the reliability of the existing meteorological monitoring system.

MDC 82-67

Component: Meteorological Monitoring System

Description: This MDC authorized the installation of new meteorological monitoring equipment racks in the Computer Room. It added signal cable from the communications cabinet in the Cable Spreading Room to the Computer Room. The change also authorized the removal of the original system equipment. This modification ensures that the requirements of Regulatory Guide 1.23 are met.

Safety Analysis: The installation of this design change will not affect any safety related equipment. It only provides for increased reliability in obtaining meteorological data.

MDC 82-86

Component: Augmented Off Gas 4% and 50% H_2 Analyzers

Description: This MDC authorized the removal of the 4% and 50% hydrogen analyzers and associated equipment. These cells were originally installed to provide indication of hydrogen concentration in the off gas line. The piping configuration provided a path for catalyst migration into the inlet piping which posed an off gas ignition problem. In addition, as referenced in General Electric SIL 150, Rev. 1, the basic cell design was unsuitable for this use.

Safety Analysis: Elimination of these analyzers reduces the risk of an off gas explosion thereby increasing the operational safety of the system. The augmented off gas piping is designed to withstand the effects of a hydrogen explosion. Knowledge of hydrogen concentration was not used to control or troubleshoot the system. Proper operation of the system can be determined by other instruments.

MDC 83-17

Component: Reactor Building Overhead Crane

Description: This MDC authorized the addition of a limit switch to the Restricted Mode circuitry of the Reactor Building crane. The modification will allow horizontal motion of the spent fuel shipping cask in the fuel pool restricted path area when the cask is not in the fully raised position. ANSI N14.6 required that modifications be made to the redundant lifting devices of large shipping containers used for nuclear materials. This eliminated the working margin for setting the cask in the spent fuel pool.

Safety Analysis: Although minor movement of the cask is not allowed in the fuel pool cask setdown area, existing circuitry limit switches still function as before and prevent any movement of the cask over stored fuel. The effect of nuclear safety of the plant is not changed since cask handling will still be done in the Restricted Mode. Personnel safety is enhanced because less time needs to be spent near the fuel pool during cask operations. All other functions of the crane while handling the cask are the same as was originally designed.

MDC 83-92

Component: Circulating Water Screen Wash and Sparger System

Description: This MDC, and its amendments, authorized the upgrade of the screen wash and sparger piping system in the intake structure. The original carbon steel piping and butterfly valves were replaced with stainless steel piping and pinch valves. In addition, the control air header, electrical conduit, and

instrumentation that control the operation of the traveling screens, were replaced or modified. All changes to the system were required to correct continuous maintenance problems caused by sand in the river.

Safety Analysis: The modification will increase the reliability of the screen wash and sparger system and reduce the maintenance on the system. The safety of personnel will be improved near the traveling screens due to the rerouting of conduit and piping. There will be no degradation in equipment or nuclear safety.

MDC 84-2

Component: Seismic Monitor Relocation

Description: This MDC authorized the relocation of the Yard seismic monitor to allow for the construction of the Multi-Purpose Facility (see MDC 84-26) and due to spurious detection of ground motion during the operation of the diesel-driven fire pump.

Safety Analysis: This design change does not affect any safety related systems or personnel and equipment safety. It will restore the seismic monitoring capability of the plant to its original design and eliminate the spurious indications caused by operation of the diesel fire pump.

MDC 84-15/84-25

Component: Meteorological Monitoring System

Description: These MDC's authorized the installation of 10 meter and 100 meter meteorological towers, their support buildings, and the tower monitoring equipment. All installations have been made to ensure compliance with NUREG 0654 and Regulatory Guide 1.23.

Safety Analysis: This modification does not degrade the safety of any personnel or equipment or present a hazard to the safe operation of the plant. It enhances the capability and reliability of the station in gathering data that might be needed to evaluate the impact of a radiological release into the atmosphere.

MDC 84-22

Component: Normal Station Service Transformer

Description: This MDC authorized the replacement of the normal station service transformer. The original transformer was destroyed by fire.

Safety Analysis: This design change restores the electrical system to its original design condition. It does not degrade any safety systems or the safety of other equipment or personnel.

MDC 84-26

Component: Multi-Purpose Facility

Description: This MDC authorized the addition of a multi-purpose building which will house a hot machine shop, a decontamination area, and a temporary contaminated storage area. With some minor modifications it can be converted to a low level waste storage area if the Central States Compact is not ready.

Safety Analysis: The new building was erected adjacent to the Control and Radwaste Buildings but with a four inch separation joint. This prevents any interaction during a Class I seismic occurrence and exceeds the criteria of Class I to Class II structures. Building support systems, such as radioactive drains and ventilation, have been designed to minimize the potential for any leakage of contaminated material.

MDC 84-38

Component: Airwash Pump Removal from Miscellaneous Heating and Ventilation Systems

Description: This MDC authorized the removal of the airwash pumps from various heating and ventilation units on site. This equipment required continuous maintenance to keep it operational, provided a negligible area cooling effect, and the humidity added to the air appeared to have an adverse effect on the operation of some instruments.

Safety Analysis: The airwash portion of the heating and ventilation systems does not affect the operation of any safety system. Therefore this modification does not degrade the personnel, equipment, or nuclear safety of the plant.

MDC 84-60

Component: Multi-Purpose Facility Effluent Monitor

Description: This MDC authorized the installation of a particulate and noble gas effluent radiation monitor for the Multi-Purpose Facility (see MDC 84-26). Since radioactive gases and particulates could be generated within the building, and since the ventilation exhausts directly to atmosphere, monitoring of the exhaust is necessary in order to evaluate the extent of any radioactive releases.

Safety Analysis: The effluent monitor is similar in design and operation to other units on site. It meets the requirements of NUREG 0737 for monitoring effluent ventilation paths and provides both local and Control Room indication. The modification only

provides a monitoring function and therefore does not degrade the function of any other system or safety related equipment or the safety of personnel.

MDC 84-95

Component: Condensate Storage Tank Addition

Description: This MDC, and its amendments, authorized the addition of a new 700,000 gallon condensate storage tank. It also provided for the installation of the support piping, electrical and pneumatic controls, and the instrumentation needed to monitor the new system. The addition of this tank will significantly increase the onsite storage capacity thereby allowing more water to be processed and stored rather than discharged.

Safety Analysis: The tank has been designed with a retaining wall to minimize the potential for contamination of the surrounding area due to a leak. All instrumentation has been designed to meet the requirements of Regulatory Guide 1.143, Rev. 1. The new condensate storage tank does not degrade existing personnel or equipment safety and enhances the nuclear safety by providing an additional source of water in the event of an accident.

MDC 84-115

Component: Multi-Purpose Facility Radioactive Drains

Description: This MDC authorized the routing of floor drain piping from the Multi-Purpose Facility to the Augmented Radwaste Building chemical sump. The drains are required in order to radiologically process drainage from the hot machine shop area and allows for the possible future use of part of the facility for low level radwaste storage.

Safety Analysis: All applicable items of IEC 80-18 have been addressed to ensure this modification does not present an increased hazard to personnel or public safety. In addition, there is no change in the plant radwaste processing, discharge, or monitoring systems thereby ensuring equipment and nuclear safety will be maintained.

MDC 84-150

Component: IGSCC Pipe Replacement

Description: This MDC, and its amendments, authorized the replacement of various amounts of piping affected by Intergranular Stress Corrosion Cracking. Piping systems affected include Reactor Recirculation, Reactor Water Cleanup, Core Spray, Residual Heat Removal, Reactor Recirculation Jet Pump Instrumentation Seals and Core Delta P/Standby Liquid Control. Cracks in this piping were identified during the previous refueling outage and numerous weld overlays were performed on the piping as an

interim remedy. The new piping will be seamless Type 316 stainless steel with modified chemistry which meets the requirements stated in NUREG 0313, Rev. 1. All of the piping and shop welds will be solution heat treated and the majority of the piping will be electropolished. Most welds on the installed piping will be subjected to IHSI to further minimize the future possibility of IGSCC. Additional changes made to these systems include the replacement of the Recirculation System flow nozzles with Venturi flow elements, the elimination of the Low Pressure Coolant Injection loop select process instrumentation piping, and the elimination of the Recirculation System four-inch bypass lines and installation of jogging circuitry to control the operation of the Recirculation System discharge valves (see MDC 84-162).

Safety Analysis: The piping design and material selection have been made based on industry and regulatory studies. Included in the design were use of Type 316 modified chemistry stainless steel material, a reduction in the number of welds in the new system, and use of a current ASME Code edition employing more technically advanced analysis methods such as leak-before-break. Use of Venturi flow elements in the Recirculation System provide more accurate instrumentation readings. A third party review of the design was conducted and determined to be acceptable. Also utilized during this modification were the guidelines provided in Generic Letter 84-07.

A detailed ALARA program was followed to minimize the amount of radiation exposure to personnel. To assist this program several additional considerations were followed. Fuel and peripheral control rods were removed, the original piping was internally decontaminated prior to removal, temporary shielding was used extensively both inside and outside the reactor vessel and installation mock-ups were used to train personnel. In addition, the reduction in the number of welds, preconditioning, and performance of IHSI on the new piping systems should contribute to reduced personnel exposures later in plant life.

Nondestructive examinations and hydrostatic testing of the replacement piping was performed. Preoperational testing and restart testing were performed to verify no excessive vibration on transient loads on the Recirculation System and to verify that the operation of all affected systems was acceptable. All work performed under this MDC was done to ensure there would be no degradation in equipment, personnel, or nuclear safety.

MDC 84-157

Component: Multi-Purpose Facility Demineralized Water Line Addition

Description: This MDC authorized the installation of a demineralized water supply line to the Multi-Purpose Facility. The water is used for the battery room water supply system and for decontamination equipment.

Safety Analysis: This modification affects no safety related equipment nor does it present a radioactive contamination hazard to personnel. Design of the modification was based on existing system design requirements.

MDC 84-159

Component: Radioactive Laundry Relocation

Description: This MDC authorized the relocation of the radioactive laundry from the Control Building to the original Radwaste Building Hot Machine Shop room. The space available in the original laundry room was inadequate to support the pipe replacement project and future station needs. Major equipment now installed include one washer, three dryers, two dry cleaners, one 23 ton A/C air handling unit, and two 12 ton A/C condensing units.

Safety Analysis: This modification was implemented in accordance with the appropriate codes, standards, and practices. Operation of the laundry equipment is similar to that existing originally. Personnel safety is increased by the installation of air conditioning that maintains the laundry habitable.

MDC 84-162

Component: Removal of Recirculation System Bypass Valves and Modification of the Discharge Valve Circuitry

Description: This MDC authorized the removal of the four-inch Recirculation System bypass lines and bypass valves, RR-MO-54A/B. The discharge valves, RR-MO-53A/B, circuitry was modified to provide an automatic jogging open function whenever the recirculation pumps are started. The open seal-in circuit originally installed for the discharge valves was removed to allow bumping open the valves for loop warmup prior to starting the pump and for proper cooldown after the pump is secured. The bypass lines and valves were removed due to IGSCC found during the previous outage.

Safety Analysis: Removal of the bypass lines and valves reduces the amount of piping that was originally exposed to IGSCC. The modification of the discharge valves opening circuitry does not degrade safe shutdown of the plant since the closing circuitry only has the bypass valve permissive requirement removed thereby maintaining its closing function. The margin of safety was not diminished since the MDC actually simplified the Recirculation System operation.

III. PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION 1984

Work and Job Function	Number of Personnel (>100 mRem)			Total Man-Rem		
	Station Employees	Utility Employees	Contractor & Others	Station Employees	Utility Employees	Contractor & Other
REACTOR OPERATIONS & SURV.						
Maintenance Personnel	9	0	16	0.500	0.000	0.615
Operating Personnel	47	0	0	19.972	0.000	0.000
Health Physics Personnel	18	0	7	11.120	0.000	0.626
Supervisory Personnel	16	3	6	3.410	0.208	0.092
Engineering Personnel	18	7	16	4.729	0.146	1.385
ROUTINE MAINTENANCE						
Maintenance Personnel	109	0	36	79.091	0.000	6.079
Operating Personnel	3	0	0	0.022	0.000	0.000
Health Physics Personnel	13	0	0	1.317	0.000	0.000
Supervisory Personnel	5	1	6	0.924	0.002	1.380
Engineering Personnel	3	6	12	0.475	0.424	1.158
SPECIAL MAINTENANCE						
Maintenance Personnel	0	1	412	0.000	0.456	471.449
Operating Personnel	37	0	0	3.258	0.000	0.000
Health Physics Personnel	16	0	17	8.829	0.000	13.263
Supervisory Personnel	3	4	68	0.438	1.331	83.680
Engineering Personnel	6	9	12	0.429	2.049	5.171
WASTE PROCESSING						
Maintenance Personnel	12	0	2	0.772	0.000	0.106
Operating Personnel	20	0	0	3.341	0.000	0.000
Health Physics Personnel	15	0	0	2.715	0.000	0.000
Supervisory Personnel	3	0	0	0.154	0.000	0.000
Engineering Personnel	1	0	0	0.108	0.000	0.000
REFUELING						
Maintenance Personnel	0	0	1	0.000	0.000	0.091
Operating Personnel	40	0	0	5.863	0.000	0.000
Health Physics Personnel	1	0	0	0.018	0.000	0.000
Supervisory Personnel	3	0	0	0.221	0.000	0.000
Engineering Personnel	2	0	0	0.124	0.000	0.000
INSERVICE INSPECTION						
Maintenance Personnel	0	0	8	0.000	0.000	4.445
Operating Personnel	1	0	0	0.005	0.000	0.000
Health Physics Personnel	0	0	1	0.000	0.000	0.007
Supervisory Personnel	2	0	0	0.101	0.000	0.000
Engineering Personnel	0	1	1	0.000	0.052	0.160
TOTA						
Maintenance Personnel	109	1	431	80.363	0.456	482.785
Operating Personnel	50	0	0	32.461	0.000	0.000
Health Physics Personnel	18	0	17	23.999	0.000	13.896
Supervisory Personnel	16	4	69	5.248	1.541	85.152
Engineering Personnel	18	10	22	5.865	2.671	7.875
GRAND TOTALS	211	15	539	147.936	4.668	589.708