Mr. Charles H. Cruse Vice President Constellation Nuclear Calvert Cliffs Nuclear Power Plant, Inc. 1650 Calvert Cliffs Parkway Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT - NRC INSPECTION REPORT

50-317/01-05, 50-318/01-05

Dear Mr. Cruse:

On June 30, 2001, the NRC completed an inspection at your Calvert Cliffs Nuclear Power Plant Units 1 & 2. The enclosed report documents the inspection findings which were discussed on July 18, 2001, with Mr. Katz and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Michele G. Evans, Chief Projects Branch 1 Division of Reactor Projects

Docket Nos. 50-317

50-318

License Nos. DPR-53

DPR-69

Enclosures: Inspection Report 50-317/01-05 and 50-318/01-05

Attachment 1 - Supplemental Information

cc w/encl:

- B. Montgomery, Director, Nuclear Regulatory Matters (CCNPPI)
- R. McLean, Administrator, Nuclear Evaluations
- J. Walter, Engineering Division, Public Service Commission of Maryland
- K. Burger, Esquire, Maryland People's Counsel
- R. Ochs, Maryland Safe Energy Coalition

State of Maryland (2)

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U.S. NUCLEAR REGULATORY COMMISSION REGION I

Docket Nos: 50-317, 50-318 License Nos.: DPR-53, DPR-69

Report No: 50-317/01-05;

50-318/01-05

Licensee: Calvert Cliffs Nuclear Power Plant, Inc.

Facility: Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Location: 1650 Calvert Cliffs Parkway

Lusby, MD 20657-4702

Dates: May 13, 2001 - June 30, 2001

Inspectors: David Beaulieu, Senior Resident Inspector

Fred Bower, Resident Inspector

Ronald Nimitz, Senior Health Physicist

Approved by: Michele G. Evans, Chief, Projects Branch 1

Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000317/2001-005, 05000318/2001-005, on 05/13/01 - 06/30/01, Calvert Cliffs Nuclear Plant, Inc.; Calvert Cliffs Nuclear Power Plant, Units 1 & 2. Resident Inspector Report.

The inspection was conducted by resident inspectors and a regional senior health physicist. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html. Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation.

A. <u>Inspector Identified Findings</u>

No findings of significance were identified.

B. Licensee Identified Findings

A violation of very low significance which was identified by the licensee has been reviewed by the inspector. Corrective actions taken or planned by the licensee appear reasonable. This violation is listed in section 4OA7 of this report.

Report Details

Unit 1 operated at or near 100 percent power except for a two-day period beginning May 18, 2001, when the unit was shut down to balance the No. 11 reactor coolant pump. At the beginning of the period, Unit 2 was shutdown in a refueling outage and was restarted on May 14, 2001. Following power ascension, Unit 2 operated at or near 100 percent power for the remainder of the inspection period except for a two day period beginning June 26, 2001, when operators performed rapid down powers in response to a No. 21 main feedwater pump lubricating oil leak followed by a failure of the main turbine throttle valve controls. Unit 2 was reduced to 12 percent power to support main turbine throttle valve control and the No. 21 main feedwater pump repairs, and was then returned to full power.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

.1 Partial Walkdown

a. <u>Inspection Scope</u>

The inspectors conducted an equipment alignment partial walkdown to evaluate the operability of a selected redundant train or backup system, while the affected train or system was inoperable or out of service. The walkdown included a review of system operating instructions to determine correct system lineup and verification of critical components to identify any discrepancies which could affect operability of the redundant train or backup system. The inspectors performed partial system walkdowns on the following systems:

- No. 22 Salt Water System was inspected on June 6, 2001, while Facility 1 was out of service for maintenance.
- Unit 2 4.16 KV Breakers were inspected on June 29, 2001.

The inspectors reviewed the following Calvert Cliffs Nuclear Power Plant documentation:

- Operating Instruction OI-29, "Saltwater System."
- Operating Instruction OI-27C, "4.16 KV System."

b. Findings

No findings of significance were identified.

1R05 Fire Protection - Fire Area Tours

a. <u>Inspection Scope</u>

The inspectors conducted tours of areas important to reactor safety to evaluate conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment and features; and (3) the fire barriers used to prevent fire damage

or fire propagation. The inspectors used administrative procedure SA-1-100, "Fire Prevention," during the conduct of this inspection. The areas inspected included:

- 2A and 1B Emergency Diesel Generator Rooms
- 2B Emergency Diesel Generator Room
- 1A Emergency Diesel Generator Building
- Unit 1 and Unit 2 Intake Structures

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. <u>Inspection Scope</u>

The inspectors reviewed performance-based problems involving selected in-scope structures, systems, or components (SSCs) to assess the effectiveness of the maintenance program. Reviews focused on: (1) proper maintenance rule scoping, in accordance with 10 CFR 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) and (a)(2) classifications; and, (5) the appropriateness of performance criteria for SSCs classified as (a)(2), and goals and corrective actions for SSCs classified as (a)(1). The inspectors reviewed the most recent system health reports and system functional failures of the last two years. The following SSCs were reviewed:

- The sampling system is a non-risk significant system within the scope of the maintenance rule. The licensee has appropriately classified this system as (a)(1) primarily due the unavailability criteria being exceeded for both hydrogen gas analyzing systems. The licensee determined that the unavailability criteria were exceeded because insufficient priority was placed on the maintenance performed on this equipment. The inspectors evaluated the acceptability of the licensee's corrective action plans as documented in Issue Report (IR) Nos. IR3-020-386 and IR3-031-367. Corrective actions include providing maintenance coverage on two shifts and weekends until the unavailability criteria are met. During February 2001 surveillance testing, the licensee identified problems with one of the two hydrogen analyzers which resulted in the addition of approximately 500 unavailability hours to that train. The licensee has completed a cause determination (IR3-083-634) and is evaluating corrective actions. The licensee plans to revise their (a)(1) corrective action plan for this system.
- The area and process radiation monitoring systems are non-risk significant systems within the scope of the maintenance rule. The licensee had appropriately classified the Units 1 and 2 wide range noble gas monitor (WRNGM) systems as (a)(1) primarily due to repetitive functional failures of the process flow instrumentation. The licensee determined that these functional failures resulted from failure of the main vent process flow transducer. The flow transducers were replaced with velocity-type flow meters and upgrades were made to the monitors. The Unit 1 WRNGM system recently completed the

required monitoring period of successful operation and was planned to be returned to (a)(2) status. However, due to a recent repetitive failure of the Unit 1 WRNGM system power supply, the system may remain in (a)(1) status. During this review, the inspectors noted that the licensee took appropriate action to initiate an IR (IR3-081-530) because the system report cards were not maintained up-to-date for the area and radiation monitoring systems since the first quarter of 2000.

- The inspector evaluated the functional failures and unavailability of the auxiliary feedwater (AFW) system and verified the licensee had appropriately classified the system as (a)(1). IR No. IR3-041-139 describes a functional failure of the No. 11 AFW pump when the pump was tripped due to a high temperature on the outboard turbine bearing. The licensee is in the process of finalizing a corrective action plan to address this failure. Additional NRC inspector follow-up and review of this issue will be documented in Special Inspection Report 05000317/2001-009. In addition, IR No. IR3-032-9364 describes the unavailability of the No. 23 AFW pump due to the cross-connect line to Unit 1 being out of service to allow heavy equipment to be moved to support modifications to the service water system.
- The inspector evaluated the licensee's (a)(1) corrective action plan to address four instances at Unit 1 since August 1999, where the main feedwater control system failed to control steam generator water level in automatic. The licensee's criteria for the number of failures is less than two failures to control steam generator level per unit per two years. The most recent failure occurred on September 12, 2000, when the feedback linkage broke on the main feedwater bypass control valve, No. 1-CV-1106. The feedback linkage, which was made of relatively low strength "pot aluminum" was replaced with a stainless steel linkage.

The inspectors also reviewed the following Calvert Cliffs Nuclear Power Plant documentation:

- Station Procedure MN-1-112, "Managing System Performance."
- Maintenance Rule Scoping Document, Revision 17.
- Maintenance Rule Indicator Report, May 2001.
- Hydrogen Gas Analyzing System Report Card, March 2001.
- Hydrogen Analyzer (System 38B) Performance Indicators, 1st Quarter 2001.
- Area and Process Radiation Monitoring (Systems 077/079) Report Cards, March 2000 and June 2001.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For the selected maintenance orders (MO) listed below, the inspectors verified: (1) risk assessments were performed in accordance with the Calvert Cliffs Maintenance Rule Risk Assessment Guideline; (2) risk of scheduled work was managed through the use of compensatory actions; and (3) applicable contingency plans were properly identified in the integrated work schedule.

•	MO1200004656	1CV4512 - No. 12 Steam Generator AFW Flow Control
		Valve
•	MO2199902057	No. 21 Salt Water Pump Motor Swap Out
•	MO2200100008	No. 21A Salt Water Heat Exchanger Cleaning

b. <u>Findings</u>

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Events and Evolutions

a. <u>Inspection Scope</u>

The inspectors reviewed operator performance during the June 26, 2001, transient at Unit 2. In response to a low lubricating oil level alarm on the No. 21 main feedwater pump, an oil leak was discovered necessitating that reactor power be reduced to less than 70 percent to allow securing the pump. While at 70 percent, the No. 22 main turbine governor control valve malfunctioned, resulting in the governor valve closing and a rapid reduction in load. Reactor power decreased to 33 percent. Operators secured pressurizer heaters and took manual control of feedwater flow in response to reactor pre-trip alarms. The inspectors examined operator logs, equipment response, sequence of events recorder logs, and alarm response procedures to determine if operators performed the appropriate actions in accordance with their training and procedures.

b. <u>Findings</u>

No findings of significance were identified.

1R15 Operability Evaluations

a. <u>Inspection Scope</u>

The inspectors reviewed selected operability evaluations affecting risk significant mitigating systems to assess: (1) technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were appropriately addressed with respect to their collective impact on continued safe plant operation; and (4) where compensatory measures were involved, whether the measures were in place, would work as intended, and were appropriately controlled. The following evaluations were reviewed:

 Operability Determination 2001-006, "No. 22A Safety Injection Tank Anchor Bolting Indications." Operability Determination 2001-007, "Unit 1 Main Spray and Auxiliary Spray Piping Anchor."

b. <u>Findings</u>

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. <u>Inspection Scope</u>

The inspectors reviewed post-maintenance test procedures and associated testing activities for selected risk significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness, consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy for the application; (5) tests were performed, as written, with applicable prerequisites satisfied; and (6) that equipment was returned to the status required to perform its safety function. The following maintenance order activities and associated surveillance test procedures (STPs) were reviewed:

- MO1200004656, 1CV4512 No. 12 Steam Generator AFW Flow Control Valve.
- MO2199902057, No. 21 Salt Water Pump Motor Swap Out.
- MO1200003322 and 1200003321, No. 1A Emergency Diesel Generator (EDG) Lube Oil, Fuel Oil, Air Start and Instrumentation Systems (Additional MOs reviewed were: 1200100879; 1200100882; 1200004736; 1200004681; 1200100642; 1200003665; 1200003666; 1200100891)
- STP O-05A-1, "Auxiliary Feedwater System Quarterly Surveillance Test."
- STP O-73A-2, "Saltwater Pump and Check Valve Quarterly Operability Test."
- STP O-8A-1, "Test of 1A DG and No. 11 4Kv Bus Loss of Coolant Incident Sequencer."

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

Unit 2 was restarted from the refueling outage on May 14, 2001. The inspectors observed portions of the plant start-up and heat-up activities, and verified on a sampling basis that technical specifications, license conditions, and administrative procedures were met prior to mode changes.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. <u>Inspection Scope</u>

The inspectors witnessed performance of surveillance test procedures and reviewed test data of selected risk-significant systems, structures, and components (SSCs) to assess whether the SSCs satisfied Technical Specifications, Updated Final Safety Analysis Report, Technical Requirements Manual, and licensee procedure requirements. The inspectors assessed whether the testing appropriately demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions. The following tests were witnessed:

- STP O-73A-2, "Saltwater Pump and Check Valve Quarterly Operability Test."
- OI-30, "Nuclear Instrumentation," Section 6.2, "Excore Nuclear Instrumentation
 Power Range Safety Channel Calibration." The inspection included a review of
 the plant process computer software formulas used to perform a secondary heat
 balance.
- ETP 98-040R, "11A Service Water (SRW) Heat Exchanger (HX) Thermal Performance Test."
- ETP 98-041R, "12A and 12B SRW HX Thermal Performance Test." The thermal performance test inspection consisted of an in-progress review of the test equipment, test procedures and test records, and observation of selected portions of the data collection. The inspector noted that monitoring equipment is installed on the Nos. 12A and 12B SRW HXs and during warm weather months the system manager periodically reports the fouling resistance and saltwater temperature operating limit for these heat exchangers.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

The inspector reviewed the following aspects of the access control program to determine the effectiveness of access controls to radiologically significant areas:

- The maximum occupational radiation exposure values sustained during the 2001
 Unit 2 outage were reviewed to: (1) determine the circumstances and magnitude
 of individual exposure results attributable to external or internal radiation
 exposure; and, (2) whether any doses potentially exceeded performance
 indicator (PI) values.
- Access points to five locked High Radiation Area access points were physically inspected to determine if controls were sufficient to preclude unauthorized entry.
- Independent radiation measurements were made during station tours to verify that areas expected to exhibit radiation levels in excess of 100 mR/hr, were properly posted and controlled as High Radiation Areas.
- Changes in physical and/or administrative controls for High and Very High Radiation Areas were discussed to identify if the changes potentially degraded access controls to such areas.

Recent Issue Reports (IRs) and self-assessments were selectively reviewed to verify appropriate implementation of the problem identification and resolution program. Identified deficiencies were reviewed to evaluate characterization, prioritization, and resolution of issues, including radiation worker and/or radiation protection technician human performance errors. The review focused on occurrences identified during the 2001 Unit 2 outage. The following documents were reviewed:

- IR Nos.: IR3-072-036, IR3-071-950, IR3-072-037, IR3-072-028, IR3-052-617, IR3-082-856, IR3-059-490, IR3-071-886, IR3-071-939, IR3-071-907, and IR3-071-931.
- Nuclear Performance Assessment No. 2000-99
- Radiation Protection Audit Checklist No. 2001-01

The review of the above matters was against requirements contained in Part 20 of 10 CFR, Technical Specifications, and applicable station procedures.

b. <u>Findings</u>

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

The inspector selectively reviewed the adequacy and the effectiveness of the program to reduce occupational radiation exposure to as low as is reasonably achievable (ALARA). The following matters were reviewed to assess licensee performance in this area:

- The station's collective exposure history, current exposure trends, two and three-year rolling average collective exposures.
- The licensee's understanding of plant radiation source terms, its source term control strategy, and prioritization and implementation of source term reduction initiatives. In particular, changes in sources terms encountered during the 2001 Unit 2 outage.
- The comparison of actual collective exposure results versus initial collective
 exposure estimates for major radiological work activities conducted during the
 2001 Unit 2 outage (to determine the adequacy and effectiveness of estimation
 methods and exposure tracking). The collective occupational exposure results
 were examined for baseline refueling work paths, including reactor refueling,
 steam generator maintenance, reactor coolant pump maintenance, valve
 maintenance, radiation safety, scaffolding, and minor maintenance modifications
 associated with incore instrumentation.

The review in the above areas was against 10 CFR 20, applicable NRC Regulatory Guides, and licensee procedures.

b Findings

No findings of significance were identified.

4 OTHER ACTIVITIES

40A1 Performance Indicator Verification

a. Inspection Scope

The inspectors reviewed data for the two below listed emergency preparedness cornerstone performance indicators (PIs) to verify accuracy and completeness. This inspection examined data and plant records from the second quarter of 2000 through the first quarter of 2001, including review of PI Data Summary Reports, plant chemistry records, licensed operator training records, emergency drill roster records, emergency

response organization key member roster records, and operations shift manager and alternates roster records.

- Emergency Response Organization (ERO) Drill Participation
- Drill/Exercise Performance (DEP)
- Reactor Coolant System Activity

b. <u>Findings</u>

The inspectors reviewed the calculation and supporting data for the ERO Drill Participation PI and noted that some personnel standing the Shift Manager watch had not been included in the calculation. Licensee personnel identified that this condition had been identified previously and IR3-051-269 was written. The IR documented that licensed operators not currently on-shift and operators assigned to a shift may not be tracked for all ERO requirements and that the NRC PI data could be affected. The inspectors discussed this issue with operations management and the licensee took action to verify that all personnel that could stand watch were fully qualified members of the ERO.

The inspectors reviewed the calculation and supporting data for the DEP PI. The inspectors noted that the licensee did not follow the NEI 99-02 guidance to identify, in advance, the DEP opportunities that would be formally assessed. The licensee initiated IR3-051-232 to document this issue. The inspectors also noted that some personnel included in the calculation currently were not qualified to stand the Shift Manager watch. IR No. IR3-051-269 documented that licensed operators not currently on-shift and operators assigned to a shift may not be tracked for all ERO requirements and ERO Drill Participation PI could be affected. The licensee initiated IR3-051-233 to document that this issue could also affect the DEP PI. The licensee also initiated IR3-075-150 to document that no clear process existed to ensure that the ERO roster was properly maintained up-to-date.

The licensee corrected the performance indicator data and recalculated both PIs. The recalculations resulted in changes which the licensee plans to report to the NRC at the end of the second quarter of 2001. These issues were considered minor since the changes did not cross a PI threshold.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection findings to members of licensee management on July 18, 2001. The licensee acknowledged the findings.

.2 <u>Annual End-of-Cycle Assessment Meeting</u>

A public meeting was held on June 26, 2001, in the Education Center at the Calvert Cliffs Nuclear Power Plant, to discuss the End-of-Cycle (EOC) Plant Performance Assessment results. This assessment was performed under the new Reactor Oversight Process and was documented in a letter to CCNPPI, dated May 31, 2001. The NRC presentation was lead by Michele G. Evans, Chief, Projects Branch 1, Division of Reactor Projects. Slides from this meeting can be found in the Publicly Available Records component of the NRC's document system (ADAMS) under ascension number ML011780161.

4OA7 Licensee Identified Violation

The following finding of very low safety significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a Non-Cited Violation (NCV).

NCV Tracking Number Requirement Licensee Failed To Meet NCV 05000318/2001-005-01 On May 3, 2001, the licensee did not conduct

On May 3, 2001, the licensee did not conduct adequate radiological surveys, as required by 10 CFR 20.1501, to detect the presence of loose radioactive contamination, contained within the Unit 2 reactor shroud, prior to starting control element drive motor (CEDM) fans. Reference the licensee's corrective action program IR No. IR3-076-089. This is being treated as a Non-Cited Violation.

The inspector noted that following the start of the Unit 2 CEDM fans on May 3, quantities of loose radioactive contamination were blown into the containment atmosphere from within the shroud area resulting in generation of elevated airborne radioactivity within containment, evacuation of workers from containment, and limited intakes of radioactive material by workers. No personnel overexposure occurred, no substantial potential for such an overexposure was apparent, and the licensee's ability to assess dose was not compromised.

If you deny this Non-Cited Violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at the Calvert Cliffs Nuclear Power Plant.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

- C. Cruse, Vice President
- J. Guidotti, Health Physicist
- M. Haney, Radiation Protection Supervisor
- D. Holm, Superintendent, Nuclear Operations
- P. Katz, Plant General Manager
- T. Kirkham, Senior Plant Health Physicist
- B. Montgomery, General Supervisor, Plant Engineering
- M. Navin, Superintendent, Technical Support
- K. Nietmann, Manager, Nuclear Performance Assessment Department
- T. Pritchett, Manager, Nuclear Engineering Department
- S. Sanders, General Supervisor-Radiation Safety
- L. Smialek, Radiation Protection Manager
- J. Spina, Superintendent, Nuclear Maintenance
- R. Wyvill, ALARA Supervisor
- J. York, Assistant General Radiation Supervisor

NRC

- M. Evans, Chief Projects Branch 1, Division of Reactor Projects
- P. Torres, Project Engineer
- M. Gray, Reactor Inspector, Division of Reactor Safety
- D. Skay, Project Manager, Office of Nuclear Reactor Regulation

ITEMS OPENED AND CLOSED

Opened and Closed

05000318/2001-005-01

NCV

Failure to conduct adequate radiological surveys of the Unit 2 reactor shroud. (Section 4OA7)

LIST OF ACRONYMS USED

AFW Auxiliary Feed Water

ALARA As Low As Reasonably Achievable CCNPPI Calvert Cliffs Nuclear Power Plant, Inc.

CEDM Control Element Drive Motor
CFR Code of Federal Regulations
DEP Drill/Exercise Performance
EDG Emergency Diesel Generator

EOC End of Cycle

ERO Emergency Response Organization

HX Heat Exchanger
IR Issue Report
MO Maintenance Order
NCV Non-cited Violation

NRC Nuclear Regulatory Commission

PI Performance Indicator

SDP Significance Determination Process

SRW Service Water

SSC Structure, System and Component

STP Surveillance Test Procedure TS Technical Specification

WRNGM Wide Range Noble Gas Monitor