

June 16, 2000

EA-00-131

Mr. Michael T. Coyle  
Vice President  
Clinton Power Station  
AmerGen Energy Company, LLC  
Mail Code V-275  
P. O. Box 678  
Clinton, IL 61727

SUBJECT: CLINTON POWER STATION - NRC INSPECTION REPORT  
50-461/2000008(DRP) AND EXERCISE OF ENFORCEMENT DISCRETION

Dear Mr. Coyle:

On May 20, 2000, the NRC completed a safety inspection at your Clinton Power Station. The results of this inspection were discussed on May 22, 2000, with you and other members of your staff. The enclosed report presents the results of that inspection.

This inspection was an examination by the resident inspectors of activities conducted under your license as they relate to safety, verification of performance indicators, and to compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel.

We have determined during this inspection that performance indicator (PI) data with significant errors were submitted to the NRC. However discretion is being exercised pursuant to Section VII.B.6 of the NRC Enforcement Policy not to cite the violation because the errors were not willful and all aspects of the process for submission of PI data have not been finalized.

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 ADAMS Public Library component on the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (The Public Electronic Reading Room.)

Sincerely,

*/RA/*

Thomas J. Kozak, Chief  
Reactor Projects Branch 4

Docket No. 50-461  
License No. NPF-62

Enclosure: Inspection Report 50-461/2000008(DRP)

See Attached Distribution

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**OFFICIAL RECORD COPY**

M. Coyle

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cc w/encl: P. Hinnenkamp, Plant Manager  
M. Reandeu, Director - Licensing  
G. Rainey, Chief Nuclear Officer  
E. Wrigley, Manager-Quality Assurance  
M. Aguilar, Assistant Attorney General  
G. Stramback, Regulatory Licensing  
Services Project Manager  
General Electric Company  
Chairman, DeWitt County Board  
State Liaison Officer  
Chairman, Illinois Commerce Commission

ADAMS Distribution:

WES

JBH1 (Project Mgr.)

R. Borchardt, OE

D. Dambly, OGC

V. Ordaz, NRR

J. Caldwell, RIII w/encl

B. Clayton, RIII w/encl

SRI Clinton w/encl

DRP w/encl

DRS w/encl

RIII\_IRTS

JRK1

BAH3

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-461  
License No: NPF-62

Report No: 50-461/2000008(DRP)

Licensee: AmerGen Energy Company, LLC

Facility: Clinton Power Station

Location: Route 54 West  
Clinton, IL 61727

Dates: April 2 through May 20, 2000

Inspectors: P. L. Loudon, Senior Resident Inspector  
C. E. Brown, Resident Inspector  
D. E. Zemel, Illinois Department of Nuclear Safety

Approved by: Thomas J. Kozak, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

## NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

### Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

### Radiation Safety

- Occupational
- Public

### Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

## SUMMARY OF FINDINGS

### Clinton Power Station NRC Inspection Report 50-461/2000008(DRP)

The report covers a seven-week period of resident inspection. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609.

#### **Cornerstone: Initiating Events**

- Green. A labeling discrepancy contributed to the improper isolation of a protective relay for the 4.16kV Bus 1B Reserve Feed Breaker. As a result, during functional testing, the relay actuated and caused the bus to be de-energized which ultimately resulted in a manual reactor shut down. This issue was determined to be of very low risk significance due to remaining mitigation capability and recovery potential. (Section 4OA3)

#### **Other: Performance Indicator Verification**

- No Color. The licensee identified a failure to submit accurate information to the NRC. The inaccurate information involved the historical data submittal for the Safety System Functional Failure Performance Indicator. The error resulted in a response band color change from Green to White for the first quarter 1999 Performance Indicator. The NRC exercised Enforcement Discretion pursuant to Section VII.B.6 of the Enforcement Policy and did not cite the violation. (Section 4OA2.4)

## Report Details

### Summary of Plant Status

The licensee continued to operate the plant at essentially 100 percent power during the inspection period. Routine weekend down powers were accomplished to conduct turbine stop valve testing and control rod drive sequence exchanges. On May 17, 2000, the reactor was manually shut down in anticipation of an automatic shut down due to decreasing reactor vessel level. Preparations were nearly complete to restart the reactor when the inspection ended on May 20.

#### 1. **Reactor Safety**

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

##### 1R01 Adverse Weather (71111.01)

###### a. Inspection Scope

The inspectors reviewed the licensee's readiness for spring and summer adverse weather conditions (hot temperatures, severe storms and tornados). The inspectors also observed the actions taken by the licensee in response to a tornado warning which was issued for the area including the site on April 20. The inspection included a walkdown of risk significant systems and components that could be challenged by adverse weather.

###### b. Issues and Findings

There were no findings identified during this inspection.

##### 1R04 Equipment Alignments (71111.04)

###### a. Inspection Scope

The inspectors reviewed Piping and Instrument Drawings (P&IDs) and conducted partial walkdowns of the following high risk importance safety systems:

- Residual Heat Removal system "A" and P&ID M05-1075.
- Division I and Division II Automatic Depressurization System, and P&ID M05-1040.

###### b. Issues and Findings

There were no findings identified during this inspection.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors reviewed portions of the licensee's Fire Protection Evaluation Report (FPER) and the Updated Safety Analysis Report (USAR) to verify consistency in the documented analysis with installed fire protection equipment at the station. The inspectors conducted walk downs of the following risk significant areas to ensure that no fire protection degradations existed:

- Fire pump A and B rooms (Fire zones M3 and M4)
- Reactor Core Isolation Cooling (RCIC) System pump rooms and corridors located on the 707' elevation of the auxiliary building (Fire zones A1a and A2a)
- The Main Control Room (MCR) complex including the Technical Support Center and Operations Support Center areas (Fire zones CB6, CB6b, and CB6c)
- The Division I and II cable spreading rooms on the 781' elevation of the control building (Fire zones CB2 and CB4)

b. Issues and Findings

There were no findings identified during this inspection.

1R06 Flood Protection (71111.06)

a. Inspection Scope

The inspectors reviewed the following licensee documents and procedures associated with the protection of equipment during external flooding conditions.

- Clinton Power Station Individual Plant Examination of External Events, Section 5.2, "Flooding Analysis"
- Procedure 3005.01, "Unit Power Changes," Revision 21
- Procedure 3006.01, "Unit Shutdown," Revision 27
- Procedure 4303.02, "Abnormal Lake Level," Revision 5
- Emergency Plan Implementing Procedure EC-02, "Emergency Classifications"
- Clinton Updated Safety Analysis Report, Section 2.4.2, "Floods"

In addition, the inspectors conducted a walkdown of the circulating water screen house and the shutdown service water system pump room cubicles to review external flood protection measures.



b. Issues and Findings

There were no findings identified during this inspection.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the maintenance rule requirements, including a review of scoping, goal-setting, and performance monitoring, short-term and long-term corrective actions, and current equipment performance status. The systems selected for the inspection were all classified as risk significant by the licensee's maintenance rule program. The systems evaluated were the containment hydrogen/oxygen (H<sub>2</sub>-O<sub>2</sub>) gas monitoring system and the rod control and information system (RC&IS).

Documents reviewed during the inspection of the above systems included:

- Condition Report (CR) 2-00-04-057, "Unplanned Limiting Condition for Operations Entry for H<sub>2</sub>-O<sub>2</sub> Gas Monitor"
- CPS 9000.10, "Accident Monitoring and Remote Shutdown Instrumentation Log," Revision 29
- CPS 9437.14, "Containment/Drywell Atmosphere H<sub>2</sub>-O<sub>2</sub> Monitoring System Channel Calibration," Revision 37
- CR 2-00-01-027, "Maintenance Rule Functional Failure of RC&IS Transponder Card"
- CR 2-00-03-055, "RC&IS Inoperability Results in Unplanned Entry Into Operational Requirements Manual (ORM) 2.1.2"
- CR 2-00-04-001, "Unplanned Entry In ORM Action Due to RC&IS Lockup"

b. Issues and Findings

There were no findings identified during this inspection.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation (71111.13)

a. Inspection Scope

The inspectors observed the licensee's risk assessment processes and considerations used to plan and schedule maintenance activities on safety-related structures, systems, and components. The inspectors assessed the conduct of risk management for the following work activities or work weeks:

- Work control for standby liquid control system operability surveillance per CPS 9015.01, "Standby Liquid Control System Operability," Revision 37b
- Emergent off gas system ventilation problems during the week of April 17, 2000.
- Emergent circulating water pump "A" problems during the week of May 7, 2000.

b. Issues and Findings

There were no findings identified during this inspection.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed operability determinations and evaluations associated with CR 2-00-01-124, "Control rod 36-49 was slow to insert and lost numerical position indication while full in" and CR 2-00-05-038, "Division III EDG protective relay "As-Found" set-points out of tolerance."

b. Observations and Findings

There were no findings identified during this inspection.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed and observed portions of the following post-maintenance testing activities involving risk significant equipment:

- Control room ventilation system train "B" hydramotor repair and testing conducted per CPS 8452.10, "Hydramotor Preventive Maintenance," Revision 4
- Return to service PMT for control rod 36-49 as directed by CPS 3304.01, "Control Rod Hydraulic and Control," Revision 28b
- Maintenance inspection and PMT on the control room ventilation system fan motor "B" conducted per Action Request D82407 and CR 2-00-05-045

b. Issues and Findings

There were no findings identified during this inspection.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed the performance of the following surveillance testing on risk significant systems and equipment:

- Division II Emergency Diesel Generator per CPS 9080.01, "Diesel Generator 1A (1B) Operability - Manual and Quick Start Operability," Revision 45a
- Division III Emergency Diesel Generator per CPS 9080.02, "Diesel Generator 1C Operability - Manual and Quick Start Operability," Revision 44b
- High Pressure Core Spray system per CPS 9051.01, "HPCS System Pump Operability," Revision 38
- Division III Shutdown Service Water system per CPS 9069.01, "Shutdown Service Water Operability Test," Revision 41
- Reactor Core Isolation Cooling system per CPS 9054.02, "Reactor Core Isolation Cooling Valve Operability Checks," Revision 34a

b. Issues and Findings

There were no findings identified during this inspection.

**4. Other Activities**

4OA2 PI Verification (71151)

Cornerstone: Initiating Events

.1 Unplanned SCRAMS per 7000 Critical Hours

a. Inspection Scope

The inspectors verified the Unplanned SCRAMS per 7000 Critical Hours Performance Indicator data reported by the licensee for January 1999 through March 2000. This was accomplished, in part, through a review of plant operating report data, operations department log entries, and discussions with licensee personnel.

b. Issues and Findings

There were no findings identified during this inspection.

.2 SCRAMS with a Loss of Normal Heat Removal

a. Inspection Scope

The inspectors verified the SCRAMS with a Loss of Normal Heat Removal Performance Indicator data reported by the licensee for January 1999 through March 2000. This was accomplished, in part, through a review of operations department log entries and discussions with licensee personnel.

b. Issues and Findings

There were no findings identified during this inspection.

Cornerstone: Mitigating Systems

.3 Safety System Unavailability, Emergency Diesel Generators

a. Inspection Scope

The inspectors verified the Safety System Unavailability, Emergency Diesel Generators (EDGs) Performance Indicator data reported by the licensee for January 1999 through March 2000. This was accomplished, in part, through evaluations of operations department log entries pertaining to EDG inoperability and unavailability times, a review of action requests and surveillance tests for the EDGs, and discussions with licensee personnel.

b. Issues and Findings

There were no findings identified during this inspection.

Cornerstone: Mitigating Systems

.4 Historical PI Data for Safety System Functional Failure PI

a. Inspection Scope

The inspectors verified the Historical PI Data for Safety System Functional Failure PI data reported by the licensee for January 1999 through March 2000. This was accomplished, in part, through a review of operations department log entries and discussions with licensee personnel.

b. Issues and Findings

During the inspection, the licensee informed the inspectors of an error discovered in the data submitted to the NRC in January 2000 regarding the Safety System Functional Failure PI. The cause of the error was attributed to using the event dates for the functional failures rather than the reporting date (to the NRC) for the failure. The difference in calculating quarterly data based on the reporting date versus the event date changed the 2<sup>nd</sup> quarter 1998 data from 1 event to 4. This changed the number

functional failures for 1998 from 6 events to 9. The 1998 data was used to establish the first quarter 1999 performance window data. The total of 9 events would have placed the Safety System Functional Failure PI in the white response band window rather than the green response band window which was reported to the NRC. The licensee documented the error in CR 2-00-02-134 and established corrective actions to prevent recurrence. Because these errors were not willful, we are exercising enforcement discretion in accordance with the Interim Enforcement Policy Regarding Enforcement Discretion for Inaccurate or Incomplete Performance Indicator Data for Nuclear Power Plants (May 1, 2000; 65 FR 25368) and not issuing any enforcement action for these errors.

#### 4OA3 Event Follow-up

##### a. Inspection Scope

The inspectors responded to and observed the recovery from a manual reactor shut down on May 17, 2000.

##### b. Observations and Findings

###### Event Description and Equipment Performance

On May 17, 2000, at 10:14 a.m. (CDT), reactor operators manually shut down the reactor and started the reactor core isolation cooling (RCIC) system after receiving several annunciator alarms that indicated nonsafety-related 4.16 kV electrical bus 1B was lost. The loss of this electrical bus resulted in a loss of both turbine driven reactor feedwater pumps and a subsequent decrease in reactor vessel level. The manual shut down and RCIC system initiation were conducted in anticipation of an automatic shut down signal for low reactor vessel level. All control rods inserted when the reactor was manually shut down. Major equipment which was not available due to the loss of the non-safety related "1B" 4.16 kV electrical bus included:

- the "B" and "D" operating condensate booster pumps
- the operating service air compressor
- 1 of 2 operating component cooling water pumps
- the operating service water pump
- the operating "B" control rod drive pump
- the low frequency motor generator set for the "1B" reactor recirculation pump

The reactor recirculation pumps switched to low speed following the shut down and the 1B recirculation pump shut down because its low frequency motor generator set was not available. The standby service air compressor was powered from the 1A nonsafety-related 4.16 kV electrical bus but failed to automatically start due to low component cooling water pressure. The loss of the service air compressors resulted in a loss of instrument air. Due to the loss of instrument air, the main steam isolation valves drifted closed; therefore, the operators closed the 4 outboard MSIV control switches. Reactor vessel water level control was maintained by injecting water via the feedwater system, control rod drive system, and the RCIC system.

The loss of instrument air also resulted in the closing of the extraction steam supply to the steam seal evaporator valves. This led to a loss of gland seal steam to the turbine and required the operators to break condenser vacuum. This removed the main condenser from service as a heat sink. The condenser is the normal heat removal flow path. Once pressure and level control in the reactor vessel was stabilized, the operator commenced a controlled cooldown of the reactor. Due to the loss of the condenser as a heat removal flow path, main steam safety relief valves were opened to reduce pressure in the reactor vessel. Throughout the course of the cooldown, SRVs were opened 18 times to relieve pressure in the reactor vessel until the condenser was made available as a heat removal source (approximately 12 hours after the shut down). The reactor was cooled down and placed in cold shutdown at approximately 2:00 p.m. on May 18, 2000, with residual heat removal system train "B" providing shut down cooling.

#### Event Risk Analysis

This event was characterized as a shut down with complications due to the loss of the condenser as a normal source of heat removal. An NRC senior risk analyst evaluated the event using the significance determination process and the NRC GEM computer program. All emergency core cooling systems and emergency diesel generators were operable and functioned properly during the course of the shut down. The results of the risk analyses concluded that the conditional core damage probability was less than 1E-06 which would categorize this event as having very low safety significance.

#### Significance Determination Process

The loss of the nonsafety-related electrical bus occurred during functional testing of a protective relay for the feed circuit breaker. A labeling discrepancy caused operators to incorrectly isolate the protective relay prior to the test. As a result of not being properly isolated, the protective relay actuated during the functional test causing the loss of the bus and the manual reactor trip.

The inspectors used the significance determination process to evaluate the significance of the labeling discrepancy. This finding had the potential to increase the frequency of an initiating event (transients) and to affect mitigating systems (power conversion system). However the finding was determined to be of very low risk significance (green) because portions of the power conversion system remained available, all other mitigating systems were unaffected, and recovery was possible.

#### 40A6 Meetings, including Exit

The inspectors presented the inspection results to Mr. M. Coyle, Vice President, and other members of licensee management at the conclusion of the inspection on May 22, 2000. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

G. Baker, Manager - Nuclear Support Services  
S. Clary, Director - Plant Engineering  
M. Coyle, Vice President  
K. Gallogly , Director - Corrective Action  
P. Hinnenkamp, Plant Manager - Clinton Power Station  
W. Maguire, Director - Operations  
R. Moore, Manager - Work Management  
M. Reandeanu, Director - Licensing  
R. Schenck, Manager - Maintenance  
D. Smith, Director - Security and Emergency Planning  
P. Walsh, Manager - Nuclear Station Engineering Department  
E. Wrigley, Manager - Quality Assurance

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

### Closed

### Discussed

None

## LIST OF ACRONYMS

CR	Condition Report
EDG	Emergency Diesel Generator
FPER	Fire Protection Evaluation Report
MCR	Main Control Room
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
RCIC	Reactor Core Isolation Cooling
RC&IS	Rod Control & Information System
USAR	Updated Safety Analysis Report