

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9411210123      DOC. DATE: 94/11/15      NOTARIZED: NO      DOCKET #

FACIL: 50-250 Turkey Point Plant, Unit 3, Florida Power and Light C      05000250

50-251 Turkey Point Plant, Unit 4, Florida Power and Light C      05000251

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	Document Control Branch (Document Control Desk)

SUBJECT: Part 21 rept re Unit 3A sequencers at Turkey Point Plant.  
 Unless contacted by FP&L to perform programming changes & subsequent V&V to sequencer software, United Controls plans no other evaluation of defect for listed reason.

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## United Controls International, Inc.

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November 15, 1994

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Notification of the Existence of a Defect per 10 CFR  
Part 21

### Background

United Controls International Inc. was notified on 11-8-94 by the Florida Power and Light Turkey Point Plant of a substantial safety hazard involving the Unit 3A sequencer. The sequencers were supplied as nuclear qualified safety related units to FP&L by the United Controls Division of HUB Inc. in October of 1990.

### Description of the Defect

During safeguards testing at Turkey Point Unit 4 on 11-3-94, the Unit 3A sequencer failed to start its safety injection pump upon receiving a valid Unit 4 safety injection signal. An extensive review of the system found no hardware failures. The defect found is a software logic error that causes a safety injection inhibit signal to "seal in" under certain conditions of the auto test mode. This condition is present approximately 25% of the time, and will prevent the sequencer from properly responding to any safety injection signal.

### Evaluation

The software program for the FP&L Sequencers is unique to the Turkey Point units. There are no other facilities affected. This was the only project ever processed under the United Controls Division of HUB Inc. Software QA Program.

The logic error resulted from changes made during validation testing. The changes were necessary to meet the requirements of the electrical power distribution system at the plant, and were not the result of problems with the control system hardware or software. The logic change introduced a very subtle error which caused a safety injection inhibit signal to "seal in" during certain conditions of auto-testing. The logic error escaped detection during the logic review. The test plan for the software included verifying the proper response to every credible

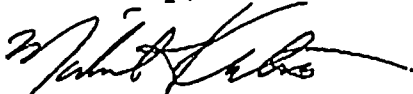
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input/output signal combination. The test plan to verify the system would properly respond while in the auto-test mode was developed on the basis that it would be sufficient to check all credible inputs/outputs while the system ran in auto-test. The test results utilizing this method were as expected. The only way the error could have been found, was to have tested every credible combination of inputs/outputs, during each of the sixteen auto-test scenarios.

United Controls has not been involved in any QA and V&V controlled programming on the sequencers since 10-15-91. Since programming changes have been made since this date, United Controls is no longer in a position to correct the specific defect without the potential for adversely effecting the existing software. As a result, no further evaluation may be performed by United Controls at this time. Unless contacted by FP&L to perform programming changes and subsequent V&V to the sequencer software, United Controls plans no other evaluation of this defect.

Sincerely,



Michael Charlton PE

Reviewed: 

Ben Camp President

Date: 11-15-94

Reviewed: 

D. Butler QA Manager

Date: 11-15-94



## GENERAL INFORMATION or OTHER

EVENT NUMBER: 28033

LICENSEE: UNITED CONTROLS INTERNATIONAL, INC  
CITY: STONE MOUNTAIN REGION: 2  
COUNTY: STATE: GA  
LICENSE#: AGREEMENT: Y  
DOCKET:

NOTIFICATION DATE: 11/15/94  
NOTIFICATION TIME: 16:43 [ET]  
EVENT DATE: 11/03/94  
EVENT TIME: 12:00 [EST]  
LAST UPDATE DATE: 11/15/94

## NOTIFICATIONS

NRC NOTIFIED BY: FACSIMILE  
HQ OPS OFFICER: WILLIAM HUFFMAN

EMERGENCY CLASS: NOT APPLICABLE  
10 CFR SECTION:  
CDEF 21.21(b) (2) DEFECTS/NONCOMPLIANCE

## EVENT TEXT

## NOTIFICATION OF SEQUENCER DEFECT.

DURING SAFEGUARDS TESTING AT TURKEY POINT ON 11/3/94, THE UNIT 3A SEQUENCER FAILED TO START A SAFETY INJECTION PUMP UPON RECEIVING A VALID SAFETY INJECTION SIGNAL. THE SEQUENCERS AT TURKEY POINT WERE SUPPLIED AS NUCLEAR QUALIFIED SAFETY RELATED UNITS TO FP&L BY THE UNITED CONTROLS DIVISION OF HUB INC. ON OCTOBER OF 1990.

INVESTIGATION DETERMINED THAT THE PROBLEM WAS THE RESULT OF A SOFTWARE LOGIC ERROR THAT CAUSES A SAFETY INJECTION INHIBIT SIGNAL TO SEAL IN UNDER CERTAIN CONDITIONS OF THE AUTO-TEST MODE. THIS CONDITION IS PRESENT APPROXIMATELY 25% OF THE TIME AND WILL PREVENT THE SEQUENCER FROM PROPERLY RESPONDING TO ANY SAFETY INJECTION SIGNAL.

THE SOFTWARE PROGRAM FOR THE FP&L SEQUENCERS IS UNIQUE TO TURKEY POINT. NO OTHER FACILITIES ARE AFFECTED.

THE LOGIC ERROR ESCAPED DETECTION DURING THE LOGIC REVIEW. THE TEST PLAN FOR THE SOFTWARE INCLUDED VERIFYING THE PROPER RESPONSE TO EVERY CREDIBLE INPUT/OUTPUT SIGNAL COMBINATION. THE TEST PLAN TO VERIFY THE SYSTEM WOULD PROPERLY RESPOND WHILE IN THE AUTO-TEST MODE WAS DEVELOPED ON THE BASIS THAT IT WOULD BE SUFFICIENT TO CHECK ALL CREDIBLE INPUTS/OUTPUTS WHILE THE SYSTEM RAN AN AUTO-TEST. THIS WAS DONE SATISFACTORILY. HOWEVER, THERE ARE APPARENTLY SIXTEEN DIFFERENT AUTO-TEST SCENARIOS. THE ONLY WAY TO HAVE DETECTED THE ERROR WOULD HAVE REQUIRED TESTING EVERY CREDIBLE COMBINATION OF INPUTS/OUTPUTS DURING EACH OF THE SIXTEEN AUTO-TEST SCENARIOS.

UNITED CONTROLS HAS NOT BEEN INVOLVED IN ANY QA OR V&V ON THE SEQUENCERS

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SINCE 10/15/91. BECAUSE PROGRAMMING CHANGES HAVE BEEN MADE SINCE THIS DATE, UNITED CONTROLS IS NO LONGER IN A POSITION TO CORRECT THE SPECIFIC DEFECT WITHOUT A POTENTIAL FOR ADVERSELY AFFECTING EXISTING SOFTWARE. CONSEQUENTLY, UNITED CONTROLS PLANS NO OTHER EVALUATION OF THIS DEFECT UNLESS CONTACTED BY FP&L TO PERFORM PROGRAMMING CHANGES AND SUBSEQUENT V&V TO THE SEQUENCER SOFTWARE.

A COPY OF THE PART 21 REPORT ON THIS CONDITION HAS BEEN SENT TO NRR/TQMB (HAASS).