#8

INL INITIAL NOTIFICATION REPORT

Entered By:	Loran Kinghorn
Date Entered:	8 October 2009
Site:	ATR Complex
Responsible Organization:	ATR Programs Operations
Title:	Loss of an Experiment Loop Operating Pump results in automatic shutdown of the Advanced Test Reactor
Discussion of Event/Condition:	**Summary:** At 0147 on 8 October 2009 one of the two operating pumps in loop 2B-SE tripped on a zero net positive suction head (NPSH) signal from the Loop Operating Control Station (LOCS) Distributed Control System (DCS). The resulting pump M-2 breaker undervoltage condition resulted in an automatic scram (shutdown) of the Advanced Test Reactor (ATR). The zero NPSH signal was caused when the Experiment Operator placed the LOCS DCS for loop 2B-SE in simulator mode to insert a loop conductivity parameter. There was no operational reason for entering the simulator mode and the operator was acting without the use of an approved procedure and without supervisor knowledge. The experiment operator was unaware that when the conductivity parameter was inserted there were other associated fields in this simulator mode which default to zero. As a result, the actual 2B-SE pressurizer pressure signal went to zero which caused the NPSH signal to momentarily go to zero which resulted in tripping the M-2 pump motor breaker. The other 2B-SE loop pump, M-3 (run-to-destruct pump) continued to provide loop flow. No reactor systems were affected. Operating Cycle experiments were not adversely affected. **Action Taken:** Established procedures for a reactor scram were performed and the reactor was verified to be in safe shutdown condition. Management was informed, a critique was conducted and the cause of the scram was determined to have been Operator error. Following necessary actions and verification, the cause of the scram has been corrected and the estimated Xenon precluded reactor start-up time (approximately 36 to 38 hours) has lapsed and the reactor will be restarted to continue the current Operating Cycle.
Safety Significance:	Low. The reactor loop action did not have a significant safety impact.
Reportability:	Group 4, Subgroup B, Sequence (5), Significance Category 4 – A facility operational event caused by deviating from a written procedure or using an inadequate procedure resulting in an adverse effect on safety, such as: an inadvertent facility or operations shutdown (i.e., a change of operational mode or curtailment of work or processes), facility or operations shutdown due to alarm response procedures, inadvertent process liquid transfer, or inadvertent release of hazardous material from its engineered containment.

NE-ID--BEA-ATR-2009-0023 NOTIFICATION/FINAL

#8

Occurrence Report
After 2003 Redesign

Advanced Test Reactor

(Name of Facility)

Category "A" Reactors

(Facility Function)

Idaho National Laboratory Battelle Energy Alliance, LLC

(Laboratory, Site, or Organization)

Name: SCHUEBERT, EDMOND J
Title: ATR OPERATIONS FACILITY MANAGER **Telephone No.:** (208) 533-4246

(Facility Manager/Designee)

Name: OWENS, MARJORIE A
Title: ATR OPERATIONS FACILITY ADMINISTRATI **Telephone No.:** (208) 533-4563

(Originator/Transmitter)

Name: E. BRUCE CRISWELL **Date:** 10/08/2009

(Authorized Classifier (AC))

1. Occurrence Report Number: NE-ID--BEA-ATR-2009-0023

Loss of an Experiment Loop Operating Pump Results in Automatic Shutdown of the Advanced Test Reactor (ATR)

2. Report Type and Date: NOTIFICATION/FINAL

	Date	Time
Notification:	10/12/2009	15:35 (ETZ)
Initial Update:	10/12/2009	15:35 (ETZ)
Latest Update:	10/12/2009	15:35 (ETZ)
Final:	10/12/2009	15:35 (ETZ)

3. Significance Category: 4

4. Division or Project: ATR Programs

5. Secretarial Office: NE - Nuclear Energy, Science and Technology

6. System, Bldg., or Equipment: Advanced Test Reactor

7. UCNI?: No

8. Plant Area: LOCS

9. Date and Time Discovered: 10/08/2009 01:47 (MTZ)

10. Date and Time Categorized: 10/08/2009 08:40 (MTZ)

11. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

12. Other Notifications:

Date	Time	Person Notified	Organization
10/08/2009	02:12 (MTZ)	R. Denning	DOE-ID

13. Subject or Title of Occurrence:

Loss of an Experiment Loop Operating Pump Results in Automatic Shutdown of the Advanced Test Reactor (ATR)

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14. Reporting Criteria:

4B(5) - A facility operational event caused by deviating from a written procedure or using an inadequate procedure resulting in an adverse effect on safety, such as: an inadvertent facility or operations shutdown (i.e., a change of operational mode or curtailment of work or processes), facility or operations shutdown due to alarm response procedures, inadvertent process liquid transfer, or inadvertent release of hazardous material from its engineered containment.

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15. Description of Occurrence:

At 0147 on October 8, 2009, one of the two operating pumps in loop 2B-SE tripped on a zero net positive suction head (NPSH) signal from the Loop Operating Control Station (LOCS) Distributed Control System (DCS). The resulting pump M-2 breaker undervoltage condition resulted in an automatic scram (shutdown) of the Advanced Test Reactor (ATR). The zero NPSH signal was caused when the Experiment Operator placed the LOCS DCS for loop 2B-SE in simulator mode to insert a loop conductivity parameter. There was no operational reason for entering the simulator mode and the operator was acting without the use of an approved procedure and without supervisor knowledge. The experiment operator was unaware that when the conductivity parameter was inserted there were other associated fields in this simulator mode which default to zero. As a result, the actual 2B-SE pressurizer

pressure signal went to zero causing the NPSH signal to momentarily go to zero which resulted in tripping the M-2 pump motor breaker.

The other 2B-SE loop pump, M-3 (run-to-destruct pump) continued to provide loop flow. No reactor systems were affected. Operating Cycle experiments were not adversely affected.

Reportability of this event was not determined until the critique was held, therefore, the categorization did not fall within the two-hour criteria.

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16. Is Subcontractor Involved? No

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17. Operating Conditions of Facility at Time of Occurrence:

The Advanced Test Reactor was operating at nominal full power for Cycle 145A-1.

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18. Activity Category:

03 - Normal Operations (other than Activities specifically listed in this Category)

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19. Immediate Actions Taken and Results:

Established procedures for a reactor scram were performed and the reactor was verified to be in safe shutdown condition. Management was informed, a critique was conducted and the cause of the scram was determined to have been Operator error.

Following necessary actions and verification, the cause of the scram has been corrected and the estimated Xenon precluded reactor startup time (approximately 36 to 38 hours) has lapsed; the reactor will be restarted to continue the current Operating Cycle.

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20. ISM:

4) Perform Work Within Controls

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21. Cause Code(s):

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22. Description of Cause:

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23. Evaluation (by Facility Manager/Designee):

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24. Is Further Evaluation Required?: No

25. Corrective Actions
Local Tracking System Name: ICAMS

26. Lessons Learned:

27. Similar Occurrence Report Numbers:

NE-ID--BEA-ATR-2008-0009

28. User-defined Field #1:

GB10

29. User-defined Field #2:

30. HQ Keyword(s):

14E--Quality Assurance - Work Process Deficiency
01I--Inadequate Conduct of Operations - Safety System Actuation/Evacuation
01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)
12B--EH Categories - Conduct of Operations
13A--Management Concerns - HQ Significant (High-lighted for Management attention)
01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance

31. HQ Summary:

On October 8, 2009, one of the two operating pumps in loop 2B-SE tripped on a zero net positive suction head (NPSH) signal from the Loop Operating Control Station (LOCS) Distributed Control System (DCS). The resulting pump M-2 circuit breaker undervoltage condition resulted in an automatic scram of the Advanced Test Reactor. The zero NPSH signal was caused when the Experiment Operator placed the LOCS DCS for loop 2B-SE in simulator mode to insert a loop conductivity parameter. There was no operational reason for entering the simulator mode and the operator was acting without the use of an approved procedure and without supervisor knowledge. The experiment operator was unaware that when the conductivity parameter was inserted there were other associated fields in this simulator mode which default to zero. As a result, the actual 2B-SE pressurizer pressure signal went to zero causing the NPSH signal to momentarily go to zero which resulted in tripping the M-2 pump motor circuit breaker. Reactor scram procedures were performed and the reactor was verified to be in safe shutdown condition. A critique was conducted and the cause of the scram was determined to have been operator error.

232.10 #8
12/21/2006
Rev. 02
Use with LWP-9302

CRITIQUE REPORT

ATR-CR-10-08-09

For EHES-related events: Transmit the approved critique report to the DOE-ID Facility Representative as soon as possible, but within 8 hours following the critique.

Facility/Area: ATR

Critique Title: Reactor Scram Due To Operator Error

Date & Time of Event: 10/08/2009 @ 0147

Date & Time of Critique: 10/08/2009 @ 0740

Description of Event (include a detailed description of the event with times and a nonpersonalized designation of each person involved in the event): (mandatory for EHES-related events):

On 10/08/2009 @ 0147 a reactor SCRAM was experienced due to an operator error. An Experiment Operator (EO) decided to enter the "Simulate" mode on the Loop Distributed Control System (DCS) in order to "round" conductivity numbers within the test loops. There are no procedures or training on the simulate mode. The EO did not check with the Senior Experiment Operator (SEO) prior to making this decision. The EO was successful in adjustments to Loops 1C and 1D. When the EO made the adjustment on Loop 2B a scram signal was initiated due to a 0 psig signal on pressurizer pressure causing a low Net Positive Suction Head (NPSH) which secured the Loop pump causing the reactor to SCRAM. The I/O (Input/Output) modules are set different between the East and West Loops. The EO was unaware that changing this value would affect multiple values with this I/O module. This is the first time this EO has attempted this action.

Categorized as: (include a brief discussion on the justification supporting the categorization)

Reportable per LWP-9301; Goup 4 Facility Status,Sub Group B Operations, Seq 5, Sig Cat 4.

"A facility operational event caused by deviating from a written procedure or using an inadequate procedure resulting in an adverse effect on safety, such as: an inadvertent facility or operations shutdown (i.e., a change of operational mode or curtailment of work or processes), facility or operations shutdown due to alarm response procedures, inadvertent process liquid transfer, or inadvertent release of hazardous material from its engineered containment."

Notifications Made:

To: Operations Manager	Date: 10/08/2009	Time: 0157
To: DOE Facility Manager	Date: 10/08/2009	Time: 0158
To: Engineering Manager	Date: 10/08/2009	Time: 0235

Procedure/Reference Applicable to the Event:

☐ No further analysis required ☐ Apparent Cause Analysis Warranted ☐ Formal Cause Analysis Warranted:

L. W. Kinghorn		10/08/2009
Critique Leader Print/Type Name	Critique Leader Signature	Date
Cause Analyst Print/Type Name	Cause Analyst Signature	Date
L.W. Kinghorn		10/08/2009
Facility Manager Print/Type Name	Facility Manager Signature	Date

CRITIQUE REPORT

For critique reports involving unplanned access to, or contact with, energized high energy systems (EHES), obtain approval of the appropriate Associate Laboratory Director or Directorate Director. The approval signature shall indicate agreement that the facts were determined and recorded as completely as possible and that decisions were made relative to securing the event and immediate corrective actions.

Print/Type Name and Position	Signature	Date

PART 1 – EVENT RECONSTRUCTION

1. Operating conditions at time of event: (mandatory for EHES-related events):
Full Power Nf

2. Detailed chronology of event:
0147-Reactor (Rx) SCRAM entered E-O. Rx SCRAM is from 2B-SE M-2 pump trip. The pump tripped on low NPSH but no Loop pressures or temperatures lowered which would cause NPSH to lower.
0157-Contacted the Operations Manager L. Kinghorn and informed him of the SCRAM.
0158-Exited E-0. Entered Rx Outage per DOP-7.2.7
0212 Notified DOE Facility Manager R. Denning of the SCRAM.
0217-Notified M. Stengel of the SCRAM.
0235-Notified Engineering Manager S.K. Penny of the SCRAM.
0340-The EO reported he caused the SCRAM by using a Simulator Function on the LOCS to manually input a conductivity value and not understanding he also would change PZR Channel B pressure to 0.0 psig which is an input to the NPSH calculator. Notified Operations Manager.
0640-Reviewed logbook for the previous 24 hours. Shift #1 0700-1900 10/08/2009
0658-SS M. Trumblee relieved the watch, conditions as before.

Immediate actions taken and results: (mandatory for EHES-related events):
3.
E-0 completed. Plant in stable shut down condtion.
EO has been removed from watch.

4. Data collection:

Personnel Statement:
Personnel Statements received from SS, SEO, and EO.

Physical Evidence; parts, debris, hardware:

Documentation; paper and electronic information, data sheets, logs, procedures:
Logbook entry

Other relevant information:
Critique Attendance Roster
Critique Minutes
Attach Form 231.05, Personnel Statement Form and Form 231.09, Critique Attendance Sheet

PART 2 – EVENT ANALYSIS & EVALUATION

CRITIQUE REPORT

A. Comparison of actual and expected response (equipment and personnel):

Expected Response:

1. Certified Operators use approved procedures.
2. First time events: Inform SEO and or SS and brief.
3. If no procedure is written, Stop and inform management before going forward.
4. Operator trained to perform evolution.

Actual Response:

1. No procedure was used because it was never intended to be used in Simulator Mode by the Operators to run the plant.
2. Loop Operator stated this was a first time event, but did not inform SEO or SS.
3. No training for the Operator to use the Simulator Mode on Loop DCS was given, but it was something he learned during system operational testing (SOT).
4. No brief from SEO because EO never informed him of intended deviation from conductivity OMM procedure.
5. Trouble shooting after Rx SCRAM. EO did not inform SEO of reproducing the events by going in to Simulator Mode. There was no brief, no permission, and no procedure to direct these activities.

B. Factors affecting human performance:

Task Demands

- ☐ Time pressure
- ☐ High workload
- ☐ Simultaneous, multiple task
- ☐ Repetitive actions, monotonous
- ☐ Irrecoverable acts
- ☐ Interpretation of requirements
- ☐ Unclear goals, roles & responsibilities
- ☐ Lack of or unclear standards

Work Environment

- ☐ Distractions/Interruptions
- ☐ Changes/Departures from routine
- ☐ Confusing displays or controls
- ☐ Work-arounds/OOS instructions
- ☐ Hidden systems response
- ☐ Unexpected equipment conditions
- ☐ Lack of alternative indications
- ☐ Personality conflicts

Individual Capabilities

- ☒ Unfamiliarity with task/First time
- ☐ Lack of knowledge
- ☒ New technique not used before
- ☐ Imprecise communication habits
- ☐ Lack of proficiency/inexperience
- ☐ Indistinct problem-solving skills
- ☒ Hazardous attitude for critical task
- ☐ Illness/fatigue

Human Nature

- ☐ Stress
- ☐ Habit patterns
- ☒ Assumptions, inaccurate mental picture
- ☒ Complacency/overconfidence
- ☐ Mindset, "tuned" to see what you expect to see
- ☒ Inaccurate risk perception
- ☐ Mental shortcuts
- ☐ Limited short term memory

Other:

Causes: (See DOE Guide 231.1-2, Occurrences Reporting Causal Analysis, or LWP-9301 for the Cause Analysis Tree and associated Cause Codes.) A3B3C05: Wrong assumptions were made based on the belief that two or more facts are related to each other and incorrect actions were taken based on the assumption. NOTE: This also covers the case where there is an incorrect assumption that two or more facts do not correlate when they do.

C. Preliminary Root Cause Analysis (mandatory for EHES-related events):

D. Similar Event:

ORPS NE-ID--BEA-ATR-2008-0009 ICARE DR #42786 & Action #43207 (BIT Toggle 1C-W Event)

E. Additional Actions Necessary for Resumption of Operations:

F. Lessons Learned:

The Training Department will make this event a case study for further training.

CRITIQUE REPORT

G. Corrective Actions:

1. Night orders to reflect absolutely NO use of Simulate mode.
2. Engineer George Marts to evaluate possibility of controlling access to "Simulate Mode". Also, to evaluate other modes or programs that may be useful so proper training can be addressed.
3. Engineering to evaluate what was done, what systems were effected and appropriate measures to correct prior to start up. A letter from G. Marts to L. Kinghorn to be composed.
4. Operations Management to brief all crews with Tailgate on events.
5. Station Manager to reset Station Clock and issue a spot light on the clock reset.
6. ATR Oversight and Assurance Manager to complete INR.
7. ATR Oversight and Assurance Manager to review past corrective actions for effectiveness.
8. EO removed from Watch
9. EO to attend remedial training to requalify.
10. Training Department to make this event a case study for further training.
11. Add lessons learned to EO school.