#10

INL INITIAL NOTIFICATION REPORT

Entered By:	E. J. Schuebert
Date Entered:	6 November 2009
Site:	ATR Complex
Responsible Organization:	ATR Operations
Title:	Automatic Shutdown Of The Advanced Test Reactor Due to Loss of Diesel Generator Power
Discussion of Event/Condition:	**Summary:** At 0517 on 6 November 2009 the Advanced Test Reactor (ATR) experienced an automatic reactor scram (shutdown) due to a loss of diesel generator power. The metal bar linkage that connects the engine Woodward mechanical governor speed control to the engine fuel rack suffered a mechanical failure, effectively disconnecting the governor from the fuel racks and allowing the fuel rack to close, shutting down the engine. The governor is a device that controls engine speed by adjusting the position of the fuel rack which in turn controls the fuel supply to the engine fuel injectors. The resultant diesel electrical bus under voltage condition caused an under voltage trip of the diesel powered pumps on the five pressurized water experiment loops. An under voltage condition on the loop pumps is an automatic scram signal. All loops operate with a combination of diesel and commercial power supplied pumps. The commercial powered pumps continued to provide loop flow. No reactor systems or operating cycle experiments were 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 and the decision was made to enter the 145B outage period that was scheduled to begin at 1000 6 November 2009.
Safety Significance:	Low. Diesel generators are not safety related and do not have a significant safety impact. All safety related systems responded as expected to the condition.
Reportability:	None. No reportability criteria were met.

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Rev. 02
Use with LWP-9302

ATR-CR-10-13-09

CRITIQUE REPORT

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: Rx Scram Due To Loss of Diesel Power

Date & Time of Event: 10/12/2009 @ 1809

Date & Time of Critique: 10/13/2009 @ 1000

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):

At 1809 on 12 October 2009, an under voltage condition on the diesel generator powered electrical distribution bus caused an automatic SCRAM (shutdown) of the Advanced Test Reactor (ATR). At 1800 an operator informed the shift supervisor that the instrument air pressure to the AMOT was indicating 20 psig vice the normal 40 psig. (AMOT is the brand name of the safety control device used to automatically shutdown the diesel engine in the event of a low lubricating oil pressure). As the mechanic started adjusting the pressure up to 40 psig the diesel engine was noted to begin shutting down (i.e., audible indication of lowering engine speed was noted). The mechanic adjusted pressure back to the original value and the engine speed recovered, but not before the bus voltage dropped to a value that caused an under voltage trip of the diesel powered pumps on the five pressurized water experiment loops. An under-voltage condition on the loop pumps is an automatic SCRAM.

All loops operate with a combination of diesel and commercial power supplied pumps. The commercial powered pumps continued to provide loop flow. No reactor systems were affected. Operating Cycle experiments were not adversely affected.

This regulator adjustment had been performed once earlier in the day after a determination that it met the requirements of "tool pouch maintenance" per Laboratory Wide Procedure-6200, "Maintenance Integrated Work Control Process" and after it was included on the Plan of the Day. The mechanics have a history of performing this adjustment under similar circumstances.

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

Non Reportable. No reportability criteria were met.

Notifications Made:

To: ATR Deputy Manager (Acting)	Date: 10/12/09	Time: 1837
To: ATR Operations Manager	Date: 10/12/09	Time: 1839
To: DOE Facility Manager	Date: 10/12/09	Time: 1841

Procedure/Reference Applicable to the Event:

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

E J Schuebert	E J Schuebert	10/29/08
Critique Leader Print/Type Name	Critique Leader Signature	Date
Cause Analyst Print/Type Name	Cause Analyst Signature	Date
E J Schuebert	E J Schuebert	10/29/08
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):
Rx at full power.

2. Detailed chronology of event:
1800-Operator informed the SS that the regulator valve PI-14-43B was at 20 psig vice the expected 40 psig on M-43 AMOT safety control device. SS instructed the operator to contact the mechanic who had adjusted the regulator earlier in the shift to have the regulator adjusted again.
1809-The Mechanic started adjusting the regulator to bring PI-14-43B up to 40 psig. The diesel started to shut down (i.e.,audible indications of engine speed lowering). The mechanic returned the regulator to the original setting and the diesel started back up. THe Rx scrammed and established procedures for a SCRAM were performed.
1837-Notified the ATR Deputy Manager (Acting)
1839-Notified ATR Operations Manager
1841-Notified DOE Facility Manager
1952 Notified Engineering, BAPL, and RML of SCRAM

Immediate actions taken and results: (mandatory for EHES-related events):
3.
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 engine speed to reduce during this regulator adjustment has yet to be determined. A work order is being issued to govern the troubleshooting necessary to determine the problem. Following determination and correction of the cause for the diesel engine shutdown, and when the xenon precluded reactor start-up time (approximately 41 hours) has lapsed, the reactor will be restarted to continue the current operating cycle.

4. Data collection:

Personnel Statement:
Personnel statements were received from the Mechanic, and Operator.

Physical Evidence; parts, debris, hardware:
None

Documentation; paper and electronic information, data sheets, logs, procedures:
Copy of log book entries for the particular shift were presented.

Other relevant information:

Attach Form 231.05, Personnel Statement Form and Form 231.09, Critique Attendance Sheet

PART 2 – EVENT ANALYSIS & EVALUATION

A. Comparison of actual and expected response (equipment and personnel):
Actual was reduction of diesel engine speed of a magnitude sufficient to cause undervoltage trips. Expected was no effect to the engine.

B. Factors affecting human performance:

Task Demands
- ☒ Time pressure
- ☐ High workload

Individual Capabilities
- ☐ Unfamiliarity with task/First time
- ☐ Lack of knowledge

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- ☐ 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

- ☐ 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:

The gauge used to set the regulator position was found to be indicating approximately 50 psig lower than actual air pressure.

Causes: (See DOE Guide 231.1-2, Occurrences Reporting Causal Analysis, or LWP-9301 for the Cause Analysis Tree and associated Cause Codes.)

A2B1C01

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

D. Similar Event:

E. Additional Actions Necessary for Resumption of Operations:

Determine correct cause of diesel engine speed reduction.

F. Lessons Learned:

G. Corrective Actions:

An investigation into the cause of the SCRAM is being performed. The switch will be removed and examined for possible seal failure. Other possible causes will be investigated.