CENTERIOR ENERGY

PERRY NUCLEAR POWER PLANT
10 CENTER ROAD
PERRY, OHIO 44081
(216) 259-3737

Mail Address
P.O. BOX 97
PERRY, OHIO 44081

Robert A. Stratman
VICE PRESIDENT - NUCLEAR

March 5, 1993
PY-CEI/NRR-1620 L

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

Perry Nuclear Power Plant
Docket No. 50-440
LER 93-005

Dear Sir:

Enclosed is Licensee Event Report 93-005 for the Perry Nuclear Power Plant.

Sincerely,

Robert A. Stratman

RAS:TSH:ss

Enclosure: LER 93-005

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

IE22 1/1

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Perry Nuclear Power Plant, Unit 1	05000 440	1 OF 4

TITLE (4)
False Indications of Fuel Failures During Fuel Sipping

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
01	19	93	93	-- 005 --	00	03	06	93	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A) Voluntary
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Teresa S. Hogan, Compliance Engineer Extension 5283	(216) 259-3737

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 16, 1993, during a mid-cycle maintenance outage, fuel vacuum sipping results began to indicate a large number of fuel defects. Sipping identified one significant fuel defect and several bundles with slowly rising indications of fission products. Because of the indeterminate nature of the fuel condition, this condition was considered a significant fuel defect, and was reported via ENS notification on January 19, 1993.

Subsequent examination and testing identified a single fuel failure, with the rest of the "slow risers" attributed to fission product contamination of the corrosion layer on the most highly exposed bundles in the core. Within a short time, followup sipping identified most of the "slow risers" to be free of fuel defects. In addition to the single failure identified, nine additional bundles were removed from the core for followup testing. Test results are expected to show these bundles to be free of defects.

The event notification was retracted on February 11, 1993. Because of the significant attention initially focused on this event, this LER is being submitted on a voluntary basis.

I. Introduction

On January 19, 1993, fuel vacuum sipping responses appeared to indicate a large number of fuel defects. At the time of the event, the plant was in Operational Condition 5 in a mid cycle maintenance outage. The reactor pressure vessel [RPV] was at atmospheric conditions with the reactor water temperature at 85 degrees Fahrenheit. On January 19, 1993, at 1010, a non-emergency four-hour notification was made to the NRC pursuant to 10CFR50.72(b)(2)(i). On February 11, 1993 at 1433 the Emergency Notification System (ENS) call was retracted. This event is being reported as a voluntary LER.

II. Event Description

In July, 1992, approximately one month after the start of the fourth fuel cycle, an increase in off gas pre-treatment activity was noted, indicative of a pinhole fuel defect. During control rod movement in August, a slight offgas response was noted. The subject rod was then reinserted a few notches, and the overall offgas activity returned to normal. On September 10, 1992, a reactor scram from full power occurred. After plant restart, it was noted that shorter-lived activity started a fairly rapid increase. Planned control rod movement was modified to allow it to serve as a mechanism for fuel defect localization. The suspect bundle was identified, and after full insertion of the adjacent control rod, activity levels dropped and remained fairly constant for the next 3 weeks. A second reactor scram occurred on October 24, 1992. Upon restart short-lived activity again increased, and two additional shadowing control rods were inserted, with little result. Although coolant and offgas activities remained well below Technical Specification limits, on December 12, 1992 the decision was made to shutdown in January to correct the failed fuel situation.

On January 16, 1993 at 1800, fuel movement and sipping commenced to detect and remove any failed fuel rods, as part of the mid cycle maintenance outage. The first bundle sipped confirmed the expected location of a significant fuel defect. As planned prior to the outage, sipping was continued to methodically sample the entire core. On January 17, 1993, an unexpected number of indeterminate sipping responses was discovered. Termed slow-risers, for the slow rise in activity noted during the sipping process, these responses were originally thought to indicate fuel defects. By January 19, 1993, with 150 bundles sipped, one significant fuel defect and 16 slow rise indications were identified. All of the slow rise indications were in bundles which were originally installed in the first refueling outage (reload one fuel). These bundles had operated at high power levels this cycle, and were not located on the periphery. The situation was conservatively considered a serious degradation of a principal safety barrier, and at 1010 on January 19, a four-hour non-emergency notification was made pursuant to 10CFR50.72(b)(2)(i). An Incident Response Team (IRT) was formed to investigate this event.

III. Cause Analysis

Fuel sipping activity identified approximately half of the interior reload one fuel as exhibiting a slow rise sipping response. None of the slow rise responses were noted on the reload one bundles which operated at low power during the last two months prior to the outage. These bundles were located on the periphery or near deeply inserted control rods. No significant sipping responses were noted on the reload two and reload three fuel.

An hypothesis developed was that the slow riser sipping response was detection of xenon-133 produced from fission products (tellurium and iodine) from the single failed fuel rod, which had been absorbed into the corrosion product layer of the other non-failed rods. Additionally, although the extended plant operation with high coolant activity had dispersed the fission product activity across most of the core, a weak correlation existed between the slow rise sipping responses and the proximity to the failed fuel rod.

Enough time had elapsed when the sipping activity commenced, that almost all of the tellurium and iodine had decayed to xenon, cesium and barium. The sipping detector measures the decay of fission products, xenon and krypton, to identify the existence of a fuel defect. With a true fuel defect, the activity sensed by sipping is expected to drop more slowly than the half-life of xenon. With a surface deposition, xenon gas would be removed by both decay and the reactor coolant flow, resulting in a more rapid decrease of activity.

The rarity of this phenomena relates to the condition of the fuel cladding surface, the reactor coolant activity, and standard sipping practices. The surface effect requires an elevated coolant activity level for an extended time period, and a heavy crud layer on the fuel rods. For the last two months of operation prior to shutdown, Perry had an elevated coolant fission product activity. Bundles on their third cycle of operation have heavier crud layers than less exposed bundles. Additionally, sipping began very soon after reactor shutdown. In a refueling outage, the start of fuel movement can be weeks after shutdown. This would have allowed much of the surface xenon to be removed by the reactor coolant and a failure to identify such a condition during normal sipping activities. Standard sipping practices do not sip bundles that will be discharged from the core. Therefore, bundles with similar history to those newly installed in Perry's first refueling are not generally tested.

To test the hypothesis, all bundles with unresolved indications were repeatedly sipped several days apart, with the sipping response dropping much faster than would be expected from just xenon decay. At the conclusion of the sipping, one fuel failure was confirmed by physical examination. The cause of the failure has not yet been determined; however, a Fuel Failure Task Force has been

established to continue root cause analysis. Nine other bundles still had small slow rising sipping responses and were also discharged from the core. These will be examined later and are expected to be defect free.

IV. Safety Analysis

The fuel assembly is designed, along with operational characteristics and protective systems, to ensure that fuel damage will not result in the release of radioactive materials in excess of values specified in 10CFR20, 50, and 100. Fuel damage is defined as a perforation of the fuel rod cladding which would permit the release of fission products to the reactor coolant. In this event one fuel rod was found to have been damaged and did release fission products to the reactor coolant. It was detection of these fission products, which were absorbed in the crud layer of the non-failed fuel, which led to the belief that there were a number of fuel failures. Fuel sipping of the entire core confirmed that only a single fuel rod was damaged. Therefore, this event is not considered safety significant.

Fuel pin cladding defects such as cracks, while not common, are not classified as abnormal degradation which would have required immediate notification under 10CFR50.72. Additionally, the plant was shut down to replace the failed fuel rod at a fraction of the limits specified in the Technical Specification. Accordingly, the non-emergency notification made on January 19 was retracted on February 11, 1993, and this LER is being submitted as a voluntary report.

V. Corrective Action

Sipping of the entire core was completed on January 30, 1993. Two slow riser bundles were inspected by visual, ultrasonic and eddy current testing and gave no indication of failure. Root cause analysis for the single confirmed failure and corrective actions from the follow-up investigation are being tracked by the plant's internal corrective action tracking system. Additionally, this event will be reviewed with licensed and non-licensed operators as part of routine operator requalification training.

Energy Industry Identification System Codes are identified in the test as [XX].