

NON-PUBLIC?: N  
ACCESSION #: 8808040191  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Three Mile Island Unit 2 PAGE: 1 OF 6

DOCKET NUMBER: 05000320

TITLE: Operation of the ACES Plasma Arc Torch Without the RB Purge  
Operating  
EVENT DATE: 06/10/88 LER #: 88-010-00 REPORT DATE: 07/26/88

OTHER FACILITIES INVOLVED: DOCKET NO:

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
OTHER "SPECIAL REPORT"

LICENSEE CONTACT FOR THIS LER:  
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COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: no

ABSTRACT:

The following separate, but related events, are not reportable per 10 CFR 50.73; however, they are being submitted as a Special Report due to their nature. NRC Letter dated April 1, 1988, authorized the use of the Automated Cutting Equipment System (ACES) plasma arc torch for disassembly of the Lower Core Support Assembly in the TMI-2 Reactor Vessel (RV). The letter also imposed a requirement that the Reactor Building (RB) Purge System must be operating during plasma arc torch operations. On June 10, 1988, it was determined that the operating procedure for the ACES plasma arc torch (i.e., 4210-OPS-3255.29) did not incorporate this requirement. It was subsequently determined that ACES plasma arc cutting had been performed without the RB Purge System operating. The procedure preparer and reviewers had failed to ensure that the referenced operating procedure contained the requirements

specified in the referenced NRC Letter which was available for their review. The operating procedure was revised on June 13, 1988, to include the requirement to operate the RB Purge. However, at 0337 on June 23, 1988, a Fuel Handling Senior Reactor Operator (FHSRO) initiated plasma arc cutting without the RB Purge operating. The FHSRO was cognizant of this requirement; however, due to sore throat, he instructed a technician to read the steps of the operating procedure to the personnel in the RB. The technician was not familiar with the procedure and the FHSRO, who was responsible for the activity being performed, failed to ensure that the steps of the procedure were performed correctly. As a result, the requirement to operate the RB Purge was inadvertently overlooked. The root cause of both events was personnel error. This event is being discussed with Defueling Department Supervisors and a checklist has been added to the operating procedure.

END OF ABSTRACT

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#### I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

The TMI-2 facility was in a long-term cold shutdown state; the defueling evolution was in progress utilizing the Automated Cutting Equipment System (ACES) plasma arc torch in the Reactor Vessel to disassemble the Lower Core Support Assembly (LCSA). The reactor decay heat was being removed via loss to ambient.

NRC Letter dated April 1, 1988, approved the TMI-2 Safety Evaluation Report (SER) for LCSA defueling. The NRC Letter contained a restriction that the Reactor Building (RB) Purge System (IEEE Code VA) must be operating whenever plasma arc cutting of the LCSA is performed.

#### II. STATUS OF STRUCTURES, COMPONENTS, OR SYSTEMS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

N/A

#### III. EVENT DESCRIPTION

The following two (2) events concern the operation of the ACES plasma arc torch without the RB Purge operating contrary to the requirement imposed by the above referenced NRC Letter. Neither of these events is reportable per 10 CFR 50.73; however, due to the nature of these events, GPU Nuclear is submitting the following

## Special Report.

### Event A

At approximately 1100 hours on June 10, 1988, during a classroom training session, a TMI-2 Fuel Handling Senior Reactor Operator (FHSRO), questioned whether compliance with the NRC requirement for operating the RB Purge during ACES plasma arc cutting was being achieved. TMI-2 Operating Procedure 4210-OPS-3255.29, "Automated Cutting Equipment System Operation," was reviewed and it was noted that the procedure did not include this requirement. Since this operating procedure governs the operation of the ACES plasma arc torch, it should have specified the requirement to operate the RB Purge during ACES plasma arc cutting. A review of the FHSRO and Control Room logs revealed that approximately 80 plasma arc cuts had been performed when the RB Purge was not operating during the period of May 11, 1988 (i.e., when ACES plasma arc cutting was initiated) to June 10, 1988 (i.e., the date of this event). It is noteworthy that each cut using the ACES plasma arc torch is of very short duration (i.e., generally less than one minute).

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Further operation of the ACES plasma arc torch was suspended until the relevant operating procedure was revised to include the prerequisite to operate the RB Purge. The operating procedure was revised to include the requirement to operate the RB Purge during ACES plasma arc torch operations via a Procedure Change Request (PCR) which became effective on June 13, 1988.

### Event B

At 0337 hours on June 23, 1988, the duty FHSRO initiated ACES plasma arc cutting of the LCSA without confirming the RB Purge was operating. The FHSRO was stationed in the TMI-2 Command Center and was remotely directing personnel stationed in the RB. Two (2) cuts were made before the FHSRO discovered his error. The FHSRO immediately ceased cutting operations and contacted the Control Room to request that the RB Purge be started prior to resuming further ACES plasma arc torch operations.

The FHSRO was cognizant of the requirement to operate the RB Purge prior to performing ACES plasma arc torch operations. At the time of this event, Operating Procedure 4210-OPS-3255.29 had been revised to require operation of the RB Purge prior to initiating operation of the ACES plasma arc torch. Additionally, prior to the start of

his shift, the FHSRO received permission from the Control Room to perform core alterations and was notified by Control Room personnel that the RB Purge was secured.

At the time of this event, the FHSRO was experiencing voice problems due to a sore throat and was having difficulty communicating with personnel in the RB. In order to avoid further throat irritation, the FHSRO instructed a vendor technician for the ACES plasma arc torch to read the steps of the referenced operating procedure to the personnel in the RB. However, the vendor technician was not familiar with the requirements of the operating procedure and the FHSRO, who is responsible for supervising the performance of core alterations per the TMI-2 Technical Specifications, failed to ensure that the requirements stipulated in the referenced operating procedure were met. Following the performance of two (2) cuts using the ACES plasma arc torch, the FHSRO realized that he had not requested start up of the RB Purge System and immediately suspended cutting operations.

#### IV. ROOT CAUSE OF THE EVENT

The root of cause of both events has been determined to be personnel error due to inattention to detail. The specific causal details for each event are described below.

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##### Event A

The preparer/cognizant engineer of Revision 0 to the referenced operating procedure properly referred to the LCSA SER, Revision 2, and the referenced NRC approval letter during the development of this procedure. This individual, who is within the Defueling organization, believed that it was the responsibility of the Site Operations Department to revise the RB Purge System Procedure (i.e. 4210-OPS-3824.02) to include the restriction on operating the RB Purge during ACES plasma arc cutting. This approach was erroneous since operation of the RB Purge is a prerequisite for ACES plasma arc torch operation; thus, the operating procedure for the ACES plasma arc torch (i.e., 4210-OPS-3255.29) should have contained this restriction.

The procedure preparer/cognizant engineer failed to communicate his viewpoint to his management. Additionally, the Responsible Technical Reviewer (RTR) and other in-line procedure reviewers, including the Safety Review Group (SRG), failed to identify the

absence of the requirement to operate the RB Purge during review of procedure 4210-OPS-3255.29. The referenced NRC Letter was widely distributed and readily available for review. Nonetheless, some procedure reviewers (e.g., the RTR) were not cognizant of the requirements stipulated in the referenced NRC Letter. In the case of the SRG, the NRC Letter was referenced but the requirement to operate the RB Purge was inadvertently overlooked during the review.

## Event B

The duty FHSRO was cognizant of the requirement to operate the RB Purge prior to ACES plasma arc torch operations. However, due to a sore throat, the FHSRO was unable to directly communicate with the personnel in the RB. As a result, the FHSRO instructed an individual not familiar with the referenced operating procedure to read the steps of the procedure to the work crew in the RB. The FHSRO should have ensured that this individual was following the procedural requirements in their proper sequence; included was the requirement to operate the RB Purge.

It is noteworthy that GPU Nuclear Policy 1000-POL-2000.02, "Standards of Conduct," states: "It is essential that employees report to work fit to perform their duties safely and efficiently." Additionally, GPU Nuclear Procedure 1000-PLN-1100.01, "GPU Nuclear Medical Plan," states: "...it is the responsibility of site management to refer any individual who is having physical difficulty in performing his/her regular job duties to the site medical department for evaluation." The Defueling Department Director was cognizant that the FHSRO was suffering voice problems. However, neither the Defueling Department Director nor the FHSRO were of the opinion that the FHSRO was unable to perform his responsibilities in a safe and efficient manner.

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A significant contributing factor to this event was that the referenced procedure did not contain sign-off steps or a checklist to aid personnel in verifying that all prerequisites had been satisfied prior to operating the ACES plasma arc torch.

Other factors which may have contributed to this event were:

A great deal of activity associated with the plasma arc torch was going on in the Command Center at the time of this event including the deployment of a new type of torch which required unique programming to operate.

The FHSRO was attempting to expedite deployment of the plasma arc torch in order to accomplish cutting on the backshift (i.e., 2300-0700).

## V. CORRECTIVE ACTIONS

### Event A

Operating Procedure 4210-OPS-3255.29 was revised on June 13, 1988, to include the requirement to operate the RB Purge during plasma arc torch operations. Affected personnel, including the Cognizant Engineer, RTR and SRG personnel, have been counselled on the need to thoroughly review all applicable GPU Nuclear and NRC documents as part of procedure review to ensure that the restrictions stipulated are incorporated in the applicable procedure(s). The Defueling Director placed specific instructions in the FHSRO night order book about RB Purge operation during plasma arc cutting and discussed this requirement with the FHSROs. Additionally, this event will be included in the "lessons-learned" section of future RTR . Requalification Training.

### Event B

A critique of this event was conducted on June 23, 1988. The FHSRO recognized that inattention to procedural detail directly contributed to this event. This event will be reviewed with all defueling supervisors, including the FHSROs, emphasizing that although certain tasks can be delegated, it is the responsibility of the supervisor to ensure tasks are performed safely and in accordance with procedural requirements.

A critical item checklist, which the duty FHSRO is required to sign prior to initiating plasma arc torch cut operations, has been added to Operating Procedure 4210-OPS-3255.29. Verification of RB Purge operation is included on this checklist. This action was implemented on

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June 24, 1988, via a Temporary Change Notice. The checklist will be permanently incorporated into the referenced operating procedure by means of a PCR which will be tracked by a Licensing and Nuclear Safety Action Item. Additionally, the Defueling Department will review this operating procedure and similar-type procedures which govern repetitive defueling operations to determine if other

critical item checklists are necessary.

#### VI. COMPONENT FAILURE DATA

N/A

#### VII. AUTOMATIC OR MANUALLY INITIATED SAFETY SYSTEM RESPONSES

N/A

#### VIII. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The ACES plasma arc torch utilizes nitrogen as the primary and secondary torch gases. Numerous analyses performed by GPU Nuclear (e.g., GPU Nuclear letter 4410-87-L-0091 dated June 25, 1987) determined that the potential for generating releases of toxic gases (e.g., nickel carbonyl, nitric oxide, and other nitric oxide compounds) was highly unlikely and, thus, does not pose a safety hazard. As a precautionary measure, GPU Nuclear correspondence to the NRC stipulated that during ACES plasma arc cutting in the RV, effluent from the off-gas system will be collected above the RV and transferred to the "B" D-ring in the vicinity of the RB Purge System exhaust suction point. As an additional precautionary measure, the referenced NRC Letter required that the RB Purge System shall be operating whenever ACES plasma arc cutting is in progress in order to provide further off-gas ventilation and filtration. During the time periods that ACES plasma arc cutting was performed without the RB Purge System operating, no deleterious effects on personnel working in the RB was observed. Thus, the events described in this report did not jeopardize the health and safety of the public.

ATTACHMENT 1 TO 8808040191 PAGE 1 OF 1

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July 26, 1988  
4410-88-L-0115/0401P

US Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Dear Sirs:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Special Report 88-10

Attached is Special Report 88-10 concerning the operation of the plasma arc torch without the Reactor Building Purge System operating, contrary to the requirement imposed by NRC Letter dated April 1, 1988.

Sincerely,

F. R. Standerfer  
Director, TMI-2

RDW/emf

Attachment

cc: Senior Resident Inspector, TMI - R. J. Conte  
Regional Administrator, Region 1 - W. T. Russell  
Director, Plant Directorate IV - J. F. Stolz  
Systems Engineer, TMI Site - L. H. Thonus

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