

Commonwealth Edison Company  
Braidwood Generating Station  
Route #1, Box 84  
Braceville, IL 60407-9619  
Tel 815-458-2801



May 7, 1996  
BW/96-0056

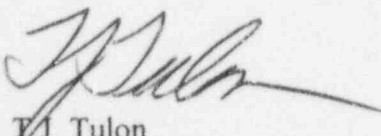
Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

To All Concerned:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted in accordance with the requirement of 10 CFR 20.2203(a)(1), which requires a 30-day report.

This report is number 96-003-00, Docket No. 50-457.

Yours truly,



T.J. Tulon  
Station Manager  
Braidwood Nuclear Station

TJT/PS/ema  
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Encl: Licensee Event Report  
No., 457-96-003-00

cc: NRC Region III Administrator  
NRC Resident Inspector  
INPO Record Center  
ComEd Distribution Center  
I.D.N.S.  
I.D.N.S. Resident Inspector

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EXPIRES 04/30/98

## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

FACILITY NAME (1)

Braidwood Unit 2

DOCKET NUMBER (2)

05000457

PAGE (3)

1 OF 7

TITLE (4)

Hot Particle Contamination of Contract Laborer in Excess of Regulatory Shallow Dose Equivalent Limit Due To Unknown Cause

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
4	8	96	96	-- 003 --	00	5	8	96	None	
									FACILITY NAME	DOCKET NUMBER
									FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)		0	X 20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(ii)	50.73(a)(2)(x)
			20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Rick Thacker, Health Physics Dept

TELEPHONE NUMBER (Include Area Code)

(815) 458-2801 x2895

## 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)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO	EXPECTED SUBMISSION	MONTH	DAY	YEAR

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

On April 8, 1996, while exiting the U2 containment building, a contract laborer alarmed the RM-14 when he attempted to survey his dosimeters. Immediate investigation by Radiation Protection personnel identified a radioactive particle on the outside of the worker's right index finger. The particle was captured, and an initial GM reading was 4.4 M dpm and RO3-C readings were 250 mrem/hr window open and 5 mrem/hr window closed. After removal of the particle, the worker cleared the Aux building portal monitors (IPM-8s) and was allowed to exit. No specific source of the particle nor cause for the contamination could be determined. Prior to this event, Braidwood Station had not experienced an unusual number of hot particles, although the number of occurrences did increase somewhat after this event.

EXPIRES 04/30/98

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Braidwood Unit 2	05000457	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 7
		96	-- 003 --	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

A. PLANT CONDITIONS PRIOR TO EVENT:

UNIT: Braidwood Unit 2                      EVENT DATE: 4/8/96  
EVENT TIME: 1030  
MODE: 6 (Refueling)                      RX POWER: 0  
RCS [AB] TEMPERATURE/PRESSURE: Atmospheric

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of this event that contributed to the severity of the event.

On April 8, 1996, at 8:07 a.m., several contract laborers signed onto Radiation Work Permit (RWP) 96-4102, which was for the setup, teardown, decontamination, and general cleaning of Steam Generator platforms, bullpen area, and equipment decontamination where necessary to support Steam Generator activities. They entered the Unit 2 containment and proceeded to the steam generator (S/G) control point where they were directed by the control point Radiation Protection Technician (RPT) to decontaminate the 2A/2D S/G bullpen (the most recent survey showed contamination levels of 20k dpm/100cm<sup>2</sup>). One of the laborers entered the bullpen dressed in Class 2 protective clothing (full set of PCs) and double rubber shoe covers and double rubber gloves. The inside rubber gloves were taped to his PCs and the outer ones were taped over the inner ones. When he was finished, he placed the used mophead in a bag designated for its disposal, removed his outer gloves and shoe covers and exited the bullpen. A contract RPT came down from the platform and told the laborer that he would hand him the used clothing. The RPT pulled the clothing and dose rated the bag. The laborer double bagged the clothing as it came across the bullpen stepoff pad and the RPT directed him to take the bag out to the control point where the control point RPT would resurvey the double-bagged clothes and mark the outside with the results. The laborer left from inside the missile barrier (IMB) with the bag of clothes.

The laborer then proceeded to the S/G control point telephone (8:40 a.m.) to order additional platform clothing. He took off one rubber glove, placed the call to order more platform clothing and replaced his right glove after the call. While he had his right rubber glove removed, the laborer said that he may have touched his PCs or his left rubber glove. When he replaced the glove, he grabbed it by the

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

B. DESCRIPTION OF EVENT (continued)

opening and pushed his hand into the glove. The laborer then performed various other tasks such as deconning the headsets and faceshields used for platform work. It should be noted here that Braidwood Station's policy requires workers to remove their outer rubber glove when using a phone within a contaminated area. This worker's actions were consistent with that policy.

The worker exited U2 containment at about 10:10 a.m. and proceeded to undress. The S/G control point RPT exited containment behind the laborer. He watched the laborer remove his booties, rubber gloves, hood and coveralls and said the worker undressed according to procedure. The laborer, who still had his cotton glove liners on, surveyed his dosimetry while holding it in his right hand. This alarmed the frisker. A contract RPT took the laborer's dosimetry to frisk it at the survey table. The laborer re-surveyed his hand with his cotton glove liners still on and again alarmed the frisker. The S/G control point RPT who was undressing behind the laborer took the cotton liner off the laborer's hand and the laborer again frisked his hand and still alarmed the monitor. A ComEd RPT came to investigate and saw that the laborer was alarming the frisker on all scales. He placed a plastic surgeon's glove on the affected hand and took the laborer to the personnel decon room.

In the decon room, the RPT isolated the probable location of the particle and tried to remove it using duct tape. The particle was successfully removed on the fourth try after more pressure was applied to the tape. The initial attempts may have failed because the glove used on the worker's hand had powder sprinkled on the inside. The powder left residue on the worker's hand, and this may have initially reduced the effectiveness of the tape to remove the particle.

The RPT surveyed the particle with a pancake GM detector which resulted in a reading of 4.4 Million dpm. An ion chamber (RO-3C) survey showed approximately 250 mrem/hr window open and approximately 5 mrem/hr window closed. The RPT then turned the particle in to the counting room for an isotopic analysis. The isotopic results indicated only Co-60 at 10.99 uCi. A dose calculation was performed (using the manual procedure method) under the direction of the RPM and the resultant Shallow Dose Equivalent (SDE) was 19.3 rem. The data was then re-run



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TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

B. DESCRIPTION OF EVENT (continued)

through the VARSKIN program using the isotopic data, and this indicated a Shallow Dose (SD) dose of approximately 106 rad. The default time used for these calculations was the total time the laborer was in the containment. At this point the laborer was locked out of the RPA using the access control system.

The time estimate was know to be a conservative estimate, so an interview of the laborer was conductive by the Radiation Protection Manager (RPM) the following morning. Upon this initial interview, it was determined that the worker had taken his rubber glove off to use the phone, and that this was the most probable point at which the particle came in contact with the cotton liner (and eventually the index finger). This new time estimate was used in the dose calculation. Dose calculations were re-performed using VARSKIN which resulted in 70.6 rad Shallow Dose.

Since this calculated dose was greater than the 10CFR20 dose limit for the skin of the extremities, the station placed an ENS call to the NRC at 10:13 a.m. on 04/09/96 pursuant to 10CFR 20.2202(a)(1)(iii), which requires the reporting of events involving byproduct, source, or special nuclear material that may have caused an individual to receive a shallow-dose equivalent of 25 rem or more.

This report is being reported pursuant to 10 CFR 20.2202, which requires the licensee to submit a written report within 30 days after learning of any incident for which an ENS notification is required by 20.2202.

C. Cause Of Event

As discussed above, the NRC cause code most appropriate for this event was determined to be Other (Unknown). A number of possible scenarios were pursued during the investigation, with the most likely method of contamination being at the time the worker used the telephone at the S/G control point. All information obtained during the investigation indicated that the worker followed the proper radiation worker practices at all times, with the possible exception of when he may have brushed his hand against his protective clothing while talking on the phone.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

D. Safety Analysis

The health effects to the worker from the radiation exposure associated with this event will be non-perceptible. The beta emission value for this event was calculated to be 18.2 microCurie hours. This was well below the beta emission criteria of 75 microCurie hours established in NRC Information Notice IN 90-48. The beta emission criteria was established at a level to prevent any deterministic (non-stochastic) effects to the skin. Since this event results in an estimated exposure at a fraction of the beta emission criteria, there will be no perceptible worker health effects.

E. Corrective Actions

The immediate actions were to isolate the contaminated area on the worker's hand, decontaminate the worker, and to restrict his access to the Radiologically Protected Area until the investigation was complete.

The S/G bullpen area, the walkway to the control point on 377', the area around the bullpen, and the control point were surveyed with large area smears to determine if additional radioactive particles were present. None were found. The walkway to the control point and the control point itself are surveyed shiftly to monitor contamination levels. Radioactive particles have never been found at the control point and they have not been a factor affecting the operation of the A/D platform. The contamination and particle controls that are in place are reasonable and appropriate given the generally "clean" nature of the platforms and given the reported lack of radioactive particle intrusion into work evolutions and job areas.

In order to determine whether the contamination may have originated from the protective clothing the worker donned, two ComEd employees performed an on-site assessment of the protective clothing launderer, Professional Laundry Management (PLM). The assessment was primarily intended to determine the likelihood of the particle making it out of the laundry facility inside a rubber glove. PLM washes and dries rubber boots and gloves in machines separate from the rest of the protective clothing. Likewise, the

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

E. Corrective Actions (cont.)

rubber gear is monitored for contamination separately from the cloth items. The contamination monitors employ two sets of gas flow proportional counters, above and below the belt. These detectors are most efficient for beta and alpha radiation. They do have some sensitivity for gamma radiation, but it is not significant. The monitors are set to alarm at 90 nCi's of Tc-99 at 1.5" (as tested with a bare source). A qualitative test of the monitor's alarms with the source inside a rubber glove showed detector response at 33 to 50% of the alarm limit (i.e., monitor response was 30 - 45 nCi). Thus, it would require approximately 180 to 270 nCi's (or 400,000 dpm to 600,000 dpm) of internal contamination to trigger an alarm, assuming no external contamination was on the glove. In response to this, ComEd requested that PLM lower the alarm setpoints to 25 nCi's for cloth items and 70 nCi's for rubber gloves, and investigate adding gamma sensitive contamination monitors to better identify contamination internal to the clothing. The setpoints were lowered to these values on 4/19/96. Even with the original monitor limits, the intensity of the particle found in this event would have been detected before leaving the laundry facility.

To address the increased number of hot particles observed by the station, assistance from the Corporate ComEd Health Physics Department was requested to review and trend the identified increase in occurrences. This review was ongoing at the time of this report's issuance. The results of this review will be tracked to completion by action item 456-180-96-00301.

F. Previous Occurrences

A search of previous LERs found no previous occurrences of hot particle contaminations of a similar nature or magnitude. Braidwood's experience during this and previous outages has shown a relatively low number of hot particles. There have been several nonreportable events relating to poor rad worker practices during each of the refueling outages, but these have been at a low enough level to not constitute an adverse trend.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

F. Previous Occurrences (cont.):

The worker involved in the incident is an experienced S/G platform worker. He understands and applies the proper S/G contamination control techniques, and has a good history regarding rad worker practices.

G. Component Failure Data

None

H. Other Information

The event particular information required by 10 CFR 20.2203(b) for this event (Individual's name, Social Security Number, and Date of Birth) is included in a separate, detachable, unnumbered page to this report. This page is only being distributed to the NRC Document Control Desk.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 60.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

ATTACHMENT TO LER 05000457-96-003

The event particular information required by 10 CFR 20.2203(b) for this event (Individual's name, Social Security Number, and Date of Birth) is provided below. This page is only being distributed to the NRC Document Control Desk.

Name of Individual Exposed: Louis Michael Peterson  
Social Security Number: 323-42-4963  
Date of Birth: 06/01/56