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RECORD #235

TITLE: Health Physics Position on the Controlling of Beam Ports,  
Thermal Columns, and Flux Traps as High Radiation Areas

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555

May 31, 1991

MEMORANDUM FOR: James H. Joyner, Chief, EPRPB, DRSS, Region I  
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FROM: LeMoine J. Cunningham, Chief  
Radiation Protection Branch  
Division of Radiation Protection  
and Emergency Preparedness  
Office of Nuclear Reactor Regulation

SUBJECT: HEALTH PHYSICS POSITION ON THE CONTROLLING OF BEAM PORTS,  
THERMAL COLUMNS, AND FLUX TRAPS AS HIGH RADIATION AREAS

The purpose of this memorandum is to clarify the NRC staff position that the subject areas must be controlled as high radiation areas. A number of notices of violation concerning the posting and control requirements of 10 CFR 20.201 and 20.203 at research and test reactors have occurred. These licensees were not properly controlling high radiation areas, specifically those involving beam ports. Enclosure 1 contains abstracts of two of these events.

The argument is made by licensees that the radiation streaming from these beam ports will not cause an exposure to the whole body. These licensees have taken the position that narrow beams don't meet the current 10 CFR 20 definition (20.202(b)(3)) that states in part, "... a major portion of the body could receive, in any one hour, a dose in excess of 100 millirems" [emphasis added].

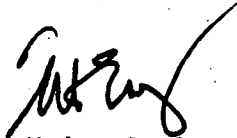
The Part 20 definition of the whole body as specified in 20.101(b)(3) includes the head and trunk; active blood forming organs; lens of the eyes; or gonads. Whether these beams are narrow or not, if they could possibly expose the lens of the eyes, the gonads or any other major portion of the head and trunk or active blood forming organs, then the beams must be controlled as high radiation areas. The revised Part 20, which goes into effect January 1, 1993, will support this position, and will further clarify it by avoiding the term "the major portion of the whole body," when defining a high radiation area.

Pursuant to paragraph 20.203(c)(5), if the stated alternatives of 20.203(c)(2) and (4) are not feasible, a licensee may apply to the Commission for approval of methods not included in paragraphs (c)(2) and (4) of this section for controlling access to high radiation areas. If a licensee chooses 20.203(c)(2)(iii) as the control option, positive entry control is required. Methods of positive entry control may include, but are not limited to, the following:

All entries into high radiation areas are controlled by requiring issuance of a Radiation Work Permit (RWP) or a work procedure. This controlling permit or procedure contains any special instructions and the requirements for entry into the high radiation area, which may include: a pre-briefing on the actions to be performed, a review of current radiation surveys, the requirement of a film badge or TLD, and a pocket ionization chamber or extremity dosimeters, signs and barriers to avoid contact with the beam, and directions not to alter any shielding or experiment without health physics supervision.

Due to the nature of the potential hazards involved, all facilities having these types of radiation beams need to control these areas as high radiation areas. However, given the diverse nature of reactor types and experimental configurations in the nonpower reactor community, we could expect these licensees to implement a wide variety of practices and controls to satisfy the regulatory requirement for positive entry control.

This Health Physics Position has been reviewed by all Regions; the Division of Advanced Reactors and Special Projects, NRR; the Office of Nuclear Material Safety and Safeguards; and the Office of Enforcement.

*for*   
LeMoine J. Cunningham, Chief  
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Division of Radiation Protection  
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Enclosures:  
As stated

CONTACT:  
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May 31, 1991

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Original signed by Thomas H. Essig

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ENCLOSURE 1

RELATED EVENT SUMMARIES

Notice of Violation - Massachusetts Institute of Technology Research Reactor

Inspection  
Report No: 50-20/83-02

Abstract: When an inspector examined the records of daily and monthly beta-gamma radiation surveys, one area of the facility showed higher than normal readings. At the inspector's request a survey was conducted in front of a hot cell window. Radiation levels were found to be above 100 mR/hr at locations three feet above and within two feet of the surface of the hot cell. This area was not posted as a high radiation area nor was it locked or otherwise controlled as required by 10 CFR 20.203 (c)(2).

Notice of Violation - Texas A&M University Nuclear Science Center

Inspection  
Report No: 50-128/88-01 and 88-03

Abstract: While reviewing the circumstances surrounding the reported overexposure of an experimenter conducting neutron diffraction studies, an inspector determined the experimenter periodically crossed through a 20 rem/hr neutron and gamma beam. Controls to the high radiation area were minimal and repeatedly ignored by the experimenter. The beam port area was fenced off but was left unlocked in violation of 10 CFR 20.203(c)(2). Neutron radiation surveys were performed and reported as greater than 1 rem/hr. While the facility neutron meter only read up to 1 rem/hr, actual neutron levels were greater than 6 rem/hr.