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Subject: Yellow Alert: Near Miss Electrocution

Title: Yellow Alert: Near Miss Electrocution

Date: 04/15/02
Identifier: 2002-CH-BNL-CO-001

Summary: Verbal instructions are inappropriate especially when involving potentially serious hazards and unfamiliar work. They need to be written as formal procedures to ensure compliance with the tenets of Integrated Safety Management (ISM). Management needs to emphasize to workers that work that falls outside of skill-of-the-craft for their level of training and expertise cannot be carried out without having formal procedures and/or task-specific controls in place. Management needs to ensure that aging equipment is inspected before using and wherever appropriate brought up to current codes.

Discussion: An induction regulator that was installed over 30 years ago at Brookhaven National Laboratory (BNL) was analyzed before replacement. Neither BNL nor Westinghouse, the manufacturer, has documentation on this regulator so an electrical engineer was assigned to make measurements on it to establish the required performance specifications for a replacement. The electrical engineer arrived with two tower-line workers to complete the measurements. As this work falls within the defined skill-of-the-craft for the tower-line workers, no work planning was required or performed. Without direction from any of the three involved in this job, a BNL cyclotron worker from the Chemistry Department used a varnished wooden pole to open three 2300-volt fused cutouts that feed the regulator, reportedly in accordance with the verbal instructions of a retired cyclotron worker. It was reported that the cutouts had been opened very infrequently for over 30 years using this method. Previous and current cyclotron workers thought that the fused cutouts would be deenergized after opening contactors in the power circuit. In fact, although the cutouts were not under electrical load, they were energized. No personal protective equipment (PPE) was used. No damage resulted and the worker was not injured. The tower-line workers and the cyclotron supervisor witnessed the last of the cutouts being opened. The tower-line workers explained the seriousness of the incident to the cyclotron worker and cyclotron supervisor. The cyclotron supervisor initiated an Occurrence Report (CH-BH-BNL-BNL-2001-0026) and the tower-line workers reported the incident to their supervisor. Plant Engineering placed the cabinet under Lockout/Tagout pending investigation.

Analysis: The tower-line workers sent to inspect the cabinets did not use or require formalized work planning (a work permit) since this job is skill-of-the-craft for tower-line workers. Chemistry Department personnel were not listed as a part of the job. With the best of intentions, the Chemistry Department worker opened the fused cutouts on his own initiative. Management in the Chemistry Department did not emphasize sufficiently that work practices associated with aging facilities must be reviewed against current ISM Standards. The worker's supervisor did not emphasize sufficiently that the verbal instructions needed to be reviewed for correctness and acceptability, and written as formal procedures.

Resolution: The members of the Imaging Group in the Chemistry Department will not work with any power distribution or utilization circuits powered to greater than 480 volts. To ensure the effectiveness of this action, control of all high-voltage equipment was transferred to Plant Engineering tower-line personnel. The cyclotron facility locks securing this equipment were replaced with Plant Engineering locks. The cyclotron personnel analyzed their procedures, and found no other equipment where they might access high-voltage power systems. This incident was reviewed and the need for work planning before carrying out verbal instructions and review of procedures associated with aging facilities was emphasized in meetings with the Imaging Group, the Chemistry Department, and the Division. A memorandum was distributed to Chemistry Department personnel emphasizing the necessity of reviewing work practices associated with aging equipment to ensure the procedures are in compliance with ISM standards before use of these procedures and that work cannot be carried out without involving work planning, even with the best of intentions.

Priority Descriptor: Yellow / Caution

Work / Function: Conduct of Operations - General, -Work Control, - Work Planning

Hazard: Electrical / NEC

ISM Core Functions: Analyze Hazards, Define Work, Develop / Implement Controls, Perform Work

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Authorized Derivative Classifier: N/A

Reviewing Official: N/A

Keywords: Verbal instructions, Integrated Safety Management, Skill-of-the-craft, Legacy equipment

References: DOE Occurrence Report Number CH-BH-BNL-BNL-2001-0026 (Electrical Incident at Building 901)

FOLLOW-UP ACTIONS: Information in this report is accurate to the best of our knowledge. As a means of measuring the effectiveness of this report, please contact the originator of significant actions taken as a result of this report or of any technical inaccuracies you find. Your feedback is appreciated.