

July 23, 2008

TO: W.A. Brocker OPS

FROM: J.L. Woodring *JLW* EQO-Industrial Hygiene

SUBJECT: Summary of EQO-Industrial Hygiene support for HEP NOVA project

This information is provided per your request for the committee investigating current health and safety conditions in building 366.

The NOVA neutrino detector is a joint project of Argonne, Fermilab, University of Minnesota and others and will involve using adhesive to assemble a large PVC plastic detector assembly. In November 2005, HEP requested Industrial Hygiene to review several candidate adhesive materials. One of the candidates was a urethane adhesive containing free isocyanates, a recognized trigger of occupational asthma. The occupational exposure limit (TLV) for methylene bisphenyl isocyanate (MDI) is only 0.005 ppm. After meeting with project managers and explaining the difficulty of controlling exposures to the level on a large-scale project, an alternate adhesive was selected. The primary volatile material is methyl methacrylate, which has an 8-hr TLV of 50 ppm and a 15-minute STEL of 100 ppm. Industrial Hygiene has worked closely with the project team in evaluating concentrations during small-scale bench tests, tests in our chamber in Building 200 to establish an emission factor (vapor release per quantity of adhesive used) and concentrations during application tests in the high bay of building 366. A summary of our major activities is below:

- 8/31/2006 Measurements of five tube applications in the Building 366 auger room; maximum breathing zone concentration was 10 ppm. Methacrylic acid concentrations were also measured; all results were below the detection limit (less than 0.09 ppm)
- 12/05/2006 Additional monitoring of test application in the Building 366 auger room. Maximum breathing zone concentration was 6 ppm methyl methacrylate.
- 02/20/2007 Survey during application of adhesive to the panels in the high bay floor assembling a 13x9 ft horizontal structure; 25 cartridges of Devcon plastic welder 60 were used. Breathing zone concentrations were 21 & 15 ppm; general air concentrations near the operation were 8 & 3 ppm methyl methacrylate
- 04/13/2007 Evaluation of total weight loss during curing of Devcon plastic welder 60 was conducted with open panels showing exposed beads of adhesive in the IH test chamber in Building 200. Devcon Corp also conducted similar tests. Such observations are needed for design of the large-scale assembly building to be built in northern Minnesota.

- 04/19/2007 Recommendations on gloves for use with the Devcon 60 adhesive
Design of the project is such that skin contact should not be needed. Gloves are used for protection against accidental contact.
- 05/11/2007 Monitoring of adhesive application in the high bay. Use of 30 cartridges of Devcon 60 adhesive assembly 13x9 ft structures stacked eight high. High bay door was open and propeller fans fitted with activated carbon filters were used near the operation. Breathing zone methyl methacrylate was 2 to 4 ppm; general air samples around the operation and in the fan discharge were in the range of 0.3 to 1.5 ppm.
- 10/17/2007 Monitoring during application of Devcon 60 in the high bay during an adhesive ratio testing of an automatic gluing apparatus. Breathing zone samples of methyl methacrylate were 1.4 to 2.0 ppm. Area samples were 0.3 to 7 ppm. Calculated 8-hr average exposures are considerably below these sample numbers; breathing zone samples of 0.03 to 0.25 ppm 8-hr TWA and area samples 0.01 to 0.1 ppm 8-hr TWA were calculated.

In summary, Industrial Hygiene has been monitoring the development of the NOVA construction research process. All exposures have been well below the occupational exposure standards. General air concentrations in the vicinity of the gluing have been well below exposure standards.

Project managers receiving our reports have been advised of the requirement to notify affected employees of the results of monitoring. The following standard notice is included in monitoring reports:

“Supervisors in areas monitored must notify employees of representative sampling results in writing, either individually or by posting sampling results in an area accessible to affected personnel. The entire survey report need not be presented; however, where exposures exceed permissible exposure levels, planned corrective action must be indicated. Records of this notification must be maintained by your Division in an auditable form and may be reviewed during DOE or internal audits. If you or employees have questions regarding interpretation of results, contact Industrial Hygiene at 2-3310.”

Note that this requirement has been applied to personnel involved in the process and not everybody in a building. However, it has been the practice of Industrial Hygiene to provide survey results and MSDS to anyone else who requests them.

cc: IH File

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