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DOW CHEMICAL U.S.A.

15452

MICHIGAN DIVISION
September 17, 1985

MIDLAND, MICHIGAN 48640

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593 Bldg.

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While working with personnel in the Pipe/Boiler-shop, I have become aware of several cases of mild to severe "sunburn" resulting from ultra-violet (UV) radiation exposure during welding activities. As a result, UV radiation was discussed in the August safety meeting, and heavier clothing and/or suntan lotions were suggested as measures to prevent overexposure. As you will recall, the relative merits of various types of protective clothing were discussed and a qualitative test was suggested for determining their effectiveness against UV radiation.

On August 28, 1985, tests were conducted using a stationary arc welder. A rack was positioned next to the welding apparatus, first fifteen inches from the weld point, then eight inches away. Shirts made from different types of fabric were hung on the rack and a UV sensor used to measure the amount of UV light passing through the shirt. Results of the test are indicated in the attached table.

For the values in the table, the absolute amounts of radiant energy passing through the shirts were not as important as the amount of energy for one shirt relative to another. As expected, the heaviest weight shirt, 10 ounce nomex, proved to be the best barrier. Of particular interest though, was that the standard shirt worn by Pipe/Boiler shop personnel, the 8 ounce nomex, provided the least protection from UV radiation exposure. The amount of UV-radiation allowed through the 8 ounce nomex was about twice that of a comparable cotton/synthetic blend fabric. Of equal interest was an observation not indicated in the table of results. This observation was that a significant percentage of the sparks generated during arc welding passed through the nomex shirt, usually without leaving visible burn holes. This was not true of any of the other shirts, and therefore it is assumed that the nomex fabric had a coarser weave than the other fabrics. Based on these observations and the fact that shop personnel are subject to "sunburns," I would have to conclude that 8 ounce nomex is not a good choice of shirt material for sustained welding activity. Heavy nomex would appear to be a more appropriate choice. During the warm season, if UV exposure is the only consideration, material other than heavy nomex would seem to be the most practical choice.

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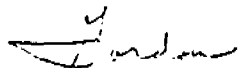
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ULTRA-VIOLET (UV) LIGHT TRANSMISSION THROUGH VARIOUS FABRICS

<u>FABRIC TYPE</u>	UV Radiation Transmission,* Milliwatts/cm ²	
	<u>8 INCHES**</u>	<u>15 INCHES</u>
Nomex, 8 ounce, blue, worn shirt	240	40
Cotton/synthetic blend, 8 ounce, gray, worn shirt	130	20
Cotton/polyester blend, 8 ounce, blue, new shirt	25	<5
Nomex/Kevlar blend, 12 ounce, blue, used shirt	0	0

*Measured radiation energy levels are not necessarily significant, use for comparative purposes only

**Distance from UV-source in inches



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