

January 22, 1968

Mr. A. W. Havelka
General Engineer
U.S. Army Weapons Command
Cleveland Tank-Automotive Plant
6200 Riverside Drive
Cleveland, Ohio

Dear Mr. Havelka:

Enclosed are two copies of a report on the visit made to the plant January 11, 1968.

Results of the tests made are shown in section 4 of the report. Atmospheric conditions in the welding area appeared to be satisfactory at the time of the visit. Ventilation seems to be adequate and this would depend upon proper operation of the building fan ventilation system.

Please contact this Division any time it may be of service regarding matters pertaining to accident prevention or industrial hygiene.

Very truly yours,

Albert E. Scheible, P.E.
Safety Engineer

AES:f

0000 0021

January 22, 1968

Re: U. S. Army Weapons Command
Cleveland Tank-Automotive Plant
Allison Div., General Motors Corp.
6200 Riverside Dr.
Cleveland, Ohio

1. On January 11, 1968 a visit was made by the writer to the subject plant in Cleveland, Ohio. The visit was requested by Mr. Sam Oliverio, District Supervisor of this Division to check for fumes in the welding area, basement area and alkaline line.
2. Contacted at the plant were Messrs. A. W. Havelka, General Engineer, Defense Supply Agency; A. J. Rehner, Safety Engineer, General Motors Allison Division; R. Newport, In charge of safety, General Motors Allison Division; and G. Rutak, General Foreman over welding.
3. At this location the operating company is currently engaged in manufacturing ordnance for the federal government.

The main welding area is on the first floor in an interior location near the south end of the plant. It was thought the area would be equivalent to about two acres but it could be more than this. Currently, there are 173 welders on the first shift and 56 on the second shift. Most of the welding is aluminum. Due to the large number of welders, it appeared that actual welding was always being done somewhere in the area. However, the welding activity by individuals appeared about the same as in any normal industrial plant, i.e., about 30% to 35% of time spent in actual welding. The floor space per individual welder is very ample, on average perhaps considerably more than 10,000 cubic feet per welder without requiring mechanical ventilation, as recommended by American Welding Society Standard Z49.1-1958.

4. Straight arc stick welding and shielded arc spool wire welding are performed. Tests were made at two locations where argon shielded arc aluminum welding was in progress. A Draeger instrument was used. Results are shown in the table below.

Location	Test For	Observed Concentration ppm *	TLV ** ppm
Just north of column EK13	Nitrogen dioxide	1.0	5.0
Just north of column EK13	Phosgene	0	0.1
Just northwest of column EK17	Nitrous oxide plus Nitrogen dioxide	1.0	—

0000 0022

- * parts of gas per million parts of air by volume.
- ** Threshold limit value.

The test for nitrogen dioxide was well below the threshold limit value and phosgene was not detected. The latter test was made because of the possibility of metal cleaning with a chlorinated hydrocarbon. It was later learned that cleaning is done with soap detergent, water rinse and oakite.

Threshold limit values refer to air-borne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. However, it is generally recognized that a wide variance of susceptibility exists among different people with respect to the toxic effect of various substances. It is not implied or recommended that conditions be such as to permit concentrations to remain at/or near threshold limit values.

5. There is no separate mechanical exhaust system for the welding area. None should be necessary for atmospheric conditions observed on the date of this visit. It was thought these conditions were normal or possibly not quite as good as normal.

There are oil fired air heaters in the basement of the building. Heated air circulates upward naturally from the basement. Outside air is brought into the building by fans in the roof. There are about 18 such fans in the roof of a balcony machine shop located over the welding area. To bring this air to the first floor there are wall fans in the north machine shop balcony wall. There are also some roof fans over the welding area in a higher ceiling area north of the balcony. Air is removed from the plant by eleven wall fans in the south wall of the building. The air intake roof fans were indicated on a blueprint to have a capacity of 20,000 cfm each. The exhaust fans were indicated to have a capacity of 40,000 cfm each.

Authoritative sources differ to some extent on the amount of general ventilation required for welding operations. However, all agree that ventilation is necessary. The American Conference of Governmental Industrial Hygienists recommends 1000 cfm per welder using 5/32" rod and up to 4500 cfm per welder using 3/8" rod. They say for toxic materials higher air flows are necessary. By another method of estimation a figure of about three air changes per hour when using 3/16" rod would be about right for the area in question. But the Ohio Building Code, Section 1218.15 on general ventilation for factories, states in part that the total air circulated shall be not less than six air changes per hour considering a room volume of eight times the floor area. It further states that no air contaminated by other than human occupancy shall be used for general recirculation.

Re: U.S. Army Weapons Command
Cleveland, Ohio

January 22, 1966
Page 3

Ventilation for the welding area is supplied as a part of the general building ventilation. There appears to be adequate general ventilation for the welding operations when the building fan ventilation system is properly operated. It might be advisable to have a written procedure for operation of the building fan ventilation system in the hands of key personnel responsible for atmospheric conditions in the plant.

6. There appeared to be some haze in the basement hall areas. This varied between clear and hazy during four different trips through some of the areas. There was no source of continuous fume generation in the basement that could be stated. Likewise, it was not known what might be meant by fume generation from an alkaline line.

The haze in the basement hall areas may have been due to engine exhaust from a few automobiles. If there is no separate means of exhausting contaminated air from these areas, the advisability of permitting any automotive traffic is questioned. There is considerable office space in the basement. Heated basement air is circulated in the work space on the first floor.

7. This survey has been made under Section IC-5-11 of IC-5, Specific Safety Requirements of The Industrial Commission of Ohio Relating To All Workshops And Factories.
8. No recommendations are made at this time.

Respectfully submitted,

Albert E. Scheible, P.E.
Safety Engineer

AES:f