OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

September 4, 2015

Mr. Mark Duvall, Esq., Principal
Beveridge & Diamond
1350 I St, N.W., Suite 700
Washington, DC 20005

Dear Mr. Duvall:

Thank you for your January 23, 2015 correspondence to the Occupational Safety and Health Administration (OSHA), Directorate of Enforcement Programs. You requested clarification of OSHA's electrical guarding standard at 29 CFR 1910.303(g)(2)(i).

Question 1: Does the electrical guarding requirement at 29 CFR 1910.303(g)(2)(i) apply to voltages below 60 volts DC?

Response: The provision in question, 29 CFR 1910.303(g)(2)(i), generally requires "live parts of electric equipment operating at 50 volts or more" to be "guarded against accidental contact by use of approved cabinets or other forms of approved enclosures" or by other specified means. The guarding requirement does not distinguish between AC and DC voltages. Therefore, the requirement applies to live parts operating at 50 volts or more AC *or* DC.[1]

Question 2: If 29 CFR 1910.303(g)(2)(i) applies to live parts operating at 50 volts or more AC *or* DC, will OSHA treat a failure to guard live parts operating below 60 volts DC as a de minimis violation?

Response: No. A de minimis violation occurs when an employer deviates from the requirements of a standard in a way that has no direct or immediate relationship to employee safety or health and in other limited circumstances in which the employer's non-compliant actions provide employee protection equivalent to or greater than that afforded by the applicable standard. See Field Operations Manual, Ch. 4, Sec. VIII (CPL 02-00-150, April 22, 2011). OSHA does not believe that the scenario described in your question satisfies these criteria. Failing to guard live parts operating at any voltage over 50 volts, DC, is not as protective as, or more protective than, guarding those parts, and *does* have a direct relationship to employee safety. Therefore, a lack of required guarding in your scenario would not be a de minimis violation.

You point out in your letter that some consensus standards consider live parts operating between 50 and 60 volts, DC, to be non-hazardous under certain circumstances. However, OSHA considers *all* voltages of 50 volts or above to be hazardous. Electric current, not voltage, passing

through the human body causes injury, and the amount of current passing through an object depends on the resistance of the object. As explained in Appendix C to 29 CFR 1910.269, theinternal resistance of the human body is 500 ohms, which is the minimum resistance of a worker with broken skin at the point of contact. The current through 500 ohms from a live part energized at 60 volts would be 120 milliamperes. This level of current, either ac or dc, is sufficient to cause serious injury.[2]

We are aware of documented cases where serious injuries occurred when employees contacted live parts operating between 50 and 100 volts, DC. See, for example, https://www.osha.gov/pls/imis/accidentsearch.accident_detail?id=775742&id=14295083.[3] In fact, although OSHA's standards require guarding starting at 50 volts (AC or DC), it is not necessarily the case that voltages below that level are completely safe, We have heard of cases in which auto mechanics have sustained serious injuries working with 12-volt or 24-volt (DC) vehicle batteries. (See, for example, http://www.ncbi.nlm.nih.gov/pubmed/23937760; http://www.researchgate.net/publication/7737406; and http://www.medbc.com/annals/review/vol_5/num_1/text/vol5n1p33.htm.)

Thank you for your interest in occupational safety and health. We hope you find this information helpful. OSHA requirements are set by statute, standards, and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov. If you have any further questions, please feel free to contact the Directorate of Enforcement Programs at (202) 693-2100.

Sincerely,

Thomas Galassi, Director
Directorate of Enforcement Programs

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[1] Note that other provisions in OSHA's electrical standards *do* distinguish between AC and DC voltages. See, for example, 29 CFR 1910.304(g)(1) (different grounding requirements for AC and DC systems).

[2] The International Electrotechnical Commission's publication on the Effects of current on human beings and livestock — Part 1, General Aspects. Available at: http://www.iec.ch/.

[3] Although the second abstract does not reference a specific voltage, the open circuit voltage on a DC welder is between 50 and 100 volts.