



Air Pollution Control Board
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Air Pollution Control Officer
R. J. Sommerville

September 15, 1993

RICHARD BODE
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TECHNICAL SUPPORT DIVISION
CALIFORNIA AIR RESOURCES BOARD
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EMISSION ESTIMATION TECHNIQUE FOR WELDING OPERATIONS

The District has reviewed your August 27, 1993 recommendations regarding emission estimation techniques for various types of welding operations. Your ongoing technical assistance with this potentially significant source of toxic air contaminants is very much appreciated. As your staff confirmed, existing scientific information regarding quantification of welding emissions is extremely limited.

Two studies which provide some test results are the American Welding Society (AWS) research performed in 1979 and the Air and Waste Management Association (AWMA) paper presented in 1993. The District remains concerned about this data because of unapproved sampling procedures, reported difficulties in the hexavalent chromium analyses, and the minimal number of tests. If sampling procedures used in these studies were not equivalent to ARB methods, fume generation rates may have been underestimated and relative metal compositions in the fumes could be incorrect. If the analytical procedures inadvertently reduced hexavalent chromium during sample preparation, the full Cr+6 composition of the fume may not have been reported. Both studies performed a few tests on a wide variety of electrodes to identify similarities for general emission estimation techniques. A more detailed study of a few electrodes is still needed to resolve basic questions regarding test procedures, significant operating parameters, and reproducibility of results.

The use of electrode specific emission factors is premature given the limited amount of data and uncertain test procedures. In the interim, the District will use the following assumptions to estimate welding emissions for AB2588 purposes;

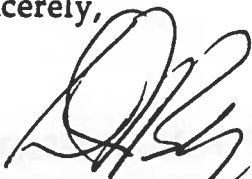
| | <u>GMAW</u> | <u>SMAW</u> | <u>OTHER</u> |
|---|---------------------|---------------------|---------------------|
| Fume Rate (lb fume/lb rod) | 0.01 | 0.02 | 0.05 |
| Fume Composition (Cr+6/Cr total) in fume | same as rod 0.05 | same as rod 0.63 | same as rod 0.10 |

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It is the District's understanding that ARB staff will continue to investigate welding as a potentially significant source of toxic air contaminants. At a minimum, source testing to confirm the results reported by the AWS and AWMA would be valuable. Welding appears to be a process that requires statewide coordination to develop more accurate estimation techniques due to its widespread use, variety of process materials, variable procedures, sampling difficulties, and testing costs.

Please keep us advised of your progress. Contact me at (619) 694-3320 if I can provide you with any additional information or assistance.

Sincerely,



DAVID BYRNES
Associate Air Pollution Control Engineer

DB:jcs

cc: Cliff Popejoy
NASSCO

| Source | Location | Rate (lb/hr) | Rate (lb/day) |
|--------|----------|--------------|---------------|
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