

San Diego County Air Pollution Control District (District)



**Welding Operations Public Meeting
April 20, 2022**

Welding Operations

- Metal welding is a fabrication process whereby two or more parts are fused together by means of heat forming a join as the parts cool.
- Welding operations can create air toxic emissions that can create adverse health effects.



Different Types of Welding

“SAW”

- Submerged Arc Welding

“FCAW”

- Flux-Cored Arc Welding

“SMAW”

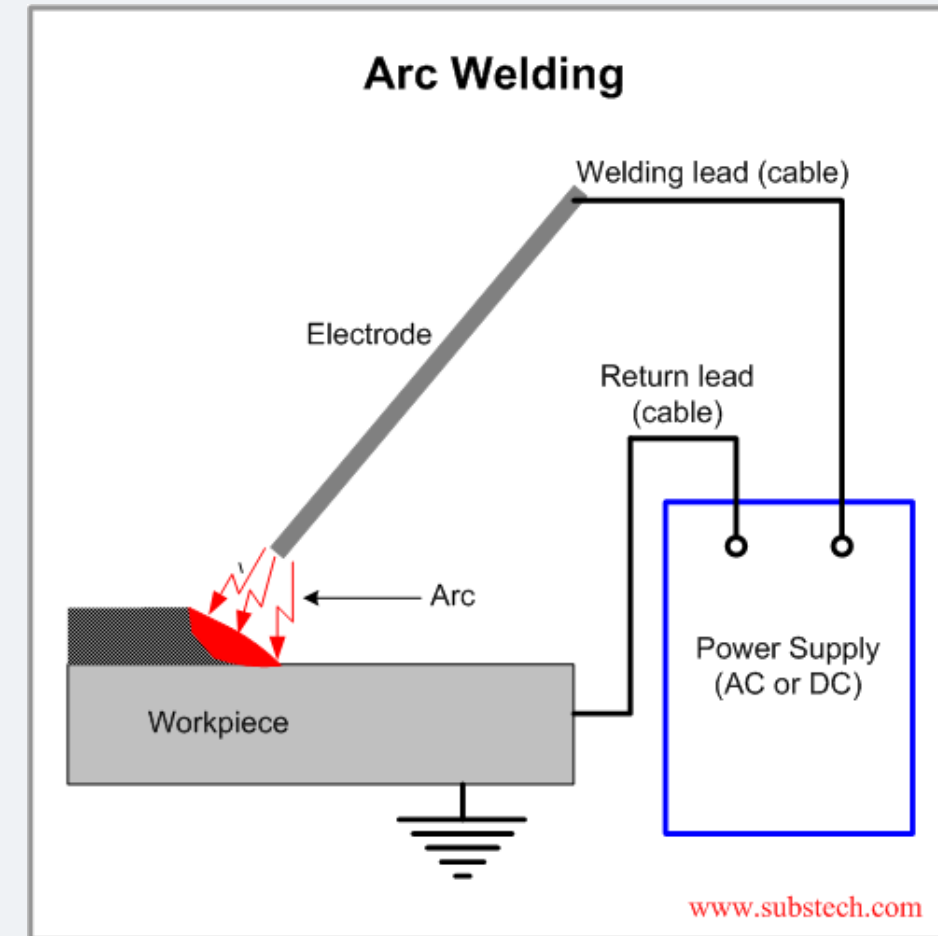
- Shielded Metal Arc Welding

“GMAW”

- Gas Metal Arc Welding a.k.a. **“MIG”** – Metal Inert Gas

“GTAW”

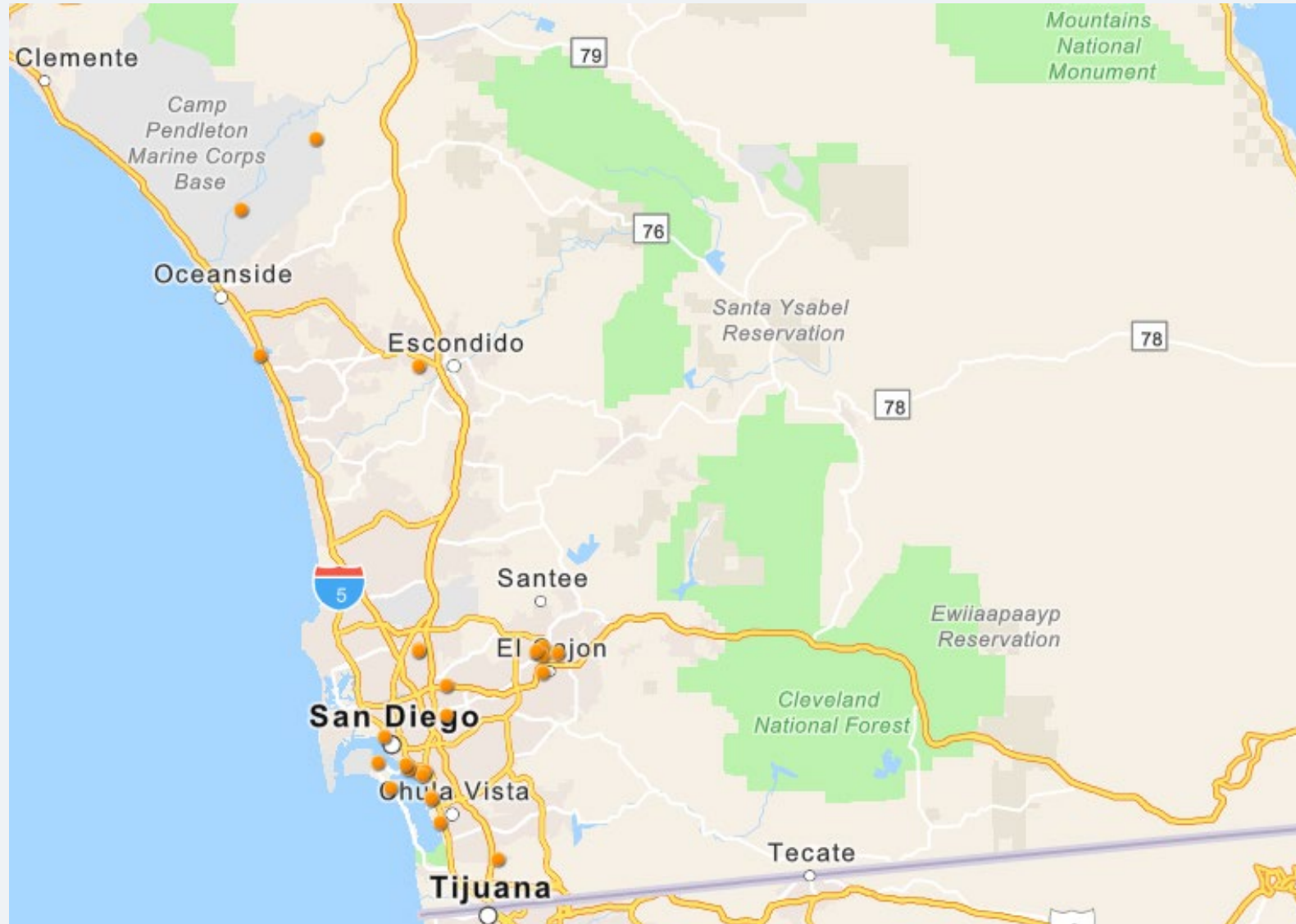
- Gas Tungsten Arc Welding a.k.a. **“TIG”** – Tungsten Inert Gas



Emissions from Welding Operations

- **Emissions from Welding Fumes**
 - Particulate Matter (**PM**)
 - Heavy Metals (**Cr, Cr⁺⁶, Ni, Pb, Cd, Mn**)
- **What Impacts Emissions from Welding Operations**
 - Fume Generation Rate
 - Fume Correction Factor
 - Composition of Welding Rod
 - Conversion of Total Cr to Cr⁺⁶

Welding Operations Regulated under the Hot Spots Program



Welding Operations Data Request & Advisory*



-
1. Please provide the following information about your operation:

Facility Name:	
Facility Address:	
Description of Facility Activities:	

2. Does this facility perform welding at this location?
- ☐ Yes ☐ No, skip to Question #9
3. Did any of the welding activities begin at this location after November 15, 2000?
- ☐ Yes ☐ No
4. Were the welding operations at this location modified after November 15, 2000 in such a manner that increased air emissions?¹
- ☐ Yes, please describe the nature of the modification below (or attach more details) ☐ No, skip to Question #9

¹ Examples of modifications that may increase air emissions include expansion of welding capacity, addition of new welding operations, or any other physical or production change that increased welding emissions above the facility's baseline as it existed prior to November 15, 2000.

Welding Operations

Data Request Outcomes



New Welding Operations

- Identified ~ 190 additional welding operations

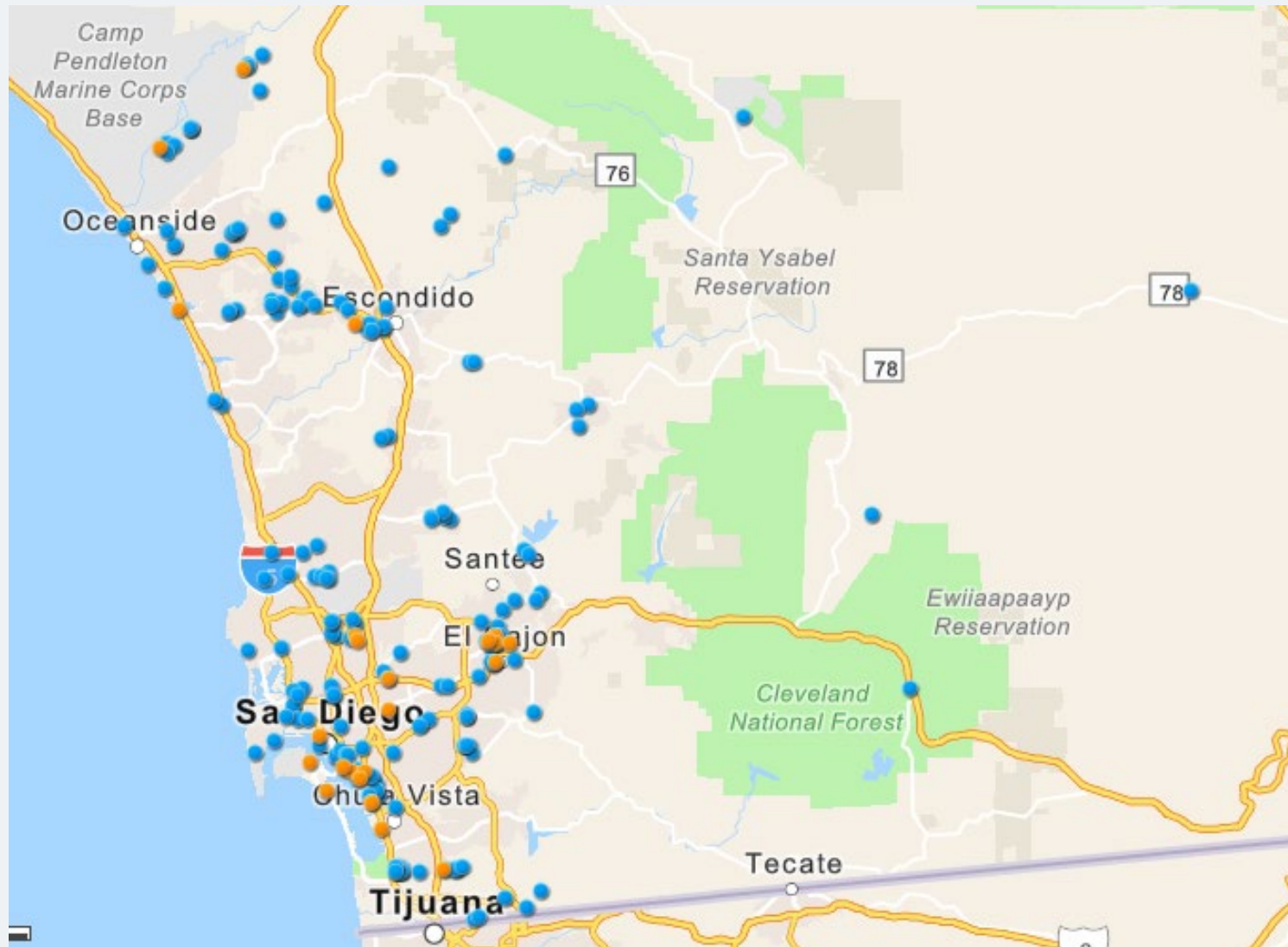
New Welding Rods

- Identified seventeen (17) new rod compositions

Enhanced Emission Calculations

- Applied a study by the Air & Waste Management Association (AMWA) and updated emissions calculations

Welding Operations Existing Operations



- Facilities that conduct welding
- Welding operations evaluated under the Hot Spots Program

Welding Operations Emission Calculation Procedures*



Historic	
1 - SUBMERGED ARC WELDING (SAW), EM12K	17 - Shielded Metal Arc Welding (SMAW)-E 316
2 - FLUX CORE ARC WELDING (FCAW), E70T	18 - Shielded Metal Arc Welding (SMAW)-E 410
3 - Flux Core Arc Welding (FCAW)-E 71T	19 - Shielded Metal Arc Welding (SMAW)-E 6010
4 - Flux Core Arc Welding (FCAW)-E 110	20 - Shielded Metal Arc Welding (SMAW)-E 6011
5 - Flux Core Arc Welding (FCAW)-E 308LT	21 - Shielded Metal Arc Welding (SMAW)-E 6012
6 - Flux Core Arc Welding (FCAW)-E 316LT	22 - Shielded Metal Arc Welding (SMAW)-E 6013
7 - Flux Core Arc Welding (FCAW)-E 11018	23 - Shielded Metal Arc Welding (SMAW)-E 7018
8 - Gas Metal Arc Welding (GMAW)-E 70S	24 - Shielded Metal Arc Welding (SMAW)-E 7024
9 - Gas Metal Arc Welding (GMAW)-E 308L	25 - Shielded Metal Arc Welding (SMAW)-E 7028
10 - Gas Metal Arc Welding (GMAW)-ER 316	26 - Shielded Metal Arc Welding (SMAW)-E 8018
11 - Gas Metal Arc Welding (GMAW)-ER 1260	27 - Shielded Metal Arc Welding (SMAW)-E 9018
12 - Gas Metal Arc Welding (GMAW)-ER 5154	28 - Shielded Metal Arc Welding (SMAW)-E 11018
13 - Gas Metal Arc Welding (GMAW)-ER NiCrMo	29 - Shielded Metal Arc Welding (SMAW)-E CoCr
14 - Gas Metal Arc Welding (GMAW)-ER NiCu	30 - Shielded Metal Arc Welding (SMAW)-E 14Mn-4Cr
15 - Shielded Metal Arc Welding (SMAW)-E 308	31 - Shielded Metal Arc Welding (SMAW)-E NiCr
16 - Shielded Metal Arc Welding (SMAW)-E 310	32 - Shielded Metal Arc Welding (SMAW)-E NiCrMo

New* District Welding Study Rods
33 - 4043
34 - 5356
35 - 309
36 - 347
37 - RN60
38 - RN67
39 - 4130
40 - 5554
41 - 5556
42 - 718
43 - 80S
44 - 90S
45 - 5786
46 - 9015
47 - ERTi-2
48 - INCO 62
49 - L-56

Emissions Calculation Procedures

Welding Operations

Emission Calculation Procedures



Welding Process	Historic			Revised		
	FGR	FCF	Cr(VI) Conv	FGR	FCF	Cr(VI) Conv
SAW	5.00E-05	0.2865	-	5.00E-05	0.2865	0.0005
FCAW	2.00E-02	0.2865	0.63	2.00E-02	0.2865	0.1
SMAW	2.00E-02	0.2865	0.63	2.00E-02	0.2865	0.55
GMAW/MIG/TIG	1.00E-02	0.5464	0.05	1.00E-02	0.5464	0.05

FGR = Fume Generation Rate

FCF = Fume Correction Factor

Cr(VI) Conv. = Conversion ratio of total chromium to Cr(VI)

Welding Operations Permitting Requirements



Exemption

- Rule 11 exempts *brazing and welding equipment, including arc welding equipment and laser welding, that **DOES NOT*** create elevated health risks in accordance with Rule 1200

Exception

- Operations for which construction or modification commenced prior to November 15, 2000 and those operations were not subsequently modified in such a manner that increases emissions of toxic air contaminants

Welding Operations Permit Screening Tool



Welding Permit Screening Tool



13

14

15



Next Steps

1

- Apply Calculation Methodologies

2

- Identify Facilities Subject to Permitting Requirements per Rule 11

3

- Notify Facilities Subject to Permitting Requirement and Require Applications within 6 months

Additional Information



- Welding webpage:
 - <https://bit.ly/38V5gC6>
- Questions?
 - Email at: apcdengineering@sdapcd.org
 - Call us at: 858-586-2600