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# ***OAR Box 1175***

*Prepped by Ryan Dugan*

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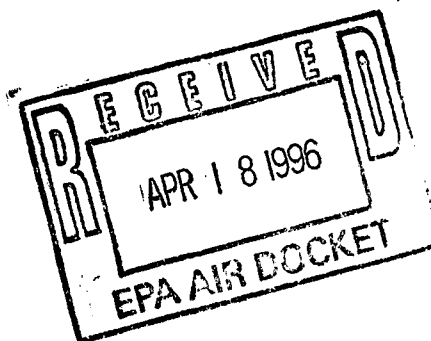
September 20, 1995

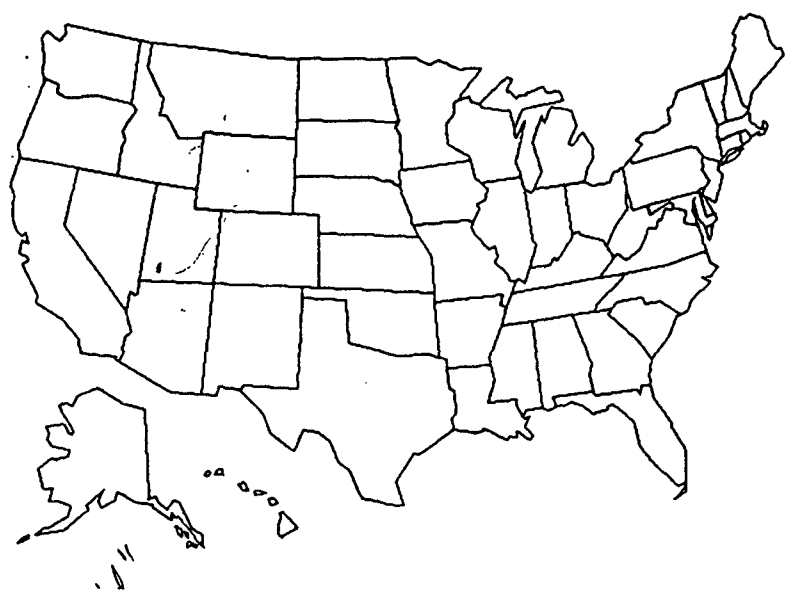
**NOTE TO SOURCE CATEGORY LIST DOCKET:**

The 5/13/93 briefing presented by ESD/ISB to the ESD Director provides compelling information to support delisting the *"Stainless Steel Manufacturing - Electric Arc Furnace (EAF) Operation"* and *"Non-stainless Steel Manufacturing - Electric Arc Furnace (EAF) Operation"* source categories from the list of major source categories. The information was submitted by Al Vervaert of EPA.

Of the 77 Non-Stainless Steel Mfg. plants nationwide, the highest emitter -- Florida Steel in Tennessee -- released 10.0 tons/year (TPY) of four hazardous air pollutants (HAP), of which 5.6 TPY was the highest emission from any single HAP. For Stainless Steel Mfg. (16 plants), the highest HAP emission was 2.5 TPY from Empire-Detroit Steel in Ohio. Clearly, with these relatively low emissions, neither of the above listed categories would qualify as being a major source category (i.e., 10 TPY of one HAP, or 25 TPY of two or more HAP). Furthermore, although some of these steel production mills are co-located with flat steel rolling mills, Al Vervaert has confirmed that in no cases do the combined facility emissions exceed the major source threshold.

  
David Svendsgaard





**ELECTRIC ARC FURNACE - NESHAP**

**Briefing for Bruce Jordan**

**5/13/93**

## ELECTRIC ARC FURNACE - NESHAP

### PURPOSE:

- Report on "major" source determination for carbon steel (CS) and stainless steel (SS) mini-mills.
- Recommend that CS and SS mills be removed from the list of "major" source categories.
- Recommend not pursuing regulation as an "area" source category through independent area source finding or other options such as UASP, LQER, Great Waters, etc.)
- Recognize the need for a source category list maintenance activity.

### BACKGROUND:

#### Source Category Description:

- Listed as two distinct source categories: carbon steel and stainless steel mini-mills
- Carbon steel and stainless steel is produced from scrap metal in high powered electric arc furnaces (EAF's) with secondary refining in ladles (carbon steel) or argon oxygen decarburization (AOD) vessels (stainless steel) followed by casting of billets, blooms, or slabs.
  - Nationwide there are 77 CS mills and 16 SS mills. Combined, these account for 40% of the steel production in the U.S..
  - Some mills are collocated with flat steel rolling mills, none of which have been identified as "major sources".

#### Assessment of HAP emissions:

- Sources of EAF emissions include scrap charging, meltdown, tapping, and refining which produce a large volume of particulate matter (PM). Another source of PM for SS mills is secondary refining in AOD vessels.

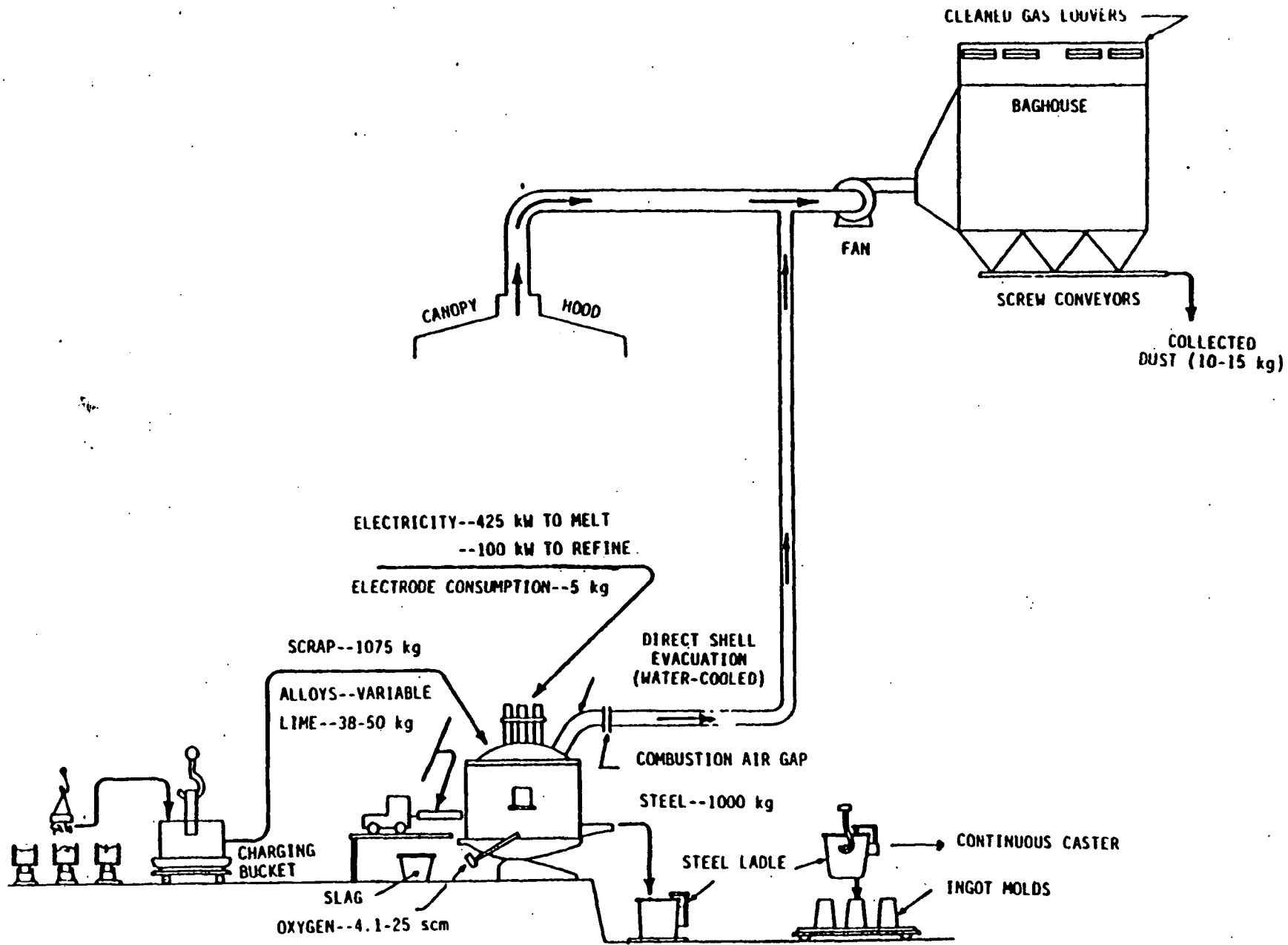


Figure 3-5. Material balance of electric arc furnace based on 1000 kg of steel produced.<sup>37</sup>

- Principal HAP emissions are metal constituents of the PM which include compounds of manganese, chromium, lead, nickel, and cadmium.
- Level of control is relatively good since most facilities are subject to an NSPS.
  - NSPS applies to both source categories.
  - Originally promulgated on 9/23/75 and amended on 10/31/84.
  - Limits PM stack emissions to 0.0052 gr/dscf and visible emissions from melt shops to 6 percent opacity.
  - Mills use a variety of hoods and enclosures to capture emissions and baghouses for collection.

#### MAJOR SOURCE DETERMINATION

##### Assessment of ICR Responses - Carbon Steel:

- Have responses from 71 of 77 mills.
- 23 reported HAP emissions based on stack testing.
  - 16 used the multi-metals train (EPA Method 29) to measure metal HAP emissions from baghouses. Seven used EPA Method 5 to measure PM.
  - 15 reported emissions for baghouses only and eight for both baghouses and fugitive emissions.
- 48 facilities reported HAP emissions based on engineering calculations.
- Highest reported individual HAP (TPY) for baghouse and fugitive emissions:

	<u>Mn</u>	<u>Cr</u>	<u>Pb</u>	<u>Cd</u>
Total	3.7	0.6	5.6	0.1

- Highest reported total of combined HAP:
  - Largest HAP emitter - 10.0 TPY (Florida Steel, TN)

Assessment of ICR Responses - Stainless Steel:

- Have responses from 16 of 16 mills.
- Eight reported HAP emissions based on stack testing.
  - Three used EPA Method 29 to measure metals and five used EPA Method 5 to measure PM.
  - Six reported emissions for baghouses only and two for both baghouses and fugitive emissions.
- Highest reported individual HAP (TPY) for process and fugitive emissions:

	<u>Mn</u>	<u>Cr</u>	<u>Pb</u>	<u>Cd</u>
Total	1.6	0.5	0.8	0.03

- Highest reported total of combined HAP's:
  - Largest HAP emitter - 2.5 TPY (Empire-Detroit Steel, OH)

**Worst Case Computations:**

- Calculations were performed assuming "worst case" conditions for meltshop fugitive emissions relative to size, potential emissions, and capture systems.
  - Highest production mills (Nucor-Yamato @  $1.6 \times 10^6$  TPY CS and J&L Specialty @ 400,000 TPY SS).
  - Conservative estimate of uncontrolled fugitive PM emissions (2.0 pounds PM/ton steel).
  - Ninety percent capture based on direct furnace evacuation and canopy hoods for EAF's and close fitting hoods on AOD's.
- Estimates of HAP metals emissions were calculated by applying information on the metals content of EAF baghouse dust to the estimate of uncaptured, uncontrolled PM emissions.
  - For CS mills, manganese compounds dominate the percent composition of baghouse dust with a value of 3.5%. Other metals include: Pb 1.5%, Cr 0.6%, Ni 0.03%, and Cd 0.02%.
  - For SS mills, chromium compounds dominate the percent composition of baghouse dust with a value of 10.7%. Other metals include: Mn 6.7%, Ni 2.0%, Pb 1.1%, and Cd 0.2%.
- Results of calculations:
  - For Nucor-Yamato, 6.4 TPY manganese and 10.3 TPY combined.
  - For the J & L Specialty, 4.4 TPY chromium and 8.5 TPY combined. (The AOD vessel is also accounted for in both estimates.)



**Conclusions:**

- Based on our review of the ICR responses and "worst case" computations of emissions, **neither category contains "major" sources.**

**RECOMMENDATIONS:**

- Initiate process for removal of carbon and stainless steel mills from the list of major source categories.
- Complete documentation of this "no major" source finding.