

ENGINEERING ANALYSIS

PROJECT DESCRIPTION

On January 12, 2022, Grooms Aluminum Processing (Grooms) conducted the initial stack test on the 25-ton rotary melting furnace permitted under Synthetic Minor Operating Permit (SMOP) no. 410-0041-X003. The results showed 2.47 lb/hr HCl emissions, greater than the 2.17 lb/hr HCl limit in the permit. On an 8,760 hour per year basis, 2.17 lb/hr translates to 9.5 TPY.

While Grooms did violate the SMOP emission limit in the permit, they did not violate the undergirding SMOP requirement to remain less than 10 TPY emissions of any single HAP species because they do not operate at their maximum capacity for 8,760 hours per year. In correspondence following the results of the stack test, Grooms promised to propose new SMOP limits.

On March 31, 2022, the Department received an application from Grooms, to raise the 2.17 lb/hr HCl limit to 3.50 lb/hr while simultaneously implementing a new 37,110 TPY scrap melting limit. This new emission limit, in conjunction with the proposed scrap melting limit, would continue to limit Grooms to 9.5 TPY of HCl, keeping the facility a synthetic minor source of HAP.

Additionally, the results of the January 12, 2022 stack test showed an average of 0.0034 lb/hr Cl₂ emissions, three orders of magnitude lower than the 2.17 lb/hr HCl permit limit. Because of these results, and because Cl₂ is controlled in the same manner as HCl (i.e. injection of lime into the baghouse), the Cl₂ SMOP limit will be removed from the permit as unnecessary.

PROCESS DESCRIPTION

The 25-ton capacity rotary furnace, heated by one 20 MMBtu/hr natural gas burner, melts approximately 6.83 tons per hour of aluminum scrap feedstock (including dross) with flux; the molten aluminum is then poured into sow molds to solidify for storage/sales.

LIMITS & EMISSIONS

As mentioned, the SMOP limit on HCl will be raised to 3.50 lb/hr and the Cl₂ limit will be removed. An additional 37,110 scrap melting limit will be added.

Table 1 below shows the PTE for the facility as calculated in the May 13, 2021 engineering analysis. Table 2 shows the new PTE for the facility, accounting for: the proposed 37,110 TPY scrap feedrate limit (or, at theoretical maximum scrap feedrate of 6.83 TPH, ~5,433 hours per year); the new 3.5 lb/hr HCl limit; and the measured Cl₂ emission rate, doubled to be conservative, rather than the now-removed SMOP limit.

GROOMS ALUMINUM PROCESSING
 ASHVILLE PLANT, NEW FURNACE SMOP LIMIT
 SMOPs: 410-0041-X003

		Crushing & Screening*							Totals
		Pouring & Casting (Fugitive)	Material Handling (Fugitive)	Rotary Furnace	Shear Shredder	Jaw Crusher	Impact Crusher	Screener	
Criteria Pollutants	PM _{Total}	-	0.04	30.66	1.21	18.75			50.66
	PM ₁₀	-	0.02	23.65	1.21	11.25			36.13
	PM _{2.5}	-	0.01	15.77	1.21	3.75			20.74
	NOX	0.01	-	8.59	-	-	-	-	8.60
	CO	-	-	7.21	-	-	-	-	7.21
	SO ₂	0.02	-	0.05	-	-	-	-	0.07
	VOC	0.14	-	0.47	-	-	-	-	0.61
HAP	HCl	-	-	9.50	-	-	-	-	9.50
	Cl ₂	-	-	9.50	-	-	-	-	9.50
	D/F	-	-	8.975E-07	-	-	-	-	8.97E-07
	Other	-	-	0.16	-	-	-	-	0.16
	Total	-	-	19.16	-	-	-	-	19.16
	CO _{2e}	-	-	10,257.69	-	-	-	-	10257.69

*limit or related calculation applicable to common emission point

Table 2: PTE (TPY) at 37,110 TPY scrap feedrate

		Crushing & Screening*							Totals
		Pouring & Casting (Fugitive)	Material Handling (Fugitive)	Rotary Furnace	Shear Shredder	Jaw Crusher	Impact Crusher	Screener	
Criteria Pollutants	PM _{Total}	-	0.04	19.02	1.21	18.75			39.02
	PM ₁₀	-	0.02	14.67	1.21	11.25			27.15
	PM _{2.5}	-	0.01	9.78	1.21	3.75			14.75
	NOX	0.01	-	5.33	-	-	-	-	5.34
	CO	-	-	4.47	-	-	-	-	4.47
	SO ₂	0.02	-	0.03	-	-	-	-	0.05
	VOC	0.14	-	0.29	-	-	-	-	0.43
HAP	HCl	-	-	9.50	-	-	-	-	9.50
	Cl ₂	-	-	0.02	-	-	-	-	0.02
	D/F	-	-	5.566E-07	-	-	-	-	5.57E-07
	Other	-	-	0.10	-	-	-	-	0.10
	Total	-	-	9.62	-	-	-	-	9.62
	CO _{2e}	-	-	6,362.32	-	-	-	-	6362.32

*limit or related calculation applicable to common emission point

REGULATIONS

The proposed new limits have not changed the applicability of any regulations to Grooms' emission sources, discussed in detail in the May 13, 2021 engineering analysis. Only the Air Division's Chapter 15 rule will be discussed in this analysis.

STATE REGULATIONS

ADEM Admin. Code r. 335-3-15, "Synthetic Minor Operating Permits (SMOPs)"

Currently, Grooms is subject to 2.17 lb/hr limits on both HCl and Cl₂ emissions from the furnace, which restrict the facility to 9.5 TPY of any single HAP, below the 10 TPY major source threshold for single-species HAP. At a theoretical maximum scrap feedrate of 6.83 TPH, Grooms' new limits of 3.50 lb/hr HCl and 37,110 TPY scrap feedrate would continue to limit HCl emissions to 9.5 TPY. Additionally, the 0.0034 lb/hr Cl₂ results of the stack test proved that the 2.17 lb/hr Cl₂ limit was unnecessary and that Grooms' PTE to emit that particular HAP is far below 9.5 TPY when operating a lime-injected baghouse. Therefore a Synthetic Minor Operating Permit will remain the appropriate permit type for Grooms.

FEDERAL REGULATIONS

40 CFR 63 Subpart RRR, "National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production"

This subpart is applicable to each secondary aluminum processing unit (SAPU) and their constituent group 1 furnaces at both area and major sources of HAP. As discussed, Grooms will remain an area source of HAP with the new limits, and the applicability of Subpart RRR to the 25-ton rotary melting furnace will not change.

RECOMMENDATIONS

This analysis indicates that the proposed emission sources, with the alternate limits implemented, would meet the requirements of all federal and state rules and regulations if operated properly. Based on the expected emissions from Grooms' facility in Ashville, I recommend that Grooms be reissued Synthetic Minor Operating Permit No. 410-0041-X003, replacing the existing SMOP 410-0041-X003.

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ADEM

May 31, 2022
Date