

ENGINEERING ANALYSIS

PROJECT DESCRIPTION

On October 22, 2021, the Department received an application from ECOVERY LLC (Ecovery) for an existing aluminum and copper processing & separation plant with briquetting operations in Loxley, Baldwin County, AL. The facility is adjacent to Ecovery's secondary aluminum meltshop permitted under Synthetic Minor Operating Permits (SMOP) Nos. 501-0048-X001 & X002. Although the Department had determined that the processing plant did not require a permit in March 2011, Ecovery has since significantly expanded the scope of the processing & separation plant without asking the Department for an updated determination. The application was requested following a September 22, 2021 inspection.

Ecovery submitted an addendum to the application on March 15, 2022 requesting SMOP limits, including a change to the particulate matter (PM) limit for the furnace under SMOP X001 from 0.68 lb/hr to 1.48 lb/hr.

PROCESS DESCRIPTION

The facility processes aluminum-copper radiator feedstock into mixed aluminum and copper material, then separates that processed stream into constituent parts. Each of the five processing lines consists of a shredder, a hammer mill, a drum magnet with conveyor (drop point), a granulator mill, and a screen. Processing lines #1 - #3 are controlled by the south baghouse, whereas lines #4 & #5 as well as one mixer are controlled by the north baghouse. The mixer is allegedly used about once per month. The west baghouse controls emissions from six separation lines, each consisting of two air separators, four conveyor drop points, and a screen.

Rather than going to landfill, the dust from the north, south, and west baghouses is collected and used as a raw material for the briquetting operations. Aluminum fines from these processing & separation lines are mixed with aluminum-rich baghouse and lime in shared one batch mixer. This mixture is compressed into briquettes to form an aluminum-rich byproduct suitable for melting in a furnace capable of processing dross.

EMISSIONS

Emissions from the processing & separation plant, including briquetting operations, are expected to be only particulate matter and have been estimated on an 8,760 hour per year basis. Ecovery has requested that their operations' throughput in ton per hour be considered confidential and has provided redacted and nonredacted copies of the application to the Department. This analysis will not state the maximum throughputs for the processing, separating, and briquetting operations, but those operations' throughputs have been accounted for in both the calculations below and the limits imposed by state regulations. The processing plant's mixer was estimated at one batch per day in this analysis instead of one batch per month as in the application.

The five processing lines' and the six separation lines' potential to emit have been estimated using AP-42 Chapter 11.19.2 (Crushed Stone Processing) factors for tertiary crushing (the shredders), fines crushing (the hammermills and granulators), conveyor drop points, screening, and mixing. The briquetting operations emissions have been estimated using AP-42 Chapter 10.7 (Charcoal Briquetting) as well as the Chapter 11.19.2 factors for conveyor drop points and mixing. Factors for charcoal briquetting should be very conservative for estimating emissions from aluminum dust briquetting.

This analysis uses a conservative 95% control efficiency for the baghouses. Particulate matter emissions from the adjacent meltshop's furnace (X001) and slag crusher (X002) are estimated on an 8,760 hour per year basis using the furnace's newly requested 1.48 lb/hr limit and the mill's permitted limit of 1.60 lb/hr. Fugitive emissions from the meltshop (salt cake cooling) were estimated in the March 15, 2022 addendum.

Uncontrolled particulate matter emissions from the processing & separation plant (X003) with briquetting operations (X004) are shown below in Table 1, and the facility-wide PTE particulate matter, accounting for enforceable limits and controls, is shown in Table 2:

Table 1 - Uncontrolled Particulate Matter Emissions				
Permit	Baghouse	Unit	lb/hr	TPY
X003	North	Processing #1	0.51	2.25
		Processing #2	0.51	2.25
		Processing #3	0.51	2.25
	South	Processing #4	0.51	2.25
		Processing #5	0.51	2.25
		Copper Mixer	0.47	2.08
	West	Separation #1	0.17	0.73
		Separation #2	0.17	0.73
		Separation #3	0.17	0.73
		Separation #4	0.17	0.73
		Separation #5	0.17	0.73
Separation #6		0.17	0.73	
X004	Briq.	Briquetting	112.50	492.75
		Mixer	1.29	5.64
		Transfer	0.01	0.06
Total			117.85	516.18

Table 2 - Particulate Matter PTE		
Permit	lb/hr	TPY
Fugitive	0.73	3.18
X001	1.48	6.48
X002	1.60	7.01
X003	0.20	0.89
X004	5.69	24.92
Total	9.70	42.48

EMISSION LIMITS

Ecovery will be required to control emissions from all lines with dust collectors as described in the application. Additionally, ADEM Admin. Code r. 335-3-4-.04(1) will limit emissions from the briquetting operations (X004) to 5.94 lb/hr at maximum throughput, only slightly higher than its emissions when estimated at 95% control efficiency. Additional lb/hr PM limits on each stack will not be necessary to show that the facility's overall emissions are below the 100 TPY SMOP threshold, though Ecovery will be required to operate their baghouses in a proper manner.

REGULATIONS

STATE REGULATIONS

ADEM Admin. Code r. 335-3-4-.01(1)(a and b), "Visible Emission"

ADEM 335-3-4-.01(a) states that no person shall emit to the atmosphere particulate of an opacity of greater than twenty percent (20%) over a six (6) minute period. **ADEM 335-3-4-.01(b)** states that during one six minute period in any sixty minute period a person may discharge into the atmosphere from any source of emissions, particulate of an opacity not greater than that designated as forty percent (40%) opacity. Therefore, the permitted sources will be subject to this regulation. If visible emissions are observed, the opacity should be determined using Method 9 of 40 CFR Part 60, Appendix A-4.

ADEM Admin. Code r. 335-3-4-.04, "Process Industries - General"

Rule 335-3-4-.04(1) states that no person in a Class 1 County shall emit particulate matter greater than the amount determined by the equation below:

$$\text{When } P < 30, E = 3.59P^{0.62}$$

Where P = Process weight in tons per hour
And E = Emissions in pounds per hour

Rule 335-3-4-.04(3) states that when the nature of a process permits multiple interpretations of the rule, the interpretation that results in the minimum value for allowable emission shall apply.

The hourly particulate matter limit is dependent on the process weight over a given hour, and the limit will be given in the permits as a formula. Using the throughput given in the unredacted version of the application, the maximum particulate emission limit on the briquetting operations would be 5.94 lb/hr, which is near the briquetting operations' PTE when estimating using conservative charcoal briquetting factors and a 95% control efficiency. The emissions from each processing line and separation line would be limited to 9.12 lb/hr per the above equation, though these sources are estimated to meet that limit without any controls.

ADEM Admin. Code r. 335-3-14-.04, "Prevention of Significant Deterioration (PSD) Permitting"

Based on the emissions found in Table 2, the facility would not be expected to exceed the 100 TPY major-source PSD threshold for criteria pollutants. A facility must address PSD regulations for Greenhouse Gases (CO₂, N₂O, and CH₄) only if that facility is major for criteria pollutants. Per Rule 335-3-14-.04(2)(a)1(i)&(ii), no PSD review would be necessary for this project.

ADEM Admin. Code r. 335-3-14-.06, "Determinations for Major Sources in Accordance with Clean Air Act Section 112(g)"

This regulation applies to major sources of hazardous air pollutants (HAPs) constructed after March 27, 1998. Since this facility is not a major source of HAPs, a 112(g) case by case MACT review would not be necessary.

ADEM Admin. Code r. 335-3-15, "Synthetic Minor Operating Permits (SMOPs)" and 335-3-16, "Major Source Operating Permits (MSOPs)"

Via the meltshop and associated sources (X001 & X002), the facility is a synthetic minor source for particulate matter and chloride HAP species. When accounting for the PM limit in X002 and the proposed new 1.48 lb/hr limit for X001, the facility still not have the potential to emit greater than 100 TPY PM after considering the control devices at the processing & separation plant. Given the above, the facility will remain synthetic minor source.

To show compliance with the PM limit, Ecovery will be required to control all emissions from the processing, separation, and briquetting processes with baghouses as described. Ecovery will be required to conduct pressure differential monitoring and preventative maintenance on the baghouses as described in the permit, and Ecovery will also be required to conduct an initial stack test on the briquetting operation baghouse to show compliance with the PM limit.

Class I Area

The nearest Class I Area to the plant, the Breton Wilderness Area, is greater than 100 kilometers away; additionally, the plant is not a major source for HAPs.

FEDERAL REGULATIONS

40 CFR Part 60 Subpart A, "General Provisions"

This subpart will be applicable provided that the facility is subject to one of the applicable subparts found under 40 CFR Part 60. There are no NSPS known to be applicable to the processing & separation plant.

40 CFR Part 63 Subpart A, "General Provisions"

This subpart will be applicable provided that the facility is subject to one of the applicable subparts found under 40 CFR Part 63. There are no NESHAP known to be applicable to the processing & separation plant, and the applicability of Subpart RRR to Ecovery's meltshop does not change with adjusting the furnace's PM SMOP limit.

RECOMMENDATIONS

This analysis indicates that the proposed emission sources would meet the requirements of all federal and state rules and regulations. Based on the expected emissions from the processing & separation plant with briquetting operations, I recommend that ECOVERY LLC be issued Synthetic Minor Operating Permits No. 501-0048-X003 & X004 for the existing plant.

Ecovery's proposal to raise the furnace (X001) PM SMOP limit from 0.68 lb/hr to 1.48 lb/hr is acceptable, as Ecovery's overall PM emissions will remain below 100 TPY under normal operations. Therefore, I recommend reissuing SMOP No. 501-0048-X001 to include the modified limit.

April 27, 2022

Date

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