Statement of Basis

Air Quality Permit To Construct

SAPA Extrusions, Inc. – Yankton, South Dakota

South Dakota
Department of Environment and Natural Resources

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1.0 Operational Description

1.1 Background

SAPA Extrusions, Inc. (SAPA) operates an aluminum extrusion and painting facility in Yankton, South Dakota, which produces soft alloy aluminum products for the consumer products industry. The primary Standard Industrial Classification codes are 3354 Rolling, Drawing, and Extruding of Nonferrous Metals – Aluminum Extruded Products and 3341 Secondary Smelting and Refining of Nonferrous Metals.

The production process is composed of three melt furnaces, a casting pit, two homogenizing furnaces, four log heaters, and four extrusion presses. The painting process consists of two vertical electrostatic paint lines.

Cast aluminum logs are processed through the cast house crop saw prior to further heat treatment in the homogenizing ovens. Prior to extrusion, the homogenized logs are preheated in one of four natural gas fired log heaters. The logs are then hydraulically sheared or sawed into billets. The billets are sent to four extrusion presses where the heated billet is mechanically forced (extruded) through a die to produce various customer ordered mechanical shapes.

The extruded pieces are cut using hot saws and then cooled on air fan quench tables. Two of the extrusion presses are equipped with a water quench table in addition to the air fans to cool the heavier walled aluminum shapes. After extrusion, cooling, and stretching, the semi-finished extruded aluminum pieces are placed into one of six natural gas fired age ovens to impart the necessary mechanical properties to the extruded pieces. Some of the pieces undergo additional fabrication to customer specifications.

SAPA operates two paint lines. The north paint line was the original paint line and consists of two application booths. Emissions from the north paint line are uncontrolled. The south paint line was installed in 1992 and consists of four application booths. Emissions from the south paint line are controlled using a regenerative thermal oxidizer. The application booths use an airless electrostatic method of paint application. After painting, the aluminum pieces are conveyed through an electrically heated paint flash off room. The paint flash off room is maintained at 300°F to remove all volatile material. The pieces are then sent to the bake oven where the paint cures.

On October 1, 2014, DENR received a construction application from SAPA requesting an expansion of their facility. SAPA proposes to construct and install the following equipment:

Table 1-1 Proposed equipment

Description	Maximum Operating Rate	Control Device
2005 Belco Industries log and billet heater.	The maximum heat input capacity is 5.5 million Btus per hour.	Not applicable

Description	Maximum Operating Rate	Control Device
2014 Belco Industries aluminum aging oven #1	The maximum heat input capacity is 3.5 million Btus per hour.	Not applicable
2014 Belco Industries aluminum aging oven #2	The maximum heat input capacity is 3.5 million Btus per hour.	Not applicable
Air makeup unit #1	The maximum heat input capacity is 2.5 million Btus per hour.	Not applicable
Air makeup unit #2	The maximum heat input capacity is 2.5 million Btus per hour.	Not applicable

1.2 Existing Operations

Table 1-2 provides a description of the permitted units, operations, and processes derived from SAPA's existing Title V air quality operating permit issued March 28, 2011.

Table 1-2 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#1	1979 Warwick Furnace Company aluminum remelt furnace (North Melter), fired with natural gas.	The maximum heat input capacity is 22.0 million Btus per hour. The furnace processes 7.5 tons of aluminum per hour.	Not applicable
#2	1979 Warwick Furnace Company aluminum remelt furnace (South Melter), fired with natural gas.	The maximum heat input capacity is 22.0 million Btus per hour. The furnace processes 7.5 tons of aluminum per hour.	Not applicable
#3	1988 Certified Industrial Technology aluminum remelt furnace (West Melter), fired with natural gas.	The maximum heat input capacity is 22.0 million Btus per hour. The furnace processes 7.5 tons of aluminum per hour.	Not applicable
#4	1979 Certified Industrial Technology alloyed aluminum log furnace (Homogenizing Oven #1), fired with natural gas.	The maximum heat input capacity is 9.0 million Btus per hour.	Not applicable
#5	1988 Certified Industrial Technology alloyed aluminum log furnace (Homogenizing Oven #2), fired with natural gas.	The maximum heat input capacity is 9.0 million Btus per hour.	Not applicable
#6R	2010 Belco Industries Alloyed Aluminum Log Heater (1800 Log Heater, Model number 57-15-3-PR15-1-P-L), Fired with natural gas.	The maximum heat input capacity is 4.5 million Btus per hour.	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
#7	2007 Belco aluminum heating furnace (2750 Log Heater), model number 89-20-4-T-PR25-2-P-L, fired with natural gas.	The maximum heat input capacity is 6.0 million Btus per hour.	Not applicable
#8	1989 Elhaus Industries alloyed aluminum billet heater (3000 Log Heater), model number 75/120/3FKWS250FK, fired with natural gas.	The maximum heat input capacity is 5.5 million Btus per hour.	Not applicable
#9	2006 Belco Industries alloyed aluminum log heater (3500 Log Heater), fired with natural gas.	The maximum heat input capacity is 7.5 million Btus per hour.	Not applicable
#10	Coating line [1] – 1979 Belco Industries paint application booths (2) and paint flash off area on the original paint line process (Paint Line #1).	Not applicable	Not applicable
#11	1979 Belco Industries aluminum extrusions paint curing bake oven on the original paint line process (North Bake Oven – Paint Line #1), fired with natural gas.	The maximum heat input capacity is 5.0 million Btus per hour.	Not applicable
#12	Coating line [1] – 1992 Belco Industries paint application booths (2), top coat application booths (2), and paint flash off area on the vertical paint line process (Paint Line #2).	Not applicable	1995 TELLKAMP Systems, Inc., regenerative thermal oxidizer fired with natural gas. The regenerative thermal oxidizer has a maximum heat input capacity of 4.0 million Btus per hour.
	1992 Belco Industries aluminum extrusions paint curing bake oven on the 1992 vertical paint line process (South Bake Oven – Paint Line #2), fired with natural gas.	The maximum heat input capacity of the bake oven is 5.0 million Btus per hour.	
#13	1992 Belco Industries aluminum extrusions pretreatment washer stage 1 on the 1992 vertical paint line process (1st Stage Washer	The maximum heat input capacity is 5.0 million Btus per hour.	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
	Burner – South Paint Line #2), fired with natural gas.		
#14 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#15 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#16 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#17 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#18 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#19 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#20 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#21 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#22 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable
#23 [2]	Process heater fired with natural gas.	Greater than 3.5 million Btus per hour but less than 10 million Btus per hour.	Not applicable

[1] – Coating operation includes the equipment used to apply cleaning materials to a substrate to prepare it for coating application (surface preparation) or to remove dried coating; to apply coating to a substrate (coating application) and to dry or cure the coating after application; or to clean coating operation equipment (equipment cleaning); all storage containers and mixing vessels in which coatings, thinners and/or other additives, and cleaning materials are stored or mixed; all manual and automated equipment and containers used for conveying coatings, thinners and/or other additives, and cleaning materials; and all storage containers and all manual and automated equipment and containers used for conveying waste materials generated by a coating operation; and

[2] – The owner or operator may install these process heaters fired only with natural gas during the term of this permit.

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards under 40 CFR Part 60 and determined there are no standards applicable to the melters, aging ovens, air makeup units or any other of the proposed emission units.

3.0 New Source Review

ARSD 74:36:10:01 notes that New Source Review regulations apply to areas of the state designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. SAPA is located in Yankton, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, SAPA is not subject to the New Source Review permit program.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NOx);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases. SAPA is not one of the 28 named PSD source categories; therefore, the major source threshold under the PSD program is 250 tons per year.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the "Tailoring Rule."

On May 13, 2010, EPA issued the final version of the "Tailoring Rule" for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

On June 24, 2014, the Supreme Court decided greenhouse gases may not be regulated under the PSD program unless the facility requires a PSD permit for the other regulated air pollutants.

4.1 Potential to Emit for Criteria Air Pollutants

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturer data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

AP-42 emission factors for combustion units are based on the designed gross heat input rate of each unit. Small industrial units range from 3.5 to 100 million Btus per hour of heat input. DENR will apply the emission factors for the industrial units for all the fuel burning units. The particulate matter (PM), particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), carbon monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO_2), and nitrogen oxide (NOx) emission factors for the natural gas combustion units

are taken from AP-42, 5th Edition, Tables 1.4-1, -2, -3, and -4, 7/98 and may be viewed in Table 4-1.

Table 4-1 – Fuel Burning Unit Emission Factors - pounds per million standard cubic feet

PM	PM10/PM2.5	SO_2	NOx	CO	VOC	Lead
7.6	7.6	0.6	100	84	5.5	0.0005

Equation 4-1 was used to convert the emission factors in Table 4-1 from pounds per million standard cubic feet to pounds per million Btus as shown in Table 4-2.

Equation 4-1 – Emission factors (pounds per million Btus)

$$Emission\ Factor\ \frac{pounds}{MMBtus} = Emission\ Factor\ \frac{pounds}{MMcf} \div 1{,}020\ \frac{MMBtus}{MMcf}$$

Table 4-2 – Fuel Burning Unit Emission Factors - pounds per million Btus

PM	PM10/PM2.5	SO_2	NOx	CO	VOC	Lead
0.0075	0.0075	0.0006	0.098	0.082	0.0054	0.0

Using the heat inputs from Table 1-1, the emission factors listed in Table 4-2 and Equation 4-2, the resulting emission factors of each permitted unit in terms of tons of pollutant emitted per year of operation are summarized in Table 4-3. DENR combined the heat input values for the units that were considered insignificant units and calculated the potential emissions from those units.

Equation 4-2 – Emission factor

$$Emissions\ \frac{tons}{year} = Emission\ Factor\ \frac{lbs}{MMBtus} \times Heat\ Input\ \frac{MMBtus}{hour} \times 8{,}760\ \frac{hrs}{yr} \div 2{,}000\ \frac{lbs}{ton}$$

Table 4-3 – Potential Emissions from Fuel Burning Units (tons per year)

Unit	Heat Input (MMBtus/hr)	PM	PM10/PM2.5	SO_2	NOx	CO	VOC	Lead
2005 log and billet heater	5.5	0.22	0.22	0.01	2.4	2.0	0.13	0.0
2014 Aging Oven #1	3.5	0.09	0.09	0.0	1.5	1.3	0.08	0.0
2014 Aging Oven #2	3.5	0.09	0.09	0.0	1.5	1.3	0.08	0.0
Air Makeup #1	2.5	0.08	0.08	0.0	1.1	0.9	0.06	0.0
Air Makeup #2	2.5	0.08	0.08	0.0	1.1	0.9	0.06	0.0
Total		**0.6**	**0.6**	**0.0**	**7.6**	**6.4**	**0.4**	**0.0**

4.2 Paint Lines (Existing Units #10 and #12)

The proposed project would not require the construction of new paint lines or modification of the existing lines. The quantity of paints and coatings used by SAPA would increase due to the increased production of extruded aluminum parts that required painting.

Emission factors are derived from the material safety data sheets (MSDS) for the products used in the paint booths. The potential emissions rate is estimated from the amount of paint, thinner, and solvent used and the amount of time the paint booths operate.

SAPA stated in the application that in 2013 the Line A paint line operated 841 hours and the South line operated 3,600 hours. Potential emissions are calculated assuming that the facility operates 24 hours per day 365 days per year (8,760 hours per year). DENR will utilize the operating hours of the South line in its emission calculations. SAPA submitted actual VOC emissions data from the paint lines for July 1, 2013 to June 30, 2014. Therefore, the potential emissions for the paint booths will be calculated by multiplying the actual emissions by the following ratio:

$$\frac{8{,}760}{3{,}600}\frac{potential\ operating\ hours/year}{actual\ operating\ hours/year} = \mathbf{2.43}$$

Table 4- 4 Paint Line VOC Emissions in tons per year

Location	Uncontrolled Emissions	Controlled Emissions	Potential VOC Emissions
Unit #10 Line A Paint Line	14.4	14.4	35.0
Unit #12 Line B Paint Line	144	4.46[a]	10.8
Total	158.4	18.9	46

[a] – the VOC emissions from Line B are controlled by a thermal oxidizer rated at a removal efficiency of 97.68%

SAPA states in its application that total paint usage as calculated in 2013 is expected to double as a result of the proposed expansion – so would the hours of operation for the paint lines Proportionally, the emissions of VOC's would also double. The thermal oxidizer is controlled by a sensor that prevents emissions from the Line B paint line being vented to the oxidizer if the oxidizer is not at operating temperature. Therefore, the potential emissions for the paint booths will be calculated by multiplying the actual emissions by the following ratio:

$$\frac{8{,}760}{7{,}200}\frac{potential\ operating\ hours/year}{actual\ operating\ hours/year} = \mathbf{1.22}$$

Table 4- 5 Paint Line VOC Emissions in tons per year

Location	Uncontrolled Emissions	Controlled Emissions	Potential VOC Emissions
Unit #10 Line A Paint Line	28.8	28.8	35.0

Unit #12 Line B Paint Line	288	8.92	10.9
Total	316.8	37.7	46

[a] – the VOC emissions from Line B are controlled by a thermal oxidizer rated at a removal efficiency of 97.68%

SAPA's proposed expansion project does not require an increase to the capacity of the paint lines. The actual production will increase due to an increase in the number of parts produced that will be painted. As shown in Tables 4-4 and 4-5, the potential VOC emissions do not increase, only the actual emissions. The increase in VOC emissions from the proposed expansion project is calculated to be 18.9 tons per year from the paint lines plus the 0.4 tons per year from the combustion of natural gas or 19.3 tons per year total.

SAPA is considered an existing non-PSD source due to the operational limits in their existing Title V air quality operating permit. The proposed project will not violate the operational limits or cause SAPA to be considered a PSD source. Therefore, SAPA is not subject to a PSD review. Based on the US Supreme Court's decision and because SAPA is not applicable to the PSD program, a review for greenhouse gas emissions are not warranted or required.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed the National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR Part 61 and determined there are no NESHAP standards applicable to SAPA.

6.0 Maximum Achievable Control Technology Standards

6.1 Potential Hazardous Air Pollutants

A major source of hazardous air pollutant (HAP) emissions is any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit any single HAP at a rate of 10 tons or more per year or any combination of HAPs at a rate of 25 tons or more per year. Based on previous reviews, SAPA's potential to emit HAPs was determined to be greater than the major source threshold under the Title V air quality operating permit program

The July 2014 Subpart MMMM report submitted by SAPA for the 12-month period from July 1, 2013 through June 30, 2014 states that total HAPs emissions were 87,150 pounds, or 43.6 tons. Using the 2.43 potential ratio, then SAPA had potential HAPS emissions of 106 tons. Therefore, SAPA is considered a major source of hazardous air pollutant emissions.

DENR determined the following subparts may be applicable to the proposed expansion project:

6.2 Secondary Aluminum Production

The requirements of the National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production (40 CFR Part 63, Subpart RRR) apply to the owner or operator of a secondary aluminum production facility. A secondary aluminum production facility means any establishment using clean charge, aluminum scrap, or dross from aluminum production as the raw material and performing one or more of the following processes: scrap shredding, thermal chip drying, scrap drying/delacquering/decoating, furnace operations (i.e., melting, holding, sweating, refining, fluxing, or alloying), or recovery of aluminum from dross, in-line fluxing, or dross cooling.

SAPA proposes to install a log and billet heater and two aluminum aging ovens – these units are used to heat the aluminum to a temperature suitable for extruding the aluminum. This process does not meet the definition of a secondary aluminum production facility. Therefore, this subpart is not applicable to the construction permit.

6.3 Surface Coating of Miscellaneous Metal Parts and Products

The provisions of the National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products (Subpart MMMM) is applicable to new, reconstructed, or existing affected sources that use 946 liters (250 gallons) per year, or more, of coatings that contain hazardous air pollutants in the surface coating of miscellaneous metal parts and products and that is a major source, is located at a major source, or is part of a major source of emissions of HAP. Miscellaneous metal parts and products include, but are not limited to, metal components of the following types of products as well as the products themselves: motor vehicle parts and accessories, bicycles and sporting goods, recreational vehicles, extruded aluminum structural components, railroad cars, heavy duty trucks, medical equipment, lawn and garden equipment, electronic equipment, magnet wire, steel drums, industrial machinery, metal pipes, and numerous other industrial, household, and consumer products.

SAPA will continue to use the existing aluminum extruding and painting facility. Production of painted parts will increase, but no new painting or coating lines will be added. Therefore, this subpart is not applicable to the construction permit.

6.4 Subpart ZZZZZZ – Aluminum, Copper, and Other Nonferrous Foundries

Aluminum foundries are subject to this subpart if the foundry is an area source of hazardous air pollutant emissions. *Aluminum foundry* means a facility that melts aluminum and pours molten aluminum into molds to manufacture aluminum castings (except die casting) that are complex shapes. This definition does not include primary or secondary metal producers that cast molten aluminum to produce simple shapes such as sows, ingots, bars, rods, or billets.

SAPA produces aluminum billets, which are then extruded into the final product. The proposed construction project includes a billet heater which heats the billet to a temperature suitable for

extruding aluminum, not melting the aluminum. SAPA is considered a major source of hazardous air pollutants. Therefore, this subpart is not applicable to the construction permit.

6.5 Other MACT Standards

DENR reviewed the remaining maximum achievable control technology standards and determined there were no other applicable standards for this facility.

7.0 State Requirements

7.1 Insignificant Activities

ARSD 74:36:20:04 identifies emissions units that are exempt from inclusion in a construction permit unless the source has requested federally enforceable permit conditions related to the emission units used to avoid a Title V operating permit, a PSD preconstruction permit, or a NSR preconstruction permit or an emission unit applicable to a federal standard such as a New Source Performance Standard or a Maximum Achievable Control Technology Standard.

Based on the information in Tables 1-1 and 4-3, the proposed emission units may be considered insignificant activities because the emission units have a heat input of 3.5 million Btus per hour (ARSD 74:36:20:04(4)) and/or have the potential to emit 2 tons or less of any criteria pollutant. SAPA existing Title V operating permit contains an emission limit of 245 tons per 12-month period that allows SAPA to forgo a PSD preconstruction permit. The proposed emission units do produce volatile organic compound emissions from the burning of the natural gas. However, rounding the potential volatile organic compound emissions from Table 4-3 to the nearest ton, the volatile organic compound emissions would be considered zero. Therefore DENR still considers the proposed emission units as insignificant activities and the proposed emission units are not required to be included in a construction permit.

8.0 Recommendation

Based on the information submitted in the construction permit application, SAPA does not require a construction permit.

Any questions pertaining to this permit recommendation should be directed to Keith Gestring, Engineer II.