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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-0383A
Plant ID No.:	035-00043
Applicant:	Alcan Rolled Products-Ravenswood, LLC
Facility Name:	Ravenswood Facility
Location:	Ravenswood, Jackson County
NAICS Code:	331314
Application Type:	Modification
Received Date:	June 2, 2011
Engineer Assigned:	Steven R. Pursley, PE
Fee Amount:	$3,500
Date Received:	June 9, 2011
Complete Date:	June 30, 2011
Due Date:	September 28, 2011
Applicant Ad Date:	June 7, 2011
Newspaper:	*The Jackson Herald*
UTM's:	Easting: 428.3 km Northing: 4,308.3 km Zone: 17
Description:	Modification of the existing DC-9B melting furnace to utilize new regenerative Low-NO_x gas-fired burners while increasing capacity from 40 mmbtu/hr to 52 mmbtu/hr. Additionally, emission limits for furnace DC-9A and holding furnace DC9 will be revised.

DESCRIPTION OF PROCESS

The Alcan Rolled Products facility located in Ravenswood consists of casting and fabrication operations. The existing air permit is broken up into the casting area and four separate areas in fabrication. The DC-9B furnace is located in the cast house, which contains 9 direct chill processing units (of which DC-9B is part of one), two induction furnaces and a rotary furnace. The DC processing unit consists of two melting furnaces, a holding furnace, a degassing/filtering operation, and a casting station. BC-9B is one of the melting furnaces. The furnace operations is a secondary aluminum melting process initiated by placing scrap into the top of the furnace by sliding the dome of the furnace body. After the charging is complete, the dome is replaced on the top of the furnace, and natural gas-fired burners heat the aluminum to its melting point (approximately 1,400°F).

Presently, the natural gas fired burners are conventional burners. The new burners that will be installed will be regenerative low-NO_x burners. Once the solid metal has been liquefied, the burner firing rate is reduced such that enough heat is added to keep the metal molten. Alloying agents and salt flux may be added to the molten aluminum in the melting furnace as required (although this is usually completed in the holding furnace) and the metal is stirred. The molten aluminum is then sampled to determine if it has obtained the desired metal properties. If no further alloying is required, the molten aluminum is transferred from the melting furnace to the holding furnace through an open trough via gravity.

DC-9B Permit History

DC-9B was originally installed in 1978. The history of DC-9B with respect to permitting is as follows:

1. On December 29, 1977 Kaiser Aluminum and Chemical Corporation (Kaiser) submitted a permit application for the DC-9 Furnace Complex, including Melting Furnace DC-9B.

2. On February 27, 1978 West Virginia issued a Regulation 13 Permit #383 to Kaiser for the DC-9 Furnace Complex, including Melting Furnace DC-9B.

3. The permit application provided by Kaiser included emission estimates for all criteria pollutants. The basis for the emission estimates is unknown. The NO_x emission estimate is 2.25 lb/hr in the permit application. Older Regulation 13 permits use the emission data provided in permit applications as the permit limits. The facility Title V permit also included this emission data as limits in the Title V permit. As the DC-9B modification was being reviewed by the applicant it was assumed that the emission change in NO_x would be a reduction due to the use of low-NO_x burners. However, as the emission estimates were reviewed it was determined that the 2.25 lb/hr emission rate was an unrealistic value and needs to be changed. The new low-NO_x burners, which the applicant claims to be the best on the market, will provide a rate of 4.99 lb/hr. This will be an actual reduction of approximately 0.61 lbs/hr from the current burners but will be an increase of 2.74 lb/hr from the current permitted level.

   Similar emission limit changes are also necessary for the DC-9A melting furnace and the DC9 Holding furnace.

SITE INSPECTION

Since this is a minor modification to a well known existing source no site inspection was performed. A full site inspection was performed by James Robertson of DAQ's enforcement section on August 21, 2009. The facility was found to be in compliance.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Note that the increases associated with SO_2, VOC, CO and NO_x from Melting Furnace DC-9A and Holding Furnace DC-9 are strictly due to a change in emission factors (going from calculations submitted in 1978 to AP-42 emission factors) or in the case of CO addressing the exclusion of CO in the original permit and application. Melting Furnace DC-9B is the ONLY furnace actually undergoing a modification.

Current permitted emissions from the sources covered by permit R13-0383 (Direct Chill casting facility DC9 and two rolling mills) are as follows:

Unit	PM		SO_2		HCl		NO_x		VOC	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Melt Furnace DC-9B	3.2	14.02	0.01	0.05	6.8	29.79	2.25	9.86	0.05	0.22
Melt Furnace DC-9A	3.2	14.02	0.01	0.05	6.8	29.79	2.25	9.86	0.05	0.22
Hold. Furnace DC-9	0.90	3.95	0.002	0.01	2.3	10.08	0.53	2.33	0.01	0.05
Rolling Mill 384	0.84	3.68	--	--	--	--	--	--	--	--
Rolling Mill 382	1.26	5.52	--	--	--	--	--	--	--	--
Total	**9.4**	**41.2**	**0**	**0.11**	**15.9**	**69.7**	**5.03**	**22.1**	**0.11**	**0.49**

Note that CO emissions were not included in application R13-0383 and thus are not limited by the permit.

Future permitted emissions from the sources covered by this modification are as follows:

Unit	PM		SO_2		CO		NO_x		VOC		HCl	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Melt Furnace DC-9B	3.20	14.02	0.04	0.18	4.37	19.15	5.00	21.9	0.29	1.28	6.8	29.79
Melt Furnace DC-9A	3.20	14.02	0.03	0.13	4.04	17.66	3.6	15.77	0.27	1.16	6.8	29.79
Hold. Furnace DC-9	0.90	3.95	0.01	0.03	0.89	3.90	1.49	6.50	0.06	0.26	2.3	10.08
Rolling Mill 384	0.84	3.68	--	--	--	--	--	--	--	--	--	--
Rolling Mill 382	1.26	5.52	--	--	--	--	--	--	--	--	--	--
Total	**9.4**	**41.2**	**0.1**	**0.34**	**9.3**	**40.7**	**10.1**	**44.2**	**0.62**	**2.7**	**15.9**	**69.7**

Therefore, the increase in PTE due to these modification are as follows:

Unit	$PM/PM_{10}/PM_{2.5}$		SO_2		CO		NO_x		VOC		HCl	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Melt Furnace DC-9B	0	0	0.03	0.13	4.37	19.15	2.75	12.04	0.24	1.06	0	0
Melt Furnace DC-9A	0	0	0.02	0.08	4.04	17.66	1.35	5.91	0.22	0.94	0	0
Hold. Furnace DC-9	0	0	0.01	0.02	0.89	3.90	0.96	4.17	0.05	0.21	0	0
Rolling Mill 384	0	0	--	--	--	--	--	--	--	--	--	--
Rolling Mill 382	0	0	--	--	--	--	--	--	--	--	--	--
Total	**0**	**0**	**0.1**	**0.23**	**9.3**	**40.7**	**5.06**	**22.1**	**0.51**	**2.21**	**0**	**0**

REGULATORY APPLICABILITY

The portion of the facility modified under this permit application is subject to the following state and federal rules:

STATE RULES

45CSR7 To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

Each of the sources evaluated herein are subject to the particulate matter standards under 45CSR7, Section 4.1 and limited under Table 45-7A, as defined for a type 'b' source. The following table shows the limits and associated PM emission rates:

Source	Process Weight Rate (lbs/hour)	Source PM Limit (lb/hr)	PM Emission Rate (lb/hr)
DC-9A	36,000	25.60	3.20
DC-9B	36,000	25.60	3.20
Hold. Furn. DC-9	72,000	31.88	0.90
Rolling Mill 384	160,000	31.35	0.84
Rolling Mill 382	26,000	5.09	1.26

For the purposes of this permit the two melting furnaces and two rolling mills were conservatively defined as a duplicate source operations and the limits above reflect that fact.

Acid Mist Standards

Under 45CSR7, Section 4.2, each source operation which emits mineral acids is subject to the acid mist limits under Table 45-7B. For HCl emissions, the limit is 210 mg/dscf of stack-gas. Since this modification does not effect HCl emissions the facility should remain in compliance with this rule.

45CSR10 To Prevent and Control Air Pollution From the Emission of Sulfur Oxides

The are subject to 45CSR10, Section 3.8. The applicable standards include a 2,000 ppm_v in-stack SO_2 limit and an inlet gas-stream limit of 50 grains/100 ft^3 of H_2S. The furnaces, however, are only permitted to burn natural gas and will, therefore, easily meet both of the above requirements. There will be no additional SO_2 emissions other than from natural gas combustion.

45CSR13 Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed facility is subject to the requirements of 45CSR13 because several permit conditions in permit R13-0383 must be changed.

45CSR30 Requirements for Operating Permits

The facility is a major stationary source with an existing Title V permit.

NONAPPLICABILITY DETERMINATION

45CSR14 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution For the Prevention of Significant Deterioration

Alcan is an existing major stationary source. The PTE of CO, VOC, NO_x and SO_2 all increase due to this modification but only the future potential emissions of NO_x from equipment covered by this permit is greater than PSD significance levels. The future potential emissions of NO_x from the sources under this permit are 44.2 tons per year. Actual emissions from furnaces DC-9A, DC-9B and DC-9 (as reported to emissions inventory) for 2008 (the most recent year available) are 14 tons per year. Obviously, the most recent year alone provides enough “past actual” emissions to prevent emissions due to this modification from being considered “significant” under 45CSR14.

FEDERAL RULES

40 CFR 63 Subpart RRR *National Emissions Standards for Hazardous Air Pollutants for Secondary Aluminum Production*

All three furnaces covered in this permit are subject to Subpart RRR. Subpart RRR contains emission limits for PM, HCl, and D/F (Dioxin/Furan). Subpart RRR defines all Group 1 furnaces and inline fluxers within a secondary aluminum production facility as one Secondary Aluminum Production Unit (SAPU). The SAPU limits allow flexibility of emission rates between specific emission units (to exceed those limits in §63.1505(i)) without allowing an aggregate SAPU emission rate (the combined emission rate of all the units within a SAPU) over the maximum limit (as calculated below) based on individual emission unit limits under §63.1505(i).

Compliance with the SAPU limits are determined by performance testing to acquire the actual emission rates in lb pollutant/ton Al charged. These actual emission rates are then used in conjunction with maximum permitted charge/feed rates to show compliance with SAPU limits. An alternative way to show compliance with the SAPU limits is to demonstrate compliance with the individual unit emission limits under §63.1505(i) through performance testing.

The individual limits for the three furnaces are as follows:

a. 0.20 kg of PM per Mg (0.40 lb of PM per ton) of feed/charge.

b. 15 µg of D/F TEQ per Mg (2.1 x 10^{-4} gr of D/F TEQ per ton) of feed/charge.

c. 0.20 kg of HCl per Mg (0.40 lb of HCl per ton) of feed/charge or, if the furnace is equipped with an add-on air pollution control device, 10 percent of the uncontrolled HCl emissions, by weight.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The only non-criteria regulated pollutants addressed in the application is HCl and D/F. Emission of HCl and D/F will not change due to these modifications.

AIR QUALITY IMPACT ANALYSIS

Since this is a minor modification to an exiting major stationary source as defined in 45CSR14, no modeling was performed.

MONITORING OF OPERATIONS

Alcan's Title V permit and 40 CFR 63 Subpart RRR already require the permittee monitor and record feed and discharge rates and the amount of natural gas consumed by melting furnaces DC-9B, DC-9A and holding furnace DC-9. No additional monitoring should be necessary but this monitoring will be included in the permit.

CHANGES TO PERMIT R13-0383

Since the existing permit is of the old "one page" variety, R13-0383A is essentially a brand new permit.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-0383A for the modification of an aluminum melting furnace near Ravenswood, Jackson County, be granted to Alcan Rolled Products-Ravenswood, LLC.

Steven R. Pursley, PE
Engineer

Date