Alcoa Mill Products

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August 19, 2011

Mr. David Phelps
Supervisor, Construction Permit Section
Air Quality Bureau
Department of Natural Resources
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

Re: PSD Construction Permit Application – Automotive Growth Project

Dear Mr. Phelps:

Please find two copies of above referenced application for review and approval by your Department. This application is being filed for the installation of new production centers and modification of existing equipment that will support an opportunity to grow automotive sheet production at Davenport Works. This is a critical project for Davenport Works that will allow our plant to fulfill the requirements of our automotive customers in the highly competitive domestic and global market places.

Our customer requirements for delivery these products in conjunction with engineering and equipment lead times make the receipt of permits to begin construction a critical path on the project time-line. We look forward to working with your Department to ensure that the engineering review and required notifications are completed without major delays that would extend this process beyond the target of 6 months for a PSD application.

Facility air dispersion modeling for compliance with the NAAQS is in the process of being completed and the modeling report will be sent under separate cover.

Please contact me at (563)459-2411 with any questions you have regarding the enclosed permit submittal.

Sincerely,

John N. Mitchell
Environmental Lead

Enclosures (2)

Cc: Alex Calder (via Email)
John Riches (via Email)
File

Automotive Project

ALCOA Davenport Works
PSD Construction Permit Application

ALCOA, Inc.
Riverdale, IA

Final
August 2011
23510.01

Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

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Section 1

Project Introduction

1.1 Project Description/Summary

Significant growth in the use of aluminum in automotive vehicles has presented an opportunity for Alcoa to grow this business at Davenport Works (DPW). This growth in aluminum is in great part driven by the federal Corporate Average Fuel Economy (CAFÉ) standards and consumer demand for more fuel efficient vehicles.

DPW currently participates in this business by supplying many of the automotive manufacturers in the North American market. The new growth opportunity will require the installation of additional (new) manufacturing equipment and the modification of the existing equipment on the automotive product flow-path.

The new equipment that is proposed to be installed will be put in place to only accommodate the automotive aluminum that DPW does not currently have the capacity to handle. The new equipment that will be installed for this automotive expansion project includes:

- Pusher Preheat Furnace
- Five (5) Annealing Furnaces
- Continuous Heat Treat (CHT) Line
- Automotive Treatment Line
- Natural Gas Emergency Generator (Automotive Treatment Line)
- Two (2) Lube (Oiler) Systems
- Two (2) Product Marking Systems

- Non-Emitting Ancillary/Support Equipment:
    - Handling Equipment (Coil Cars, Unwinds/Rewinds, Cranes, Downenders, Accumulators, etc.)
    - Product Mechanical Operations (Shearing, Slitting, Trimming,Tension Leveling, etc.)
    - Product Packaging and Interleave Equipment
    - IR Electric Heaters
    - Heat Treat Quench (Air or DI water)
    - Alkaline and Acid Storage Tanks

The Hot Rolling Mills on the automotive flow path (100" Hot Mill, 144" Hot Mill, and 160" Hot Mill) will be modified to support this automotive expansion project. These modifications that will accommodate the additional automotive aluminum production include:

- New equipment at the entry of the 160" Hot Mill for the Pusher Preheat and an upgrade to the filter media for existing pollution control device. The upgrade will include the following:
    - The primary improvement will be designed to reduce emissions and extend the life of the existing Series 800 eliminators. New pre-filtration elements will be added upstream of the existing Series 800 elements.
- Modification to the coolant spray system at the 144" Hot Mill and an upgrade to the filter media for the existing pollution control device. The upgrade will include the following:
    - The primary improvement will be designed to reduce emissions and extend the life of the existing Series 800 eliminators. New pre-filtration elements will be added upstream of the existing Series 800 elements.
- Modification of the motor drive design at the 100" Hot Mill and the replacement of the existing cyclone-type pollution control device with a fixed media design. The replacement will include the following:
    - Four existing Busch Purifiers will be removed and replaced with Two (2) high efficiency Busch PPS Mist Elimination Units
    - PPS Units will utilize a 3 stage configuration with first stage droplet separator followed by a second stage high efficiency Busch Series 800 eliminator section.

Third stage consists of a condensate capture system to minimize the risk of condensate droplet re-entrainment.

The project Prevention of Significant Deterioration (PSD) regulatory analysis indicates that the project is above the PSD significant emission increase threshold value of 40 tons per year for Volatile Organic Compounds (VOCs) and below the applicable PSD thresholds for all other pollutants (See Section 2). The PSD applicability analysis was conducted based on the following:

- Potential emissions for PSD pollutants from the new emission sources that include proposed emission limitations and annual limits on fuel consumption.
- Baseline actual to projected actual test for the modified Hot Mills that includes proposed emission limitations for projected actual emissions.
- Emissions increases due additional automotive aluminum volume requirements on the debottlenecked unmodified sources on the automotive flow-path. These sources in the analysis include the #3 and #4 scalpers, 100" hot mill scrap conveyor, and the #1 and #3 cold mills.

The following sources are not part of the PSD applicability analysis described above:

- All equipment not on the product flow-path, the Ingot Plant, and the existing Preheats, Anneals and CHT Line on the product flow path.
- The project is for coil products – all equipment used for flat sheet and plate production are not in the analysis (Reheats, 220" Hot Mill, and Plate Mill).

The Ingot Plant is excluded because the plant is unable to meet current demand and ingot is purchased from other facilities. In the event that ingot requirements increase, more ingot will be purchased off-site to meet the new higher production rates.

The existing sources on the automotive product flow path are excluded from the analysis considering that in the current plant configuration those sources run to capacity and the automotive expansion project's purpose is to install the additional process capacity to address the increased volume.

1.2 Maximum Achievable Control Technology Regulation Review

On March 21, 2011 the EPA promulgated National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters. This regulation is known as the ICI Boiler MACT and has specific requirements for an applicable Metal Process Furnace process heater subcategory. New Metal Process Furnaces subject to the ICI Boiler MACT must comply with the provisions of the regulation upon start-up. As defined in the ICI Boiler MACT, only the new anneals are indirect-fired furnaces that would be considered process heaters under the ICI Boiler MACT. The new pusher preheats and CHT furnaces are direct fired units and are not considered applicable process heaters under this ICI Boiler MACT. The new annealing furnaces associated with the automotive expansion project would have had to comply with the ICI Boiler MACT upon start-up. The only requirement for the new natural gas fired annealing furnaces is the need to conduct an annual tune-up and submit compliance reports.

The ICI Boiler MACT was scheduled to become effective on May 20, 2011. On May 16, 2011 the EPA issued a stay postponing the effective date of the regulation. This means that the applicable new annealing furnaces that DPW plans to install would not need to meet the ICI Boiler MACT until a new effective date is issued. It is anticipated that new anneals would be considered new process heaters under the MACT and would need to comply upon the effective date of the regulation or other date as specified in any revised regulation language.

The new anneals are not subject to case-by-case MACT requirements for new sources under section 112(g) of the clean air act. The section 112(g) requirements only apply to new applicable sources when the new applicable sources themselves exceed the major source levels for hazardous air pollutants (HAPs). The new natural gas fired anneal furnaces do not emit major levels of HAPs, therefore the section 112(g) requirements are not applicable for the new anneals.

The Lube Systems were reviewed with respect to NESHAP regulations. A potentially applicable NESHAP is found under Subpart SSSS in Title 40 Part 63 of the code of federal regulations. Metal coils at least 0.15 millimeters in thickness coated with an organic substance are subject to Subpart SSSS. The definition of a coating in section 63.5110 of that subpart does not regard protective oil as a coating. The definition of protective oil in section 63.5110 of subpart SSSS means an organic material that is applied to metal for the purpose of providing lubrication or protection from corrosion without forming a solid film. This definition of protective oil includes but is not limited to lubricating oils, evaporative oils (including those that evaporate completely), and extrusion oils. The oil (liquid) lube proposed to be used in these systems is an organic material applied for lubrication and does not form a solid film on the metal surface. Therefore the liquid oil lube would be considered protective oil for the purposes of subpart SSSS. However, the dry lube (wax) proposed to be used would form a solid film on the metal and may be considered a coating in the definitions of subpart SSSS. The dry lube considered for use does not contain any hazardous air pollutants (HAPs). Therefore, when using the dry lube in these systems compliance with subpart SSSS can be demonstrated through the use of a dry lube that meets the HAP requirement in the MACT standard.

The automotive treatment line will require a small emergency generator to keep the scrubber and exhaust system operating in the event of a power outage. The engine will be subject to a NESHAP under subpart ZZZZ in 40 CFR Part 63. This NESHAP is for stationary reciprocating internal combustion engines (RICE) and is also known as the RICE MACT. The RICE MACT provisions indicate that new emergency stationary RICE with a site rating of less than 500 HP located at a major source of HAPs must only meet the requirements of 40 CFR Part 60 subpart IIII for compression ignition engines and subpart JJJJ for spark ignition engines. The small emergency generator proposed to be installed is a natural gas spark ignition engine. Therefore, in order to comply with the RICE MACT the engine must only comply with the requirements in 40 CFR Part 60 subpart JJJJ.

1.3 New Source Performance Standards Regulation Review

The Lube Systems were reviewed with respect to New Source Performance Standards (NSPS) regulations. During this review the Lube Systems were found to not be subject to the NSPS for Metal Coil Surface Coating. This NSPS is found under Subpart TT in Part 60 of the code of federal regulations. Metal coil surface coating systems installed after January 5, 1981 are subject to Subpart TT. In that subpart the affected facility subject to the provisions is each prime coat, finish coat, or each prime and finish coat combined operation. The definition of a prime coat and finish coat operation in section 60.461, means the coating application station, curing oven, and quench station used to apply and dry or cure the initial or final coating(s) on the surface of the metal coil. The lube system does not have a curing oven or quench station used to dry or cure the

lube. The lube systems are not subject to this NSPS because they do not fit the definition of the affected facility.

As mentioned above the automotive treatment line will require a small emergency generator to keep the scrubber and exhaust fan operating during a power outage. The engine will be subject to a NSPS under subpart JJJJ in 40 CFR Part 60. Subpart JJJJ is specific to spark ignition stationary internal combustion engines such as the one being proposed to be installed as part of this project. The emergency engine is proposed to be a 25 kW (33.5 HP) four stroke rich burn natural gas engine. An engine of that type would be subject to a combined NO_x and hydrocarbon emission limit of 10 grams per horsepower hour and a CO emission limit of 387 grams per horsepower hour. The engine manufacturer (likely Kohler) will provide an engine that is certified to meet these emission standards.

1.4 Ozone Preconstruction Monitoring

The emission increase demonstration for the automotive expansion project is presented in Section 2 of the permit application package. In Section 2, the determination that the automotive expansion project would be a major PSD modification for VOCs was made. The increase in VOC emissions was determined to be greater than 100 tons per year. For major PSD modifications with a VOC emissions increase greater than 100 tons per year, on-site ozone preconstruction monitoring is required.

Alcoa DPW proposes the use of the IDNR's existing 8-hour ozone monitoring network in the Davenport Region in lieu of establishing a site specific 8-hour ozone monitoring network. The nature of ozone is to be more of a regional concern rather than a localized one. Onsite specific monitoring would not be ideal for an ozone monitoring network. A network consisting of a local population based monitor and several other downwind monitors that would give an indication of ozone formation levels in between the VOC sources and the downwind monitors would be more ideal.

After discussions with Sean Fitzsimmons of the IDNR Air Quality Bureau's ambient air monitoring section, several ozone monitors in the Davenport area were considered to be possibly representative for DPW. The ozone monitors identified are the Davenport (Jefferson School), Davenport (Scott County Park), and Clinton (Rainbow Park). The Davenport monitor at the Jefferson School could be considered a population based monitor, while the Scott County Park and Clinton monitoring location could be downwind regional type monitors. These two monitors would be good candidates for regional ozone monitoring since winds during the ozone months (April-October) are generally out of the south from the Davenport metro area.

Alcoa DPW requests that the existing IDNR maintained monitoring sites of Davenport (Jefferson School, ID# 19-163-0015), Davenport (Scott County Park, ID# 19-163-0014), and Clinton (Rainbow Park, ID# 19-045-0021) be used as representative ozone monitors for preconstruction monitoring requirements. The maximum monitored 8-hour ozone levels for 2008-2010 and monitored 2008-2010 design value levels at the three proposed representative monitoring sites (Data provided by IDNR) can be viewed in Appendix D. Alcoa DPW believes that the existing 8-hour ozone network maintained in the Davenport area by the IDNR is of adequate size and spacing to be representative of ozone monitoring that might otherwise be conducted on-site. Based on recent PSD projects that have required pre-construction monitoring for ozone, the IDNR has accepted the use of their existing representative monitoring network in lieu of on-site monitoring performed by the facility itself.

1.5 Control Device Parametric Monitoring Recommendations

Control devices are being installed or modified at the 100", 144", and 160" Hot Mills as part of the automotive expansion project. The PM filter controls being installed have a manufacturer's recommended method for ensuring proper operation and maintenance procedures. These procedures include the following:

Monthly:

- Pressure drop shall be observed and recorded to ensure operating range is maintained in accordance with manufacturer's recommendations. The recommended pressure drop operating ranges will be supplied to the IDNR when the equipment specifications are finalized.

The automotive treatment line being added as part of the automotive expansion project will include a demistor/particle separator and wet scrubber as control devices. The demistor/particle separator and wet scrubber controls being installed have yet to be finalized and manufacturer's recommended monitoring procedures for both will supplied to the IDNR when the equipment specifications and operating parameters are finalized.

Section 2

PSD Applicability Evaluation

2.1 Overview of Project

Alcoa DPW proposes to implement a plant expansion that would accommodate increased automotive aluminum production. The automotive expansion will utilize existing unmodified processes, existing modified processes, and new processes. Each category of processes utilized after the automotive expansion will be treated differently with respect to calculating emissions changes needed for Prevention of Significant Deterioration (PSD) applicability determinations for a major modification.

The existing unmodified processes (emission sources) category will experience additional utilization above the baseline burden hours as a result of the automotive expansion. The processes included in this category are the following:

- #1 and #3 Cold Mills
- 100" Hot Mill Scrap Conveyor
- #3 and #4 Scalpers

The existing modified processes category will be physically modified in order to accommodate the automotive expansion and will experience additional utilization above the baseline burden hours. The processes included in this category are the following:

- 100" Hot Mill
- 144" Hot Mill
- 160" Hot Mill

The new processes category will be installed in order to address the needs of the automotive expansion only. The processes included in this category are the following:

- Five (5) Annealing Furnaces
- Pusher Preheat Furnace
- Continuous Heat Treat (CHT) Furnace
- Automotive Treatment Line
- Natural Gas Emergency Generator (1,000 hrs/yr)
- Two (2) Lube Systems
- Two (2) Product Marking Systems

The PSD emissions net emissions increase calculations for each process category are handled differently. Each process category's PSD emission increases are calculated and then summed together to determine if the automotive expansion project is a major modification at an existing PSD major source for one or more PSD pollutants. See Appendix A for the complete PSD calculation materials.

2.2 PSD Applicability Evaluation

The PSD program is applicable to cases, in attainment areas, where there is a new major facility or a major modification at an existing major facility that results in a net significant emissions increase in any criteria PSD pollutant. A net significant emissions increase can exist for one criteria pollutant or several. The PSD program review is only applicable to those criteria pollutants that are shown to have a net significant emissions increase.

Major modifications are physical changes or changes in method of operation at an existing major facility that exceeds the annual significant emission increase thresholds defined in the PSD regulations. As mentioned previously, the emission increases for different process categories associated with the automotive expansion project are calculated differently, depending on whether the processes are unmodified and used more often, modified to be used more often, and new processes to be used for the automotive expansion only.

First, the physically modified processes emission increases are evaluated by subtracting baseline annual actual emissions from future projected annual actual emission levels (Baseline Actual to Projected Actual Test). Baseline actual emissions are average actual emissions calculated over 24 months of consecutive operation selected from the 10-year period preceding the date construction begins. Construction is planned to begin in the 1st quarter of 2012.

Second, the unmodified processes that will be utilized more often, as a result of the automotive expansion project, are evaluated by only determining the increase in emissions above the selected baseline period. The increase in emission for the unmodified emission units only take into account the future projected actual emissions based on the additional utilization of the

emission units above the consecutive 24-month baseline usage selected in the Baseline to Projected Actual Test mentioned above.

Third, the new processes that will be installed to address the production needs of the automotive expansion are evaluated by looking at the potential to emit. The projected emissions or potential to emit is based on the maximum operational limits expected for the new emission units. DPW is proposing these operational limits be in the form of emissions and natural gas usage limits on the new emissions units in order to reduce the potential to emit.

The emission increase totals for these three categories were then summed to determine the net emissions increase. The net emissions increase for the entire automotive expansion project is then compared to the applicable PSD significant increase levels. Any pollutant(s) above the applicable PSD significance level is required to incorporate the relevant PSD review components into the permit application.

2.3 Baseline Actual Emissions – Modified Processes

To determine baseline emissions for the modified 100", 144", and 160" Hot Mills, the actual emissions from 2001 through 2010 have been reviewed. Emissions data was obtained from the facility's annual emission inventories. Emissions during the two consecutive calendar years 2004 and 2005 were averaged to calculate baseline actual emissions. Baseline actual emissions for the selected baseline period for the hot mills are provided in Tables 2-1, 2-2, and 2-3. See Appendix A for more detailed information on baseline annual actual burden hours and emissions.

Table 2-1 100" Hot Mills Baseline Actual Emissions

Year	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
2004	2631	30.48	30.48	30.48	45.9
2005	2573	30.98	30.98	30.98	46.12
Avg.	2602.00	30.73	30.73	30.73	46.01

Table 2-2 144" Baseline Actual Emissions

Year	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
2004	2711	6.73	6.73	6.73	5.21
2005	2596	9.88	9.88	9.88	4.63
Avg.	2653.50	8.31	8.31	8.31	4.92

Table 2-3 160" Baseline Actual Emissions

Year	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
2004	2757	19.62	19.62	19.62	13.29
2005	3587	25.53	25.53	25.53	17.27
Avg.	3172.00	22.57	22.57	22.57	15.28

2.4 Projected Actual Emissions – Modified Processes

The future or projected annual burden hours for the modified hot mills is expected to increase on an annual basis above the 2004-2005 baseline actual burden hours. The projected increase in annual burden hours is based on the expectation that the automotive expansion project will require the hot mills to be utilized more often on an annual basis and will include modifications to accommodate this additional annual utilization. Projected actual hours for the modified hot mills are not expected to become annual permit limits and DPW expects to track PSD applicability after the automotive expansion project based on an annual emissions calculation test.

To determine future actual annual emissions for each modified hot mill, the results of engineering testing/calculations and the installation of revised air pollution control systems were used. Fugitive emissions not captured by the control device hoods are also included in the projected lb/hr emission rates used. The post automotive expansion projected PSD pollutant actual annual emissions from the modified hot mills are provided in Tables 2-4, 2-5, and 2-6 below. See Appendix A for the detailed projected actual emission rates and projected annual emissions calculations and methodology.

Table 2-4 100" Hot Mill Projected Actual Emissions

Projected Burden Hours (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
5082.56	Lbs/hr	10.00	8.8	8.00	35.35
	TPY	25.41	22.36	20.33	89.84

Table 2-5 144" Hot Mill Projected Actual Emissions

Projected Burden Hours (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
5199.57	Lbs/hr	6.64	5.84	5.31	15.79
	TPY	17.26	15.19	13.81	41.05

Table 2-6 160" Hot Mill Projected Actual Emissions

Projected Burden Hours (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
5077.96	Lbs/hr	7.98	7.03	6.39	15.79
	TPY	20.27	17.84	16.22	40.09

2.5 Baseline Actual to Projected Actual Emissions – Modified Processes

The projected actual annual emissions from each modified hot mill were compared to the 2004-2005 average baseline emissions. The difference between the projected actual emissions and

the baseline actual emissions provides the emissions changes for each modified hot mill that are used in this analysis. Appendix A provides the detailed baseline actual to projected actual emissions test and supporting calculations for each modified hot mill. Tables 2-7, 2-8, and 2-9 below summarize the baseline actual to projected actual emissions changes (BAE-PAE) calculations completed for the modified hot mills for this PSD analysis.

Table 2-7 Baseline Actual to Projected Actual – 100" Hot Mill

	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
Base	2602.00	30.73	30.73	30.73	46.01
Future	5082.56	25.41	22.36	20.33	89.84
Change	2480.56	-5.32	-8.37	-10.40	43.83

Table 2-8 Baseline Actual to Projected Actual – 144" Hot Mill

	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
Base	2653.50	8.31	8.31	8.31	4.92
Future	5199.57	17.26	15.19	13.81	41.05
Change	2546.07	8.95	6.88	5.50	36.13

Table 2-9 Baseline Actual to Projected Actual – 160" Hot Mill

	Burden Hours (hrs/yr)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
Base	3172.00	22.57	22.57	22.57	15.28
Future	5077.96	20.27	17.84	16.22	40.09
Change	1905.96	-2.30	-4.73	-6.36	24.81

2.6 Additional Affected Unmodified Processes Emissions Increases

There are additional actual projected emissions increases (debottlenecks) associated with the other processes at the facility that are not being modified. These increases in emissions are associated with the increased annual burden hour usage in each of the affected unmodified processes resulting from the automotive expansion. The total projected emissions increases associated with the additional utilization of unmodified processes are added to the BAE-PAE totals for the modified hot mills as seen above. The PSD pollutant emissions increases for each existing unmodified processes that will be affected by the automotive expansion are summarized in Table 2-10 through 2-15 below. The projected burden hour increases used for the increased utilization emissions increases are the difference between the 2004-2005 baseline burden hours and the projected burden hours for each affected unmodified process. See Appendix A for detailed emission rate and emissions increase calculations for the unmodified processes affected by the automotive expansion.

Table 2-10 Unmodified Process Projected Emissions Increases - #1 Cold Mill

Hours Increase (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
1118.49	Lbs/hr	6.39	7.03	6.39	21.05
	TPY	4.47	3.93	3.58	11.77

Table 2-11 Unmodified Process Projected Emissions Increases - #3 Cold Mill

Hours Increase (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
2413.56	Lbs/hr	3.68	3.24	2.95	20.00
	TPY	4.44	3.91	3.56	24.14

Table 2-12 Unmodified Process Projected Emissions Increases - 100" Scrap Conveyor

Hours Increase (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
2480.56	Lbs/hr	1.07	0.94	0.86	0.86
	TPY	1.33	1.17	1.06	1.07

Table 2-13 Unmodified Process Projected Emissions Increases - #3 Scalper

Hours Increase (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
117.00	Lbs/hr	1.88	1.65	1.50	3.50
	TPY	0.11	0.10	0.09	0.20

Table 2-14 Unmodified Process Projected Emissions Increases - #4 Scalper

Hours Increase (hrs/yr)	Emission Rate Units	PM	PM_{10}	$PM_{2.5}$	VOC
3490.50	Lbs/hr	3.13	2.75	2.50	2.00
	TPY	5.45	4.80	4.36	3.49

2.7 New Processes Potential Emissions

There are several new processes being installed to be used in the future production related to the automotive expansion. The potential emissions of these entirely new processes are added to the emissions changes calculated for the modified and unmodified processes affected by the automotive expansion. The potential emissions calculated for new processes are added to the emissions changes shown above to calculate the automotive expansion project's total net emissions. Potential emissions from the new processes are proposed to be limited by tracking natural gas usage limits in the new emission sources. The potential PSD pollutant emissions from the new process that will be installed are summarized in Tables 2-15 through 2-16 below.

See Appendix A for detailed potential to emit calculations for the new processes proposed to be installed as a result of the automotive expansion project.

Table 2-15 New Process Potential to Emit - New Metal Treatment Furnaces

Process	Number of Units	NO_x (TPY)	SO_2 (TPY)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	CO (TPY)	VOC (TPY)	CO_2e (TPY)
Preheat	1	8.8	0.06	0.84	0.84	0.84	7.51	0.44	13,064
Anneals	5	15.1	0.09	1.20	1.20	1.20	2.40	18.6	18,663
CHT	1	2.8	0.02	0.31	0.31	0.31	3.21	26.21	4,759
Emerg. Generator	1	0.096	3.0E-5	0.001	0.001	0.001	17.30	0.001	4.89

Note: Anneals and CHT furnaces have VOC emissions from residual oil on the aluminum sheet in addition to natural gas combustion emissions.

Table 2-16 New Process Potential to Emit - New Lube Systems, New Marking Systems, and Automotive Treatment Line

Process	Number of Units	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	VOC (TPY)
ATL	1	2.82	2.82	2.82	25.5
Lubes Systems	2	0.14	0.14	0.14	19.9
Marking Systems	2	0	0	0	11.22

Note: The automotive treatment line (ATL) has VOC emissions from residual oil on the aluminum sheet and PM emissions are based on 0.01 gr/dscf.

2.8 Project Emission Increases and PSD Significance

The total emissions increase for the automotive expansion project are a culmination of all individual emission change components of the project demonstrated above. The emission changes entail the baseline actual to future actual test for the modified hot mills, emission increases from existing unmodified processes, and the potential emissions from new processes. The emission changes for the automotive expansion project are summarized in Table 2-17.

Table 2-17 Total Automotive Expansion Net Emissions Changes

Process Categories	NO_x (TPY)	SO_2 (TPY)	PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	CO (TPY)	VOC (TPY)	CO_2e (TPY)
Modified Units	0.0	0.0	1.34	-6.22	-11.25	0.0	104.77	0.0
Existing Unmodified Units	0.0	0.0	15.81	13.91	12.65	0.0	40.67	0.0
New Equipment	26.88	0.18	5.28	5.28	5.28	30.47	101.78	36,492
Total Increases	26.88	0.18	22.42	12.97	6.67	30.47	247.23	36,492
PSD Significant	40	40	25	15	10	100	40	75,000

As seen above, the results of this analysis indicate that the emissions changes for the automotive project will result in a significant increase in emissions of only VOC for the purpose of PSD review. There are no significant increases in any other PSD pollutants; therefore, this project does not trigger PSD review for any PSD pollutants besides VOC. All emissions calculations and assumptions used for the PSD analysis of the automotive expansion project are provided in more detail in Appendix A to this application.

For the five (5) year period precluding the start-up of the automotive expansion DPW will keep track of actual hours and actual emissions to demonstrate that the emissions increase, based on actual future hours data, do not exceed the levels shown in this permit application for modified and debottlenecked sources. According to the definitions in the PSD rules of the Iowa Administrative Code (IAC 567-33.3(1)), "projected actual emissions" means the maximum annual rate an existing emissions unit is projected to emit a PSD pollutant in any one of the five years beginning on the first day of the month following the date when the unit resumes regular operation after the project or in any one of the ten years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that PSD pollutant, and full utilization of the unit would result in a significant emissions increase, or a significant net emissions increase at the major stationary source. DPW believes a five (5) year tracking period for actual hours and emissions after completion of this project is sufficient given that the modified and debottlenecked sources' design capacities and potential to emit will not increase as a result of the automotive expansion project. DPW does not expect the projected hours used in this analysis to become limits in permits and permit modifications issued in association with the automotive expansion project.

Several processes affected by the automotive expansion project are also on the flow path for other products such as aerospace, defense, industrials, commercial, transportation, etc. The #3 and #4 scalpers, 100" hot mill, 140" hot mill, 160" hot mill, and the #1 and #3 cold mills are all affected by the automotive expansions as seen above. However, because the manufacture of products other than automotive also takes place on these process centers the future actual hours used on these process centers for production of products other than automotive will be excluded from the annual emissions change demonstrations post project. DPW is able to track separate hours of use for the affected process centers based on whether automotive or non-automotive production has taken place. DPW would keep rolling 12-month total hours used in each affected production center for both non-automotive and automotive production. This approach will remove the affect of any non-automotive demand growth in the future for processes that are on production flow paths for both automotive and non-automotive. Based on demand growth exclusion guidance this would be the proper method to track the future actual net emissions changes that only relate to the automotive expansion project and not to the demand growth for non-automotive products that can be accommodated by the affected process center as they exist today.

For example, hypothetically speaking the 144"Hot Mill operated for 6,000 hours in 2013. Records maintained at the facility indicate during the rolling 12-month period from January to December that non-automotive production accounted for 950 hours and automotive production accounted for 5,050 hours. The 144" Hot Mill projected actual emissions for the automotive expansion during the 12-month rolling period from January to December 2013 would be

calculated using only the 5,050 hours of automotive production and the stack tested average actual pound per hour emission rate.

Section 3

VOC BACT Analysis

3.1 Introduction

This section summarizes the findings of the Best Available Control Technology (BACT) analysis for the proposed automotive project at the Alcoa DPW facility. The proposed automotive project existing source modifications and new sources will result in a significant emissions increase in PSD pollutants that will be reviewed in this BACT analysis. Specifically, it provides information on the BACT analysis for Volatile Organic Compounds (VOC).

3.2 BACT Methodology

Any major stationary source or major modification subject to PSD must conduct an analysis to ensure the application of BACT. The requirement to conduct a BACT analysis and determination is set forth in section 165(a)(4) of the Clean Air Act (Act), in federal regulations at 40 CFR 52.21(j), in regulations setting forth the requirements for State Implementation Plan (SIP) approval of a State PSD program at 40 CFR 51.166(j), and in the SIP's of the various States at 40 CFR Part 52, Subpart A - Subpart FFF. The BACT requirement is defined as:

"an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."

The evaluation and selection of appropriate BACT emission controls is performed on a case-by-case/pollutant-by-pollutant basis within the PSD permitting process called the "top-down" method. This procedure, involves five steps:

1. Identify all emission control technology alternatives and process alternatives.
2. Eliminate any control options that are not technically feasible for use with the type of source considered.
3. Rank remaining emission control technologies from the most effective to the least effective.
4. Determine the economic, energy, and other environmental impacts of each control technology and eliminate any technology with unacceptable impacts.
5. Select the remaining most effective control technology as BACT.

In brief, the top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent, or "top" alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not

feasible in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on.

3.3 Step 1: Identification of Control Technologies

The modified VOC emission units that will be reviewed in this analysis are the 100" Hot Mill, 144" Hot Mill, and 160" Hot Mill. The new VOC emission units that will be reviewed in this analysis are a pusher pre-heat furnace, a continuous heat treat furnace, two (2) lube systems, five (5) annealing furnaces, automotive treatment line, natural gas emergency generator, and two (2) product marking systems. The following resources were reviewed to identify available VOC control technologies for the modified and new VOC emission units associated with automotive project.

- EPA Clean Air Technology Center:
  - EPA RACT/BACT/LAER Clearinghouse (RBLC)
  - EPA-CICA Air Pollution Technology Fact Sheets
  - EPA Air Pollution Control Cost Manual (Sixth Edition)
- Air Pollution Engineering Manual, Air & Waste Management Association (Second Edition - 2000)
- Control of VOC Emissions from Non-Ferrous Metal Rolling Processes, June 1992, EPA Document Reference No. 453/R-92-001
- AP-42 Chapter 12 Metallurgical Industry; Section 12.1 – Primary Aluminum Production (10/98)

3.3.1 Identification of VOC Control Technologies – Rolling Mills

The following VOC control technologies identified below are considered available at this time for the modified hot rolling mills associated with the automotive project.

Thermal and Catalytic Oxidation

Thermal oxidation destroys VOC by passing the exhaust stream through a flame or high temperature region for sufficient time to complete combustion to carbon dioxide (CO_2) and water (H_2O). Several methods of thermal oxidation exist including regenerative thermal oxidation, recuperative thermal oxidation, flares, and afterburners. Time, temperature, turbulence, and the availability of oxygen impact the rate and efficiency of these control process. Thermal oxidation may or may not recover heat from the exhaust stream depending on the type of technology. Typically, exhaust flow rates for thermal oxidation are between 500 to 50,000 scfm (up to 500,000 scfm for regenerative types) and require VOC concentrations of 1,500 to 3,000 ppm. High combustion temperatures, such as 1,100 to

1,200°F, must be maintained in the exhaust stream in order to achieve reasonable levels of VOC control. The catalytic versions of these oxidation technologies allows for VOC destruction at lower temperatures (600-800°F) than the thermal types.

Absorption

Wet scrubbers are often used to separate VOC from a gas stream using absorption. When exhaust gas contacts a scrubbing liquid used in a wet scrubber pollutants in a gas phase can be absorbed into the scrubbing liquid. The VOC controlled should be soluble in the scrubbing liquid selected for the scrubber. Oil absorbers (wet scrubbers) are available that provide a closed-loop system that does not have traditional scrubber problems of steam generation, corrosion, and waste water production. An oil wet scrubber is the most applicable scrubber type for rolling mills. Wet scrubber designs that allow the most contact between the gas and a liquid have the best removal efficiencies. Additionally, wet scrubbers inherently promote condensation of VOC into the liquid phase as well. Typical wet scrubber designs for gas absorption can operate at temperatures of 40 to 100°F and at flow rates of 500 to 75,000 scfm.

Adsorption

Adsorption systems use adsorbents (highly porous particles) to remove VOC from an exhaust stream. VOCs are removed from exhaust gases in these types of systems by adhering to the surface of the solid. Typically, activated carbon is used in adsorption systems as it tends to have large amounts of surface area available per particle for adsorption of gas molecules. Low concentrations of VOC in the exhaust gas are more difficult to adsorb. Adsorption systems are typically used to control VOC concentrations down to approximately 20 ppm for exhaust flows greater than 5,000 scfm. Adsorption systems are now available for flow rate capacities beyond 100,000 scfm. Exhaust temperatures are very important for adsorption system performance, as adsorption capacity decreases as temperature increases. Generally, carbon adsorber temperatures are kept below 130°F.

Emulsion Formulation

The VOC emissions from the hot rolling mills are created by the volatilization of constituents of the emulsion (lube oil/coolant/additives) used in the process. An oil/water emulsion will have inherently low VOC emission rates. Ideally the rolling mill emulsion would be of a low volatile nature to reduce the amounts of oil that escape the rolling mill process via volatilization. However, the emulsion characteristics are determined by the product requirements of the rolling mills. During a review of the RACT/BACT/LAER Clearinghouse no determinations were found for aluminum hot rolling mills within the last 15 years.

3.3.2 Identification of VOC Control Technologies – Metal Treatment Furnaces

The following VOC control technologies identified below are considered available at this time for the new metal treatment furnaces associated with the automotive project.

Thermal or Catalytic Oxidation

Thermal oxidation destroys VOC by passing the exhaust stream through a flame or high temperature region for sufficient time to complete combustion to carbon dioxide (CO_2) and water (H_2O). Several methods of thermal oxidation exist including regenerative thermal oxidation, recuperative thermal oxidation, flares, and afterburners. Time, temperature, turbulence, and the availability of oxygen impact the rate and efficiency of these control process. Thermal oxidation may or may not recover heat from the exhaust stream depending on the type of technology. Typically, exhaust flow rates for thermal oxidation are between 500 to 50,000 scfm (up to 500,000 scfm for regenerative types) and require VOC concentrations of 1,500 to 3,000 ppm. High combustion temperatures, such as 1,100 to 1,200°F, must be maintained in the exhaust stream in order to achieve reasonable levels of VOC control. The catalytic versions of these oxidation technologies allows for VOC destruction at lower temperatures (600-800°F) than the thermal types.

Good Combustion Practices and Coolants/Lubricants Oil Residue on Product

Good combustion practices (GCP) is the process of converting fuel to useable energy in a controlled and manageable method to maximize furnace efficiency and minimize combustion emissions. In general, natural gas fired metal treatment furnaces do not have large VOC concentrations in the exhaust while the furnace is operating properly and is maintained according to good engineering practices (Good Combustion Practices). There are coolants and lubricants oils left on the metal entering the annealing furnaces and continuous heat treat furnaces. VOCs in these coolants and lubricants oils are released during the metal treatment process. The VOC emissions from this process can be effectively controlled by limiting the coolants and lubricants oil residue on product on the metal entering the furnaces.

3.3.3 Identification of VOC Control Technologies – Lube and Marking Systems

The following VOC control technologies identified below are considered available at this time for the new lube coating processes and product marking systems associated with the automotive project.

Thermal or Catalytic Oxidation

Thermal oxidation destroys VOC by passing the exhaust stream through a flame or high temperature region for sufficient time to complete combustion to carbon dioxide (CO_2) and

water (H_2O). Several methods of thermal oxidation exist including regenerative thermal oxidation, recuperative thermal oxidation, flares, and afterburners. Time, temperature, turbulence, and the availability of oxygen impact the rate and efficiency of these control process. Thermal oxidation may or may not recover heat from the exhaust stream depending on the type of technology. Typically, exhaust flow rates for thermal oxidation are between 500 to 50,000 scfm (up to 500,000 scfm for regenerative types) and require VOC concentrations of 1,500 to 3,000 ppm. High combustion temperatures, such as 1,100 to 1,200°F, must be maintained in the exhaust stream in order to achieve reasonable levels of VOC control. The catalytic versions of these oxidation technologies allows for VOC destruction at lower temperatures (600-800°F) than the thermal types.

Lube and Marking Ink Formulation

The lube system applies a lubricant to the metal with to prepare the metal surface for stamping and forming. The lubes proposed to be used have a low VOC content. The VOC content of the lube controls the amount of VOC emissions emitted from the process. Using a lube with a low VOC content would control the amount of VOCs emitted without the addition of control technology. Likewise, the ink/solvent used to mark the product has an inherently low VOC content. Using an ink with a low VOC content or a solvent free ink such as a water based ink would control the amount of VOCs emitted without the addition of control technology.

Marking Ink Technology

The direct application of ink using inkjet, videojet, or similar technology will mark the product using a minimal amount of ink. There are also much less fugitive VOC emissions associated with these technologies because these technologies typically used sealed cartridges and/or closed loop systems. The reduction in ink usage and elimination of open ink storage will produce lower VOC emissions compared to other printing technologies available.

3.3.4 Identification of VOC Control Technologies – Automotive Treatment Line

The following VOC control technologies identified below are considered available at this time for the automotive treatment line associated with the automotive project.

Thermal or Catalytic Oxidation

Thermal oxidation destroys VOC by passing the exhaust stream through a flame or high temperature region for sufficient time to complete combustion to carbon dioxide (CO_2) and water (H_2O). Several methods of thermal oxidation exist including regenerative thermal oxidation, recuperative thermal oxidation, flares, and afterburners. Time, temperature,

turbulence, and the availability of oxygen impact the rate and efficiency of these control process. Thermal oxidation may or may not recover heat from the exhaust stream depending on the type of technology. Typically, exhaust flow rates for thermal oxidation are between 500 to 50,000 scfm (up to 500,000 scfm for regenerative types) and require VOC concentrations of 1,500 to 3,000 ppm. High combustion temperatures, such as 1,100 to 1,200°F, must be maintained in the exhaust stream in order to achieve reasonable levels of VOC control. The catalytic versions of these oxidation technologies allows for VOC destruction at lower temperatures (600-800°F) than the thermal types.

Coolants/Lubricants Oil Residue on Product

There are coolants and lubricants oils left on the metal entering the chemical treatment line. VOCs in these coolants and lubricants oils are released during the metal chemical treatment process. The VOC emissions from this process can be effectively controlled by limiting the coolants and lubricants oil residue on product on the metal entering the chemical treatment line.

3.3.5 Identification of VOC Control Technologies – Natural Gas Emergency Generator

Thermal or Catalytic Oxidation

Thermal oxidation destroys VOC by passing the exhaust stream through a flame or high temperature region for sufficient time to complete combustion to carbon dioxide (CO_2) and water (H_2O). Several methods of thermal oxidation exist including regenerative thermal oxidation, recuperative thermal oxidation, flares, and afterburners. Time, temperature, turbulence, and the availability of oxygen impact the rate and efficiency of these control process. Thermal oxidation may or may not recover heat from the exhaust stream depending on the type of technology. Typically, exhaust flow rates for thermal oxidation are between 500 to 50,000 scfm (up to 500,000 scfm for regenerative types) and require VOC concentrations of 1,500 to 3,000 ppm. High combustion temperatures, such as 1,100 to 1,200°F, must be maintained in the exhaust stream in order to achieve reasonable levels of VOC control. The catalytic versions of these oxidation technologies allows for VOC destruction at lower temperatures (600-800°F) than the thermal types.

Good Combustion Practices

Good combustion practices (GCP) is the process of converting fuel to useable energy in a controlled and manageable method to maximize engine efficiency and minimize combustion emissions. In general, natural gas fired stationary internal combustion engines do not have

large VOC concentrations in the exhaust while the engine is operating properly and is maintained according to good engineering practices (Good Combustion Practices).

3.4 Step 2: Eliminate Technically Infeasible Options

This step in the analysis evaluates the technical feasibility of the VOC emission control technologies identified for the modified existing hot rolling mills and the new sources.

3.4.1 Technically Infeasible VOC Control Options – Hot Rolling Mills

The identified VOC control options listed below are considered to be technically infeasible. This section of the analysis explains why the identified VOC controls are not feasible for the modified hot rolling mills.

Catalytic Oxidation

Catalytic oxidizers, including regenerative and recuperative types, are technically designed to control gas streams with high VOC concentrations and not the relatively low levels captured from a hot rolling mill. The reported typical design parameters of effective catalytic oxidizers have a maximum air flow rates up to 50,000 scfm and up to 500,000 scfm for regenerative types. The 100" Hot Mill, 144" Hot Mill, and 160" Hot Mill all have exhaust flows between 100,000 to 200,000 scfm, in the range suitable for regenerative catalytic oxidizers. Recent stack tested average exhaust gas VOC concentrations for the three hot mills were less than 20 ppm for each. Catalytic oxidizers have been used for VOC concentrations in dilute gas streams down to 1 ppm; however the presence of metal particulates would likely poison the catalyst. More importantly, the VOC being controlled consist of volatized long chained hydrocarbons with high boiling points that adhere to surfaces when condensed. At the operating temperature of a catalytic oxidizer those long chained hydrocarbons would condense and adhere to the catalyst, blinding it and rendering the catalytic oxidizer ineffective.

Catalytic oxidation is considered technically infeasible because of catalyst blinding that would occur from controlling hot rolling mill VOCs. A review of the RACT/BACT/LAER clearing house (RBLC) did not show any oxidizer installations for hot rolling mill operations in the last 15 years.

Absorption

Heavy oil absorbers (wet scrubbers) are technically designed to control and recover VOCs from a concentrated exhaust stream. The high flow rates of the hot rolling mills introduce a large amount of air and dilute the VOC concentrations in the exhaust gas. The reported

typical design parameters of an effective oil wet scrubber have maximum flow rates between 500 and 75,000 scfm. The effective temperatures of the wet scrubber should be between 40 to 100°F, in general the higher exhaust gas temperatures the lower the absorption rate. Also high exhaust temperatures tend to vaporize the scrubbing liquid. Heavy Oil wet scrubbers are best suited to control high VOC concentrations, where normal vendor guarantee outlet concentrations are typically 50 $\mu g/m^3$. Recently stack tested average exhaust gas VOC concentrations for the three hot mills were approximately 20 ppm (35 $\mu g/m^3$) or less for each, much less than the 50 $\mu g/m^3$ considered typical for gas absorption systems. The 100" Hot Mill, 144" Hot Mill, and 160" Hot Mill all have exhaust flows between 100,000 to 200,000 scfm, which are higher than what is considered typical for heavy oil scrubbing systems. The hot mill rolling oil is a water based emulsion and oil scrubbers use a vacuum distillation process to collect rolling oil from the scrubbing liquid. The presence of water in the air stream disrupts the distillation process used for scrubbing liquid recirculation.

A wet scrubbing (absorption) system is considered technically infeasible for the hot mills since the water present in the rolling oil would disrupt the vacuum distillation process used by heavy oil scrubbers. A review of the RBLC did not show any absorption (wet scrubbing) system installations for hot rolling mill operations in the last 15 years.

Adsorption

Adsorption systems are technically designed to control and recover VOCs from a VOC concentrated exhaust stream. Adsorption systems can be used to control VOC concentrations down to 20 ppm. Recent stack tested average exhaust gas VOC concentrations for the three hot mills are approximately 20 ppm or less for each hot mill exhaust stream. Adsorption systems have reported typical design parameter flow rates of 5,000 to greater than 100,000 scfm. Temperatures are very important for adsorption system performance. As the temperature in the adsorption system increases, the adsorption capacity of the adsorber diminishes. Generally, carbon adsorber temperatures are kept below 130°F. The exhaust temperatures of the hot mills are between approximately 85 to 105°F and flow rates range from 100,000 to 200,000 scfm. The types of VOC being controlled from the Hot Rolling Mills consist of volatized long chained hydrocarbons with high boiling points. The "sticky" nature and high boiling points of these VOCs would make regeneration of the adsorption bed by conventional means such as steam regeneration infeasible. Steam regeneration generally desorbs oil and solvents from the carbon bed at temperatures of 250°F to 350°F. The hot rolling mill lubricants have an average boiling point of 432°F and get as high as 630°F. Additionally, there would be significant challenges in removing the recovered oils from the

steam condensate and could cause wastewater issues. These VOCs would remain in the adsorption bed and breakthrough would occur immediately during the next use of the adsorption bed and the control device would be rendered ineffective.

Based on desorption/regeneration challenges in the adsorption bed an adsorption system is considered technically infeasible. A review of the RBLC did not show any adsorption system installations for hot rolling mill operations in the last 15 years.

3.4.2 Technically Infeasible VOC Control Options – Metal Treatment Furnaces

The identified VOC control options listed below are considered to be technically infeasible. This section of the analysis explains why the identified VOC controls are not feasible for the new metal treatment furnaces.

Catalytic Oxidation

Catalytic oxidizers, including regenerative and recuperative types, are technically designed to control gas streams with high VOC concentrations and not the relatively low levels emitted from metal treatment furnaces. Catalytic oxidizers have been used for VOC concentrations down to 1 ppm, however the presence of coolants and lubricants oil particulates in the exhaust, consisting of volatized long chained hydrocarbons with high boiling points, would adhere to surfaces when condensed. In the annealing furnaces and continuous heat treat furnace condensed oil would repeatedly blind the catalyst, rendering it ineffective. Catalytic oxidation is not considered to be technically feasible for the annealing furnaces and continuous heat treat furnace due to catalyst blinding. A review of the RBLC did not show any oxidizer system installations for metal treatment furnaces in the last 15 years.

3.4.3 Technically Infeasible VOC Control Options – Lube and Marking Systems

The identified VOC control options listed below are considered to be technically infeasible. This section of the analysis explains why the identified VOC controls are not feasible for the lube application and product marking systems.

Thermal or Catalytic Oxidation

Thermal and catalytic oxidizers, including regenerative and recuperative types, are technically designed to control gas streams with high VOC concentrations and not the relatively low levels seen in the lube application and product marking system processes. Exhaust gas VOC concentrations for the lube and product marking system are small, much less than the 1,500 to 3,000 ppm concentrations considered typical for thermal oxidation systems. Catalytic oxidizers have been used for VOC concentrations down to 1 ppm,

however the presence of oily wax particulates in the exhaust gas pulled off the lube systems and ink particles pulled off the marking system by a VOC capture system would likely blind the catalyst.

Ventilation of the lube and product marking system is not feasible as they are both fugitive VOC sources that have no exhaust duct work or vents and cannot be reasonably vented to the ambient air. The lube machines and inkjet marking systems are packaged equipment that are delivered as built with no ventilation or duct work. The VOC capture systems employed would need to draw a large vacuum in order to capture the small amounts of VOC emitted. The large volumes of air drawn off the lube application and product marking systems would interfere with the functions of these systems and they would no longer function properly. Thermal and catalytic oxidation is infeasible due to the lack of process ventilation on the packaged lube application and inkjet marking system machines.

Marking Ink Formulation

Low VOC (high solids) inks cannot be used in inkjet or videojet technology, which is the likely technology to be used. Inkjet and Videojet printing technology typically use a dye type of ink that has virtually no solids. Water based inks are not feasible because of the quick drying times required for those types of inks and metal adhesion limitations. Required dry times for the metal being produced is on the order of seconds because the marking is taking place on a moving web.

3.4.4 Technically Infeasible VOC Control Options – Automotive Treatment Line

The identified VOC control options listed below are considered to be technically infeasible. This section of the analysis explains why the identified VOC controls are not feasible for the automotive treatment line.

Thermal or Catalytic Oxidation

Thermal or Catalytic oxidizers, including regenerative and recuperative types, are technically designed to control gas streams with high VOC concentrations and not the relatively low levels emitted from the chemical treatment line. Catalytic oxidizers have been used for VOC concentrations down to 1 ppm, however the presence of coolants and lubricants oil particulates in the exhaust, consisting of volatized long chained hydrocarbons with high boiling points, would adhere to surfaces when condensed. In the chemical treatment line condensed oil would repeatedly blind the catalyst, rendering it ineffective. Two of the metal treatment processes in the chemical treatment line consist of treating the metal surface with acids. The acid aerosols are controlled by an acid scrubber, however some amount of these

aerosols are exhausted from the wet scrubber. These acid aerosols would severely corrode the internal components of a thermal oxidizer, rendering it ineffective and would require frequent maintenance and downtime.

Thermal and Catalytic oxidation is not considered to be technically feasible for the chemical treatment line due to catalyst blinding and oxidizer component corrosion. A review of the RBLC did not show any oxidizer system installations for chemical metal treatment systems in the last 15 years.

3.4.5 Technically Infeasible VOC Control Options – Natural Gas Emergency Generator

All identified control options for the natural gas emergency generator are considered to be technically feasible.

3.5 Step 3: Rank Remaining Technologies by Effectiveness

This step in the analysis evaluates the remaining technically feasible emission control technologies identified for the modified hot rolling mills, new metal treatment furnaces, automotive treatment line, product marking systems and the lube application processes. Then these remaining technologies are ranked by effectiveness.

3.5.1 Remaining VOC Control Options – Hot Rolling Mills

For the modified hot rolling mills the following control options for VOC are considered to be technically feasible and are ranked by effectiveness.

Thermal Oxidation

Regenerative thermal oxidizers (RTOs) can be designed for flow rates up to approximately 500,000 scfm. The 100" Hot Mill, 144" Hot Mill, and 160" Hot Mill all have exhaust flows between 100,000 to 200,000 scfm, in the range suitable for RTOs. A regenerative type of thermal oxidizer could possibly handle the exhaust flows from the rolling mills; however the low VOC concentrations in the exhaust would likely require the use of a VOC concentrator to increase the VOC destruction efficiency of the RTO. The VOC concentrator is essentially a rotating adsorption bed used in front of an RTO that is regenerated with hot exhaust from the oxidizer. For the same reasons addressed in the technical infeasibility determination for an adsorption system, a VOC concentrator would be technically infeasible for the hot mills.

Emulsion Formulation

The VOC emissions from the hot rolling mills are created by the volatilization of organic constituents of the emulsion (lube oil/coolant/additives) used in the hot rolling process. The physical properties of the emulsion determine the amount of VOCs that will be released from

the hot rolling mill process. The physical properties of importance for VOC emissions are the vapor pressure and boiling point temperatures. During a review of the RBLC no determinations were found for rolling mills within the last 15 years.

3.5.2 Remaining VOC Control Options – Metal Treatment Furnaces

For the metal treatment furnaces the following control options for VOC are considered to be technically feasible and are ranked by effectiveness.

Thermal Oxidation

Thermal oxidizers are the only incineration option for the anneals and continuous heat treat based on the presence of coolants and lubricants rolling mill oil on the metal prior to entering the treatment systems. Thermal oxidizers can be designed for flow rates from 500 to 50,000 scfm. The metal treatment furnaces all have flows between 1,000 to 7,400 scfm, in the range suitable for thermal oxidizers.

Catalytic Oxidation

The pusher preheat metal treatment furnace would not have any coolants and lubricants oil on the metal prior to entering the furnace. The blinding problems that would occur for the other metal treatment systems are not present for the pusher preheat. The pusher preheat has very low VOC emissions produced from the combustion of natural gas. Catalytic Oxidizers can be designed for very low VOC concentrations down to 1 ppm. Catalytic oxidizers can be designed for flow rates from 700 to 50,000 scfm. The pusher preheat has a flow rate of 1,350 scfm, in the range suitable for a catalytic oxidizer.

Good Combustion Practices and Coolants/Lubricants Oil Residue on Product

The metal treatment furnaces generate VOC emissions from natural gas combustion and the volatilization of coolants and lubricants oil on the metal entering the furnace; except for the pusher preheat furnace which only emits VOC from natural gas combustion. In general, natural gas combustion in furnaces does not produce large VOC concentrations in the exhaust while the furnace is operating properly and is maintained according to good engineering practices (Good Combustion Practices). The coolants and lubricants oil amounts (content) on the metal entering the furnace can vary for the continuous heat treat and annealing furnaces. The coolants and lubricants oil levels on the metal entering the furnaces are inherently low due to the processes that create them and product quality requirements. The VOC emissions from the coolants and lubricants oil volatilization in the furnaces can be effectively controlled by limiting the coolants and lubricants oil residue on product on the metal entering the furnaces

3.5.3 Remaining VOC Control Options –Lube and Product Marking Systems

For the new lube application systems and product marking systems the following control options for VOC are considered to be technically feasible and are ranked by effectiveness.

Lube Formulation

The lube and Ink properties such as VOC content can be controlled to reduce the fugitive VOCs emitted from the process. The lube oil or wax proposed to be used in the lube system has a low VOC content.

Marking Ink Technology

Inkjet or videojet printing technology uses a direct application method, which makes transfer efficiency to the substrate nearly 100%. The high transfer efficiencies allow these technologies to use much less ink and subsequently have less VOC emissions. The sealed ink cartridges and/or closed loop systems also reduce fugitive VOC emissions from the printing process.

3.5.4 Remaining VOC Control Options – Automotive Treatment Line

For the automotive treatment line the following control options for VOC are considered to be technically feasible and are ranked by effectiveness.

Coolants/Lubricants Oil Residue on Product

The chemical treatment line generates VOC emissions from the volatilization of coolants and lubricants oil on the metal entering the treatment line. The coolants and lubricants oil amounts (content) on the metal entering the treatment line can vary. The coolants and lubricants oil levels on the metal entering the chemical treatment line are inherently low due to product quality requirements. The VOC emissions from the coolants and lubricants oil volatilization in the furnaces can be effectively controlled by limiting the residue on product entering the chemical treatment line.

3.5.5 Remaining VOC Control Options – Natural Gas Emergency Generator

For the natural gas emergency generator the following control options for VOC are considered to be technically feasible and are ranked by effectiveness.

Thermal and Catalytic Oxidation

Thermal and Catalytic oxidizers are the most effective VOC control devices for the natural gas emergency generator. Thermal oxidizers can be designed for flow rates from 500 to 50,000 scfm. Catalytic Oxidizers can be designed for very low VOC concentrations down to 1 ppm. Catalytic oxidizers can be designed for flow rates from 700 to 50,000 scfm. The flow

rate ranges considered typical for thermal and catalytic oxidizers are larger than the flows exhibited by the natural gas emergency generator proposed to be installed of around 200 to 250 cubic feet per min.

Good Combustion Practices

The natural gas emergency generator produces VOC emissions from incomplete natural gas combustion. In general, natural gas combustion in stationary internal combustion engines does not produce large VOC concentrations in the exhaust while the engine is operating properly and is maintained according to good engineering practices (Good Combustion Practices).

3.6 Step 4: Evaluate Most Effective Controls & Document Results

This step evaluates the most effective technically feasible VOC control technologies based on economics, energy, and environmental impacts.

3.6.1 Economic, Energy, and Environmental Impacts – Hot Rolling Mills

For the modified hot rolling mills only two technically feasible control options were identified. RTO and emulsion formulations were the only feasible control options remaining. The economic, energy, and environmental impacts of RTOs and emulsion formulation are discussed below.

Thermal Oxidation

The economics of an RTO are taken from general cost information provided in the EPA-CICA Air Pollution Technology Fact sheet for regenerative thermal and catalytic oxidizers. This general and conservative economic analysis uses only the capital cost estimated in 2002 dollars based on the flow rates of the hot mills that would be controlled. The fixed capital costs for an RTO in 2002 dollars are as follows:

- Capital Cost - $35 to $140 per scfm

Generally the costs in the upper end of the range apply when VOC concentrations are low (less than 100 ppmv) and flow rates are low (less than 5,000 scfm). Typical RTO VOC destruction efficiencies range from 95% to 99%. The parameters for the 100", 144", and 160" Hot Mills used in this economics evaluation are shown in Table 3-1 below.

Table 3-1 Hot Mill Parameters

Hot Mills	Projected Total Actual VOC Emissions (Tons/yr)	Stack Flow Rate (SCFM)
100"	89.84	209,314
144"	41.05	152,667
160"	40.09	184,517

Note: 100" Hot Mill has two stacks, therefore the flow rate listed is the combined flow rate of the two stacks (114,299 scfm – North and 95,015 scfm – South).

The capital cost for an RTO to be equipped on each modified hot mill is based on the flow rates of the exhaust gases treated. As mentioned previously, the combination of low VOC concentrations (< 100 ppmv) and low flow rates (< 5,000 scfm) drive the cost towards the upper end of the capital cost range. The hot mills each have low VOC concentrations of approximately 20 ppmv and high flow rates. Because the VOC concentrations in the hot mill exhausts are low and the flow rates are high, the middle of the capital cost range ($90 per scfm) was used to calculate the capital costs for each hot mill to be retrofitted with an RTO. For this economic analysis it is conservatively assumed that the RTO would be designed for 99% VOC destruction efficiency. The following table (Table 3-2) shows the calculated annual capital cost ($/ton) to control VOCs with an RTO for each hot mill. Note that annualized operation & maintenance costs were not included.

Table 3-2 Hot Mill RTO Capital Cost (2002 Dollars)

Hot Mills	Capital Cost (Fixed Cost)	Annualized Capital Cost ($/yr)	VOC Emissions Controlled (Tons/yr)	Annual Capital Cost ($/ton controlled)
100"	$18,838,260	2,068,340	88.94	$23,255
144"	$13,740,030	1,508,581	40.64	$37,121
160"	$16,606,530	1,823,308	39.69	$45,939
Total	$49,184,820	5,400,229	169.27	$31,903

Note: The annualized capital cost is based on a 7% interest rate and 15 year depreciation.

In addition to the economic impacts of retrofitting RTOs on the hot rolling mills there are energy and environmental impacts to consider. The RTOs would need to be fueled in order to oxidize (control) VOC pollutants. The use of natural gas as a fuel for the RTO(s) would increase the energy usage impact at the Alcoa DPW facility. In general, an RTO used to control low VOC concentrations such as those found in the modified hot mills would lead to large amounts of natural gas being used to fuel the RTOs and maintain the destruction efficiency of 99% assumed in this analysis. There are also environmental implications of burning natural gas. Combustion of natural gas leads to the release of air pollutants such as Nitrogen Oxides, Carbon Monoxide, and various Greenhouse Gases.

Emulsion Formulation

Limiting the release of VOC emissions by limiting the oil residue on product of the emulsion formulation used in the modified hot mills has little to no economic impact to the plant. The modified hot mills already use a water-based emulsion that limits the oil residue on product. There would be no adverse environmental or energy impact as a result of limiting the oil residue on product of the emulsion used in the modified rolling mills.

RTOs are eliminated from consideration for BACT based on the large amount of capital $ per ton of VOC controlled needed on an annual basis in order to retrofit the modified hot mills. Additionally the RTOs would create adverse environmental and energy impacts at DPW. Controlling the VOCs released through limiting the oil residue on product in the emulsion used in the modified hot mills is the best alternative based on the lack of economic, energy, and environmental impacts.

3.6.2 Economic, Energy, and Environmental Impacts –Metal Treatment Furnaces

For the treatment furnaces and chemical treatment line, two technically feasible control options were identified. Thermal oxidation and Good Combustion Practices and coolants/lubricants oil residue on product were the only feasible control options remaining. The economic, energy, and environmental impacts of the remaining control options are discussed below.

Thermal Oxidation

The economics of thermal oxidizers are taken from general cost information provided in the EPA-CICA Air Pollution Technology Fact sheet for a direct flame thermal oxidizer or afterburner. This general and conservative economic analysis uses only the capital cost estimated in 2002 dollars based on the flow rates of the metal treatment furnaces that would be controlled. The fixed capital costs for a direct flame thermal oxidizer in 2002 dollars are as follows:

- Capital Cost - $25 to $90 per scfm
- Annual O & M Cost - $5 to $75 per scfm

Generally the costs in the upper end of these ranges apply when VOC concentrations are low to moderate (less than 1000 to 1500 ppmv). Typical direct flame thermal oxidizer VOC destruction efficiencies are approximately 95%. The operating parameters for pusher preheat, continuous heat treat and anneals used in this economics evaluation are shown in Table 3-3 below.

Table 3-3 Treatment Furnaces Parameters

Treatment Unit(s)	Projected Total Actual VOC Emissions (Tons/yr)	Stack Flow Rate (SCFM)
5 Anneals	18.6	37,000
Pusher Preheat	0.44	13,500
Continuous Heat Treat	26.21	4,375
Note: The flow rate listed is the combined flow rate of the five new annealing furnaces.		

The capital cost for a thermal oxidizer to be equipped on each metal treatment furnace is based on the flow rates of the exhaust gases treated. As mentioned previously, the low VOC to moderate concentrations (< 1000 to 1500 ppmv) drive the cost towards the upper end of the capital cost range. The metal treatment furnaces each have low VOC concentrations less than 1,000 ppmv. Because the VOC concentrations in the metal treatment furnaces exhausts are low, the high end of the capital cost range ($90 per scfm) and annual O & M cost range ($75 per scfm) were used to calculate the costs for each metal treatment furnaces to be equipped with thermal oxidizers. For this economic analysis it is assumed that each thermal oxidation unit would be designed for at least 95% VOC destruction efficiency, as that is typical. The following table (Table 3-4) shows the annual calculated cost ($/ton) to control VOCs with a thermal oxidizer for the metal treatment furnaces.

Table 3-4 Metal Treatment Furnace Thermal Oxidizer Capital Cost (2002 Dollars)

Treatment Unit(s)	Capital Cost (Fixed Cost)	Annualized Capital Cost ($/yr)	Annual O & M Cost ($/yr)	VOC Emissions Controlled (Tons/yr)	Annual Capital Cost ($/ton controlled)
5 Anneals	$3,330,000	362,322	2,775,000	17.67	$177,551
Pusher Preheat	$1,215,000	133,400	1,012,500	0.42	$2,728,333
Continuous Heat Treat	$393,750	43,232	328,125	24.90	$14,914
Total	$4,938,750	538,954	4,115,625	43.39	$107,273

Note: The annualized capital cost is based on a 7% interest rate and 15 year depreciation.

Catalytic Oxidation

The economics of catalytic oxidizers are taken from general cost information provided in the EPA-CICA Air Pollution Technology Fact sheet for a direct flame catalytic thermal oxidizer. This general and conservative economic analysis uses only the capital cost estimated in 2002 dollars based on the flow rates of the pusher preheat furnace that would be controlled. The fixed capital costs for a direct flame thermal oxidizer in 2002 dollars are as follows:

- Capital Cost - $22 to $90 per scfm
- Annual O & M Cost - $4 to $25 per scfm

Generally the costs in the upper end of the ranges apply when VOC concentrations are low (less than 100 ppmv). Typical direct flame catalytic oxidizer VOC destruction efficiencies are approximately 95%. The operating parameters for pusher preheat used in this economics evaluation are shown in Table 3-3 above.

The capital cost for a catalytic oxidizer to be equipped on the pusher preheat furnace is based on the flow rate of the exhaust gases treated. As mentioned previously, the low VOC concentrations (< 100 ppmv) drive the cost towards the upper end of the capital cost range. The pusher preheat furnace has a low VOC concentrations less than 100 ppmv. Because the VOC concentrations in the pusher preheat furnace exhaust is low, the high end of the capital cost range ($90 per scfm) and the annual O & M cost range ($25 per scfm) were used to calculate the costs for the pusher preheat furnace to be equipped with a catalytic oxidizer. For this economic analysis it is assumed that the catalytic oxidation unit would be designed for at least 95% VOC destruction efficiency, as that is typical. The following table (Table 3-5) shows the annual calculated cost ($/ton) to control VOCs with a catalytic oxidizer for the pusher preheat furnaces.

Table 3-5 Pusher Preheat Furnace Catalytic Oxidizer Capital Cost (2002 Dollars)

Treatment Unit(s)	Capital Cost (Fixed Cost)	Annualized Capital Cost ($/yr)	Annual O & M Cost ($/yr)	VOC Emissions Controlled (Tons/yr)	Capital Cost ($/ton controlled)
Pusher Preheat	$1,215,000	133,400	337,500	0.42	$1,121,190

Note: The annualized capital cost is based on a 7% interest rate and 15 year depreciation.

In addition to the economic impacts of installing thermal or catalytic oxidizers on the metal treatment furnaces there are energy and environmental impacts to consider. The thermal or catalytic oxidizers would need to be fueled in order to oxidize (control) VOC pollutants. The

use of natural gas as a fuel for the thermal or catalytic oxidizers would increase the energy usage impact at the Alcoa DPW facility. In general a thermal or catalytic oxidizer used to control low VOC concentrations such as those found in the metal treatment furnaces would lead to large amounts of natural gas being used to fuel the oxidizers and maintain the destruction efficiency of 95% assumed in this analysis. There are also environmental implications of burning natural gas. Combustion of natural gas leads to the release of air pollutants such as Nitrogen Oxides, Carbon Monoxide, and various Greenhouse Gases.

Good Combustion Practices and Coolants/Lubricants Oil Residue on Product

Limiting the release of VOC emissions by using good combustion practices and limiting the coolant and lubricants oil residue on product entering the annealing and continuous heat treat furnaces has little to no economic impact to the plant. The furnaces already function in a fuel efficient manner and the coolants and lubricants oil residue on product is minimized to maintain product quality. There would be no adverse environmental or energy impact as a result of maintaining good combustion practices and limiting the coolant and lubricant oil residue on product entering the anneals and continuous heat treat furnaces.

Thermal and catalytic oxidizers are eliminated from consideration for BACT based on the large amount of annual capital $ per ton of VOC controlled needed in order to equip the metal treatment furnaces. Additionally the thermal or catalytic oxidizers would create adverse environmental and energy impacts at DPW. Controlling the VOCs released through good combustion practices and limiting the coolants and lubricants oil residue on product entering the treatment furnaces is the best alternative based on the lack of economic, energy, and environmental impacts.

3.6.3 Economic, Energy, and Environmental Impacts – Lube and Marking System

For the new lube application and product marking systems only one technically feasible control option was identified for each. Because lube material formulation and marking ink technology were the only feasible options remaining there is no need to compare technically feasible control options based on economic, energy, and environmental impacts.

3.6.4 Economic, Energy, and Environmental Impacts – Automotive Treatment Line

For the chemical treatment line only one technically feasible control option was identified. Because limiting coolant and lubricant oil residue on product entering the chemical treatment line is the only feasible option remaining there is no need to compare technically feasible control options based on economic, energy, and environmental impacts.

3.6.5 Economic, Energy, and Environmental Impacts – Natural Gas Emergency Generator

Both thermal and catalytic oxidation is considered technically feasible for the natural gas emergency generator. The natural gas emergency generator is a small generator that is rated 25KW (33.5 HP) and only operates intermittently. The operations of the emergency generator are limited to 1,000 hours per year, which includes testing, maintenance, and emergency operations. Based on the intermittent operation and the inherently low VOC emissions from natural gas combustion in an engine, add-on controls would be prohibitively expensive. Alcoa DPW believes the determination of add-on controls not being cost effective for the emergency generator to be implied without any further specific annualized capital and annual O & M costs being analyzed.

Because Good Combustion Practices is the only cost effective feasible option remaining there is no need to compare the technically feasible control options based on economic, energy, and environmental impacts.

3.7 Step 5: Selection of Best Available Control Technology

The selection of BACT for the modified hot rolling mills, new metal treatment furnaces, and new dry lube system is discussed below.

3.7.1 BACT Selection – Hot Rolling Mills

The selection of BACT for the hot rolling mills is proposed to be the use of an oil water emulsion for cooling and lubrication.

The coolant used in an aluminum hot rolling mill is a critical part of the manufacturing production process. The physical and chemical characteristics of the lubricant establish the product surface quality, manage heat extraction to ensure proper dimensions and properties, and controls friction that determines roll pass reductions. These requirements are met through a proprietary emulsion that includes a base oil and additives that provide load bearing characteristics, adjust the pH, prolong the life of the coolant, reduce foaming, adjust viscosity, control the stability of the emulsion and control bacteria growth. The use of these additives and the levels in oils are adjusted as required by changing product requirements and manufacturing conditions. In addition to the emulsion, kerosene sprayed when the aluminum slab enters the roll bite to prevent bite refusal (metal will not pass through the roll bite).

In general the base oil and the additives have low vapor pressures and high boiling points. This leads to the relatively low emission concentrations of approximately 20 ppmv. In terms

of setting BACT, it is technically impossible to set limits on the composition of the coolant that will provide the flexibility to operate the mill in all circumstances. The coolant is an oil water mixture (emulsion), where the key factor impacting the VOC emissions from the hot rolling mills is the oil residue on product in the emulsion.

The one parameter that we can effectively control and still maintain flexibility in the characteristics of the coolant is the percent (%) by weight oil in the emulsion. We are proposing to limit the % by weight oil residue on product in the emulsion for the 100", 144" and 160" Hot Mills to no more than 10% by weight. Alcoa DPW proposes to take samples at a minimum of 10 times per month or 1/3 of the number of days each hot mill operated in the month, whichever is less. The samples will be analyzed using acid extraction, evaporative methodology or other Industry accepted methodologies. Compliance will be determined monthly by averaging all valid samples during each month. We are also proposing that the permit contain language that will allow this percentage by weight level to be adjusted using stack testing to show that any agency derived BACT emission limits set for the 100", 144", and 160" Hot Mills would not be exceeded.

3.7.2 BACT Selection – Metal Treatment Furnaces

The selection of BACT for the new metal treatment furnaces is proposed to be good combustion practices (GCP) and coolants and lubricants oil residue on the aluminum sheet processed by the annealing and CHT furnaces. For the coolants and lubricants oil residue on product entering the annealing furnaces and continuous heat treat furnaces, the levels will be limited by employing good operating practices. Good operating practices will limit coolants and lubricants oil on the aluminum sheet to levels required for process and product quality standards only.

3.7.3 BACT Selection – Lube and Marking Systems

The selection of BACT for the new lube systems is proposed to be lube formulation. The VOC content of the lube used is very low based on current proposed product quality and customer requirements. Alcoa DPW proposes a BACT limit of 20 tons per year for the lube systems installed for this project. This limit is based on the use of a lubricant that has a very low VOC content (< 10% by wt.) and a conservative estimate of the application rates required by the customer. This process is inherently low emitting in that it involves the direct application of lubricant (wax or oil) to the substrate and no heat is applied for drying or curing, meaning the material is never exposed to the temperatures in Method 24 to determine the VOC content. For lubes we have examined, the VOC content of the lube is due to the

light ends of the petroleum products used to manufacture the lube and is not a solvent added as a carrier for the lube that evaporates during the curing process. Because of changing customer demands over time in the type, application rate, and inherently low emission rate of this process, we request no short term limits on the VOC content of the lubes. Alcoa DPW proposes to maintain records of the VOC content of the lubes applied (MSDS, technical data sheets or lab analysis) and the amount of lube used. These data will be used to calculate emission levels and demonstrate compliance with the proposed BACT limit. Alcoa DPW also requests language that allows an alternate compliance demonstration to determine VOC emission from the lubes that are approved by IDNR.

The selection of BACT for the product marking systems is the use of inkjet, videojet or similar technologies that are designed to create markings required by the customer. The estimated usages of inks/solvents by these systems are very low at 0.04 ml/linear foot of product. Alcoa DPW proposes a BACT limit of 11 tons VOC per year for all the marking systems installed for the automotive project. This limit is based on the use of an ink with a VOC content of 6.6 lbs per gallon. Because of changing customer demands over time in the marking requirements and the relatively low emission rate of these systems, Alcoa DPW requests no short term VOC limits on the content of the inks/solvents. Alcoa DPW proposes to maintain records of the VOC content of the inks/solvents used in these systems (MSDS, technical data sheets or lab analysis) and the amount of these materials consumed. These data will be used to calculate emissions levels and demonstrate compliance with the BACT limit. Alcoa DPW also requests language that allows the use of a mass balance calculation to determine the VOC from these systems that is approved by IDNR in the event the waste from this process is a substantial portion of the total use.

3.7.4 BACT Selection – Automotive Treatment Line

The selection of BACT for the new automotive treatment line is proposed to be the coolants and lubricants oil residue on product on the aluminum sheet processed by the treatment line. For the coolants and lubricants oil residue on product entering the automotive treatment line the levels will be limited by employing good operating practices. Good operating practices will limit coolants and lubricants oils on the aluminum sheet to levels required for process and product quality standards only.

3.7.5 BACT Selection – Natural Gas Emergency Generator

The selection of BACT for the new natural gas emergency generator is proposed to be Good Combustion Practices (GCP) and proper engine design. The design of the engine will be one

that will promote good combustion efficiency and will comply with emission standards within NSPS subpart JJJJ, which include a combined NO_x and Hydrocarbon (VOC) limit. The proposed BACT limit for the natural gas emergency generator is 0.296 lbs/MMBtu at full load based on AP-42, Supplement F, August 2000, Chapter 3, Section 3.2.

Section 4

Non-PSD PM_{10} NAAQS Modeling Report

(Will be submitted under a separate cover after main application submittal)

Section 5

Additional Impacts

5.1 Purpose

All projects which require review under the Prevention of Significant Deterioration (PSD) regulations must conduct an additional impacts analysis. This analysis must address the following elements:

- Soils and Vegetation
- Visibility
- Class I Area Impacts Analysis
- Growth

An additional impacts analysis has been conducted for Growth, Soils and Vegetation only. Analyses of the impacts on Visibility and Class I Areas were not conducted for the following reasons:

- The volatile organic compounds (VOC) significant emissions increases associated with this project do not affect visibility in the area. Because of the absence of a significant net emissions increase for NO_x, $PM/PM_{10}/PM_{2.5}$, and/or SO_2 from this project, no Class II area visibility concerns are anticipated.

- PSD regulations require a Class I impacts analysis only when a site is located within 100 kilometers of a Class I area. The closest Class I area to the project site, Mingo (MO), is approximately 500 kilometers away. Because the Alcoa Davenport Works (DPW) facility is greater than 100 kilometers from any Class I area, no Class I visibility analysis has been conducted.

5.2 Soils and Vegetation

Surrounding land use and land cover data obtained through the use of the IDNR Interactive Mapping webpage was used to evaluate a one-mile radius around the project site. Virtually the entire area surrounding the site is used for residential or commercial purposes interspersed with areas of wetland and woodland. The Mississippi River is located immediately to the south and east of the site. Available online soil information provided by the Natural Resource Conservation Service (NRCS) shows that soils in the immediate area consist primarily of silty loam and urban land, typical of urban locations in a river valley.

Grasses and trees on developed/urban landscapes are the most prevalent type of vegetation within the vicinity that could be affected by facility emissions. In addition, threatened and endangered species and species of special concern may be present in nearby wooded areas along the Mississippi river. Those species that were evaluated for potential impacts are those that are listed on the United States Fish and Wildlife Service (USFWS) website as distributed in Scott County. A total of twenty-one plant species are listed within the county currently.

In this permit application, the PSD analysis sections demonstrate that VOC emissions will increase in significant amounts with respect to PSD applicability. In large quantities, some VOC species can have an impact on vegetation in the environment near the output source. A majority of the VOC species emitted are petroleum hydrocarbons (see attached MSDS for hot rolling mill coolant/emulsion) and HAPs are only a small fraction of the VOCs being emitted. The VOC species emitted in significant quantities from the automotive expansion project are Formaldehyde, Benzene, and Hexane. Research conducted during the preparation of this application did not uncover any adverse effects to plants from Formaldehyde concentrations found in the ambient air. Large Benzene concentrations have been found to cause death in plants as well as damage to the leaves and roots of agricultural crops; however, plant health is not damaged by observed Benzene concentrations in ambient air. According to research done during the preparation of this application, Hexane has no adverse effects were found for plant species. VOCs in general contribute to the formation of ground level Ozone. Ground level ozone concentrations can be harmful to vegetation (phytotoxic). The 100", 144", and 160" hot mills, which emit the majority of the VOC emissions from the automotive expansion project, have stack heights of 70 to 85 feet and are located a distances of approximately 1 kilometer from the nearest property-line. At those heights and distances, any ground level VOC concentrations in the ambient air produced by the hot mills in the vicinity of the DPW plant would be small. At greater distances from the facility property-line, even smaller, concentrations would be observed due to residence time and mixing with ambient air. Additionally, Alcoa DWP has had studies performed on the VOC materials emitted from the rolling mill lubricants/coolants. The rolling mills account for a majority of the VOC increase for the automotive project. In the studies performed it was found that the VOCs emitted from the rolling mill lubricants/coolants have very low photochemical reactivity and therefore, would not significantly contribute to ground level ozone concentrations in the area.

5.3 Growth Impacts

The purpose of the growth impact analysis is to quantify growth resulting from the construction and operation of the proposed project. Due to the fact that this project is a plant expansion some level of sustained economic, industrial, transportation or commercial growth at or in the vicinity of DPW is anticipated as a result of this project.

Short term increases in transportation and commercial activities are expected during the construction phase of the project between early 2012 and June 2013. Aloca, Inc. anticipates that 150-200 contract jobs will be needed for about 18 months during construction. These transient, insignificant activities including additional personnel at the site, delivery of materials, and execution of the plant expansion projects described in this application are assumed to not affect growth for the purposes of the PSD additional impacts analysis.

Aloca Inc. anticipates that a capital investment of ~$300 million will be made in the automotive expansion. After construction and installation for this project are completed the automotive expansion is anticipated to create up to 200 new full time equivalent employment opportunities. These numbers of new personnel will not significantly affect residential and transportation growth in the area. The increase in utility demands due to the operation of automotive expansion will have no major impact on local fuel markets. Any increase in transportation impacts on air quality in the area would be offset by the fact that the automotive expansion's primary purpose is to produce aluminum sheet for passenger vehicles. The aluminum would make automobiles lighter and would increase the fuel economy of automobiles and reduce air emissions in Iowa and elsewhere over the lifetime of the vehicles produced with aluminum sheet produced at DPW.

Section 6

IDNR Construction Application Forms

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

Scott

DNR USE ONLY	CP-AP
	Project No: 11-322
	Plant No: 82-01-002
	Doc Date:

FI

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

AIR CONSTRUCTION PERMIT APPLICATION

Form FI: Facility Information -- Please see instructions on reverse side

ALL INFORMATION IS REQUIRED FOR PROCESSING – IF INFORMATION IS MISSING PERMIT WILL NOT BE ISSUED

FACILITY INFORMATION

1) Company Name	Alcoa, Inc.	1a) Facility Plant Number	92-0132
2) Facility Name (if different than #1)	Alcoa Davenport Works		
3) Facility Permit Contact Person/Title	John Mitchell, Environmental Specialist	☒ Mr. ☐ Mrs. ☐ Ms. ☐ Dr.	
4) Telephone Number and Email Address	(563) 459-2411 john.mitchell@alcoa.com		
5) Facility Modeling Contact Person	John Mitchell	☒ Mr. ☐ Mrs. ☐ Ms. ☐ Dr.	
6) Telephone Number and Email Address	(563) 459-2411 john.mitchell@alcoa.com		
7) Name and Address Permit should be sent to	John Mitchell, PO Box 3567		
8) City/State/Zip	Bettendorf, IA 52722		
9) Equipment Location Address (if different than #7)	4879 State St.		
10) City/State/Zip	Riverdale, IA 52722		
10a) Facility County	Scott		
11) Is the Equipment Portable?	☐ Yes ☒ No	12) Do you want Draft Permits?	☒ Yes ☐ No
13) SIC Code and NAICS Code	SIC: 3353, 3355	NAICS:	
14) Provide Brief Business Description and Principal Product	Aluminum sheet, plate, & foil; Aluminum rolling & drawing NEC		
15) Identify any adjacent or contiguous facility that this company owns and/or operates	NA		

PERMIT PREPARER

THIS SECTION IS REQUIRED IF APPLICATION WAS PREPARED BY SOMEONE OTHER THAN A COMPANY EMPLOYEE

16) Name	Stanley Consultants, Inc./ Lain Pacini	☒ Mr. ☐ Mrs. ☐ Ms. ☐ Dr.
17) Address	2658 Crosspark Rd., Suite 100	
18) City/State/Zip Code	Coralville, IA 52241	
19) Phone Number and Email Address	(319) 626-3990 pacinilain@stanleygroup.com	
20) Iowa P.E. Number (IAC 567 22.1(3)"b")	16745, Tyler Marshall	
21) SIGNATURE	Tyler Marshall	

CERTIFICATION

I CERTIFY THAT BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE ENCLOSED DOCUMENTS INCLUDING THE ATTACHMENTS ARE TRUE, ACCURATE, AND COMPLETE. LEGAL ENTITLEMENT TO INSTALL AND OPERATE THE EQUIPMENT COVERED BY AND ON THE PROPERTY IDENTIFIED IN THE PERMIT APPLICATION HAS BEEN OBTAINED.

22) Responsible Official's Name/Title	Malcolm Murphy – V.P. and General Manager	☒ Mr. ☐ Mrs. ☐ Ms. ☐ Dr.
23) RESPONSIBLE OFFICIAL SIGNATURE		
24) Date	8-19-2011	

APPLICATION FORMS ATTACHED

25. ☒ EU (Number of forms: 17), ☒ CE (#: 5), ☒ EP (#: 14), ☒ EC(#:14), ☒ EI, ☒ Plot Plan, ☐ MI2, ☒ FRA, ☒ MD, ☒ GHG

Other Forms and Attachments (e.g. dispersion modeling analysis) **Modeling Report under a separate cover and EC-04A**

RECEIVED
AUG 22 2011
IDNR AIR QUALITY

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

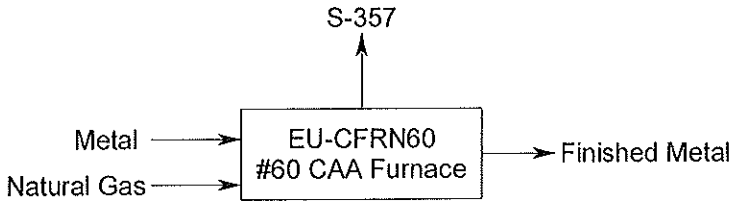
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	#60 Controlled Atmosphere Annealing (CAA) Furnaces		
2) EU ID Number:	CFRN60	EP ID Number:	S-357
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:			
5) Model:	Fabricated On-site		
6a) Maximum Nameplate Capacity:	12 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual Natural Gas Capacity Factor of 0.6 or 61.84 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-357

2) Stack Opening size: ☒ circular, diameter (inches) 30.0 ☐ other size (inches x inches) _____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)

- ☒ Vertical (without rain cap or obstruction)
- ☐ VR (Vertical with rain cap or obstruction)
- ☐ D (Downward discharge; for example, a goose neck stack)
- ☐ H (Horizontal discharge)
- ☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 17.5%

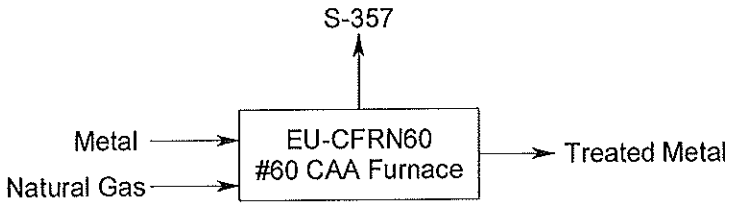
8) Exit Temperature (Fahrenheit): 520 °F

9) Rated Flow Rate: ☐ ACFM: _____ ☒ SCFM: 7,400

10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
S-357

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 60% annual capacity factor limit on fuel usage. PM, SOx, and GHG emission factors are AP-42 for NG combustion.

PM: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
PM_{10}: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
$PM_{2.5}$: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
NOx: (12 MMBtu/hr)*(0.096 lbs/MMBtu) = 1.15 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3.03 tons/yr
SOx: (12 MMBtu/hr)*(0.000588 lbs/MMBtu) = 0.007 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.02 tons/yr
CO: (12 MMBtu/hr)*(0.015 lbs/MMBtu) = 0.18 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.47 tons/yr
VOC_{comb}: (12 MMBtu/hr)*(0.00539 lbs/MMBtu) = 0.065 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60%= 0.17 tons/yr
VOC_{oil}: (222,000 lbs/day)*(365 days/yr)/(0.1 lbs/in^3)/(0.035 in thick)/(144 in^2/ft^2)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)/(2000lbs/ton)*(2 sides) = 3.54 tons/yr = 0.81 lbs/hr

CO_2: (12 MMBtu/hr)*(117.647 lbs/MMBtu) = 1411.76 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3710.12 tons/yr
CH_4: (12 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.027 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr
N_2O: (12 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.026 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr

CO_2e: (3710.12 tons CO_2)+((0.07 tons/yr CH_4)*21)+((0.07 tons/yr N_2O)*310) = 3733.29 tons/yr

Hexane: (12 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.021 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.06 tons/yr
Formaldehyde: (12 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 8.82 E-4 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.002 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu:	0.0075	0.0075	0.0075	0.0006	0.1	0.0054	0.015	118.36		0.0018	0.0018
lbs/hr	0.089	0.089	0.089	0.007	1.15	0.88	0.18	1420.39		0.013	0.014
tons/year	0.23	0.23	0.23	0.02	3.03	3.71	0.47	3733.29		0.06	0.062

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

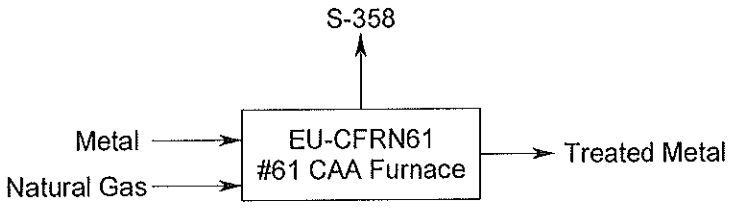
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	#61 Controlled Atmosphere Annealing (CAA) Furnaces		
2) EU ID Number:	CFRN61	EP ID Number:	S-358
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:			
5) Model:	Fabricated On-Site		
6a) Maximum Nameplate Capacity:	12 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual Natural Gas Capacity Factor of 0.6 or 61.84 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

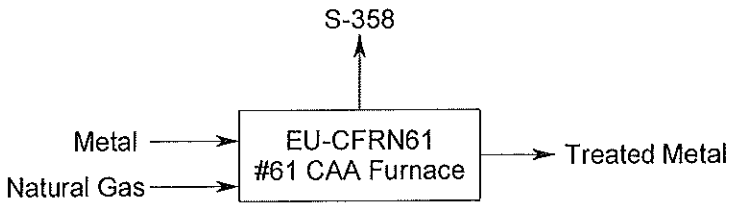
Company Name Alcoa, Inc.	
1) EP Number ID: S-358	
2) Stack Opening size: ☒ circular, diameter (inches) 30.0 ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): See modeling report submitted under separate cover	
4) Height from highest building level (feet): at least 15	
5) Distance from the nearest property line (feet): See modeling report submitted under separate cover	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 17.5%	8) Exit Temperature (Fahrenheit): 520 °F
9) Rated Flow Rate: ☐ ACFM: _____	☒ SCFM: 7,400
10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



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AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-358

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 60% annual capacity factor limit on fuel usage. PM, SOx, and GHG emission factors are AP-42 for NG combustion.

PM: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
PM_{10}: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
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SOx: (12 MMBtu/hr)*(0.000588 lbs/MMBtu) = 0.007 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.02 tons/yr
CO: (12 MMBtu/hr)*(0.015 lbs/MMBtu) = 0.18 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.47 tons/yr
VOC_{comb}: (12 MMBtu/hr)*(0.00539 lbs/MMBtu) = 0.065 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60%= 0.17 tons/yr
VOC_{oil}: (222,000 lbs/day)*(365 days/yr)/(0.1 lbs/in^3)/(0.035 in thick)/(144 in^2/ft^2)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)/(2000lbs/ton)*(2 sides) = 3.54 tons/yr = 0.81 lbs/hr

CO_2: (12 MMBtu/hr)*(117.647 lbs/MMBtu) = 1411.76 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3710.12 tons/yr
CH_4: (12 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.027 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr
N_2O: (12 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.026 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr

CO_2e: (3710.12 tons CO_2)+((0.07 tons/yr CH_4)*21)+((0.07 tons/yr N_2O)*310) = 3733.29 tons/yr

Hexane: (12 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.021 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.06 tons/yr
Formaldehyde: (12 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 8.82 E-4 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.002 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu	0.0075	0.0075	0.0075	0.0006	0.1	0.0054	0.015	118.36		0.0018	0.0018
lbs/hr	0.089	0.089	0.089	0.007	1.15	0.88	0.18	1420.39		0.013	0.014
tons/year	0.23	0.23	0.23	0.02	3.03	3.71	0.47	3733.29		0.06	0.062

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

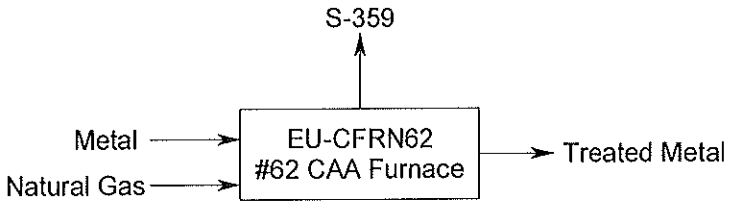
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	# 62 Controlled Atmosphere Annealing (CAA) Furnaces		
2) EU ID Number:	CFRN62	EP ID Number:	S-359
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:			
5) Model:	Fabricated On-Site		
6a) Maximum Nameplate Capacity:	12 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual Natural Gas Capacity Factor of 0.6 or 61.84 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-359

2) Stack Opening size: ☒ circular, diameter (inches) 30.0 ☐ other size (inches x inches) _____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 17.5%

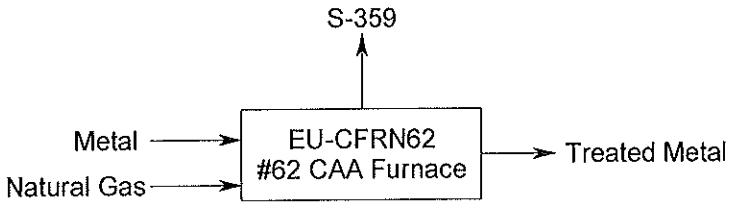
8) Exit Temperature (Fahrenheit): 520 °F

9) Rated Flow Rate: ☐ ACFM: _____ ☒ SCFM: 7,400

10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



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AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
S-359

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 60% annual capacity factor limit on fuel usage. PM, SOx, and GHG emission factors are AP-42 for NG combustion.

PM: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
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EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	#63 Controlled Atmosphere Annealing (CAA) Furnace		
2) EU ID Number:	CFRN63	EP ID Number:	S-360
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:			
5) Model:	Fabricated On-Site		
6a) Maximum Nameplate Capacity:	12 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
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☐ Production Limits:			
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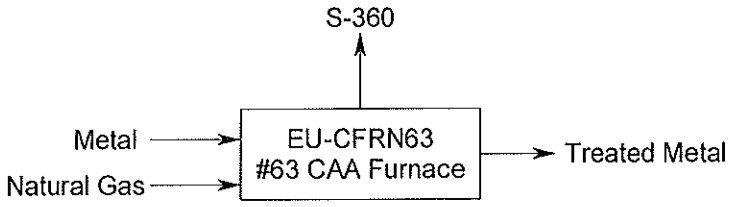

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EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-360

2) Stack Opening size: ☒ circular, diameter (inches) 30.0 ☐ other size (inches x inches) _____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)

- ☒ Vertical (without rain cap or obstruction)
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- ☐ H (Horizontal discharge)
- ☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 17.5%

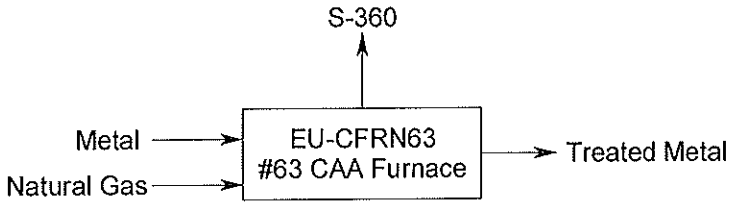
8) Exit Temperature (Fahrenheit): 520 °F

9) Rated Flow Rate: ☐ ACFM: _____ ☒ SCFM: 7,400

10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



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AIR QUALITY BUREAU
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Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-360

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

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CO: (12 MMBtu/hr)*(0.015 lbs/MMBtu) = 0.18 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.47 tons/yr
VOC_{comb}: (12 MMBtu/hr)*(0.00539 lbs/MMBtu) = 0.065 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60%= 0.17 tons/yr
VOC_{oil}: (222,000 lbs/day)*(365 days/yr)/(0.1 lbs/in^3)/(0.035 in thick)/(144 in^2/ft^2)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)/(2000lbs/ton)*(2 sides) = 3.54 tons/yr = 0.81 lbs/hr

CO_2: (12 MMBtu/hr)*(117.647 lbs/MMBtu) = 1411.76 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3710.12 tons/yr
CH_4: (12 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.027 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr
N_2O: (12 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.026 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr

CO_2e: (3710.12 tons CO_2)+((0.07 tons/yr CH_4)*21)+((0.07 tons/yr N_2O)*310) = 3733.29 tons/yr

Hexane: (12 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.021 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.06 tons/yr
Formaldehyde: (12 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 8.82 E-4 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.002 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu:	0.0075	0.0075	0.0075	0.0006	0.1	0.0054	0.015	118.36		0.0018	0.0018
lbs/hr	0.089	0.089	0.089	0.007	1.15	0.88	0.18	1420.39		0.013	0.014
tons/year	0.23	0.23	0.23	0.02	3.03	3.71	0.47	3733.29		0.06	0.062

EU

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

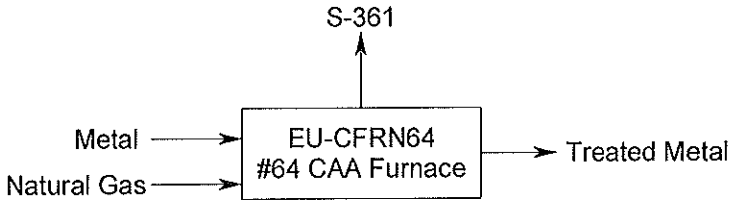
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	#64 Controlled Atmosphere Annealing (CAA) Furnace		
2) EU ID Number:	CFRN64	EP ID Number:	S-361
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:			
5) Model:	Fabricated On-Site		
6a) Maximum Nameplate Capacity:	12 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual Natural Gas Capacity Factor of 0.6 or 61.84 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-361

2) Stack Opening size: ☒ circular, diameter (inches) 30.0 ☐ other size (inches x inches) _____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)

- ☒ Vertical (without rain cap or obstruction)
- ☐ VR (Vertical with rain cap or obstruction)
- ☐ D (Downward discharge; for example, a goose neck stack)
- ☐ H (Horizontal discharge)
- ☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 17.5%

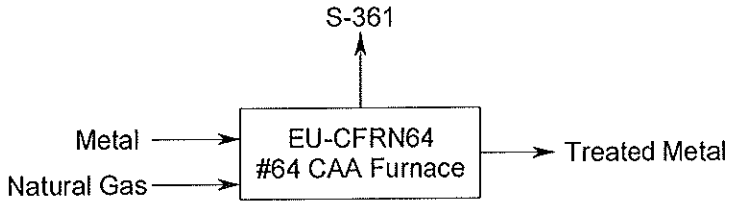
8) Exit Temperature (Fahrenheit): 520 °F

9) Rated Flow Rate: ☐ ACFM: _____ ☒ SCFM: 7,400

10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



Note: Combustion products are emitted out the stack.
Fugitive VOC emissions resulting from oil evaporation from the coils are emitted into the room.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
S-361

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 60% annual capacity factor limit on fuel usage. PM, SOx, and GHG emission factors are AP-42 for NG combustion.

PM: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
PM_{10}: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
$PM_{2.5}$: (12 MMBtu/hr)*(0.007451 lbs/MMBtu) = 0.089 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.23 tons/yr
NOx: (12 MMBtu/hr)*(0.096 lbs/MMBtu) = 1.15 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3.03 tons/yr
SOx: (12 MMBtu/hr)*(0.000588 lbs/MMBtu) = 0.007 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.02 tons/yr
CO: (12 MMBtu/hr)*(0.015 lbs/MMBtu) = 0.18 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.47 tons/yr
VOC_{comb}: (12 MMBtu/hr)*(0.00539 lbs/MMBtu) = 0.065 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60%= 0.17 tons/yr
VOC_{oil}: (222,000 lbs/day)*(365 days/yr)/(0.1 lbs/in^3)/(0.035 in thick)/(144 in^2/ft^2)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)/(2000lbs/ton)*(2 sides) = 3.54 tons/yr = 0.81 lbs/hr

CO_2: (12 MMBtu/hr)*(117.647 lbs/MMBtu) = 1411.76 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 3710.12 tons/yr
CH_4: (12 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.027 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr
N_2O: (12 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.026 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.07 tons/yr

CO_2e: (3710.12 tons CO_2)+((0.07 tons/yr CH_4)*21)+((0.07 tons/yr N_2O)*310) = 3733.29 tons/yr

Hexane: (12 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.021 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.06 tons/yr
Formaldehyde: (12 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 8.82 E-4 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 60% = 0.002 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu:	0.0075	0.0075	0.0075	0.0006	0.1	0.0054	0.015	118.36		0.0018	0.0018
lbs/hr	0.089	0.089	0.089	0.007	1.15	0.88	0.18	1420.39		0.013	0.014
tons/year	0.23	0.23	0.23	0.02	3.03	3.71	0.47	3733.29		0.06	0.062

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

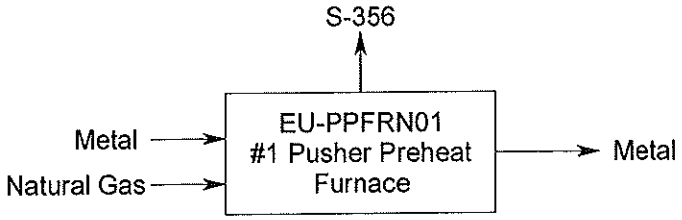
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	#1 Pusher Preheat Furnace		
2) EU ID Number:	PPFRN01	EP ID Number:	S-356
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:	Ebner		
5) Model:	HICON Pusher Preheat		
6a) Maximum Nameplate Capacity:	60 MMBtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	1,000,000 lbs (Fully Loaded)		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☒ No ☐ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual natural gas capacity factor of 0.42 or 216 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-356

2) Stack Opening size: ☒ circular, diameter (inches) 63.0 ☐ other size (inches x inches) _____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)	
	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 15.5%

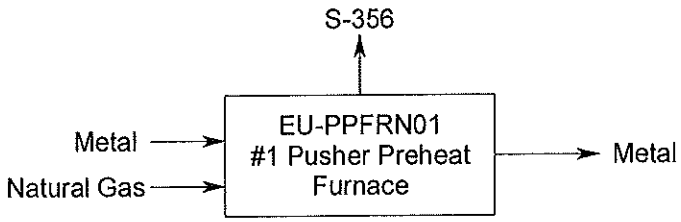
8) Exit Temperature (Fahrenheit): 482 °F

9) Rated Flow Rate: ☐ ACFM: _____ ☒ SCFM: 13,500

10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
S-356

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 77% annual capacity factor limit on fuel usage. SOx and GHG emission factors are AP-42 for NG combustion.

PM: (60 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.46 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.84 tons/yr
PM_{10}: (60 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.46 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.84 tons/yr
$PM_{2.5}$: (60 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.46 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.84 tons/yr
NOx: (60 MMBtu/hr)*(0.08 lbs/MMBtu) = 4.80 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 8.83 tons/yr
SOx: (60 MMBtu/hr)*(0.000588 lbs/MMBtu) = 0.035 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs *42%= 0.064 tons/yr
CO: (60 MMBtu/hr)*(0.068 lbs/MMBtu) = 4.08 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 42% = 7.51 tons/yr
VOC: (60 MMBtu/hr)*(0.004 lbs/MMBtu) = 0.24 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.44 tons/yr

CO_2: (60 MMBtu/hr)*(117.647 lbs/MMBtu) = 7058.82 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 12,985.4 tons/yr
CH_4: (60 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.135 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.248 tons/yr
N_2O: (60 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.129 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs * 42%= 0.237 tons/yr

CO_2e: (12,985.4 tons CO_2)+((0.25 tons/yr CH_4)*21)+((0.24 tons/yr N_2O)*310) = 13,064 tons/yr

Hexane: (60 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu)= 0.106 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.19 tons/yr
Formaldehyde: (60 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.004 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 42% = 0.007 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu:	0.0076	0.0076	0.0076	0.0006	0.08	0.004	0.068	118.36		0.0018	0.0018
lbs/hr	0.46	0.46	0.46	0.035	4.8	0.24	4.08	7101.65		0.106	0.11
tons/year	0.84	0.84	0.84	0.064	8.83	0.44	7.51	13,064		0.19	0.197

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

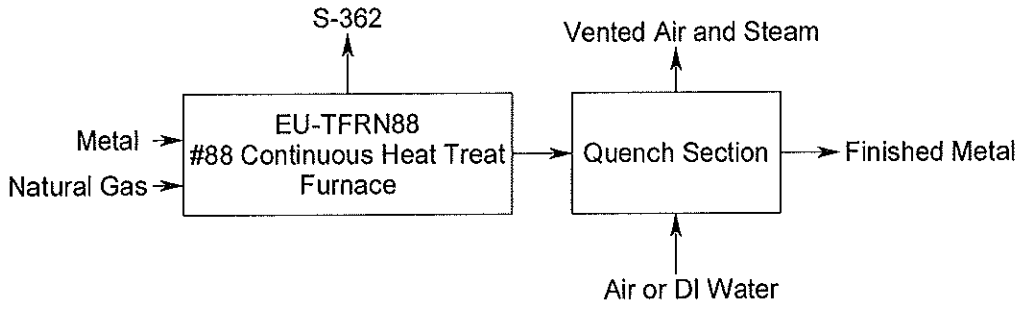
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	88" Continuous Heat Treat Line		
2) EU ID Number:	TFRN88	EP ID Number:	S-362
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:	Ebner		
5) Model:	Floater Furnace		
6a) Maximum Nameplate Capacity:	20.4 MMbtu/hr		
6b) Maximum Process Design Capacity (if different than 6a)	300 ft/min		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	Annual Natural Gas Capacity Factor of 0.45 or 78.84 MMCF/yr		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	Gas usage limit needed for project to remain minor for NO_x		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

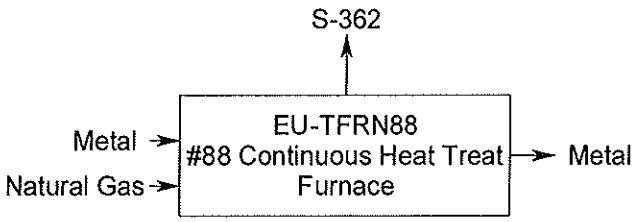
Company Name Alcoa, Inc.	
1) EP Number ID: S-362	
2) Stack Opening size: ☒ circular, diameter (inches) 30 ☐ other size (inches x inches) ____ ☐ Dual Stack	
3) Height from ground (feet): See modeling report submitted under separate cover	
4) Height from highest building level (feet): at least 15	
5) Distance from the nearest property line (feet): See modeling report submitted under separate cover	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 15.5	8) Exit Temperature (Fahrenheit): 482 °F
9) Rated Flow Rate: ☐ ACFM: ____	☒ SCFM: 4,375
10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: ____	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
S-362

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42) ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor

Calculations: 60% annual capacity factor limit on fuel usage. SOx and GHG emission factors are AP-42 for NG combustion.

PM: (20.4 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.155 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.306 tons/yr
PM_{10}: (20.4 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.155 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.306 tons/yr
$PM_{2.5}$: (20.4 MMBtu/hr)*(0.0076 lbs/MMBtu) = 0.155 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.306 tons/yr
NOx: (20.4 MMBtu/hr)*(0.07 lbs/MMBtu) = 1.43 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 2.82 tons/yr
SOx: (20.4 MMBtu/hr)*(0.000588 lbs/MMBtu) = 0.012 lbs/hr * 8760 hrs/yr * 1 ton/200 lbs * 45% = 0.024 tons/yr
CO: (20.4 MMBtu/hr)*(0.08 lbs/MMBtu) = 1.63 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 3.21 tons/yr
VOC_{comb}: (20.4 MMBtu/hr)*(0.004 lbs/MMBtu) = 0.082 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.162 tons/yr
VOC_{oil}: (300 ft/min)*(60 min/hr)*(90 in/side)/(12 in/ft)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)*(2 sides) = 5.95 lbs/hr = 26.05 ton/yr

CO_2: (20.4 MMBtu/hr)*(117.647 lbs/MMBtu) = 2400.0 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 4730.4 tons/yr
CH_4: (20.4 MMBtu/hr)*(0.00225 lbs/MMBtu) = 0.046 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.091 tons/yr
N_2O: (20.4 MMBtu/hr)*(0.00216 lbs/MMBtu) = 0.044 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs * 45% = 0.087 tons/yr

CO_2e: (4730.4 tons CO_2)+((0.091 tons/yr CH_4)*21)+((0.087 tons/yr N_2O)*310) = 4759.3 tons/yr

Hexane: (20.4 MMBtu/hr)*(1.8 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.036lbs/hr * 8760 hrs/yr * 45% = 0.071 tons/yr
Formaldehyde: (20.4 MMBtu/hr)*(0.075 lbs/MMCF)*(1 MMCF/1020 MMBtu) = 0.0015 lbs/hr *8760 hrs/yr * 1 ton/2000 lbs* 45% = 0.003 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, lbs/MMBtu:	0.0076	0.0076	0.0076	0.0006	0.07	0.004	0.08	118.36		0.0018	0.0018
lbs/hr	0.155	0.155	0.155	0.012	1.43	6.03	1.63	2414.6		0.036	0.036
tons/year	0.306	0.306	0.306	0.024	2.82	26.21	3.21	4759.3		0.071	0.074

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EU: Emission Unit Information

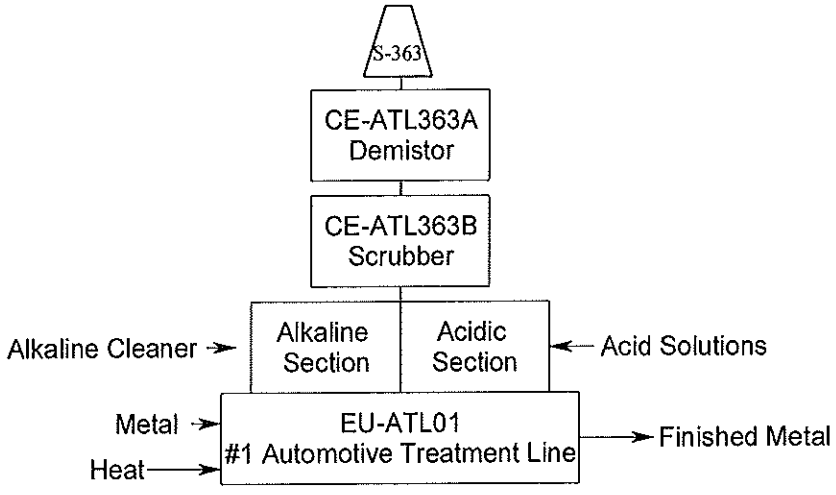
Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**#1 Automotive Treatment Line**		
2) **EU ID Number:**	**ATL01**	**EP ID Number:**	**S-363**
3) **EU Type:** ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) **Manufacturer:**	**Andritz**		
5) **Model:**	Fabricated on-site		
6a) **Maximum Nameplate Capacity:**	**300 ft per min**		
6b) **Maximum Process Design Capacity** (if different than 6a)			
7) **Date of Construction:**	**1st Quarter 2012**		
8) **Date of Modification (if applicable)**	**NA**		
9) **Is this a Controlled Emission Unit?** ☐ No ☒ Yes	If Yes, Control Equipment name/ID are: **CE-ATL363A & CE-ATL363B**		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**8760 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☒ No ☐ Yes **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☐ **Material Usage Limits**			
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☐ **Other:**			
Rationale for Requesting the Limit(s):			

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.

Metal chemical cleaning system using alkaline and acidic solutions.



EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) EP Number ID: S-363

2) Stack Opening size: ☒ circular, diameter (inches) 30 ☐ other size (inches x inches) ____ ☐ Dual Stack

3) Height from ground (feet): See modeling report submitted under separate cover

4) Height from highest building level (feet): at least 15

5) Distance from the nearest property line (feet): See modeling report submitted under separate cover

6) Discharge Style (check one)

- ☒ Vertical (without rain cap or obstruction)
- ☐ VR (Vertical with rain cap or obstruction)
- ☐ D (Downward discharge; for example, a goose neck stack)
- ☐ H (Horizontal discharge)
- ☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 95%-100%

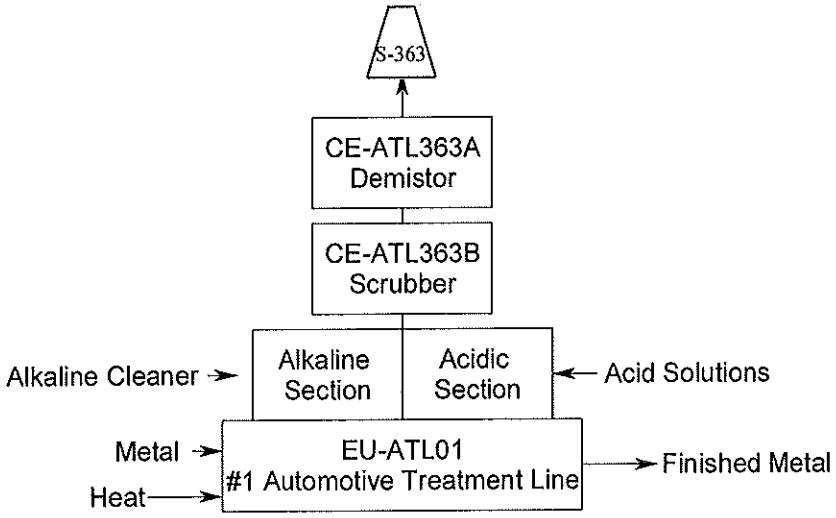
8) Exit Temperature (Fahrenheit): 125 °F

9) Rated Flow Rate: ☐ ACFM: ____ ☒ SCFM: 7,500

10) Does this emission point have control equipment? ☐ No ☒ Yes; If yes, provide control ID: CE-ATL363A & CE-ATL363B

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE Control Equipment Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) CE Number ID: ATL363A

2) Emission Point(s) ID: S-363

3) Manufacturer: ANDRITZ

4) Model Number: Munters DH2100 Packing

5) Control Equipment Description: De-mistor (High-Efficiency Drop Separator)

6) Date of Construction: 1st Quarter 2012

7) Date of Modification: NA

8) Capture Hood involved: ☐Yes ☒No

9) Capture Hood Efficiency (percentage):

10) Date of Hood Installation:

11) Date of Hood Modification (if any):

12) **Pollutant Controlled**

	PM	PM_{10}	VOC	SO_2	NO_x	CO	Other( )
Control Efficiency	See Below	See Below					

13) If manufacturer's data is not available attach a separate sheet of paper (labeled CE-13A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
Vendor guarantee shows a total PM concentration out of the common stack of 0.01 gr/scf.

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE3 Control Equipment Information for Wet Scrubbers

Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) CE Number ID: ATL363B

2) Emission Point(s) ID: S-363

3) Manufacturer: ANDRITZ

4) Model Number: Fabricated On-Site

5) Type of Scrubber : ☒ Packed Bed ☐ Spray Chamber ☐ Venturi ☐ Other ____

6) Total Liquor Flow Rate (gallons per minute) : 15 gpm addition (180 gpm internal circulation)

7) Recycled Liquor Flow Rate (gallons per minute) : 11 gpm

8) Normal Liquor pH : 4-7

9) Pressure drop across Scrubber (in H_2O): TBD

10) Type of additive used (if any): NA

11) Additive feed rate: NA

12) Date of Construction: 1st Quarter 2012

13) Date of Modification: NA

14) Capture Hood involved: ☐Yes ☒No

15) Capture Hood Efficiency (percentage):

16) Date of Hood Installation:

17) Date of Hood Modification (if any):

18) **Pollutant Controlled**

	PM	PM_{10}	VOC	Other( )
Control Efficiency	See Below	See Below		

19) If manufacturer's data is not available attach a separate sheet of paper (labeled CE3-19A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
Vendor guarantee shows a total PM concentration out of the common stack of 0.01 gr/scf.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-363

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor and Engineering Est.

Calculations:

Automotive Treatment Process is made up of three steps:

1. Alkaline Surfactant Treatment

2. Acid De-Ox Process (Nitric Acid and/or Sulfuric Acid)

3. Proprietary Surface Treatment (R951-Acid Solution)

One common system exhaust will be used for all three steps. The vendor has supplied the expected PM concentration exiting the common stack of 0.01 gr/scf.

$PM/PM_{10}/PM_{2.5}$: 0.01 gr/scf x 7,500 scf/min x 1 lb/7,000 gr x 60 min/hr = 0.64 lbs/hr x 8760 hr/yr x 1 ton/2,000 lbs = 2.82 Tons/yr

VOC_{oil}: (300 ft/min)*(60 min/hr)*(88 in/side)/(12 in/ft)*(10 mg/ft^2)/(1000 mg/g)/(454 g/lb)*(2 sides) = 5.81 lbs/hr = 25.47 ton/yr

See attached MSDS for information on chemicals used.

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, gr/cf:	0.01	0.01	0.01								
lbs/hr	0.64	0.64	0.64			5.81					
tons/year	2.82	2.82	2.82			25.47					

MATERIAL SAFETY DATA SHEET

Alkaline cleaner

1. Product and Company Identification

Material Name	**ALCOA 685 SOLUTION**
MSDS Number	630
Chemical Formula	Mixture
Product use	Aqueous alkaline cleaning solutions
Manufacturer information	Alcoa Inc. 201 Isabella Street Pittsburgh, PA 15212-5858 US accmsds@alcoa.com Health and Safety: +1-412-553-4649 Alcoa Inc. Alcoa Warrick Operations P.O. Box 10 Newburgh, IN 47629-0010 +1-812-853-6111
Emergency Information	USA: Chemtrec: +1-703-527-3887 +1-800-424-9300 ALCOA: +1-412-553-4001
Website	For a current Material Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or Internally at my.alcoa.com EHS Community

2. Hazards Identification

Emergency overview

Liquid. Clear. Mild odor. Non-combustible.

Direct contact: Can cause severe irritation, corrosive burns and permanent injury of the eyes. Can cause severe irritation of the skin.
Mists: Can cause severe irritation of the upper respiratory tract.

Potential health effects

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

Eyes	Direct contact: Can cause severe irritation, corrosive burns and permanent injury.
Skin	Direct contact: Can cause severe irritation.
Inhalation	Mists: Can cause severe irritation of the upper respiratory tract.
Ingestion	Can cause severe irritation.
Medical conditions aggravated by exposure to product	Asthma, chronic lung disease, and skin rashes.

3. Composition / Information on Ingredients

Composition comments Complete composition is provided below and may include some components classified as non-hazardous.

Components	CAS #	Percent
Water	7732-18-5	>88
Sodium carbonate	497-19-8	<10
Sodium gluconate	527-07-1	<1
Ethoxylated surfactant	Proprietary	<0.75

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes. Get emergency medical care. Call 911 if available in your area.
Skin contact	Immediately remove all contaminated clothing. Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Consult a physician.
Ingestion	If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.

5. Fire Fighting Measures

Flammable/Combustible Properties	Non-combustible.
Extinguishing media	
Suitable extinguishing media	Use fire fighting methods and materials that are appropriate for surrounding fire.
Protection of firefighters	
Protective equipment for firefighters	Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

6. Accidental Release Measures

Spill or leak procedure	Small Spills: Absorb with absorbent material. Neutralize spill with a weak acid such as vinegar or acetic acid. Spills may be slippery and potentially hazardous to personnel or mobile equipment due to reduced traction. Large Spills: Notify spill coordinator. Dike and transfer spill to container for reuse and reprocessing.

7. Handling and Storage

Handling	Avoid contact with skin and eyes. Use with adequate ventilation. Avoid generating mists. Spills may be slippery and potentially hazardous to personnel or mobile equipment due to reduced traction.
Storage	Keep containers closed when not in use. Store in plastic, glass or epoxy coated steel containers. Do not store in metal containers (aluminum, magnesium, tin or zinc).

8. Exposure Controls / Personal Protection

Engineering controls	Use with adequate ventilation.
Personal protective equipment	
Eye / face protection	Wear safety goggles or face shield to avoid direct eye contact.
Skin protection	Wear impervious gloves/apron to prevent any skin contact. Launder contaminated clothing before reuse.
Respiratory protection	Use respiratory protection as specified by an Industrial Hygienist or other qualified professional. Suggested respiratory protection: N95.

9. Physical & Chemical Properties

Form	Liquid.
Appearance	Clear.
Boiling point	< 225 °F (< 107.2 °C)
Freezing point	Not determined
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable

Vapor pressure	Not determined
Vapor density	Not determined
Solubility (water)	Soluble
Specific gravity	1.03
pH	10 - 11.5
Odor	Mild odor.
Partition coefficient (n-octanol/water)	Not applicable

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal conditions of use, storage, and transportation.
Conditions to avoid	Incompatible with acids.
Incompatible materials	Contact with strong acids can generate carbon dioxide and heat.
Hazardous decomposition products	No hazardous decomposition products are known.
Hazardous polymerization	Will not occur.

11. Toxicological Information

Health effects associated with ingredients

Sodium carbonate: Can cause irritation of eyes, skin and upper respiratory tract. Acute overexposures (high concentrations): Can cause severe irritation and corrosive burns of eyes and skin. Ingestion (large quantities): Can cause vomiting, diarrhea, abdominal pain and cardiovascular collapse.

Surfactant: Can cause severe irritation of eyes. Can cause irritation of skin and upper respiratory tract. Skin contact (prolonged or repeated): Can cause severe irritation and dermatitis. Ingestion: Can cause irritation, nausea, vomiting and diarrhea.

Health effects associated with compounds formed during processing

No new/additional compounds are expected to be formed during processing.

Component analysis - LD50 No data available for this product.

Components

Toxicology Data - Selected LD50s and LC50s

Ethoxylated surfactant (Proprietary)	Oral LD50 Rat 4190 mg/kg
Sodium carbonate (497-19-8)	Oral LD50 Rat 4090 mg/kg; Dermal LD50 Mouse 2210 mg/kg
Water (7732-18-5)	Oral LD50 Rat >90 mL/kg

Carcinogenicity No data available for this product.
None of this product's components are listed by ACGIH, IARC or NTP.

12. Ecological Information

Ecotoxicity

Components

Ecotoxicity - Freshwater Algae - Acute Toxicity Data

Sodium carbonate (497-19-8)	120 Hr EC50 Nitzschia: 242 mg/L

Ecotoxicity - Freshwater Fish - Acute Toxicity Data

Sodium carbonate (497-19-8)	96 Hr LC50 Lepomis macrochirus: 300 mg/L [static]; 96 Hr LC50 Pimephales promelas: <310-1220 mg/L [static]

Ecotoxicity - Water Flea - Acute Toxicity Data

Sodium carbonate (497-19-8)	48 Hr EC50 Daphnia magna: 265 mg/L

Environmental Fate No data available for product.

13. Disposal Considerations

Disposal instructions Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Waste codes	RCRA Status: Not federally regulated in the U.S. if disposed of "as is." RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S.

14. Transport Information

General Shipping Information

Basic shipping description:

UN number	-
Proper shipping name	Not regulated
Hazard class	-
Packing group	-

General Shipping Notes

- When "Not regulated", enter the proper freight classification, MSDS Number and Product Name onto the shipping paperwork.

15. Regulatory Information

US federal regulations In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

MSDS History	Origination date: January 30, 1991 Supersedes: March 5, 2009 Revision date: July 12, 2010
MSDS Status	July 12, 2010: Change(s) in Section: 11. March 5, 2009: New format. May 25, 2005: Reviewed on a periodic basis in accordance with Alcoa policy. Change(s) in Section: 2, 3, 4, 13 and 15 March 28, 2002: New format.
Prepared By	Hazardous Materials Control Committee Preparer: Jon N. Peace, 412-553-2293/Robert W. Barr, 412-553-2618/Jim Perriello, 480-278-6928
MSDS System Number	145297

Other information

- Guide to Occupational Exposure Values 2010, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, September 2005.
- expub, Expert Publishing, LLC., www.expub.com

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan - Existing and New Chemical Substances
EWC	European Waste Catalogue
EPA	Environmental Protective Agency
IARC	International Agency for Research on Cancer
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of MSDS ***

ALCOA 685 SOLUTION

DANGER

Non-combustible.

Direct contact: Can cause severe irritation, corrosive burns and permanent injury of the eyes. Can cause severe irritation of the skin.

Mists: Can cause severe irritation of the upper respiratory tract.

FIRST AID

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes. Get emergency medical care. Call 911 if available in your area.
Skin contact	Immediately remove all contaminated clothing. Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Consult a physician.
Ingestion	If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.

See Alcoa Material Safety Data Sheet No. 630 for more information about use and disposal.
Emergency Phone: (412) 553-4001.

FIRE FIGHTING

Suitable extinguishing media	Use fire fighting methods and materials that are appropriate for surrounding fire.

SPILL PROCEDURES

Spill or leak procedure	Small Spills: Absorb with absorbent material. Neutralize spill with a weak acid such as vinegar or acetic acid. Spills may be slippery and potentially hazardous to personnel or mobile equipment due to reduced traction. Large Spills: Notify spill coordinator. Dike and transfer spill to container for reuse and reprocessing.

HANDLING AND STORAGE

Handling	Avoid contact with skin and eyes. Use with adequate ventilation. Avoid generating mists. Spills may be slippery and potentially hazardous to personnel or mobile equipment due to reduced traction.
Storage	Keep containers closed when not in use. Store in plastic, glass or epoxy coated steel containers. Do not store in metal containers (aluminum, magnesium, tin or zinc).

Contains:

Water	7732-18-5
Sodium carbonate	497-19-8
Sodium gluconate	527-07-1
Ethoxylated surfactant	Proprietary

Alcoa Inc.
201 Isabella Street, Pittsburgh PA 15212-5858 United States

ALCOA

MATERIAL SAFETY DATA SHEET

R-951

1. Product and Company Identification

Material Name	**ALCOA 951 PROCESS BATH**
MSDS Number	1380
Chemical Formula	Mixture
Product use	Metal surface treatment
Synonym(s)	Process bath, Rinse water
Manufacturer information	Alcoa Inc. 201 Isabella Street Pittsburgh, PA 15212-5858 US Health and Safety: +1-412-553-4649 Alcoa Inc. Alcoa Technical Center 100 Technical Drive Alcoa Center, PA 15069-0001 +1-724-337-5300
Emergency Information	USA: Chemtrec: +1-703-527-3887 +1-800-424-9300 ALCOA: +1-412-553-4001
Website	For a current Material Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or internally at my.alcoa.com EHS Community

2. Hazards Identification

Emergency overview	Liquid. Colorless to amber. Odorless. Non-combustible. Direct contact: Can cause severe irritation of the eyes and irritation of the skin. Vapors and mists: Can cause irritation of the upper respiratory tract.

Potential health effects

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

Eyes	Direct contact: Can cause severe irritation.
Skin	Direct contact: Can cause irritation.
Inhalation	Vapors and mists: Can cause irritation of the upper respiratory tract.
Ingestion	Can cause irritation.
Carcinogenicity and Reproductive Hazard	Does not present any cancer or reproductive hazards.
Medical conditions aggravated by exposure to product	Asthma, chronic lung disease, and skin rashes.

3. Composition / Information on Ingredients

Composition comments Complete composition is provided below and may include some components classified as non-hazardous.

Components	CAS #	Percent
Water	7732-18-5	Proprietary
Organic acid	Proprietary	Proprietary
Anionic polymer	Proprietary	Proprietary

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes. Consult a physician.

Skin contact	Immediately remove contaminated clothing. Isolate contaminated clothing. Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.
Ingestion	If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.

5. Fire Fighting Measures

Flammable/Combustible Properties	Non-combustible. Irritating and/or toxic gases may be emitted upon the products decomposition. See also section 10
Extinguishing media	
Suitable extinguishing media	Use fire fighting methods and materials that are appropriate for surrounding fire. Use water spray to cool exposed containers.
Protection of firefighters	
Protective equipment for firefighters	Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

6. Accidental Release Measures

Spill or leak procedure	Notify spill coordinator. Avoid contact with skin and eyes. Dike ahead of spill. Do not allow to enter drains, sewers or watercourses. Absorb with inert absorbent such as dry clay, sand, diatomaceous earth or commercial sorbents. Containerize for disposal. Spill may be reportable to the National Response Center.

7. Handling and Storage

Handling	Avoid generating mists or vapors. Avoid contact with skin and eyes. Use with adequate ventilation.
Storage	Store in tightly closed containers in a cool dry area. Store away from incompatible materials (See Section 10).

8. Exposure Controls / Personal Protection

Engineering controls	Use with adequate ventilation to meet the limits listed in Section 8.
Personal protective equipment	
Eye / face protection	Wear safety glasses with side shields (or goggles) and a face shield.
Skin protection	Wear appropriate gloves and clothing to avoid direct skin contact.
Respiratory protection	Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8. Suggested respiratory protection: P95, Acid gas cartridge.

9. Physical & Chemical Properties

Form	Liquid.
Appearance	Colorless to amber.
Boiling point	Not determined
Melting point	Not determined
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Vapor pressure	Not determined
Vapor density	Not determined
Solubility (water)	Soluble
Density	1 g/cm3 (0.036 lb/in3) Approximate
pH	1 (Process bath), 3 (Rinse water) Approximate
Odor	Odorless

Partition coefficient (n-octanol/water)	Not determined

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal conditions of use, storage, and transportation.
Conditions to avoid	Reacts with strong acids and strong alkalis.
Hazardous decomposition products	Carbon monoxide, carbon dioxide, oxides of phosphorus and acids of phosphorus.
Hazardous polymerization	Will not occur.

11. Toxicological Information

Health effects associated with ingredients

Organic acid Can cause severe irritation and burns of eyes and gastrointestinal tract. Can cause irritation of skin and upper respiratory tract.

Health effects associated with compounds formed during processing

No new/additional compounds are expected to be formed during processing.

Component analysis - LD50 No LD50/LC50's are available for this product's components.

Components

Toxicology Data - Selected LD50s and LC50s

Water (7732-18-5)	Oral LD50 Rat >90 mL/kg

Carcinogenicity No information available for product. None of this product's components are listed by ACGIH, IARC or NTP.

12. Ecological Information

General Product Information	May cause significant environmental impact if material reaches waterways. LC50/96h/Fathead minnows =141 mg/L (based upon active polymer) EC50/48h/daphnia =278 mg/L (based upon active polymer)
Environmental Fate	No data available for product.

13. Disposal Considerations

Disposal instructions	Reuse or recycle material whenever possible. If reuse or recycling is not possible, material may be neutralized on site with necessary permits and precautions, or off site by a reputable waste treatment company.
Waste codes	RCRA Status: D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel] Material may not be considered D002 as indicated herein, based on pH results for specific material/concentration in question. RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S.

14. Transport Information

General Shipping Information

Basic shipping description:

UN number	3265
Proper shipping name	Corrosive liquid, acidic, organic, n.o.s.
Hazard class	8
Packing group	III

Additional description & information:

Technical name	ANIONIC POLYMER & ORGANIC ACID
HTS	2916.11.0000

General Shipping Notes

• Material may be considered "Not regulated" instead of Class 8 (i.e.; for rinse waters with PH~3) as indicated herein, based on test results for specific material in question. Contact Alcoa EHS Services for additional classification review for other than what is provided here.

DOT Specific Notes

- Precede proper shipping name with the word "Waste" when required to be shipped using a U.S. EPA hazardous waste manifest. and
- Insert "RQ" reference for D002 for packages containing 100lbs (process bath) or greater.
- Add D002 (when determined to be an U.S. EPA hazardous waste) to Section 13 of the Hazardous Waste Manifest.

15. Regulatory Information

US federal regulations In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

Components

U.S. - TSCA (Toxic Substances Control Act) - Section 12(b) - Export Notification

Anionic polymer (Proprietary)	Section 5, 1 % de minimus concentration

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

MSDS History
Original: February 27, 2006
Revision: June 18, 2010

MSDS Status
June 18, 2010: New format.
February 27, 2006: New MSDS.

Prepared By
Hazardous Materials Control Committee
Preparer: Jon N. Peace, 412-553-2293/Robert W. Barr, 412-553-2618/Jim Perriello, 480-278-6928

MSDS System Number 174278

Other information

- Guide to Occupational Exposure Values 2010, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, September 2005.
- expub, Expert Publishing, LLC., www.expub.com

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan - Existing and New Chemical Substances
EWC	European Waste Catalogue
EPA	Environmental Protective Agency
IARC	International Agency for Research on Cancer
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of MSDS ***

Disclaimer The information in the sheet was written based on the best knowledge and experience currently available.

ALCOA 951 PROCESS BATH

WARNING
Non-combustible.
Direct contact: Can cause severe irritation of the eyes and irritation of the skin.
Vapors and mists: Can cause irritation of the upper respiratory tract.

FIRST AID

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes. Consult a physician.
Skin contact	Immediately remove contaminated clothing. Isolate contaminated clothing. Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.
Ingestion	If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.

See Alcoa Material Safety Data Sheet No. 1380 for more information about use and disposal.
Emergency Phone: (412) 553-4001.

FIRE FIGHTING

Suitable extinguishing media	Use fire fighting methods and materials that are appropriate for surrounding fire. Use water spray to cool exposed containers.

SPILL PROCEDURES

Spill or leak procedure	Notify spill coordinator. Avoid contact with skin and eyes. Dike ahead of spill. Do not allow to enter drains, sewers or watercourses. Absorb with inert absorbent such as dry clay, sand, diatomaceous earth or commercial sorbents. Containerize for disposal. Spill may be reportable to the National Response Center.

HANDLING AND STORAGE

Handling	Avoid generating mists or vapors. Avoid contact with skin and eyes. Use with adequate ventilation.
Storage	Store in tightly closed containers in a cool dry area. Store away from incompatible materials.

Contains:

Water	7732-18-5
Organic acid	Proprietary
Anionic polymer	Proprietary

Alcoa Inc.
201 Isabella Street, Pittsburgh PA 15212-5858 United States

ALCOA

PURITAN PRODUCTS
Custom Formulated and Specialty Chemicals
2290 Avenue A, Bethlehem, PA 18017

Effective Date: ***11/03/2009***

NON-EMERGENCY TELEPHONE
610-866-4225

24-HOUR CHEMTREC EMERGENCY TELEPHONE
800-424-9300

Material Safety Data Sheet

NITRIC ACID 65-70%

1. Product Identification

Synonyms: Aqua Fortis; Azotic Acid
CAS No.: 7697-37-2
Molecular Weight: 63.01
Chemical Formula: HNO3 solution
Product Codes: 2698, 2702, 2704, 2705, 2706, 2710, 2711, 2718, 6623, 6624

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nitric Acid	7697-37-2	65-70%	Yes
Water	7732-18-5	30-35%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:
Corrosive! May cause irritation of the nose, throat, and respiratory tract including coughing and choking. Higher concentrations or prolonged exposure to vapors of nitric acid may lead to pneumonia or pulmonary edema.
Ingestion:
Corrosive. May cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.
Skin Contact:
Corrosive! May cause redness, pain, and severe skin burns.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.
Explosion:
May react explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc.
Fire Extinguishing Media:
Water or water spray.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Increases the flammability of combustible, organic and readily oxidizable materials.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from combustible, organic, or any other readily oxidizable materials. Protect from freezing.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Nitric Acid:
OSHA Permissible Exposure Limit (PEL):
2 ppm (TWA)
ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 ppm (STEL)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). Canister-type respirators using sorbents are ineffective.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear to pale yellow solution.
Odor:
Suffocating, acrid.
Solubility:
Infinitely soluble.
Density:
1.054
pH:

No information found.
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
ca. 101C (ca. 214F)
Melting Point:
ca. -3C (ca. 27F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.
Conditions to Avoid:
Heat and incompatibles.

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11. Toxicological Information

For Nitric Acid: Investigated as a mutagen and reproductive effector.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID (other than red fuming with at least 65 percent, but not more than 70 percent nitric acid)
Hazard Class: 8, 5.1
UN/NA: UN2031
Packing Group: II

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (other than red fuming with at least 65 percent, but not more than 70 percent nitric acid)
Hazard Class: 8, 5.1
UN/NA: UN2031
Packing Group: II

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	-TSCA- 261.33	8(d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0 Other: Oxidizer

Label Hazard Warning:

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor or mist.

Use only with adequate ventilation.

Wash thoroughly after handling.

Store in a tightly closed container.

Remove and wash contaminated clothing promptly.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large

quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases call a physician.

Product Use:

Laboratory Reagent.

Disclaimer:

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO PURITAN PRODUCTS AT THIS TIME. WHILE BELIEVED TO BE ACCURATE, PURITAN PRODUCTS DOES NOT CLAIM IT TO BE ALL INCLUSIVE. IT IS PROVIDED INDEPENDENT OF ANY SALE OF THE PRODUCT, FOR THE PURPOSE OF HAZARD COMMUNICATION, AND AS A GUIDE FOR THE APPROPRIATE PRECAUTIONARY HANDLING OF THE PRODUCT BY PROPERLY TRAINED INDIVIDUALS. IT IS NOT INTENDED TO PROVIDE PRODUCT PERFORMANCE OR APPLICABILITY INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, THE UNDERLYING PRODUCT DATA, OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN MATERIAL SAFETY DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED THEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY OR DAMAGE RESULTING FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

NorFalco Inc.
NorFalco Sales Inc.

Safety Data Sheet
77% - 100% SULFURIC ACID

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Trade Name	**77 % - 100 % Sulfuric Acid**
Product Code	None
Manufacturers/Distributors	NorFalco Inc., 6000 Lombardo Center, The Genesis Blg, Suite 650 Seven Hills, OH 44131 NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2
Information Contact	André Auger, Administration Assistant
Product Information	1-905-542-6901 (Mississauga)
Phone Number (Transportation Emergency)	Canada 1-877-ERP-ACID (377-2243)
Phone Number (Transportation Emergency)	U.S.A. 1-800-424-9300 CHEMTREC
Phone Number (Medical Emergency)	**1-418-656-8090**
Phone Number (Emergency)	**CANUTEC 1-613-996-6666**
Synonyms	Dihydrogen Sulfate ; Oil of Vitriol ; Vitriol Brown Oil ; Sulphuric Acid. Acide sulfurique (French)
Name / Chemical Formula	Sulfuric Acid / H_2SO_4
Chemical Family	Acid
Utilization	Chemical industries ; Water treatment ; Fertilizer ; Pulp and Paper.
Manufacturers	CEZinc on behalf of Noranda Income Limited Partnership, Salaberry-de-Valleyfield (Quebec) Canada J6T 6L4 Xstrata Copper, Horne Smelter, Rouyn-Noranda (Quebec) J9X 5B6 Xstrata Zinc, Brunswick Smelting, Belledune, New Brunswick E0B 1G0 Xstrata Copper, Kidd Metallurgical Division, Timmins, Ontario P4N 7K1 Xstrata Nickel, Sudbury Operations, Falconbridge, Ontario P0M 1S0

SECTION 2. HAZARDS IDENTIFICATION

WHMIS (Canada): CLASS D-1A : Very toxic material causing immediate and serious effects
CLASS E : Corrosive material

Labelling (EEC): C Corrosive

Other hazards: Danger. Extremely corrosive. Causes severe burns and eye damage. Mist : Causes respiratory irritation. Harmful if inhaled. Harmful or fatal if swallowed.

Environmental hazards: Strong acid. Highly toxic to plants and to aquatic organisms.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS No	Percentage (%)	EC No	R Phrases[1]
Sulfuric (Acid)	7664-93-9	77 % to 100 %	231-639-5	R35
60 Deg Technical	7664-93-9	77.7	231-639-5	R35
66 Deg or 93% Technical	7664-93-9	93.2	231-639-5	R35
1.835 Electrolyte	7664-93-9	93.2	231-639-5	R35
98 % Technical	7664-93-9	98	231-639-5	R35
99 % Technical	7664-93-9	99	231-639-5	R35
100 % Technical	7664-93-9	100	231-639-5	R35
Water	7732-18-5	0-22	231-791-2	-

Note 1 : See section 15 for the complete wording of risk phrases.

SECTION 4. FIRST-AID MEASURES

Eye Contact: Remove contact lenses if present. Immediately flush eyes with plenty of water, holding eyelids open for at least 15 minutes. Consult a physician. If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid. Possibility of conjonctivitis, severe irritation, severe burns, permanent eye damage.

Skin Contact: Remove contaminated clothing and shoes as quickly as possible protecting your hands and body. Place under a deluge shower for 15 minutes. Flush exposed skin gently and thoroughly with running water (Pay particular attention to : Folds, crevices, creases, groin). Call a physician if irritation persists. May irritate skin, cause burns (Highly corrosive) and possibility of some scarring.

Wash contaminated clothing before reusing. While the patient is being transported to a medical facility, continue the application of cold, wet compresses. If medical treatment must be delayed, repeat the flushing with tepid water or soak the affected area with tepid water to help remove the last traces of sulfuric acid. *Creams or ointments SHOULD NOT be applied before or during the washing phase of treatment.*

Inhalation: Take precautions to avoid secondary contamination by residual acids. Remove the person to fresh air. If not breathing, give artificial respiration. Difficult breathing : Give oxygen. Get immediate medical attention. Possibility

	of damage to the upper respiratory tract and lung tissues. Maintain observation of the patient for delayed onset of pulmonary oedema. May cause irritation to the upper respiratory tract : Coughing, sore throat, shortness of breath.
Ingestion	DO NOT INDUCE VOMITING. Conscious and alert person : Rinse mouth with water and give ½ to 1 cup of water or milk to dilute material. Spontaneous vomiting : Keep head below hips to prevent aspiration ; Rinse mouth and give ½ to 1 cup of water or milk. UNCONSCIOUS person : DO NOT induce vomiting or give any liquid. Immediately obtain medical attention.

Notes to Physicians
Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

SECTION 5. FIRE-FIGHTING MEASURES

Flash Point	Not available
Flammable Limits	Not available
Auto-Ignition Temperature	Not available
Products of Combustion	Releases of sulfur dioxide at extremely high temperatures.
Fire Hazard	Not flammable
Explosion Hazard	Reacts with most metals, especially when dilute : Hydrogen gas release (Extremely flammable, explosive). Risk of explosion if acid combined with water, organic materials or base solutions in enclosed spaces (Vaccum trucks, tanks). Mixing acids of different strengths/concentrations can also pose an explosive risk in an enclosed space/container.
Extinguishing media	ERG (Emergency Response Guidebook) : Guide 137 When material is not involved in fire, do not use water on material itself. **Small fire :** Dry chemical or CO_2. Move containers from fire area if you can do it without risk. **Large fire:** Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only. **Fire involving Tanks or Car/Trailer Loads :** Cool containers with flooding quantities of water until well after fire is out. Do not get water inside containers. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.
Protective equipment	Evacuate personnel to a safe area. Keep personnel removed and upwind of fire. Generates heat upon addition of water, with possibility of spattering. Wear full protective clothing. Runoff from fire control may cause pollution. Neutralize run-off with lime, soda ash, etc., to prevent corrosion of metals and formation of hydrogen gas. Wear self-contained breathing apparatus if fumes or mists are present.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Measures	Review **Fire and Explosion Hazards** and **Safety Precautions** before proceeding with clean up. Stop flow if possible. Soak up small spills with dry sand, clay or diatomaceous earth.
Methods	Dike large spills, and cautiously dilute and neutralize with lime or soda ash, and transfer to waste water treatment system. Prevent liquid from entering sewers, waterways, or low areas. If this product is spilled and not recovered, or is recovered as a waste for treatment or disposal, the Reportable Quantity (U.S. DOT) is 1 000 lbs (Based on the sulfuric acid content of the solution spilled). Comply with Federal, State, and local regulations on reporting releases.
Protective equipment	Review Fire Fighting Measures and Handling (Personnel Protection) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

SECTION 7. HANDLING AND STORAGE

Handling	DO NOT get in eyes, on skin, or on clothing. Avoid breathing vapours or mist. Wear approved respirators if adequate ventilation cannot be provided. Wash thoroughly after handling. Ingestion or inhalation : Seek medical advice immediately and provide medical personnel with a copy of this SDS. NEVER add water to acid.
Conditions for storage	Sulfuric acid must be stored in containers or tanks that have been specially designed for use with sulfuric acid. DO NOT add water or other products to contents in containers as violent reactions will result with resulting high heat, pressure and/or generation of hazardous acid mists. Keep containers away from heat, sparks, and flame. All closed containers must be safely vented before each opening. For more information on sulfuric acid tanks, truck tanks and tank cars including safe unloading information go to www.norfalco.com.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

		Control parameters	
		ACGIH (U.S.A.) 2009	OSHA (U.S.A.)
Name	CAS #	TLV-TWA (mg/m³)	PEL - TWA (mg/m³)
Sulfuric (Acid)	7664-93-9	0.2 (thoracic fr.)	1
60 Deg Technical	7664-93-9	0.2 (thoracic fr.)	1
66 Deg or 93% Technical	7664-93-9	0.2 (thoracic fr.)	1
1.835 Electrolyte	7664-93-9	0.2 (thoracic fr.)	1
98 % Technical	7664-93-9	0.2 (thoracic fr.)	1
99 % Technical	7664-93-9	0.2 (thoracic fr.)	1
100 % Technical	7664-93-9	0.2 (thoracic fr.)	1
Water	7732-18-5	Not established	Not established

ACGIH : American Conference of Governmental Industrial Hygienists. OSHA : Occupational Safety and Health Administration.

Note : Sulfuric (Acid) : Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours) : 1 mg/m³ ; IDLH : 15 mg/m³.
Consult local authorities for acceptable exposure limits.

Engineering Controls Good general ventilation should be provided to keep vapour and mist concentrations below the exposure limits.

Individual protection Chemical splash goggles ; Full-length face shield/chemical splash goggles combination ; Acid-proof gauntlet gloves, apron, and boots ; Long sleeve wool, acrylic, or polyester clothing ; Acid proof suit and hood ; Appropriate NIOSH respiratory protection.

In case of emergency or where there is a strong possibility of considerable exposure, wear a complete acid suit with hood, boots, and gloves. If acid vapour or mist are present and exposure limits may be exceeded, wear appropriate NIOSH respiratory protection.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance	Liquid (Oily ; Clear to turbid)	**Odour**	Odourless
Molecular Weight	98.08	**Colour**	Colourless to light grey
pH (1% soln/water)	< 1	**Volatility**	< 1 (Butyl Acetate = 1.0)
Boiling Point	193°C to 327 °C (379°F to 621°F) @ 760 mm Hg	**Vapour Density**	3.4
Melting Point	-35°C to 11°C (-31°F to 52°F)	**Dispersion**	Yes (Water)
Vapour Pressure	< 0.3 mm Hg @ 25°C (77 °F) < 0.6 mm Hg @ 38°C (100 °F)	**Solubility**	Yes (Water)

GRADE	Boiling Point		Freezing Point		Specific Gravity
	DEG °C	DEG °F	DEG °C	DEG °F	
60 DEG TECHNICAL	193	380	- 12	10	1.706
66 DEG or 93% TECHNICAL	279	535	- 35	- 31	1.835
1.835 ELECTROLYTE	279	535	- 35	- 31	1.835
98 % TECHNICAL	327	621	- 2	29	1.844
99 % TECHNICAL	310	590	4	40	1.842
100 % TECHNICAL	274	526	11	51	1.839

SECTION 10. STABILITY AND REACTIVITY

Stability Yes (Under normal conditions of ambiant temperature)

Reactivity Reacts violently with water, organic substances and base solutions with evolution of heat and hazardous mists.

Conditions to avoid Sources of ignition, Heat : Possibility of decomposition. Release of toxic gases and vapours (Sulfur oxides SO_2, SO_3)

Polymerization Polymerization will not occur.

Materials to avoid Vigorous reactions with : Water; alkaline solutions ; Metals, metal powder ; Carbides ; Chlorates ; Fulminates ; nitrates ; Picrates ; Strong oxidizing, reducing, or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides, sulfides, and carbides.

Corrosivity Yes

SECTION 11. TOXICOLOGICAL INFORMATION

Routes of Entry Ingestion. Inhalation. Skin and eye contacts.

Carcinogenicity Strong inorganic acid mists containing sulfuric acid (Occupational exposures) : PROVEN (Human, Group 1, IARC) ; SUSPECTED (Human, Group A2, ACGIH) ; Group X (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

Mutagenicity Cytogenic analysis : Ovaries 4 mmol/L (Hamster). (RTECS).

Teratogenicity	Not teratogenic (Mice, rabbits).
Acute toxicity	ORAL (LD50) : 2 140 mg/kg (Rat) ; INHALATION (LC50, 2 hours) : 510 mg/m^3 (Rat) ; 320 mg/m^3 (Mouse). (RTECS).
Acute Effects	May be fatal if inhaled or ingested in large quantity. Liquids or acid mists : May produce tissue damage : Mucous membranes (Eyes, mouth, respiratory tract). Extremely dangerous by eyes and skin contact (Corrosive). Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation (Mists) at high concentrations : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking).
Chronic Effects	Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth. **Acid mists :** Overexposure to strong inorganic mists containing sulfuric acid : Possibility of laryngeal cancer (HSBD, IARC). Possibility of irritation of the nose and throat with sneezing, sore throat or runny nose. Headache, nausea and weakness. Gross overexposure : Possibility of irritation of nose, throat, and lungs with cough, difficulty breathing or shortness of breath. Pulmonary edema with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin. Symptoms may be delayed. Repeated or prolonged exposure to mists may cause : Corrosion of teeth. **Contact (Skin) :** Possibility of corrosion, burns or ulcers. Contact with a 1 % solution : Possibility of slight irritation with itching, redness or swelling. Repeated or prolonged exposure (Mist) : Possibility of irritation with itching, burning, redness, swelling or rash. **Contact (Eye) :** Possibility of corrosion or ulceration (Blindness may result). Repeated or prolonged exposure (Mist) : Possibility of eye irritation with tearing, pain or blurred vision. **Ingestion :** Immediate effects of overexposure : Burns of the mouth, throat, esophagus and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure. Damage may appear days after exposure.
Toxicity	Persons with the following pre-existing conditions warrant particular attention : **Sulfuric (Acid) :** Laryngeal irritation. *Eating, drinking and smoking must be prohibited in areas where this material is handled and processed. Wash hands and face before eating, drinking and smoking.*

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity	**Aquatic toxicity :** Slightly to moderately toxic. Bluegill Sunfish (LC50 ; 48 hours) : 49 mg/l (Tap water, 20 °C, conditions of bioessay not specified). (HSBD). Flounder (LC50 ; 48 hours) : 100-330 mg/l (Aerated water, conditions of bioessay not specified). (HSBD).
Toxicity to Animals	Toxicity to aquatic life increases with lowering pH. At pH lower than 5, only a few fish species can survive and at pH lower than 4, aquatic life is rare. EYE : Concentrated compound is corrosive. 10 % solution : Moderate eye irritant. SKIN : Concentrated compound is corrosive. 10 % solution : Slight skin irritant. Single and repeated exposure : Irritation of the respiratory tract ; Corrosion of the respiratory tract ; Lung damage ; Labored breathing ; Altered respiratory rate ; Pulmonary oedema. Repeated exposure : Altered red blood cell count.
Mobility (Soil)	Easy soil seeping under rain action
Persistence and degradability	Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants.
Bioaccumulation	Sulfate ion : Ubiquitous in the environment. Metabolized by micro-organisms and plants without bioaccumulation.
Biodegradation Products	Not available
Biodegradation Products (Toxicity)	Not applicable
Remarks on Environment	Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because the run-off water will become acidic and may be harmful to flora and fauna.
BOD5 and COD	Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods	Cleaned-up material may be an hazardous waste on *Resource Conservation and Recovery Act* (RCRA) on disposal due to the corrosivity characteristic. **DO NOT** flush to surface water or sanitary sewer system. Comply with Federal, State, and local regulations. If approved, neutralize and transfer to waste treatment system.

SECTION 14. TRANSPORT INFORMATION

TDG (Canada)	CLASS 8 Corrosives	
PIN	UN1830 SULFURIC ACID	PG II
Special Provisions (Transport)	None	
DOT (U.S.A.)/IMO (Maritime)	Proper Shipping Name	SULFURIC ACID
	Hazard Class	8
	UN N°	1830

	DOT/IMO Label	CORROSIVE
	Packing Group	II
	Reportable Quantity	1000 lbs (454 kg)
	Shipping Containers	Tank Cars, Tank Trucks, Vessel
ERG	Guide 137	

SECTION 15 REGULATORY INFORMATION

Labelling (EEC)

EU (Directive 67/548/EEC) :
Sulfuric (Acid) : C Corrosive (Pictogram)
Annex I Index number : 016-020-00-8 ; EU Consolidated Inventories : EC Number 231-639-5
C ≥ 15 % C ; R35 ; S2, 26, 30, 45.

Risk Phrases (EEC)

R35- Causes severe burns

Safety Phrases (EEC)

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S30- Never add water to this product
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

CEPA DSL (CANADA)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) : On the Domestic Substances List (DSL) ; Acceptable for use under the provisions of CEPA.
Sulfuric Acid is a Class B Drug Precursor under *Health Canada's Controlled Drugs and Substances Act* and *Precursor Control Regulations*.

Regulations (U.S.A.)

CERCLA Section 103 Hazardous substances (40 CFR 302.4) ; SARA Section 302 Extremely Hazardous Substances (40 CFR 355) : Yes ; SARA Section 313, Toxic Chemicals (40 CFR 372.65) ; US: TSCA Inventory : Listed :
Sulfuric (Acid) (Final RQ) : 1 000 pounds (454 kg)

Sulfuric Acid is subject to reporting requirements of Section 313, *Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)*, 40 CFR Part 372.

Certain companies must report emissions of Sulfuric Acid as required under *The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)*, 40 CFR Part 302

For more information call the *SARA Hotline* 800-424-9346.

Strong Inorganic Acid Mists Containing Sulfuric Acid : Chemical listed effective March 14, 2003 to the *State of California, Proposal 65.*

U.S. FDA Food Bioterrorism Regulations : These regulations apply to Sulfuric Acid when being distributed, stored or used for Food or Food Processing.

TSCA (EPA, Toxic Substance Control Act) Chemical Inventory (40 CFR710) : Listed.
Sulfuric (Acid)

Classifications HCS (U.S.A.)

Corrosive liquid

NFPA (National Fire Protection Association) (U.S.A.)

Fire Hazard 0 Reactivity 2 Health 3 **Special Hazard** **ACID**

NPCA- HMIS Rating

Fire Hazard 0 Reactivity 2 Health 3

SECTION 16. OTHER INFORMATION

References

- TLVs and BEIs (2009). Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. ACGIH, Cincinnati, OH – http://www.acgih.org
- CCOHS (2009) - Canadian Centre for Occupational Health and Safety - http://www.ccohs.ca/
- CSST (2009) - Commission de la Santé et de la Sécurité du Travail (Québec). Service du répertoire toxicologique - http://www.reptox.csst.qc.ca/
- ERG (2008). Emergency Response Guidebook, U.S. Department of Transportation, Transport Canada, et le Secretariat of Communications and Transportation of Mexico
- HSDB (2009) - Hazardous Substances Data Bank. TOXNET® Network of databases on toxicology, hazardous chemicals, and environmental health. NLM Databases & Electronic Resources, U.S. National Library of Medicine, NHI, 8600 Rockville Pike, Bethesda, MD 20894 - http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
- ESIS : C&L (Classification and Labelling), substances or preparations in accordance with Directive 67/548/EEC (substances) and 1999/45/EC (preparations),
- ESIS : EINECS (European Inventory of Existing Commercial chemical Substances) O.J. C 146A, 15.6.1990
- ESIS : EINECS corrections published in O.J. C 54/13 01.03.2002, 2002/C54/08.
- IARC - Monographs on the Evaluation of Carcinogenic Risks to Humans (collection) - http://www-cie.iarc.fr/
- Merck Index (1999). Merck & CO., Inc, 12th edition

- NIOSH U.S. (2009) - Pocket Guide to Chemical Hazards - http://www.cdc.gov/niosh/npg/
- Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition
- Règlement sur les produits contrôlés (Canada)
- RTECS (2009). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC
- Toxicologie industrielle & intoxication professionnelle, 3e édition, Lauwerys
- TSCA (2009) - U.S. EPA Toxic Substance Control Act, Chemical Inventory. System of Registries (SoR), Substance Registry Services, http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/substancesearch/search.do

Glossary

CSST : Commission de la Santé et de la Sécurité du Travail (Québec).
HSDB : Hazardous Substances Data Bank.
IARC : International Agency for Research on Cancer.
NIOSH : National Institute of Occupational Safety and Health.
NTP : U.S. National Toxicology Program.
RTECS : Registry of Toxic Effects of Chemical Substances

Note

For further information, see NorFalco Inc. Sulfuric Acid « Storage and Handling Bulletin ».

Because of its corrosive characteristics and inherent hazards, Sulfuric Acid should not be used in sewer or drain cleaners or any similar application; regardless of whether they are formulated for residential, commercial or industrial use. NorFalco will not knowingly sell sulfuric acid to individuals or companies who repackage the product for sale as sewer or drain cleaners, or any other similar use.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

For additional information, please visited our website : www.norfalco.com

Written by : Groupe STEM Consultants / NorFalco Sales Inc.
Complete revision : 2010-01-24 **Partial review :** None **Previous complete revision :** 2009-01-24

Verified by : Guy Desgagnés and Eric Kuraitis, Technical Representative - Sulfuric Acid
Request to : André Auger, Administration Assistant Tel. : (905) 542-6901 extension 0 Fax : (905) 542-6914 / 6924
NorFalco Sales Inc., 6755 Mississauga Road, Suite 304, Mississauga, Ontario L5N 7Y2

EU

LL AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

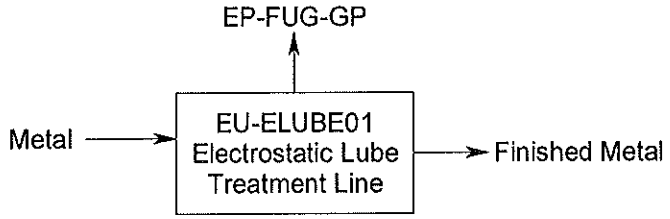
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	Electrostatic Lube – Treatment Line		
2) EU ID Number:	ELUBE01	EP ID Number:	FUG-GP
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:	Sundwig		
5) Model:			
6a) Maximum Nameplate Capacity:	556,910 lbs Lube/yr (Total for 2 units)		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☐ Material Usage Limits			
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☒ Other: VOC Emissions	20 tons/yr (Total for 2 units)		
Rationale for Requesting the Limit(s):	BACT Analysis		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

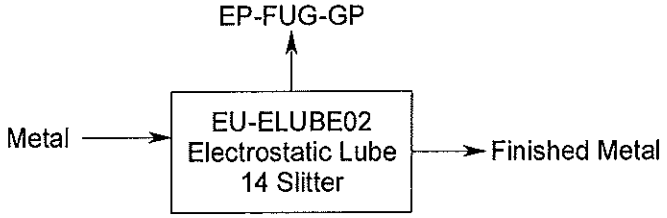
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	Electrostatic Lube – 14 Slitter		
2) EU ID Number:	ELUBE02	EP ID Number:	FUG-GP
3) EU Type: ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) Manufacturer:	Sundwig		
5) Model:			
6a) Maximum Nameplate Capacity:	556,910 lbs Lube/yr (Total for 2 units)		
6b) Maximum Process Design Capacity (if different than 6a)	NA		
7) Date of Construction:	1st Quarter 2012		
8) Date of Modification (if applicable)	NA		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	8760 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes If Yes, check below and write down all that apply			
☐ Operation Hour Limits:			
☐ Production Limits:			
☐ Material Usage Limits			
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☒ Other: VOC Emissions	20 tons/yr (Total for 2 units)		
Rationale for Requesting the Limit(s):	BACT Analysis		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

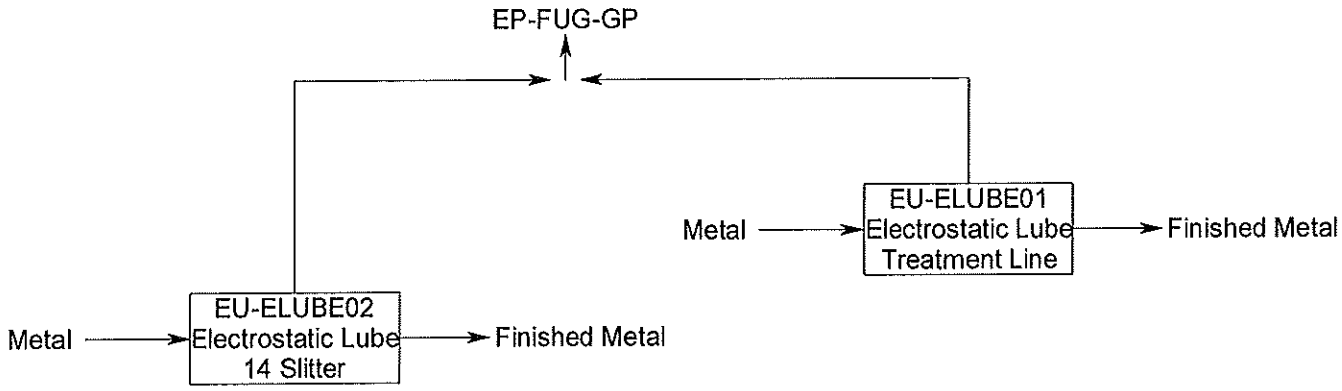
Company Name Alcoa, Inc.	
1) EP Number ID: FUG-GP	
2) Stack Opening size: ☐ circular, diameter (inches) _____ ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): No stack	
4) Height from highest building level (feet): No stack	
5) Distance from the nearest property line (feet): No stack	
6) Discharge Style (check one)	☐ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☒ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known):	8) Exit Temperature (Fahrenheit): 70 °F
9) Rated Flow Rate: ☐ ACFM: _____	☐ SCFM: _____
10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: FUG-GP

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor (MSDS) & VOC BACT Limit

Calculations: Transfer eff. approaches 100% (99.95%) with an electrostatic application system.

PM: 556,910 lbs/yr (max. lube use) * (1-0.9995) * 1 yr/8760 hrs = 0.032 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs = 0.14 tons/yr

PM_{10}: 556,910 lbs/yr * (1-0.9995) * 1 yr/8760 hrs = 0.032 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs = 0.14 tons/yr

$PM_{2.5}$: 556,910 lbs/yr * (1-0.9995) * 1 yr/8760 hrs = 0.032 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs = 0.14 tons/yr

VOC: 556,910 lbs/yr (max. lube use) * 0.143 gal/lb (density) * 0.5 lbs VOC/gal * 1 yr/8760 hrs = 4.55 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs = 19.91 tons/yr

Please see attached Lube MSDS's

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, gr/scf:	No Air Flow	No Air Flow	No Air Flow			No Air Flow					
lbs/hr	0.032	0.032	0.032			4.55					
tons/year	0.14	0.14	0.14			19.91					

Material Safety Data Sheet

Print date: 10/10/2007 *Version: 2* *Revision date: 10/10/2007*

1. COMPANY AND PRODUCT IDENTIFICATION

Product name: **QUAKERDRAW ® 61 A US**

Product code: 007734-22

Supplier:
Quaker Chemical Corporation
Quaker Park One
901 Hector Street
Conshohocken, PA 19428
610-832-4000
E-mail: she@quakerchem.com

Emergency telephone number:
* 24 HOUR TRANSPORTATION:
**CHEMTREC: 1-800-424-9300
703-527-3887 (Call collect outside of US)
* 24 HOUR EMERGENCY HEALTH & SAFETY:
**QUAKER CHEMICAL CORPORATION: (800) 523-7010(Within US only)
Outside of US call (703) 527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS

Components	CAS No.	Weight %	OSHA Ceiling Limits	ACGIH Ceiling Limits	OSHA TWA (final):	ACGIH Exposure Limits:	Vendor Exposure Limits:
Mineral Oil*	8012-95-1	90 - 100%			5mg/m³	5 mg/m³	None
Sulfonic acids, petroleum, calcium salts, overbased	68783-96-0	1 - 5%			None	None	

* May include one or more of the following CAS #: 64741-88-4, 64741-89-5, 64741-44-2, 64741-96-4, 64741-97-5, 64742-46-7, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-62-7, 64742-65-0, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1 and 64741-95-3

3. HAZARDS IDENTIFICATION

Emergency Overview
This product may cause irritation of the eyes, skin, mucous membranes and respiratory tract.
May be harmful if swallowed.

Signal word: CAUTION

Principle routes of exposure: Eyes, skin and inhalation.

Eye contact: Contact with eyes may cause irritation.

Skin contact: Repeated or prolonged contact with base product may cause irritation leading to various skin disorders such as dermatitis, oil acne, or folliculitis.

Inhalation:	Inhalation of vapor (generated at high temperatures only) or oil mist from this product may cause mild irritation of the upper respiratory tract.
Ingestion:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Physico-chemical properties:	No hazards resulting from material as supplied.

4. FIRST AID MEASURES

General advice:	Take off contaminated clothing and shoes immediately. Wash off with soap and water. If symptoms persist, call a physician.
Eye contact:	Rinse thoroughly with plenty of water, also under the eyelids. Consult a physician
Skin contact:	Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. If skin irritation persists, call a physician.
Ingestion:	If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.
Inhalation:	Move to fresh air in case of accidental inhalation of vapors. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.
Notes to physician:	Treat symptomatically.
Medical condition aggravated by exposure:	Dermatitis and asthma.

5. FIRE-FIGHTING MEASURES

Flash Point (°C): 193 **Flash point (°F):** 380 **Flash Point Method:** COC

Flammable limits in air - upper (%): Not determined	**Flammable limits in air - lower (%):** Not determined
Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Unusual hazards:	None known.
Special protective equipment for fire-fighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Specific methods:	Water mist may be used to cool closed containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing.
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Handling

Technical measures/precautions: Provide sufficient air exchange and/or exhaust in work rooms.

Safe handling advice: In case of insufficient ventilation, wear suitable respiratory equipment. Wear personal protective equipment. Do not breathe vapors or spray mist. Avoid contact with skin and eyes. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.

Storage

Technical measures/storage conditions: Store at room temperature in the original container

Incompatible products: strong oxidizing agents

Safe storage temperature: 40-100 ° F

Shelf life: 6 months

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components	ACGIH Ceiling Limits	ACGIH Exposure Limits:	OSHA Ceiling Limits	OSHA TWA (final):	NIOSH - Pocket Guide - TWAs:	Vendor Exposure Limits:
Mineral Oil*		5 mg/m³		5mg/m³	5mg/m³	None
Sulfonic acids, petroleum, calcium salts, overbased		None		None	None	None

Engineering measures: Ensure adequate ventilation.

Personal Protective Equipment

General: Eye Wash and Safety Shower

Respiratory protection: If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, a NIOSH/MSHA certified respirator with organic vapor/P100 filter should be worn.

Hand protection: Neoprene gloves

Skin and body protection: Long sleeved clothing

Eye protection: Safety glasses with side-shields.

Hygiene measures: Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Physical state: Liquid
Color: Clear Amber

9. PHYSICAL AND CHEMICAL PROPERTIES:

Odour:	Pleasant
Boiling point/range (°C):	235-400
Boiling point/range (°F):	455-700
Vapour pressure:	0.9 mm HG @ 25 C.
Vapour density:	Not determined
VOC Content Product (g/L)	0.44 lb/gal (ASTM D-2369)
Solubility:	Negligible
Evaporation rate:	Not determined
Flash Point (°C):	193
Flash point (°F):	380
Decomposition temperature:	Not determined
Auto-ignition temperature (°C):	Not determined
Density @ 15.5 ° C (g/cc) :	0.899
Bulk density @ 60 ° F (lb/gal):	7.5
Volatiles (% by volume) :	6.1
Partition coefficient (n-octanol/water, log Pow):	Not determined
Explosive properties:	
- upper limit:	No data available
- lower limit:	No data available

10. STABILITY AND REACTIVITY

Stability:

Stable under recommended storage conditions..

Conditions to avoid:

None known

Materials to avoid:

Strong oxidising agents

Hazardous decomposition products:

Carbon oxides, Sulphur oxides, Nitrogen oxides (nox)

Polymerization:

Not applicable

11. TOXICOLOGICAL INFORMATION

MINERAL OIL INFORMATION: Any product containing a substance for which OSHA has established a permissible exposure limit (PEL) is considered hazardous. OSHA has established a PEL of 5 mg/m^3 for worker exposure to air borne mists of mineral oils. Therefore, the presence of mineral oils brings this product within the provisions of the OSHA Hazard Communication Standard where the PEL reaches or exceeds 5 mg/m^3. Health studies have shown that many petroleum hydrocarbons pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

No toxicological information is available on the product. Data obtained on components are summarized below.

11. TOXICOLOGICAL INFORMATION

Components	NTP:	IARC:	OSHA - Select Carcinogens	NIOSH - Selected LD50s and LC50s
Mineral Oil*	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	22g/kgOral LD50Mouse
Sulfonic acids, petroleum, calcium salts, overbased	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	20000mg/kgDermal LD50Rabbit 20000mg/kgOral LD50Rat

12. ECOLOGICAL INFORMATION

Persistence and degradability: No information available

Mobility: No data available

Bioaccumulation: No data available

Ecotoxicity effects: No data available

Aquatic toxicity: Not Determined

Sulfonic acids, petroleum, calcium salts, overbased
Ecotoxicity - Fish Species Data LC50 (Pimephales promelas - 96h) > 1000 mg/L

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Sweep up and shovel into suitable containers for disposal.

14. TRANSPORT INFORMATION

U. S. DEPARTMENT OF TRANSPORTATION:
Proper shipping name: Not Regulated

TDG (CANADA):
Proper shipping name: Not Regulated

IMDG/IMO:
Proper shipping name: Not Regulated

14. TRANSPORT INFORMATION

IATA/ICAO:

Proper shipping name: Not Regulated

CLASSIFICATION AND LABELING

OSHA Hazard Communication Standard: This product is considered to be hazardous under the OSHA Hazard Communication Standard.

Canada - WHMIS Classification Information: This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

Canadian Product Classification: Not Regulated

Product Classification Graphic(s):

Component Classification Data:

Mineral Oil* - 8012-95-1

WHMIS hazard class: Listed
Uncontrolled product according to WHMIS classification criteria

Canadian National Pollution Inventory Data:

U.S. REGULATIONS:

SARA (311, 312) hazard class: This product possesses the following SARA Hazard Categories:

Immediate Health (Acute):	Yes
Delayed Health (Chronic):	No
Flammability:	No
Pressure:	No
Reactivity:	No

RCRA Status Not Regulated

STATE REGULATIONS (RTK):

California Proposition 65 Status: No components are listed

Mineral Oil* - 8012-95-1

MARTK: Listed

NJRTK:	Listed
PARTK:	Listed

INVENTORY STATUS:

United States TSCA - Sect. 8(b) Inventory:	This product complies with TSCA
Canada DSL Inventory List -	This product complies with DSL
EC EINECS/ELINCS/NLP list:	This product complies with EINECS
Inventory - Japan - Existing and New Chemical Substances (ENCS):	Compliance has not been determined.

16. OTHER INFORMATION

Sources of key data used to compile the data sheet: Material safety data sheets of the ingredients.

Prepared by: Quaker Chemical Corporation -Safety, Health and Environmental Affairs Group - US

Reason for revision: This data sheet contains changes from the previous version in section(s) 2

HMIS classification:	HMIS Use Dilution	NFPA rating:
Health: 1	**Health** --	**Health:** 1
Flammability: 1	**Flammability** --	**Flammability:** 1
Reactivity: 0	**Reactivity** --	**Reactivity:** 0
Personal Protection: B	**Personal Protection** --	**Special:** NA

* Indicates possible chronic heath effect

Personal protection recommendations should be reviewed by purchasers. Workplace conditions are important factors in specifying adequate protection.

Disclaimer

This product's safety information is provided to assist our customers in assessing compliance with safety/health/environmental regulations. The information contained herein is based on data available to us and is believed to be accurate. However, no warranty of merchantability, fitness for any use, or any other warranty is expressed or implied regarding the accuracy of this data, the results to be obtained from the use thereof, or the hazards connected with the use of the product. Since the use of this product is within the exclusive control of the user, it is the user's obligation to determine the conditions for safe use of the product. Such conditions should comply with all regulations concerning the product. Quaker Chemical Corporation ("Quaker") assumes no liability for any injury or damage, direct or consequential, resulting from the use of this product unless such injury or damage is attributable to the gross negligence of Quaker.

End of Safety Data Sheet

Material Safety Data Sheet

Revision Number: 003.1

Issue date: 04/27/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: MULTAN PL PRELUBE MP-404
Product type: Lubricant

IDH number: 594397

Region: United States

Company address:
Henkel Corporation
32100 Stephenson Highway
Madison Heights, MI 48071

Contact Information:
Telephone: 248.583.9300
For Chemical Emergency: Call CHEMTREC at 800.424.9300
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS:

Physical state:	Liquid	**HEALTH:**	1
Color:	Amber	**FLAMMABILITY:**	1
Odor:	Petroleum	**PHYSICAL HAZARD:**	0
		Personal Protection:	See MSDS Section 8

CAUTION: MAY CAUSE EYE AND SKIN IRRITATION.
MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS.
ASPIRATION HAZARD IF SWALLOWED.

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects

Inhalation: Inhalation of vapors or mists of the product may be irritating to the respiratory system. Excessive inhalation of this material causes headache, dizziness, nausea and incoordination.

Skin contact: Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis.

Eye contact: This product may cause irritation to the eyes.

Ingestion: Ingestion of this product may cause nausea, vomiting and diarrhea. Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Existing conditions aggravated by exposure: Eye, skin and respiratory disorders.

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Petroleum Distillates	Proprietary	30 - 60
Petroleum sulfonate, calcium salt	Proprietary	10 - 30

4. FIRST AID MEASURES

Inhalation: If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.

Skin contact: Immediately flush skin with plenty of water (using soap, if available). If symptoms develop and persist, get medical attention.

Eye contact:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. If symptoms develop and persist, get medical attention.
Ingestion:	Get immediate medical attention. Do not induce vomiting.
Notes to physician:	This material, if aspirated into the lungs, may cause chemical pneumonitis; treat the affected person appropriately.

5. FIRE FIGHTING MEASURES

Flash point:	137.8 °C (280.04 °F) Cleveland open cup
Autoignition temperature:	Not determined
Flammable/Explosive limits - lower:	Not determined
Flammable/Explosive limits - upper:	Not determined
Extinguishing media:	Water spray (fog), foam, dry chemical or carbon dioxide.
Special firefighting procedures:	Wear full protective clothing. Wear self-contained breathing apparatus.
Unusual fire or explosion hazards:	This product is combustible at high temperatures. Empty containers retain product residue, so obey hazard warnings and handle empty containers as if they were full. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition.
Hazardous combustion products:	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions:	Prevent further leakage or spillage if safe to do so. Wear suitable protective clothing, gloves and eye/face protection. Remove all sources of ignition.
Clean-up methods:	Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling:	Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Do not take internally. For industrial use only. Launder work clothes frequently.
Storage:	For safe storage, store at or above 4.4 °C (39.9 °F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Thaw and mix thoroughly if frozen.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Petroleum Distillates	5 mg/m3 TWA mist 10 mg/m3 STEL mist	5 mg/m3 TWA mist	None	None
Petroleum sulfonate, calcium salt	None	None	None	None

Engineering controls: Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Wear chemical goggles; face shield (if splashing is possible).

Skin protection: Chemical resistant, impermeable gloves. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Amber
Odor:	Petroleum
Odor threshold:	Not available
pH:	Not applicable
Vapor pressure:	Not determined
Boiling point/range:	> 100 °C (> 212°F) calculated
Melting point/ range:	Not determined
Specific gravity:	0.91 - 0.94 at 16 °C (60.8 °F)
Vapor density:	Not determined
Flash point:	137.8 °C (280.04 °F) Cleveland open cup
Flammable/Explosive limits - lower:	Not determined
Flammable/Explosive limits - upper:	Not determined
Autoignition temperature:	Not determined
Evaporation rate:	Not available
Solubility in water:	Negligible
Partition coefficient (n-octanol/water):	Not determined
VOC content:	Not applicable

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Hazardous reactions: Will not occur.

Hazardous decomposition products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Incompatible materials: This product may react with strong oxidizing agents.

Conditions to avoid: Keep away from heat, ignition sources and incompatible materials.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Petroleum Distillates	No	No	No
Petroleum sulfonate, calcium salt	No	No	No

Hazardous components	Health Effects/Target Organs
Petroleum Distillates	Irritant
Petroleum sulfonate, calcium salt	No Target Organs

12. ECOLOGICAL INFORMATION

Ecological information: Not available

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

International Air Transportation (ICAO/IATA)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

Water Transportation (IMO/IMDG)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification:	None above reporting de minimus
CERCLA/SARA Section 302 EHS:	None above reporting de minimus
CERCLA/SARA Section 311/312:	Immediate Health
CERCLA/SARA 313:	None above reporting de minimus
California Proposition 65:	No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class:	D.2.B

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: John DiCerbo, Regulatory Affairs Specialist

DISCLAIMER: The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation does not assume responsibility for any results obtained by persons over whose methods Henkel Corporation has no control. It is the user's responsibility to determine the suitability of Henkel's products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any of Henkel Corporation's products. In light of the foregoing, Henkel Corporation specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

FUCHS LUBRICANTS CO.

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION: . . : METALUB RP 4107 A

MANUFACTURER IDENTIFICATION
- Company Name. . . . . : FUCHS LUBRICANTS CO.
- Address . . . . . : 17050 LATHROP AVE.
  HARVEY IL 60426
- Telephone . . . . . : 708-333-8900
- Emergency Contact . . . . : Regulatory Compliance Department
- Emergency Telephone . . . : 708-333-8900 (8am - 5pm CST, M-F)
  800-255-3924 (24 Hours)

MSDS PRINT DATE . . . . . : 02/29/2008

* EMERGENCY OVERVIEW
This product is a water-insoluble liquid.
Direct eye contact may cause slight irritation. Short term skin contact is not expected to be irritating. Ingestion and inhalation are not anticipated routes of exposure during normal conditions of use.

* HMIS Rating: Health- 1 Flammability- 1 Reactivity- 0 PPE- X

SECTION 2 - COMPONENT DATA

Components listed in this section may contribute to the potential hazards associated with exposure to the concentrate. The product may contain additional non-hazardous or trade-secret components.

Mineral Oil Cas#: proprietary Percent: > 90
- Exposure Limit:
  - ACGIH TLV: 5 mg/m3 (as mist)
  - ACGIH STEL: 10 mg/m3 (as mist)
  - OSHA PEL: 5 mg/m3 (as mist)

- Carcinogenic Components: This product contains no carcinogens.

SECTION 3 - HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS and SYMPTOMS from SHORT TERM/ACUTE EXPOSURE:

- EYE EXPOSURE -
  This product is not expected to cause eye irritation under normal conditions of use. Symptoms of slight eye irritation may result when direct contact occurs, or when exposed to high mist levels in poorly ventilated areas.

- SKIN EXPOSURE -
  Short term skin contact is not expected to cause skin irritation. Prolonged or repeated direct exposure to the skin may result in

symptoms of irritation and redness. In severe cases, prolonged or repeated contact may result in dermatitis accompanied by symptoms of irritation, itching, dryness, cracking and/or inflammation.

- INHALATION -
This product has low volatility and so is not expected to cause respiratory tract irritation during normal conditions of use. Exposure to high mist levels in poorly ventilated areas may cause upper respiratory tract irritation and difficulty breathing.

- INGESTION -
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

POTENTIAL CHRONIC HEALTH EFFECTS:
No further data known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
No further data known.

CARCINOGENICITY:
This product is not listed as a known or suspected carcinogen by IARC, OSHA, or the NTP.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Upon direct eye contact, hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. If irritation is due to exposure to mist or vapors, remove the individual to fresh air. If irritation persists, flush the eyes with clean water until the irritation subsides. If symptoms persist, contact a physician.

SKIN CONTACT:
Remove product from the skin by washing with a mild soap and water. Contaminated clothing should be removed to prevent prolonged exposure. If symptoms of exposure persist, contact a physician.

INHALATION:
Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs, remove the employee to fresh air. Contact a physician or other medical professional if irritation or distress persists.

INGESTION:
If ingested, dilute stomach contents with two glasses of milk or water. (NOTE: Do NOT give anything by mouth to an unconscious person.) DO NOT induce vomiting!! Aspiration of product into the lungs through vomiting

may cause chemical pneumonitis which can be a dangerous condition. If vomiting occurs spontaneously, keep airway clear. If symptoms of ingestion persist, seek medical assistance.

NOTE TO PHYSICIAN:
No further data known.

SECTION 5 - FIRE FIGHTING MEASURES

FIRE AND EXPLOSIVE PROPERTIES:

Flashpoint	:	315.0	ŒF Cleveland Open Cup
Flammability Limits	:	LEL	-N/A
		UEL	-N/A

EXTINGUISHING MEDIA:
In accordance with NFPA guidance, dry chemical, foam, or CO2 fire extinguishers are all acceptable. Note that while water fog extinguishers are also acceptable, do NOT apply a direct stream of water onto burning product because it may cause spreading and increase fire intensity.

UNUSUAL FIRE & EXPLOSION HAZARDS:
No further data known.

FIRE-FIGHTING PROCEDURES AND EQUIPMENT:
Emergency responders in the danger area should wear bunker gear and self-contained breathing apparatus for fires beyond the incipient stage. See Section 8 of the MSDS for other PPE to be worn as conditions warrant.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

CLEAN-UP MEASURES:
Important: As with any spill or leak, before responding ensure that you are familiar with the potential hazards and recommendations of the MSDS. Appropriate personal protective equipment must be worn. See Section 8 of this MSDS for PPE recommendations.

If possible, safely contain the spill with dikes or other spill response equipment appropriate for petroleum or organic material releases. Take measures to prevent spreading of product. Note that while product will ignite it will not readily burn. However, as a precaution eliminate ignition sources. Prevent from entering sewers or waterways. Large volumes may be transferred to an appropriate container for proper disposal. Small volumes or residues may be soaked up with absorbents. Spill response materials should be collected for proper disposal.

SECTION 7 - HANDLING AND STORAGE

HANDLING:

PRODUCT NAME: METALUB RP 4107 A

As with any industrial chemical, handle the product in a manner that minimizes exposure to practicable levels. Prior to handling, consult Section 8 of this MSDS to evaluate personal protective equipment needs. Open containers slowly to relieve any pressure. Follow all other standard industrial hygiene practices.

Empty containers may contain product residue. All safety precautions taken when handling this product should also be taken when handling empty drums and containers. Keep containers closed when not in use.

Product residue in empty containers is combustible but will not readily burn. NOTE however, that excessive heating or cutting of empty containers may create an ignition source sufficient to start a fire and in extreme cases, cause an explosion.

STORAGE:
Protect product quality by storing indoors and away from extreme temperatures. Close all containers when not in use.

SPECIAL COMMENTS:
No further data known.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:
Selection of personal protective equipment should be based upon the anticipated exposure and made in accordance with OSHA's Personal Protective Equipment Standard found in 29 CFR 1910 Subpart I. The following information may be used to assist in PPE selection.

- EYE PROTECTION -
Wear eye protection appropriate to prevent eye exposure. Where splashing is not likely, chemical safety glasses with side shields are recommended. Where splashing may occur, chemical goggles or full face shield is recommended.

- SKIN PROTECTION -
Gloves are not normally needed during normal conditions of use. If health effects are experienced, oil or chemical resistent gloves such as butyl or nitrile are recommended.

Where splashing or soaking is likely, wear oil or chemical resistent clothing to prevent exposure.

- RESPIRATORY PROTECTION -
A respirator may be worn to reduce exposure to vapors, dust, or mist. Select a NIOSH/MSHA approved respirator appropriate for the type and physical character of the airborne material. A self-contained breathing

apparatus is recommended in all situations where airborne contaminant concentration has not been confirmed to be below safe levels. Respirator use should comply with the OSHA Respirator Protection Standard found in 29 CFR 1910.134.

ENGINEERING CONTROLS:
Normal general ventilation is expected to be adequate. It is recommended that ventilation be designed in all instances to maintain airborne concentrations at lowest practicable levels. Ventilation should at a minimum, prevent airborne concentrations from exceeding any exposure limits listed in Section 2 of this MSDS.

The user may wish to refer to 29 CFR 1910.1000(d)(2) and the ACGIH "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indicies" (Appendix C) for the determination of exposure limits of mixtures. An industrial hygienist or similar professional may be consulted to confirm that the calculated exposure limits apply.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical Appearance	Dark Brown Color
Odor	Petroleum
Physical State	Liquid
Water Solubility	Insoluble
Specific Gravity	.890

SECTION 10 - STABILITY AND REACTIVITY

INCOMPATIBILITIES:
This product is incompatible with strong oxidizing agents.

DECOMPOSITION PRODUCTS MAY INCLUDE:
Thermal decomposition products are dependent on combustion conditions. A complex mixture of airborne solid, liquid, particulates and gasses may evolve when the material burns. Combustion byproducts may include:
- oxides of carbon,
- oxides of sulfur,
- incompletely burned hydrocarbons as fumes and smoke.

CONDITIONS TO AVOID:
Avoid contact with incompatible materials and exposure to extreme temperatures.

POLYMERIZATION:
This product is not expected to polymerize.

PRODUCT NAME: METALUB RP 4107 A

STABILITY:
This product is stable.

SECTION 11 - TOXICOLOGICAL INFORMATION

EYE EFFECTS:
No further toxicological data known.

SKIN EFFECTS:
No further toxicological data known.

ORAL EFFECTS:
No further toxicological data known.

INHALATION EFFECTS:
No further toxicological data known.

OTHER:
No further data known.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
This product has not been evaluated for ecotoxicity. As with any industrial chemical, exposure to the environment should be prevented and minimized wherever possible.

ENVIRONMENTAL FATE:
The degree of biodegradability and persistence of this product has not been determined.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:
Ensure that collection, transport, treatment, and disposal of waste product, containers and rinsate complies with all applicable laws and regulations. Note that use, mixture, processing, or contamination of the product may cause the material to be classified as a hazardous waste. It is the responsibility of the product user or owner to determine at the time of disposal, whether the product is regulated as a hazardous waste.

SECTION 14 - TRANSPORT INFORMATION

DOT HAZARDOUS MATERIAL INFORMATION:
* Not otherwise DOT regulated.

SECTION 15 - REGULATORY INFORMATION

PRODUCT NAME: METALUB RP 4107 A

FEDERAL REGULATIONS:

SARA 313:
This product contains NONE of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Clean Water Act / Oil Pollution Act:
This product contains mineral oil and is subject to regulation by Section 311 of the Clean Water Act and the Oil Pollution Act. Releases of the product into or leading to surface waters must be reported to the National Response Center at 1-800-424-8802.

CERCLA Reportable Quantity:
Any components listed below have been assigned a reportable quantity (RQ) by the Federal EPA. Releases of the product into the environment that exceed the RQ for a particular component must be reported to the National Response Center at 1-800-424-8802.

Component	RQ
* - * - * - * - * - * - * - * - * - * - * - * - * - * - * - *	

Toxic Substances Control Act:
The components of this product are listed on the TSCA Inventory.

Ozone Depleting Substances:
This product contains no ozone depleting substances as defined by the Clean Air Act.

Hazardous Air Pollutants:
Any components listed below are defined by the Federal EPA as hazardous air pollutants.

Component
* - * - * - * - * - * - * - * - * - * - * - * - * - * - * - *

STATE REGULATIONS:
This product contains mineral oil, and as used, may be regulated by state used oil regulations. Check with the appropriate state agency to determine whether such a regulation exists.

No further data known.

SECTION 16 - OTHER INFORMATION

Prepared by . . . . . : Corporate Regulatory Compliance
Date of issue . . . . . : 02/29/2008
Last Revision Date . . . . . : 12/28/2000
942772

FUCHS LUBRICANTS CO.

PRODUCT NAME: METALUB RP 4107 A

NOTICE: This MSDS provides a good faith representation of information believed to be accurate as of the last revision date. This document does not create any express or implied product warranties. Since conditions of use are beyond the control of Fuchs Lubricants Co., all risks associated with product use are assumed by the user.

Drawing, Forming & Stamping

FERROCOTE® 6130 METAL PRESERVATIVE

Quaker

APPLICATION SHEET

Applications

This oil-based rust preventive provides in-process or final protection for medium to long-term indoor storage of metal surfaces, both ferrous and non-ferrous.

Meets Southern California Air Quality Management District (SCAQMD) 2012 requirements under Rule 1144, ASTM E1868-10 (TGA) for metal protecting, general (corrosion preventives).

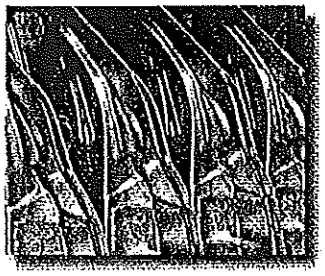
- Flood
- Flow-on
- Immersion
- Wipe-on
- Electrostatic

Benefits

- Specified and used by steel mills and automotive manufacturers including: Ford (TOX #160905), General Motors (FID #343783) and Chrysler.
- Rapidly displaces moisture and can be used to treat wet parts with no loss of protection. Passes MIL-C-16173 requirements.
- Protection against normal humidity and acidic atmospheres found in industrial environments. The protection is equivalent of 15 days in the JAN H-792 Cabinet.
- Non-staining. Excellent resistance to stain and varnish where metal-to-metal contact is present, especially with high temperature and humidity.
- Provides versatility in a single product to protect many metals. This simplifies overall operations and reduces costs.
- Globally available formula with approvals in multiple regions.

Customers/Approvals

- Algoma Steel
- American Lubricants
- ArcelorMittal - Brazil & Europe
- China Steel Corporation Taiwan
- Chrysler
- Dilmar Oil Co.
- Ford Motor Company
- General Motors
- Nissan North America
- PSA
- Renault
- TATA
- TKS Anshan Steel China
- TKS Steel Europe AG
- Vehtek Systems
- Wisco - China
- Worthington Specialty Products
- Wuhan Steel - China



Fluid Maintenance

This product is used as received via immersion, flow-on, flooding, electrostatically or wipe on. Dilution with any oil or solvent will decrease this preventive's performance. Please consult your Quaker representative for more information on proper fluid maintenance.

Process Compatibility

To enhance process compatibility, use Quaker metalworking fluids and cleaners. Consult your Quaker representative.

Packaging/Storage

FERROCOTE® 6130 is available in drums (54 gals/402 lbs) or totes (320 gals/2381 lbs). All containers are filled to volume by weight.

This product has a shelf life of 12 months. Like most chemicals, it should be stored out of direct sunlight in temperatures between 40°F (4°C) and 110°F (43°C).

Properties

PROPERTY	TYPICAL VALUE
Appearance	Clear Amber
Pounds per gallon at 60°F	7.44 lbs/gal
Flash Point via COC	425°F / 218°C
Odor	Oil-Like
VOC (EPA Method 24)	0.0 lbs/gal
VOC (SCAQMD ASTM E1868-10)	6.42 g/l
Viscosity at 100°F	130 SUS / 28 cSt

Dry Lube

Material Safety Data Sheet

Print date: 03/21/2006 *Version: 1* *Revision date: 03/21/2006*

1. COMPANY AND PRODUCT IDENTIFICATION

Product code: 040816-04U
Product name: QUAKER DRYCOTE® 2-90

Supplier:
Quaker Chemical Corporation
Quaker Park One
901 Hector Street
Conshohocken, PA 19428
610-832-4000
E-mail: she@quakerchem.com

Emergency telephone number:
* 24 HOUR TRANSPORTATION:
**CHEMTREC: 1-800-424-9300
703-527-3887 (Call collect outside of US)
* 24 HOUR EMERGENCY HEALTH & SAFETY:
**QUAKER CHEMICAL CORPORATION: (800) 523-7010(Within US only)
Outside of US call (703) 527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS

Components	CAS No.	Weight %	OSHA Ceiling Limits	OSHA TWA (final):	ACGIH Ceiling Limits	ACGIH Exposure Limits:	Vendor Exposure Limits:
Mineral Oil*	8012-95-1	30 - 40%		5mg/m³		5 mg/m³	None
Paraffin waxes and hydrocarbon waxes	8002-74-2	30 - 40%		None		2 mg/m³	
Slack wax, petroleum	64742-61-6	10 - 15%		None		None	
Calcium sulfonate	61789-86-4	1 - 5%		None		None	
Alcohols, c16-c18, ethoxylated	68439-49-6	1 - 5%		None		None	
Sodium sulfonate	68608-26-4	1 - 5%		None		None	

* May include one or more of the following CAS #: 64741-88-4, 64741-89-5, 64741-96-4, 64741-97-5, 64742-46-7, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-62-7 and 64742-65-0, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1.

3. HAZARDS IDENTIFICATION

Emergency Overview
Irritating to eyes.
May cause skin irritation and/or dermatitis.
May cause irritation of respiratory tract.
May be harmful if swallowed.

Signal word: CAUTION

9. PHYSICAL AND CHEMICAL PROPERTIES:

Physical state:	Solid
Color:	beige
Odour:	Mild
Boiling point/boiling range (°C):	>200
Boiling point/range (°F):	>392
Vapour pressure:	Not determined
Vapour density:	Not determined
Viscosity:	4.5 cst @ 210 °F
VOC Content Product	0.10 lb/gal (EPA Method 24)
Solubility:	Insoluble
Evaporation rate:	Not determined
Flash point (°C):	>200
Flash point (°F):	>392
Decomposition temperature:	Not determined
Auto-ignition temperature:	Not determined
Density @ 15.5 ° C (g/cc) :	0.84
Bulk density @ 60 ° F (lb/gal):	7.01
Partition coefficient (n-octanol/water, log Pow):	Not determined
Explosive properties:	
- upper limit:	No data available
- lower limit:	No data available

10. STABILITY AND REACTIVITY

Stability:

Stable under recommended storage conditions.

Conditions to avoid:

None known

Materials to avoid:

Strong oxidising agents

Hazardous decomposition products:

Carbon oxides, Sulphur oxides, Nitrogen oxides (nox)

Polymerization:

Not applicable

11. TOXICOLOGICAL INFORMATION

MINERAL OIL INFORMATION: Any product containing a substance for which OSHA has established a permissible exposure limit (PEL) is considered hazardous. OSHA has established a PEL of 5 mg/m^3 for worker exposure to air borne mists of mineral oils. Therefore, the presence of mineral oils brings this product within the provisions of the OSHA Hazard Communication Standard where the PEL reaches or exceeds 5 mg/m^3. Health studies have shown that many petroleum hydrocarbons pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

No toxicological information is available on the product. Data obtained on components are summarized below.

Components	NTP:	IARC:	OSHA - Select Carcinogens	NIOSH - Selected LD50s and LC50s
Mineral Oil*	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	22g/kgOral LD50Mouse
Paraffin waxes and hydrocarbon waxes	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	3600mg/kgDermal LD50Rabbit 3750mg/kgOral LD50Rat
Slack wax, petroleum	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	
Calcium sulfonate	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	4000mg/kgDermal LD50Rabbit 5000mg/kgOral LD50Rat
Alcohols, c16-c18, ethoxylated	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	
Sodium sulfonate	This product does not contain any material shown to be a carcinogen by the National Toxicology Program (NTP).	This product does not contain any material shown to be a carcinogen by the International Agency for Research on Cancer (IARC).	This product does not contain any material shown to be a carcinogen by OSHA.	

12. ECOLOGICAL INFORMATION

Persistence and degradability: No information available

Mobility: No data available

Bioaccumulation: No data available

Reactivity: 0	**Reactivity:** 0
Personal Protection: 3	**Special:** NA

* Indicates possible chronic heath effect

Personal protection recommendations should be reviewed by purchasers. Workplace conditions are important factors in specifying adequate protection.

Disclaimer

This product's safety information is provided to assist our customers in assessing compliance with safety/health/environmental regulations. The information contained herein is based on data available to us and is believed to be accurate. However, no warranty of merchantability, fitness for any use, or any other warranty is expressed or implied regarding the accuracy of this data, the results to be obtained from the use thereof, or the hazards connected with the use of the product. Since the use of this product is within the exclusive control of the user, it is the user's obligation to determine the conditions for safe use of the product. Such conditions should comply with all regulations concerning the product. Quaker Chemical Corporation ("Quaker") assumes no liability for any injury or damage, direct or consequential, resulting from the use of this product unless such injury or damage is attributable to the gross negligence of Quaker.

End of Safety Data Sheet

EU

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

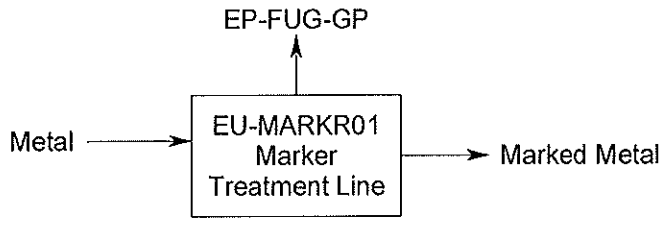
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**Marker – Treatment Line**		
2) **EU ID Number:**	**MARKR01**	**EP ID Number:**	**FUG-GP**
3) **EU Type:** ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) **Manufacturer:**	TBD		
5) **Model:**	TBD		
6a) **Maximum Nameplate Capacity:**	**3,400 gal/yr (Total 2 units)**		
6b) **Maximum Process Design Capacity** (if different than 6a)	**NA**		
7) **Date of Construction:**	**1st Quarter 2012**		
8) **Date of Modification (if applicable)**	**NA**		
9) **Is this a Controlled Emission Unit?** ☒ **No** ☐ **Yes**	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**8760 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☒ **No** ☐ **Yes** **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☐ **Material Usage Limits**			
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☒ **Other: VOC Emissions**	**11 tons VOC/yr (2 Units Combined)**		
Rationale for Requesting the Limit(s):	**BACT Analysis**		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EU

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

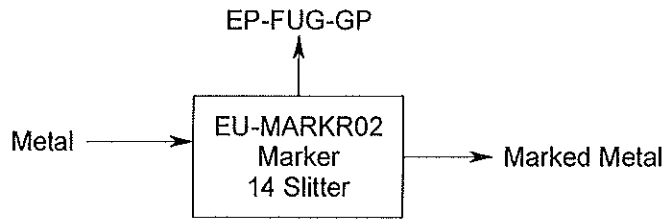
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**Marker – 14 Slitter**		
2) **EU ID Number:**	**MARKR02**	**EP ID Number:**	**FUG-GP**
3) **EU Type:** ☒ New Source ☐ Unpermitted Existing Source ☐ Modification to a Permitted Source Previous Permit # is:			
4) **Manufacturer:**	TBD		
5) **Model:**	TBD		
6a) **Maximum Nameplate Capacity:**	**3,400 gal/yr (Total 2 units)**		
6b) **Maximum Process Design Capacity** (if different than 6a)	**NA**		
7) **Date of Construction:**	**1st Quarter 2012**		
8) **Date of Modification (if applicable)**	**NA**		
9) Is this a Controlled Emission Unit? ☒ No ☐ Yes	If Yes, Control Equipment name/ID are:		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**8760 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☐ No ☒ Yes **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☐ **Material Usage Limits**			
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☒ **Other:**	**11 tons VOC/yr (2 Units Combined)**		
Rationale for Requesting the Limit(s):	**BACT Analysis**		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

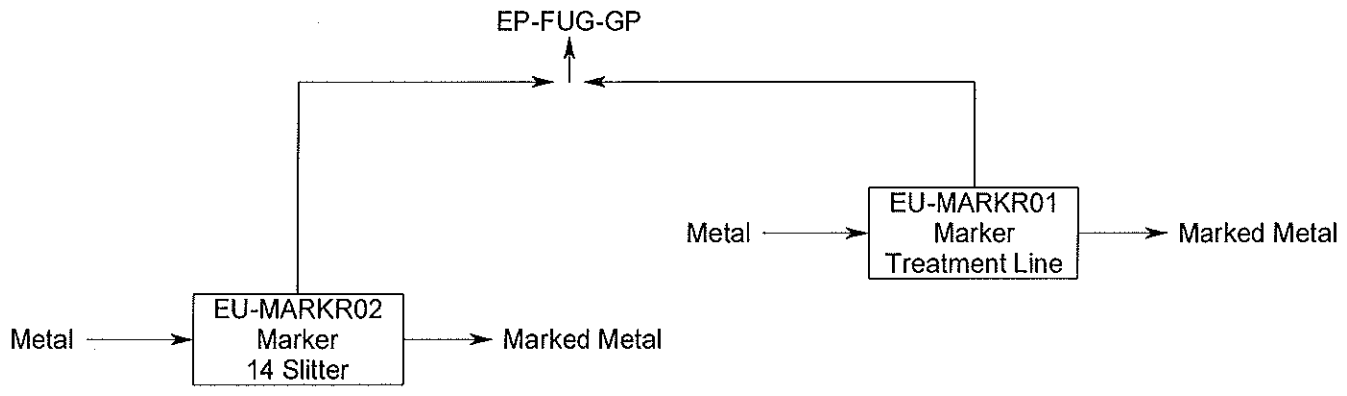
Company Name Alcoa, Inc.	
1) EP Number ID: FUG-GP	
2) Stack Opening size: ☐ circular, diameter (inches) _____ ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): No stack	
4) Height from highest building level (feet): No stack	
5) Distance from the nearest property line (feet): No stack	
6) Discharge Style (check one)	☐ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☒ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known):	8) Exit Temperature (Fahrenheit): 70 °F
9) Rated Flow Rate: ☐ ACFM: _____	☐ SCFM: _____
10) Does this emission point have control equipment? ☒ No ☐ Yes; If yes, provide control ID: _____	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number:
FUG-GP

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☐ Testing Data ☒ Other: Vendor (MSDS) and VOC BACT

Calculations: Ink/Solvents used are 100% VOC/HAPs and no Solids. Therefore, there are no PM emissions from these systems.

VOC/HAPs: 3,400 gal/yr (max. ink/solvent use) * 6.60 lbs/gal (density) * 1 yr/8760 hrs = 2.56 lbs/hr * 8760 hrs/yr * 1 ton/2000 lbs = 11.21 tons/yr

Please see attached Marking Ink/Solvent MSDS's – These are only example MSDS's and final MSDS's can be provided when finalized. HAPs are assumed to be equal to VOCs to be conservative and provide flexibility in the different inks that could be used. The marking systems will likely use ink jet technology, where electromagnetic fields guide electrically charged ink streams into the substrate.

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration:						No Air Flow				No Air Flow	No Air Flow
lbs/hr						2.56				2.56	2.56
tons/year						11.21				11.21	11.21

MATERIAL SAFETY DATA SHEET

Jet Coding Inks

Ryeco Inc
810 Pickens Drive Ext
Marietta, GA 30062

Last Update: June 2, 2010
MSDS Number: 9000001
Emergency: 770.423.0934

I. PRODUCT IDENTIFICATION

Product Name: 12117 Solvent Based Flush/Cleaner

Chemical Family: Ester

II. INGREDIENTS

Ingredient	CAS No.	Wt. %	LD50	ACGIH TLV	OSHA PEL	OSHA STEL
Ethyl Acetate	141-78-6	50-90	11g/kg	400ppm	400ppm	400ppm
Methanol	67-56-1	20-70	NA	200ppm	200ppm	NA

III. PHYSICAL DATA

Boiling Point:	168-172° F / 75.5-78° C
Vapor Pressure (mm Hg):	86
Vapor Density (Air=1):	3.04
Solubility in Water:	Miscible.
Evaporation Rate (n-Butyl Acetate=1):	4.1
Specific Gravity (Water=1):	0.80-0.92
Percent Volatile by Volume (%):	80-90
Appearance and odor:	Clear liquid with an alcohol odor.

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point:	24° F / 4.44° C
Flammable Limits:	LEL: 3.4 UEL: 19
Extinguishing Media:	Carbon dioxide,dry chemical, or alcohol foam.
Special Fire Fighting Procedures:	Wear a self-contained breathing apparatus and chemical resistant personal protection.
Unusual Fire and Explosion Hazards:	Flammable, may ignite by spark or open flame.

V. REACTIVITY DATA

Stability:	(X) Stable ( ) Unstable
Incompatibility:	Oxidizing Materials.
Hazardous decomposition products:	Carbon Monoxide on combustion.
Conditions to avoid:	Prevent exposure to excessive heat and flame.

VI. HEALTH HAZARD DATA

Effects of Overexposure:

Eye Contact:	Can cause irritation, redness, tearing and blurred vision.
Skin Contact:	Prolonged or repeated contact can cause minor skin irritation.
Inhalation:	Excessive inhalation of vapors can cause nasal and respiratory irritation.
Ingestion:	Can cause gastrointestinal irritation, nausea, vomiting and diarrhea.

First Aid:

Eye Contact:	Flush with large amounts of water for 15 minutes and seek medical attention.
Skin Contact:	Remove contaminated clothing. Wash skin with soap and water.
Inhalation:	Remove to fresh air. If breathing is difficult, administer oxygen. If problems persist, seek medical attention.
Ingestion:	Keep person warm and seek medical advice on whether to induce vomiting.

VII. SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Isolate spill. Prevent run-off to sewers or other bodies of water. Absorb liquid with suitable absorbent material and place in containers for proper disposal.

Waste Disposal:	Dispose contaminated absorbent in accordance with local, state and federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection:	NIOSH / MSHA approved respirator when high concentrations of vapors exist.
Ventilation:	Provide sufficient mechanical ventilation to maintain low concentrations of vapors.
Protective Clothing:	Chemical resistant gloves.
Eye Protection:	Safety goggles.
Other Protective Equipment:	As necessary to avoid prolonged contact.

IX. TRANSPORTATION

Proper Shipping Names:	DOT: Printing Ink	IMCO: Printing Ink
Hazard Classification:	Flammable Liquid UN 1210	Flammable Liquid UN 1210

X. HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

Hazard Ratings:	0 - Minimal	1 - Slight	2 - Moderate	3 - Serious	4 - Severe
Health:	1				
Flammability:	3				
Reactivity:	0				

IMPORTANT: THIS INFORMATION CONTAINED IS FURNISHED WITHOUT WARRANTY OF ANY KIND AND IS HEREIN GIVEN IN GOOD FAITH. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE. SQUID INK ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE TO VENDORS, USERS OR THIRD PARTIES. WHILE THE INFORMATION HEREIN IS BELIEVED TO BE RELIABLE, WE DO NOT GUARANTEE ITS ACCURACY. PURCHASERS ARE ENCOURAGED TO MAKE THERE OWN TESTS WITH MATERIALS DESCRIBED HEREIN AND MUST MAKE INDEPENDENT DETERMINATION OF SUITABILITY AND COMPLETENESS OF INFORMATION FROM ALL SOURCES TO ASSURE PROPER USE WITH MATERIALS AND COMPATIBILITY WITH EQUIPMENT.

MATERIAL SAFETY DATA SHEET

RYECO, INC.
810 Pickens Drive Ext.
Marietta, Georgia 30062
Phone: 770-423-0934
September 25, 2009

Ryeco Product Number: 12112
Information Phone: 770-423-0934
Emergency Phone: 404.433.4526
404.229.9038

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name	Blue Series Colored Solvent Based Ink Jet Ink	Supplier	Ryeco, Inc.
Pack Code	Ryeco Part # 12112		810 Pickens Drive Ext.
Size	per gallon		Marietta, Georgia 30062
			Phone: 770.423.0934
			Fax: 770.424.2554

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/preparation: Preparation

Information on Hazardous Ingredients*

	Wt. %	LD50	ACGIH TLV		OSHA PEL	OSHA STEL
Ethyl Acetate	80-100	11g/kg	400ppm		400ppm	400ppm
Color Blend	Proprietary	5-15	NA	NA	NA	NA

*All Materials contained are listed on the TSCA Inventory List.

Common Name

Solvent Based Ink Jet Ink

3. HAZARDS IDENTIFICTION

HMIS Hazard Ratings: Health – 1, Flammability – 3, Chemical Reactivity – 0

NOTE: HMIS rating involve data and interpretations that may vary from company to company. These are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

4. FIRST-AID MEASURES

Effects and symptoms

Inhalation	: Excessive inhalation of vapors can cause nasal and respiratory irritation.
Ingestion	: Can cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Skin contact	: Prolonged or repeated contact can cause minor skin irritation and discoloration due to pigment.
Eye contact	: Can cause irritation, redness, tearing and blurred vision.

First-aid measures

Inhalation	: Remove to fresh air. If breathing is difficult, administer oxygen. If problems persist, seek medical attention.
Ingestion	: Keep person warm and seek medical advice on whether to induce vomiting.
Skin contact	: Remove contaminated clothing. Wash skin with soap and water.
Eye Contact	: Flush with large amounts of water for 15 minutes and seek medical attention.

5. FIRE-FIGHTING MEASURES

Flash Point	: 24° F (4.44° C)
Flammable Limits	: LEL: 2.2 UEL: 11
Extinguishing media	: Carbon dioxide, dry chemical, or alcohol foam.
Special fire-fighting procedures	: Wear a self-contained breathing apparatus and chemical resistant personal protection.
Unusual fire/explosion hazards	: Flammable, may ignite by spark or open flame.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	: Put on appropriate personal protective equipment (see Section 8).
Environmental precautions And cleanup methods	: In the event of spillage: Isolate spill. Prevent run-off to sewers or other bodies of water. Absorb liquid with suitable absorbent material and place in containers for proper disposal. Dispose contaminated absorbent in accordance with local, state and federal regulations.

7. HANDLING AND STORAGE

Handling	: Avoid contact with skin and eyes.
Storage	: Store in a dry, cool and well-ventilated area away from heat, open flame or other potential sources of ignition. Keep out of the reach of children. For Professional use only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

When handling product as supplied :

Engineering controls	: Provide sufficient mechanical ventilation to maintain low concentrations of

Material Safety Data Sheet
InkSource
Ink
V435-D

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name : V435-D

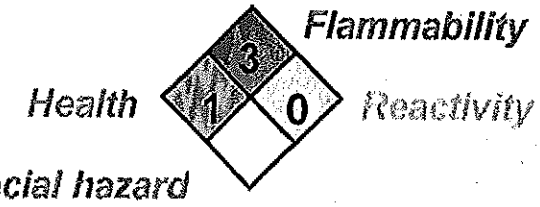
Material uses : Industrial applications: Ink for use in a continuous ink jet process.

Emergency telephone number : Medical: CALL RMPDC, USA (303) 623-5716
Transporters: CALL CHEMTREC, USA (800)-424-9300

Manufacturer : Videojet Technologies Inc., 1500 Mittel Boulevard, Wood Dale, IL, 60191-1073 U.S.A
Phone: 1-800-843-3610 Fax: 1-800-582-1343
Videojet Technologies Europe BV., Strijkviertel 39, 3454 PJ De Meern, The Netherlands.
Phone: 31-030-6693000 Fax: 31-030-6693060

2. HAZARDS IDENTIFICATION

National Fire Protection Association (U.S.A.) :



Emergency overview : WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL. Keep away from flame, heat, and static discharge sources. Irritant and central nervous system depressant: Avoid inhalation of vapors and contact with eyes and skin. May be harmful or fatal if swallowed. If inhaled remove to fresh air. If splashed in eyes flush with water. If contacts skin flush with water and wash with mild soap. In medical emergency call Poison Control Center (USA 1-303-623-5716) and a physician. Read MSDS before using.

Effects and symptoms

	Chemical name	Effects and symptoms
1)	2-Butanone	Irritating to eyes. May cause skin irritation. Defatting to the skin. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness. Can cause central nervous system (CNS) depression.
2)	Colorant, Organometallic Compound, Chromium III, 5.7% Cr	Repeated exposure may cause skin dryness or cracking.
3)	Cyclohexanone	Slightly irritating to the eyes, skin and respiratory system. Absorbed through skin. Can cause gastrointestinal disturbances. Harmful by inhalation. Can cause central nervous system (CNS) depression. Vapors may cause drowsiness and dizziness. Repeated exposure may cause skin dryness or cracking. Repeated or prolonged contact with irritants may cause dermatitis.

Continued on next page

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

	CAS number	Percent (%)	Chemical name
1)	78-93-3	65 - 80	2-Butanone
2)	--	3 - 7	Colorant, Organometallic Compound, Chromium III, 5.7% Cr
3)	108-94-1	3 - 7	Cyclohexanone

Occupational exposure limits, if available, are listed in section 8.

4. FIRST AID MEASURES

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if symptoms appear.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. FIRE-FIGHTING MEASURES

Extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Special fire-fighting procedures : Highly flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Unusual fire/explosion hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides

Protection of fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Continued on next page

Methods for cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. HANDLING AND STORAGE

Handling : Store and use away from heat, sparks, open flame or any other ignition source. Use only with adequate ventilation. Use non-sparking tools. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Do not reuse container. Use suitable protective equipment (section 8). Refer to and follow equipment manual for operation and maintenance procedures.

Storage : Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Keep away from sources of ignition.

Packaging materials : Use original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits

	Chemical name	Occupational exposure limits
1)	2-Butanone	1) United States ACGIH TLV STEL 15 minutes 300 ppm (2004) 2) United States ACGIH TLV TWA 8 hours 200 ppm (2004) 3) United States OSHA PEL TWA 8 hours 200 ppm
2)	Colorant, Organometallic Compound, Chromium III, 5.7% Cr	1) United States ACGIH TLV TWA 8 hours 0.5 mg/m³ (2004) 2) United States OSHA PEL TWA 8 hours 0.5 mg/m³
3)	Cyclohexanone	1) United States ACGIH TWA 8 hours 25 ppm (Skin) (1999) 2) United States OSHA TWA 8 hours 50 ppm (1994)

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protective equipment

Respiratory system : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin and body : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Continued on next page

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: Liquid.
Color	: Black.
Odor threshold	: Highest known value: 10 ppm. Weighted average: 10 ppm.
Boiling point	: Lowest known value: 80 °C. Weighted average: 84 °C.
Melting point	: May start to solidify at the following temperature: -47 °C. Weighted average: -84 °C.
Specific gravity	: 0.87 (Water = 1)
Vapor density	: >2.5 (Air = 1)
Vapor pressure	: Highest known value: 71 mm Hg at 20°C. Weighted average: 66 mm Hg at 20°C.
Evaporation rate (butyl acetate = 1)	: Highest known value: 7.1. Weighted average: 6.7.
Solubility	: Easily soluble in the following materials: methanol, diethyl ether, n-octanol and acetone. Soluble in the following materials: cold water and hot water.
Flash point	: -6 °C.
Auto-ignition temperature	: Lowest known value: 419 °C. Weighted average: 508 °C.
Flammable limits	: Lowest known value: 1.1%. Highest known value: 10.1%.
Volatility (w/w)	: 84 %.
VOC Volatility (w/w) - less exempt volatile.	: 84 %.

10. STABILITY AND REACTIVITY

Stability	: The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

Chemical name	Toxicological information
1) 2-Butanone	1) LD50 Oral Rat: 2737 mg/kg 2) LD50 Oral Mouse: 2190 mg/kg 3) LD50 Oral Mouse: 4050 mg/kg 4) LD50 Dermal Rabbit: 6480 mg/kg 5) LD50 Oral Rat: 2737 mg/kg
2) Colorant, Organometallic Compound, Chromium III, 5.7% Cr	Not available.
3) Cyclohexanone	1) LD50 Oral Mouse: 1400 mg/kg 2) LD50 Oral Rat: 1539 mg/kg 3) LD50 Dermal Rabbit: 948 mg/kg 4) LDLo Oral Rabbit: 1600 mg/kg 5) LD50 Oral Mouse: 1400 mg/kg 6) LD50 Oral Rat: 1539 mg/kg 7) LD50 Dermal Rabbit: 948 mg/kg

Continued on next page

12. ECOLOGICAL INFORMATION

Ecotoxicity : No known significant effects or critical hazards.

Heavy Metals : Total concentration: Pb, Hg, Cd, Cr(VI) < 100 ppm

California, VOC Content : 733 grams volatile organic / liter less water or exempt volatile.

13. DISPOSAL CONSIDERATIONS

Waste disposal : Waste must be disposed of according to applicable regulations. Small quantities of waste may best be handled using a 'lab pack' service offered by a licensed waste disposal firm.

14. TRANSPORT INFORMATION

UN number : UN1210

Proper shipping name : Printing Ink

TDG Class : 3

Packing group : II

15. REGULATORY INFORMATION

CERCLA: Hazardous substances. : The following components are listed: 2-Butanone (65 - 80%); Cyclohexanone (3 - 7%)

SARA 313 : The following components are listed: None.

California Prop. 65 : This product contains a chemical or chemicals known to the state of California to cause cancer. The following components are listed: Vinyl Chloride (< 0.001%); proprietary (< 0.001%). This product contains a chemical or chemicals known to the state of California to cause birth defects or other reproductive harm. The following components are listed: Cyclohexanol (< 0.003%); Toluene (< 0.0002%).

Tariff Code - harmonized system : 3215.11 Printing ink: Black.
USA ...00.60
EU ...00.00

16. OTHER INFORMATION

Date of issue : May 23, 2008

Prepared by : Garth Studebaker, CSP

Version : 7

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet
InkSource
Make-Up Fluid
V708-D

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name : V708-D

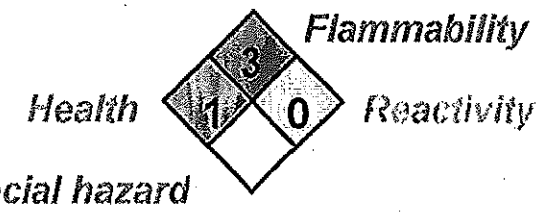
Material uses : Industrial applications: Make-Up fluid for use in a continuous ink jet process. Replaces solvents lost through evaporation during normal ink drop recycling process.

Emergency telephone number : Medical: CALL RMPDC, USA (303) 623-5716
Transporters: CALL CHEMTREC, USA (800)-424-9300

Manufacturer : Videojet Technologies Inc., 1500 Mittel Boulevard, Wood Dale, IL, 60191-1073 U.S.A
Phone: 1-800-843-3610 Fax: 1-800-582-1343
Videojet Technologies Europe BV., Strijkviertel 39, 3454 PJ De Meern, The Netherlands.
Phone: 31-030-6693000 Fax: 31-030-6693060

2. HAZARDS IDENTIFICATION

National Fire Protection Association (U.S.A.) :



Emergency overview : WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL. Keep away from flame, heat, and static discharge sources. Irritant and central nervous system depressant: Avoid inhalation of vapors and contact with eyes and skin. May be harmful or fatal if swallowed. If inhaled remove to fresh air. If splashed in eyes flush with water. If contacts skin flush with water and wash with mild soap. In medical emergency call Poison Control Center (USA 1-303-623-5716) and a physician. Read MSDS before using.

Effects and symptoms

	Chemical name	Effects and symptoms
1)	2-Butanone	Irritating to eyes. May cause skin irritation. Defatting to the skin. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness. Can cause central nervous system (CNS) depression.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

	CAS number	Percent (%)	Chemical name
1)	78-93-3	95 - <100	2-Butanone

Occupational exposure limits, if available, are listed in section 8.

Continued on next page

4. FIRST AID MEASURES

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if symptoms appear.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. FIRE-FIGHTING MEASURES

Extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Special fire-fighting procedures : Highly flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Unusual fire/explosion hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Protection of fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Continued on next page

7. HANDLING AND STORAGE

Handling : Store and use away from heat, sparks, open flame or any other ignition source. Use only with adequate ventilation. Use non-sparking tools. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Do not reuse container. Use suitable protective equipment (section 8). Refer to and follow equipment manual for operation and maintenance procedures.

Storage : Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Keep away from sources of ignition.

Packaging materials : Use original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits

	Chemical name	Occupational exposure limits
1)	2-Butanone	1) United States ACGIH TLV STEL 15 minutes 300 ppm (2004) 2) United States ACGIH TLV TWA 8 hours 200 ppm (2004) 3) United States OSHA PEL TWA 8 hours 200 ppm

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protective equipment

Respiratory system : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin and body : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : Liquid.

Color : Clear.

Odor threshold : Highest known value: 10 ppm. Weighted average: 10 ppm.

Boiling point : Lowest known value: 80 °C. Weighted average: 80 °C.

Melting point : May start to solidify at the following temperature: -87 °C. Weighted average: -87 °C.

Specific gravity : 0.8 (Water = 1)

Vapor density : >2.5 (Air = 1)

Vapor pressure : Highest known value: 71 mm Hg at 20°C. Weighted average: 71 mm Hg at 20°C.

Evaporation rate (butyl acetate = 1) : 7.1

Continued on next page

Solubility	: Easily soluble in the following materials: methanol, diethyl ether, n-octanol and acetone. Soluble in the following materials: cold water and hot water.
Flash point	: <23 °C.
Auto-ignition temperature	: Lowest known value: 515 °C. Weighted average: 515 °C.
Flammable limits	: Lowest known value: 1.8%. Highest known value: 10.1%.
Volatility (w/w)	: 99 %.
VOC Volatility (w/w) - less exempt volatile.	: 99 %.

10. STABILITY AND REACTIVITY

Stability	: The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

Chemical name	Toxicological information
1) 2-Butanone	1) LD50 Oral Rat: 2737 mg/kg 2) LD50 Oral Mouse: 2190 mg/kg 3) LD50 Oral Mouse: 4050 mg/kg 4) LD50 Dermal Rabbit: 6480 mg/kg 5) LD50 Oral Rat: 2737 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity	: No known significant effects or critical hazards.
Heavy Metals	: Total concentration: Pb, Hg, Cd, Cr(VI) < 100 ppm
California, VOC Content	: 800 grams volatile organic / liter less water or exempt volatile.

13. DISPOSAL CONSIDERATIONS

Waste disposal	: Waste must be disposed of according to applicable regulations. Small quantities of waste may best be handled using a 'lab pack' service offered by a licensed waste disposal firm.

14. TRANSPORT INFORMATION

UN number	: UN1193
Proper shipping name	: Methyl ethyl ketone solution
TDG Class	: 3
Packing group	: II

15. REGULATORY INFORMATION

CERCLA: Hazardous substances.	: The following components are listed: 2-Butanone (95 - <100%); Cyclohexanone (0.1 - 1%)
SARA 313	: The following components are listed: None.
California Prop. 65	: This product contains a chemical or chemicals known to the state of California to cause birth defects or other reproductive harm. The following components are listed: Cyclohexanol (< 0.0002%).

Continued on next page

Tariff Code - harmonized system	: 3814.00 Organic composite solvents and thinners, not elsewhere specified or included. USA ...50.90 EU ...90.90

16. OTHER INFORMATION

Date of issue	: August 5, 2008
Prepared by	: Garth Studebaker, CSP
Version	: 7.02

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

English (US)

Material Safety Data Sheet
InkSource
Cleaning Solution
V902-Q

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name : V902-Q

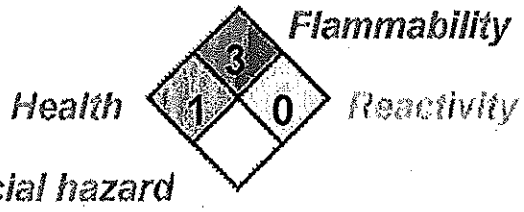
Material uses : Industrial applications: Use for cleaning the Videojet printer and printer components only.

Emergency telephone number : Medical: CALL RMPDC, USA (303) 623-5716
Transporters: CALL CHEMTREC, USA (800)-424-9300

Manufacturer : Videojet Technologies Inc., 1500 Mittel Boulevard, Wood Dale, IL, 60191-1073 U.S.A
Phone: 1-800-843-3610 Fax: 1-800-582-1343
Videojet Technologies Europe BV., Strijkviertel 39, 3454 PJ De Meern, The Netherlands.
Phone: 31-030-6693000 Fax: 31-030-6693060

2. HAZARDS IDENTIFICATION

National Fire Protection Association (U.S.A.) :



Emergency overview : WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL. Keep away from flame, heat, and static discharge sources. Irritant and central nervous system depressant: Avoid inhalation of vapors and contact with eyes and skin. May be harmful or fatal if swallowed. If inhaled remove to fresh air. If splashed in eyes flush with water. If contacts skin flush with water and wash with mild soap. In medical emergency call Poison Control Center (USA 1-303-623-5716) and a physician. Read MSDS before using.

Effects and symptoms

	Chemical name	Effects and symptoms
1)	2-Butanone	Irritating to eyes. May cause skin irritation. Defatting to the skin. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness. Can cause central nervous system (CNS) depression.
2)	Acetone	Irritating to eyes. Slightly irritating to the skin and respiratory system. Absorbed through skin. Can cause central nervous system (CNS) depression. Vapors may cause drowsiness and dizziness. Can cause gastrointestinal disturbances. Repeated exposure may cause skin dryness or cracking. Repeated or prolonged contact with irritants may cause dermatitis.

Continued on next page

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

	CAS number	Percent (%)	Chemical name
1)	78-93-3	90 - 99	2-Butanone
2)	67-64-1	1 - 3	Acetone

Occupational exposure limits, if available, are listed in section 8.

4. FIRST AID MEASURES

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if symptoms appear.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. FIRE-FIGHTING MEASURES

Extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Special fire-fighting procedures : Highly flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Unusual fire/explosion hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon oxides

Protection of fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Continued on next page

7. HANDLING AND STORAGE

Handling : Store and use away from heat, sparks, open flame or any other ignition source. Use only with adequate ventilation. Use non-sparking tools. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Do not reuse container. Use suitable protective equipment (section 8). Refer to and follow equipment manual for operation and maintenance procedures.

Storage : Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Keep away from sources of ignition.

Packaging materials : Use original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits

Chemical name	Occupational exposure limits
1) 2-Butanone	1) United States ACGIH TLV STEL 15 minutes 300 ppm (2004) 2) United States ACGIH TLV TWA 8 hours 200 ppm (2004) 3) United States OSHA PEL TWA 8 hours 200 ppm
2) Acetone	1) United States ACGIH TLV STEL 15 minutes 750 ppm (2004) 2) United States ACGIH TLV TWA 8 hours 500 ppm (2004) 3) United States OSHA PEL TWA 8 hours 1000 ppm

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protective equipment

Respiratory system : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin and body : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : Liquid.

Color : Clear.

Odor threshold : Highest known value: 62 ppm. Weighted average: 62 ppm.

Boiling point : Lowest known value: 56 °C. Weighted average: 79 °C.

Melting point : May start to solidify at the following temperature: -87 °C. Weighted average: -87 °C.

Specific gravity : 0.795 (Water = 1)

Vapor density : >2.0 (Air = 1)

Vapor pressure : Highest known value: 185 mm Hg at 20°C. Weighted average: 73 mm Hg at 20°C.

Continued on next page

Evaporation rate (butyl acetate = 1) : Highest known value: 14.4. Weighted average: 7.3.

Solubility : Easily soluble in the following materials: hot water, methanol, diethyl ether, n-octanol and acetone.
Soluble in the following materials: cold water.

Flash point : <23 °C.

Auto-ignition temperature : Lowest known value: 465 °C. Weighted average: 514 °C.

Flammable limits : Lowest known value: 1.8%. Highest known value: 12.8%.

Volatility (w/w) : 99 %.

VOC Volatility (w/w) - less exempt volatile. : 98 %.

10. STABILITY AND REACTIVITY

Stability : The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

Chemical name	Toxicological information
1) 2-Butanone	1) LD50 Oral Rat: 2737 mg/kg 2) LD50 Oral Mouse: 2190 mg/kg 3) LD50 Oral Mouse: 4050 mg/kg 4) LD50 Dermal Rabbit: 6480 mg/kg 5) LD50 Oral Rat: 2737 mg/kg
2) Acetone	1) LD50 Oral Rat: 5800 mg/kg 2) LD50 Oral Rabbit: 5340 mg/kg 3) LDLo Oral Human: 1159 mg/kg 4) LDLo Oral Rat: 5800 mg/kg 5) LDLo Dermal Rabbit: 20000 mg/kg 6) LD50 Oral Rat: 5800 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity : No known significant effects or critical hazards.

Heavy Metals : Total concentration: Pb, Hg, Cd, Cr(VI) < 100 ppm

California, VOC Content : 795 grams volatile organic / liter less water or exempt volatile.

13. DISPOSAL CONSIDERATIONS

Waste disposal : Waste must be disposed of according to applicable regulations. Small quantities of waste may best be handled using a 'lab pack' service offered by a licensed waste disposal firm.

14. TRANSPORT INFORMATION

UN number : UN1210

Proper shipping name : Printing Ink Related Material

TDG Class : 3

Packing group : II

Continued on next page

15. REGULATORY INFORMATION

CERCLA: Hazardous substances.	: The following components are listed: 2-Butanone (90 - 99%); Acetone (1 - 3%)
SARA 313	: The following components are listed: None.
California Prop. 65	: This product contains a chemical or chemicals known to the state of California to cause cancer. The following components are listed: Benzene (< 0.000007%); Formaldehyde (< 0.000005%); Acetaldehyde (< 0.000005%). This product contains a chemical or chemicals known to the state of California to cause birth defects or other reproductive harm. The following components are listed: Benzene (< 0.000007%).
Tariff Code - harmonized system	: 3402.90 surface-active preparations, washing preparations (including auxiliary washing preparations) and cleaning preparations, whether or not containing soap, other than those of heading 3401: Other. USA ...50.30 EU ...90.90

16. OTHER INFORMATION

Date of issue	: January 11, 2008
Prepared by	: Garth Studebaker, CSP
Version	: 7.01

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

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EU1

ATTN: Application Log In
AIR QUALITY BUREAU
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EU1: Industrial Engine Information

Please see instructions on reverse side

EXEMPTION

According to 567 Iowa Administrative Code Chapter 22.1(2)r, an internal combustion engine with a brake horsepower rating of less than 400 is exempted from the provisions of construction permits. Owners of a new exempt engine may be required to submit a DNR registration form for the engine – see instructions.

Company Name: Alcoa, Inc.	**Is the facility a major source of HAP?** ☒ yes ☐ no

ENGINE (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

☒ **New Unit** ☐ **Unpermitted Existing Unit** ☐ **Modification to an unit with Permit #:**

(1) Use of Engine: ☐ Non-emergency ☒ Emergency ☐ Fire Pump (Check only one)

(2) Engine ID Number:	(3) Rated Power:	(4) Construction Date:
EU-OCOM20	☐ bhp ☒ 25 KW	1st Quarter 2012
(5) Manufacturer:	(6) Manufacture Date:	(7) Model Year & Model Number:
Kohler Power Systems	TBD	2011 - 25REZG
(8) Engine Order Date:	(9) Control Device (if any):	(10) Displacement per cylinder (L):
TBD	NA	3.0
(11) Engine Ignition Type: ☒ Spark Ignition ☐ Compression	(12) Engine Burn Type: ☐ 2SLB ☐ 2SRB ☒ 4SRB	(13) Date of Modification (if applicable):

FUEL DESCRIPTION AND SPECIFICATIONS

(14) Fuel Type	☐ Diesel Fuel (#) (gal/hr)	☐ Gasoline Fuel (gal/hr)	☒ Natural Gas (cf/hr)	☐ Other Fuels (unit:)
(15) Full Load Consumption Rate	NA	NA	366	
(16) Actual Consumption Rate			366	
(17) Sulfur Content wt%		N/A	N/A	

OPERATING LIMITS

(18) Requested Operating Limits (hours/year, or gallons fuel/year, etc.):

1000 hrs/yr

STACK/VENT (EMISSION POINT) SPECIFICATIONS

(19) Stack/Vent ID: S-364	(20) Stack Opening Size: ☒ circular, diameter (inches) is:
(21) Stack Height (feet) from the Ground: NA	☐ other, size (inches x inches) is: ☒ Single Stack ☐ Dual Stack
(22) Stack Height (feet) above the Building (If Applicable): NA	(23) Discharge Style: ☐ V (Vertical, without rain cap or with unobstructing rain cap) ☐ VR (Vertical, with obstructing rain cap) ☐ H (Horizontal discharge) ☐ D (Downward discharge; for example, a goose neck stack) ☒ I (Inside-Vent inside building)
(24) Distance (feet) from the Property Line: NA	

EXHAUST INFORMATION

(25) Rated Flow Rate (☒ acfm ☐ scfm):	(26) Moisture Content % (if known):	(27) Exit Temperature (°F)
250		1270

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-364

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☒ Emission Factors (AP-42; NSPS IIII) ☐ Mass Balance ☐ Testing Data ☐ Other:

Calculations: Unit rated at 0.085 MMBtu/hr (25 kW) PM emission factor is $PM_{10}/PM_{2.5}$ filterable + the total condensable PM in AP-42 Chapter 3, Section 3.2.

PM: (0.085 MMBtu/hr)*(0.01941 lbs/MMBtu) = (0.002 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.001 tons/yr
PM_{10}: (0.085 MMBtu/hr)*(0.01941 lbs/MMBtu) = (0.002 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.001 tons/yr
$PM_{2.5}$: (0.085 MMBtu/hr)*(0.01941 lbs/MMBtu) = (0.002 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.001 tons/yr
SO_x: (0.085 MMBtu/hr)*(0.0006 lbs/MMBtu) = (0.00005 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.00003 tons/yr
NO_x: (0.085 MMBtu/hr)*(2.27 lbs/MMBtu) = (0.19 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.096 tons/yr
VOC: (0.085 MMBtu/hr)*(0.296 lbs/MMBtu) = (0.003 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.001 tons/yr
CO: (0.085 MMBtu/hr)*(407.14 lbs/MMBtu) = (34.61 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 17.30 tons/yr (CO emissions based on NSPS limit of 387 g/HP-hr)

CO_2: (0.085 MMBtu/hr)*(110 lbs/MMBtu) = (9.35 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 4.68 tons/yr
CH_4: (0.085 MMBtu/hr)*(0.23 lbs/MMBtu) = (0.020 lbs/hr)*(1000 hrs/yr)/(2000 lbs/hr) = 0.010 tons/yr
CO_2e: (4.68 tons/yr)+(21*0.010 tons/yr) = 4.89 tons/yr

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, (lb/MMBtu):	0.01941	0.01941	0.01941	0.0006	2.27	0.296	407.14	114.83		negligible	negligible
lbs/hr	0.002	0.002	0.002	0.00005	0.19	0.003	34.61	9.78		negligible	negligible
tons/year	0.001	0.001	0.001	0.00003	0.096	0.001	17.30	4.89		negligible	negligible

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

EU

AIR CONSTRUCTION PERMIT APPLICATION

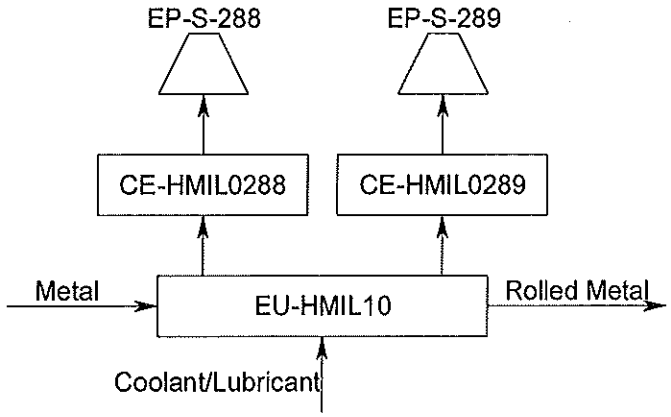
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**100" 5 Stand Hot Mill - N**		
2) **EU ID Number:**	**HMIL10**	**EP ID Number:**	**S-288**
3) **EU Type:** ☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source	Previous Permit # is: **88-A-158**		
4) **Manufacturer:**	**SMS**		
5) **Model:**	**5 Stand 4-Hi Hot Mill**		
6a) **Maximum Nameplate Capacity:**			
6b) **Maximum Process Design Capacity** (if different than 6a)	**NA**		
7) **Date of Construction:**	**1989**		
8) **Date of Modification (if applicable)**	**1st Quarter 2012**		
9) **Is this a Controlled Emission Unit?** ☐ No ☒ Yes	If Yes, Control Equipment name/ID are: **HMIL0288/HMIL0289**		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**5083 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☒ No ☐ Yes **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☒ **Material Usage Limits**	**10% oil content by wt. in emulsion**		
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☐ **Other:**			
Rationale for Requesting the Limit(s):	**BACT Analysis**		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

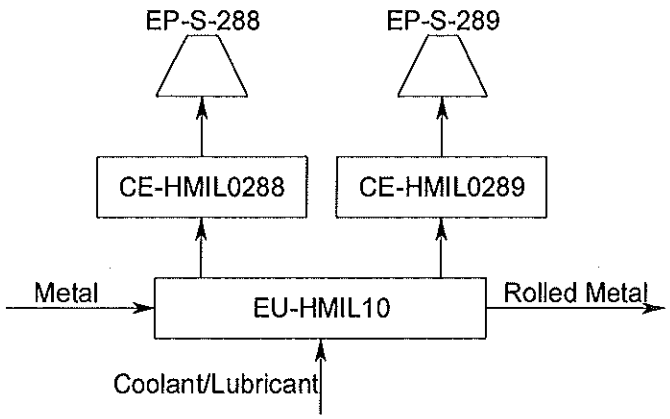
Company Name Alcoa, Inc.	
1) EP Number ID: 288	
2) Stack Opening size: ☒ circular, diameter (inches) 108 ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): 86.4	
4) Height from highest building level (feet): 32.3	
5) Distance from the nearest property line (feet): 977	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 5.0	8) Exit Temperature (Fahrenheit): 100 °F
9) Rated Flow Rate: ☒ ACFM: 130,000	☐ SCFM: _____
10) Does this emission point have control equipment? ☐ No ☒ Yes; If yes, provide control ID: HMIL0288, HMIL0289	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE Control Equipment Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) CE Number ID: HMIL0288

2) Emission Point(s) ID: S-288

3) Manufacturer: Busch

4) Model Number: Series 800

5) Control Equipment Description: PPS 3-Stage Mist Eliminator

6) Date of Construction: 1st Quarter 2012

7) Date of Modification:

8) Capture Hood involved: ☒Yes ☒No

9) Capture Hood Efficiency (percentage): 80%

10) Date of Hood Installation: 1990

11) Date of Hood Modification (if any): NA

12) **Pollutant Controlled**

	PM	PM_{10}	VOC	SO_2	NO_x	CO	Other( )
Control Efficiency	28.5%	28.5%					

13) If manufacturer's data is not available attach a separate sheet of paper (labeled CE-13A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
The above mentioned control efficiency is an engineering estimate.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-288

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☒ Testing Data ☒ Other: Eng. Est.

Calculations: See Appendix A page A-3 for lbs/hr emission rates

PM: 5.00 lbs/hr; (5.00 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 12.705 tons/yr

PM_{10}: 4.40 lbs/hr; (4.40 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 11.18 tons/yr

$PM_{2.5}$: 4.00 lbs/hr; (4.00 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 10.165 tons/yr

VOC: 17.675 lbs/hr; (17.675 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 44.92 tons/yr

See attached EC-04A for HAPs

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, (gr/cf):	0.0051	0.0045	0.0041								
lbs/hr	5.00	4.40	4.00			17.675				1.4103	1.8292
tons/year	12.705	11.18	10.165			44.92				3.58	4.65

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

EU

AIR CONSTRUCTION PERMIT APPLICATION

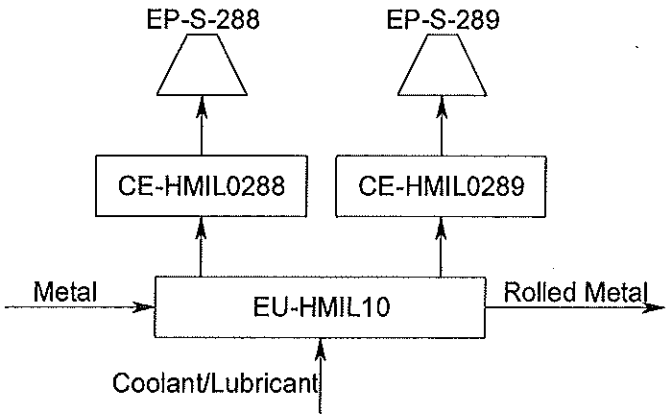
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**100" 5 Stand Hot Mill - S**		
2) **EU ID Number:**	**HMIL10**	**EP ID Number:**	**S-289**
3) **EU Type:** ☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source	**Previous Permit # is: 88-A-159**		
4) **Manufacturer:**	**SMS**		
5) **Model:**	**5 Stand 4-Hi Hot Mill**		
6a) **Maximum Nameplate Capacity:**			
6b) **Maximum Process Design Capacity** (if different than 6a)	**NA**		
7) **Date of Construction:**	**1989**		
8) **Date of Modification (if applicable)**	**1st Quarter 2012**		
9) Is this a Controlled Emission Unit? ☐ No ☒ Yes	If Yes, Control Equipment name/ID are: **HMIL0288/HMIL0289**		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**5083 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☒ No ☐ Yes **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☒ **Material Usage Limits**	**10% oil content by wt. in emulsion**		
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☐ **Other:**			
Rationale for Requesting the Limit(s):	**BACT Analysis**		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

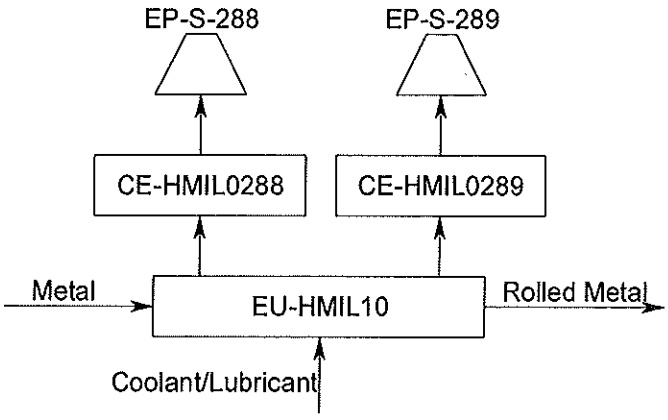
Company Name Alcoa, Inc.	
1) EP Number ID: 289	
2) Stack Opening size: ☒ circular, diameter (inches) 108 ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): 86.4	
4) Height from highest building level (feet): 32.3	
5) Distance from the nearest property line (feet): 1000	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 5.0	8) Exit Temperature (Fahrenheit): 100 °F
9) Rated Flow Rate: ☒ ACFM: 135,000	☐ SCFM: _____
10) Does this emission point have control equipment? ☐ No ☒ Yes; If yes, provide control ID: HMIL0288, HMIL0289	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE Control Equipment Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.	
1) CE Number ID: HMIL0289	
2) Emission Point(s) ID: S-289	
3) Manufacturer: Busch	4) Model Number: Series 800
5) Control Equipment Description: PPS 3-Stage Mist Eliminator	
6) Date of Construction: 1st Quarter 2012	
7) Date of Modification:	
8) Capture Hood involved: ☒Yes ☐No	
9) Capture Hood Efficiency (percentage): 80%	
10) Date of Hood Installation: 1990	11) Date of Hood Modification (if any): NA

12) **Pollutant Controlled**

	PM	PM_{10}	VOC	SO_2	NO_x	CO	Other( )
Control Efficiency	28.5%	28.5%					

13) If manufacturer's data is not available attach a separate sheet of paper (labeled CE-13A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
The above mentioned control efficiency is an engineering estimate.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-289

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☒ Testing Data ☒ Other: Eng. Est.

Calculations: See Appendix A page A-3 for lbs/hr emission rates

PM: 5.00 lbs/hr; (5.00 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 12.705 tons/yr

PM_{10}: 4.40 lbs/hr; (4.40 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 11.18 tons/yr

$PM_{2.5}$: 4.00 lbs/hr; (4.00 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 10.165 tons/yr

VOC: 17.675 lbs/hr; (17.675 lbs/hr)*(5082.56 hrs/yr)/(2000 lbs/ton) = 44.92 tons/yr

See attached EC-04A for HAPs

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, (gr/acf):	0.0061	0.0054	0.0049								
lbs/hr	5.00	4.40	4.00			17.675				1.4103	1.8292
tons/year	12.705	11.18	10.165			44.92				3.58	4.65

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

EU

AIR CONSTRUCTION PERMIT APPLICATION

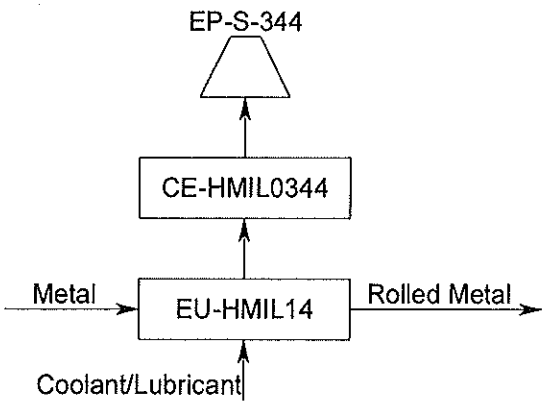
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	Alcoa, Inc.		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) Emission Unit (EU) Name:	144" Hot Mill		
2) EU ID Number:	HMIL14	EP ID Number:	S-344
3) EU Type: ☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source	Previous Permit # is: Grandfathered		
4) Manufacturer:	Mesta		
5) Model:	4-Hi Reversing Mill		
6a) Maximum Nameplate Capacity:			
6b) Maximum Process Design Capacity (if different than 6a)			
7) Date of Construction:	1948		
8) Date of Modification (if applicable)	1st Quarter 2012		
9) Is this a Controlled Emission Unit? ☐ No ☒ Yes	If Yes, Control Equipment name/ID are: HMIL0344		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) Actual Operation	5200 hrs/yr		
11) Maximum Operation	8760 hrs/yr		
REQUESTED LIMITS			
12) Are you requesting any permit limits? ☐ No ☒ Yes	If Yes, check below and write down all that apply		
☐ Operation Hour Limits:			
☐ Production Limits:			
☒ Material Usage Limits	10% oil content by wt. in emulsion		
☐ Limits Based on Stack Testing	Please attach all relevant stack testing summary reports		
☐ Other:			
Rationale for Requesting the Limit(s):	BACT Analysis		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



EP

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information
Please see instructions on the reverse side

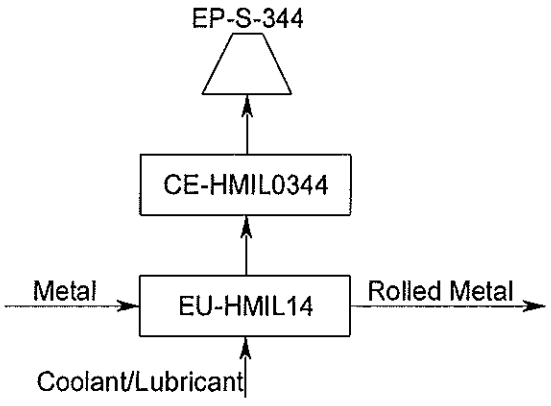
Company Name Alcoa, Inc.	
1) EP Number ID: 344	
2) Stack Opening size: ☒ circular, diameter (inches) 88 ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): 85	
4) Height from highest building level (feet): 31	
5) Distance from the nearest property line (feet): 1089	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 5.0	8) Exit Temperature (Fahrenheit): 85 °F
9) Rated Flow Rate: ☒ ACFM: 152,435	☐ SCFM: _____
10) Does this emission point have control equipment? ☐ No ☒ Yes; If yes, provide control ID: HMIL0344	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



CE

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE Control Equipment Information

Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) CE Number ID: HMIL0344

2) Emission Point(s) ID: S-344

3) Manufacturer: Busch

4) Model Number: Series 800

5) Control Equipment Description: PPS 3-Stage Mist Eliminator

6) Date of Construction: 7/31/2003

7) Date of Modification: 1st Quarter 2012

8) Capture Hood involved: ☒Yes ☐No

9) Capture Hood Efficiency (percentage): 70%

10) Date of Hood Installation: 7/31/2003

11) Date of Hood Modification (if any): NA

12) **Pollutant Controlled**

	PM	PM_{10}	VOC	SO_2	NO_x	CO	Other( )
Control Efficiency	28.5%	28.5%					

13) If manufacturer's data is not available attach a separate sheet of paper (labeled CE-13A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
The above mentioned control efficiencies are based on engineering estimates.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-344

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☒ Testing Data ☒ Other: Eng. Est.

Calculations: See Appendix A page A-3 for lbs/hr emission rates

PM: 6.64 lbs/hr; (6.64 lbs/hr)*(5199.57 hrs/yr)/(2000 lbs/ton) = 17.26 tons/yr

PM_{10}: 5.84 lbs/hr; (5.84 lbs/hr)*(5199.57 hrs/yr)/(2000 lbs/ton) = 15.19 tons/yr

$PM_{2.5}$: 5.31 lbs/hr; (5.31 lbs/hr)*(5199.57 hrs/yr)/(2000 lbs/ton) = 13.81 tons/yr

VOC: 15.79 lbs/hr; (15.79 lbs/hr)*(5199.57 hrs/yr)/(2000 lbs/ton) = 41.05 tons/yr

See attached EC-04A for HAPs

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, (gr/acf):	0.0049	0.0043	0.0039								
lbs/hr	6.64	5.84	5.31			15.79				0.2498	0.4362
tons/year	17.26	15.19	13.81			41.05				0.649	1.134

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

EU

AIR CONSTRUCTION PERMIT APPLICATION

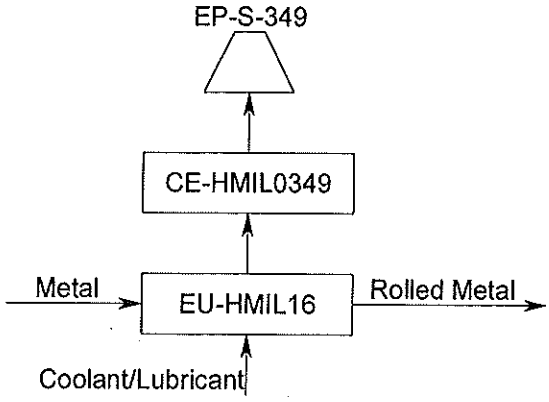
Form EU: Emission Unit Information

Please see instruction on reverse side

Company Name:	**Alcoa, Inc.**		
EMISSION UNIT (PROCESS) IDENTIFICATION & DESCRIPTION			
1) **Emission Unit (EU) Name:**	**160" Hot Mill**		
2) **EU ID Number:**	**HMIL16**	**EP ID Number:**	**S-349**
3) **EU Type:** ☐ New Source ☒ Unpermitted Existing Source ☐ Modification to a Permitted Source	Previous Permit # is: **Grandfathered**		
4) **Manufacturer:**	**United**		
5) **Model:**	**4-Hi Reversing Mill**		
6a) **Maximum Nameplate Capacity:**			
6b) **Maximum Process Design Capacity** (if different than 6a)			
7) **Date of Construction:**	**1955**		
8) **Date of Modification (if applicable)**	1st Quarter 2012		
9) **Is this a Controlled Emission Unit?** ☐ No ☒ Yes	If Yes, Control Equipment name/ID are: **HMIL0349**		
EMISSION UNIT OPERATING SCHEDLULE (hours/day, hours/year, or other)			
10) **Actual Operation**	**5078 hrs/yr**		
11) **Maximum Operation**	**8760 hrs/yr**		
REQUESTED LIMITS			
12) **Are you requesting any permit limits?** ☐ No ☒ Yes **If Yes, check below and write down all that apply**			
☐ **Operation Hour Limits:**			
☐ **Production Limits:**			
☒ **Material Usage Limits**	**10% oil content by wt. in emulsion**		
☐ **Limits Based on Stack Testing**	Please attach all relevant stack testing summary reports		
☐ **Other:**			
Rationale for Requesting the Limit(s):	**BACT Analysis**		

PROCESS DESCRIPTION

13 Provide a description **AND** a drawing to show quantitatively how **product or material** flows through this emission unit. Include product input and output, fuel throughput, and any parameters which impact air emissions. If space below is insufficient, attach a separate sheet labeled EU-13A.



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

EP

IOWA DNR Air Construction Permit Application

Form EP Stack/Vent Information

Please see instructions on the reverse side

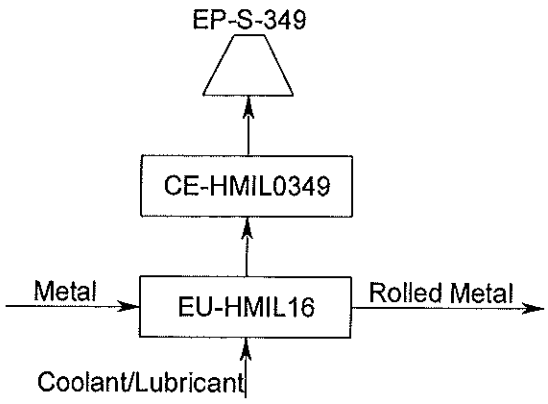
Company Name Alcoa, Inc.	
1) EP Number ID: 349	
2) Stack Opening size: ☒ circular, diameter (inches) 96 ☐ other size (inches x inches) _____ ☐ Dual Stack	
3) Height from ground (feet): 70	
4) Height from highest building level (feet): 31	
5) Distance from the nearest property line (feet): 1046	
6) Discharge Style (check one)	☒ Vertical (without rain cap or obstruction)
	☐ VR (Vertical with rain cap or obstruction)
	☐ D (Downward discharge; for example, a goose neck stack)
	☐ H (Horizontal discharge)
	☐ I (Inside-Vent inside building)

Exhaust Information

7) Moisture Content % (if known): 2.0	8) Exit Temperature (Fahrenheit): 100 °F
9) Rated Flow Rate: ☒ ACFM: 194,404	☐ SCFM: _____
10) Does this emission point have control equipment? ☐ No ☒ Yes; If yes, provide control ID: HMIL0349	

Air Emissions Pathway Diagram

11) Air Emissions Pathway Diagram (see examples on reverse-side)



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form CE Control Equipment Information
Please see instructions on the reverse side

Company Name Alcoa, Inc.

1) CE Number ID: HMIL0349

2) Emission Point(s) ID: S-349

3) Manufacturer: Busch

4) Model Number: Series 800

5) Control Equipment Description: PPS 3-Stage Mist Eliminator

6) Date of Construction: 7/31/2003

7) Date of Modification: 1st Quarter 2012

8) Capture Hood involved: ☒Yes ☐No

9) Capture Hood Efficiency (percentage): 70%

10) Date of Hood Installation: 7/31/2003

11) Date of Hood Modification (if any): NA

12) **Pollutant Controlled**

	PM	PM_{10}	VOC	SO_2	NO_x	CO	Other( )
Control Efficiency	28.5%	28.5%					

13) If manufacturer's data is not available attach a separate sheet of paper (labeled CE-13A) to provide the control equipment design specifications and performance data to support the above mentioned control efficiency.
The above mentioned control efficiencies are based on engineering estimates.

AIR QUALITY BUREAU
Application Log in Desk
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

Form EC: Emission Calculations
Please see instructions on reverse side

1) Company Name: Alcoa, Inc.

2) Emission Point (Stack/Vent) Number: S-349

3) Emission Calculation (Please see instructions for proper way to calculate). This calculation is based on (check all that apply):
☐ Emission Factors ☐ Mass Balance ☒ Testing Data ☒ Other: Eng. Est.

Calculations: See Appendix A page A-3 for lbs/hr emission rates

PM: 7.98 lbs/hr; (7.98 lbs/hr)*(5077.96 hrs/yr)/(2000 lbs/ton) = 20.27 tons/yr

PM_{10}: 7.03 lbs/hr; (7.03 lbs/hr)*(5077.96 hrs/yr)/(2000 lbs/ton) = 17.84 tons/yr

$PM_{2.5}$: 6.39 lbs/hr; (6.39 lbs/hr)*(5077.96 hrs/yr)/(2000 lbs/ton) = 16.22 tons/yr

VOC: 15.79 lbs/hr; (15.79 lbs/hr)*(5077.96 hrs/yr)/(2000 lbs/ton) = 40.09 tons/yr

See attached EC-04A for HAPs

4) POTENTIAL EMISSIONS: SUMMARY OF EMISSIONS FROM THIS EMISSION POINT

Pollutant	PM	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	CO_2e	Lead	HAP	THAP
Concentration, (gr/acf):	0.0049	0.0043	0.0039								
lbs/hr	7.98	7.03	6.39			15.79				0.2498	0.4362
tons/year	20.27	17.84	16.22			40.09				0.634	1.108

Projected Future HAP Emissions for Existing/Modified Sources

S-288
Projected Future Hours 5082.56

HAP Name	Glycol Ether	POM Cd.	Formaldehyde	Benzene	Acetaldehyde	Dibutyl Phthalate	Naphthalene	Bis(2-bromoethyl)ether	Phenol	Bis(2-ethylhexyl)phthalate
lbs/hr	0.0218	0.0074	1.4388	0.2778	0.0356	0.0183	0.0292	0.0178	0.0026	0.0139
tons/yr	0.055	0.019	3.656	0.706	0.090	0.047	0.074	0.045	0.007	0.035

S-289
Projected Future Hours 5082.56

HAP Name	Glycol Ether	POM Cd.	Formaldehyde	Benzene	Acetaldehyde	Dibutyl Phthalate	Naphthalene	Bis(2-bromoethyl)ether	Phenol	Bis(2-ethylhexyl)phthalate
lbs/hr	0.0218	0.0074	1.4103	0.2723	0.0356	0.0183	0.0292	0.0178	0.0026	0.0139
tons/yr	0.055	0.019	3.584	0.692	0.090	0.047	0.074	0.045	0.007	0.035

S-344
Projected Future Hours 5199.57

HAP Name	Glycol Ether	POM Cd.	Formaldehyde	Benzene	Acetaldehyde	Dibutyl Phthalate	Naphthalene	Bis(2-bromoethyl)ether	Phenol	Bis(2-ethylhexyl)phthalate
lbs/hr	0.0064	0.0046	0.0555	0.2629	0.0132	0.016	0.076	0.002	0.0058	0.0097
tons/yr	0.017	0.012	0.144	0.683	0.034	0.042	0.198	0.005	0.015	0.025

S-349
Projected Future Hours 5077.96

HAP Name	Glycol Ether	POM Cd.	Formaldehyde	Benzene	Acetaldehyde	Dibutyl Phthalate	Naphthalene	Bis(2-bromoethyl)ether	Phenol	Bis(2-ethylhexyl)phthalate
lbs/hr	0.0064	0.0046	0.0555	0.2629	0.0132	0.016	0.076	0.002	0.0058	0.0097
tons/yr	0.016	0.012	0.141	0.667	0.034	0.041	0.193	0.005	0.015	0.025

	Glycol Ether	POM Cd.	Formaldehyde	Benzene	Acetaldehyde	Dibutyl Phthalate	Naphthalene	Bis(2-bromoethyl)ether	Phenol	Bis(2-ethylhexyl)phthalate
Totals (tpy)	0.144	0.061	7.526	2.749	0.249	0.175	0.539	0.101	0.043	0.120

Note: All emission factors are based on engineering estimates found in the latest Title V renewal application. Uncaptured fugitive HAP emissions for the rolling mills are included.

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EI Facility Emission Inventory

See instructions on reverse side

Company Name: Alcoa, Inc.

PSD Classification: ☒ Major ☐ Minor ☐ Unknown

STACK/VENT EMISSIONS SUMMARY

(1) EP ID	(2) EU ID	(3) Source Description	(4) Construction Date	(5) Permit Number	(6) Potential or Permitted Emission Rate (tons/yr)									
					PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	VOC	CO	Pb	HAP	THAP
S-357	CFRN60	#60 CAA Furnace	1st Qtr 2012	TBD	0.234	0.234	0.234	0.02	3.03	3.71	0.47		0.06	0.062
S-358	CFRN61	#61 CAA Furnace	1st Qtr 2012	TBD	0.234	0.234	0.234	0.02	3.03	3.71	0.47		0.06	0.062
S-359	CFRN62	#62 CAA Furnace	1st Qtr 2012	TBD	0.234	0.234	0.23	0.02	3.03	3.71	0.47		0.06	0.062
S-360	CFRN63	#63 CAA Furnace	1st Qtr 2012	TBD	0.234	0.234	0.234	0.02	3.03	3.71	0.47		0.06	0.062
S-361	CFRN64	#64 CAA Furnace	1st Qtr 2012	TBD	0.234	0.234	0.234	0.02	3.03	3.71	0.47		0.06	0.062
S-356	PPFRN01	#1 Pusher Preheat Furnace	1st Qtr 2012	TBD	0.84	0.84	0.84	0.064	8.83	0.44	7.51		0.19	0.197
S-362	TFRN88	88" Continuous Heat Treat Line	1st Qtr 2012	TBD	0.306	0.306	0.306	0.024	2.82	26.21	3.21		0.071	0.074
S-363	ATL01	#1 Automotive Treatment Line	1st Qtr 2012	TBD	2.82	2.82	2.82			25.47				
S-364	ATLEG	Auto Treatment Line Emergency Generator	1st Qtr 2012	TBD	0.001	0.001	0.001	0.00003	0.096	0.001	17.30		0.0	0.0
(7) Total Stack Emissions					5.14	5.14	5.14	0.188	26.9	70.67	30.37		0.561	0.581

FUGITIVE EMISSIONS SUMMARY

(8) Source: Filt15	#15 Filter Box	0.35	0.35	0.35									
Filt16	#16 Filter Box	0.35	0.35	0.35									
ELUBE01	Electrostatic Lube – Treatment Line	0.07	0.07	0.07			9.96						
ELUBE02	Electrostatic Lube – 14 Slitter	0.07	0.07	0.07			9.96						
(9) Total Fugitive Emissions		0.84	0.84	0.84			19.91						
(10) Total Plant Emissions		116.21	98.39	93.36	39.69	49.52	273.79	45.82		20.55	20.55		

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

IOWA DNR Air Construction Permit Application

Form EI Facility Emission Inventory

See instructions on reverse side

Company Name: Alcoa, Inc.

PSD Classification: ☒ Major ☐ Minor ☐ Unknown

STACK/VENT EMISSIONS SUMMARY

(1) EP ID	(2) EU ID	(3) Source Description	(4) Construction Date	(5) Permit Number	(6) Potential or Permitted Emission Rate (tons/yr)									
					PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	VOC	CO	Pb	HAP	THAP
S-288	HMIL10	100" Hot Mill Stack - N	7/1/1988	88-A-158	12.705	11.18	10.165	0.00	0.00	44.92	0.00		3.58	4.65
S-289	HMIL10	100" Hot Mill Stack - S	7/1/1988	88-A-159	12.705	11.18	10.165	0.00	0.00	44.92	0.00		3.58	4.65
S-344	HMIL14	144" Hot Mill Stack	1948	No Permit	17.26	15.19	13.81	0.00	0.00	41.05	0.00		0.65	1.13
S-349	HMIL16	160" Hot Mill Stack	1955	No Permit	20.27	17.84	16.22	0.00	0.00	40.09	0.00		0.63	1.11
S-336	DFRN03	Pig Drying Furnace	11/2007	No Permit	0.03	0.03	0.03	0.00	0.43	0.02	0.36		0.01	0.01
S-047	HFRN15	#15 Holding Furnace	11/1992	92-A-624-S2	10.51	10.51	10.51	0.03	4.29	0.24	3.61		0.08	0.08
S-048	MRFN15	#15 Melter	6/2008	08-A-297	26.24	15.97	15.97	39.44	13.61	0.52	7.87		0.17	0.17
S-050	HFRN16	#16 Holding Furnace	11/1992	92-A-625-S5	10.51	10.51	10.51	0.03	4.29	0.24	3.61		0.08	0.08
(7) Total Stack Emissions					110.23	92.41	87.38	39.5	22.62	172	15.45		8.78	11.88

FUGITIVE EMISSIONS SUMMARY

INKJET01	Marker – Treatment Line	0	0	0			5.61			5.61	5.61
INKJET02	Marker – 14 Slitter	0	0	0			5.61			5.61	5.61
(9) Total Fugitive Emissions		0	0	0			11.22			11.22	11.22
(10) Total Plant Emissions											

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA
50324

IOWA DNR Air Construction Permit Application

Form GHG Facility and Project Greenhouse Gas Emission Inventory

See instructions on reverse side

Company Name: Alcoa, Inc.

PSD Classification: ☒ Major ☐ Minor ☐ Unknown

**Check box in (1) below if source is part of project*

STACK/VENT EMISSIONS SUMMARY

(1) *	(2) EP ID	(3) EU ID	(4) Source Description	(5) Construction Date	(6) Permit Number	(7) Potential or Permitted Emission Rate						
						CO_2 (TPY)	CH_4 (TPY)	N_2O (TPY)	SF_6 (lb/yr)	HFCs (lb/yr)	PFCs (lb/yr)	CO_2e (TPY)
☒	S-357	CFRN60	#60 CAA Furnace	1st Qtr 2012	TBD	3710.12	0.071	0.068	0	0	0	3732.7
☒	S-358	CFRN61	#61 CAA Furnace	1st Qtr 2012	TBD	3710.12	0.071	0.068	0	0	0	3732.7
☒	S-359	CFRN62	#62 CAA Furnace	1st Qtr 2012	TBD	3710.12	0.071	0.068	0	0	0	3732.7
☒	S-360	CFRN63	#63 CAA Furnace	1st Qtr 2012	TBD	3710.12	0.071	0.068	0	0	0	3732.7
☒	S-361	CFRN64	#64 CAA Furnace	1st Qtr 2012	TBD	3710.12	0.071	0.068	0	0	0	3732.7
☒	S-356	PPFRN01	#1 Pusher Preheat Furnace	1st Qtr 2012	TBD	12985.4	0.248	0.237	0	0	0	13064
☒	S-362	TFRN88	88" Continuous Heat Treat Line	1st Qtr 2012	TBD	4730.4	0.091	0.087	0	0	0	4759.3
☒	S-363	ATL01	#1 Automotive Treatment Line	1st Qtr 2012	TBD	0	0	0	0	0	0	0
☒	S-364	ATLEG	Automotive Treatment Line E. Generator	1st Qtr 2012	TBD	4.7	0.01	0	0	0	0	4.9
(8) Total Stack Emissions						36271.1	0.704	0.664				36491.9

FUGITIVE EMISSIONS SUMMARY

	(9) Source:										
☒	ELUBE01	Electrostatic Lube – Treatment Line	0	0	0	0	0	0	0
☒	ELUBE02	Electrostatic Lube – 14 Slitter	0	0	0	0	0	0	0
(10) Total Fugitive Emissions			0	0	0	0	0	0	0
(11) Total Project Emissions			36271.1	0.704	0.664	0	0	0	36491.9
(12) Total Plant Emissions			58119.6	1.124	1.064	0	0	0	58473.3

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
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50324

IOWA DNR Air Construction Permit Application

Form GHG Facility and Project Greenhouse Gas Emission Inventory

See instructions on reverse side

Company Name: Alcoa, Inc. **PSD Classification:** ☒ Major ☐ Minor ☐ Unknown

**Check box in (1) below if source is part of project*

STACK/VENT EMISSIONS SUMMARY

(1) *	(2) EP ID	(3) EU ID	(4) Source Description	(5) Construction Date	(6) Permit Number	(7) Potential or Permitted Emission Rate						
						CO_2 (TPY)	CH_4 (TPY)	N_2O (TPY)	SF_6 (lb/yr)	HFCs (lb/yr)	PFCs (lb/yr)	CO_2e (TPY)
☒	S-288	HMIL10	100" Hot Mill Stack - N	7/1/1988	88-A-158	0	0	0	0	0	0	0
☒	S-289	HMIL10	100" Hot Mill Stack - S	7/1/1988	88-A-159	0	0	0	0	0	0	0
☒	S-344	HMIL14	144" Hot Mill Stack	1948	No Permit	0	0	0	0	0	0	0
☒	S-349	HMIL16	160" Hot Mill Stack	1955	No Permit	0	0	0	0	0	0	0
☐	S-336	DFRN03	Pig Drying Furnace	11/2007	No Permit	515.29	0.0099	0.0094	0	0	0	518.43
☐	S-047	HFRN15	#15 Holding Furnace	11/1992	92-A-624-S2	5152.9	0.099	0.094	0	0	0	5184.3
☐	S-048	MRFN15	#15 Melter	6/2008	08-A-297	5152.9	0.099	0.094	0	0	0	5184.3
☐	S-050	HFRN16	#16 Holding Furnace	11/1992	92-A-625-S5	11027.3	0.211	0.202	0	0	0	11094.4
(8) Total Stack Emissions						21848.5	0.42	0.40				21981.4

FUGITIVE EMISSIONS SUMMARY

☐	(9) Source: Filt15	#15 Filter Box	0	0	0	0	0	0	0
☐	Filt16	#16 Filter Box	0	0	0	0	0	0	0
☒	INKJET01	Marker – Treatment Line	0	0	0	0	0	0	0
☒	INKJET02	Marker – 14 Slitter	0	0	0	0	0	0	0
(10) Total Fugitive Emissions			0	0	0	0	0	0	0
(11) Total Project Emissions									
(12) Total Plant Emissions									

FORM FRA

AIR CONSTRUCTION PERMIT APPLICATION

FEDERAL REGULATION APPLICABILITY (FRA)

Please see instructions on the reverse side

AIR QUALITY BUREAU
ATTN: Application Log In
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50322

Company Name:

APPLICABILITY DETERMINATION

1) Will this project be subject to 1990 Clean Air Act (CAA) Section 112(g) (Case-by-Case Maximum Achievable Control Technology (MACT))	☒ NO ☐ YES The applicant shall submit an application for a case-by-case MACT determination [IAC 567 22-1(3)"b" (8)] ☐ DON'T KNOW
2) Will this project be subject to a New Source Performance Standard? (40 CFR part 60)	☐ NO ☒ YES Applicable subpart 40 CFR Part 60 Subpart JJJJ ☐ DON'T KNOW
3) Will this project be subject to a MACT Regulation? (40 CFR part 63) THIS ONLY APPLIES IF THE PROJECT EMITS A HAZARDOUS AIR POLLUTANT – SEE TABLE A FOR LIST	☐ NO ☒ YES Applicable subpart 40 CFR Part 63 Subpart DDDD, ZZZZ, & SSSS ☐ DON'T KNOW
4) Will this project be subject to a NESHAP (National Emission Standards for Hazardous Air Pollutants) Regulation? (40 CFR part 61)	☒ NO ☐ YES Applicable subpart 40 CFR Part 61 Subpart _____ ☐ DON'T KNOW
5) Will this project be subject to PSD (Prevention of Significant Deterioration) ? (40 CFR section 52.21)	☐ NO ☒ YES (VOCs) ☐ DON'T KNOW
6) Was netting done for this project to avoid PSD?	☒ NO ☐ YES ☐ DON'T KNOW

IF YOU ARE UNSURE HOW TO ANSWER ANY OF THESE QUESTIONS CALL 1-877 AIR IOWA

FEDERAL REGULATIONS APPLICABILITY FORM INSTRUCTIONS

This form is designed to provide the review engineer information regarding applicable federal regulations. This project may be subject to a federal regulation. These regulations have also been adopted by the state of Iowa in IAC 567 23.1(1), 23.1(2), 23.1(3), 23.1(4) and 23.1(5).

1) The 112(g) provision is a transitional measure to ensure that facilities protect the public from hazardous air pollutants until EPA issues MACT standards that apply to the facilities. If this project is already subject to a MACT regulation it will not be subject to the provisions of 112 (g).

2) New Source Performance Standards are Federal Regulations that apply to a wide range of sources of criteria air pollutants. To locate the rule go to: http://www.access.gpo.gov/nara/cfr/waisidx_09/40cfr60_09.html.

3) MACT regulations apply to sources of hazardous air pollutants. See Table A for a list of hazardous air pollutants (http://www.epa.gov/ttn/atw/orig189.html). To locate specific rules for specific source categories go to http://www.epa.gov/ttn/atw/mactfnlalph.html.

4) NESHAP regulations apply to sources of the following pollutants: beryllium, mercury, vinyl chloride, radionuclides, benzene, asbestos and arsenic. To locate the rule - go to http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200940 and then review items 9 thru 14.

5) If you are a PSD major source and the net emissions increase from this project exceeds significance levels (as defined by 40 CFR 52.21: http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr52.21.htm) this project will be subject to PSD regulations. Please contact DNR prior to application submission on how to proceed.

FORM MD

AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA 50324

AIR CONSTRUCTION PERMIT APPLICATION

NON-PSD MODELING DETERMINATION – FORM MD

Company Name: Alcoa, Inc.	Facility ID: 82-01-002

DISPERSION MODELING DETERMINATION

Completion of Form MD is intended to assist applicants in determining whether or not point source emissions associated with non-PSD construction permit projects will require an air dispersion modeling analysis. Modeling requirements for non-point source emissions will be determined on a case-by-case basis. This procedure is used for both new construction permit projects and for modifications to previous projects, but does not apply to emissions from VOC-only sources at this time.

This form reflects the Air Dispersion Modeling Applicability Procedure found in the DNR "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications". A flow chart of the Air Dispersion Modeling Applicability Procedure is on the back of this form. As you go through the flowchart, one should identify the flow of this project for each emission point being permitted or re-permitted. Please check the appropriate box below depending on whether the flow chart indicates that dispersion modeling is required or not.

Note: ALL projects must include a site plan; see Form MI-1 instructions.

☐ DISPERSION MODELING ANALYSIS IS NOT REQUIRED

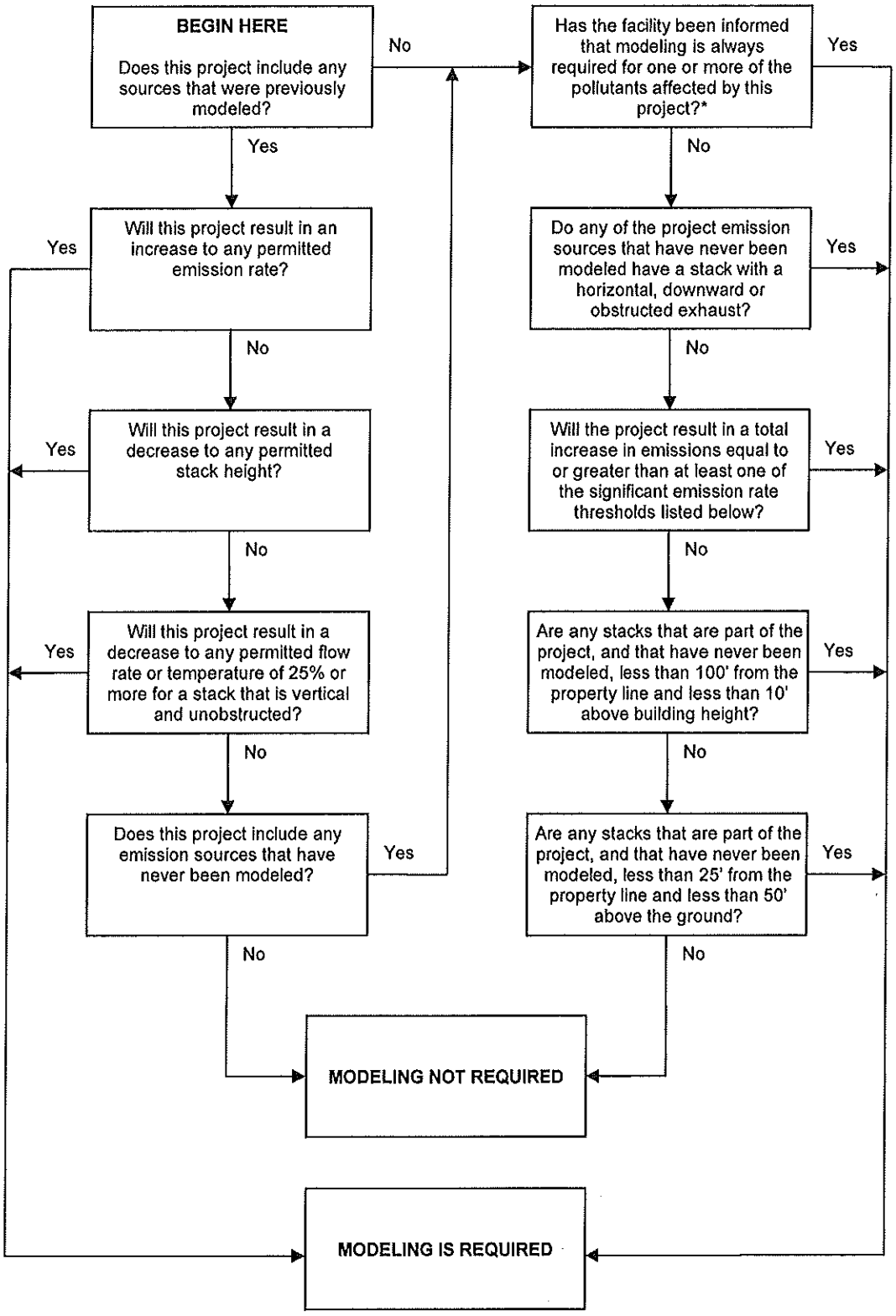
Since the point source emissions in this application meet the criteria currently listed in the Air Dispersion Modeling Applicability Procedure, it is likely that modeling is not required.

There are unique circumstances that the Air Dispersion Modeling Applicability Procedure does not address that may trigger a modeling review. Recommendations for modeling reviews that fall outside of the Air Dispersion Modeling Applicability Procedure will be reviewed by DNR management.

☒ DISPERSION MODELING ANALYSIS IS REQUIRED

When dispersion modeling is required, the modeling analysis is either conducted by the DNR or is submitted by the applicant for DNR review as noted below:

- All applicants have the option to prepare and submit a complete dispersion modeling analysis per DNR's "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications" and the "Dispersion Modeling Checklist for Non-PSD Projects".
- For major sources as defined in 567 IAC 22.100 that have previously been modeled, the DNR will conduct the modeling analysis if resources allow. Applicants with extensive changes to their facility may expedite the modeling review by submitting their own modeling analysis.
- For major sources as defined in 567 IAC 22.100 that have not previously been modeled, the applicant must prepare and submit the dispersion modeling analysis.
- For non-major sources (minor) which are not major sources as defined in 567 IAC 22.100, the DNR will conduct the initial dispersion modeling as a service to minor sources when a modeling analysis has not been submitted by the applicant.



Significant Emission Rate Thresholds

PM_{10}	3.29 lb/hr
SO_2	9.00 lb/hr
CO	22.69 lb/hr
NO_X	39.40 ton/yr

Appendix A

PSD Modification Calculations

Debottlenecked Emission Units - Actual Burden Hours

Year	#1 Cold Mill Burden Hours	#3 Cold Mill Burden Hours	100" HM Scrap Conveyor Burden Hours	#3 Scalper Burden Hours	#4 Scalper Burden Hours
2004	3292	2431	2631	2593	3565
2005	3246	1517	2573	3173	3862
2004/2005	3269.105	1974.035	2602.00	2883.00	3713.50

Modified Emission Units - Actual Burden Hours and Emissions

	100" Hot Mill			144" HM			160" HM		
Year	Burden Hours	PM (TPY)	VOC (TPY)	Burden Hours	PM (TPY)	VOC (TPY)	Burden Hours	PM (TPY)	VOC (TPY)
2004	2631	30.48	45.9	2711	6.73	5.21	2757	19.62	13.29
2005	2573	30.98	46.12	2596	9.88	4.63	3587	25.53	17.27
2004/2005	2602.00	30.73	46.01	2653.50	8.31	4.92	3172.00	22.57	15.28

Note: In 2004 and 2005 the 160" Hot Mill vented internally and did not have a hood to capture and vent emissions to the atmosphere. In 2004 and 2005 the PM emissions were included with several other plant fugitive emission sources for EIQ. For the purposes of the PSD BAE to PAE analysis the 144" Hot Mill stack testing data from 2005 was used to back calculate the actual 2004 and 2005 emissions for the 160" Hot Mill. The stack tested average uncontrolled PM emission rate for the 144" Hot Mill of 14.232 lbs/hr, which is a very similar process to the 160" Hot Mill, was used with the actual burden hours for the 160" Hot Mill in 2004 and 2005 to calculate the actual emissions used in the baseline.

Projected Actual Hourly Emission Rates - Stack Tested Sources

Test Results (lbs/hr/stack)

1 Cold Mill	Old Data									New Data				Projected	Fug.	Projected W/ Fug	
PM2.5						7.07	3.94	5.7	3.647	3.653	1.795	12/10/2010		6	0.39474	6.39	
														Projected	Fug.	Projected W/ Fug	
VOC						20.11	26.83	22.23	8.71	12.88	14.38	12/10/2010		20	1.05263	21.05	
3 Cold Mill	Old Data								New Data					Projected	Fug.	Projected W/ Fug	
PM2.5				1.43	2.5	2.93	1.018	0.536	0.619	0.742	1.019	7/29/2008		2.15	0.7963	2.95	
														Projected	Fug.	Projected W/ Fug	
VOC				12.68	19.54	18.22	8.77	10.67	10.03	12.35	12.05	7/29/2008		15	5	20	
100" HM														Projected	Fug.	Projected W/ Fug	Stack Conc.
PM2.5	Projected actual emissions based on vendor information for air pollution control upgrades and engineering estimates. The projected emissions for PM are based on 0.004 to 0.005 gr/dscf on each hot mill stack.													3.95	0.04987	4.00	0.0040 gr/dscf
														Projected	Fug.	Projected W/ Fug	Conc.
VOC														17.5	0.17677	17.68	81.87 ppmv
100" HM														Projected	Fug.	Projected W/ Fug	Conc.
PM2.5	Projected actual emissions based on vendor information for air pollution control upgrades and engineering estimates. The projected emissions for PM are based on 0.004 to 0.005 gr/dscf on each hot mill stack.													3.95	0.04987	4.00	0.0049 gr/dscf
														Projected	Fug.	Projected W/ Fug	Conc.
VOC														17.5	0.17677	17.68	98.49 ppmv
144" HM														Projected	Fug.	Projected W/ Fug	Conc.
PM2.5	Projected actual emissions based on vendor information for air pollution control upgrades and engineering estimates. The projected emissions for PM are based on 0.004 to 0.005 gr/dscf on each hot mill stack.													4.94	0.37143	5.31	0.0038 gr/dscf
														Projected	Fug.	Projected W/ Fug	Conc.
VOC														15	0.78947	15.79	52.54 ppmv
160" HM														Projected	Fug.	Projected W/ Fug	Conc.
PM2.5	Projected actual emissions based on vendor information for air pollution control upgrades and engineering estimates. The projected emissions for PM are based on 0.004 to 0.005 gr/dscf on each hot mill stack.													5.94	0.44662	6.39	0.0038 gr/dscf
														Projected	Fug.	Projected W/ Fug	Conc.
VOC														15	0.78947	15.79	43.47 ppmv
3 Scalper	Old Data - No New Data															Projected	
PM2.5	0.67	1.21	0.5134	0.8282	0.535	0.8466	0.4424	0.4856	0.4832	0.351	0.32	0.312	0.29	0.3002	11/28 - 11/30/1995	1.50	
																Projected	
VOC	0.559	0.583	1.12	0.455	0.159	0.165	0.188	0.176	0.277	0.409	0.415	0.447	0.423	0.256	11/28 - 11/30/1995	3.50	

4 Scalper	Old Data			New Data				Projected
PM2.5	0.279	0.294	0.565	0.8168	0.515291	0.874973	1.2304	7/1/2011	2.5
VOC	None			0.3054	0.25992	0.304965	0.2606	7/1/2011	2

Notes: 1. The fugitive emissions not captured by the control device hood are included in the projected + fug projected actual emissions rates. No uncaptured fugitives for scalpers.
2. The projected emission rates are based on engineering tests and calculations that take into account the effect of modifications made to the processes and pollution control equipment additions.
3. Projected emission rates are conservative estimates based on stack tested average emissions + at least 3 standard deviations.

Projected Actual Emission Rates and Future Burden Hours

Year	#1 Cold Mill Project Burden Hours	#1 Cold Mill Stack Test $PM_{2.5}$ (Lbs/Hr)	#1 Cold Mill Stack Test PM_{10} (Lbs/Hr)	#1 Cold Mill Stack Test PM (Lbs/Hr)	#1 Cold Mill Stack Test VOC (Lbs/Hr)	#3 Cold Mill Project Burden Hours	#3 Cold Mill Stack Test $PM_{2.5}$ (Lbs/Hr)	#3 Cold Mill Stack Test PM_{10} (Lbs/Hr)	#3 Cold Mill Stack Test PM (Lbs/Hr)	#3 Cold Mill Stack Test VOC (Lbs/Hr)
2010	2020	6.39	7.03	7.99	21.05	2020	2.95	3.24	3.68	20.00
2011	2428.7	6.39	7.03	7.99	21.05	2428.7	2.95	3.24	3.68	20.00
2012	2717.5	6.39	7.03	7.99	21.05	2717.5	2.95	3.24	3.68	20.00
2013	2963.9	6.39	7.03	7.99	21.05	2963.9	2.95	3.24	3.68	20.00
2014	4387.6	6.39	7.03	7.99	21.05	4387.6	2.95	3.24	3.68	20.00
2015	4339.5	6.39	7.03	7.99	21.05	4339.5	2.95	3.24	3.68	20.00

Year	100" Hot Mill Project Burden Hours	100" Hot Mill Stack Test $PM_{2.5}$ (Lbs/Hr)	100" Hot Mill Stack Test PM_{10} (Lbs/Hr)	100" Hot Mill Stack Test PM (Lbs/Hr)	100" Hot Mill Stack Test VOC (Lbs/Hr)	100" HM Scrap Conveyor Project Burden Hours	100" HM Scrap Conveyor Eng. Est. $PM_{2.5}$ (Lbs/Hr)	100" HM Scrap Conveyor Eng. Est. PM_{10} (Lbs/Hr)	100" HM Scrap Conveyor Eng. Est. PM (Lbs/Hr)	100" HM Scrap Conveyor Eng. Est. VOC (Lbs/Hr)
2010	2345.2	8.00	8.80	10.00	35.35	2345.2	0.86	0.94	1.07	0.86
2011	2870.4	8.00	8.80	10.00	35.35	2870.4	0.86	0.94	1.07	0.86
2012	3227.1	8.00	8.80	10.00	35.35	3227.1	0.86	0.94	1.07	0.86
2013	3399.3	8.00	8.80	10.00	35.35	3399.3	0.86	0.94	1.07	0.86
2014	5082.6	8.00	8.80	10.00	35.35	5082.6	0.86	0.94	1.07	0.86
2015	5009.6	8.00	8.80	10.00	35.35	5009.6	0.86	0.94	1.07	0.86

Year	144" Hot Mill Project Burden Hours	144" Hot Mill Stack Test $PM_{2.5}$ (Lbs/Hr)	144" Hot Mill Stack Test PM_{10} (Lbs/Hr)	144" Hot Mill Stack Test PM (Lbs/Hr)	144" Hot Mill Stack Test VOC (Lbs/Hr)	160" Hot Mill Project Burden Hours	160" Hot Mill Stack Test $PM_{2.5}$ (Lbs/Hr)	160" Hot Mill Stack Test PM_{10} (Lbs/Hr)	160" Hot Mill Stack Test PM (Lbs/Hr)	160" Hot Mill Stack Test VOC (Lbs/Hr)
2010	2176.33	5.31	5.84	6.64	15.79	2174.22	6.39	7.03	7.98	15.79
2011	2899.58	5.31	5.84	6.64	15.79	2811.26	6.39	7.03	7.98	15.79
2012	3304.13	5.31	5.84	6.64	15.79	3179.91	6.39	7.03	7.98	15.79
2013	3503.96	5.31	5.84	6.64	15.79	3465.16	6.39	7.03	7.98	15.79
2014	5199.57	5.31	5.84	6.64	15.79	5077.96	6.39	7.03	7.98	15.79
2015	5120.57	5.31	5.84	6.64	15.79	5001.82	6.39	7.03	7.98	15.79

Year	#3 Scalper Project Burden Hours	#3 Scalper Stack Test $PM_{2.5}$ (Lbs/Hr)	#3 Scalper Stack Test PM_{10} (Lbs/Hr)	#3 Scalper Stack Test PM (Lbs/Hr)	#3 Scalper Stack Test VOC (Lbs/Hr)	#4 Scalper Project Burden Hours	#4 Scalper Stack Test $PM_{2.5}$ (Lbs/Hr)	#4 Scalper Stack Test PM_{10} (Lbs/Hr)	#4 Scalper Stack Test PM (Lbs/Hr)	#4 Scalper Stack Test VOC (Lbs/Hr)
2010	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00
2011	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00
2012	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00
2013	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00
2014	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00
2015	3000	1.50	1.65	1.88	3.50	7204	2.50	2.75	3.13	2.00

Note: The 100" Hot Mill Scrap Conveyor VOC emission rate is the engineering est. used in the annual emissions inventory. PM emissions are negligible but have been included at the VOC rate to be conservative. The PM testing data provided on page A-3 was used for projected hourly $PM_{2.5}$ emissions. PM_{10} and PM projected actual hourly emission rates were ratioed up 10% and 25% respectively from the stack tested numbers.

Appendix A - PSD Analysis Calculations

Emission Units Physically Modified to Accomodate Future Automotive Use

PM2.5 - BAE to PAE Modification

	100" HM		144" HM		160" HM		Totals
Year	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	$PM_{2.5}$ (TPY)
BAE(04-05)	2602.00	30.73	2653.50	8.31	3172.00	22.57	61.61
PAE	5082.56	20.33	5199.57	13.81	5077.96	16.22	50.35
BAE to PAE	2480.56	-10.40	2546.07	5.50	1905.96	-6.36	-11.25

PM10 - BAE to PAE Modification

	100" HM		144" HM		160" HM		Totals
Year	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	PM_{10} (TPY)
BAE(04-05)	2602.00	30.73	2653.50	8.31	3172.00	22.57	61.61
PAE	5082.56	22.36	5199.57	15.19	5077.96	17.84	55.39
BAE to PAE	2480.56	-8.37	2546.07	6.88	1905.96	-4.73	-6.22

PM - BAE to PAE Modification

	100" HM		144" HM		160" HM		Totals
Year	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	PM (TPY)
BAE(04-05)	2602.00	30.73	2653.50	8.31	3172.00	22.57	61.61
PAE	5082.56	25.41	5199.57	17.26	5077.96	20.27	62.94
BAE to PAE	2480.56	-5.32	2546.07	8.96	1905.96	-2.30	1.34

VOC - BAE to PAE Modification

	100" HM		144" HM		160" HM		Totals
Year	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	VOC (TPY)
BAE (04-05)	2602.00	46.01	2653.50	4.92	3172.00	15.28	66.21
PAE	5082.56	89.84	5199.57	41.05	5077.96	40.09	170.98
BAE to PAE	2480.56	43.83	2546.07	36.13	1905.96	24.81	104.77

Note: Baseline actual to Projected actual emissions test used to calculate emissions increase associated with modified emission units.

Incremental Annual Projected Emissions Increase - Debottlenecked Emission Units

PM2.5 - Debottleneck

	#1 Cold Mill		#3 Cold Mill		100" HM Scrap Conveyor		#3 Scalper		#4 Scalper		Totals
Debottleneck	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	Burden Hours	$PM_{2.5}$ (TPY)	$PM_{2.5}$ (TPY)
Future Actual Increase	1118.49	3.58	2413.56	3.56	2480.56	1.06	117.00	0.09	3490.50	4.36	12.65

PM10 - Debottleneck

	#1 Cold Mill		#3 Cold Mill		100" HM Scrap		#3 Scalper		#4 Scalper		Totals
Debottleneck	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	Burden Hours	PM_{10} (TPY)	PM_{10} (TPY)
Future Actual Increase	1118.49	3.93	2413.56	3.91	2480.56	1.17	117.00	0.10	3490.50	4.80	13.91

PM - Debottleneck

	#1 Cold Mill		#3 Cold Mill		100" HM Scrap		#3 Scalper		#4 Scalper		Totals
Debottleneck	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	Burden Hours	PM (TPY)	PM (TPY)
Future Actual Increase	1118.49	4.47	2413.56	4.44	2480.56	1.33	117.00	0.11	3490.50	5.45	15.81

VOC - Debottleneck

	#1 Cold Mill		#3 Cold Mill		100" HM Scrap Conveyor		#3 Scalper		#4 Scalper		Totals
Debottleneck	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	Burden Hours	VOC (TPY)	VOC (TPY)
Future Actual Increase	1118.49	11.77	2413.56	24.14	2480.56	1.07	117.00	0.20	3490.50	3.49	40.67

Note: Burden hours listed are the projected increase in annual hours above the 2004-2005 baseline hours for that emissions unit.

Automotive Project - New Emission Units

Emission Unit	# of Units	Unit Capacity (MM BTU/hr)	Annual Capcity Factor for Fuel	PM (TPY)	SOx (TPY)	NOx (TPY)	VOC (Combustion)	VOC[1] (Residual Oil)	VOC Total (TPY)	CO (TPY)	CO2 (TPY)	CH4 (TPY)	N2O (TPY)	CO2e (TPY)
Ebner Preheats	1	60	0.42	0.8	0.06	8.8	0.44	0	0.44	7.5	12985.4	0.25	0.24	13064.4388
CEC Anneals	5	12	0.6	1.2	0.09	15.1	0.9	17.7	18.6	2.4	18550.6	0.36	0.34	18663.484
Ebner CHT	1	20.4	0.45	0.3	0.02	2.8	0.2	26.0	26.2	3.2	4730.4	0.09	0.09	4759.18843
Emergency Generator	1	0.085	0.114	0.001	0.00003	0.097	0.00126	0.0	0.0013	17.385	4.697	0.010	0.000	4.90323021
			Totals	**2.3**	**0.18**	**26.9**	**1.5**	**43.8**	**45.2**	**30.5**	**36271.1**	**0.7**	**0.7**	**36492.01**

Note: The annual capacity factor for the Emergency Generator is based on 1,000 hours per year of operation.

NG Combustion Emission Factors

			PM	PM EF Source	AP-42 SOx	NOx	NOx EF Source	VOC	Source	CO	CO EF Source	AP-42 CO2	AP-42 CH_4	AP-42 N_2O
Preheats	Nat Gas Combustion	lbs/MMBTU	0.0076	Vendor	0.000588235	0.08	Vendor	0.004	Vendor	0.068	Vendor	117.64706	0.0022549	0.002156863
Anneals	Nat Gas Combustion	lbs/MMBTU	0.007451	AP-42	0.000588235	0.096	Vendor	0.005392157	AP-42	0.015	Vendor	117.64706	0.0022549	0.002156863
Cont. Heat Treat	Nat Gas Combustion	lbs/MMBTU	0.0076	Vendor	0.000588235	0.07	Vendor	0.004	Vendor	0.08	Vendor	117.64706	0.0022549	0.002156863
Emergency Engine	Nat Gas Combustion	lbs/MMBTU	0.01941	AP-42	0.000588	2.27	AP-42	0.0296	AP-42	407.13945	NSPS JJJJ	110	0.23	0

[1]Residual Oil Anneals 405.15 MM lbs/yr 0.1 lbs/in^3 Oil Cont = 10 mg/ft^2 Auto Gauge 0.035 in 2 sides

[1]Residual Oil CHT 300 ft/min 2 sides Oil Cont = 10 mg/ft^2 Sheet Width 90 in

Automotive Project - Other New Equipment

Emission Unit	MHDR (gal/yr)	PM Emission Factor (lb/gal)	Transfer Eff. (%)	PM (TPY)	VOC Emission Factor (lb/gal)	VOC TPY
**Lube Systems	79559.0	7	99.95%	0.14	0.50	19.89
***Marking Systems	3400.0	0	NA	0.00	6.60	11.22
Emision Unit	MHDR (scfm)	PM Emission Factor (gr/scf)	Control Eff. (%)	PM (TPY)	VOC Emission Factor (mg/ft^2)	VOC[1] TPY (Residual Oil)
*Automotive Treatment Line	7500.0	0.01	NA	2.82	10	25.47
Other New Equip. Totals				2.95		56.58

[1]Residual Oil ATL 300 ft/min 2 sides Oil Cont = 10 mg/ft^2 Sheet Width 88 in

Note: *The automotive treatment line is a three step process that includes surfactant cleaning, acid De Ox process, and proprietary surface treatment steps.

**The MHDR for the Lube Systems is based on 2 systems, applying to a total metal surface area of 2.73E09 ft^2/yr with 95 mg/ft^2 of lube.

***The MHDR for the Marking Systems is based on 2 systems, printing on metal with 3.21E08 lineal ft/yr with 0.04 ml/ft of ink. Ink/solvent density of 6.60 lbs/gal (100% VOC).

Existing Unmodified-Future Actual Increases (2004-2005 Base)

PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
15.81	13.91	12.65	0.00	0.00	40.67	0.00	0.00

Modified Existing Sources - BAE to PAE (2004-2005 Base)

PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
1.34	-6.22	-11.25	0.00	0.00	104.77	0.00	0.00

New Equipment Total-PTE

PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
5.28	5.28	5.28	0.18	26.88	101.79	30.47	36492.01

PSD Significant Emissions Increase Thresholds

PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
25.00	15.00	10.00	40.00	40.00	40.00	100.00	75,000

Total Automotive Project Emissions Increases

PM (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)	SOx (TPY)	NOx (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
22.42	12.97	6.67	0.18	26.88	247.23	30.47	36492.01

Note: For the new equipment PM emissions are assumed to be equal to PM_{10} and $PM_{2.5}$

Appendix B

Dispersion Modeling Inputs

(Will be submitted under a separate cover with the modeling report)

Appendix C

Predicted Non-PSD Model Concentrations

(Will be submitted under a separate cover with the modeling report)

Appendix D

Representative Ozone Monitoring Site Data

Jun. 23, 2011

Ozone (44201) — Iowa — Parts per million (007)

8-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX> STD	CERT EDT
19-045-0021	1	1080	Clinton	Clinton	ROOSEVELT ST.	2008	000	100	213	214	.070	.066	.063	.063	0	0
19-045-0021	1	1080	Clinton	Clinton	ROOSEVELT ST.	2009	047	99	211	214	.072	.065	.065	.064	0	0
19-045-0021	1	1080	Clinton	Clinton	ROOSEVELT ST.	2010	047	96	206	214	.068	.068	.066	.064	0	0
19-163-0014	1	1080	Davenport	Scott	SCOTT COUNTY PARK	2008	000	100	214	214	.066	.066	.066	.063	0	0
19-163-0014	1	1080	Davenport	Scott	SCOTT COUNTY PARK	2009	047	100	214	214	.073	.064	.064	.064	0	0
19-163-0014	1	1080	Davenport	Scott	SCOTT COUNTY PARK	2010	047	100	214	214	.071	.068	.066	.064	0	0
19-163-0015	1	1080	Davenport	Scott	10TH ST. & VINE ST. DAVENPORT	2008	000	98	210	214	.067	.064	.064	.063	0	0
19-163-0015	1	1080	Davenport	Scott	10TH ST. & VINE ST. DAVENPORT	2009	047	99	212	214	.073	.066	.064	.064	0	0
19-163-0015	1	1080	Davenport	Scott	10TH ST. & VINE ST. DAVENPORT	2010	047	100	214	214	.069	.067	.067	.065	0	0

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jun. 23, 2011

Pollutant: Ozone(44201)
Standard Units: Parts per million(007)
NAAQS Standard: Ozone 8-Hour 2008
Statistic: Annual 4th Maximum **Level:** .075

Design Value Year: 2008
REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.
State: Iowa

Site ID	Poc	STREET ADDRESS	2008 Valid Days	2008 Percent Complete	2008 4th Max	2008 Cert	2007 Valid Days	2007 Percent Complete	2007 4th Max	2007 Cert	2006 Valid Days	2006 Percent Complete	2006 4th Max	2006 Cert	3 - Year Percent Complete	3 - Year Design Value	D. V. Validity
19-045-0021	1	ROOSEVELT ST.	213	100	.063		214	100	.074		208	97	.065	Y	99	.067	Y
19-163-0014	1	SCOTT COUNTY PARK	214	100	.063		207	97	.073		214	100	.059	Y	99	.065	Y
19-163-0015	1	10TH ST. & VINE ST. DAVENPORT	210	98	.063		214	100	.063		214	100	.064	Y	99	.063	Y

Notes:
1. Warning: Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jun. 23, 2011

Pollutant: Ozone(44201)
Standard Units: Parts per million(007)
NAAQS Standard: Ozone 8-Hour 2008
Statistic: Annual 4th Maximum **Level:** .075

Design Value Year: 2009
REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.
State: Iowa

Site ID	Poc	STREET ADDRESS	2009 Valid Days	2009 Percent Complete	2009 4th Max	2009 Cert	2008 Valid Days	2008 Percent Complete	2008 4th Max	2008 Cert	2007 Valid Days	2007 Percent Complete	2007 4th Max	2007 Cert	3 - Year Percent Complete	3 - Year Design Value	D. V. Validity
19-045-0021	1	ROOSEVELT ST.	211	99	.064		213	100	.063		214	100	.074		99	.067	Y
19-163-0014	1	SCOTT COUNTY PARK	214	100	.064		214	100	.063		207	97	.073		99	.066	Y
19-163-0015	1	10TH ST. & VINE ST. DAVENPORT	212	99	.064		210	98	.063		214	100	.063		99	.063	Y

Notes:
1. Warning: Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jun. 23, 2011

Pollutant: Ozone(44201)
Standard Units: Parts per million(007)
NAAQS Standard: Ozone 8-Hour 2008
Statistic: Annual 4th Maximum **Level:** .075

Design Value Year: 2010
REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.
State: Iowa

Site ID	Poc	STREET ADDRESS	2010 Valid Days	2010 Percent Complete	2010 4th Max	2010 Cert	2009 Valid Days	2009 Percent Complete	2009 4th Max	2009 Cert	2008 Valid Days	2008 Percent Complete	2008 4th Max	2008 Cert	3 - Year Percent Complete	3 - Year Design Value	D. V. Validity
19-045-0021	1	ROOSEVELT ST.	206	96	.064		211	99	.064		213	100	.063		98	.063	Y
19-163-0014	1	SCOTT COUNTY PARK	214	100	.064		214	100	.064		214	100	.063		100	.063	Y
19-163-0015	1	10TH ST. & VINE ST. DAVENPORT	214	100	.065		212	99	.064		210	98	.063		99	.064	Y

Notes:
1. Warning: Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Appendix E

Plot Plan

(Will be submitted under a separate cover with the modeling report)