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March 5, 1982

Mr. Stanley T. Cuffe
Chief Industrial Studies Branch (MD-13)
Emissions Standards and Engineering Division
U. S. E. P. A.
Research Triangle Park
North Carolina 27711

RE: Background Document for Metallic Minerals Processing Industry,
A. P. - 42 Emissions factors.

Dear Mr. Cuffe:

Following your telephone request for additional information on the variation of emissions with moisture content for Jamaican Bauxite, I have contacted my plants and Research and Development Departments and requested all available information on emissions from Jamaican Bauxite. After a number of discussions and considerable searching, I find that we have done very little in attempting to quantify emissions from Bauxite related to water content.

Very early in our experience with processing this mineral, we found that Jamaican Bauxite must be maintained within a relatively narrow range of moisture content in order to avoid either excessive dusting (low moisture). Over the years we have found in actual practice that moisture contents, ranging from sixteen to eighteen, have been satisfactory for keeping all problems to a minimum. We therefore, have found little need to run actual dust test emissions.

However, there have been two studies which support the general information that we already have concerning the dustiness of Bauxite and may provide a small amount of data for your use. Attachment I is a summary sheet from a study in which we deliberately dried bauxite well into the dusty range and then back-mixed either water or caustic solutions to a point where good handling was observed. As you can see, generally, Bauxite in the range of sixteen to eighteen percent moisture will not be excessively dusty nor will it be too sticky to transfer properly. Unfortunately, this testing was rather subjective and also represents an addition of surface moisture as opposed to moisture contained within the particles. However, this is the best information that is available.

CORPORATE REGIONAL ENVIRONMENTAL

3636 S. PINEWOOD FOREST BOULEVARD, SUITE 467, BATON ROUGE, LOUISIANA 70816, (504) 292-1350 OR 292-1224

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Attachment II was extracted from a separate study in which a number of different types of dust collectors were tested in Jamaican Bauxite service. With the exception of the air tumbler, all of the other test units were attached to a sidestream from an operating dust collection system and did not handle the full dust emissions from any one transfer point. The air tumbler was the main unit in operation and was connected as is indicated in the schematic numbered Figure 10. As the numbers on the inlet ports indicate, two of the intakes were on one of the discharge chutes from a screening operation. The third was a pick-up point connected with the inlet to this screening operation. Bauxite throughput to the operation during the period of the testing was approximately 5700 tons per day. The dust loading on the inlet of the air tumbler would thus give an indication of the amount of dust coming from both transfer points. Inlet points one and two cover the discharge transfer where the bauxite falls approximately ten feet from a discharge chute onto a belt. The pick-up point number three represents the dust emissions coming from a discharge from a belt going into a rotary screen, a drop of about 5 feet.

Moisture content on the bauxite ranged from 16.9 to 17.9 per cent during the period of these tests. All testing was conducted during the period, July, 1973 through July, 1974.

I regret that we have no more definitive test data to offer you for evaluation because most of our observations have been subjective and from the practical standpoint of keeping the process in operation. However, I trust that this information may be of a little help in developing your emission factors. Please advise if you have any questions.

→ Two transfer points each processing 5700 tons/24hr day or 237 tons/hr

Total material processed by ~~each~~ both points is 475 tons/hr

Very truly yours,
P. H. Fournet
P. H. Fournet
Corporate Regional Manager of Environmental Activities

Total emissions are 479.3 tons/hour
PHF:cyf Attachments
Emission Factor = $\frac{479\#ph}{475TPH} = 1.01\#/ton$

BR-7305

ATTACHMENT I

MARCH 1976

Dedusting of Bauxite Pilot Studies
Patterson-Kelly Continuous Liquid Solid Zig-Zag Blender

Test #	Material Treated	Binder Used	Charging Rate		Condition of Treated Materials			
			Solids #/Min	Binder #/Min	B.D. #/Cu Ft.	H ₂ O %	Dusting Charact.	Handling Charact.
1a	Dust	H ₂ O	40	~4.9~	62	10.2	Bad	Good
2a	Dust	Caustic	40	3.5	44	20.0	Good	Sticky
b	Dust	Sol.	40	-	59	13.1	Bad	Good
c	Dust		40	5.3 (2.2%)	61	13.8	Bad	Good
					67	15.9	Good	Good
3a	Whole	Caustic	50	1.5	56	19.1	Good	Sticky
b	Dry	Sol.	50	1.5	62	18.4	Good	Sticky
c	Bauxite		50	1.5	71	17.9	Good	Good
d			50	.65 (.02%)	73	17.8	Good	Good
4a	Whole	H ₂ O	50	~1.3	63	18.7	Good	Sticky
b	Dry		50	1.3	73	17.8	Fair	Good
c	Bauxite		50	1.3	69	18.2	Good	Good
d			50	Decreasing	71	17.9	Good	Good
*5a	Wet/Dry	-	50 (40/60)	-	73	18.5	Good	Sticky
b	Bauxite	-	50 (50/50)	-	75	18.4	Good	Sticky
*6a	Wet/Dry	-	50 (50/50)	-	63	18.6	Good	Sticky
b	Bauxite	-	50 (40/60)	-	64	18.3	Good	Borderline
c		-	50 (30/70)	-	66	17.4	Fair	Good
d		-	50 (20/80)	-	66	17.7	Fair	Good

Dust Feed 62 10.2
 Whole Dry Bx. 78 16.5
 Wet Bauxite ~50~ 20.7

* Test 5 - Pin bar intensifier
 Test 1, 2, 3, 4, 6 - Standard 9 bladed dispersion and intensifier unit

Attachment II

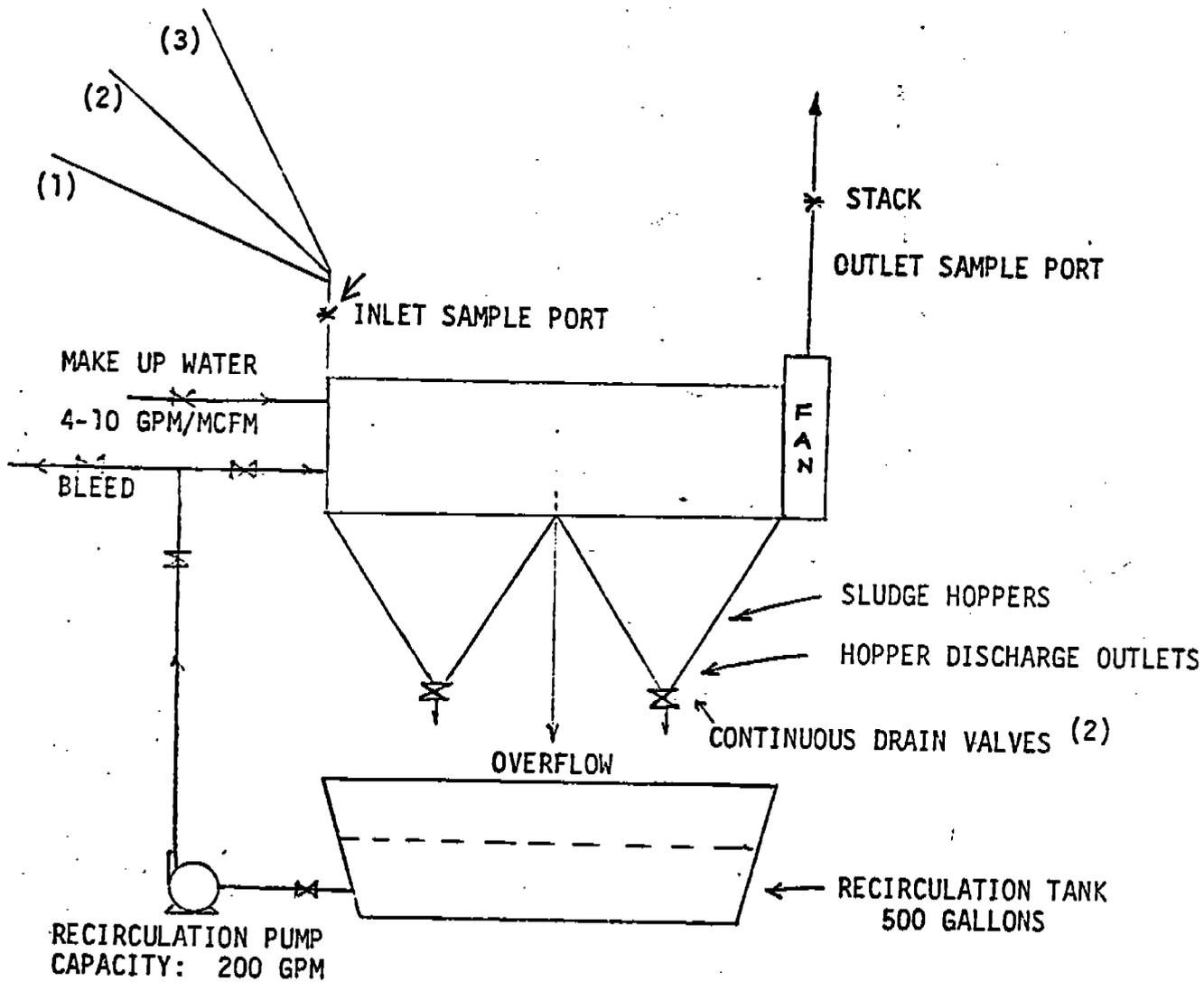


FIGURE 10

AIR TUMBLER TEST UNIT SCHEMATIC

DUST PICK UP FROM:

- (1) Belt Conveyor #8, North End of the Discharge Chute
- (2) Belt Conveyor #8, South End of the Discharge Chute
- (3) Belt Conveyor #6, Inlet of the Bradford Breaker

DU01 UN-4

TABLE - 1

NAME OF UNIT	TYPE	SUPPLIER	CAPACITY CFM.	TEST NO.	TEST AIR FLOW CFM	DUST LOAD GR/CF	EMISSION RATE GR/CF	VISIBILITY OF * STACK	DUST COLL. EFFICIENCY	SCRUBBER ΔP "WG	POWER		MAKE-UP WATER		SLURRY CONCENT. % W		LOCATION OF PLUGGAGE			
											TEST BHP/MCFM	FULL SCALE BHP/MCFM	TEST GPM/MCFM	FULL SCALE GPM/MCFM	TEST	FULL SCALE				
SLY IMPINJET	COMBINATION-SPRAY AND PLATE (LOW TO MEDIUM ENERGY)	W. W. SLY Co. CLEVELAND, OHIO	2100-2250	1	2042	6.18	0.022	SLIGHT	99.6	2 1/2	SINGLE STAGE	3-6	3-4	4	3-4	2.7	5	1) DOWNCOMERS 2) DOWNCOMER SEAL 3) RECIRCULATION TANK BUILT UP SLUDGE	IMP REM. DOV CAN OR C.	
					1710	7.29	0.007	"	99.6	2 1/2		"	"	4	3-4	2.6	5			
					1761	5.1	0.042	"	99.1	2 1/2		"	"	4	"	2.6	5			
					4	1848	7.10	0.025	SLIGHT	99.7	4 1/2	TWO STAGES	3-8	3-5	4	3-4	3.9			5
					5	1842	7.21	0.026	"	"	5		"	"	4	"	4.1			5
					6	1872	6.44	0.006	"	"	4 1/2		"	"	4	"	3.4			5
FULLER DRACCO CAA	COMPRESSED AIR ATOMIZING (MEDIUM ENERGY)	FULLER Co. CATASAUQUA, PA.	2000-2500	1	1070	5.43	0.005	CLEAR	99.8	5-6	ENTRAINMENT ENTRAPMENT	19	3-4	4	4	2.6	5	BUILD UP AT THE INLET OF THE UNIT	DOOR TEST EXCEL. NOTICE AT BIC LEVEL NOT.	
					2	"	5.43	0.015	SLIGHT	99.6		"	"	"	"	"	5			
					3	"	5.43	0.017	"	99.5		"	"	"	"	"	5			
					4	"	5.43	0.061	"	98.7		"	"	"	"	"	5			
					5	1357	10.5	MIST	"	"		7.0	3-4	"	"	"	5			
					6	1400	16.2	MIST	"	"		9.5	"	"	"	"	4.2			5
AIR TUMBLER	CENTRIFUGAL (MEDIUM ENERGY)	DUST SUPPRESSION LAKE ORION, MICH.	5000-7200	1	4800	6.7	0.074	SLIGHT	98.9	5	ENTRAINMENT ENTRAPMENT	3	3-4	5-6	4	1.3	5.0	1) HOPPER OUTLET PLUGGED FREQUENT TO T1 2) OCCASIONAL BUILD UP AT THE INLET OF THE HELIX	THE L LOAD TO T1 LEVEL DOES *	
					2	4786	11.23	0.284	OBVIOUS	97.5		5	"	"	"	"	2.2			5.0
					3	5174	18.9	0.25	"	98.7		6	"	"	"	"	2.7			5.0
					4	5645	5.04*	1.04*	"	79.4*		6	"	3-4	"	"	"			5.0
					5	6187	10.25	0.21	OBVIOUS	78.0		6 1/2	4	"	5-6	4	2.6			5.0
DUCON UW-4	CENTRIFUGAL (MEDIUM TO HIGH ENERGY)	THE DUCON Co. MINEOLA, N.Y.	15,000	1	12,900	4.8	0.04	CLEAR	99.2	11	ENTRAINMENT ENTRAPMENT	-	-	3-4	4	2.0	5	BUILD-UP OF DUST AT THE INLET TO PRECLEANER	NO SE EXPER SLURR	
					2	(UNWETTED INLET)	4.2	0.03	"	99.5		"	"	"	"	"	1.8			5
					3	-	3.3	0.03	"	99.1		"	"	"	"	"	1.4			5
					4	13,800	8.1	0.06	"	99.3		15	5	5	4	"	3.5			5
					5	(WITH WETTED INLET)	7.3	0.11	"	98.5		"	"	"	"	"	3.2			5
STURBULAIRE - V	VENTURI (MEDIUM TO HIGH ENERGY)	JOY MFG. Co. LOS ANGELES, CALIF.	1000	1	675	5.84	0.0004	CLEAR	99.99	ΔP (STURB)	ENTRAINMENT ENTRAPMENT	34.6	3-4	3	"	1.4	10	1) CONVERGING SECTION OF VENTURI DUE TO IMPROPER WATER DISTRIBUTION	THE V PREVE ΔP A HIGH	
					2	656	21.4	0.012	SLIGHT	99.95		4.1	"	"	"	"	5.2			10
					3	740	18.9	0.016	SLIGHT	99.91		4.0	3.5	"	8.5	8.5	2.7			10
					4	829	6.7	0.001	CLEAR	99.98		6.7	37	3-4	3	"	1.5			10
					5	834	25.2	0.020	SLIGHT	99.92		"	"	"	"	"	6.7			10
					6	839	25.2	0.015	SLIGHT	99.94		"	"	"	"	"	"			"

↑
Data from this facility used

$\bar{x} = 479.3 \text{ \# / hr.}$