AP42 Section:	9.12.1
Background Chapter	4
Reference:	19
Title:	Stack Emissions Survey, Adolph Coors Company Brewery Complex, Golden, Colorado, Western Environmental Services and Testing, Inc., Casper, WY, February, 1991.

Section 4 Reference 9-Coors (19)
AP-42 Reference ___

Emission Test Report Review Checklist--Short Form

Reviewer: BRIAN SHRAGER
Review Date: SEPTEMBER 12, 1994

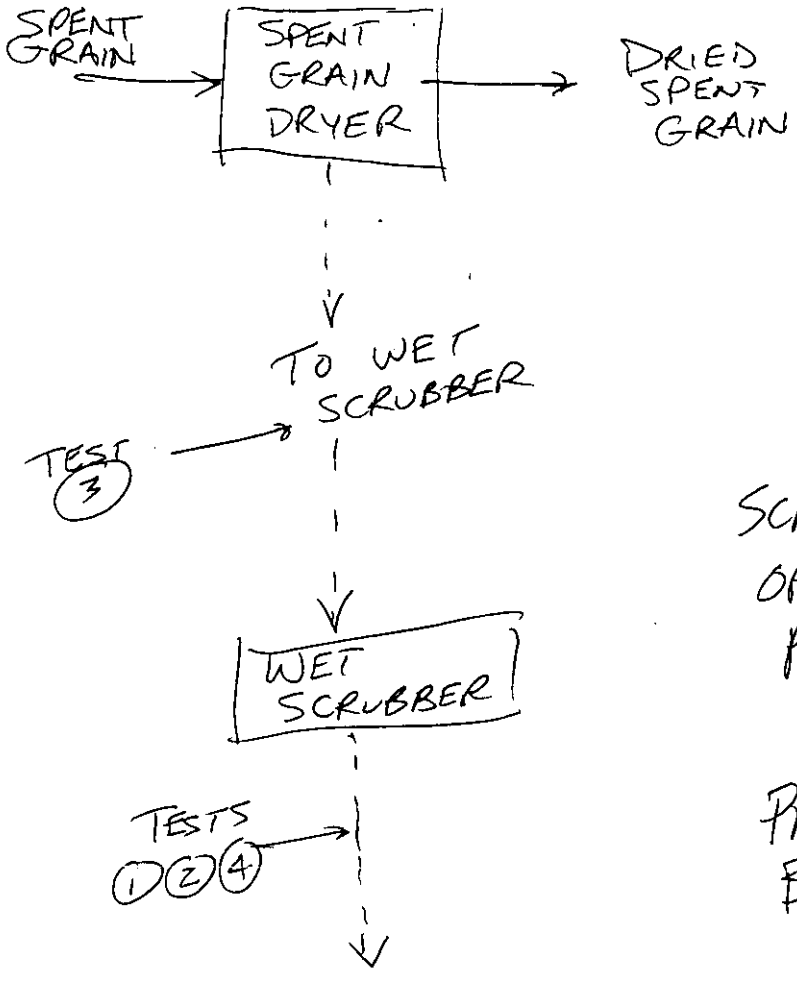
A. Background Information

1. Facility name: COORS, REPORT #9
   Location: GOLDEN, COLORADO
2. Source category: MALT BEVERAGES
3. Test date: FEB. 13-16, 1991
4. Test sponsor: COORS
5. Testing contractor: WESTERN ENVIRONMENTAL
6. Purpose of test: Determine emissions from spent grain dryers, determine PM control efficiency of wet scrubber
7. Pollutants measured (include test method and indicate if valid):
   PM 5
   CO 10
   THC 25A
   } EPA METHODS
   Particle size - CASCADE IMPACTOR
   CO_2 - 3 (ORSAT)
8. Process overview: Attach a process description and a block diagram. Identify processes tested with letters from the beginning of the alphabet (A, B, C, etc...) and APC systems with letters from the end of the alphabet (V, W, X, etc...). Also identify test locations with Arabic numerals (1,2,3, ...). Using the ID symbols from the diagram, complete the table below.

Test ID	Process	Process ID	Emissions tested		APCD (controlled emissions only)
			Uncontrolled	Controlled	
1	2 Spent Grain Dryers	A		✓	ID: Z Type: Wet Scrubber Model #:
2	Spent Grain Dryer	A		✓	ID: Z Type: Wet Scrubber Model #:
3	Spent Grain Dryer	A	✓		ID: Type: Model #:
4	Spent Grain Dryer	A		✓	ID: Type: Wet Scrubber Model #:

B. Process Information

1. Provide a brief narrative description of the process and attach process flow diagram. (Note: If the process description provided in the test report is adequate, attach a copy here.)



SCRUBBER OPERATING PARAMETERS NOT PROVIDED!

PROCESS RATES BASED ON BBL OF BEER PRODUCED. GRAIN RATE THROUGH DRYER NOT AVAILABLE.

COORS REPORT 9 TEST DATA SUMMARY

D. Emission Data/Mass Flux Rates/Emission Factors — Background Report Reference 19

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
1	Stack temperature	Deg F	170	173	175	
2 SPENT GRAIN DRYERS WITH WET SCRUBBER	Moisture	%	47.65	48.17	50.52	
	Oxygen	%	20.8	21.0	20.8	
	Volumetric flow, actual	acfm	19470	18661	16371	
	Volumetric flow, standard	dscfm	6984	6598	5508	
	Isokinetic variation	%	92.11	98.54	102	
Production rate: based on plant average 0.44 brews/hr/dryer*2 dryers*2.6315 tons dry grain/brew		ton/hr dry grain	2.31572	2.31572	2.31572	
	Pollutant concentrations:					
	Filterable PM	g/dscf	0.0176	0.0171	0.0151	
	TOC as propane	ppmdv	50.7	41.3	68.6	
	CO2	%	0.2	0.2	0.2	
	CO	ppmdv	31	40	67	
	Filterable PM-10	% of PM	37.3%	51.1%	34.1%	
	Filterable PM-2.5	% of PM	18.7%	33.4%	15.8%	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	1.05	0.967	0.713	
	TOC as propane	lb/hr	2.43	1.87	2.59	
	CO2	lb/hr	95.7	90.4	75.5	
	CO	lb/hr	0.944	1.15	1.61	
	Filterable PM-10	lb/hr	0.393	0.494	0.243	
	Filterable PM-2.5	lb/hr	0.197	0.323	0.113	
	Emission factors:					Average
	Filterable PM	lb/ton	0.45	0.42	0.31	0.39
	TOC as propane	lb/ton	1.0	0.81	1.1	0.99
	CO2	lb/ton	41	39	33	38
	CO	lb/ton	0.41	0.50	0.69	0.53
	Filterable PM-10	lb/ton	0.17	0.21	0.10	0.16
	Filterable PM-2.5	lb/ton	0.085	0.14	0.049	0.091

PM-10 values from linear interpolation of cascade impactor data. Different from reported values.

COORS REPORT 9 TEST DATA SUMMARY

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
2	Stack temperature	Deg F	156	160	157	
SPENT GRAIN DRYER WITH WET SCRUBBER	Moisture	%	32.7	34.74	32.8	
	Oxygen	%	21.2	21.0	20.8	
	Volumetric flow, actual	acfm	7874	9249	8473	
	Volumetric flow, standard	dscfm	3710	4205	3984	
	Isokinetic variation	%	89.97	97.27	96.47	
Production rate: based on plant average 0.44 brews/hr/dryer*1 dryer*2.6315 tons dry grain/brew		ton/hr dry grain	1.15786	1.15786	1.15786	
	Pollutant concentrations:					
	Filterable PM	g/dscf	0.0147	0.0098	0.0144	
	TOC as propane	ppmdv	25.5	19.1	19.6	
	CO2	%	0.4	0.2	0.4	
	CO	ppmdv	29	7	13	
	Filterable PM-10	% of PM	10.0%	18.3%	13.8%	
	Filterable PM-2.5	% of PM	5.2%	10.7%	6.8%	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	0.467	0.353	0.492	0.437
	TOC as propane	lb/hr	0.65	0.55	0.54	0.578
	CO2	lb/hr	102	57.6	109	89.5
	CO	lb/hr	0.469	0.128	0.226	0.274
	Filterable PM-10	lb/hr	0.0467	0.0646	0.0679	0.0597
	Filterable PM-2.5	lb/hr	0.0243	0.0378	0.0334	0.0318
	Emission factors:					Average
	Filterable PM	lb/ton	0.40	0.305	0.42	0.38
	TOC as propane	lb/ton	0.56	0.48	0.46	0.50
	CO2	lb/ton	88	50	94	77
	CO	lb/ton	0.41	0.111	0.195	0.24
	Filterable PM-10	lb/ton	0.040	0.056	0.059	0.052
	Filterable PM-2.5	lb/ton	0.021	0.033	0.029	0.028

PM-10 values from linear interpolation of cascade impactor data. Different from reported values.

COORS REPORT 9 TEST DATA SUMMARY

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
3	Stack temperature	Deg F	191	192	192	
K-1 SPENT GRAIN DRYER (uncontrolled)	Moisture	%	59.4	58.51	57.69	
	Oxygen	%	20.0	20.0	20.0	
	Volumetric flow, actual	acfm	5490	5369	5687	
	Volumetric flow, standard	dscfm	1484	1481	1600	
	Isokinetic variation	%	111.73	98.36	93.75	
Production rate: based on plant average 0.44 brews/hr/dryer*1 dryer*2.6315 tons dry grain/brew		ton/hr dry grain	1.15786	1.15786	1.15786	
	Pollutant concentrations:					
	Filterable PM	g/dscf	7.3178	9.4518	6.5563	
	TOC as propane	ppmdv	27.1	32.3	21.8	
	CO	ppmdv	4	4	2	
	Filterable PM-10	% of PM	0.75%	0.35%	0.37%	
	Filterable PM-2.5	% of PM	0.40%	0.10%	0.10%	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	93.1	120	89.9	
	TOC as propane	lb/hr	0.276	0.328	0.239	
	CO	lb/hr	0.0259	0.0258	0.0140	
	Filterable PM-10	lb/hr	0.698	0.420	0.333	
	Filterable PM-2.5	lb/hr	0.372	0.120	0.0899	
	Emission factors:					Average
	Filterable PM	lb/ton	VOID	104	78	91
	TOC as propane	lb/ton	0.238	0.283	0.206	0.242
	CO	lb/ton	0.0224	0.0223	0.0121	0.0189
	Filterable PM-10	lb/ton	VOID	0.36	0.287	0.33
	Filterable PM-2.5	lb/ton	VOID	0.104	0.078	0.091

PM-10 values from linear interpolation of cascade impactor data. Different from reported values.

COORS REPORT 9 TEST DATA SUMMARY

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
4	Stack temperature	Deg F	174	165	172	
K-1 SPENT GRAIN DRYER WITH WET SCRUBBER	Moisture	%	49.47	40.08	48.57	
	Oxygen	%	20.6	20.6	20.8	
	Volumetric flow, actual	acfm	6193	6092	6124	
	Volumetric flow, standard	dscfm	2123	2513	2144	
	Isokinetic variation	%	94.07	81.21	105.93	
Production rate: based on plant average 0.44 brews/hr/dryer*1 dryer*2.6315 tons dry grain/brew		ton/hr dry grain	1.15786	1.15786	1.15786	
	Pollutant concentrations:					
	Filterable PM	g/dscf	0.0145	0.0082	0.0059	
	TOC as propane	ppmdv	49.6	29.2	47.4	
	CO	ppmdv	10	23	2	
	CO2	% DRY VOLUM	0.4	0.4	0.2	
	Filterable PM-10	% of PM	21.6%	16.0%	ND	
	Filterable PM-2.5	% of PM	11.8%	9.5%	ND	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	0.264	0.177	0.108	
	TOC as propane	lb/hr	0.722	0.503	0.696	
	CO	lb/hr	0.0926	0.252	0.0187	
	CO2	lb/hr	58.2	68.9	29.4	
	Filterable PM-10	lb/hr	0.0570	0.0283	ND	
	Filterable PM-2.5	lb/hr	0.0311	0.0168	ND	
	Emission factors:					Average
	Filterable PM	lb/ton	0.228	VOID	0.094	0.161
	TOC as propane	lb/ton	0.62	0.43	0.60	0.55
	CO	lb/ton	0.080	0.218	0.0161	0.105
	CO2	lb/ton	50	59	25.4	45
	Filterable PM-10	lb/ton	0.049	VOID	ND	VOID
	Filterable PM-2.5	lb/ton	0.0269	VOID	ND	VOID

PM-10 values from linear interpolation of cascade impactor data. Different from reported values.