AP42 Section:	9.13.3
Title:	Comments and letters

Note: This material is related to a section in *AP42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

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ANHEUSER-BUSCH COMPANIES

November 8, 1993

Mr. Dan March
Midwest Research Institute
401 Harrison Oaks Blvd., Suite 350
Cary, NC 27513

Re: Snack Food Test Data

Dear Mr. March:

On October 20, 1993, your request for additional process data, for five Visalia emission tests dates. You had already received the emission reports from Mr. John Stier of the Environmental Affairs Department.

The test dates and additional data are as follows.

Test Date	Snack Line	Requested Data, Comments
Oct. 10, 1990	Continuous Potato Chip (PC) No. 1	a) Fryer temp: Ave inlet was 352°F. Field data sheets enclosed (also in report).
		b) Output Rate: In fall, 25% of input per plant engineer. (Varies from 25% to 28% depending on time of year.)
Feb. 4, 1992	Kettle No. 5	Fryer temp: Start at 295° F. Field data sheets enclosed.
Feb. 5, 1992	Kettle No. 8	Fryer temp: Start at 295° F. Field data sheets enclosed.
Oct. 20, 1992	Tortilla Chip No. 1	Fryer temp: Standard 355° to 365° F inlet per plant engineer.
Jan. 26, 1993	Cont. PC No. 1	Fryer temp: Standard 345° to 365° F. inlet per plant engineer

If you have any questions concerning this information or need additional information, please do not hesitate to call me or Mr. John Stier. Mr. Stier's phone number is (314) 577-4170.

Yours truly,

Anheuser-Busch Companies, Inc.

Donald M. DeHart
Senior Environmental Engineer
Tel: (314) 577-4158
Fax: (314) 577-1032

cc: J. V. Stier

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Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

VISALIA Eagle Snacks Kettle Fryer 8 Feb 3, 1992

TEST No. / Testing Times	Batch Start hr	Batch WT, lb	Oil Temps °F Set	Oil Temps °F Start	Oil Temps °F Low	Oil Temps °F Out	Cook Time min/sec	Batch cycle Time m/s	Scrub Liq psig	Batch Set WT, lb	Comments (Time My 8:30:00, WE? 7:31:20, PLC Compt 8:30)
8 1	8:33	61.0	295	292	262	276	6.48	8:06	11.0	59.0	Auto Rake
Start 0840	8:41	59.0		292	257	276	6:48	8:35			For run KF-1 shift
	8:49	53.4	295	291	266	276	5:34	6:59			all wts down by one batch
	8:56	56.8		291	262	277	6:12	7:35			I'm reading batch start X
	9:03	57.4		292	256	276	8:18	9 31			and wt for batch (X+1) observations
	0911	57.8		293	263	277	6:26	7:42	11.0	59.0	
	0920	60.0		291	260	276	7:22	8:44			2/3 Regular White
	0928	60.8	295	293	266	276	6:21	7:47			Potatoes
	0937	57.8	294	292	263	276	6:05	7:28			Σ: 1295.0
	0945	57.2									22 Batches in 179 min
	0952	58.8		291	261	277	7:19	8:45			435 #/hr
	10:01	61.0	295	291	264	277	6.54	8:12			59.0 x 22 = 1298 #
	10:09	60.8		292	262	277	6.59	8:13			
	10.17	60.2		292	263	277	642	755			
	10.25	59.2									Σ: 1295.0# ≈ 434#/hr
	10:33	60.4		294	259	276	6:55	8:11			
	1042	64.4	296	308	264	277	6:02	8:24			Long cycle ?? started seconds before
	1050	58.6	294	294	255	276	7:48	9:02			
	1059	56.0	295	300	258	276	6:17	7:54			
8-1	1107	60.4		292	266	276	6:53	8:14			Frances
	1115	59.2		291	266	277	7:07	8:34			
	1124	57.8		291	271	276	6:24	8:00			
End 1140	1132	56.8		290	269	276	6.54	8:31			
	1140	62.0									
	1253	[illegible]	295	293	267	275	6:01	7:23	11.0	59.0	Hum. Batch wts ok for KF-2
8-2 Start 1300	1300	60.0		292	260	275	6:54	8:26			Sump looks ok (Scrub liq)
	1308	61.0		292	265	275	7:02	8:16			
	1317	64.4	294	291	264	275	7:23	8:49			
	1326	58.2	296	291	266	275	6:30	7:54			23 Batches in 183 min
	1333	60.2	295	291	263	275	7:20	8:43			(20 x 59) + (3 x 57)
	1342	64.0	294	295	254	275	7:41	8:55			@ 59.0# / batch
	1351	57.4	295	294	268	275	5:18	6:32			1354 lb
	1358	61.8	295	291	260	275	7:31	8:53			444 #/hr
	1406	58.4	295	293	263	274	5:19	6:33			
	1413	56.4									
	1421	61.4	295	291	263	274	6:31	745			Σ = 1357.0 lb
	1429	60.6		290	260	274	7:22	8:35	11.0	59.0	≈ 445 #/hr.
	1437	58.2		290	268	274	552	708			
8-2	1445	60.6	295	287	263	274	7:36	8:57			
	1453	58.2	294	288	267	274	6:15	7:29			
	1501	58.2	296	287	266	274	6:36	7:52			

Visalia Kettle Fryer 8, Eagle Snacks Feb 3-4, 1992 p2

Test No. and Times	Batch START hr	Batch WT, lb	Oil Temps °F SET	START	LOW	OUT	Cook Time min/sec	Batch Cycle Time m/s	Scrub Liq psig	Batch SET WT, lb	Comments Time Mine 07:30.00 2/4 WES 07:31:20
8-2 Run 2	1509	57.8	294	287	265	274	7:18	8:33	10.5	59.0	[illegible] 07:30
	1517	55.6	295	288	269	274	5:51	7.04			
	1525	58.0	294	293	258	274	6:06	7:21			
	1532	58.8		295	264	274	6:31	8:11			
	1540	566	295	294	263	274	5:35	7:05		58.0	
	1547	55.6	295	291	257	274	6:56	8:10	10+		
	15 55	56.6		288	264	274	6:29	7:43			
End 1600	1603	61.2									
	0711	61.6	295	287	258	270	6:18	7:32	11±	58.0	2/4 - Russett Potatoes
	0719	69.0		287	249	270	7:39	8:53			
~~8-3~~	0728	58.0	295	291	263	270	5:30	6:44		58.0	
Run 3	0735	56.4		286	260	270	6:05	7:37			
Start 0730	0743	58.0	294	285	259	270	5:30	7:10			
	0750	56.6	295	287	260	270	6:10	7:42			24 batch × 58.0 = 1392#
	0758	57.0	295	294	263	270	5:26	6:56			in 182 min
	0805	68.2		292	254	271	7:56	9:48	11		to 459#/hr
	0813	55.2	296	287	266	270	5:11	6:24			
	0821	59.8	295	286	258	272	7:52	9:30			23 ~~1352.2~~
	0830	61.2		288	265	271	5:28	6:42			
	0837	59.2	294	286	254	271	6:43	7:59			24 1410.6#
	0845	59.0									
	0852	58.6	296	293	260	271	5:40	7:19			465.0#/hr
	0859	61.2	295	287	255	271	5:58	7:15			
	0907	57.0		286	255	271	6:32	7:47		57.0	
	0914	58.0							10+		no
	0922	58.2	294	289	261	271	5:50	7:03			
	0929	60.0	295	287	260	271	6:32	7:48			
	0937	58.4		287	259	271	6:27	7:44			
	0945	56.8	295	289	263	271	[illegible]	6:32			
	0952	58.4	296	287	259	271	7:05	8:23			
	1000	56.6	296	289	265	270	5:44	6:58			
	1007	59.4	295	287	252	271	7:04	8:22			
8-3	1015	59.6		291	258	271	6:22	7:36			
	1023	59.2	295	288	258	272	5:42	6:56			
End 1030	1030	60.0									
		56.6									

Visalia Eagle Snacks Kettle fryer #5 (Manual Rake) Feb 4-5, 1992

Test No and Times	Batch Start hr	Batch WT, lb	Oil Temps °F Set	Start	Low	Out	Cook Time min/sec	Batch cycle Time m/s	Scrub Liq psig	Batch SD WT. lb	Comments Time: My 11:30:00 WGS 10:31.25 [illegible] 11.30
Feb 4	11.24	59.4	295	290	257	278	6:47	8:01			Manual rake
	11 32	57.8	294	290	257	279	6:34	7:45			
5-1	1139	58.6	295	293	253	278	6:59	8:13	14.	58.4	22 Batches
Start 1140	1148	64.8	294	290	248	277	7:20	8:32			1605.8 + 60.59 in 180 min
	1156	63.0	295	290	254	277	7:21	8:44			1282# 427#/h
	1205	55.8	294	289	262	278	6:08	7:28			Σ1310/3 437#/h
	1212	60.2	295	290	256	279	7 00	8:13			
	1224	59.8	294	290	254	278	7:22	8:30			
	1230	56.4	294	290	261	78	5 53	8.19		58.0	Operator mistakenly dumped scrubber when refilling [illegible]
	1237	57.6	295	89	54	77	6.37	7:46			off ≈ 5 min for refill
	1248	57.4		288	249	275	6:54	8:10			(one stop cycle in fryer)
	1255	56.6	294	92	69	80	5:48	8:20	14		
	1302	59.2	95	92	60	81	5:49	7:24			
	13 09	57.0		94	55	80	5:53	7:20			
	1317	65.8	95	93	48	78	7 37	9:10			
	1326	57.0	95	91	49	76	6:38	7:55			
	1334	57.4		89	60	77	6:48	8:04			
	1342	60.0		90	59	77	6:44	8:09		59.0	
	1350	61.2		89	59	77	7:03	8:34			
	13 58	61.4	295	90	59	78	6.32	7:52			
	14 06	63.0		90	56	78	7 12	8:28			Scrubber off? Auto Dump
5-1	1415	62.8		90	57	77	6:59	8:15			cycle (1415)
	1423	57.4	294	90	59	79	6.25	7:48			off/on 1430
End 1440	1431	57.6									
	1439	58.4									
Feb 5	0705										
	0713	62.4	295	295	247	280	7:17	8:26	14+	62.0	20 Batches in [illegible]
Start 0715	0722	60.6	94	97	51	80	7:04	8:10			9063 + [illegible] = 1229
	0730	62.0		98	54	70	5:58	7:17			or 408#/h
5-2	0738	[illegible]6	295	286	249	269	6:37	7:39			
	0745	65.6	94	85	53	69	6:56	8:21			
	0753	61.4	95	86	56	70	6.14	7:44			
64.0	0801	111.2									← Empl. Error Dumped bucket of potatoes into wrong hopper
	0826	62.0									(scale [illegible])
	08 33	66.4	295	89	252	275	7:29	8:59			Cleaned batch from fryer by hand after [illegible]
	0842	64.6	95	89	54	75	7:01	8:57		61.0	Waited to add oil (low) (6 min)
	0851	63.2		89	57	75	6:49	8:37			Auto oil makeup off (3rd shift)
	0900	62.0	95	89	60	78	6:23	8:12			
	0908	59.4		90	59	75	6 27	8:13	14		Σ = 1308.6# or 436#/hr
	0916	67.0	295	290	255	275	7:27	8:57			20

Visalia Eagle Snacks Kettle Fryer "5 (Manual Rake) Feb 5, 1992

Trial No. & Times	Batch Start hr.	Batch WT, lb	Oil Temps, °F Set	Stand	Low	Dwell	Cook Time min/sec	Batch cycle Time m/s	Scrub Lig psig	Batch WT Set lbs.	Comments
(5-2)	0925	58.2	295	290	261	275	6:13	7:57	14	61.0	
	0933	63.0		90	52	78	7:00	8:27			
	0941	61.2		92	58	78	6:35	7:59			
	0949	63.2	295	292	252	278	6:45	8:09			
End	0958	65.0		91	53	78	7:26	9:02			
1015	1007	61.6		93	56	75	6:35	8:03			
	1015	66.4									
		64.4									
	1032	60.4	294	259	260	274	6:07	7:53		61.0	
(5-3)	1040	58.6	295	90	55	75	6:15	7:50			
	1048	63.8		89	57	75	6:34	8:23			22 batch @ 61.8 lbs in 186 min
Start	1057	59.2		89	60	75	6:19	8:17			1342 lb ÷ 433 lb/hr
1045	1105	69.0	295	89	55	75	7:29	9:22			
	1114	63.2		90	55	74	6:52	8:21	14		
	1123	65.4	294	90	53	75	7:08	9:08			
	1132	62.4	295	90	57	75	6:46	8:34			ε = 1379.3 lb
	1140	64.6		90	59	74	6:57	8:39			22 445 lb/hr
	1148	60.4	294	90	61	75	6:31	7:57			
	1157	64.4	295	89	61	75	6:55	8:52			
	1205	61.4		90	53	75	6:40	8:10		61.0	
	1214	65.0	294	90	57	75	7:22	9:03	14		
	1223	59.0		89	67	75	6:01	7:40			
	1231	61.2	295	89	65	75	6:19	8:39			
	1239	68.2	294	89	60	75	7:31	9:34			
	1248	62.4		92	59	79	7:17	8:45			
	1257	61.0	295	91	58	78	6:57	8:14			
	1305	60.0		95	61	75	5:54	7:35			
	1313	61.6	294	290	255	280	7:18	8:41	14	61.0	
	1321	63.4	295	91	50	75	6:58	7:45			
End	1330	63.0		89	55	75	6:55	8:38			
1345	1338	62.6	295	90	62	75	6:28	8:14			
	1346	63.2									

ANHEUSER-BUSCH COMPANIES

October 24, 1990

Mr. Thomas L. Rooney
Western Environmental Services
1010 So. Pacific Coast Highway
Redondo Beach, CA 90277

RE: Visalia Eagle Snacks, Inc.
October Fryer Testing

Dear Tom:

Attached is a copy of my field notes from October 10, 11, 12, 1990 for inclusion in the pending report covering testing on those dates. These field notes include my best estimates of the process rates during each of your test runs.

For each fryer, there was a circumstance that limited production. In the Fall, the potato chip Fryer operates at a lower frying temperature (about 10°F) to reduce the product chip coloration from the higher raw potato sugar content of newly harvested potatoes. This lower frying temperature also reduces the maximum possible fryer thruput.

Two different tortilla products were processed during your tests. The thinner "premium" chip is triangular. The tortilla chip processing line can produce up to about 1500 lb/hr of finished, unseasoned, "premium" chips. A thicker "restaurant" chip is shaped like a quarter circle. The chip processing line can produce up to about 1150 lb/hr of the finished, unseasoned, "restaurant" chips. The maximum outputs for both the potato chip and tortilla fryers are theoretical ones based on many assumptions which are only approximated on a day to day basis.

In your process description of your test report, please include a short narrative of the potato sugar variance and the tortilla chip products. In the summary table where you list the tortilla process rate, please include a column showing the chip type being processed as noted in my field notes (i.e. "premium" or "restaurant"). Please call if you have any questions.

Yours truly,

ANHEUSER-BUSCH COMPANIES, INC.

Donald M. DeHart

Donald M. DeHart
Sr. Env. Eng.

Tel: (314) 577-4158
Fax: (314) 577-1032

DMD/tms
Attachment

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U S A 63118-1852
Telex 447 117 ANBUSCH STL

Visalia Continuous Potato Chip Fryer, Size Distribution ~~Nov~~ Oct 10, 1990

DATE	TIME	INPUT, Raw Potatoes Totalizer lb	rate lb/hr	Testing Start/Stop Time	RUN	Frying Oil Makeup lb	Circulate [illegible] gpm	Oil Temp of Fryer disc	Oil Temp Exit	Exhaust Damper %	Input Speed RPM	Comments
10/10	0845	166080	10700			1304	(Kettle)	305	354	55	838	Operator uses
	0900.00	168700	10500			1517		303	352	55	842	Potato Hopper Auger Speed (% Input discontinued)
	0915.00	171360	11100			1853	332	304	354	55	841	
	0925.00	173150	10300	0920	1	2068	373	305	352	55	848	S.N. - 1,102 Atlantic (Vandy) 11NL.
	0940.00	175760	10830			2345	429	308	350	55	849	
	0955.00	178360	10400			2608	476	306	352	55	857	305 - 310°F Outlet Temp - criteria
	1010.00	181020	11080			2887	524	305	352	55	860	If too low decrease Auger speed
	1025.00	182820	10450	1022	1	3070	564	305	352	55	860	IN Fall, potatoes have higher moisture + sugar
		11460 lb in 70 min	or	9823 lb/hr		avg 9820	lb/hr					
	1028.00	195110	10500			4346	795	305	350	55	864	Thus need to speed up (slower frying)
	1200.00	200950				4966	918	303	352	55	864	and lower the temp due to minimizing chip
	12:15:30	203760				5166	949	302	351	55	861	coloration.
	12:25:00	205500	11100	1220	2	5386	991	304	352	55	865	
	12:40.00	208250	12100			5714	1054	304	353	55	866	
	12:56.30	211080	11300			5996	1100	304	353	55	863	
	13 15.00	214660	10400			6300	1168	305	352	55	865	
	13 25:00	216510	10700	1322	2	6506	1201	304	350	55	861	
		12760 lb	in 70 min	or 10,929 lb/hr		avg 10,920	lb/hr					
	15 05:00	235470	12000	1506	3	8426	1576	303	351	57	860	
	15 20:00	238370	11300			8704	1625	300	351	57	859	
	15 37:00	241690	10600			235	47	304	354	57	835	
	15 54:00	244840	10200			574	113	306	352	57	824	
	16:10:00	247640	10980	1608	3	871	171	305	353	57	824	
		12170 # in 65 min	or	11234 lb/hr		avg 11,230	lb/hr					

D00002

Visalia Eagle Snacks   Tortilla Fryer #1   Oct 11, 1990

DATE Run #	Testing Start/Stop Time	TIME	SHEETER/CUTTER RPM wt	Ind	IN grams 10pc	OUTPUT RATE lb/hr	Oil Temp, °F Fryer disch	@HT Exch Digital	Finished chips grams/10pc
			1 / 2	1 / 2	1 / 2				
10/11		0810	32.3/32.4	115/116	20.5/20.2		340	359	16.5
1	Start 0841	850	32.1/32.5	115/115	21.4/20.4		340	358	16.2
	Run 1	9:30	32.4/32.4	115/115	22.3/21.6		342	358	16.6
		10.05	32.2/32.5	115/116	21.8/19.8		342	361	16.4
		10:35	32.4/32.4	115/115	21.6/20.7		344	360	16.5
1	End 11:42	11 00	32.1/32.4	114/116	21.6/21.1		344	359	16.9
		11.35	32.2/32.5	114/116	21.4/20.4		34[illegible]	360	16.6
	Ave. For run (trend)		32.34		21.175	1525 - lb/hr*		-	16.53
2 (10/11)	Start 1221	12 35	32.4/32.5	114/116	22.3/20.7		344	361	16.5
		13 10	32.4/32.5	114/115	22.3/21.5		342	361	16.8
		13:40	32.0/32.5	114/116	21.5/20.5		344	360	16.8
	Run 2	14 05	32.2/32.4	115/116	19.8/20.3		342	359	16.5
		14 35	32.2/32.8	115/116	21.6/21.1		342	359	16.2
(2)		15 00	32.4/32.4	115/116	21.5/21.1		3[illegible]	3[illegible]	16.9
Oct 11	End 1532	1525	32.3/32.6	114/115	22.0/21.5		342	361	16.4
	Ave For Run (Trend)		32.43		21.19	1535 lb/hr			16.59
Oct 12	Start 0800	0755	35.5/35.4	12[illegible]/120	31.5/31.4		344	361	25.3
(3)		0830	35.4/35.6	126/126	31.2/32.5		342	360	24.7
	Run 3	0900	35.4/35.3	126/126	31.5/32.4		344	360	24.7
		0930	35.3/35.5	126/126	31.1/31.9		346	360	24.8
		1005	35.2/35.3	126/126	32.1/31.8		340	361	24.2
		1030	35.3/35.4	126/126	30.8/31.3		34[illegible]	360	24.6
	1102 End	1100	35.2/35.4	126/126	31.2/31.3		348	360	24.6
	Ave For Run (Trending)		35.37		31.57	1176 lb/hr			24.66 gm

Comments

Product - "Premium"

Target is 16.50g/10 Finished chip

Operator sets weight of chips after toaster oven (and spray) to obtain finished chips at Target Weight.

Down 5 min @ 900h to repair cutter wire.

*based on ave RPM of cutter, finished chip weights and sheeter data correlation for each Product. Finished chips are without seasoning.

Product - "Restaurant"

Target is 24.0 gm.

Note: RPM measured by digital meter for 15 sec. Meter measures RPM every second and then gives Average over time read.

Finished unseasoned chips weighed on balance to nearest 0.1 gram for 10 or 20 chips.

D0C003

Rec'd 6/1/94 TL

ANHEUSER-BUSCH COMPANIES

May 31, 1994

Mr. Tom Lapp
Midwest Research Institute
401 Harrison Oaks Boulevard
Suite 350
Cary, North Carolina 27513

Mr. Dallas Safriet
USEPA
Office of Air Quality and Standards
Research Triangle Park, NC 27711

Gentlemen:

We have reviewed the draft Emission Factor Documentation for AP-42, Deep Fat Frying - Snack Chips and have the following comments:

- Page 6.13.3-4 and -5. The break-out of PM into condensable and filterable fractions is unnecessary and should be combined into one PM emission factor. The use of emission factors for permitting work would focus on the use of PM and PM-10 factors only. Otherwise, agencies may issue complex permit limits based on the various break-outs in the table. Further break-out of condensable PM into an inorganic and organic fraction is misleading, since the organic fraction may be misinterpreted as VOC. The result could be a double counting of the VOC present by combining the organic fraction with the VOC factor shown on page 6.13.3-6.

The PM-10 emission factor is based on 86% of the filterable PM and does not include the PM-10 fraction (.864) of the condensables. These two should be added together to obtain the correct PM-10 factor.

The emission factors after control with a mesh pad mist eliminator incorporates data from two different efficiency mist pads. To take an average efficiency of these pads is misleading and would dictate the use of the more efficient pad to comply with any permit limits developed from these factors. Two options are available: include specific factors for a low efficiency and high efficiency mesh pad, or use one set of data and identify it as either the high or low efficiency mesh pad. As stated on page 4-14, you have chosen the data for a standard or low efficiency mist pad based on reference 5. We feel that this data is not representative of normal operations and that reference 9 should be used. This reference is the basis for our permit limits at the Visalia facility. Attached are design specifications for the "large" demisters identified in references 3 and 4.

- Page 6.13.3-3. We are not aware of anyone in the industry utilizing an electrostatic precipitator to control potato chip fryer exhaust streams. This reference should be removed.

The test data marked confidential can be used in the report. Please white-out the confidential stamp to avoid any further confusion.

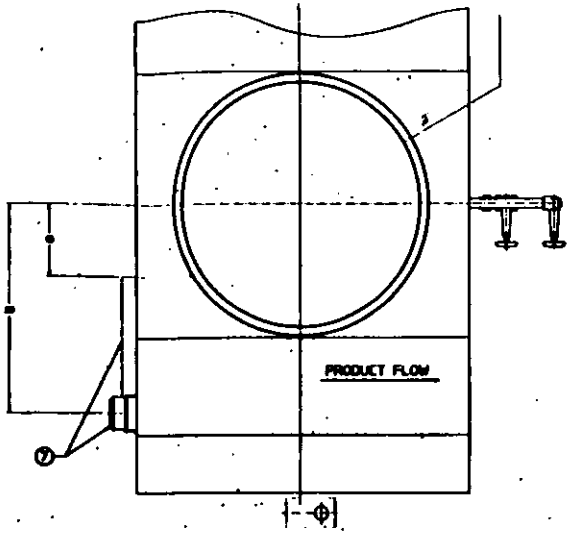
We appreciate the opportunity to comment on the draft documentation. Please call Dean Pusch at 314-577-4162 or John Stier at 314-577-4170 with any questions.

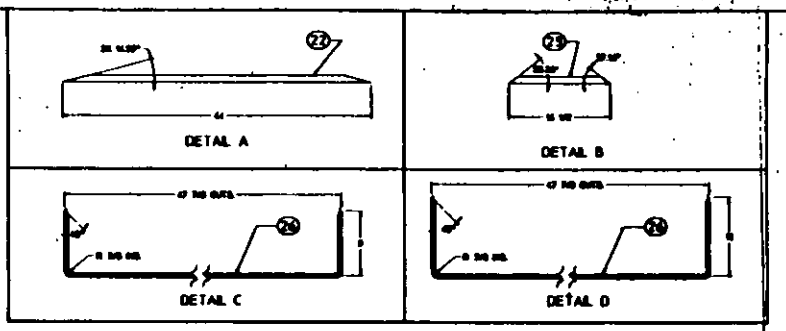
Sincerely,

John V. Stier
Environmental Affairs

Dean E. Pusch
Environmental Affairs

Anheuser-Busch Companies, Inc.
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

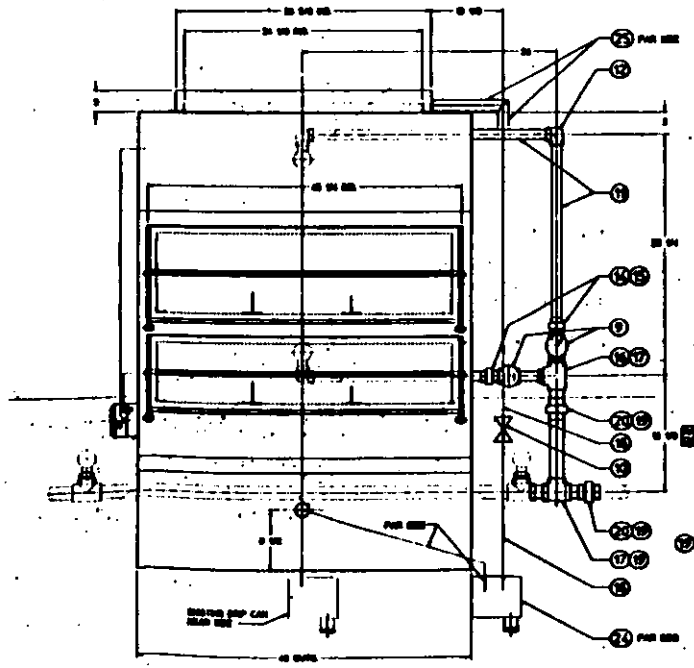


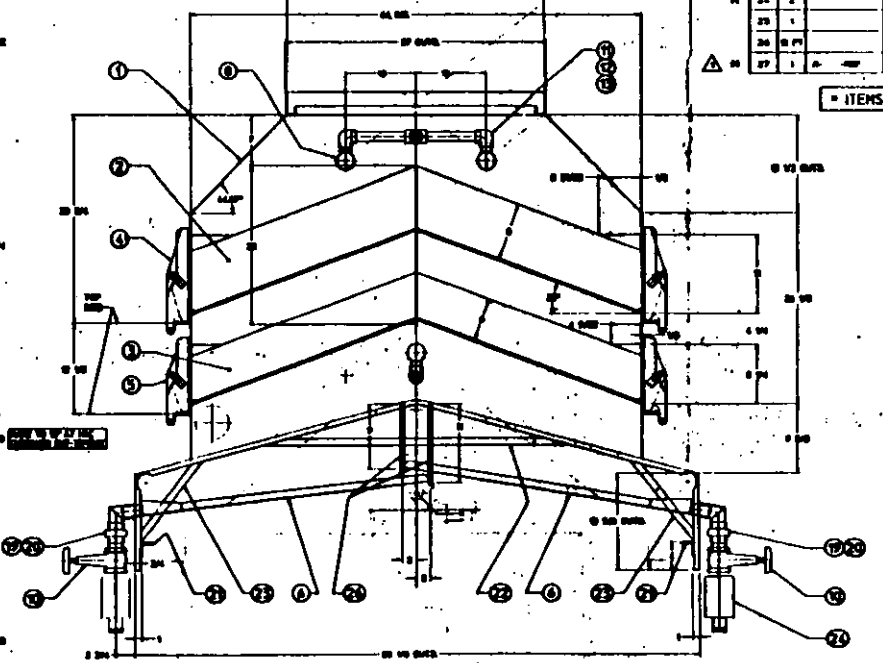


BILL OF MATERIAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	H-2901-2	MIST ELIMINATOR DETAIL
2	6	25- 3	6" DIA. [illegible] PAD
3	6	25- 4	6" DIA. [illegible] PAD
4	3	25- 5	6" DIA. [illegible]
5	3	25- 6	6" DIA. [illegible]
6	2	25- 7	DRIP PAN
7	1	25- PS	DIFFERENTIAL PRESSURE GAUGE INSTALLATION
8	3	NOZZLE B	SPRAYHEAD OVERFLOW 1 2 1/2" DIA BALL 1" NPTM
9	2	PS 1000	GATE VALVE, CARBON, 1" NPT, 3.5
10	3	PS 1000	GATE VALVE, CARBON, 1 1/2" NPT, 3.5
11	18 FT		PIPE, 1" SCH 40 CUT TO SHAP 1-304
12	3		ELBOW 1" 150 LB
13	1		TEE 1" 150 LB
14	2		UNION, 1" 150 LB
15	3		CLOSE NIPPLE, 1" SCH 40 1 1/2" LG
16	3		HEX BUSHING, 1 1/2" - 1" NPT
17	2		TEE, 1 1/2" - 150 LB
18	18 FT		PIPE, 1 1/2" - SCH 40 CUT TO SHAP
19	5		CLOSE NIPPLE, 1 1/2" SCH 40 - 1 3/4" LG
20	4		UNION, 1 1/2" - 150 LB
21	2		ANGLE, 90° 4 3/8" x 3" x 23.9 LB
22	3		FLAT BAR, 12 GA x 14" LG
23	4		FLAT BAR, 12 GA x 14 1/2" LG
24	2		DRIP PAN
25	1		PIPE, 1 1/2" SCH 40 x 180 W x 9 FT CUT TO SHAP
26	15 FT		ROUND BAR, 3/8" CUT TO SHAP
27	1	H- 4001	[illegible]

* ITEMS AS MARKED TO BE SHIPPED LOOSE





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JUN 14 1991
HEAT & CONTROL, INC.

THIS IS A REVISED DRAWING
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HEAT AND CONTROL, INC.

OIL DEMISTER, ME 18X
ONE COOKER/OIL MIST ELIMINATOR

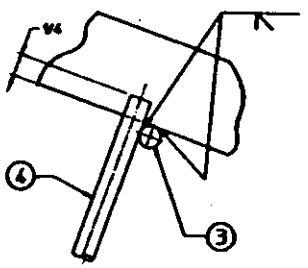
MODULE ME 18X

H-2901-1 1

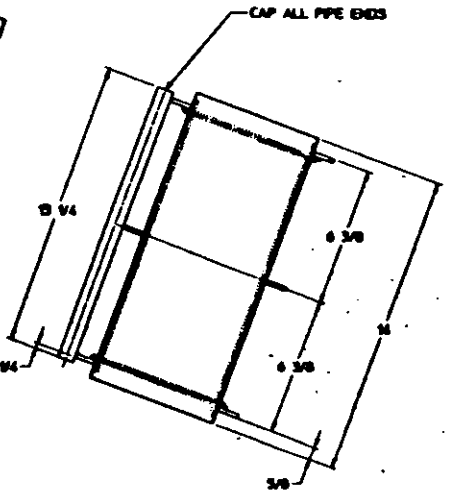
191-0491

BILL OF MATERIAL			
ITEM	QTY	DESCRIPTION	
1	1	PAD, OTTO YORK STYLE 322-78 DEMISTER PLUS, 316 S.S WIRE MESH & GRIDS	
2	6	FLAT BAR, 3/16" x 1" x 35 1/4" LG.	T-316
3	14	ROUND BAR, Ø 1/4" x 13 1/4" LG.	
4	10	ROUND BAR, Ø 1/4" x 6 1/2" LG.	
5	1	PIPE, 1/2" SCH 40 x 13 1/4" LG.	

QTY SHOWN IS FOR (1) PAD.
REQ'D (6) PADS PER OME.



DETAIL A
SCALE: 1" = 1"



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NOTES,
1. VENDOR TO SUPPLY ALL ITEMS TO COMPLETE THIS ASSEMBLY.

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DATE 6-14-91 BY AL/ANN

1	ITEM 1 WAS REV. ITEM 3 WAS SAE ROUND BAR.	6-14-91	AL

HEAT AND CONTROL, INC.
SAN FRANCISCO, CALIFORNIA

THIS DRAWING IS SENT TO YOU SUBJECT TO RECEIPT UPON DEMAND, AND WITH THE UNDERSTANDING THAT IT IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO OUR INTERESTS, ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

6" OIL DEMISTER PAD
OME COOKER/OIL MIST ELIMINATOR
EAGLE SNACKS, ANHEUSER-BUSCH

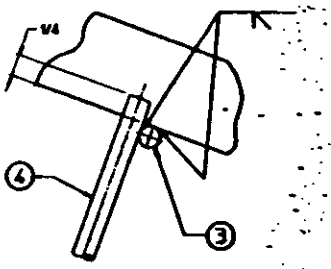
MODULE NO. ME-100

DRAWING NO. JB-2901-3 REV 1

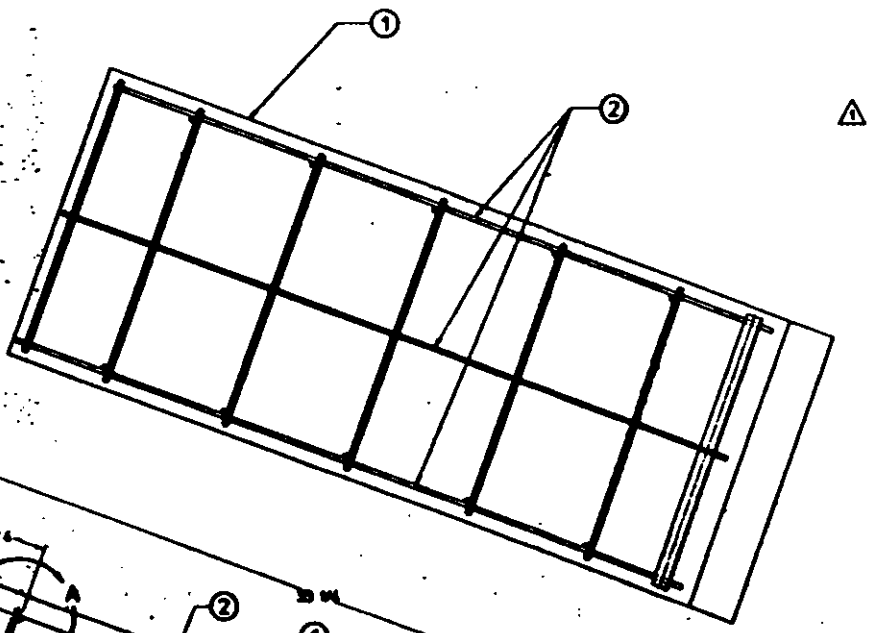
SHEET NO. 191-0491

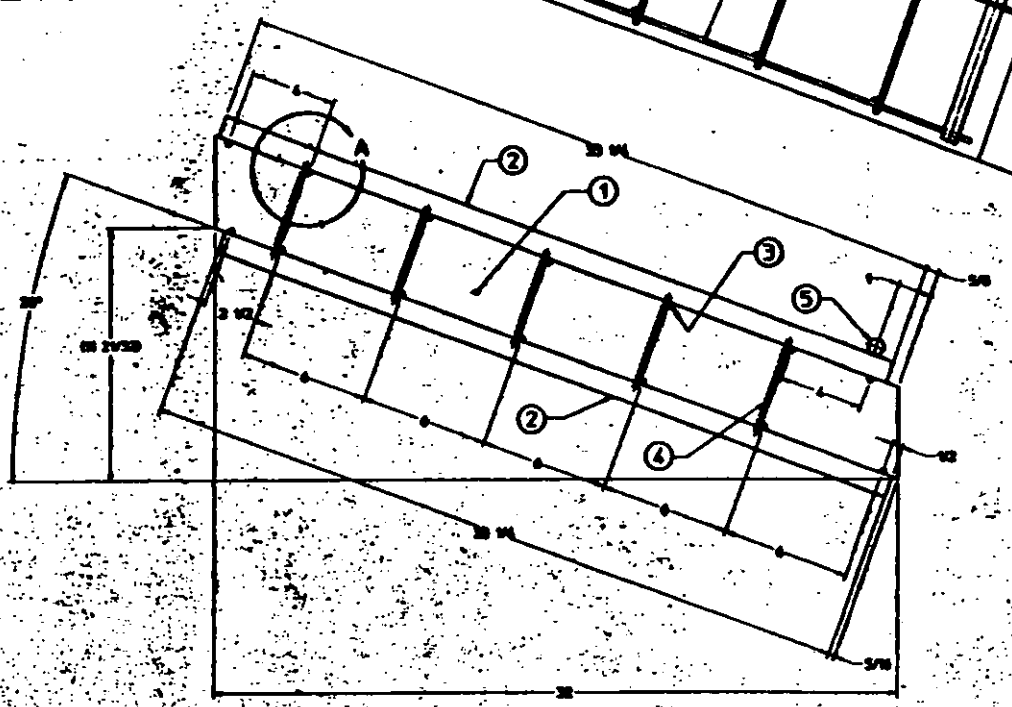
BILL OF MATERIAL			
ITEM	QTY	DESCRIPTION	
1	1	PAD, OTTO YORK STYLE 322-7A DEMISTER PLUS, 316 S.S WIRE MESH & GRIDS	
2	6	FLAT BAR, 3/16" x 1" x 33 1/4" LG.	T-316
3	14	ROUND BAR, Ø 1/4" x 13 1/4" LG.	
4	10	ROUND BAR, Ø 1/4" x 4 1/2" LG.	
5	1	PIPE, 1/2" SCH 40" x 13 1/4" LG.	

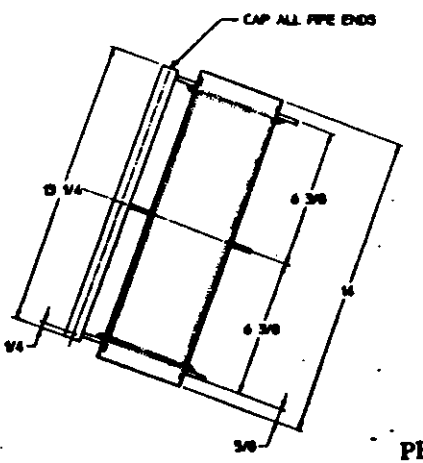
QTY SHOWN IS FOR (1) PAD.
REQ'D (6) PADS FOR OME.



DETAIL A
SCALE: 1 - 1







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HEAT & CONTROL, INC.

NOTES:
1. VENDOR TO SUPPLY ALL ITEMS TO COMPLETE THIS ASSEMBLY.

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DESTROY ALL PREVIOUS COPIES
DATE 6-14-91 BY AL/ARW

MODULE: ME-18X

1	6-14-91	AL

HEAT AND CONTROL, INC.
SO. SAN FRANCISCO, CALIFORNIA

WT - 1
3-21-91

4" OIL DEMISTER PAD
OME COOKER/OIL MIST ELIMINATOR
EAGLE SNACKS, ANHEUSER-BUSCH VISALIA, CA

Drawing No. JB-2901-4 REV 1
Job No. 191-0491

ANHEUSER-BUSCH COMPANIES

ENVIRONMENTAL AFFAIRS DEPARTMENT
ST. LOUIS, MISSOURI
FACSIMILE TRANSMITTAL

314/577-1032 (FAX)

DATE: 5/31/94

- Per Our Discussion ✓
- Urgent, Please Deliver Immediately
- Please Review and Fax Me Your Comments
- Please Review and Give Me A Call
- Original Will Follow by: _____
- Original Will Not Follow

TO: Tom Dagg

FROM: John Stien PHONE: 314/577-4120

TOTAL NUMBER OF PAGES (INCLUDING THIS PAGE): 5

COMMENTS: I found info on "Large" demisters. We will formalize Letter & send out To you and Dallas overnight mail tonight. Please call with questions. Thanks.

John

May 25, 1994

Mr. Tom Lapp
Midwest Research Institute

Mr. Dallas Safriet
USEPA

Gentlemen:

We have reviewed the draft Emission Factor Documentation for AP-42, Deep Fat Frying - Snack Chips and have the following comments:

- Page 6.13.3-4 and -5. The break-out of PM into condensable and filterable fractions is unnecessary and should be combined into one PM emission factor. The use of emission factors for permitting work would focus on the use of PM and PM-10 factors only. Otherwise, agencies may issue complex permit limits based on the various break-outs in the table. Further break-out of condensable PM into an inorganic and organic fraction is misleading, since the organic fraction may be misinterpreted as VOC. The result could be a double counting of the VOC present by combining the organic fraction with the VOC factor shown on page 6.13.3-6.

The PM-10 emission factor is based on 86% of the filterable PM and does not include the PM-10 fraction (.864) of the condensables. These two should be added together to obtain the correct PM-10 factor.

The emission factors after control with a mesh pad mist eliminator incorporates data from two different efficiency mist pads. To take an average efficiency of these pads is misleading and would dictate the use of the more efficient pad to comply with any permit limits developed from these factors. Two options are available: include specific factors for a low efficiency and high efficiency mesh pad, or use one set of data and identify it as either the high or low efficiency mesh pad. As stated on page 4-14, you have chosen the data for a standard or low efficiency mist pad based on reference 5. We feel that this data is not representative of normal operations and that reference 9 should be used. This reference is the basis for our permit limits at the Visalia facility. Attached are design specifications for the "large" demisters identified in references 3 and 4.

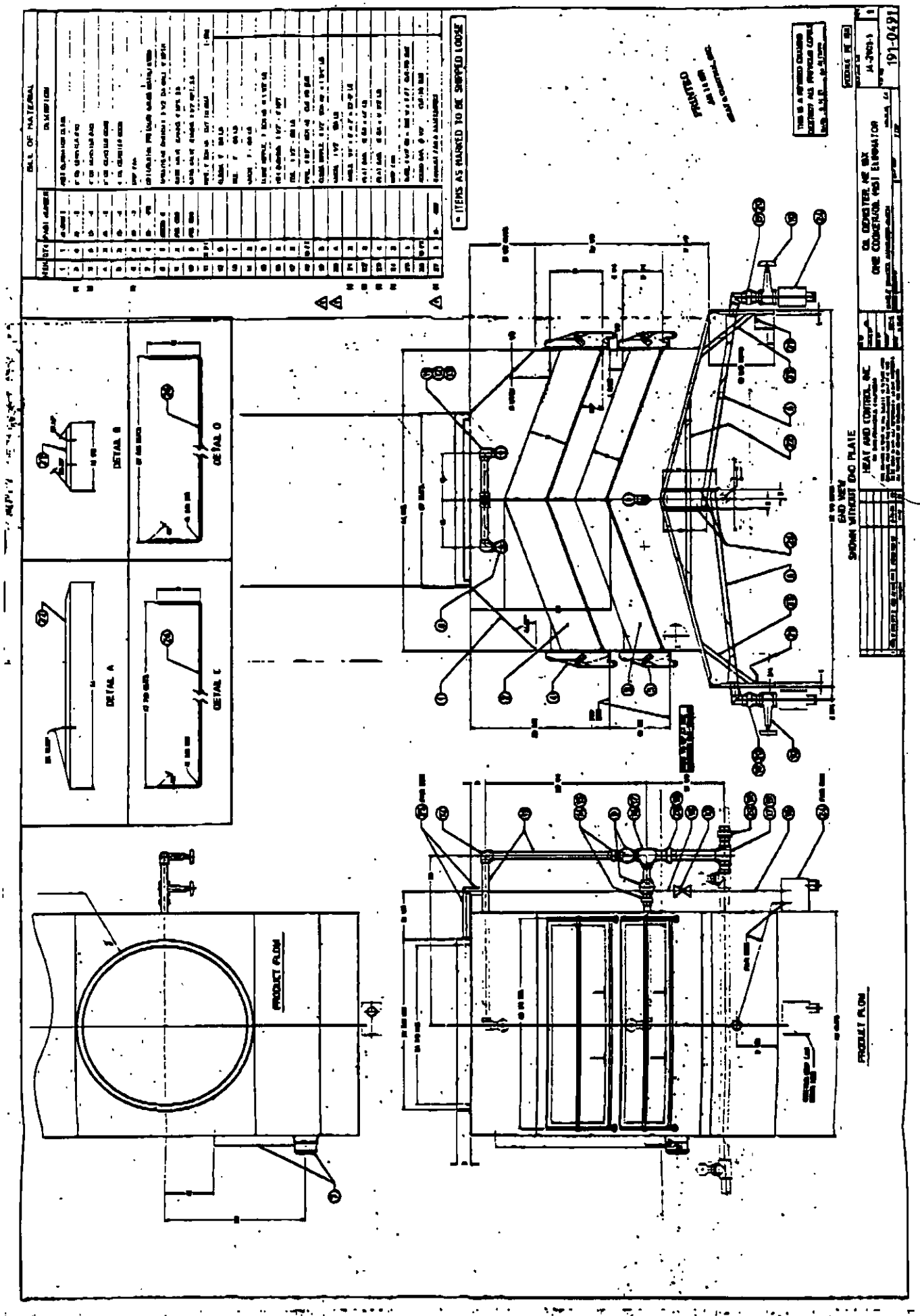
- Page 6.13.3-3. We are not aware of anyone in the industry utilizing an electrostatic precipitator to control potato chip fryer exhaust streams. This reference should be removed.

The test data marked confidential can be used in the report. Please white-out the confidential stamp to avoid any further confusion.

We appreciate the opportunity to comment on the draft documentation. Please call Dean Pusch at 314-577-4162 or John Stier at 314-577-4170 with any questions.

Sincerely;

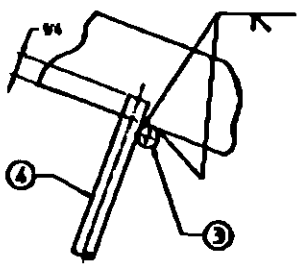
John Stier
Dean Pusch


BILL OF MATERIAL
* ITEMS AS MARKED TO BE SHIPPED LOOSE
DETAIL B
DETAIL D
DETAIL A
DETAIL E
END VIEW SHOWN WITHOUT END PLATE
PRODUCT FLOW
PRODUCT FLOW
HEAT AND CONTROL, INC.
191-0491

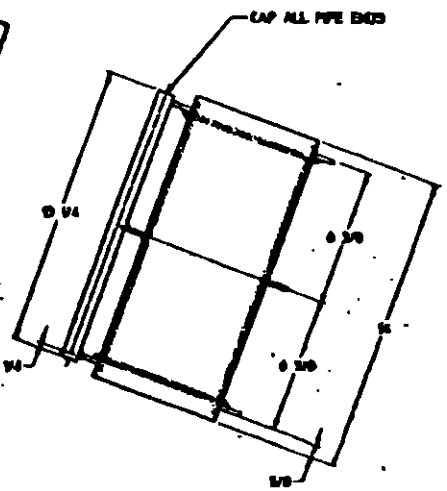
415 871-9234

BILL OF MATERIAL		
ITEM	QTY	DESCRIPTION
1	1	PAD, OTTO YORK STYLE 302-70 DEMISTER PLUS, 316 S.S. WIRE MESH & GRIDS
2	6	FLAT BAR, 3/16" x 1" x 19 1/4" LG. T-316
3	14	ROUND BAR, Ø 1/4" x 19 1/4" LG.
4	10	ROUND BAR, Ø 1/4" x 6 1/2" LG.
5	1	PIPE, 1/2" SCH 40 x 19 1/4" LG.

QTY SHOWN IS FOR (1) PAD REQ'D (6) PADS PER OME.



DETAIL A
SCALE: 1" = 1"



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JUN 14 1991
HEAT & CONTROL, INC.

NOTES:
1. VENDOR TO SUPPLY ALL ITEMS TO COMPLETE THIS ASSEMBLY.

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DATE 6-14-91 BY AL/MHV

MODULE NO. ME-1001

HEAT AND CONTROL, INC.
SAN FRANCISCO, CALIFORNIA

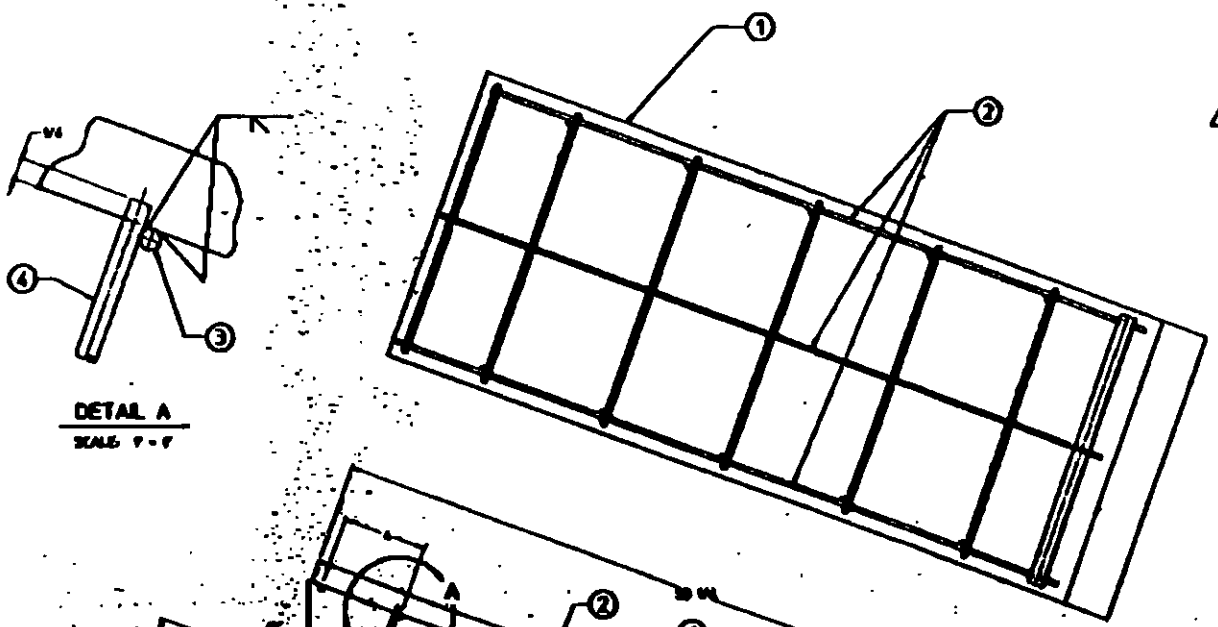
6" OIL DEMISTER PAD
ONE COOKER/OIL MIST ELIMINATOR

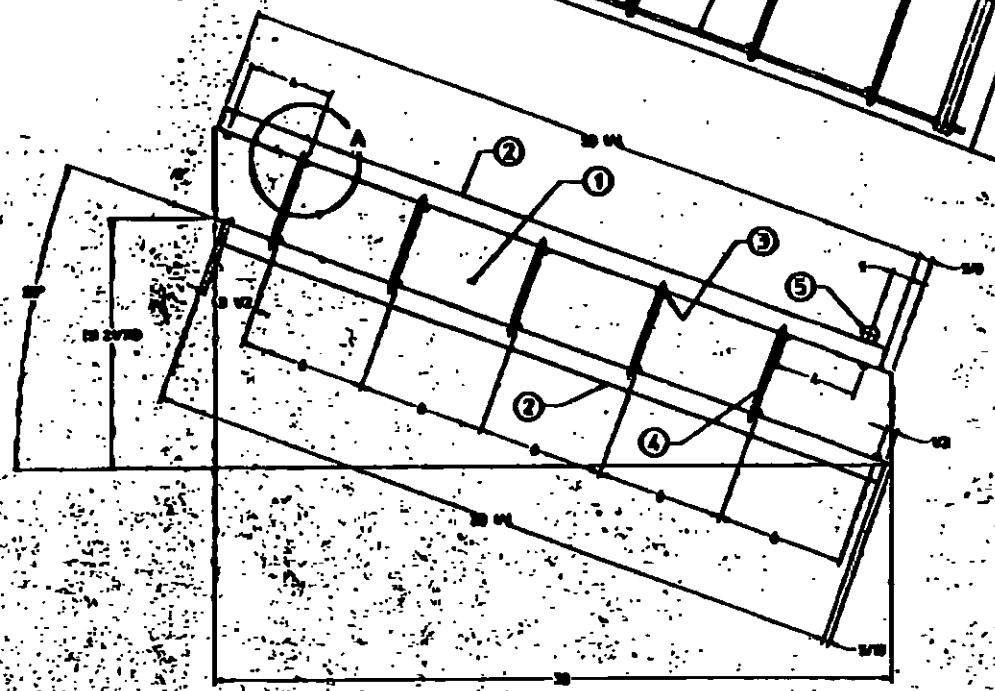
DRAWING NO. B-2901-3 REV. 1

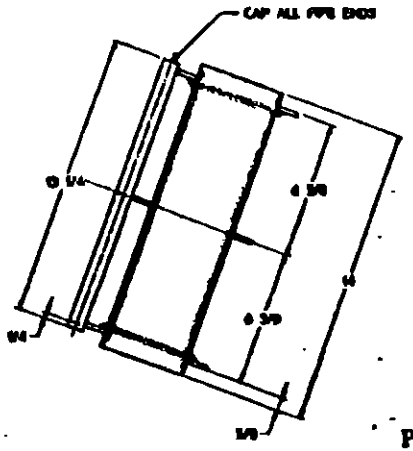
PART NO. 191-0491

BILL OF MATERIAL			
ITEM	QTY	DESCRIPTION	
1	1	PAD, OTTO YORK STYLE SIZE-7A DEMISTER PLUS, 316 S.S MIST MESH & GRIDS	
2	6	FLAT BAR 3/16" x 1" x 33 3/4" LG.	T-316
3	14	ROUND BAR, 5/16" x 13 1/4" LG.	
4	10	ROUND BAR, 5/16" x 4 1/2" LG.	
5	1	PIPE, 1/2" SCH 40 x 13 3/4" LG.	

QTY SHOWN IS FOR (1) PAD.
REQ'D (6) PADS FOR ONE.







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HEAT & CONTROL, INC

NOTES:
1. VENDOR TO SUPPLY ALL ITEMS TO COMPLETE THIS ASSEMBLY.

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DATE 6-14-91 BY AL/AMV

				HEAT AND CONTROL, INC. SAN FRANCISCO, CALIFORNIA	4" OIL DEMISTER PAD OME COOKER/OIL MIST ELIMINATOR EAGLE SNACKS, ANHEUSER-BUSCH NEVADA, CA	DRAWING NO. J3-2901-6 REV 1	
						JOB NO. 191-0491	

May 25, 1994

Mr. Tom Lapp
Midwest Research Institute

Tom:

We have reviewed the Emission Factor Documentation for AP-42, Deep Fat Frying - Snack Chips and have the following comments.

- Page 6.13.3-4 and -5. The break-out of PM into condensable and filterable fractions is unnecessary and should be combined into one PM emission factor. The use of emission factors for permitting work would focus on the use of PM and PM-10 factors only. Otherwise, agencies may issue complex permit limits based on the various break-outs in the table. Further break-out of condensable PM into an inorganic and organic fraction is misleading, since the organic fraction may be misinterpreted as VOC.

The PM-10 emission factor is based on 86% of the filterable PM and does not include the PM-10 fraction (.864) of the condensables. These two should be added together to obtain the correct PM-10 factor.

The emission factors after control with a mesh pad mist eliminator incorporates data from several different efficiency mist pads. To take an average of these pads may be misleading and would dictate the use of the more efficient pad to comply with any permit limits developed from these factors. Two options are available: include specific factors for a low efficiency and high efficiency mesh pad, or use one set of data and identify it as either the high or low efficiency mesh pad.

- Page 6.13.3-3. We are not aware of anyone in the industry utilizing an electrostatic precipitator to control potato chip fryer exhaust streams. This reference should be removed.

John Stier
Dean Pusch

Anheuser-Busch Companies

John Stiel > Eagle Brands 5/25/94

Dear Rusch

Snack Foods — Deep Fat Frying

VOC or NOx emissions from direct-fired kettle fryers — separate stacks or flue from the flame (combustion gases) not tested

Comment #1 — This is a result of standard EPA format for all AP-42 sections; MRI recognizes that there may be a problem with misinterpretation of Condensible organics and VOC. The data are reported in this manner but there should be a caveat in the intro. stating that addition of these 2 values can lead to double counting.

(Part 1)

(Part 2) — MRI could not differentiate from the test reports which mesh pads were high efficiency and which were low. If A-B can provide us with that information, we will separate the emission factors — I could not do it based on current info.

Comment #2 — OK, and agree to delete this reference; some comment received from Frito-Lay.

Confidentiality issue — those pages are not confidential; no problem using the data. John will fax or send me a memo stating this.

ANHEUSER-BUSCH COMPANIES

ENVIRONMENTAL AFFAIRS DEPARTMENT
ST. LOUIS, MISSOURI
FACSIMILE TRANSMITTAL

314/577-1032 (FAX)

DATE: 5/25/94

- Per Our Discussion ✓
- Urgent, Please Deliver Immediately
- Please Review and Fax Me Your Comments
- Please Review and Give Me A Call
- Original Will Follow by: _____
- Original Will Not Follow

TO: TOM LAPP

FROM: J STIGR PHONE: 314/ 577- 4170

TOTAL NUMBER OF PAGES (INCLUDING THIS PAGE): 2

COMMENTS:

4/6/94 R

Frito-Lay, Inc.

March 18, 1994

Dallas Safriet
Emission Inventory Branch
US EPA
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

Dear Mr. Safriet

Thank you for sending me, for my review, the Site Visit report from September 14, 1993 tour of Frito-Lay's Charlotte, N.C. facility. With your inclusion of the following comments I will consider the information accurate and not confidential business information.

1. Page One, III Attendees
   Brian Klepp is the Maintenance Supervisor who participated

2. Page 2, Sec A., 1st Paragraph
   Reads:
   "Frito-Lay produces four types of snack chips..."
   Delete the reference to Frito-Lay products and brands.
   Change to read:
   "Frito-Lay produces several types of snack chips in their N.C. facility. Each type of chip is produced by one of the cooking processes discussed below."

3. Page 4, 1st Paragraph
   Reads:
   "...oil droplets from the oil surface; these droplets are exhausted with the moisture."
   Change to read:
   "...oil droplets from the oil surface. Eighty to ninety percent of these droplets are removed from the vapor streams and collected as liquid oil, the remainder are discharged with the moisture."

moore #4 charepa.sam

March 18, 1994
Dallas Safriet

4. Page 4, Section 2, 2nd Paragraph
   Reads:
   "Mr. Moore indicated that the toaster oven typically is rated at less than 2×10^6 BTU's"
   Change to read:
   "Mr. Moore indicated that the toaster oven on the line observed typically is rated at less than 2×10^6 BTU's."

5. Page 6, Section C
   Reads:
   "...biological oxygen demand..."
   Change to read:
   "...total suspended solids (TSS)..."

With these changes incorporated, the document is accurate and need not be classified as confidential. Thank you for your diligence in considering Frito-Lay's confidentiality.

If you need additional information, please call me at (214) 334-4881.

Sincerely,

FRITO-LAY, INC.

Bill Moore

Bill Moore
js

moore #4 charepa.sam

Frito-Lay, Inc.

Rec'd 4/26/94 BL

Engineering Department

P. O. Box 660634
Dallas, Texas 75266-0634
Phone: (214) 334-7000

7701 Legacy Drive
Plano, Texas 75024-4099
Fax: (214) 334-5175

FACSIMILE TRANSMITTAL

DATE: 4/25/94

TO: Dallas Safriet

COMPANY: EPA

FAX #: _____ PHONE #: _____

FROM: Rhonda Grigg PHONE #: _____

NUMBER OF PAGES BEING TRANSMITTED (including cover sheet): 2

MESSAGE:

Frito-Lay, Inc.

April 22, 1994

Mr. Dallas W. Safriet
Environmental Engineer
United States Environmental Protection Agency
Emission Inventory Branch (MD-14)
Research Triangle Park, North Carolina 27711

Dear Mr. Safriet:

Frito-Lay again appreciates this opportunity to provide comments on the revised Section 6.13.3, Deep Fat Frying, that is proposed for publication in the next edition of AP-42. In general, the report appears compatible with snack chip fryer emission information available to Frito-Lay. However, we do have a concern regarding the new nomenclature used in the report to distinguish "inorganic" and "organic" condensible particulate matter. This terminology does not appear to serve any useful purpose and could be misinterpreted by subscribers. This distinction should be eliminated and replaced with the more simplified "condensible" particulate matter classification.

The only other concern apparent at this time is the inclusion of electrostatic precipitators (ESPs) as an example of control devices in the last paragraph of Section 6.13.3.2. The sentence prior to this listing in the document discusses controls for potato chip fryer exhaust streams which leads the reader to believe that ESPs may be used to control PC emissions. ESPs are not compatible with PC fryer exhausts due to the high moisture content of the stream. Based on three trial installations on other types of snack chip fryers, we have also found that ESPs are not effective in controlling oily particulate matter because the oil coats the surfaces inside the precipitator and very negatively impacts the ESP control efficiency. All of our data indicates that ESPs should not be used on fryer exhaust streams, and we therefore request that they be removed from the listing of examples of control devices.

If you would like to discuss these comments, please contact me at (214) 334-4745. We look forward to working with you to improve this emission factor report as more data becomes available. Please do not hesitate to call if we can be of further assistance.

Sincerely,

Rhonda Page Grigg

Rhonda Page Grigg
West Division Environmental Manager
Frito-Lay, Inc.

P.O. BOX 660634 • Dallas, Texas 75266-0634 • (214) 334-7000

Frito-Lay, Inc.

July 30, 1993

Mr. Dallas W. Safriet
Environmental Engineer
United States Environmental Protection Agency
Emission Inventory Branch (MD-14)
Research Triangle Park, North Carolina 27711

Dear Mr. Safriet:

Frito-Lay again appreciates this opportunity to provide comments on the proposed AP-42 Section 6.13.3 entitled "Deep Fat Frying - Snack Chips." In an effort to streamline this process, our comments are restricted to the draft AP-42 text and do not address the Development Document by Midwest Research Institute.

For discussion purposes, Frito-Lay's comments have been sequentially numbered and are organized according to the order of occurrence in the reference text. Frito-Lay's key concerns are as follows:

1. Section 6.13.3.2, Paragraphs 1 and 4: The two sentences "Condensed water and oil droplets in the exhaust stream are collected by control devices before the exhaust is routed to the atmosphere," and "Controls - Particulate matter emission control equipment is typically installed on fryer exhaust streams," are inaccurate and misleading. Based on a brief review of Frito-Lay's snack food installations, we estimate that only 10 to 15% of our snack food lines are equipped with control devices. The majority of our air pollution control devices are associated with potato chip snack food lines; and, even some of the smaller potato chip lines are not equipped with any control devices.

We would suggest that these two sentences be revised as follows:

"Condensed water and oil droplets in the exhaust stream **may be** collected by control devices before the exhaust is routed to the atmosphere.", and

"Controls - Particulate matter emission control equipment is typically installed on **potato chip** fryer exhaust streams **due to the higher moisture content in the exhaust.**"

2. Tables 6.13.3.1 and 6.13.3-2: The nomenclature "Total PM" used in these two tables to represent the summation of Filterable PM and Condensible PM will be misleading in some locations, because several state agencies do not recognize Condensible PM as a contributor to the Total Suspended Particulate Matter (TSP)

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number, since the condensible fraction typically will not cross the plant boundaryline. Two states which adopt this interpretation are Connecticut and New York.

In order to eliminate this potential confusion, we would recommend that the columns entitled "Total PM" be deleted or renamed "Filterable and Condensible PM".

3. Tables 6.13.3.1, 6.13.3.2, 6.13.3.3, and 6.13.3.4: Since the Emission Factor Rating for all of these table is very poor (E), Frito-Lay is requesting that the tables be footnoted as follows:

"Where available, source testing data should be used in place of developed emission factors, due to the highly variable nature of sources and emissions."

If you have any questions on these comments, please feel free to contact me at (214)334-4745 or Bill Moore at (214)334-4881 during my anticipated absence (through November 1st). Frito-Lay would also like to extend an invitation to you to visit one of our snack food manufacturing facilities close to your location if such a visit would be of interest to you.

Sincerely,

Frito-Lay, Inc.

Rhonda Page Grigg

Rhonda Page Grigg, P.E.
Division Environmental Manager

s:\dept\envirsys\safreit.sam

Frito-Lay, Inc.

April 16, 1993

Mr. Dallas W. Safriet
Environmental Engineer
United States Environmental Protection Agency
Emission Inventory Branch (MD-14)
Research Triangle Park, North Carolina 27711

Dear Mr. Safriet:

Frito-Lay appreciates this opportunity to provide comments on the draft Section 6.13.3, Deep Fat Frying, that is proposed for publication in a supplement to AP-42 this spring. Since the proposed emission factors are based on technical information provided by Frito-Lay, we have reviewed the draft text very carefully, and we have compiled fairly extensive comments on the proposed document.

Frito-Lay's most significant comments focus on the suitability of the data included in the emission factor calculations, but we have also noted minor comments on the wording in the narrative. These comments are summarized on a section by section basis in the enclosed attachment.

The 1991 Frito-Lay report entitled "Characterization of Industrial Deep Fat Fryer Air Emissions" was provided to assist the USEPA in understanding that snackchip fryers are not and should not be considered VOC sources. However, the information included in the report has been used to develop proposed quantitative standards for VOC emissions. Although the information provided in the characterization report was based on the best information available at that time, the integrity of the data is not sufficient to establish nationwide emission factor standards. The proposed emission factors do not accurately represent Frito-Lay's operations and their applicability to the remainder of the snack food industry is questionable. Therefore, Frito-Lay is requesting that the publication of these emission factors be delayed until these discrepancies can be resolved.

Frito-Lay would welcome an opportunity to discuss these comments with yourself and/or MRI. I will contact you to verify your receipt of these comments and to discuss our next steps. You may contact me at (214) 334-4745 if you have any questions on the enclosed comments.

Sincerely,

Frito-Lay, Inc.

Rhonda Page Grigg

Rhonda Page Grigg, P.E.
Division Environmental Manager

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FL—4537-02

emissions factors for widely differing processes. Specifically, the particulate emissions for potato chips is more than four times the emission for tortilla chips used in the development of this "grouped" emission factor. This method of averaging emissions regardless of the nature of the source will have a negative impact on future snack food process compliance and permitting activities for the following reasons:

a) If potato chip fryer particulate emissions are permitted at the proposed emission factor level, then compliance after permitting would be impossible to achieve.

b) If tortilla chip, corn chip, or multigrain chip fryer particulate emissions are licensed at the proposed emission factor level, then these emission will be grossly over-stated, which will eliminate exemptions currently available to these insignificant sources.

Frito-Lay proposes that either (1) uncontrolled emission factors be established for specific sources (e.g. potato chip fryer, tortilla chip fryer, etc.); or, (2) a generic emission factor should not be published.

Table 6.13.3-3 and Table 6.13.3-4:

The data used to develop the controlled emission factors presented in these tables is for Frito-Lay Corn Chip fryers, and these emission factors should not be applied to other types of snack food processes. Therefore, the table should be not be named "PARTICULATE EMISSION FACTORS FOR SNACK CHIP FRYING". The Frito Corn Chip is a Frito-Lay proprietary product and is not produced by other snack food manufacturers. An emission factor for a Frito-Lay proprietary product should not appear in this publication.

Additionally, the tendencies of local regulatory agencies will be to use the controlled corn chip emission factors for all controlled snack chip fryers since controlled emissions factors for other types of snackchips would not be available in the publication. However, if an uncontrolled factor is available and the control equipment is defined, then a controlled emission factor can be developed from published manufacturer's data or from performance guarantees.

Tables 6.13.3-5, 6.13.3-6, 6.13.3-7, and 6.13.3-8:

Frito-Lay's intent in providing the original characterization report was to show that the emissions from fryers should not be classified as VOC emissions because of the extremely low concentrations of hydrocarbons identified in the fryer exhausts. However, since the data was used in an attempt to quantify these emissions, we feel it is important that the EPA understand the limitations of this data.

The data used to develop emission factors for controlled and uncontrolled VOC's for snack chip fryers varies greatly. Based on MRI's expressed concern about the accuracy and consistency of the data provided, Frito-Lay reevaluated the raw data and we agree with MRI's assessment of this data as "poor" in terms of establishing a quantitative emission factor for fryer VOC's. In fact, we

ATTACHMENT 1

Frito-Lay Comments
Draft AP-42 Section 6.13.3, Deep Fat Frying

Section 6.13.3.2.2 (page 6.18.3-1):

The statement that "particulate emission control equipment is typically installed on fryer exhaust streams" is not accurate. This statement would be more accurate if it read as follows:

"Particulate emission control equipment is typically installed on **potato chip** fryer exhaust streams. **Control equipment requirements for corn chip, tortilla chip, or multigrain chip fryers are dependent on the size of the installations due to the low concentrations of particulate matter emissions associated with these processes.**"

Tables 6.13.3-1, 6.13.3-2, 6.13.3-3, 6.13.3-4, 6.13.3-5, 6.13.3-6, 6.13.3-7, 6.13.3-8:

1. Footnote "b" indicates that the emission factor is "expressed as weight of total particulate matter per unit weight of vegetable cooked". This statement is confusing and could be interpreted to mean "per unit of raw vegetable cooked". The emission factor is actually based on the weight of finished product. Therefore, the statement would be phrased more clearly if it read as follows:

"Expressed as weight of total particulate matter per unit weight of **finished product**."

2. Frito-Lay has conducted a fairly extensive statistical analysis of fryer particulate emission factors compiled over the past decade. The results of this analysis indicates that the relation of particulate emissions to finished product throughput is non-linear. Particulate matter emissions are primarily influenced by equipment size and configuration, which in turn impacts exhaust airflow, and percent moisture in the exhaust stream. Therefore, expressing a fryer or product emission factor in terms of pounds of particulate per ton of finished product is inaccurate and misleading.

Tables 6.13.3-1, 6.13.3-2, 6.13.3-3, and 6.13.3-4

By incorporating back-half particulate emissions into the Total Particulate Emissions (TPE) factor, the EPA will be including a new component in the particulate matter equation that is currently not recognized in many states. The "tentative" status of Method 202 has only recently been changed, and many snack food installations are permitted based on Method 5 (or filterable) particulate matter only.

Table 6.13.3-1, 6.13.3-2

The "PARTICULATE EMISSION FACTORS FOR SNACK CHIP FRYING - UNCONTROLLED EMISSIONS" have been calculated by taking the arithmetic mean of

question the appropriateness of EPA's plan to establish emission factors based on this data, and we offer the following comments:

- Testing methods were inconsistent. In some cases a straight Method 25 or 25A was used and in other cases a combination of Methods 5 and 25 were used. The different methods resulted in extremely different results when used on the same source. In some test reports the exact sampling method was not clearly defined.

- Based on an evaluation by an independent consultant, some of the identified methods were not conducted in strict accordance with the EPA-accepted Method procedures.

- Some reports did not contain the required calibration data

- In one test, the selected analytical equipment was not rated to measure hydrocarbon concentrations in the range of the reported results

- In at least one case, the flowrate was not measured simultaneously with hydrocarbon concentration

- Stratification was identified in the ductwork during one test, but temperature and velocity traverse data was not recorded to allow for corrections to the data

Tables 6.13.3-5 and 6.13.3-6:

The MRI analysis of the uncontrolled VOC emission factor included data from extremely diverse sources and sampling methods. As a result, the emission factor of 0.18 lb/ton has a standard deviation of 0.17 lb/ton. It seems apparent from this result that a larger test set designed to identify process specific (e.g. sunflower, cottonseed, etc.) VOC emissions using consistent testing methods is necessary to establish reasonable and appropriate emissions factors.

Tables 6.13.3-7 and 6.13.3-8:

The controlled emission factor for the proprietary Frito Corn Chip fryer VOC's is based on a single reading. It is not good engineering practice to establish a nationwide emission factor based on this extremely limited sample set. In addition to which, this process is a proprietary Frito-Lay product which is not manufactured by the remainder of the snack food industry, therefore this table should not be included in the document due to its limited applicability. Also, this emission factor essentially implies that controlled VOC emissions from corn chip fryers (0.31 lb/ton) are higher than uncontrolled VOC emissions from any snack chip fryer (0.18 lb/ton). These confusing emission factors could result in very unwise control equipment decisions. For all of these reasons, these tables should be entirely deleted from the proposed publication.

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401 Harrison Oaks Blvd.
Cary, N.C. 27513
Telephone (919) 677-0249
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FAX TRANSMISSION

TO: John Steir
FROM: Dan March
TIME: 11:00
DATE: 11/9/93
CHARGE NO: 4601-08-01
(Task AND Subtask Nos.)

THIS FAX CONSISTS OF 3 PAGES (INCLUDING THIS PAGE)
RECEIVING FAX NUMBER: 314/577-1032
VERIFICATION PHONE NUMBER:
COMMENTS:

Mr. Steir,

Thankyou and you staff for the information you provided to us for use in developing AP-42 Section 6.13.3. Mr. DeHart has been especially helpful.

The attached letter explains the concerns we had that your reports contained confidential information. Mr. DeHart assures me this is not the case. I have just sent a summary of that conversation to Mr. DeHart to verify this.

Dan March

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

Mr. John Stier
Manager, Environmental Affairs and Planning
Anheuser-Busch
One Busch Place (202-4)
St. Louis, MO 63118-1852

Subject: Confidential emission test information from tests performed at the Visalia, CA, facility.

Dear Mr. Stier:

Thank you for your help with AP-42 Section 6.13.3, Deep Fat Frying. The test reports Anheuser-Busch provided from their Eagle Snacks, Inc. facility add to the validity of the emission factors for particulate matter.

During a review of the Eagle Snack emission test reports, Midwest Research Institute (MRI) noticed that reports from November 19-21, 1991, October 20-21, 1993, and January 26, 1993, contain raw material input and potato chip production information that is labeled "CONFIDENTIAL." These data are contained in a tabulation that appears to be a computerized tracking system printout of daily potato charge weights. Test reports from February 3-4, 1992, and February 4-5, 1992, contain similar computer generated input/output summary sheets but these sheets are not labeled confidential. A test report dated November 1990 does not contain computer generated summary sheets, but the handwritten production data were not labeled confidential. Test reports from November 1989 and June 1989 do not contain computer input/output summary sheets, but the raw potato inputs are listed in the body of the report as they are for all other reports.

Would you please clarify which, if any, of the data are confidential? The data of greatest concern are the total production rates during the test which are needed to compute the emission factor. For our calculations, the unit of production is tons of potato chips put into bags per day regardless of the amount of seasoning or the amount of finished waste. If the data are not to be used outside of the corporate Anheuser-Busch structure, EPA will be required to maintain these reports in a confidential business information (CBI) facility. The CBI designation will also require MRI to aggregate the data in some manner in order to be able to incorporate the data in AP-42 Section 6.13.3. Each AP-42 Section has a background document that presents the information used to develop the section, including the data used to calculate emission factors.

Therefore, the confidential nature of some of the data presents a problem. Perhaps you could suggest a method to modify the reports to eliminate the confidential data but still allow us to obtain the data needed for Section 6.13.3.

The table below is a summary of Eagle Snacks data currently held by MRI and its presumed status.

Date	Source	Data/Status [a]
Nov. 19-21, 1991	Kettle No. 7	Y,C
Nov. 19-21, 1991	Continuous Line No. 1	Y,C
Oct. 20-21, 1992	Tortilla Line No. 1	Y,C
Jan. 26, 1993	Continuous Line No. 1	Y,C[b]
Feb. 3-4, 1992	Kettle No. 5	Y,N
Feb. 4-5, 1992	Kettle No. 8	Y,N
Nov. 10-11, 1990	Tortilla Line No. 1	Y,N
Nov. 10-11, 1990	Continuous Line No. 1	N,?
Nov. 9-11, 1989	Continuous Line No. 1	N,?
Nov. 9-11, 1989	Kettle No. 5	N,?
May 31-June 1, 1989	Continuous Line No. 1	N,?
May 31-June 1, 1989	Kettle No. 6	N,?

[a] Data: Y=yes, have data; N=no, no data. Status: C=confidential; N=nonconfidential; ?=cannot tell if confidential since data does not exist.
[b] Run 3 only. Runs 1 and 2 > 110% isokinetic.

Please contact me at (919) 677-0249, ext. 5136 if you have any questions.

Sincerely,
MIDWEST RESEARCH INSTITUTE

Dan March
Environmental Scientist

cc:
Dallas Safriet, EPA/EIB
Tom Lapp, MRI
Roy Neulicht, MRI
Project File
Don DeHart, Anheuser-Busch

CONTACT REPORT--MRI Project No. 4601-08

From: Dan March Department

Date of Contact: November 8, 1993

Contacted by: Don DeHart

Company/Agency: Anheuser-Busch

Telephone Number: (314) 577-4158

CONTACT SUMMARY:

Mr. DeHart called to respond to a request I made of Mr. John Stier to clarify the designation of confidentiality in some of the test reports from the Visalia, CA, Eagle Snacks, Inc. facility.

Mr. DeHart says the data contained in the computer generated production tracking system printouts from several of the Eagle Snacks, Inc. reports is not considered confidential by Anheuser-Busch. The printouts have had any extraneous data removed from them to render them nonconfidential so they can be included in reports for submittal to regulatory agencies.

We agreed that I should send a letter to Mr. Stier that explains EPA's concern with the seeming confidentiality claim made by the data sheets. This conversation can then be accepted as a resolution to any confidentiality problems raised by the reports.

Copy 2 of 3

Midwest Research Institute
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513

Date: April 7, 1994

Sent via: Hand-Carried

CUSTODY RECEIPT FOR CAA CONFIDENTIAL BUSINESS INFORMATION

To:	From:
Mr. Dallas Safriet Emission Inventory Branch US EPA/OAQPS Research Triangle Park, NC 27711	Lisa K. Scruggs Document Control Officer Midwest Research Institute 401 Harrison Oaks Boulevard Suite 350 Cary, North Carolina 27513-2412

Instructions:

1. Original of this receipt to be signed by recipient and returned to sender.
2. Duplicate of this receipt to be retained by recipient.

Document Control No.	Copy No.	Description of material
4601-08-13	2 of 3	MRI Project No. 4601-08-13; EPA Contract No. 68-D2-0159; Food & Ag. Site Visit Report: Frito-Lay, Incorporated; finalized April 7, 1994; 6 pages. Note: This version has had Mr. Bill Moore's comments incorporated into it and is no longer confidential business information based on his letter of March 18, 1994 to you. Attn: Mr. Dallas Safriet

I have personally received materials, enclosures, and attachments as identified above. I assume full responsibility for the safe handling, storage, and transmittal of this material in accordance with existing Confidential Business Information regulations.

Date received: 4-11-94

Signature of recipient: Dallas Safriet

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

Date: March 14, 1994
(Finalized April 7, 1994)

Subject: Site Visit--Frito-Lay, Incorporated
Emission Factor Documentation for AP-42, Section 6.13.3
EPA Contract No. 68-D2-0159; MRI Project No. 4601-08

From: Dan March

To: Dallas Safriet
TSD/EIB
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

I. Purpose

The purpose of the visit was to obtain information on the production of potato and corn snack chips. This information will be used to revise AP-42 Section 6.13.3, Deep Fat Frying--Snack Chips.

II. Place and Date

Frito-Lay, Incorporated
2911 Nevada Boulevard
Charlotte, North Carolina

September 14, 1993

III. Attendees

Frito-Lay, Incorporated

Bill Moore, Group Manager
Environmental and Mechanical Engineering
Dallas, Texas

Dennis Zito
Charlotte, North Carolina

Brian Klepp, Maintenance Supervisor
Charlotte, North Carolina

U. S. Environmental Protection Agency (EPA)

Dallas Safriet, EIB
Dee Graf, EIB

Midwest Research Institute (MRI)

Roy Neulicht
Dan March

IV. Discussion

A meeting was held with Frito-Lay personnel to discuss the objectives of the visit and the status of work performed to revise the AP-42 emission factors for Section 6.13.3, Deep Fat Frying--Snack Chips. This discussion was followed by a tour of the production facility. The following discussion is a description of deep fat fryers and toasters used to produce corn and potato snack chips at Frito-Lay in its Charlotte, North Carolina, facility. A detailed process description of deep fat fryers is presented in the Final Draft Report of AP-42, Section 6.13.3, and is not repeated here.

A. Production

Frito-Lay produces several types of snack chips in their Charlotte, North Carolina, facility. Each type of chip is produced by one of the cooking processes discussed below. Only continuous processes are used at the Charlotte facility; batch kettle fryers are not used. The different process lines used are described in the following sections.

1. Steam heated potato chip fryer. A diagram of a typical steam-heated, potato chip fryer is presented in Figure 1. As indicated in Figure 1, after proceeding through a cleaning process (washing and peeling), the potatoes are sliced and discharged into a deep fryer. Steam heated fryers are the most common type of fryer used by Frito-Lay in their Charlotte facility. The fryers vary in size according to the moisture content of the raw material. Potatoes, which have a moisture content of about 80 percent, require much larger fryers than corn, which has a moisture content of about 40 percent.

The higher moisture content of potatoes versus corn results in two differences in the deep fat fryers used:

1. The moisture emitted from cooking potatoes removes a substantial amount of heat energy from the cooking oil in the dewatering zone of the fryer, thus requiring additional fryer length to maintain the minimum contact time at the target temperature required for cooking.

2. More make-up oil is required for cooking potatoes than corn for two reasons, both related to the moisture content of the potatoes. The moisture from potato slices emitted as steam from below the surface of the oil causes a boiling action that strips oil droplets from the oil surface. According to Mr. Moore, eighty to ninety percent of these droplets are removed from the

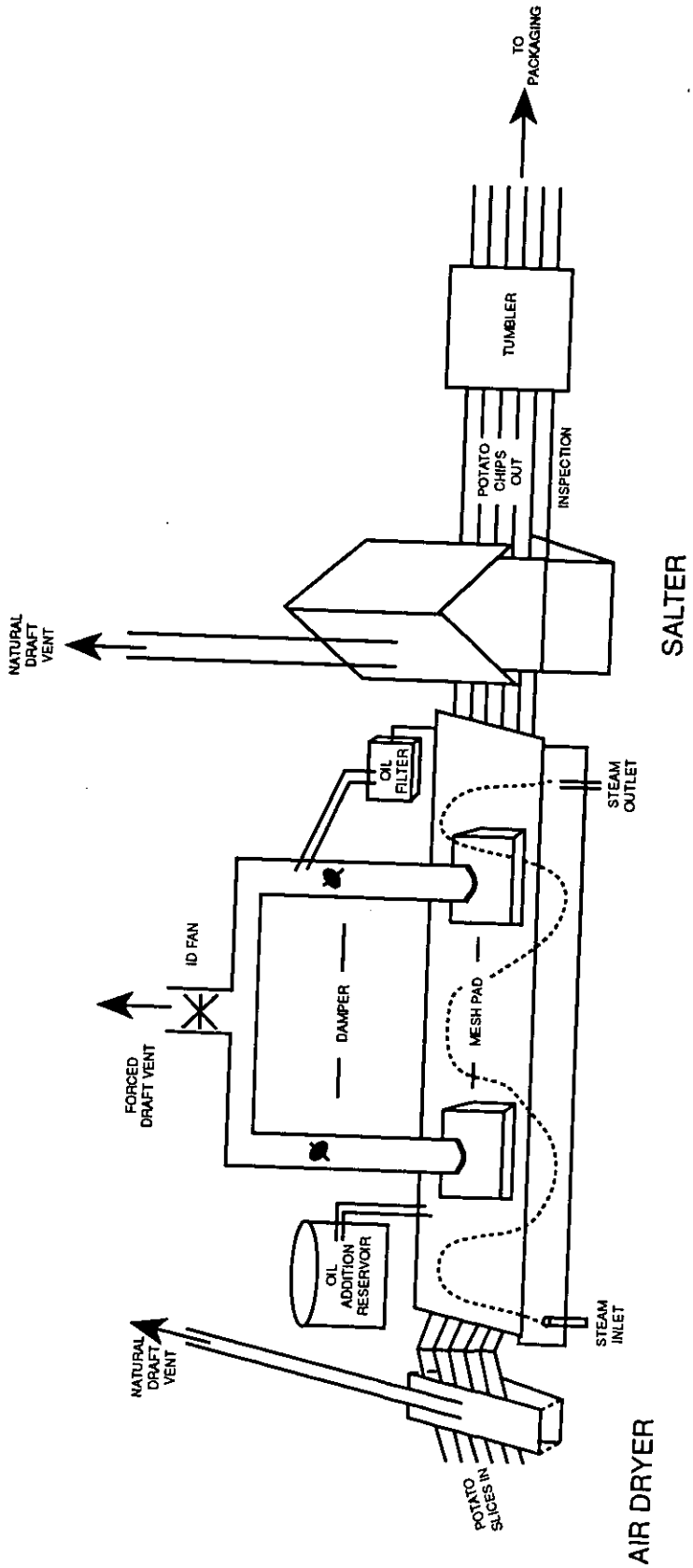

Figure 1. Potato chip fryer line.

vapor streams and collected as liquid oil, the remainder are discharged with the moisture. Also, oil is lost during fry cooking because the water in the food is replaced by the oil. Therefore, potatoes require about twice as much make-up oil as corn to replace moisture contained in the chips.

The deep-fat fryers used for potato chips have two process vent ducts. The first is located near the raw material inlet and the second is located near the chip exit. Each vent duct is equipped with a mesh pad demister; the vents are ducted to a common induced draft fan and stack to atmosphere. A portion of the fryer oil is recirculated through a filter as a normal part of the process. The filter tank also is vented to the process stack.

The demister pads are located at the base of the exhaust duct just above the fryer. The pads are 1 meter (m) by 1 m (3 feet [ft] by 3 ft) wide and 0.2 m (8 inches [in.]) thick. Each pad is composed of four 1 m by 0.2 m by 0.2 m (3 ft by 8 in. by 8 in.) sections of stainless steel mesh arranged horizontally. Demister pads are cleaned weekly by immersion in sodium hydroxide (NaOH) followed by boiling in water, rinsing and drying. The entire cleaning process takes about 12 hours.

2. Steam heated corn chip, multigrain chip, and tortilla chip fryer line. A diagram of a typical corn chip, multigrain chip, and tortilla chip fryer line is presented in Figure 2. As indicated in Figure 2, the prepared snack material to be fried is first extruded and cut; next, the material either enters a toaster prior to discharge to the deep fat fryer (tortilla chips), or is discharged directly into the fryer. The toasting oven assembly is used only for tortilla chips. The configuration contains three elements: a toaster, a drying stand, and a fryer.

The toaster is a natural gas direct-fired oven. Mr. Moore indicated that the toaster oven on the line observed typically is rated at less than 2×10^6 Btu's. The toaster has two exhaust ducts for venting the natural gas combustion products and the moisture given off by the chips. These exhaust ducts are natural draft controlled by a barometric damper; they are not equipped with any air pollution control device. The drying stand allows additional moisture to be given off from the chips as they cool. The drying stand has no exhaust collection or emission control system.

The fryer used in this process line typically is smaller than the fryers used for potato chips, since the moisture content of corn is less than that of potatoes. The natural draft fryer exhaust ducts on this process line are not equipped with an air pollution control device (i.e., mesh pad demister). However, Mr. Moore indicated that mesh pad demisters are sometimes used on this type process line (e.g., in California). The filter tank for the fryer oil purifier is vented to the fryer vent duct. The

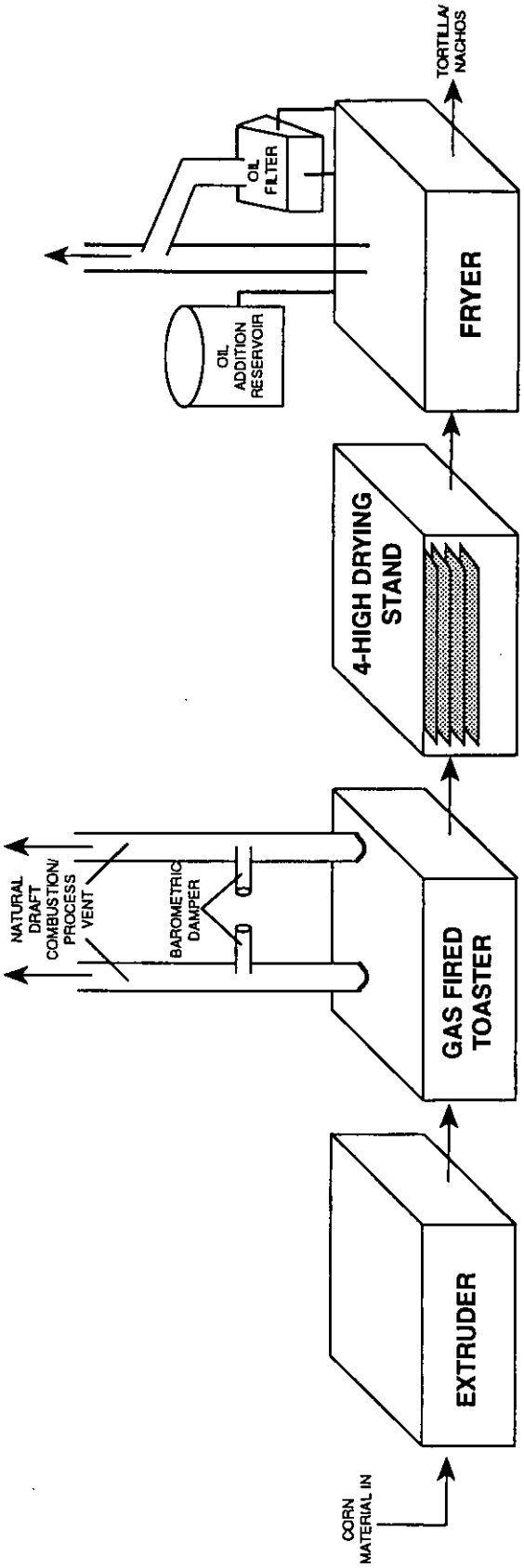

Figure 2. Tortilla corn chip fryer line.

area where salt is applied to the chips also is vented to the atmosphere via a natural draft stack.

3. Gas fired fryers. At least one older direct gas fired fryer is still in operation at this facility. The configuration of gas fired fryers is similar to but smaller than steam heated fryers.

As with the steam heated fryers, an exhaust duct above the surface of the frying oil is located in about the first third of the length of the fryer. A separate combustion exhaust duct vents the combustion products from the natural gas burner that heats the fryer. Both ducts use natural draft to exhaust emissions. Neither duct is equipped with any type of air pollution control device.

B. Materials

Frito-Lay uses cottonseed, soybean, and canola oils to cook potato and corn chips. Other oils such as peanut oil and corn oil can also be used for this purpose.

Commercially available and in-house designed fryers are used by Frito-Lay. The commercial fryers are manufactured by Heat and Control, Salvo, and Southoak. A fourth fryer supply company, no longer in business, is Ferry.

C. Starch Recovery Unit

The sliced potatoes are water washed before they are introduced into the fryer. The starch released from sliced potatoes would create a high total suspended soilds (TSS) if the wash water was discharged to the wastewater system. Instead, the water is air evaporated and the resulting dry starch is recovered in a cyclone separator and sold. Facility personnel indicated that about 1 lb of starch is recovered per 100 lb of potatoes processed. The cyclone discharge is a potential particulate matter emission source.

V. Summary

The site visit was instructive with regard to gaining a better understanding of the overall design and operation of deep fat-fryers used for snack foods. This facility produces two types of products: (1) potato chips and (2) other snack chips. Two differences in these products were noted: (1) the emissions from the potato chips fryers are controlled using a mesh pad demister while the emissions from the other fryers are uncontrolled, and (2) a direct-fired natural gas toaster is incorporated into the process line for some of the other snack foods (e.g., tortilla chips).

SNACK FOOD ASSOCIATION
1711 King Street Suite One, Alexandria, Virginia 22314
(703) 836-4500 TELEX: 704234
FAX (703) 836-8262

May 7, 1993

Mr. Dallas W. Safriet
Environmental Engineer
United States Environmental Protection Agency
Emission Inventory Branch (MD-14)
Research Triangle Park, North Carolina 27711

Dear Mr. Safriet:

The Snack Food Association (SFA) appreciates this opportunity to comment on the draft Section 6.13.3, Deep Fat Frying, as proposed for publication in a supplement to AP-42. SFA is a trade association representing more than 500 domestic manufacturers and suppliers involved in the production and distribution of products made from vegetables, grains, fruits, meats, and nuts consumed in the United States. While there are national companies in the association, many are moderately-sized regional businesses.

SFA has reviewed the February 23, 1993, MRI Report, titled Emission Factor Documentation for AP-42; Section 6.13.3; Deep Fat Frying; Revised Draft Report, that you mailed to us in March for comment on the technical aspects of the report and to review the general information on the snack food industry. SFA has also reviewed comments on the report submitted by our member company, Frito-Lay, Inc., regarding the quality of the report's underlying data based largely on a study conducted by Frito-Lay, Inc. of several snack frying manufacturing facilities.

We recognize that the data MRI used in preparing the report did not, as pointed out on page 3-4 of the report, represent a random sample of the industry. We also agree in part with many of the concerns raised by Frito-Lay, Inc. in their comments to you on certain applications of the data. SFA has observed that the controlled VOC emission factor for corn chips in the study is inconsistent with the "uncontrolled" factor for snack chips. This factor was taken from a test at one Frito-Lay, Inc. cooker that was equipped with a condenser and an electronic precipitator. The facility was tested once with the precipitator disabled, and once with the condenser off and the duct work temporarily insulated. Neither of these tests were representative of a normal operation.

Even in view of the data classification, however, SFA firmly believes that the data is useful as a benchmark to conclude that emissions from vegetable oil fryers are primarily composed of non-volatile particulate matter and the levels of volatile organic compound, if any, from vegetable oil frying in snack food operations is deminimus in evaluating the effect of VOCs contribution to ozone depletion, even in non-attainment areas. Furthermore, it is our understanding that AP-42 is intended as a yard stick with which to measure areas of true environmental concern. In this light, we recommend that EPA publish the AP-42, in order to provide the regulatory community with a benchmark for analyzing the kind of frying

operation generally found in the snack manufacturing industry. We suggest, however, that when EPA publishes the AP-42 it should either not publish an emission factor for controlled facilities, or should only publish the indicated condenser control efficiency rather than an emission factor.

With respect to general information on the size, geographic region, and consumption data of our industry's products, I have included our annual consumption survey of the industry and an excerpt from our annual directory on snack company locations state by state. This is the most up-to-date information available we have on the industry. This document will be updated again in the fall and I would be happy to provide you with a copy of that edition when it becomes available.

Again, thank you for the opportunity to provide our thoughts on this report, and please contact me if I can provide you with further information.

Sincerely,

James W. Shufelt
President

JWS/smb
Enclosure