Attached is the Reactor Opening Loss (ROL) data completed as of August 5, 1985 using the hot box sampling method. A total of 146 samples was taken. 129 of these were valid samples, and 17 were invalid samples due to problems with the sampling system equipment. A complete report with portable hydrocarbon detector data will be issued by Process Engineering Department at a later date.

The attached summary sheet divides the samples into the following categories: stripping procedure used, number of valid and invalid samples, use of reactor and condenser sample tubes, and the number of valid samples above ROL limits. Stripping procedures are described in the Appendix and labeled by letters A through I. Stripping Procedure A is the current stripping procedure used at the plant. The stripping procedures are less severe than Procedure A and were used to determine how sensitive ROL data is to stripping conditions. Log sheets and batch sheets for all samples taken are included in the Appendix.

When it was realized that polymer buildup inside reactor and condenser nozzles could affect sample results, sample tubes were inserted into the reactor headspace where possible to ensure a clean sampling path. A sample tube was also inserted into the condenser of reactor 700 after pluggage problems and polymer buildup was found in the condenser's sampling nozzle. Also, after problems with steam tracing on the sample lines and hot boxes were encountered, steam tracing was verified to be above 300°F before samples were taken.

Problems with sampling equipment invalidated certain samples. Problems due to sample line pluggage and polymer buildup inside reactor and condenser sample nozzles invalidated samples on the following reactor batches:

	Date	Reactor	Batch No.	Blend No.
1.	4/2/85	744	492	38991
2.	4/3/85	300	3615	60243
3.	4/4/85	743	1015	39024
4.	4/4/85	743	1016	39030
5.	4/16/85	743	1051	39211
6.	4/16/85	744	538	39214
7.	4/17/85	600	5205	60447
8.	4/22/85	700	2713	60529
9.	4/23/85	700	2715	60539
10.	4/23/85	700	2716	60544
11.	6/21/85	700	2830	61275
12.	6/22/85	700	2833	61296
13.	7/8/85	700	2858	61414
14.	7/9/85	700	2859	61424

Problems with steam tracing on sample lines, where steam tracing was not hot enough or completely shut off, invalidated the following samples:

	Date	Reactor	Batch No.	Blend No.
15.	6/3/85	400	5419	61053
16.	6/3/85	600	5327	61052

Problems with air leakage into the sampling system invalidated the following sample:

	Date	Reactor	Batch No.	Blend No.
17.	4/15/85	300	3651	60425

Invalid samples no. 1,6,7,8,9,11,12,13, and 14 were caused by verified polymer buildup and pluggage in the reactor/condenser sample nozzles on sample lines. In each case, the actual pluggage in the line was discovered and either drilled out or removed. Evidence that the lines were plugged was usually indicated by a difference in the reactor and condenser sample line pressures when pulling sample vapors. Whenever these lines showed a pressure difference of more than 2" Hg, pluggage was suspected and usually sampling was aborted. Sometimes the sample line pressures would fluctuate as sample was being pulled from the reactor/condenser, indicating polymer chunks inside the sample line. Experience has indicated that sample lines that contain a buildup of polymer give erroneous results when the samples are analysed due to residual vinyl chloride monomer in the polymer.

Invalid samples no. 2,3,4,5,and 10 were caused by sample line pluggage also. This was indicated by the difference in the reactor and condenser line pressures while sample vapors were being pulled from the reactor/condenser. This was usually double-checked after the reactor was dumped. When pulling sample from a reactor/condenser at atmospheric pressure, a clear line would give a reading of no more than 4" to 5" Hg on the sample line vacuum gauge. Any reading higher than this indicated pluggage and corrective action had to be taken. In some instances, the pluggage would dissappear when vacuum on the reactor/condenser was broken to dump the reactor, thus no verified evidence that polymer was in the sample line was obtainable. Any line pressure differences exceeding 2" Hg indicated pluggage in the line.

Invalid samples no. 15 and 16 were caused by the fact that after the samples were taken, the steam tracing on one of the sample lines was not on. The steam traced sample lines must be hot enough to keep sample vapors from condensing while being pulled through the sample line. Otherwise, water vapor will condense and the percent vinyl chloride monomer in the sample vapor will increase. After problems with the steam tracing were discovered, all steam tracing temperatures were checked before a sample was taken.

Invalid sample no. 17 had a leak on the reactor sample line. All sample lines and bombs were vacuum checked before a sample was taken. This leak wad discovered after the sample was taken and was traced to a leaking pressure gauge connection.

The conversion factors used in calculating the amount of slurry produced were based on the Aberdeen Resin Economics Program issued August 6, 1984 by Process Engineering Department.

The volume used to make the ROL calculation was measured on 5385 resin and 5465 resin. Volumes for the other products were calculated using the measured volumes as a basis.

The sample bomb temperature correction factors, as described in the ROL Sample Calculation section of this report, were calculated using sample bomb surface temperatures. These temperature measurements were made with a hand-held surface temperature thermocouple probe. This procedure required that the hot box be opened after the actual sample was taken. This delay, and opening the box, resulted in some sample bomb surface temperatures that were below reactor or condenser operating temperatures at the time of sampling. Whenever this happened, no temperature correction factor was used.

ROL SAMPLE SUMMARY SHEET

STRIPPING PROCEDURE	NO. OF VALID SAMPLES	NO. OF INVALID SAMPLES	REACTOR SAMPLE TUBE	CONDENSER SAMPLE TUBE
A	63	12	No	No
**A	18	0	Yes	No
*A	2	0	Yes	Yes
B	9	1	No	No
C	3	0	No	No
D	8	4	No	No
D	18	0	Yes	No
*D	1	0	Yes	Yes
*E	2	0	Yes	Yes
*F	2	0	Yes	Yes
*G	1	0	Yes	Yes
*H	1	0	Yes	Yes
*I	2	0	Yes	Yes

*All of these samples were taken on Reactor 700.
** 7 of these samples were duplicate samples on the Reactor only.

ABERDEEN ROL DATA

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Sample ID #	1	2	3	4	5	6	7	8	9	10	11
Product	5265	5265	5265	5265	5265	5265	5265	5425	5265	5425	5265
Reactor	700	700	700	700	745	700	745	742	745	742	745
Batch #	2650	2651	2652	2654	1409	2655	1410	1311	1411	1312	1412
Blend #	60190	60195	60200	60210	38968	60215	38973	38974	38978	38979	38983
Date	3-30	3-30	3-30	3-31	3-31	4-1	4-1	4-1	4-1	4-1	4-1
Time	142	1125	2115	1532	1825	100	125	330	830	1047	1552
VCM Charge, gals	10220	10220	10230	10270	8790	10230	8790	6750	8790	6750	8790
Water Charge, gals	10650	10650	10650	10650	10550	10650	10550	7550	10550	7550	10550
Colloid Charge, gals	315	305	305	295	365	275	365	205	365	205	365
Other Water, gals	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8
Cond. Steam, gals	1169	1169	1169	1169	1059	1169	1059	1005	1059	1005	1059
Conversion, %	73.85	73.85	73.85	73.85	73.85	73.85	73.85	74.3	73.85	74.3	73.85
PVC, lbs	57361	57361	57417	57641	49335	57417	49335	38116	49335	38116	49335
Volumes, cu.ft.											
Reactor Vol	4291.7	4291.7	4291.7	4291.7	4291.7	4291.7	4291.7	2853.3	4291.7	2853.3	4291.7
Slurry Vol	2488.0	2486.6	2487.3	2488.6	2370.6	2483.1	2370.6	1795.8	2370.6	1795.8	2370.6
Cond Head Space	87.6	87.6	87.6	87.6	87.6	87.6	87.6	29.2	87.6	29.2	87.6
Cond Tube Vol	107.4	107.4	107.4	107.4	107.4	107.4	107.4	33	107.4	33	107.4
Reactor Sample											
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N
Rx Temp, F	198	198	200	200	193	200	200	200	200	199	199
Rx Bomb Pressure, in.Hg	10.9	10	9.8	10.5	12.4	10.4	11	9.9	10.5	11	11.5
Rx Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	277	105	333	179	920	350	452	991	364	18	410
Rx Vapor Vol, cu. ft.	1857.4	1858.8	1858.1	1856.8	1974.8	1862.3	1974.8	1074.0	1974.8	1074.0	1974.8
Lbs VCM in reactor	0.2470	0.0937	0.2970	0.1595	0.8721	0.3129	0.4285	0.5109	0.3450	0.0093	0.3886
Reactor ROL	4.31	1.63	5.17	2.77	17.68	5.45	8.68	13.40	6.99	0.24	7.88
Reactor Sample No. 2											
Tube Sample, Y/N											
Rx Bomb Pressure, in.Hg											
Rx Bomb Temp, F											
Bomb ppm											
Lbs VCM in reactor											
Reactor ROL											
Condenser Sample											
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N
Cond Temp, F	193	194	196	194	190	193	184	195	200	190	185
Cond Bomb Pressure, in.Hg	21	20	21.4	12.1	14	12.2	12.6	10	14.5	10.3	14
Cond Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	309	2237	3157	3314	2942	9808	1541	862	920	1339	1613
Cond. Vol, cu. ft.	141.3	141.3	141.3	141.3	141.3	141.3	141.3	45.7	141.3	45.7	141.3
Lbs VCM in Cond	0.0210	0.1517	0.2141	0.2248	0.1995	0.6652	0.1045	0.0189	0.0624	0.0294	0.1094
Cond. ROL	0.37	2.65	3.73	3.90	4.04	11.59	2.12	0.50	1.26	0.77	2.22
Total ROL	4.67	4.28	8.90	6.67	21.72	17.03	10.80	13.90	8.26	1.01	10.10
Time Cond Temp >180	30	28	21	30	15	20	16	30	20	23	NA
Stripping Procedure Used	A	A	A	A	A	A	A	A	A	A	A
Slurry Residuals											
Concurrent w/bomb sample											
Initial Sample		56	232	89	517	620	240	73	235	92	158
5 mins. into dump	144	84	178	87	208	200	165	39	156	48	170
10 mins. into dump		73	145	32	205	178	200	34	150	48	169
15 mins. into dump									157	67	
20 mins. into dump										76	
End of dump									161		

Sample ID #	12	13	14	15	16	17	18	19	20	21	22
Product	5425	5385	5425	5385	5425	5425	5425	5425	5425	5385	5385
Reactor	742	744	742	742	741	741	741	741	741	600	600
Batch #	1313	491	1314	1315	804	805	806	807	808	5164	5165
Blend #	38984	38986	38989	38994	38987	38992	38997	39002	38907	60246	60251
Date	4-1	4-1	4-2	4-2	4-2	4-2	4-2	4-2	4-3	4-3	4-3
Time	1750	2017	45	745	1224	1224	1224	2015	333	716	1440
VCM Charge, gals	6750	6950	6750	6950	6750	6750	6750	6750	6750	5830	5810
Water Charge, gals	7550	7990	7550	7990	7550	7550	7550	7550	7550	6500	6500
Colloid Charge, gals	205	215	205	215	205	205	205	205	205	145	145
Other Water, gals	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8
Cond. Steam, gals	1005	1051	1005	1051	1005	1005	1005	1005	1005	912	912
Conversion, %	74.3	80.13	74.3	80.13	74.3	74.3	74.3	74.3	74.3	80.13	80.13
PVC, lbs	38116	42325	38116	42325	38116	38116	38116	38116	38116	35504	35382
Volumes, cu.ft.											
Reactor Vol	2853.3	2853.3	2853.3	2853.3	2853.3	2853.3	2853.3	2853.3	2853.3	2450.1	2450.1
Slurry Vol	1795.8	1914.0	1795.8	1914.0	1795.8	1795.8	1795.8	1795.8	1795.8	1600.0	1598.5
Cond Head Space	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
Cond Tube Vol	33	33	33	33	33	33	33	33	33	33	33
Reactor Sample											
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N
Rx Temp, F	201	200	200	200	200	200	200	200	200	200	200
Rx Bomb Pressure, in.Hg	9.8	16.6	10	9.5	12.4	12.2	11.5	11.4	11.4	10	10
Rx Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	115	881	67	146	45	138	26	645	121	188	356
Rx Vapor Vol, cu. ft.	1074.0	955.8	1074.0	955.8	1074.0	1074.0	1074.0	1074.0	1074.0	866.6	868.1
Lbs VCM in reactor	0.0593	0.4042	0.0345	0.0670	0.0232	0.0711	0.0134	0.3325	0.0624	0.0782	0.1483
Reactor ROL	1.56	9.55	0.91	1.58	0.61	1.87	0.35	8.72	1.64	2.20	4.19
Reactor Sample No. 2											
Tube Sample, Y/N											
Rx Bomb Pressure, in.Hg											
Rx Bomb Temp, F											
Bomb ppm											
Lbs VCM in reactor											
Reactor ROL											
Condenser Sample											
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N
Cond Temp, F	195	194	193	194	189	189	200	190	192	196	190
Cond Bomb Pressure, in.Hg	10.9	10	10	9.5	12.9	12.8	13.2	14	11.9	10.5	10.4
Cond Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	1858	2280	915	39	3227	3597	2626	15680	3096	4090	2659
Cond. Vol, cu. ft.	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7
Lbs VCM in Cond	0.0408	0.0500	0.0201	0.0009	0.0708	0.0789	0.0576	0.3440	0.0679	0.0897	0.0583
Cond. ROL	1.07	1.18	0.53	0.02	1.86	2.07	1.51	9.02	1.78	2.53	1.65
Total ROL	2.62	10.73	1.43	1.60	2.47	3.94	1.86	17.75	3.42	4.73	5.84
Time Cond Temp >180	16	40	25	27	27	25	28	24	29	25	40
Stripping Procedure Used	A	A	A	A	A	A	A	A	A	A	A
Slurry Residuals											
Concurrent w/bomb sample											
Initial Sample	106	101	33	66	44	24	126	47	37	161	193
5 mins. into dump	53	83	32	67	33	22	34	39	36	176	179
10 mins. into dump	42	79	30	66	26	20	39	43	41	143	140
15 mins. into dump				53		25	41				
20 mins. into dump				46			401				
End of dump							563				

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ABERDEEN ROL DATA

Sample ID #	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Product	5425	5385	5385	5465	5385	5385	5425	5385	5385	5425	5385	5385	5385	5425	5385	5425	5385	5385	5425	5385	5385	5385
Reactor	741	743	300	743	600	300	741	744	300	741	400	500	300	741	400	744	600	300	741	500	400	300
Batch #	810	1014	3618	1016	5201	3652	848	537	3653	849	5287	5506	3654	850	5288	539	5204	3655	851	5508	5289	3656
Blend #	39017	39019	60258	39030	60428	60430	39209	39210	60435	39213	60436	60437	60440	39217	60441	39218	60443	60445	39222	60446	60452	60449
Date	4-3	4-3	4-4	4-4	4-15	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-16	4-17	4-17	4-17	4-17	4-17
Time	1954	2322	252	1603	2059	105	333	435	853	1112	1112	1208	1425	1905	1941	2028	2243	117	221	422	542	1024
VCM Charge, gals	6750	6950	5930	6360	6100	6100	6750	6950	6100	6750	6130	6120	6100	6750	6100	6950	6100	6100	6750	6100	6100	6130
Water Charge, gals	7550	7990	6800	6950	6800	6800	7550	7990	6800	7550	6800	6800	6800	7550	6800	7990	6800	6800	7550	6800	6800	6800
Colloid Charge, gals	205	215	145	205	155	155	205	215	155	205	155	155	155	205	155	215	155	155	205	155	155	155
Other Water, gals	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8
Cond. Steam, gals	1005	1051	912	937	912	912	1005	1051	912	1005	912	912	912	1005	912	1005	912	912	1005	912	912	912
Conversion, %	74.3	80.13	80.13	71.78	80.13	80.13	74.3	80.13	80.13	74.3	80.13	80.13	80.13	74.3	80.13	74.3	80.13	80.13	74.3	80.13	80.13	80.13
PVC, lbs	38116	42325	36113	34696	37148	37148	38116	42325	37148	38116	37331	37270	37148	38116	37148	39245	37148	37148	38116	37148	37148	37331
Volumes, cu.ft.																						
Reactor Vol	2853.3	2853.3	2440.9	2853.3	2450.1	2440.9	2853.3	2853.3	2440.9	2853.3	2450.1	2450.1	2440.9	2853.3	2450.1	2853.3	2450.1	2440.9	2853.3	2450.1	2450.1	2440.9
Slurry Vol	1795.8	1914.0	1648.4	1663.7	1662.2	1662.2	1795.8	1914.0	1662.2	1795.8	1664.3	1663.6	1662.2	1795.8	1662.2	1871.0	1662.2	1662.2	1795.8	1662.2	1662.2	1664.3
Cond Head Space	29.2	29.2	13.8	29.2	29.2	13.8	29.2	29.2	13.8	29.2	29.2	29.2	13.8	29.2	29.2	29.2	29.2	13.8	29.2	29.2	29.2	13.8
Cond Tube Vol	33	33	33.6	33	33	33.6	33	33	33.6	33	33	33	33.6	33	33	33	33	33.6	33	33	33	33.6
Reactor Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Rx Temp, F	200	200	200	200	200	200	200	200	200	200	200	195	195	200	200	200	197	192	200	195	195	190
Rx Bomb Pressure, in.Hg	12	10.9	10.5	11.6	10.6	10.7	10.2	14.8	11	11	12	16	16.5	12.5	10.5	9.7	13	13.8	10.5	13.5	13.5	14.8
Rx Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	34	120	55	863	241.5	145.3	495.7	940.8	216.4	256.9	158.6	325.5	310	52.53	54.69	60.57	332.5	214.1	103.7	608.6	1216	290.4
Rx Vapor Vol, cu. ft.	1074.0	955.8	809.3	1206.1	804.4	795.5	1074.0	955.8	795.5	1074.0	802.3	803.0	795.5	1074.0	804.4	998.8	804.4	795.5	1074.0	804.4	804.4	793.4
Lbs VCM in reactor	0.0175	0.0551	0.0214	0.4996	0.0933	0.0555	0.2555	0.4316	0.0826	0.1324	0.0611	0.1255	0.1184	0.0271	0.0211	0.0290	0.1284	0.0818	0.0535	0.2350	0.4695	0.1106
Reactor ROL	0.46	1.30	0.59	14.40	2.51	1.49	6.70	10.20	2.22	3.47	1.64	3.37	3.19	0.71	0.57	0.74	3.46	2.20	1.40	6.33	12.64	2.96
Reactor Sample No. 2																						
Tube Sample, Y/N																						
Rx Bomb Pressure, in.Hg																						
Rx Bomb Temp, F																						
Bomb ppm																						
Lbs VCM in reactor																						
Reactor ROL																						
Condenser Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Cond Temp, F	192	190	190	195	194	189	192	193	192	190	189	187	183	193	191	194	194	180	191	187	184	180
Cond Bomb Pressure, in.Hg	12	13.7	10.2	18	17.4	14.8	10.7	12.5	10.8	11	12	15.8	16.5	12	10.5	9.3	14.5	14.4	10.5	18.2	13.2	17
Cond Bomb Temp, F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bomb ppm	1588	12260	1311	18940	9578	5952	430.1	8723	5435	513	1030	3367	9993	206.3	678.3	4737	2712	9210	585.7	3209	7774	5632
Cond. Vol, cu. ft.	45.7	45.7	30.6	45.7	45.7	30.6	45.7	45.7	30.6	45.7	45.7	45.7	30.6	45.7	45.7	45.7	45.7	30.6	45.7	45.7	45.7	30.6
Lbs VCM in Cond	0.0348	0.2689	0.0193	0.4155	0.2101	0.0874	0.0094	0.1913	0.0798	0.0113	0.0226	0.0739	0.1468	0.0045	0.0149	0.1039	0.0595	0.1353	0.0128	0.0704	0.1705	0.0827
Cond. ROL	0.91	6.35	0.53	11.97	5.66	2.35	0.25	4.52	2.15	0.30	0.61	1.98	3.95	0.12	0.40	2.65	1.60	3.64	0.34	1.89	4.59	2.22
Total ROL	1.37	7.65	1.12	26.37	8.17	3.85	6.95	14.72	4.37	3.77	2.24	5.35	7.14	0.83	0.97	3.39	5.06	5.84	1.74	8.22	17.23	5.18
Time Cond Temp >180	24	21	30	22	26	22	30	32	31	28	32	17	11	30	38	25	21	11	25	13	9	21
Stripping Procedure Used	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	B	A	B	B	B
Slurry Residuals																						
Concurrent w/bomb sample																						
Initial Sample	70	115	65			82	34	211	85	36	109	248	494	26	268	106	198	316		279	297	110
5 mins. into dump	39	104	50	34	177		13	96											40	273		
10 mins. into dump	29	100	48			72	10	86		20	101	212	410	15	85	54	136	320		214	337	110
15 mins. into dump		67							78													
20 mins. into dump						79			77		20			18								
End of dump										27			243		120	41		277			219	160

VAB.0011.02/7/67

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ABERDEEN ROL DATA

Sample ID #	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
Product	5385	5385	5385	5465	5385	5465	5385	5465	5385	5465	5385	5385	5465	5385	5385	5465	5385	5465	5385	5385	5385	5385
Reactor	500	400	742	743	600	742	300	741	500	744	400	600	742	300	500	743	600	742	300	500	400	744
Batch #	5509	5290	1357	1056	5207	1358	3658	854	5511	540	5292	5208	1059	3659	5512	1058	5209	1060	3660	5513	5294	541
Blend #	60450	60451	39229	39231	60458	39233	60460	39234	60461	39235	60462	60463	39248	60465	60466	39240	60468	39254	60470	60471	60472	39245
Date	4-17	4-17	4-17	4-17	4-17	4-17	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18	4-18
Time	1211	1304	1418	2040	2210	2308	130	258	324	404	426	548	727	1003	1219	1233	1324	1508	1740	1945	2100	2333
VCM Charge, gals	6140	6120	6950	6350	6100	6350	6100	6350	6120	6350	6120	6140	6350	6100	6130	6350	6130	6350	6130	6130	6120	6900
Water Charge, gals	6800	6800	7990	6960	6800	6960	6800	6960	6800	6960	6800	6800	6960	6800	6800	6960	6800	6960	6800	6800	6800	7990
Colloid Charge, gals	155	155	215	195	155	195	155	195	155	195	155	155	195	155	155	195	155	196	155	155	155	215
Other Water, gals	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8
Cond. Steam, gals	912	912	1051	937	912	937	912	937	912	937	912	912	937	912	912	937	912	937	912	912	912	1051
Conversion, %	80.13	80.13	80.13	71.78	80.13	71.78	80.13	71.78	80.13	71.78	80.13	80.13	71.78	80.13	80.13	71.78	80.13	71.78	80.13	80.13	80.13	80.13
PVC, lbs	37392	37270	42325	34641	37148	34641	37148	34641	37270	34641	37270	37392	34641	37148	37331	34641	37331	34641	37331	37331	37270	42020
Volumes, cu.ft.																						
Reactor Vol	2450.1	2450.1	2853.3	2853.3	2450.1	2853.3	2440.9	2853.3	2450.1	2853.3	2450.1	2450.1	2853.3	2440.9	2450.1	2853.3	2450.1	2853.3	2440.9	2450.1	2450.1	2853.3
Slurry Vol	1665.1	1663.6	1914.0	1663.0	1662.2	1663.0	1662.2	1663.0	1663.6	1663.0	1663.6	1665.1	1663.0	1662.2	1664.3	1663.0	1664.3	1663.2	1664.3	1664.3	1663.6	1910.4
Cond Head Space	29.2	29.2	29.2	29.2	29.2	29.2	13.8	29.2	29.2	29.2	29.2	29.2	29.2	13.8	29.2	29.2	29.2	29.2	13.8	29.2	29.2	29.2
Cond Tube Vol	33	33	33	33	33	33	33.6	33	33	33	33	33	33	33.6	33	33	33	33	33.6	33	33	33
Reactor Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Rx Temp, F	195	195	200	200	200	200	195	200	200	200	200	200	200	195	200	200	200	200	195	200	202	200
Rx Bomb Pressure, in.Hg	13	14	10.6	10.7	10.8	7	13	10.7	12.4	9.8	11	11	10	13	10.5	10.5	10.6	11	12.8	12	11.4	10
Rx Bomb Temp, F	0	190	0	205	220	240	190	0	200	210	180	0	0	215	210	200	0	250	230	200	200	200
Bomb ppm	557.5	3831	185.3	66.7	289.2	13.63	328.9	108	482	134.9	691.1	411	82.6	958.8	233	883.5	228	462	797	104	21	23
Rx Vapor Vol, cu. ft.	801.5	803.0	955.8	1206.8	804.4	1206.8	795.5	1206.8	803.0	1206.8	803.0	801.5	1206.8	795.5	802.3	1206.8	802.3	1206.6	793.4	802.3	803.0	959.4
Lbs VCM in reactor	0.2145	1.4766	0.0850	0.0386	0.1117	0.0079	0.1256	0.0626	0.1858	0.0781	0.2664	0.1581	0.0478	0.3661	0.0897	0.5118	0.0878	0.2676	0.3035	0.0400	0.0081	0.0106
Reactor ROL	5.74	39.62	2.01	1.12	3.10	0.24	3.38	1.81	4.98	2.29	7.15	4.23	1.38	10.16	2.44	14.77	2.35	8.31	8.56	1.07	0.22	0.25
Reactor Sample No. 2																						
Tube Sample, Y/N																						
Rx Bomb Pressure, in.Hg																						
Rx Bomb Temp, F																						
Bomb ppm																						
Lbs VCM in reactor																						
Reactor ROL																						
Condenser Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Cond Temp, F	192	184	192	192	196	194	184	193	196	194	191	195	194	184	193	195	193	195	184	194	192	195
Cond Bomb Pressure, in.Hg	14	13.5	10.6	11.8	12.7	10.5	12.8	9.4	13.7	9.2	14.8	11.7	9	13.5	12	10.5	11.6	10.2	13.3	13.5	10.5	13
Cond Bomb Temp, F	0	220	0	220	200	240	195	0	200	210	190	0	0	185	190	215	0	235	185	200	195	210
Bomb ppm	3208	6532	1709	339.1	4122	548.3	13840	546.7	4075	3682	1490	5462	1282	8150	13630	1371	4842	706	12050	4114	1616	6713
Cond. Vol, cu. ft.	45.7	45.7	45.7	45.7	45.7	45.7	30.6	45.7	45.7	45.7	45.7	45.7	45.7	30.6	45.7	45.7	45.7	45.7	30.6	45.7	45.7	45.7
Lbs VCM in Cond	0.0704	0.1433	0.0375	0.0074	0.0904	0.0120	0.2033	0.0120	0.0894	0.0808	0.0327	0.1198	0.0281	0.1197	0.2990	0.0301	0.1062	0.0155	0.1770	0.0902	0.0354	0.1473
Cond. ROL	1.88	4.06	0.89	0.22	2.45	0.37	5.57	0.35	2.41	2.39	0.88	3.20	0.81	3.23	8.01	0.89	2.85	0.47	4.75	2.44	0.96	3.58
Total ROL	7.62	43.68	2.89	1.35	5.55	0.61	8.95	2.15	7.40	4.68	8.02	7.43	2.19	13.38	10.45	15.67	5.20	8.78	13.31	3.51	1.17	3.84
Time Cond Temp >180	16	15	26	21	28	26	12	16	25	29	30	23	23	13	24	26	26	22	17	24	28	24
Stripping Procedure Used	B	B	A	A	A	A	B	A	A	A	A	A	A	C	A	A	A	A	C	A	A	A
Slurry Residuals																						
Concurrent w/bomb sample																						
Initial Sample	241	225	140	15	210	17	60	12	70	50	240	160	43	950	152	28	135	32		114	204	108
5 mins. into dump								14	110													
10 mins. into dump	199	61	110	30	40	9	40			50	140	160	34	329	154	48	93	26	314	113	150	93
15 mins. into dump																						
20 mins. into dump			120																			
End of dump		280		50		11	150				14	110	33	894	146	102	92	12		97		

VAB.0001102768

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ABERDEEN ROL DATA

Sample ID #	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
Product	5385	5385	5385	5385	5385	5305	5385	5305	5305	5305	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385
Reactor	300	500	400	300	500	745	500	700	745	700	300	300	500	500	300	300	400	400	300	400	300	500
Batch #	3661	5514	5295	3662	5515	1489	5533	2721	1493	2723	5811	5814	5421	5633	5826	5831	5458	5459	5863	5461	5864	5675
Blend #	60475	60476	60477	60480	60481	39330	60568	60569	39348	60584	60986	60994	60995	61050	61051	61087	61233	61238	61246	61248	61251	61260
Date	4-19	4-19	4-19	4-19	4-19	4-24	4-25	4-25	4-25	4-26	5-29	5-30	5-30	6-3	6-3	6-7	6-18	6-18	6-19	6-19	6-19	6-20
Time	110	255	416	930	1035	1302	1038	1213	1426	1556	1052	1020	1112	911	1252	1130	1303	2008	1046	1241	707	914
VCM Charge, gals	6130	6120	6120	6150	6150	7760	6120	9420	7760	9370	6140	6100	6100	6100	6100	6120	6100	6100	6100	6120	6100	6100
Water Charge, gals	6800	6800	6800	6800	6800	10400	6800	12440	10400	12440	6800	6800	6800	6800	6800	6800	6800	6800	6800	6800	6800	6800
Colloid Charge, gals	155	155	155	155	155	330	150	315	330	315	151	150	150	145	145	185	145	145	145	145	145	145
Other Water, gals	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1041.8	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042
Cond. Steam, gals	912	912	912	912	912	1145	912	1145	1145	1145	912	912	912	912	912	912	912	912	912	912	912	912
Conversion, %	80.13	80.13	80.13	80.13	80.13	79.65	80.13	79.65	79.65	79.65	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13
PVC, lbs	37331	37270	37270	37453	37453	46974	37270	57023	46974	56720	37392	37148	37148	37148	37148	37270	37148	37148	37148	37270	37148	37148
Volumes, cu.ft.																						
Reactor Vol	2440.9	2450.1	2450.1	2440.9	2450.1	4291.7	2450.1	4291.7	4291.7	4291.7	2440.9	2440.9	2450.1	2450.1	2440.9	2440.9	2450.1	2450.1	2440.9	2450.1	2440.9	2450.1
Slurry Vol	1664.3	1663.6	1663.6	1665.8	1665.8	2328.3	1662.9	2725.9	2328.3	2722.3	1664.5	1661.5	1661.5	1660.8	1660.8	1667.8	1660.8	1660.8	1660.8	1662.2	1660.8	1660.8
Cond Head Space	13.8	29.2	29.2	13.8	29.2	87.6	29.2	87.6	87.6	87.6	13.8	13.8	29.2	29.2	13.8	13.8	29.2	29.2	13.8	29.2	13.8	29.2
Cond Tube Vol	33.6	33	33	33.6	33	107.4	33	107.4	107.4	107.4	33.6	33.6	33	33	33.6	33.6	33	33	33.6	33	33.6	33
Reactor Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Rx Temp, F	200	200	200	200	195	200	195	200	200	200	190	190	190	190	190	190	182	188	190	190	190	190
Rx Bomb Pressure, in.Hg	10.6	11.5	11.5	10.9	13.5	10.5	13.5	11	12	9.5	14.5	14.5	14.3	14.75	14.5	14.5	16	15	14.5	14.5	14	14.5
Rx Bomb Temp, F	0	215	200	215	230	270	220	210	265	205	230	210	190	190	205	200	205	195	210	200	203	175
Bomb ppm	128	111	7	266	231.1	72.14	319.1	312.5	74.5	392.6	424.5	726.9	821.3	407.5	161	557.1	453.9	160.1	436.1	674.7	668.7	408.1
Rx Vapor Vol, cu. ft.	793.4	803.0	803.0	791.9	800.8	2017.1	803.7	1619.5	2017.1	1623.1	793.2	796.2	805.1	805.8	796.9	789.9	805.8	805.8	796.9	804.4	796.9	805.8
Lbs VCM in reactor	0.0487	0.0428	0.0027	0.1011	0.0888	0.0698	0.1231	0.2429	0.0721	0.3059	0.1616	0.2778	0.3174	0.1576	0.0616	0.2112	0.1756	0.0619	0.1668	0.2605	0.2558	0.1579
Reactor ROL	1.31	1.17	0.07	2.76	2.50	1.64	3.43	4.32	1.69	5.43	4.59	7.71	8.54	4.24	1.70	5.75	4.90	1.69	4.63	7.10	7.02	4.25
Reactor Sample No. 2																						
Tube Sample, Y/N																						
Rx Bomb Pressure, in.Hg																						
Rx Bomb Temp, F																						
Bomb ppm																						
Lbs VCM in reactor																						
Reactor ROL																						
Condenser Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Cond Temp, F	190	195	192	190	187	184	190	195	184	194	178	178	186	185	175	178	174	175	179	178	181	184
Cond Bomb Pressure, in.Hg	12.1	14.4	11.2	13.2	14.8	12	15	13	13	11.8	15	15	14.8	14.75	14.5	15	17	15.5	15	15	15	15
Cond Bomb Temp, F	0	220	210	185	195	230	200	200	215	195	190	160	180	180	175	165	190	190	170	185	171	170
Bomb ppm	11890	2833	1126	8864	3342	776.3	6420	9140	474.6	9919	13200	14680	7835	4430	1894	8927	9523	2312	5244	6782	7448	5764
Cond. Vol, cu. ft.	30.6	45.7	45.7	30.6	45.7	141.3	45.7	141.3	141.3	141.3	30.6	30.6	45.7	45.7	30.6	30.6	45.7	45.7	30.6	45.7	30.6	45.7
Lbs VCM in Cond	0.1746	0.0621	0.0247	0.1302	0.0733	0.0527	0.1408	0.6199	0.0322	0.6727	0.1939	0.2156	0.1719	0.0972	0.0278	0.1311	0.2089	0.0507	0.0770	0.1488	0.1094	0.1264
Cond. ROL	4.68	1.73	0.68	3.48	1.98	1.20	3.84	10.95	0.72	11.88	5.28	5.80	4.63	2.62	0.75	3.52	5.77	1.40	2.07	4.04	2.94	3.40
Total ROL	5.98	2.91	0.75	6.24	4.48	2.85	7.27	15.28	2.40	17.31	9.87	13.51	13.17	6.86	2.45	9.27	10.66	3.08	6.70	11.13	9.97	7.65
Time Cond Temp >180	32	30	40	29	15	19	12	20	18	32	11	9	13	13	22	9	13	8	10	14	8	8
Stripping Procedure Used	A	A	A	A	C	A	D	A	A	A	D	D	D	D	D	D	D	D	D	D	D	D
Slurry Residuals																						
Concurrent w/bomb sample																						
Initial Sample	100	168	151	149	568	143	429	192	174	115	354	625	454	556	229	341	906	652	579	907	660	634
mins. into dump											360	699	532		235	521	956	658	607	857	466	656
mins. into dump	76	139	99	130	401	132	308	169	148	128	408	563	435		213	512	928	622	668	829	444	594
mins. into dump																						
mins. into dump																						
End of dump	119	142	71	165	310	118	311	107		90												

ABERDEEN ROL DATA

Sample ID #	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
Product	5385	5385	5385	5385	5265	5385	5265	5385	5385	5265	5385	5265	5385	5265	5385	5385	5385	5385	5385	5305	5385	5305
Reactor	300	500	500	600	745	741	745	741	741	745	741	745	741	745	600	500	500	500	500	700	500	700
Batch #	5866	5676	5678	5977	1081	1061	1085	1062	1064	1088	1073	1090	1074	1101	5900	5705	5706	5709	5711	2865	5714	2866
Blend #	61261	61265	61274	61290	40266	40291	40294	40296	40306	40309	40350	40354	40355	40369	61341	61410	61415	61425	61440	61453	61455	61458
Date	6-20	6-20	6-21	6-22	6-25	6-27	6-27	6-27	6-28	6-28	7-1	7-1	7-1	7-2	7-3	7-8	7-8	7-9	7-10	7-11	7-11	7-11
Time	1211	1826	1016	1424	1414	932	1519	1740	1037	1531	815	1511	1614	1555	1418	1213	2018	1224	1303	1125	1443	1903
VCM Charge, gals	6100	6100	6100	6100	8790	6950	8790	6950	6950	8820	6950	8790	6900	8790	6120	6100	6100	6100	6100	9350	6150	9350
Water Charge, gals	6800	6800	6800	6800	10550	7990	10550	7990	7990	10540	7990	10550	7990	10550	6800	6800	6800	6800	6800	12440	6800	12440
Colloid Charge, gals	145	145	145	145	340	175	331	170	175	350	185	350	185	350	165	155	155	155	150	325	150	325
Other Water, gals	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042
Cond. Steam, gals	912	912	912	912	1059	1051	1059	1051	1051	1059	1051	1059	1051	1059	912	912	912	912	912	1145	912	1145
Conversion, %	80.13	80.13	80.13	80.13	73.85	80.13	73.85	80.13	80.13	73.85	80.13	73.85	80.13	73.85	80.13	80.13	80.13	80.13	80.13	73.85	80.13	73.85
PVC, lbs	37148	37148	37148	37148	49335	42325	49335	42325	42325	49503	42325	49335	42020	49335	37270	37148	37148	37148	37148	52478	37453	52478
Volumes, cu.ft.																						
Reactor Vol	2440.9	2450.1	2450.1	2450.1	4291.7	2853.3	4291.7	2853.3	2853.3	4291.7	2853.3	4291.7	2853.3	4291.7	2450.1	2450.1	2450.1	2450.1	2450.1	4291.7	2450.1	4291.7
Slurry Vol	1660.8	1660.8	1660.8	1660.8	2367.1	1908.5	2365.8	1907.8	1908.5	2369.1	1909.9	2368.5	1906.2	2368.5	1665.0	1662.2	1662.2	1662.2	1661.5	2673.0	1665.1	2673.0
Cond Head Space	13.8	29.2	29.2	29.2	87.6	29.2	87.6	29.2	29.2	87.6	29.2	87.6	29.2	87.6	29.2	29.2	29.2	29.2	29.2	87.6	29.2	87.6
Cond Tube Vol	33.6	33	33	33	107.4	33	107.4	33	33	107.4	33	107.4	33	107.4	33	33	33	33	33	107.4	33	107.4
Reactor Sample																						
Tube Sample, Y/N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rx Temp, F	190	190	190	190	190	190	190	190	190	190	195	195	195	195	190	195	195	195	195	190	195	195
Rx Bomb Pressure, in.Hg	14	14.5	15	14.5	15.5	14.5	14.5	14	14.5	14.5	13.5	13	14	17.5	14.5	13	13.5	13.5	N/A	16.5	14.5	11.5
Rx Bomb Temp, F	210	210	0	180	230	215	200	205	190	210	195	205	205	185	200	240	230	223	200	215	220	205
Bomb ppm	704.4	484.8	229.4	872.3	342.2	454.6	253.8	434.7	498.2	302.5	124.3	103.8	48.38	434.9	433.8	68.5	23	381.3	63.12	2134	148	75
Rx Vapor Vol, cu. ft.	796.9	805.8	805.8	805.8	1978.3	961.3	1979.6	962.0	961.3	1976.3	959.9	1976.9	963.6	1976.9	801.6	804.4	804.4	804.4	805.1	1672.4	801.5	1672.4
Lbs VCM in reactor	0.2695	0.1875	0.0887	0.3374	0.3249	0.2098	0.2412	0.2007	0.2299	0.2870	0.0573	0.0988	0.0224	0.4127	0.1669	0.0265	0.0089	0.1472	0.0244	1.7131	0.0569	0.0602
Reactor ROL	7.48	5.20	2.39	9.08	6.99	5.15	4.96	4.85	5.43	5.98	1.38	2.08	0.54	8.36	4.55	0.76	0.25	4.13	0.66	33.90	1.58	1.16
Reactor Sample No. 2																						
Tube Sample, Y/N																			Y		Y	
Rx Bomb Pressure, in.Hg																			N/A		14	
Rx Bomb Temp, F																			0		195	
Bomb ppm																			56.89		201	
Lbs VCM in reactor																			0.0220		0.0773	
Reactor ROL																			0.59		2.06	
Condenser Sample																						
Tube Sample, Y/N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Y		Y
Cond Temp, F	178	184	182	180	178	181	175	183	180	180	188	180	186	180	180	193	191	192	192	184	194	192
Cond Bomb Pressure, in.Hg	15	15	15.5	15	14	14.5	16	14	14.5	16.5	12.5	14.5	13.5	16	15	14	13	13.5		15		12.5
Cond Bomb Temp, F	195	180	0	175	210	210	170	190	190	175	180	180	200	170	185	200	205	204		180		190
Bomb ppm	7121.3	5792	5034	6835	3120	2653	4351	2793	3938.5	3883	941.5	1755	567.4	7280.5	9707	1540	212.1	1283		60443		3725
Cond. Vol, cu. ft.	30.6	45.7	45.7	45.7	141.3	45.7	141.3	45.7	45.7	141.3	45.7	141.3	45.7	141.3	45.7	45.7	45.7	45.7		141.3		141.3
Lbs VCM in Cond	0.1046	0.1271	0.1104	0.1499	0.2116	0.0582	0.2951	0.0613	0.0864	0.2634	0.0207	0.1190	0.0124	0.4938	0.2129	0.0338	0.0047	0.0281		4.0995		0.2526
Cond. ROL	2.89	3.42	2.97	4.04	4.50	1.44	5.98	1.46	2.07	5.32	0.49	2.41	0.30	10.01	5.76	0.92	0.13	0.77		78.12		4.81
Total ROL	10.37	8.62	5.36	13.12	11.50	6.58	10.95	6.32	7.50	11.30	1.84	4.44	0.84	18.37	10.31	1.68	0.38	4.90		112.02		5.98
Time Cond Temp >180	8	10	6	11	7	12	9	9	8	8	26	12	17	8	18	25	15	36	25	5	25	23
Stripping Procedure Used	D	D	D	D	D	D	D	D	D	D	A	A	A	A	D	A	A	A	A	D	A	A
Slurry Residuals																						
Concurrent w/bomb sample						718	615	702	804	724												
Initial Sample	619	683	612	740	563						142	210	167	275	320	109	249	153	251	815	262	158
5 mins. into dump	629	727	570	720	585						117	187	58	231	525	94	98	115	116	860	121	131
10 mins. into dump	494	677	526	651	558						138	181	121	251	495	98	103	94	111	864	158	147
15 mins. into dump																						

A

ABERDEEN ROL DATA

Sample ID #	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129
Product	5385	5385	5305	5305	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385	5385
Reactor	600	500	700	700	700	600	700	400	700	400	700	300	400	700	300	700	400	700	300
Batch #	6013	5717	2868	2877	2880	6026	2882	5519	2883	5520	2884	5733	5521	2885	5921	2886	5523	2887	5922
Blend #	61466	61469	61470	61510	61524	61530	61533	61537	61538	61542	61543	61545	61547	61548	61552	61553	61556	61557	61558
Date	7-12	7-12	7-12	7-15	7-16	7-17	7-17	7-17	7-17	7-18	7-18	7-18	7-18	7-18	7-18	7-18	7-19	7-19	7-19
Time	1109	1520	1640	1540	1849	520	1043	1703	1934	20	303	711	1032	1139	1924	2023	211	352	538
VCM Charge, gals	6120	6130	9350	9350	9100	6130	9100	6100	9100	6100	9100	6120	6150	9100	6120	9200	6140	9100	6150
Water Charge, gals	6800	6800	12440	12440	10000	6800	10000	6800	10000	6800	10000	6800	6800	10000	6800	10000	6800	10000	6800
Colloid Charge, gals	150	150	325	325	265	145	265	145	265	145	265	145	145	265	145	265	145	265	145
Other Water, gals	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042	1042
Cond. Steam, gals	912	912	1145	1145	968	912	968	912	968	912	968	912	912	968	912	968	912	968	912
Conversion, %	80.13	80.13	73.85	73.85	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13
PVC, lbs	37270	37331	52478	52478	55418	37331	55418	37148	55418	37148	55418	37270	37453	55418	37270	56027	37392	55418	37453
Volumes, cu.ft.																			
Reactor Vol	2450.1	2450.1	4291.7	4291.7	4291.7	2450.1	4291.7	2450.1	4291.7	2450.1	4291.7	2440.9	2450.1	4291.7	2440.9	4291.7	2450.1	4291.7	2440.9
Slurry Vol	1662.9	1663.6	2673.0	2673.0	2341.9	1662.9	2341.9	1660.8	2341.9	1660.8	2341.9	1662.2	1664.4	2341.9	1662.2	2349.1	1663.7	2341.9	1664.4
Cond Head Space	29.2	29.2	87.6	87.6	87.6	29.2	87.6	29.2	87.6	29.2	87.6	13.8	29.2	87.6	13.8	87.6	29.2	87.6	13.8
Cond Tube Vol	33	33	107.4	107.4	107.4	33	107.4	33	107.4	33	107.4	33.6	33	107.4	33.6	107.4	33	107.4	33.6
Reactor Sample																			
Tube Sample, Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rx Temp, F	198	195	195	195	195	190	194	195	195	195	195	195	195	195	195	195	195	195	185
Rx Bomb Pressure, in.Hg	15.4	13	14	11.75	13	15	13	13.5	13.5	14	14	15	14.5	14	13	11	14	13.5	14
Rx Bomb Temp, F	220	200	215	215	194	210	207	0	190	220	180	210	229	207	210	195	170	180	0
Bomb ppm	411	109	67	225.3	256.3	626	201	53.33	389	1	496.7	227.7	111	628	71.67	891	100	217	28.5
Rx Vapor Vol, cu. ft.	803.7	803.0	1672.4	1672.4	2003.5	803.7	2003.5	805.8	2003.5	805.8	2003.5	795.5	802.2	2003.5	795.5	1996.3	802.9	2003.5	793.3
Lbs VCM in reactor	0.1586	0.0420	0.0538	0.1809	0.2465	0.2415	0.1933	0.0206	0.3741	0.0004	0.4777	0.0869	0.0427	0.6039	0.0274	0.8538	0.0385	0.2087	0.0109
Reactor ROL	4.40	1.13	1.06	3.55	4.45	6.67	3.56	0.56	6.75	0.01	8.62	2.39	1.20	11.10	0.75	15.24	1.03	3.77	0.29
Reactor Sample No. 2																			
Tube Sample, Y/N		Y						Y		Y			Y				Y		
Rx Bomb Pressure, in.Hg		12.5						13.5		14			15.5				15		
Rx Bomb Temp, F		205						0		220			231				175		
Bomb ppm		273						40		0.4			186.3				124.7		
Lbs VCM in reactor		0.1052						0.0155		0.0002			0.0717				0.0481		
Reactor ROL		2.86						0.42		.00			2.02				1.29		
Condenser Sample																			
Tube Sample, Y/N	N		Y	Y	Y	N	Y		Y		Y	N		Y	N	Y		Y	N
Cond Temp, F	190	193	192	191	190	180	184	184	190	185	187	184	183	190	187	196	184	190	195
Cond Bomb Pressure, in.Hg	17.3		14.5	12.5	14	15	14.5		15		15	15		15	13.5	11		14.5	13.5
Cond Bomb Temp, F	188		210	211	198	215	200		185		175	225		204	230	185		175	0
Bomb ppm	8632		3268	3688	5582	6496	9098		42660		13620	1507		8904	441.5	1608		3703	373
Cond. Vol, cu. ft.	45.7		141.3	141.3	141.3	45.7	141.3		141.3		141.3	30.6		141.3	30.6	141.3		141.3	30.6
Lbs VCM in Cond	0.1894		0.2216	0.2501	0.3786	0.1425	0.6171		2.8934		0.9238	0.0221		0.6039	0.0065	0.1091		0.2512	0.0055
Cond. ROL	5.08		4.34	4.91	6.92	4.03	11.41		52.21		16.67	0.63		11.13	0.19	1.95		4.53	0.15
Total ROL	9.48		5.40	8.46	11.36	10.69	14.97		58.96		25.29	3.02		22.23	0.94	17.18		8.30	0.44
Time Cond Temp >180	14	24	27	20	13	11	4	30	4	32	4	25	29	14	34	15	28	16	27
Stripping Procedure Used	D	A	A	B	F	D	F	A	E	A	E	A	A	H	A	I	A	I	A
Slurry Residuals																			
Concurrent w/bomb sample				179	294		352		369		540			335		444		276	
Initial Sample	392	444	118			622		150		296		80	124		101		349		94
5 mins. into dump	622	110	80			584		67		33		112	142		70		99		59
10 mins. into dump	555	111	90					122		19		103	81		66		91		41
15 mins. into dump																			

APPENDIX

A

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PVC REACTOR STRIPPING

PROCEDURE A

Products: 5265, 5305, 5385, 5425, 5465 - Both Modules

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor (old module reactors only).

4. After the vacuum pumps have come on, bring the slurry temperature up to the following temperature and hold (slurry temperature sometimes overshoots set point).

   5385, 5425, 5465 both modules - 215°F
   5305, 5265 both modules - 210°F

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen above the following limits for 10 minutes.

Slurry Temperature	Reactor Head Space Temperature
215°F	195°F
210°F	190°F

6. Turn the full cooling water on the condenser and open the dump valve and recover the dump manifold.

7. After the cooling has been on five minutes, cut off steam and continue cooling.

8. When the slurry cools to 195°F, turn off the cooling water.

9. Dump the reactor.

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PVC REACTOR STRIPPING

PROCEDURE B

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 205°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
205°F	200°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

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PVC REACTOR STRIPPING

PROCEDURE C

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 200°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
200°F	195°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

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PVC REACTOR STRIPPING

PROCEDURE D

Products: 5385,5305,5265 - Both Modules

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 195°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
195°F	190°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

PVC REACTOR STRIPPING

PROCEDURE E

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps come on, bring the slurry temperature up to 200°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
195°F	195°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

PVC REACTOR STRIPPING

PROCEDURE F

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 205°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the bove set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
205°F	200°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

CONFIDENTIAL

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PVC REACTOR STRIPPING

PROCEDURE G

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps come on, bring the slurry temperature up to 210°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the above set point without cooling until the reactor head space temperature has risen to the following limits:

Slurry Temperature	Reactor Head Space Temperature
210°F	205°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

CONFIDENTIAL A)

PVC REACTOR STRIPPING

PROCEDURE H

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 200°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the bove set point without cooling until the reactor head space temperature has risen to the following limits for 5 minutes.

Slurry Temperature	Reactor Head Space Temperature
200°F	195°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

CONFIDENTIAL

PVC REACTOR STRIPPING

PROCEDURE I

Products: 5385 - Old Module Only

1. Kill the reactor at the conditions prescribed on the product formula sheet.

2. Start the compressors and begin recovery.

3. Set the temperature set point at 180°F and start injecting steam into the reactor.

4. After the vacuum pumps have come on, bring the slurry temperature up to 200°F and hold (slurry temperature sometimes overshoots set point).

5. When the slurry begins to boil, the reactor head space temperature will rise rapidly and approach the slurry temperature. Hold the slurry temp at the bove set point without cooling until the reactor head space temperature has risen to the following limits for 10 minutes.

Slurry Temperature	Reactor Head Space Temperature
200°F	195°F

6. Turn the full cooling water on the condenser, cut off steam, and open the dump valve and recover the dump manifold.

7. When the slurry cools to 195°F, turn off the cooling water.

8. Dump the reactor.

A

SAMPLING PROCEDURE

The procedure used in sampling the reactor and condenser vapor space for ROL data is given below. Each step is listed in chronological order. Refer to the sampling system diagram in figure 1.

The same procedure was utilized throughout the sampling period except for the following two changes:

1. All samples were taken when the slurry temperature reached 195°F on cool-down except for Procedure A samples prior to 5-29-85 (sample no. 77). Procedure A samples prior to 5-29-85 were taken when the slurry the temperature reached 200°F on cool-down.

2. Beginning on 6/18/85, sample insertion tubes were used to obtain reactor vapor space samples with the exception of sample no. 92. A sample insertion tube was also used on the condenser of reactor 700 beginning with sample no. 109. When the reactor pressure reached a vacuum, the half-inch stainless steel tubes were inserted into the vapor space. The tubes were long enough to clear the inside wall of the reactor/condenser by at least 6 inches. Once inserted, the tubes were secured with an air-tight connection and sample vapors could then be pulled from the reactor/condenser through the sampling system. The sample insertion tubes were used to ensure a clean, clear sample flow path.

In addition to these procedures, pertinent data was taken concerning each reactor batch sample and logged in on the sample logsheet (see appendix).

Procedure

1. Check that the steam tracing on the sample box and sampling line is turned on and that the bombs are installed inside the box at least one hour prior to sampling. This will ensure that the system is hot when sampling begins. When the bombs are installed, vacuum test the bombs and sampling lines for air leakage into the system by:

   a. With the sampling box and bomb valves open (reactor valves closed) use the eductors to pull a vacuum on the system and note the pressure gauge reading on each side of the sampling box.

   b. Close the bottom (eductor suction) valves on each side of the sample box.

   c. Observe the pressure gauge reading on each side of the sampling box. If the pressure rises, there is a leak in the system which must be located and corrected before sampling.

   d. Close the sample box valves and turn off eductors when finished.

   After vacuum testing the system, leave the bomb valves open and close the sample box allowing the bombs to heatup.

Procedure - continued

2. Begin pulling vapor out of the reactor/condenser through the sampling system five to ten minutes before the sample is to be taken. This is accomplished by turning on the eductors and opening the sample box and reactor sampling valves. Use a fresh air mask respirator to avoid VCM overexposure when in the vicinity of the sampling system while pulling vapor.

3. When the slurry is at the correct temperature, take the sample by:

   a. Close the bottom (eductor suction) valves on each side of the sample box.

   b. Wait three seconds for system pressure equalization.

   c. Close the top (sample line) valves on each side of the sample box.

   d. Record the pressures shown on the sample pressure gauges on each side of the sample box.

   e. Open the box and close the bomb valves.

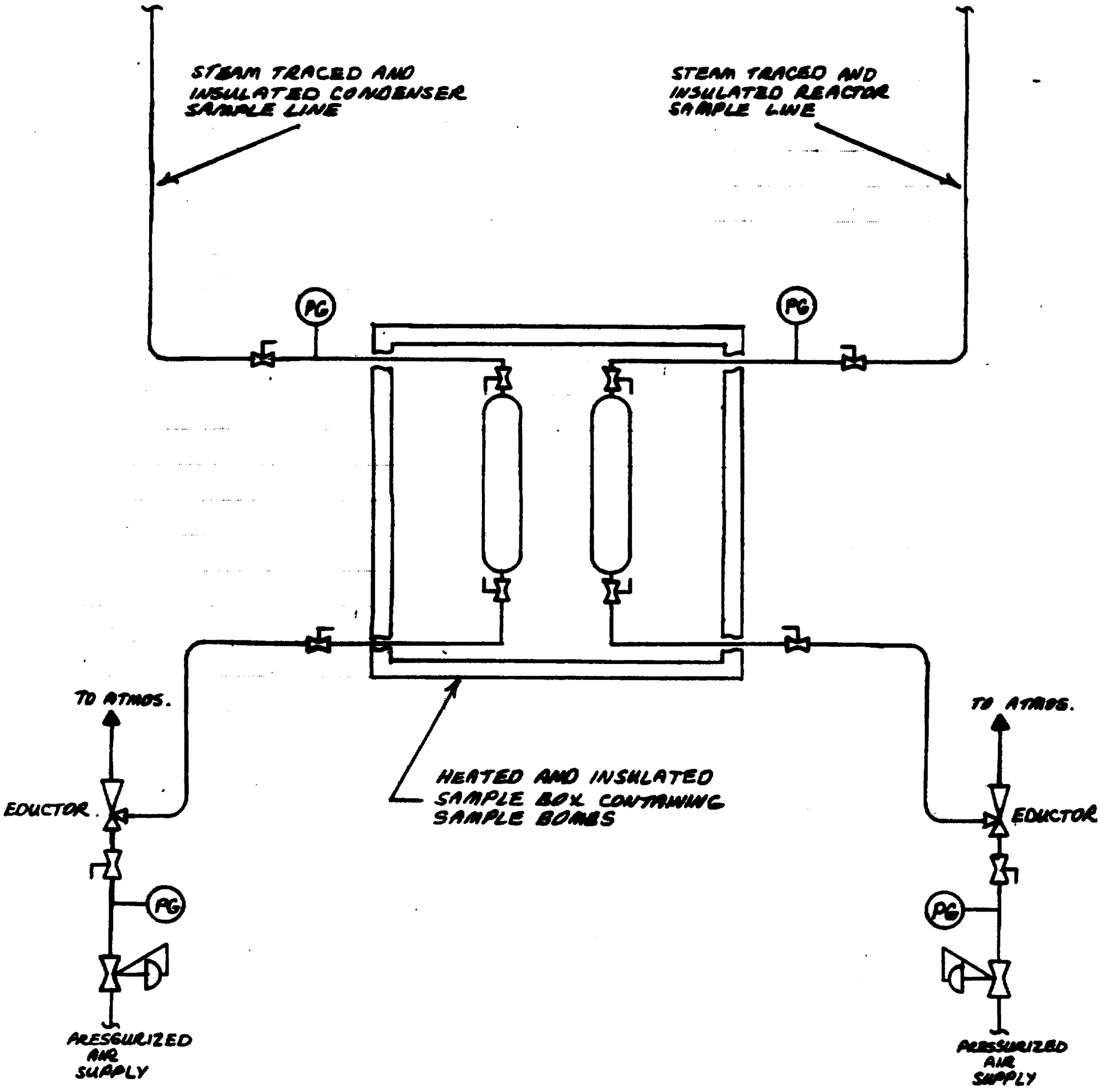
   The above steps should be done in rapid succession. When completed, the reactor can be dumped.

4. Measure and record the surface temperature of each sample bomb.

5. Record which bomb and eductor were used for each sample.

6. Close the sample line valves on the reactor and condenser.

FIGURE 1 - R.O.L. SAMPLING SYSTEM



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A

ROL Sample Calculation

Attached is a sample ROL calculation using data from D-600 reactor batch number 5207. The basis of the calculation is also included. A step-by-step description of the ROL calculation procedure follows.

After both reactor and condenser sample bombs were brought to the lab, they were allowed to cool to room temperature (24°C) and then pressurized to 44.1 psia pressure using nitrogen. Next, the gas in the bombs was analyzed using a gas chromatograph. The results were measured in ppm on a volumetric basis (vppm) for the reactor and condenser bomb each.

At the 24°C lab temperature and 44.1 psia pressure, the gas in the sample bombs was assumed ideal for calculation purposes. Utilizing the ideal gas law, the total number of lb.-moles of gas in the bombs was calculated. This value, and the fact that vppm equals mole percent for an ideal gas, was used to calculate the lb.-moles of VCM in each of the reactor and condenser sample bombs.

The number of lb.-moles of VCM in each bomb was then corrected using a temperature correction factor. (The factors were calculated using bomb temperature data taken at the time of sampling.) The factor converts the number of lb.-moles of VCM in the 312 cu.cm. bomb to the number of lb.-moles of VCM in an equivalent 312 cu.cm. of reactor/condenser vapor space at sampling conditions.

The lb.-moles of VCM in 312 cu.cm. of reactor/condenser vapor space was next converted to lb. of VCM in each of the reactor and condenser vapor spaces by multiplying the number of lb.-moles of VCM in 312 cu.cm. of vapor space by the total vapor space volume and the molecular weight of VCM, and then dividing by the 312 cu.cm. volume

The total ROL was then calculated by dividing the number of pounds of VCM in the reactor and condenser vapor spaces by the millions of pounds of PVC produced, and then adding the results.

The slurry volumes used to obtain the reactor and condenser head space volumes were measured on 5385 and 5465 resin. Slurry volumes for the other products were calculated based on the measured volumes. All of the reactor head space volumes used in the ROL calculations include one-half of the condenser tube volume.

Conversion factors used in calculating the pounds of PVC produced were based on the Aberdeen Resin Economics Program issued August 6, 1984 by Process Engineering Department.

CONFIDENTIAL

A

REACTOR OPENING LOSS SAMPLE CALCULATION

I. Basis of Calculation

1. Gas in bomb assumed to be ideal
2. 312 cu.cm. bomb volume (measured)
3. 24^{o} C bomb temperature (average lab temperature)
4. Batch number 5207 sample data
5. 1.043 temperature correction factor for reactor bomb ppm
6. 1.006 temperature correction factor for condenser bomb ppm
7. 44.1 psia bomb pressure
8. 80.13% of factor used for conversion of 5385 resin.

II. Measure of VPPM of VCM in Bomb

Reactor bomb vppm = 289.2 vppm

Condenser bomb vppm = 4122 vppm

III. Calculate Lb.-Moles of Total Gas in Bomb

1. P = 44.1 psia

2. V = 312 cu.cm. = 0.01102 cu.ft.

3. T = $24^{o}C = 535.2^{o}R$

4. $R = 10.73 \frac{(psia)(cu.ft.)}{(lb.-mole)(^{o}R)}$

5. $n = \frac{PV}{RT} = \frac{(44.1\ psia)(0.01102\ cu.ft.)}{(10.73)(535.2^{o}R)} = 8.463 \times 10^{-5}$ lb.-moles

IV. Calculate Lb.-Moles of VCM in Bomb by Ideal Gas Law

vppm = mole % (Ideal Gas Law)

lb.-moles VCM in reactor bomb = (289.2×10^{-6})

$(8.463 \times 10^{-5}$ Lb.-moles total gas) = 2.448×10^{-8} lb.-moles VCM

Lb.-moles VCM in condenser bomb = (4122×10^{-6})

$(8.463 \times 10^{-5}$ lb.-moles total gas) = 3.488×10^{-7} lb.-moles VCM

This is the lb.-moles of VCM in the bomb at 44.1 psia pressure which equals lb.-moles of VCM in the bomb when the sample is taken and the bomb valves are closed.

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V. Calculate Lb.-Moles of VCM in 312 cu.cm. of Reactor and Condenser Vapor Space

Temperature correction factor converts lb.-moles of VCM in 312 cu. cm. bomb volume to lb.-moles of VCM in 312 cu.cm. of reactor or condenser vapor space at the reactor/condenser temperature measured at time of sampling.

Lb.-moles VCM in 312 cu.cm. of reactor vapor space =

$(2.448 \times 10^{-8}$ lb.-moles VCM)(1.043) = 2.553×10^{-8} lb.-moles VCM

Lb.-Moles VCM in 312 cu.cm. of condenser vapor space =

$(3.488 \times 10^{-7}$ lb.-moles VCM)(1.006) = 3.509×10^{-7} lb.-moles VCM

VI. Calculate Lb. of VCM in Reactor and Condenser Vapor Space

Total reactor vapor space = 804.4

Total condenser vapor space = 45.7 cu.ft.

312 cu.cm. = 0.01102 cu.ft.

VCM in reactor vapor space =

(804.4 cu.ft.)$(2.553 \times 10^{-8}$ lb.-moles VCM/0.01102 cu.ft.) ok

(62.5 lb.VCM/lb.-mole VCM) = 0.1165 lb. VCM

VCM in condenser vapor space =

(45.7 cu.ft.)$(3.509 \times 10^{-7}$ lb.-moles VCM/0.01102 cu.ft.)

(62.5 lb. VCM/lb.-mole VCM) = 0.0909 lb. VCM

VII. Calculate Total ROL

Lb. PVC produced = 0.03715 MM Lb.

Reactor ROL = 0.1165 lb. VCM/0.03715 MM lb. PVC =

3.14 lb. VCM/MM lb. PVC

Condenser ROL = 0.0909 lb. VCM/0.03715 MM lb. PVC =

2.45 lb. VCM/MM lb. PVC

Total ROL = 3.14 + 2.45 = 5.59 lb. VCM/MM lb. PVC