VAPOR CONTROL SYSTEM CALCULATIONS

for

200' X 35' X 12'- 6" DOUBLE SKIN TANK BARGES

HULLS 95 THROUGH 104 AND 111 THROUGH 126

for

C & C MARINE AND REPAIR, INC.

February 22, 2008

REVISED APRIL 24, 2008

Subject to comments in
Marine Safety Center letter of

APR 16 2008

EXAMINED

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TABLE 1 (HIGHEST GROWTH RATE CARGO)

	CHRIS CODE	NAME	VCS CAT	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	PRESSURE DROP TO PV VALVE IN VCS(psig) (LOADING)	VAPOR VOLUMETRIC FLOW RATE (bbl/h)	AIR EQUIVALENT VOLUMETRIC FLOW RATE	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (LOADING)*	PRESSURE DROP TO PV VALVE IN VCS(psig) (UNLOADING)	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (UNLOADING)*
1	ACT	Acetone	1	0.79	10	2	0.130	1.2000	0.007	1920	2401	0.011	0.009	0.013
2	GAK	Gasoline Blended Stocks: Alkylates	1	0.75	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
3	GRF	Gasoline Blended Stocks: Reformate	1	0.8	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
4	GAT	Gasolines: Automotive (containing not over 4.23 grams	1	0.74	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
5	GAV	Gasolines: Aviation (containing not over 4.86 grams lea	1	0.71	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
6	GCS	Gasolines: Casinghead	1	0.67	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
7	GPL	Gasolines: Polymer	1	0.75	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
8	GSR	Gasolines: Straight Run	1	0.76	12.5	3.4	0.224	1.2500	0.014	2000	3282	0.021	0.016	0.024
9	HXS	Hexane (all isomers)	1	0.68	7	3	0.149	1.1400	0.008	1824	2440	0.012	0.009	0.013
10	HXA	Hexane	1	0.66	7	3	0.149	1.1400	0.008	1824	2440	0.012	0.009	0.013
11	JPT	Jet Fuels: JP-3	1	0.8	6.51	4.5	0.223	1.1702	0.012	1672	3066	0.019	0.014	0.021

LIQUID TRANSFER RATE vs PRESSURE DROP
(HIGHEST GROWTH RATE CARGO)

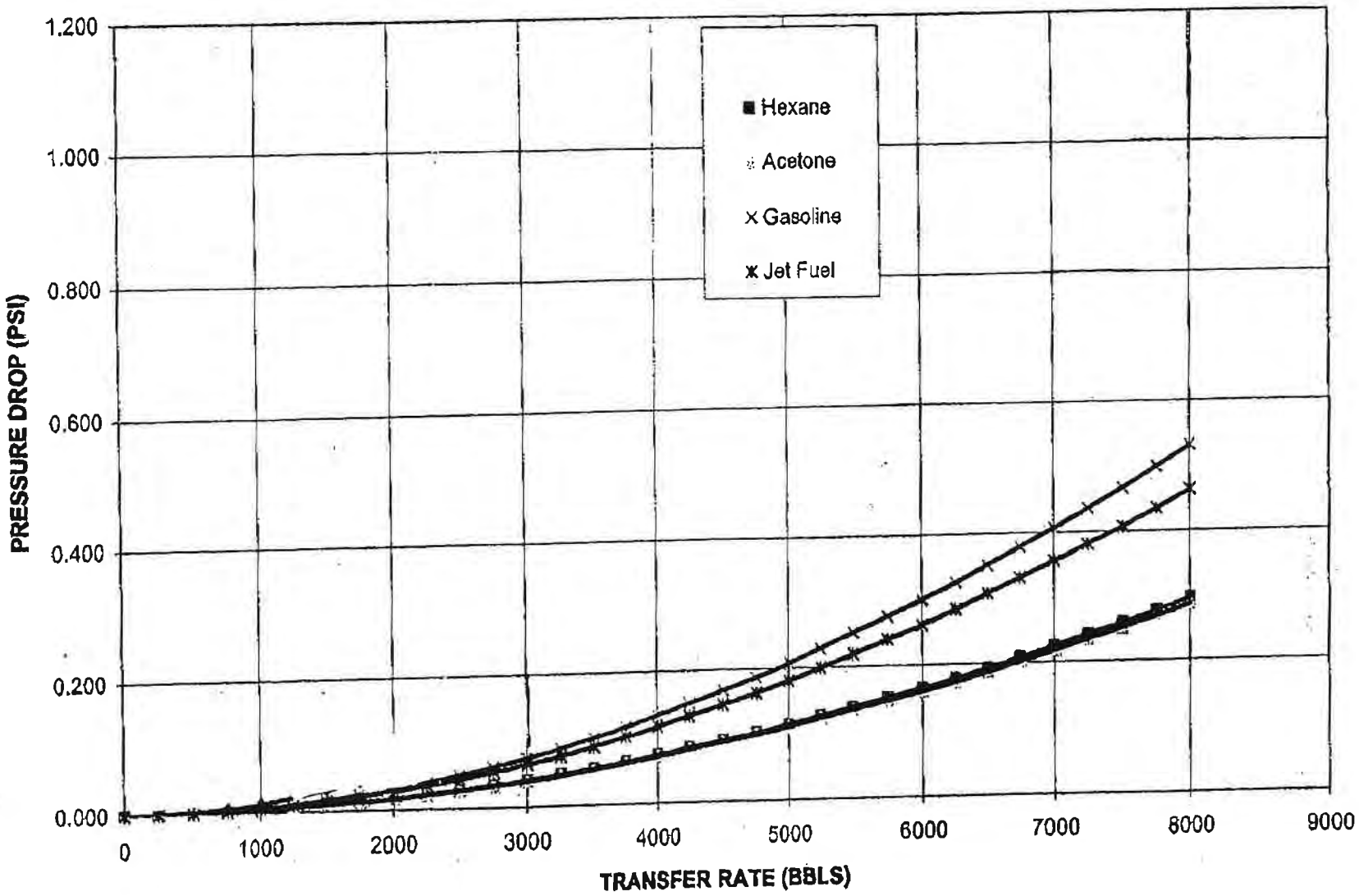


TABLE 2 (SUBCHAPTER "D" CARGOES)

CHRIS CODE	NAME	VCS CAT	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	PRESSURE DROP TO PV VALVE IN VCS(psig) (LOADING)	VAPOR VOLUMETRIC FLOW RATE (bbl/h)	AIR EQUIVALENT VOLUMETRIC FLOW RATE	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (LOADING)*	PRESSURE DROP TO PV VALVE IN VCS(psig) (UNLOADING)	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (UNLOADING)*
1	NOT USED												
2 ACP	Acetophenone	1	1.03	0.6	4.14	0.092	1.0120	0.008	2326	2448	0.012	0.024	0.036
19 AAT	Amyl Acetate (iso-)	1	0.88	0.33	4.48	0.086	1.0066	0.007	2315	2388	0.011	0.022	0.034
20 AAJ	Amyl Alcohol (iso-, n-, sec-, primary) (See also IAA)	1	0.82	0.3	3.04	0.086	1.0060	0.007	2314	2353	0.011	0.022	0.033
21 AAN	Amyl Alcohol (n-)	1	0.82	0.3	3.04	0.086	1.0060	0.007	2314	2353	0.011	0.022	0.033
23 APM	Amyl Alcohol, Primary	1	0.82	0.3	3.04	0.086	1.0060	0.007	2314	2353	0.011	0.022	0.033
24 ASE	Amyl Alcohol, (sec-)	1	0.82	0.3	3.04	0.086	1.0060	0.007	2314	2353	0.011	0.022	0.033
26 IAA	Amyl Alcohol, (iso-)	1	0.82	0.3	3.04	0.086	1.0060	0.007	2314	2353	0.011	0.022	0.033
34 BAL	Benzyl Alcohol	1	1.05	0.1	3.73	0.084	1.0020	0.007	2305	2322	0.011	0.021	0.032
40 BAX	Butyl Acetate (iso-, n-)	1	0.87	0.6	4	0.091	1.0120	0.008	2326	2442	0.012	0.023	0.036
42 BTA	Butyl Acetate (sec-)	1	0.88	1.5	4	0.104	1.0300	0.009	2369	2552	0.014	0.028	0.042
44 IAL	Butyl Alcohol (iso-)	1	0.81	0.9	2.6	0.090	1.0180	0.008	2341	2434	0.012	0.023	0.035
46 BAS	Butyl Alcohol (sec-)	1	0.81	1.3	2.6	0.093	1.0260	0.008	2360	2494	0.012	0.024	0.037
47 BAT	Butyl Alcohol (tert-)	1	0.78	2.6	2.6	0.104	1.0560	0.010	2429	2718	0.015	0.029	0.044
48 BPH	Butyl Benzyl Phthalate	1	1.12	0.01	10.8	0.083	1.0002	0.007	2300	2300	0.010	0.021	0.032
58 BUE	Butyl Toluene	1	0.86	0.1	5.11	0.086	1.0020	0.007	2305	2331	0.011	0.021	0.032
64 CLS	Caprolactam Solutions	1	1.02	0.05	3.9	0.084	1.0010	0.007	2302	2311	0.011	0.021	0.032
70 CUM	Cumene	1	0.86	0.60	4.20	0.092	1.0120	0.008	2326	2450	0.012	0.024	0.036
72 CHX	Cyclohexane	1	0.78	4.5	2.9	0.123	1.0900	0.012	2507	3052	0.018	0.037	0.056
73 CHN	Cyclohexanol	1	0.95	0.15	3.45	0.086	1.0030	0.007	2307	2330	0.011	0.021	0.032
74 CPD	1,3-Cyclopentadiene dimer (molten)	1	0.99	0.25	4.65	0.087	1.0050	0.007	2312	2368	0.011	0.022	0.033
76 CMP	Cymene (para-)	1	0.86	0.11	4.62	0.086	1.0022	0.007	2305	2330	0.011	0.021	0.032
77 DHN	Decahydronaphthalene	1	0.89	0.1	4.76	0.085	1.0020	0.007	2305	2328	0.011	0.021	0.032
78 IDA	Decaldehyde (iso-)	1	0.83	0.01	5	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032
79 DAL	Decaldehyde (n-)	1	0.83	0	5.01	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032
81 DCE	Decane	1	0.74	0.12	4.8	0.085	1.0024	0.007	2306	2334	0.011	0.021	0.032
82 DAX	Decyl Alcohol (all isomers) (Decanol)	1	0.83	0.01	5.3	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
83 ISA	Decyl Alcohol (iso-)	1	0.83	0.01	5.3	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
84 DAN	Decyl Alcohol (n-)	1	0.83	0.01	5.3	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
85 DBZ	Decylbenzene (n-)	1	0.86	0.01	7.52	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032
87 DAA	Diacetone Alcohol	1	0.97	0.1	4	0.084	1.0020	0.007	2305	2323	0.011	0.021	0.032
91 DPA	Dibutyl Phthalate (ortho-)	1	1.05	0	9.59	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032
92 DPT	Dicyclopentadiene, See 1,3-Cyclopentadiene Dimer (mc	2	0.98	0.25	4.55	0.087	1.0050	0.007	2312	2368	0.011	0.022	0.033
93 DEB	Diethybenzene	1	0.87	0.08	4.62	0.084	1.0016	0.007	2304	2322	0.011	0.021	0.032
94 DEG	Diethylene Glycol	1	1.12	0.01	3.66	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032
95 DME	Diethylene Glycol Butyl Ether	1	0.95	0.01	5.5	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
100 DGA	Diethylene Glycol Ethyl Ether Acetate	1	0.99	0.02	4.62	0.083	1.0004	0.007	2301	2305	0.010	0.021	0.032
101 DGM	Diethylene Glycol Methyl Ether	1	1.03	0.03	4.14	0.083	1.0006	0.007	2301	2307	0.010	0.021	0.032
111 DBC	Diisobutylcarbinol	1	0.81	0.09	4.97	0.085	1.0018	0.007	2304	2327	0.011	0.021	0.032
112 DBL	Diisobutylene	1	0.72	2	3.86	0.110	1.0400	0.010	2392	2751	0.015	0.030	0.045
113 DIK	Diisobutyl Ketone	1	0.81	0.16	4.9	0.086	1.0032	0.007	2307	2347	0.011	0.022	0.033
119 DIX	Diisopropylbenzene (all isomer)	1	0.86	0.03	5.6	0.084	1.0006	0.007	2301	2310	0.011	0.021	0.032
124 DTL	Dimethyl Phthalate	1	1.19	0	6.69	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032
126 DIF	Dinonyl Phthalate	1	0.97	0.01	14.4	0.084	1.0002	0.007	2300	2309	0.011	0.021	0.032
130 DOP	Dioctyl Phthalate	1	0.98	0	13.47	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032
131 DPN	Dipentene	1	0.84	0.1	4.9	0.085	1.0020	0.007	2305	2329	0.011	0.021	0.032
132 DIL	Diphenyl	1	0.99	0.01	5.31	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
133 DDO	Diphenyl, Diphenyl Ether Mixture	1	1.07	0.01	5.86	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
134 DPE	Diphenyl Ether	1	1.07	0.01	5.87	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032
135 DPG	Dipropylene Glycol	1	1.03	0.07	4.63	0.084	1.0014	0.007	2303	2319	0.011	0.021	0.032
139 DFF	Distillates: Flashed Feed Stocks	1	0.75	2.3	3.4	0.109	1.0460	0.010	2406	2755	0.015	0.030	0.045
140 DSR	Distillates: Straight Run	1	0.73	2.3	3.4	0.109	1.0460	0.010	2406	2755	0.015	0.030	0.045
145 DOZ	Dodecene (all isomers)	1	0.76	0.02	5.61	0.083	1.0004	0.007	2301	2307	0.010	0.021	0.032
146 DOD	Dodecene	1	0.76	0.02	5.61	0.083	1.0004	0.007	2301	2307	0.010	0.021	0.032
147	NOT USED												
155 ETG	Ethoxy Triglycol (crude)	1	1.02	0	6.14	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032
156 ETA	Ethyl Acetate	1	0.9	4.5	3.04	0.126	1.0900	0.012	2507	3089	0.019	0.037	0.057
157 EAA	Ethyl Acetoacetate	1	1.03	0.2	4.48	0.086	1.0040	0.007	2309	2354	0.011	0.022	0.033

158	EAL	Ethyl Alcohol (Ethanol)	1	0.79	3.5	1.6	0.093	1.0700	0.009	2481	2602	0.013	0.027
160	ETB	Ethyl Benzene	1	0.87	0.8	3.56	0.090	1.0120	0.008	2328	2426	0.012	0.023
161	EBT	Ethyl Butanol	1	0.83	0.12	3.52	0.084	1.0024	0.007	2306	2324	0.011	0.021
162	EBR	Ethyl Butyrate	1	0.88	1	4	0.097	1.0200	0.008	2346	2536	0.013	0.025
163	ECY	Ethyl Cyclohexane	1	0.79	0.5	3.87	0.090	1.0100	0.008	2323	2416	0.011	0.023
166	EGL	Ethylene Glycol	1	1.19	0.01	2.21	0.083	1.0002	0.007	2300	2301	0.010	0.021
169	EMA	Ethylene Glycol Butyl Ether Acetate	1	0.94	0.05	5.52	0.084	1.0010	0.007	2302	2316	0.011	0.021
172	EGY	Ethylene Glycol Diacetate	1	1.1	0.01	5.03	0.083	1.0002	0.007	2300	2302	0.010	0.021
178	EME	Ethylene Glycol Methyl Ether	1	1.1	0.01	4.8	0.083	1.0002	0.007	2300	2302	0.010	0.021
180	EPE	Ethylene Glycol Phenyl Ether	1	1.1	0.01	4.8	0.083	1.0002	0.007	2300	2302	0.010	0.021
184	EHA	2-Ethylhexaldehyde, See Octyl Aldehydes	1	0.82	0.17	4.41	0.086	1.0034	0.007	2308	2345	0.011	0.022
186	EHX	2-Ethylhexanol , see Octanol (all isomers)	1	0.84	0.02	4.5	0.083	1.0004	0.007	2301	2305	0.010	0.021
190	EPR	Ethyl Propionate	1	0.89	3.5	1.6	0.093	1.0700	0.009	2461	2602	0.013	0.027
191	ETE	Ethyl Toulene	1	0.88	0.28	4.15	0.087	1.0058	0.007	2313	2369	0.011	0.022
194	FAM	Formamide	1	1.13	0.1	1.55	0.083	1.0020	0.007	2305	2306	0.010	0.021
195	FAL	Furfuryl Alcohol	1	1.13	0.05	3.4	0.084	1.0010	0.007	2302	2309	0.011	0.021
197		NOT USED											
200		NOT USED											
201		NOT USED											
202		NOT USED											
203		NOT USED											
204	GCR	Glycerine	1	1.26	0	3.17	0.083	1.0000	0.007	2300	2299	0.010	0.021
217	HMX	Heptane (all isomers) (Methylhexane)	1	0.68	2.5	3.45	0.112	1.0500	0.010	2415	2601	0.015	0.031
218	HPT	Heptane (n-)	1	0.68	2.5	3.45	0.112	1.0500	0.010	2415	2601	0.015	0.031
219	HEP	Heptoic Acid	1	0.92	0.01	4.49	0.083	1.0002	0.007	2300	2302	0.010	0.021
220	HTX	Heptanol (all isomers)	1	0.82	0.04	4	0.084	1.0008	0.007	2302	2309	0.011	0.021
221	HTN	Heptanol (all isomers)	1	0.82	0.04	4	0.084	1.0008	0.007	2302	2309	0.011	0.021
222	HPX	Heptene (all isomers)	2	0.7	2.9	3.4	0.116	1.0580	0.011	2433	2671	0.016	0.032
223	THE	Heptene (1-)	1	0.7	2.8	3.4	0.115	1.0560	0.011	2429	2652	0.016	0.032
224	HPE	Heptyl Acetate	1	0.86	0.1	5.5	0.085	1.0020	0.007	2305	2333	0.011	0.021
229		NOT USED											
230		NOT USED											
231	HXO	Hexanoic Acid	1	0.93	0.01	4	0.083	1.0002	0.007	2300	2302	0.010	0.021
232		NOT USED											
234	HEX	Hexane (all isomers)	2	0.67	8	2.9	0.154	1.1600	0.017	2668	3536	0.026	0.052
235	HXE	Hexene (1-)	1	0.67	8.2	2.9	0.156	1.1640	0.017	2677	3670	0.027	0.053
236	HXT	Hexene (2-)	1	0.67	8.2	2.9	0.156	1.1640	0.017	2677	3670	0.027	0.053
238	HXG	Hexylene Glycol	4	0.92	0.01	1.1	0.083	1.0002	0.007	2300	2300	0.010	0.021
243	IPH	Isophorone	1	0.93	0.01	4.75	0.083	1.0002	0.007	2300	2302	0.010	0.021
244	JPO	Jet Fuels: JP-1 (Kerosene)	1	0.8	0.14	4.5	0.085	1.0026	0.007	2306	2337	0.011	0.021
245		NOT USED											
246	JPF	Jet Fuels: JP-4	1	0.81	3.4	4	0.131	1.0680	0.012	2456	3083	0.019	0.037
247	JPV	Jet Fuels: JP-5 (Kerosene, heavy)	1	0.82	0.1	4	0.084	1.0020	0.007	2305	2323	0.011	0.021
249	KRS	Kerosene	1	0.81	0.16	4.5	0.085	1.0030	0.007	2307	2340	0.011	0.022
263	MTT	Methyl Acetate	1	0.92	6.1	2.6	0.129	1.1220	0.013	2581	3213	0.020	0.041
265	MAL	Methyl Alcohol (See Methanol)	1	0.79	6.83	1.1	0.086	1.1326	0.009	2605	2653	0.014	0.028
266	MAC	Methyl Amyl Acetate	1	0.86	0.33	4.07	0.089	1.0066	0.007	2315	2399	0.011	0.023
267	MAA	Methyl Amyl Alcohol	1	0.81	0.43	3.62	0.088	1.0066	0.007	2320	2389	0.011	0.022
271	MBK	Methyl n-Butyl Ketone	1	0.81	0.97	3.5	0.094	1.0194	0.008	2345	2499	0.012	0.025
273	MBU	Methyl Butyrate	1	0.9	1.26	3.53	0.096	1.0252	0.009	2356	2561	0.013	0.026
274	MEK	Methyl Ethyl Ketone	1	0.8	4.5	2.5	0.115	1.0900	0.011	2507	2946	0.017	0.034
275	MTF	Methyl Formal (Dimethyl Formal)	1	0.86	15.42	2.6	0.199	1.3084	0.028	3009	4656	0.043	0.085
276	MHK	Methyl Heptyl Ketone	1	0.83	0.06	4.9	0.084	1.0012	0.007	2303	2317	0.011	0.021
278	MIK	Methyl Isobutyl Ketone	1	0.8	1.16	3.45	0.096	1.0230	0.008	2353	2533	0.013	0.025
281	MNA	1-Methyl Naphtalene	1	1.02	0.01	4.91	0.083	1.0002	0.007	2300	2302	0.010	0.021
283	MPN	2-Methyl-1-Pentene	1	0.69	6.3	2.9	0.139	1.1260	0.015	2590	3352	0.022	0.044
284	MTN	5-Methyl-1-Pentene	1	0.67	6.49	2.9	0.159	1.1666	0.018	2691	3719	0.027	0.054
286	MBE	Methyl Tert-Butyl Ether (MTBE)	1	0.74	0.04	3.1	0.083	1.0008	0.007	2302	2307	0.010	0.021
288	MNS	Mineral Spirits	1	0.75	0.2	4.3	0.086	1.0040	0.007	2309	2361	0.011	0.022
289	MRE	Myrcene	1	0.8	0.17	4.7	0.086	1.0034	0.007	2308	2348	0.011	0.022
295	NSV	Naphtha: Solvent	1	0.87	0.2	3.5	0.085	1.0040	0.007	2309	2341	0.011	0.022
296	NSS	Naphtha: Stoddard Solvent	1	0.78	0.2	4.3	0.086	1.0040	0.007	2309	2361	0.011	0.022
297	NVM	Naphtha: Varnish Maker's and Painters (76%)	1	0.77	0.19	4.3	0.086	1.0038	0.007	2309	2349	0.011	0.022
300	NAX	Nonane (all isomers)	1	0.72	0.27	4.4	0.087	1.0064	0.007	2312	2371	0.011	0.022

301 NAN	Nonane	1	0.72	0.27	4.4	0.087	1.0054	0.007	2312	2371	0.011	0.022			
304 NON	Nonene	1	0.73	0.35	4.3	0.088	1.0070	0.007	2316	2390	0.011	0.022	0.032		
305 NNS	Nonyl Alcohol (all isomers)	1	0.94	0.1	5	0.085	1.0020	0.007	2305	2330	0 011	0.021	0.032		
306 NNN	Nonyl Alcohol	1	0.94	0.1	5	0.085	1.0020	0.007	2305	2330	0.011	0.021	0.032		
307 NNI	Nonyl Alcohol (iso-)	1	0.94	0.1	5	0.085	1.0020	0.007	2305	2330	0.011	0.021	0.032		
309 NNP	Nonyl Phenol	1	0.95	0.01	7.6	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032		
315 OAX	Octane (all isomers)	1	0.7	0.79	3.9	0.094	1.0156	0.008	2336	2482	0.012	0.024	0.037		
317 OAN	Octane	1	0.7	0.79	3.9	0.094	1.0156	0.008	2336	2482	0.012	0.024	0.037		
318 OAA	Octanoic Acid (all isomers)	1	0.91	0.01	5	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
319 OCX	Octanol (all isomers)	1	0.83	0.01	4.48	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
320 OTA	Octanol	2	0.83	0.01	4.48	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
321 OTX	Octane (all isomers)	1	0.72	0.9	3.9	0.095	1.0160	0.008	2341	2507	0.012	0.025	0.037		
322 OTE	Octene (1-)	1	0.72	1	3.86	0.096	1.0200	0.008	2346	2528	0.013	0.025	0.038		
324 OCX	Octyl Alcohol (iso-, n-) (all isomers). See Octanol (all is	1	0.83	0.01	4.48	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
325 IOA	Octyl Alcohol	1	0.83	0.01	4.48	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
364 OTW	Fuel: No. 2	1	0.88	0.56	8	0.101	1.0112	0.009	2326	2570	0.013	0.026	0.039		
366 OFR	Fuel: No. 4	1	0.9	0.15	3.4	0.085	1.0030	0.007	2307	2330	0.011	0.021	0.032		
367 OFV	Fuel: No. 5	1	0.94	0.15	3.4	0.085	1.0030	0.007	2307	2330	0.011	0.021	0.032		
368 OSX	Fuel: No. 6	1	0.95	0.15	3.4	0.085	1.0030	0.007	2307	2330	0.011	0.021	0.032		
382 OIL	OIL, Misc: Crude	1	0.96	0.15	3.4	0.085	1.0030	0.007	2307	2330	0.011	0.021	0.032		
383 ODS	OIL, Misc: Diesel	1	0.9	0.69	3.4	0.091	1.0138	0.008	2332	2438	0.012	0.023	0.035		
389 OLB	OIL, Misc: Lubricating	1	0.9	0.15	1	0.083	1.0030	0.007	2307	2306	0.010	0.021	0.032		
403 ORS	OIL, Misc: Resin	1	1.02	0.15	1	0.083	1.0030	0.007	2307	2306	0.010	0.021	0.032		
418 OTB	OIL, Misc: Turbine	1	0.87	0.3	5.4	0.089	1.0060	0.007	2314	2398	0.011	0.023	0.034		
429 PDC	Pentadecanol, See Alcohols (C13 and above)		0.83	0.01	7.66	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032		
432	NOT USED														
437	NOT USED														
442 PIN	Pinene	1	0.86	0.35	4.7	0.089	1.0070	0.007	2316	2399	0.011	0.023	0.034		
448 PLB	Polybutene	1	0.91	0.01	79.3	0.087	1.0002	0.007	2300	2350	0.011	0.022	0.033		
457 PGC	Polypropylene Glycol	1	1.01	0.1	1	0.083	1.0020	0.007	2305	2304	0.010	0.021	0.032		
458 PGM	Polypropylene Glycol Methyl Ether	1	0.92	0.8	3.11	0.091	1.0160	0.008	2337	2445	0.012	0.023	0.036		
464 IAC	Propyl Acetate (iso-)	1	0.89	1.8	3.52	0.104	1.0360	0.008	2363	2670	0.014	0.028	0.043		
465 PAT	Propyl Acetate (n-)	1	0	1.85	3.52	0.105	1.0370	0.009	2365	2680	0.014	0.028	0.043		
466 IPA	Propyl Alcohol (iso-)	1	0.79	3	2.07	0.098	1.0000	0.009	2438	2649	0.014	0.028	0.042		
467 PAL	Propyl Alcohol (n-)	1	0.8	1.2	2.07	0.089	1.0240	0.008	2355	2438	0.012	0.023	0.035		
468 PBZ	Propylbenzene (n-)	1	0.86	0.2	4.14	0.088	1.0040	0.007	2309	2349	0.011	0.022	0.033		
469 IPX	Iso-Propylcyclohexene	1	0.8	0.01	4.35	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
473 PPG	Propylene Glycol (1,2-Propanediol)	1	1.04	0.01	2.62	0.083	1.0002	0.007	2300	2301	0.010	0.021	0.032		
476 PME	Propylene Glycol Methyl Ether	1	0.92	0.7	3.11	0.090	1.0140	0.008	2332	2427	0.012	0.023	0.035		
478 PTT	Propylene Tetramer	1	0.29	0.02	1	0.083	1.0004	0.007	2301	2300	0.010	0.021	0.032		
488 SFL	Sulfolene	1	1.25	0.01	4.14	0.083	1.0002	0.007	2300	2302	0.010	0.021	0.032		
493 TTN	Tetradecanol	1	0.82	0	7.39	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032		
494 TTD	1-Tetradecene, See the olefin or Alpha-Olefin Entries	1	0.77	0.01	6.77	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032		
496 TTG	Tetraethylene Glycol	1	1.12	0.01	6.7	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032		
497 THN	Tetrahydronaphthalene	1	0.97	0.04	4.66	0.084	1.0008	0.007	2302	2310	0.011	0.021	0.032		
499 TOL	Toluene	1	0.87	1.5	3.14	0.098	1.0300	0.009	2368	2674	0.013	0.026	0.040		
502 TCP	Tricresyl Phosphate (less than 1% of the ortho isomer)	1	1.16	0.01	12.69	0.084	1.0002	0.007	2300	2307	0.010	0.021	0.032		
503 TRD	Tridecane	1	0.78	0.02	8.4	0.084	1.0004	0.007	2301	2307	0.010	0.021	0.032		
505 TDN	Tridecanol , See Alcohols (C13 and above)	1	0.85	0.01	6.91	0.083	1.0002	0.007	2300	2304	0.010	0.021	0.032		
506 TDC	1-Tridecene	1	0.77	0.01	6.29	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032		
508 TEB	Triethylbenzene	1	0.86	0.02	5.6	0.083	1.0004	0.007	2301	2305	0.010	0.021	0.032		
509 TEG	Triethylene Glycol	1	1.12	0.01	5.17	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032		
510 TRE	Trimethylbenzenes (all isomers)	1	0.89	0.14	4.2	0.085	1.0028	0.007	2306	2335	0.011	0.021	0.033		
520 TMB	Trimethyl Benzene (1,2,5-)	1	0.89	0.14	4.14	0.086	1.0028	0.007	2306	2334	0.011	0.021	0.032		
521 TMD	Trimethyl Benzene (1,2,3-)	1	0.89	0.14	4.14	0.085	1.0028	0.007	2306	2334	0.011	0.021	0.032		
522 TME	Trimethyl Benzene (1,2,4-) (Pseudocumene)	1	0.89	0.14	4.14	0.085	1.0028	0.007	2306	2334	0.011	0.021	0.032		
529 TRP	Trixylenyl Phosphate	1	1.16	0	14.2	0.083	1.0000	0.007	2300	2299	0.010	0.021	0.032		
533 UDC	Undecene (1-)	1	0.75	0.05	5.32	0.084	1.0010	0.007	2302	2316	0.011	0.021	0.032		
534 UND	Undecyl Alcohol	1	0.84	0.01	5.94	0.083	1.0002	0.007	2300	2303	0.010	0.021	0.032		
546 XLX	Xylenes (Ortho-, meta-, para-)	1	0.89	0.51	3.66	0.089	1.0102	0.008	2323	2410	0.011	0.023	0.035		
547 XLM	Xylene (M-)	1	0.87	0.51	3.66	0.089	1.0102	0.008	2323	2410	0.011	0.023	0.035		
548 XLO	Xylene (O-)	1	0.89	0.4	3.66	0.088	1.0080	0.007	2316	2386	0.011	0.022	0.034		
549 XLP	Xylene (P-)	1	0.86	0.61	3.66	0.089	1.0102	0.008	2323	2410	0.011	0.023	0.035		
550 XYL	Xylenol		1.01	0.1	3.66	0.084	1.0020	0.007	2305	2321	0.011	0.021	0.032		

551	Zinc Dialkyldithiophosphate										
		Max.	1.260	15.420	79.300	0.169	1.306	0.026	3009	4655	0.043	0.055
		Min.	0.000	0.000	1.000	0.083	1.000	0.007	2300	2299	0.010	0.000

*When barge vapor piping is connected to facility vapor recovery system.

LIQUID TRANSFER RATE vs PRESSURE DROP

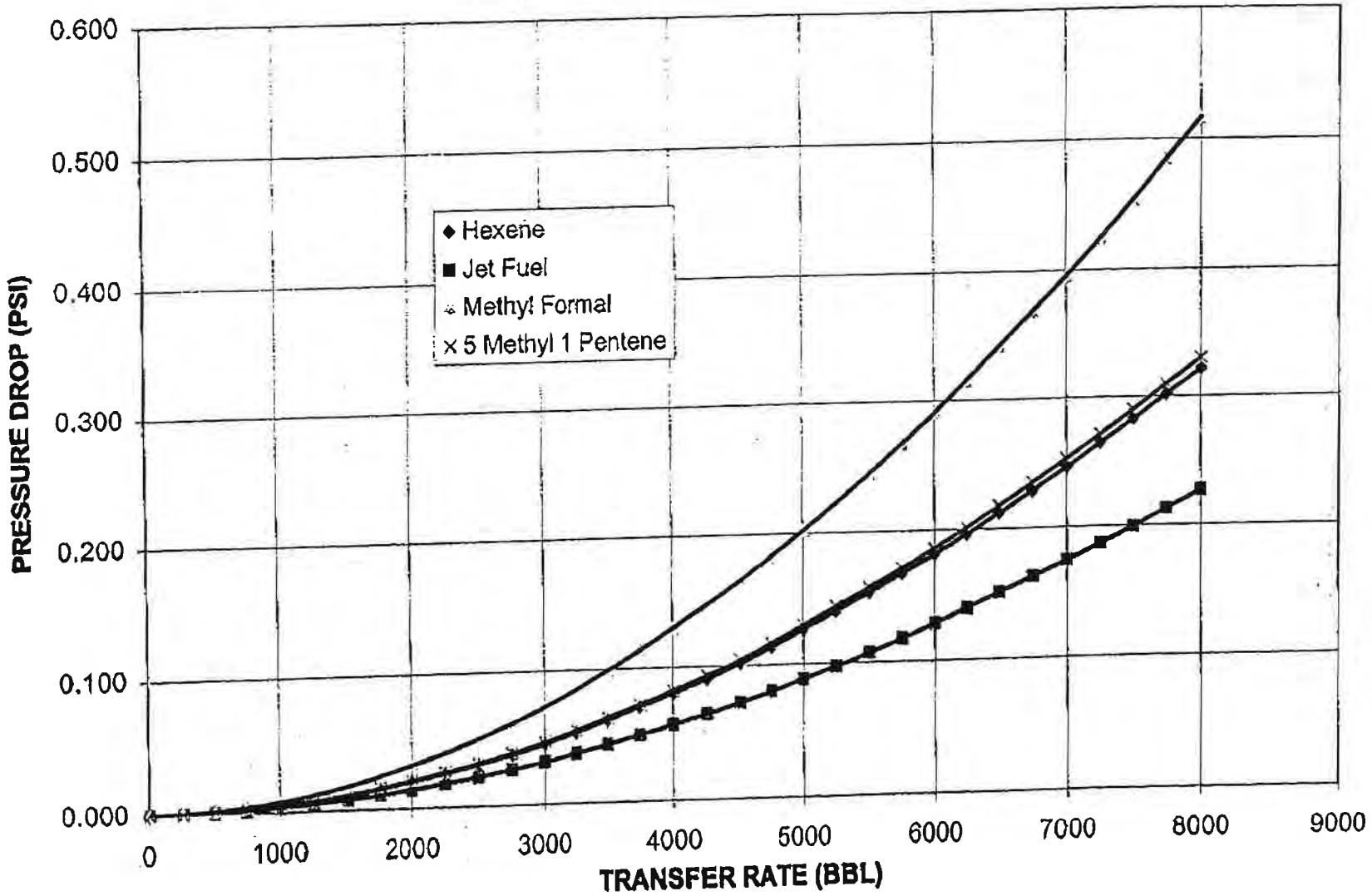


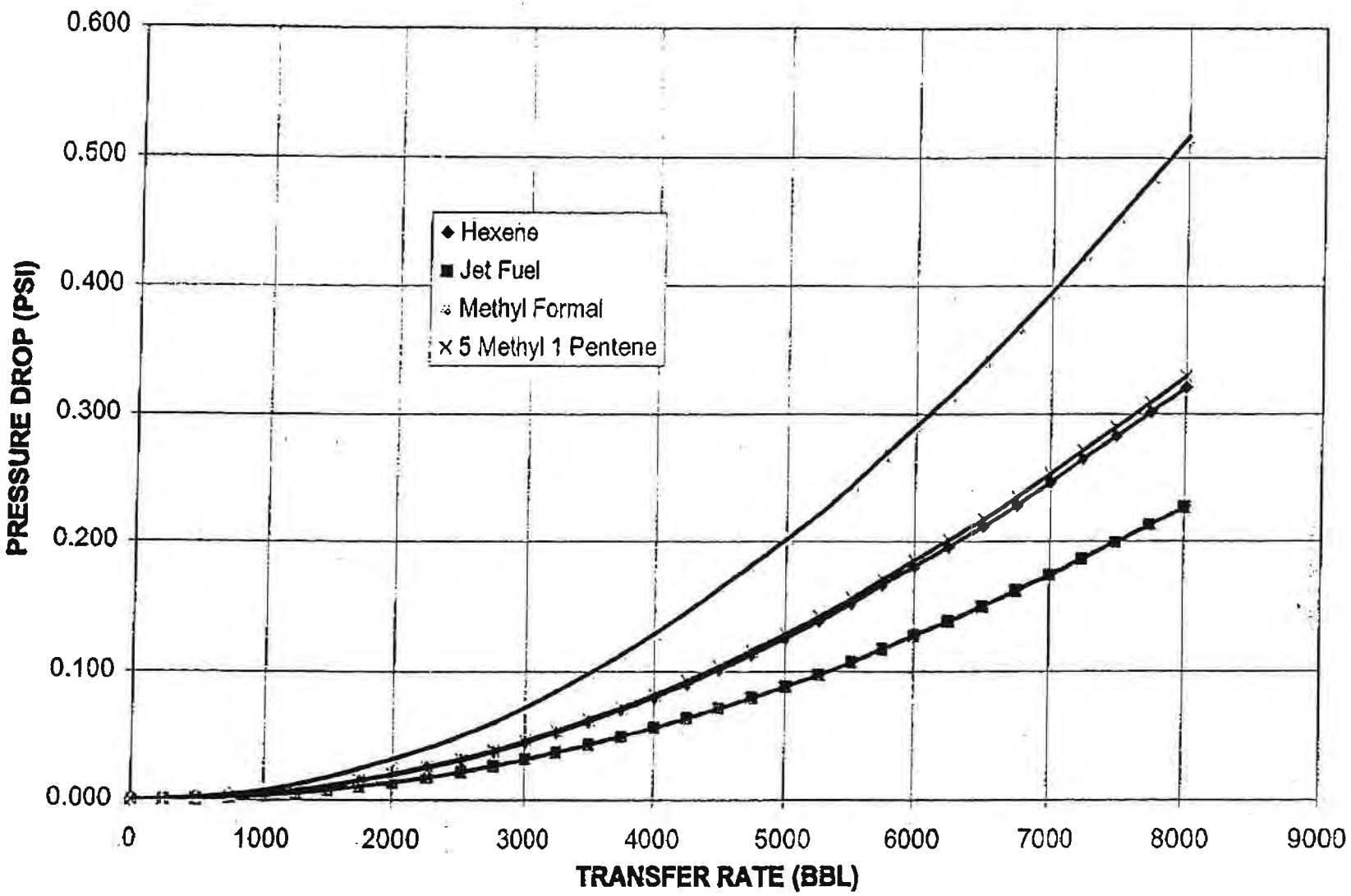
TABLE 3 (SUB CHAPTER "O" CARGOES)

	CHRIS CODE	NAME	VCS CAT	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	PRESSURE DROP TO PV VALVE IN VCS(psig) (LOADING)	VAPOR VOLUMETRIC FLOW RATE (bbl/h)	AIR EQUIVALENT VOLUMETRIC FLOW RATE	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (LOADING)*	PRESSURE DROP TO PV VALVE IN VCS(psig) (UNLOADING)	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (UNLOADING)*
1	ACN	Acrylonitrile	4	0.81	5.60	1.80	0.102	1.1000	0.011	2640	2922	0.017	0.006	0.009
2		NOT USED												
3	ADN	Adiponitrile	1	0.95	0.01	3.73	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
4	ATN	Acetonitrile	3	0.78	0.03	1.41	0.083	1.0006	0.007	2401	2402	0.011	0.004	0.006
5	BAD	Iso-Butyraldehyde	1	0.80	7.80	2.50	0.138	1.1560	0.017	2774	3575	0.025	0.008	0.013
6	BAN	Butyl alcohol (n-)	1	0.81	0.50	2.60	0.087	1.0100	0.008	2424	2477	0.012	0.004	0.006
7	BAR	Butyl acrylate (iso-, n-)	2	0.90	0.60	4.42	0.093	1.0120	0.009	2429	2565	0.013	0.004	0.007
8	BCN	Butyl acetate (n-)	1	0.88	0.80	4.00	0.094	1.0160	0.009	2438	2598	0.013	0.004	0.007
9	BNZ	Benzene	1	0.88	4.50	2.80	0.121	1.0900	0.013	2616	3157	0.020	0.007	0.010
10	BTR	n-Butyraldehyde	1	0.80	7.80	2.50	0.138	1.1560	0.017	2774	3575	0.025	0.008	0.013
11	BTX	Benzene, Toluene, Xylene mixtures (10% Benzene or more)	1	0.84	7.30	2.80	0.145	1.1460	0.017	2750	3629	0.026	0.009	0.013
12	CCH	Cyclohexanone	1	0.95	0.20	3.40	0.085	1.0040	0.008	2410	2441	0.012	0.004	0.006
13	CHA	Cyclohexylamine	1	0.87	0.62	3.42	0.090	1.0124	0.008	2430	2530	0.013	0.004	0.006
14	CHX	Cyclohexane	1	0.78	4.50	2.90	0.123	1.0900	0.013	2616	3186	0.020	0.007	0.010
15	CPD	1,3-Cyclopentadiene dimer (molten)	2	0.69	0.25	4.55	0.087	1.0050	0.008	2412	2471	0.012	0.004	0.006
16	CRB	Chlorobenzene	1	1.11	0.60	3.88								
17	CRS	Cresols	1	1.05	0.06	3.72								
18	DAN	Decyl alcohol (n-)	1	0.83	0.01	5.30	0.083	1.0002	0.007	2400	2403	0.011	0.004	0.006
19	DCH	1,1-Dichloroethane	1	1.18	9.90	3.41	0.195	1.1960	0.025	2875	4404	0.038	0.013	0.020
20	DDB	Dodecylbenzene	1	0.86	4.70	8.40	0.248	1.0940	0.027	2626	4520	0.040	0.014	0.021
21	DEG	Diethylene glycol	1	1.12	0.01	3.66	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
22	DEN	Diethylamine	3	0.71	1.00	2.50	0.090	1.0200	0.008	2448	2549	0.013	0.004	0.007
23	DIP	Diisopropanolamine	1	0.98	0.01	4.59	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
24	DMF	Dimethylformamide	1	0.95	0.30	2.51	0.085	1.0060	0.008	2414	2444	0.012	0.004	0.006
25	DOD	Dodecene	1	0.76	0.02	5.81	0.083	1.0004	0.008	2401	2407	0.011	0.004	0.006
26	DPG	Dipropylene glycol	1	1.03	0.07	4.63	0.084	1.0014	0.008	2403	2420	0.012	0.004	0.006
27	DPX	1,1-, 1,2-, or 1,3-Dichloropropane	3	1.16	6.30	3.90	0.169	1.1260	0.019	2702	3851	0.029	0.010	0.015
28	EAC	Ethyl acrylate	2	0.93	2.00	3.50	0.106	1.0400	0.010	2496	2828	0.016	0.005	0.008
29	EAI	2-Ethylhexyl acrylate	2	0.89	0.02	6.35	0.084	1.0004	0.008	2401	2408	0.011	0.004	0.006
30	EDC	Ethylene dichloride	1	1.25	4.00	3.42	0.128	1.0800	0.013	2592	3223	0.020	0.007	0.010
31	EGL	Ethylene glycol	1	1.13	0.01	2.21	0.083	1.0002	0.007	2400	2401	0.011	0.004	0.006
32	EHX	2-Ethyl hexanol	1	0.84	0.02	4.50	0.083	1.0004	0.008	2401	2405	0.011	0.004	0.006
33	ETA	Ethyl acetate	1	0.90	4.50	3.04	0.126	1.0900	0.013	2616	3223	0.020	0.007	0.010
34	FFA	Furfural	1	1.20	0.15	3.31	0.085	1.0030	0.008	2407	2430	0.012	0.004	0.006
35	FMS	Formaldehyde solution (37% to 50%)	1	1.13	0.15	1.03	0.083	1.0030	0.008	2407	2407	0.011	0.004	0.006
36		NOT USED												
37		NOT USED												
38		NOT USED												
39		NOT USED												
40		NOT USED												
41		NOT USED												
42		NOT USED												
43		NOT USED												
44	HMX	Heptane (all isomers)	1	0.68	2.50	3.45	0.112	1.0500	0.011	2520	2923	0.017	0.006	0.009
45	HPX	Heptane (all isomers)	2	0.70	2.90	3.40	0.116	1.0560	0.012	2539	2996	0.018	0.006	0.009
46		NOT USED												
47	HXN	Hexanol	1	0.82	1.00	3.52	0.095	1.0200	0.009	2448	2616	0.013	0.005	0.007
48	IPA	Propyl alcohol (iso)	1	0.79	3.00	2.07	0.098	1.0600	0.010	2544	2764	0.015	0.005	0.008
49	KRS	Kerosene	1	0.81	0.15	4.50	0.085	1.0030	0.008	2407	2442	0.012	0.004	0.006
50	MAL	Methyl alcohol	1	0.79	6.63	1.10	0.096	1.1326	0.010	2718	2768	0.015	0.005	0.008
51	MAM	Methyl acrylate	2	0.95	4.10	3.00	0.121	1.0820	0.013	2597	3140	0.019	0.007	0.010
52	MBE	Methyl tert-butyl ether	1	0.74	0.04	3.10	0.083	1.0008	0.008	2402	2407	0.011	0.004	0.006

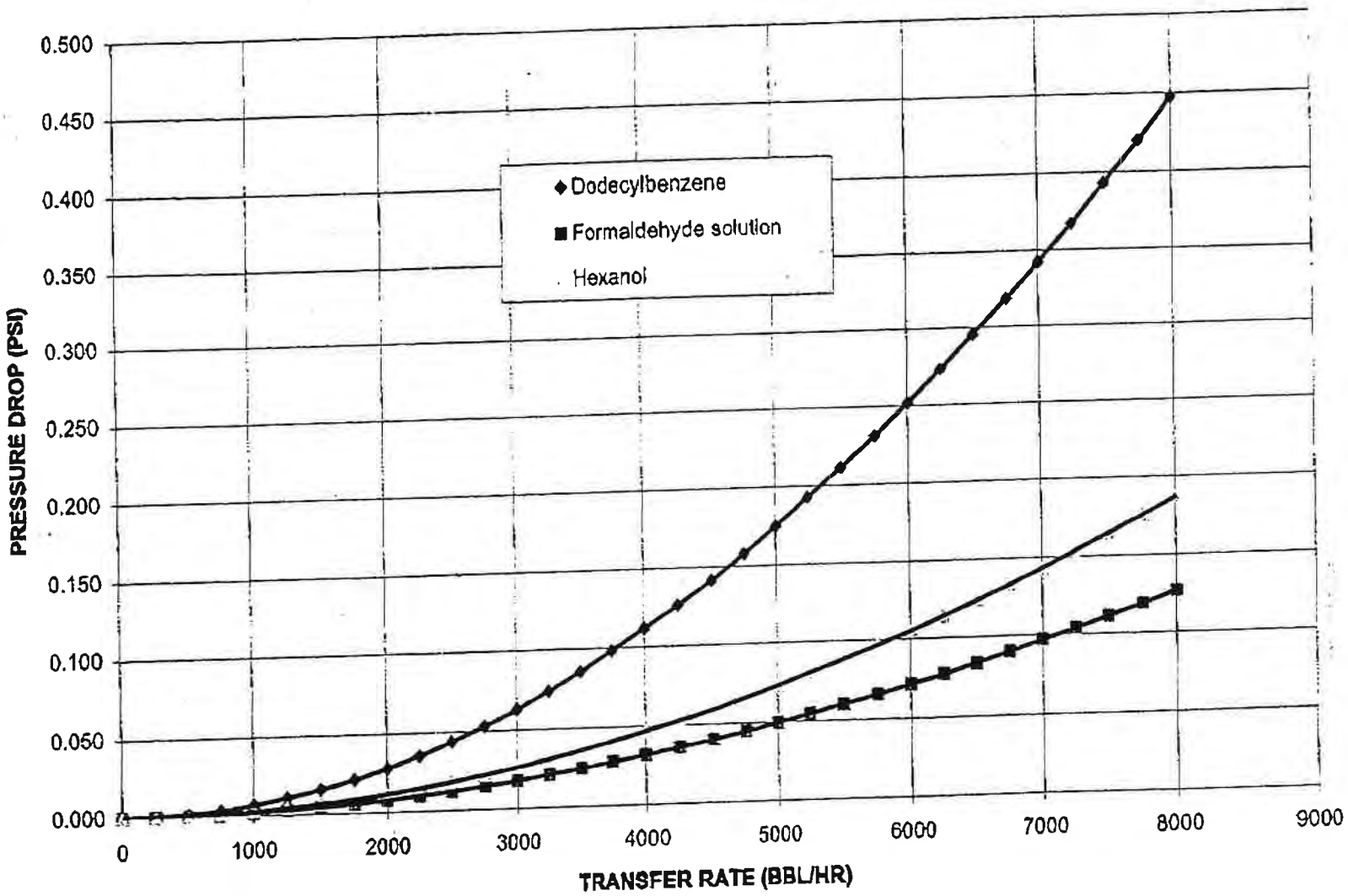
54 MMM	Methyl methacrylate	1	0.80	4.00	2.40	0.116	1.0800	0.012	2618	3074	0.019	0.008	0.0
55 MNS	Mineral spirits	2	0.94	2.02	3.46	0.100	1.0404	0.010	2497	2824	0.016	0.005	0.009
56 MPL	Morpholine	1	0.75	0.20	4.30	0.086	1.0040	0.008	2410	2453	0.012	0.004	0.006
57 MTT	Methyl acetate	1	1.00	0.80	3.00	0.091	1.0160	0.008	2438	2548	0.013	0.004	0.007
58 NNN	Nonyl alcohol	1	0.82	6.10	2.60	0.129	1.1220	0.015	2693	3353	0.022	0.007	0.011
59 NON	Nonene	1	0.94	0.10	6.00	0.085	1.0020	0.008	2405	2431	0.012	0.004	0.006
60 NPM	1- or 2-Nitropropane	2	0.73	0.35	4.30	0.088	1.0070	0.008	2417	2494	0.012	0.004	0.006
61 NSV	Naphtha:Solvent	1	0.99	1.05	3.06	0.093	1.0210	0.009	2450	2595	0.013	0.004	0.007
62 NVM	Naphtha:VM & P (75% Naphtha)	1	0.87	0.20	3.60	0.085	1.0040	0.008	2410	2443	0.012	0.004	0.006
63 OIL	Oil,misc:Crude	1	0.77	0.19	4.30	0.086	1.0038	0.008	2409	2451	0.012	0.004	0.006
64 OTW	Oil,Fuel:No.2	1	0.95	0.15	3.40	0.085	1.0030	0.008	2407	2431	0.012	0.004	0.006
65 PRD	Pyridine	1	0.88	0.56	8.00	0.101	1.0112	0.009	2427	2661	0.014	0.005	0.007
66 PBY	Propylbenzene	1	0.98	1.30	2.72	0.093	1.0260	0.009	2462	2613	0.013	0.005	0.007
67 STY	Styrene	1	0.86	0.60	4.20	0.092	1.0120	0.008	2429	2556	0.013	0.004	0.007
68 TCN	1,2,3-Trichloropropane	2	0.92	0.40	3.60	0.088	1.0080	0.008	2419	2489	0.012	0.004	0.006
69 TEN	Triethylamine	3	1.39	0.15	5.60	0.086	1.0030	0.008	2407	2453	0.012	0.004	0.006
70 THF	Tetrahydrofuran	3	0.73	2.50	3.49	0.112	1.0500	0.011	2520	2929	0.017	0.006	0.009
71 TOL	Toluene	1	0.89	0.50	1.35	0.097	1.1700	0.012	2808	3034	0.018	0.006	0.009
72 VAM	Vinyl acetate	1	0.87	1.50	3.14	0.098	1.0300	0.009	2472	2668	0.014	0.005	0.007
		2	0.94	5.80	2.97	0.137	1.1160	0.015	2678	3435	0.023	0.008	0.012
		Max.	1.39	12.5	8.40	0.246	1.198	0.027	2876	4520	0.040	0.014	0.021
		Min.	0.69	0.01	1.03	0.083	1.000	0.007	2400	2401	0.011	0.004	0.006

*When barge vapor piping is connected to facility vapor recovery system.

LIQUID TRANSFER RATE vs PRESSURE DROP



LIQUID TRANSFER RATE vs PRESSURE DROP (SUBCHAPTER "O" CARGOES)



070101-2.....CARGO PIPING ARRANGEMENT
070101-4.....HEATING SYSTEM ARRANGEMENT

GENERAL NOTES

1. P/V VALVES SHALL BE SET @ 2.0 PSIG PRES. & -.5 PSIG VAC.
2. ENDS OF THE VAPOR MANIFOLD SHOULD BE PAINTED AS SHOWN IN DETAIL "1" IN ACCORDANCE WITH CRF 46 PART 39.20-D-(d).
3. THE VAPOR COLLECTION PIPING MUST BE ELECTRICALLY CONTINUOUS AND BONDED TO THE HULL.
4. NO VAPOR COLLECTION HOSES ARE TO BE CARRIED ABOARD THE BARGE.
5. PIPING SYSTEM TO BE U.S.C.G. CLASS II SYSTEM.
6. PIPING SYSTEM TO BE AIR TESTED TO 1.5 PSI IN ASSOCIATION WITH SOAPY WATER SOLUTION.

Subject to comments in Marine Safety Center letter of
APR 16 2008
APPROVED

NO.	REVISION	BY	DATE
2	INCORPORATED USCG COMMENTS PER LETTER 16710/P013823 DATED 3/24/08	RF	4/1/08
1	INCORPORATED USCG COMMENTS.	RF	8/22/07

PREPARED FOR:
C&C MARINE AND REPAIR

SHEARER & ASSOC., INC.
NAVAL ARCHITECTS
NEW ORLEANS •HOUSTON •NASHVILLE

200'-0" x 35'-0" x 12'-6"
DOUBLE SKIN TANK BARGE

SCALE: 1/8"=1'-0" U.N.	APPROVED BY:	DRAWN BY: KTS
DATE: 11/08/07		REV. No. 2

VAPOR CONTROL SYSTEM ARRANGEMENT

JOB A-1182	HULL 95-104 HULL 111-126	DRAWING NUMBER 070101-3

TABLE 3 (SUB CHAPTER "O" CARGOES)

	CHRIS CODE	NAME	VCS CAT	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	PRESSURE DROP TO PV VALVE IN VCS(psig) (LOADING)	VAPOR VOLUMETRIC FLOW RATE (bbl/h)	AIR EQUIVALENT VOLUMETRIC FLOW RATE	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (LOADING)*	PRESSURE DROP TO PV VALVE IN VCS(psig) (UNLOADING)	PRESSURE DROP TO SHORE CONNECTION IN VCS (psig) (UNLOADING)*
1	ACN	Acrylonitrile	4	0.81	5.00	1.80	0.102	1.1000	0.011	2640	2922	0.017	0.006	0.009
2		NOT USED												
3	ADN	Adiponitrile	1	0.95	0.01	3.73	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
4	ATN	Acetonitrile	3	0.78	0.03	1.41	0.083	1.0006	0.007	2401	2402	0.011	0.004	0.006
5	BAD	Iso-Butyraldehyde	1	0.80	7.80	2.50	0.138	1.1560	0.017	2774	3575	0.025	0.008	0.013
6	BAN	Butyl alcohol (n-)	1	0.81	0.50	2.60	0.087	1.0100	0.008	2424	2477	0.012	0.004	0.006
7	BAR	Butyl acrylate (iso-, n-)	2	0.90	0.80	4.42	0.093	1.0120	0.009	2428	2565	0.013	0.004	0.007
8	BCN	Butyl acetate (n-)	1	0.88	0.80	4.00	0.094	1.0160	0.009	2438	2598	0.013	0.004	0.007
9	BNZ	Benzene	1	0.88	4.50	2.80	0.121	1.0900	0.013	2616	3157	0.020	0.007	0.010
10	BTR	n-Butyraldehyde	1	0.80	7.80	2.50	0.138	1.1560	0.017	2774	3575	0.025	0.008	0.013
11	BTX	Benzene, Toluene, Xylene mixtures (10% Benzene or more)	1	0.84	7.30	2.80	0.145	1.1460	0.017	2750	3529	0.026	0.009	0.013
12	CCH	Cyclohexanone	1	0.95	0.20	3.40	0.085	1.0040	0.008	2410	2441	0.012	0.004	0.006
13	CHA	Cyclohexylamine	1	0.87	0.62	3.42	0.090	1.0124	0.008	2430	2530	0.013	0.004	0.006
14	CHX	Cyclohexane	1	0.78	4.50	2.99	0.123	1.0900	0.013	2616	3185	0.020	0.007	0.010
15	CPD	1,3-Cyclopentadiene dimer (molten)	2	0.89	0.25	4.55	0.087	1.0050	0.008	2412	2471	0.012	0.004	0.006
16	CRB	Chlorobenzene	1	1.11	0.80	3.88								
17	CRS	Cresols	1	1.05	0.06	3.72								
18	DAN	Decyl alcohol (n-)	1	0.83	0.01	5.30	0.083	1.0002	0.007	2400	2403	0.011	0.004	0.006
19	DCH	1,1-Dichloroethane	1	1.18	9.90	3.41	0.195	1.1980	0.025	2875	4404	0.038	0.013	0.020
20	DDB	Dodecylbenzene	1	0.86	4.70	8.40	0.248	1.0940	0.027	2626	4520	0.040	0.014	0.021
21	DEG	Diethylene glycol	1	1.12	0.01	3.66	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
22	DEN	Diethylamine	3	0.71	1.00	2.50	0.090	1.0200	0.008	2446	2549	0.013	0.004	0.007
23	DIP	Diisopropanolamine	1	0.98	0.01	4.59	0.083	1.0002	0.007	2400	2402	0.011	0.004	0.006
24	DMF	Dimethylformamide	1	0.95	0.30	2.51	0.085	1.0060	0.008	2414	2444	0.012	0.004	0.006
25	DOD	Dodecene	1	0.76	0.02	5.81	0.083	1.0004	0.008	2401	2407	0.011	0.004	0.006
26	DPG	Dipropylene glycol	1	1.03	0.07	4.63	0.084	1.0014	0.008	2403	2420	0.012	0.004	0.006
27	DPX	1,1-,1,2-, or 1,3-Dichloropropane	3	1.16	6.30	3.90	0.169	1.1260	0.019	2702	3851	0.029	0.010	0.015
28	EAC	Ethyl acrylate	2	0.93	2.00	3.50	0.106	1.0400	0.010	2496	2826	0.016	0.005	0.008
29	EAI	2-Ethylhexyl acrylate	2	0.89	0.02	6.35	0.084	1.0004	0.008	2401	2408	0.011	0.004	0.006
30	EDC	Ethylene dichloride	1	1.25	4.00	3.42	0.128	1.0800	0.013	2592	3223	0.020	0.007	0.010
31	EGL	Ethylene glycol	1	1.13	0.01	2.21	0.083	1.0002	0.007	2400	2401	0.011	0.004	0.006
32	EHX	2-Ethyl hexanol	1	0.84	0.02	4.50	0.083	1.0004	0.008	2401	2405	0.011	0.004	0.006
33	ETA	Ethyl acetate	1	0.90	4.50	3.04	0.126	1.0900	0.013	2616	3223	0.020	0.007	0.010
34	FFA	Furfural	1	1.20	0.15	3.31	0.085	1.0030	0.008	2407	2430	0.012	0.004	0.006
35	FMS	Formaldehyde solution (37% to 50%)	1	1.13	0.15	1.03	0.083	1.0030	0.008	2407	2407	0.011	0.004	0.006
36		NOT USED												
37		NOT USED												
38		NOT USED												
39		NOT USED												
40		NOT USED												
41		NOT USED												
42		NOT USED												
43		NOT USED												
44	HMX	Heptane (all isomers)	1	0.68	2.50	3.45	0.112	1.0500	0.011	2520	2923	0.017	0.006	0.009
45	HPX	Heptene (all isomers)	2	0.70	2.90	3.40	0.116	1.0580	0.012	2539	2986	0.018	0.006	0.009
46		NOT USED												
47	HXN	Hexanol	1	0.82	1.00	3.52	0.095	1.0200	0.009	2446	2616	0.013	0.005	0.007
48	IPA	Propyl alcohol (iso)	1	0.79	3.00	2.07	0.098	1.0600	0.010	2544	2764	0.015	0.005	0.008
49	KRS	Kerosene	1	0.81	0.15	4.50	0.085	1.0030	0.008	2407	2442	0.012	0.004	0.006
50	MAL	Methyl alcohol	1	0.79	6.63	1.10	0.086	1.1326	0.010	2718	2758	0.015	0.005	0.008
51	MAM	Methyl acrylate	2	0.95	4.10	3.00	0.121	1.0820	0.013	2597	3140	0.019	0.007	0.010
52	MBE	Methyl tert-butyl ether	1	0.74	0.04	3.10	0.083	1.0008	0.008	2402	2407	0.011	0.004	0.006

Marine Safety Center Vapor Control System (VCS) Plan Review Information Sheet (PRIS)

Vessel Name	**CBC 1331-CBC 1334, unnamed**	**Shipyard**	**C&C Marine and Repair, Inc.**
Official Number	**Unassigned**	**Hull Number**	**130 through 137**

1. This sheet consolidates critical VCS parameters for MSC Staff Engineers and CG Field Inspectors dealing with Vapor Control Systems. CG Inspectors should verify the vessel's VCS design is consistent with the information listed in boxes 2, 6, 7 & 8 prior to updating the vapor control endorsement on the vessel's Certificate of Inspection. For cases where the information in the VCS PRIS does not reflect the vessel's design the CG Inspector should contact the Marine Safety Center.

2. Tank Maximum Design Working Pressure 3.25 **psig**

3. Authorized Maximum Cargo Transfer Rate(s) 2400 **bbl/hr loading**; 2400 **bbl/hr discharging**

4. Authorized Maximum Cargo Density 0.246 **lbm/ft^3**

5. Authorized VCS Categories 1 through 4

6. Cargoes with the highest vapor density and/or pressure drop:

a. Cargo Name **DDB**

b. Cargo Name **GAK**

7. Pressure Vacuum Valve:

Manufacturer	**BERGEN**
Size	**KLPH-6**
CG Approval	**162.017/144**

Settings in psig:

Pressure-side	2
Vacuum-side	0.5

8. VCS Pipe Sizes:

Approx. Inside Diameter

Longitudinal Header (inches)	8
Transverse Header (Inches)	8

Required Venting Capacity of Pressure-Side of P/V valve 5094 **bbl/hr (air)**

Required Venting Capacity of Vacuum-Side of P/V valve 2400 **bbl/hr (air)**

9. Tank Overfill Protection System (check appropriate box or boxes)

a. High Level/Tank Overfill Alarm	X	Type	BERGEN
b. Overfill Control Shutdown	X	Type	BERGEN
c. Spill Valve		Type	N/A
d. Rupture Disk		Type	N/A

Setting in psig N/A

10. Closed Gauging Verify the vessel has closed gauging that satisfies 46 CFR 39.20-3 and 151.15-10(c).

11. Instructions/Guidelines for the OCMI:

11a. The following is the Marine Safety Center's recommended COI endorsement

Only those hazardous cargoes named in the vessel's Cargo Authority Attachment, Serial # C1-0801180 dated 4/16/2008, may be carried and then only in the tanks indicated.
When the vessel is carrying cargoes containing greater than 0.5% benzene, the person in charge is responsible for ensuring the provisions of 46 US Code of Federal Regulations Part 197, Subpart C are applied.
In accordance with 46 CFR Part 39, excluding part 39.40, this vessel's vapor control system has been inspected to the plans approved by Marine Safety Center letter Serial # C1-0801180 dated 4/16/2008, and found acceptable for collection of bulk liquid cargo vapors annotated with "Yes" in the CAA's VCS column.

11b. The MSC approval letter/s must be available at the OCMI's request.

11c. Verify isolation valve at the vapor connection flange is manually operable and designed in a way it is "clearly" open or closed.

11d. Previous applicable approval letters:

None	

VCS Approval Letter: C1-0801180 dated 4/16/2008

MSC Plan Reviewer: Marcus Ewardo