

To: P. J. Kober

From: D. A. Doherty

Date: May 9, 1988

Subject: VCM Efficiencies

VISTA

Interoffice
Communication

Cumulative VCM Efficiency for fiscal year 1988 (through April) is 1.01259. Budgeted efficiency for fiscal '88 is 1.00756.

An investigation into the VCM efficiency was undertaken by Operations, Engineering, and other plant personnel. The investigation included a brainstorming session to develop a list of possible causes of efficiency problems. (The list is attached.)

The only major cause of reduced efficiency identified is the difference between the KCS Railroad scale (used to weigh VCM cars) and the Aberdeen railcar scale (used to weigh PVC product cars). The effect of the scale difference on the reported monthly efficiency is an unfavorable increase of about 0.006 (based on a recent scale weight comparison). April year-to-date efficiency adjusted to eliminate the effect of scale differences is 1.00678.

In order to estimate the difference between the Aberdeen railcar scale and the KCS scale, thirty-six VCM cars were weighed in Aberdeen during a two week period in January 1988. These cars were weighed both before and after unloading. The billed weight from the KCS scale averaged 946 pounds more than the Aberdeen scale weights. This difference does not include the heel weight of 750 lbs. assumed left in the car for billing purposes. The actual difference in the two scales averages 1,717 lbs. when the heel weight is included.

Table I lists the weights for the railcars received during the two week period as measured by the KCS and Aberdeen scales. Also included in this table are average differences between the KCS and Aberdeen scales. Graph I illustrates the consistently higher values from the KCS scales.

KCS guarantees their scale to $\pm 1\%$ tolerance. An average 1.0% overweight (as compared to Aberdeen scales) would result in an efficiency of 1.01 even if the actual plant efficiency was perfect. The Aberdeen railcar scales are certified quarterly to be within 0.1% of actual weight. The effect on efficiency is based on the difference between the incoming and outgoing scales regardless of the "correct" weight.

Aberdeen efficiencies are sensitive to changes in the difference between the VCM measured weight and the PVC product measured weight. Several methods were devised to try to detect changes in the KCS scale so that efficiency swings caused by a change in the

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railroad's scale could be explained. The only method proven effective is to check VCM car weights against the Aberdeen scale. Weighing VCM cars as done during this investigation cost \$140 per car. The cost for weighing all VCM cars would be approximately \$28M per month.

Volumetric methods of calculating railcar contents were investigated to see if the KCS scale could be monitored that way. VCM cars were gauged and the contents of railcars was calculated based on outages and measured temperatures. Outages and temperatures for loaded cars were provided by the LCVCM plant and similar measurements were made in Aberdeen for a few cars. Volumetric methods do not appear accurate enough to detect a small (but significant) change in a rail scale's performance.

Table II shows calculated contents and comparisons to scale weights for many of the railcars recently shipped to the Aberdeen Plant from LCVCM. Several graphs were constructed comparing the KCS scale weights against the Lake Charles and Aberdeen calculated volumetric weights. No obvious correlation exists between the calculated content and scale weight.

Based on the 36 cars weighed by KCS and checked at Aberdeen, approximately 50% of the Aberdeen Plant's reported inefficiency is accounted for by the scale difference. A cumulative efficiency adjusted by assuming a similar scale difference throughout the fiscal year, is favorable compared to budget.

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slh

cc: RWS, DCS, CWT, CJMc, AEB, DFJ, LDH
HOUSTON: RRS,

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TABLE I

RAILCAR NUMBER	KCS FREIGHT WEIGHT POUNDS	KCS BILLED WEIGHT POUNDS	ABERDEEN NET WEIGHT POUNDS	DIFF. NET-KCS BILLED WT./HEEL	AB. DIFF. NET KCS BILLED WT

UTLX2185	177300	176550	176270	-1030	-280
UTLX8238	177100	176350	175710	-1390	-640
UTLX8217	179100	178350	176590	-2510	-1760
TILX0002	175343	174593	175113	-230	520
UTLX8242	177303	176553	176113	-1190	-440
UTLX2235	176883	176133	175693	-1190	-440
UTLX2195	177863	177113	176613	-1250	-500
TILX0014	176303	175553	175073	-1230	-480
TILX0027	176203	175453	174953	-1250	-500
UTLX8264	178783	178033	176793	-1990	-1240
TILX0000	174100	173350	173150	-950	-200
UTLX8250	178400	177650	176510	-1890	-1140
UTLX8214	178500	177750	175950	-2550	-1800
TILX0016	175100	174350	173530	-1570	-820
UTLX2196	177300	176550	176190	-1110	-360
UTLX8089	177400	176650	176030	-1370	-620
UTLX8211	177300	176550	175430	-1870	-1120
UTLX8198	177100	176350	176370	-730	20
UTLX8136	179000	178250	177910	-1090	-340
UTLX8266	179600	178850	178230	-1370	-620
UTLX8066	179300	178550	178070	-1230	-480
UTLX2012	178600	177850	176530	-2070	-1320
UTLX8188	178900	178150	177430	-1470	-720
UTLX2087	177400	176650	176310	-1090	-340
UTLX8262	178800	178050	176633	-2167	-1417
UTLX8261	178200	177450	175233	-2967	-2217
TILX0007	175100	174350	174313	-787	-37
UTLX2267	178500	177750	175313	-3187	-2437
UTLX2041	179400	178650	176633	-2767	-2017
UTLX8263	180000	179250	175373	-4627	-3577
UTLX2249	178800	178050	176333	-2467	-1717
TILX0004	176100	175350	173893	-2207	-1457
UTLX2266	179200	178450	177473	-1727	-977
TILX0031	175100	174350	175193	93	843
TILX0013	176300	175550	173893	-2407	-1657
UTLX2069	178500	177750	175533	-2967	-2217

AVERAGES	177616	176866	175899	-1717	-967

TABLE II

RCAR NO.	L.C. CAL. VOLUME POUNDS	KCS SCALE WEIGHT POUNDS	ABERDEEN CAL. VOL. POUNDS	KCS VS L.C. WT. DIFF. POUNDS	KCS SCALE VS ABER. VOLUMETRIC WT DIFF POUNDS
UTLX8046	177690	178200		-510	
UTLX8070	177931	177700		231	
UTLX8223	177386	178400		-1014	
UTLX8239	177536	176800		736	
UTLX2068	177989	179000		-1011	
UTLX8067	178108	179500		-1392	
UTLX2271	178141	178200	177533	-59	-667
UTLX8231	177730	178500		-770	
UTLX8109	177619	178800	177533	-1181	-1267
UTLX8212	178222	178800		-578	
UTLX8251	177788	178800		-1012	
UTLX2150	178330	176900		1430	
UTLX8259	178009	178300		-291	
UTLX8250	178132	177900		232	
UTLX2012	177989	178000		-11	
UTLX2267	178504	177950		554	
UTLX8107	177989	178000		-11	
UTLX8078	177852	179900		-2048	
UTLX8197	178147	179000		-853	
UTLX2172	178754	178900		-146	
UTLX8236	177627	179200		-1573	
UTLX8261	177409	179500		-2091	
UTLX2249	178079	179400		-1321	
UTLX8263	177852	179300		-1448	
UTLX8225	178019	179600		-1581	
UTLX2196	177903	178600		-697	
UTLX8216	175828	179500		-3672	
UTLX8084	176554	178000		-1446	
UTLX8258	176471	178100		-1629	
UTLX8073	177852	179500	177578	-1648	-1922
UTLX2069	178867	179100	178257	-233	-843
UTLX1702	177900	173100		4800	
UTLX8256	177677	179300		-1623	
UTLX2189	178821	179100	177815	-279	-1285
UTLX2087	178372	179400	177910	-1028	-1490
UTLX8264	178105	179400	177890	-1295	-1510
UTLX8209	177867	178600		-733	
UTLX8238	178051	176200	177651	1851	1451
UTLX8121	177569	179900		-2331	
UTLX8269	177543	178600		-1057	
UTLX8207	177741	179000		-1259	
UTLX0482	178655	179200		-545	
UTLX8200	177409	178900		-1491	
UTLX2239	178142	178500		-358	
UTLX8220	178060	179600		-1540	
UTLX8235	177439	178000		-561	
UTLX2185	178097	179000		-903	
UTLX8204	177627	178700		-1073	
UTLX8208	177559	178800		-1241	
UTLX8271	177574	179100		-1526	

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RCAR NO.	L.C. CAL. VOLUME POUNDS	KCS SCALE WEIGHT POUNDS	ABERDEEN CAL. VOL. POUNDS	KCS VS L.C. WT. DIFF. POUNDS	KCS SCALE VS ABER. VOLUMETRIC WT DIFF POUNDS
UTLX8215	177635	178500		-865	
UTLX2246	178111	178700		-589	
UTLX8042	177794	178200		-406	
UTLX8091	177672	178300		-628	
UTLX8188	177837	179300		-1463	
UTLX8137	178012	178500		-488	
UTLX8266	177559	178400		-841	
UTLX2093	178707	178300		407	
UTLX8045	178250	179100		-850	
UTLX0101	178776	178500		276	
UTLX8096	178234	179000		-766	
UTLX8089	178486	178200		286	
UTLX8247	178173	178900		-727	
UTLX8231	178120	177300		820	
UTLX2068	178381	177700		681	
UTLX8246	178044	178400		-356	
UTLX8229	178135	177000		1135	
UTLX8060	178549	179100		-551	
UTLX8067	178289	180300		-2011	
UTLX8258	178081	180700		-2619	
UTLX2196	178542	178200		342	
UTLX0294	177365	178900		-1535	
UTLX2041	177597	177700		-103	
UTLX8206	177567	178800		-1233	
UTLX8201	177719	179100		-1361	
UTLX8226	177406	177900		-494	
UTLX8269	177730	178000		-270	
UTLX8121	177783	177800		-17	
UTLX8220	177822	177900		-78	
UTLX8247	177763	178200		-437	
UTLX8089	178073	178700		-627	
UTLX8199	178050	177800		250	
UTLX2140	178217	179100		-883	
UTLX2172	178353	178300		53	
UTLX8204	177814	178400		-586	
UTLX2271	178126	177900		226	
UTLX8091	177846	177800		46	
UTLX8057	178043	178600		-557	
UTLX2160	178111	178800		-689	
UTLX8137	177642	179000		-1358	
UTLX2167	178818	178300		518	
UTLX8188	178147	178400		-253	
UTLX2246	178419	178000		419	
UTLX2248	178338	178300		38	
UTLX2180	178336	176600		1736	
UTLX8266	177122	179000		-1878	

AVG. =

-578

-837 VAB.0001105519

BRAINSTORMING LISTCAUSES FOR VCM EFFICIENCY PROBLEMS

1. Railcar weights are from KCS for Vinyl - unloading procedure
2. Low-mole resin: Product mix affects efficiency/High temperature reactors have more losses.
3. Recipe changes - chemistry-(lock up VCM?)
4. Strapping tables, etc. and inventory procedures, way we measure what is in reactor
5. Compound - Dryblend resin consumption
6. Send back more VCM in cold weather
7. Sphere gauge, etc. not accurate
8. Leaks and losses VCM, baghouses, and at Tank Farm
9. Calibration and reporting problems
10. Impurities in Vinyl
11. Reduced impurities in PVC
12. Losses to ponds, incinerators
13. No RVCM in 5305