CONOCO

Interoffice Communication

To J. Friend

From D. W. Linderud

Date August 4, 1975

Subject Maximum Liquid Chlorine Unloading Rate.

Presently the maximum liquid chlorine unloading rate is 30,000 lbs per hour. A recent pressure drop survey determined that the unloading rate is limited only by the capacity of the flow check valves. Attached is a sketch of the unloading system and a table showing various line pressures at chlorine unloading rates of 17,700 pph, 25,200 pph, and 26,400 pph.

The nitrogen pressure in the suction line to the nitrogen compressor, in the discharge line from the nitrogen compressor, and in the chlorine tank car were unaffected by changes in the chlorine unloading rate. There are two pressure gauges in the chlorine line located upstream and downstream from the safety flow control valve. The only noticeable decrease in pressure occurred after the safety flow control valve.

The existing nitrogen compressor's design capacity is equivalent to an un-loading rate of 81,800 pph. At an unloading rate of 26,400 pph the nitrogen compressor had no problems maintaining a discharge pressure of 240 psig. The existing one inch nitrogen line to the railcar has sufficient capacity to unload a 90 ton railcar at a rate of 30,000 pph with a pressure drop of about 3 pounds.

If there are any questions, they should be directed to Jim Robinson or myself.

David Linderud

David Linderud

Approved By Jim Robinson

bw

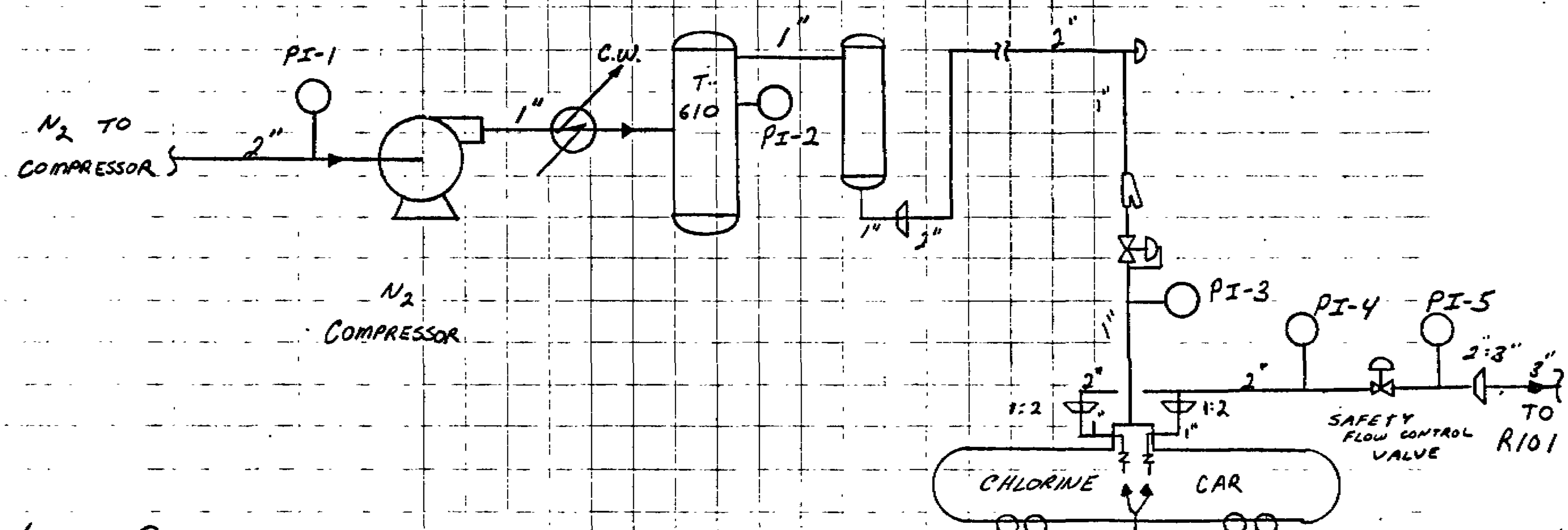
cc:

JAD-GGD-JF-JRH-JHM

CCR 000038348

SKETCH OF LIQUID CHLORINE UNLOADING SYSTEM TO DEFINE PRESSURE GAUGE LOCATIONS ONLY.

FIGURE I



LINE PRESSURE IN LIQUID CL_2 UNLOADING SYSTEM

LIQUID CL_2 UNLOADING	LINE PRESSURES. (PSIG)				
RATE (PPH)	PI-1 COMPRESSOR SUCTION	PI-2 COMPRESSOR DISCHARGE	PI-3 NITROGEN PRES. ON CAR.	PI-4 CHLORINE LINE PRESSURE	PI-5 LOCAL + BOARD CHLORINE LINE PRESSURE
17,700	100 *	240	175	155	150 **
25,200	98	240	175	155	142
26,400	120	240	175	155	138

* SUCTION PRESSURE DEPENDS ON NITROGEN HEADER PRESSURE.

** PRESSURE DROP IN CHLORINE LINE OCCURRED ACROSS THE SAFETY FLOW CONTROL VALVE.

CONOCO

copied JBD JHM'd 10-15-75

Interoffice Communication

To J. A. DeBernardi

From W. B. Carter

Date October 13, 1975

Subject Chlorine Unloading Capacity

Confirming our discussions, we should not plan to AFE the chlorine unloading facility in 1975, nor to budget it in 1976. This assumes that we will finally get a satisfactory contract from PPG.

However, we should not forget this project as it could be needed in 1978 when there will probably be a price reopener in the PPG contract and in 1979 when we expand the plant.

WB Carter

W. B. Carter

WBC:cp

cc: REL, LNV, RWMcP, RFW

CCR 000038350

Dick Churns

CONOCO

To Greg Hoenes - VCM Plant Date 1-26-81

Here is the information that went into the cost estimates for the Chlorine Pipeline, Chlorine Compressors, and Chlorine Barge Facilities. There wasn't much engineering or planning done so the numbers aren't very good.

Dick Churns

CCR 000038351

CHLORINE EVALUATION
VCM PLANT EXPANSION

NEW PIPELINE FROM PPG

PIPELINE	14,000 LF @ 12"	$ 800,000
METER STATION		50,000
COMPRESSOR	1 @ 500 HP	165,000
REFRIGERATION	2 @ 40 TONS (+25°F)	230,000
EXCHANGERS	400 SF, 300 SF	30,000
OTHER MATERIALS		605,000
INDIRECT COSTS		3,220,000
		$ 5,100,000

NEW COMPRESSORS AT CONOCO

COMPRESSORS	2 @ 1000 HP	$ 600,000
EXCHANGERS	800 SF + 300 SF	50,000
OTHER MATERIALS		960,000
INDIRECT COSTS		2,690,000
		$ 4,300,000

CHLORINE BARGE FACILITY

DOCK	300 LF	$ 1,100,000
COMPRESSORS	2 @ 50 HP, 1 @ 500 HP	300,000
REFRIGERATION	2 @ 40 TONS (+5°F), 2 @ 40 TONS (+25°F)	490,000
EXCHANGERS	2 @ 1000 SF, 400 SF, 300 SF, 5 @ 100 SF	130,000
TANKS	2 @ 15,000 GAL, 2 @ 5,000 GAL	50,000
PUMPS		50,000
CHLORINE BULLETS	6 @ 250 TONS	660,000
PIPELINE	20,000 LF @ 12"	1,140,000
OTHER MATERIALS		2,680,000
INDIRECT COSTS		9,400,000
		$ 16,000,000

BASIS: MECH COMP 1-1-83, 30% CONTINGENCY
ESTIMATE QUALITY −50%, +100%

CCR 000038352

CONTINENTAL OIL COMPANY
CALCULATION SHEET

MADE BY
CHECKED BY
DATE
PAGE OF
TITLE

ESTIMATE SUMMARY (BASED ON INDEX NUMBERS DATED 7/79)

NEW CHLORINE COMPRESSORS

FOR: PED CHEM ESTIMATOR: RWC CAPACITY: 1000 T/D
CLASS: PRELIM CHECKED BY: DATE-ORIG: 10/16/79
LOCATION: LAKE CHARLES W.O. REVISION:

	MH'S	LABOR	MATERIAL	SUB-CON	TOTAL
VESSELS					
DRUMS					
TOWERS					
INTERN					
PUMPS					
COMPRESSORS			600000		600000
EXCHANGERS					50000
SHELL & TUBE			50000		
AIR COOLED					
FURNACES					
MISC EQUIP					
SPECIAL ITEMS					
EQUIPMENT TOTALS	2345	35737	650000		685737
PIPING	12228	202006	168499		370505
INTRUMENTATION	2004	32705	59499		92204
ELECTRICAL	4626	81325	72500		153825
STRUCTURAL	807	11685	37998		49683
CONCRETE & SITE	7315	95387	31999		127386
INSULATION				40498	40498
PAINTING				19999	19999
FIREPROOFING	4940	63775	6500		70275
TOTAL OTHER MATERIALS	31920	486883	376995	60497	924375
TOTAL DIRECT COST	34265	522620	1026995	60497	1610112
FIELD COST					380311
HOME OFFICE COST					400365
FEE					147763
BOND					19039
ALL RISK INSURANCE					8598
SALES TAX					42289
ESCALATION	(25.8%)				673026
CONTINGENCY	(30.0%)				988497
TOTAL COST					4270000

(CCR 000038353

ESTIMATE SUMMARY (BASED ON INDEX NUMBERS DATED 7/79)

NEW PIPELINE TO PPG

FOR: PED CHEM ESTIMATOR: RWC CAPACITY: 500 T/D
CLASS: PRELIM CHECKED BY: DATE-ORIG: 10/16/79
LOCATION: LAKE CHARLES W.O. REVISION:

	MH'S	LABOR	MATERIAL	SUB-CON	TOTAL
VESSELS					
DRUMS					
TOWERS					
INTERN					
PUMPS					
COMPRESSORS			395000		395000
EXCHANGERS					30000
SHELL & TUBE			30000		
AIR COOLED					
FURNACES					
MISC EQUIP					
SPECIAL ITEMS					
EQUIPMENT TOTALS	1533	23362	425000		448362
PIPING	7997	132110	110199		242309
INTRUMENTATION	1309	21362	38849		60211
ELECTRICAL	3043	53495	47700		101195
STRUCTURAL	529	7659	24898		32557
CONCRETE & SITE	4788	62435	20949		83384
INSULATION				26398	26398
PAINTING				13049	13049
FIREPROOFING	3229	41686	4250		45936
TOTAL OTHER MATERIALS	20895	318747	246845	39447	605039
TOTAL DIRECT COST	22428	342109	671845	39447	1053401
PIPELINE	30200	510000	290000	50000	850000
					1903401
FIELD COST					618700
HOME OFFICE COST					675600
FEE					
BOND					24000
ALL RISK INSURANCE					13600
SALES TAX					38500
ESCALATION (25.8%)					656700
CONTINGENCY (30.0%)					1169499
TOTAL COST					5100000

CCR 000038354

***** INDIRECT COSTS ESTIMATE SHEET *****

PROJECT TITLE- CHLORINE PIPELINE FROM PPG
LOCATION- LAKE CHARLES
BY- RWC
CLASS- BIG GUESS

SHEET NO.++++ OF ++++
W.O. NO. DB-000-000
DATE 10/16/79
REV.+++++++++++++

DESCRIPTION	LABOR MH	LABOR $	MAT. $	S/C $	TOTAL $
TOTAL DIRECT COST	52628	852109	961845	89447	1903401
OVERTIME COSTS					0

ENGINEERING TYPE- 1

FIELD COST	BASIS	BASE $	%	ADJUST. %	$
SUPERVISION	TDL+OT	852109	16.62	100.	141600
EQUIP. RENTAL	TDL	852109	15.82	100.	134800
TEMP. FAC. & UTIL.	TDL	852109	9.46	100.	80600
SMALL TOOLS, ETC.	TDL	852109	7.90	100.	67400
TESTING & CLEAN-UP	TDL	852109	5.80	100.	49400
LABOR BURDENS	TDL+OT	852109	17.00	100.	144900
LARGE CRANE RENTAL					

****TOTAL-FIELD COST ~ 618700

HOME OFFICE COST

ENGINEERING	EQUIP.+S/C	537809	8.53	100.	45900
	BULK ITEMS	1365592	20.85	100.	284800
OVERHEADS	TDC	1903401	6.78	100.	129100
PROCUREMENT	TDC	1903401	2.33	100.	44400
PROFIT	TDC	1903401	9.00	100.	171400

****TOTAL-HOME OFFICE COST ~ 675600

BOND	CONTRACTS	3197701	0.75%	24000
ALL RISK INS.	TDC+IFC	2522101	$0.54/$100	13600
SALES TAX	MATERIALS	961845	4.0%	38500

****TOTAL-BOND,ARI,TAX ~ 76100

SUB-TOTAL		3273801
ESCALATION	20.06%	656700
SUB-TOTAL		3930501
CONTINGENCY	29.8%	1169499

*****GRAND TOTAL 5100000

CCR 000038355

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                                                 Y  A R S

                    1979        1980        1981        1982        1983        1984
   ITEM          1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4
   ===================================================================================

H.O.C.
  ENG.
  BOND
  A.R.I.                       ************
PROCUREMENT
  EQUIP.
  BULK MAT
  TAX                                   ******************
FIELD CONST.
  T.D.L.
  I.F.C.
  S/C                                          ******************
   ===================================================================================
```

		ESCALATION		
	BASE COST	#YRS.	TOTAL%	$$$$$$$
H.O.C.	713200	1.25	11.95	85227.
PROCUREMENT	1000345	2.25	18.60	186064.
FIELD CONST.	1560256	2.75	24.70	385383.
****TOTAL	3273801		20.06 ~	656700

CCR 000038356

DATE- 10/16/79
LOCATION- LAKE CHARLES
W.O. NO. DB-000-000
SHEET NO. ←←←←OF←←←←

BY- RWC
PROJECT TITLE- CHLORINE PIPELINE FROM PPG

ESTIMATE SUMMARY (BASED ON INDEX NUMBERS DATED 7/79)

CHLORINE BARGE FACILITIES

FOR: PED CHEM — ESTIMATOR: RWC — CAPACITY: 1000 MM LB/YR VC

CLASS: PRELIM — CHECKED BY: — DATE-ORIG: 10/16/79

LOCATION: LAKE CHARLES — W.O: — REVISION:

	MH'S	LABOR	MATERIAL	SUB-CON	TOTAL
VESSELS					710000
DRUMS			710000		
TOWERS					
INTERN					
PUMPS			50000		50000
COMPRESSORS			790000		790000
EXCHANGERS					130000
SHELL & TUBE			130000		
AIR COOLED					
FURNACES					
MISC EQUIP					
SPECIAL ITEMS					
EQUIPMENT TOTALS	6062	92384	1680000		1772384
PIPING	39684	655579	546797		1202376
INTRUMENTATION	6463	105476	191797		297273
ELECTRICAL	8742	153684	136999		290683
STRUCTURAL	2087	30219	98196		128415
CONCRETE & SITE	18904	246508	82699		329207
INSULATION				104696	104696
PAINTING				51699	51699
FIREPROOFING	12767	164821	16800		181621
TOTAL OTHER MATERIALS	88647	1356287	1073288	156395	2585970
TOTAL DIRECT COST	94709	1448671	2753288	156395	4358354
PIPELINE	44000	730000	410000		
DOCK				1100000	
					6798274
FIELD COST					1302200
HOME OFFICE COST					2114100
FEE					—
BOND					51100
ALL RISK INSURANCE					43700
SALES-TAX					147300
ESCALATION	(18.2%)				2067500
CONTINGENCY	(30.0%)				3475826
TOTAL COST					16000000

CCR 000038357

***** INDIRECT COSTS ESTIMATE SHEET *****

PROJECT TITLE- CHLORINE BARGE FACILITY
LOCATION- LAKE CHARLES
BY- RWC
CLASS- BIG GUESS

SHEET NO.++++ OF ++++
W.O. NO. DB-000-000
DATE 10/16/79
REV.++++++++++++

LABOR

DESCRIPTION	MH	$	MAT. $	S/C $	TOTAL $
TOTAL DIRECT COST	138709	1858671	3683208	1256395	6798274
OVERTIME COSTS					0

ENGINEERING TYPE- 1

FIELD COST	BASIS	BASE $	%	ADJUST. %	$
SUPERVISION	TDL+OT	1858671	15.85	100.	294500
EQUIP. RENTAL	TDL	1858671	15.08	100.	280300
TEMP. FAC. & UTIL.	TDL	1858671	9.00	100.	167300
SMALL TOOLS, ETC.	TDL	1858671	7.57	100.	140700
TESTING & CLEAN-UP	TDL	1858671	5.57	100.	103400
LABOR BURDENS	TDL+OT	1858671	17.00	100.	316000
LARGE CRANE RENTAL					

****TOTAL-FIELD COST ~ 1302200

HOME OFFICE COST

ENGINEERING	EQUIP.+S/C	3028779	7.96	100.	241200
	BULK ITEMS	3769495	19.42	100.	731900
OVERHEADS	TDC	6798274	6.33	100.	430400
PROCUREMENT	TDC	6798274	2.07	100.	140900
PROFIT	TDC	6798274	8.38	100.	569700

****TOTAL-HOME OFFICE COST ~ 2114100

BOND	CONTRACTS	10214574	0.50%	51100
ALL RISK INS.	TDC+IFC	8100474	$0.54/$100	43700
SALES TAX	MATERIALS	3683208	4.0%	147300

****TOTAL-BOND,ARI,TAX ~ 242100

SUB-TOTAL		10456674
ESCALATION	19.77%	2067500
SUB-TOTAL		12524174
CONTINGENCY	27.8%	3475826

*****GRAND TOTAL 16000000

CCR 000038358

Y A R S

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                1979          1980          1981          1982          1983          1984
ITEM          1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4
===============================================================================================

H.O.C.
  ENG.
  BOND
  A.R.I.                        ************
PROCUREMENT
  EQUIP.
  BULK MAT
  TAX                                   ******************
FIELD CONST.
  T.D.L.
  I.F.C.
  S/C                                         ******************
===============================================================================================
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			ESCALATION	
	BASE COST	#YRS.	TOTAL%	$$$$$$$
H.O.C.	2208900	1.25	11.95	263964.
PROCUREMENT	3830508	2.25	18.60	712474.
FIELD CONST.	4417266	2.75	24.70	1091064.
****TOTAL	10456674		19.77	2067500

CCR 000038359

DATE- 10/16/79
LOCATION- LAKE CHARLES
BY- RWC
W.O. NO. DB-000-000
PROJECT TITLE- CHLORINE BARGE FACILITY
SHEET NO. ←←←←OF←←←←