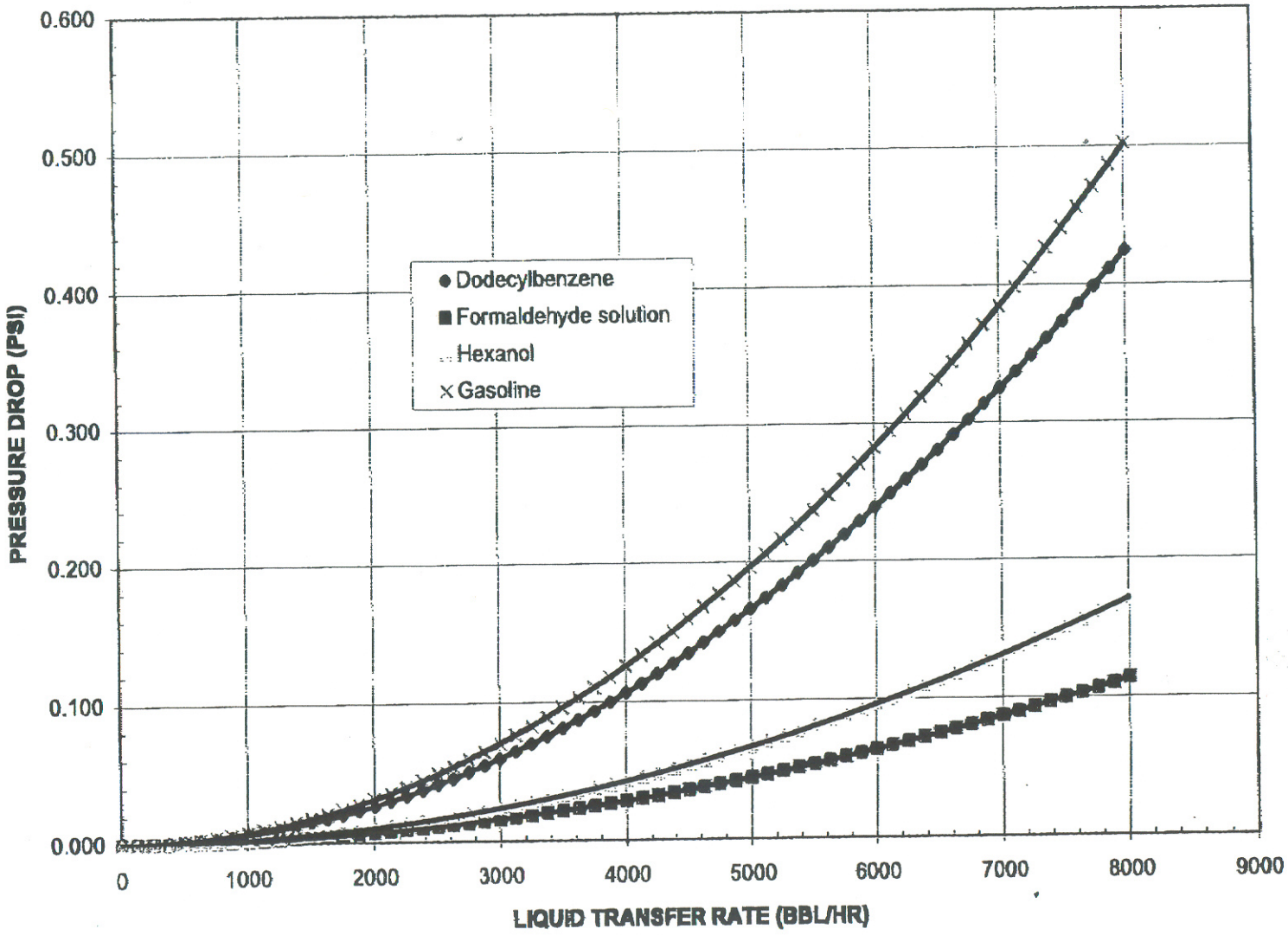
CBC 301 & CBC 302

LIQUID TRANSFER RATE vs PRESSURE DROP



U.S. Department of Transportation
United States Coast Guard

Commanding Officer
United States Coast Guard
Marine Safety Center
www.uscg.mil/hq/msc

400 7th Street, S.W.
Washington, DC 20590-0001
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16710/P006933/ama
16710/ TRAC 4375
Serial: C1-0100570
February 15, 2001

cc: SID TOCHE
JOHN BASS
FILE 96046
USCG IN

Mr. Chetan Kumaria
Trinity Marine Products, Inc.
1050 Trinity Road
Ashland City, TN 37015

Subj: CBC 302
Trinity Marine Products, Ashland City Hull 4375 (Trail Barge)
297.5' x 54' x 12'; Unmanned Type II Hull Tank Barge (O/D)
Grade A (max. 25 psia Reid) & Lower Flammable or Combustible Liquids & Specified Hazardous Cargoes
Design Density 8.7 lbs/gal; Maximum Density (slack load) 13.6 lbs/gal
Rivers; Lakes, Bays, and Sounds; Limited Coastwise on unmanned fair weather voyages only, not more than 12 miles offshore between St. Marks and Carrabelle, Florida
New Construction: General Arrangement, Structures, Stability, and Cargo Authority

Ref: (a) Your letter dated January 24, 2001

Dear Mr. Kumaria:

We reviewed the information submitted with reference (a). Enclosures (1) and (2) are marked **"Approved"** and enclosure (3) is marked **"Examined."** Construction, testing, and workmanship shall be to the satisfaction of the Officer in Charge, Marine Inspection (OCMI). The following comments apply:

1. In general, we have not duplicated your calculations. As with all calculations, the responsibility for their accuracy rests with the submitter.

2. The lightship parameters for this vessel based on weight estimate, and used in the stability calculations are as follows:

Displacement	853.00	Short Tons
VCG	10.32	Ft Above the Baseline
LCG	157.25	Ft Aft of the Bow

3. Based on the data in enclosure (3), this barge meets the stability standards in 46 CFR 172 Subpart E for the carriage of uniformly loaded cargo to a maximum draft of 9'-6" for hull type II, and 11'-6" for hull type III, on the routes indicated in the subject block above. The maximum cargo specific gravity authorized is 1.63 (13.6 lbs/gal). The maximum allowable working pressure is 3.0 psig.

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4. The stability calculations assume minimum trim. If conditions other than minimal trim (6 inches or less) are anticipated, these must be supported by stability and longitudinal strength calculations at the anticipated trims.

5. A deadweight survey of this barge must be conducted to verify the lightship displacement and the longitudinal center of gravity used in the stability calculations. If the results are satisfactory, further calculations will not be required.

Enclosure (4) is the Plan Review Information Sheet (PRIS) for the subject vessel. The PRIS gives the Officer in Charge, Marine Inspection (OCMI) our recommendations for endorsements on the barge's Certificate of Inspection (COI), and includes a list of 46 CFR Part 151 cargoes we have found this barge qualified to carry based on the plans and information we have on file. Once the tank group characteristics are verified, the OCMI will enter the requested cargoes into the Coast Guard's Marine Safety Information System (MSIS). The barge is authorized to carry a specific cargo from 46 CFR Part 151, only after its COI has been so amended by the OCMI.

If you have questions regarding your submission, please contact Mr. Ahmed Adam at the number listed above.

Sincerely,

K. P. McAVOY
Lieutenant Commander, U. S. Coast Guard
Chief, Structures and Stability Branch
Tank Vessel and Offshore Division
By direction of the Commanding Officer

Encl: (1) General Arrangement (Trail), Dwg. No. S-1, Rev. 1, sheet 1 of 2.
(2) General Arrangement (Trail), Dwg. No. S-1, Rev. 0, sheet 2 of 2.
(3) Strength and Stability Calculations for Trinity Marine Products, Ashland City Yard, Hull 4375, dated January 23, 2001.
(4) PRIS for CBC 302

Copy: MSD Nashville w/ encls (1) - (4)

Plan Review Information Sheet (PRIS) for Unmanned Tank Barge

1. Vessel Name(s)	Builder and Hull#	VIN	Build Date	Hull Type	Service	ABS classed?
CBC 302	Trinity Marine Product Hull 4375			II/III	O/D	No

2. Route Permitted (VFOD)

R	Rivers (R)
LBS	Lakes, Bays, and Sounds (LBS)
LC 0-12	Limited Coastwise (0-12 miles offshore b/t St. Marks, FL and Carrabelle, FL), {does not require a loadline certificate}

3. Cargo Authority (VFCA)

Authorization: Specific Hazardous Cargoes

46 CFR Sub. D Authority:	Highst Grade	A	Capacity (bbls)	31062		
46 CFR Sub. O Authority:	Part 151	Yes	Part 153	No	Part 154	No
33 CFR Sub. O Authority:	Part 151.47	No	Part 151.49a	No	Part 151.49b	No

4. Specific Hazardous Cargo Authority (VFCL)

This vessel has been reviewed and found satisfactory for the carriage of the hazardous cargoes listed on the attached cargo list. These cargoes should not be endorsed on the Certificate(s) of Inspection until the cognizant OCMI has verified that the applicable carriage requirements identified on the attached Tank Group Characteristics sheet have been met.

5. Conditions of Carriage (VFCC)

1. The following statement should appear at the beginning of the COI's "Conditions of Carriage" VFCC section "Per 46 CFR 150.130, the Person In Charge of the barge (vessel) is responsible for ensuring that the compatibility requirements of 46 CFR 150 are met. Cargoes must be checked for compatibility using the figures, tables, and appendices of 46 CFR 150 in conjunction with the reactive group numbers from the "REACT GRP" column listed above in the "SPECIFIC HAZARDOUS CARGO AUTHORITY" section."

2. Cargo tanks must be loaded uniformly whenever a 46 CFR Subchapter O cargo is carried. For trim purpos the weight of cargo in each tank may exceed the uniformly loaded weight by at most 5%.

3. 46 CFR 151.45-2(b) contains restrictions on operating box and square end barges as the lead barges of tow

4. The maximum design density of cargo which may be filled to the tank top is 8.745 lbs/gal. Cargoes with hig densities, up to 13.74 lbs/gal, may be carried as slack loads, but shall not exceed the tank weight limits as liste

6. Liquid Bulk Cargo Authority/Conditions (VFCA)

Note: Per 46 CFR 151.10-15(c)(2) the max. tank weights listed below reflect uniform (within 5%) loading at the deepest draft allowed. When carrying SubCh. O cargoes at shallower drafts, the barge(s) should always be loaded uniformly, within 5%.

Loading Constraints - Structural/Stability

Tank	Max Cargo Wgt/Each Tank (ST)	Max Density (lbs/gal)
1 P/S	854.2	13.6
2 P/S	827.4	13.6
3 P/S	796.4	13.6

Hull Type	Route	Max. Load (ST)	Max Draft (ft, in)	Density (lbs/gal)
III	R, LBS	4720	11'-6"	13.6
II	R, LBS	3720	9'-6"	13.6

46 CFR Part 151 Tank Group Characteristics

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 9, 46 CFR Table 151.05 Tank Group Characteristics:

Tank Group Information		Cargo Identification				Tanks				Cargo Transfer		Environmental Control			Special Requirements			
Tank Group	Tanks in Group	Density	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Protection Provided	General	Materials of Construction	Elec Haz	Temp Cont
A	3	13.74	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	NA	Portable	.50-60, .50-70(a), .50-73, .50-80, .50-81(a), .50-81(b), .50-86,	55-1(b), (c), (e), (f), (h), (j), 56-1(a), (b), (c), (d), (e), (f), (g),	NR	No

Notes:

1. Under Environmental Control, Tanks, NR means that the tank group is suitable only for those cargoes which require no environmental control in the cargo tanks.

2. Under Environmental Control, Handling Space, NR means that the tank group is suitable only for those cargoes which require no environmental control in the cargo handling space. NA means that the vessel does not have a cargo control space, and this requirement is not applied.

3. Under Electrical Hazard Class, NA means that the tank group is suitable only for those cargoes which have no electrical hazard class requirement. NR means that the vessel has no electrical equipment located in a hazardous location.

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification						Tanks			Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
Acetonitrile	ATN	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Acrylonitrile	ACN	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	.50-70(a), .55-1(e)	I-D	NA	G	A
Adiponitrile	ADN	Atmos.	Amb.	II	1ii 2i	Integral Gravity	PV	Open	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Alkyl(C7-C9) nitrates	AKN	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	.50-81, .50-86	NA	NA	G	A
Aminoethylethanolamine	AEE	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	.55-1(b)	NA	NA	G	A
Ammonium bisulfite solution (70% or less)	ABX	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	.50-73, .56-1(a), (b), (c)	NA	NA	G	A
Ammonium hydroxide (28% or less NH3)	AMH	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	.56-1(a), (b), (c), (f), (g)	I-D	NA	G	A
Benzene	BNZ	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	.50-60	I-D	NA	G	A
Benzene or hydrocarbon mixtures (having 10% Benzene or more)	BHB	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Benzene or hydrocarbon mixtures (containing Acetylene and 10% Benzene or more)	BHA	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	.56-1(b), (d), (f), (g)	I-D	NA	G	A
Benzene, Toluene, Xylene mixtures (10% Benzene or more)	BTX	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Butyl acrylate (all isomers)	BAR	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent N	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Butyl methacrylate	BMH	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Butyraldehyde (all isomers)	BAE	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Open	II	G-1	NR	Vent F	Yes	.55-1(h)	I-C	NA	G	A
Camphor oil	CPO	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	I-D	NA	G	A
Carbon tetrachloride	CBT	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Open	II	G-1	NR	Vent N	No	No	NA	NA	G	A
Chlorobenzene	CRB	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Open	II	G-1	NR	Vent N	Yes	No	I-D	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9

Cargo Identification						Tanks			Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
Chloroform	CRF	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent F	No	No	NA	NA	G	A
Coal tar naphtha solvent	NCT	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-73	I-D	NA	G	A
Creosote (all isomers)	CCW	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	NA	NA	G	A
Cresols (all isomers)	CRS	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	NA	NA	G	A
Cresylate spent caustic (mixtures of Cresols and Caustic soda solutions)	CSC	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	50-73, 55-1(b)	NA	NA	G	A
Cresylic acid tar	CRX	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(f)	NA	NA	G	A
Crotonaldehyde	CTA	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(h)	I-C	NA	G	A
Crude hydrocarbon feedstock (containing Butyraldehydes and Ethylpropyl acrolein)	CHG	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	NR	Yes	No	I-D	NA	G	A
Cyclohexanone	CCH	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1(a), (b)	I-D	NA	G	A
Cyclohexanone, Cyclohexanol mixture	CYX	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1 (b)	I-D	NA	G	A
Cyclohexylamine	CHA	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1(a), (b), (c), (g)	I-D	NA	G	A
Cyclopentadiene, Styrene, Benzene mixture	CSB	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
iso-Decyl acrylate	IAI	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	50-70(a), 50-81(a), (b), 55-1(c)	NA	NA	G	A
Dichlorobenzene (all isomers)	DBX	Atmos.	Amb.	III	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1(a), (b)	I-D	NA	G	A
1,1-Dichloroethane	DCH	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
2,2-Dichloroethyl ether	DEE	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(f)	I-C	NA	G	A
Dichloromethane	DCM	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	No	I-D	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10. List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification						Tanks			Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution	DDE	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	56-1(a), (b), (c), (g)	NA	NA	G	A
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution	DTI	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	56-1(a), (b), (c), (g)	NA	NA	G	A
1,1-Dichloropropane	DPB	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
1,2-Dichloropropane	DPP	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
1,3-Dichloropropane	DPC	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
1,3-Dichloropropene	DPU	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Dichloropropene, Dichloropropane mixtures	DMX	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Diethanolamine	DEA	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	NA	NA	G	A
Diethylamine	DEN	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(c)	I-C	NA	G	A
Diethylenetriamine	DET	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	NA	NA	G	A
Diisobutylamine	DBU	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(c)	I-C	NA	G	A
Diisopropanolamine	DIP	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	NA	NA	G	A
Diisopropylamine	DIA	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	55-1(c)	I-C	NA	G	A
N,N-Dimethylacetamide	DAC	Atmos.	Amb.	III	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1(b)	I-D	NA	G	A
Dimethylethanolamine	DMB	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	56-1(b), (c)	I-C	NA	G	A
Dimethylformamide	DMF	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(e)	I-D	NA	G	A
Di-n-propylamine	DNA	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(c)	I-C	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification						Tanks			Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
Dodecyldimethylamine, Tetradecyldimethylamine mixture	DOT	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	56-1(b)	NA	NA	G	A
Ethanolamine	MEA	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	I-D	NA	G	A
Ethyl acrylate	EAC	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-70(a), 50-81(a), (b)	I-D	NA	G	A
Ethylamine solution (72% or less)	EAN	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	55-1(b)	I-D	NA	G	A
N-Ethylbutylamine	EBA	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(b)	I-C	NA	G	A
N-Ethylcyclohexylamine	ECC	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(b)	I-C	NA	G	A
Ethylene cyanohydrin	ETC	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	NA	NA	G	A
Ethylenediamine	EDA	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(c)	I-D	NA	G	A
Ethylene dichloride	EDC	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Ethylene glycol hexyl ether	EGH	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	NA	NA	G	A
Ethylene glycol monoalkyl ethers	EGC	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-C	NA	G	A
Ethylene glycol propyl ether	EGP	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	No	NA	NA	G	A
2-Ethylhexyl acrylate	EAI	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	50-70(a), 50-81(a), (b)	I-D	NA	G	A
Ethyl methacrylate	ETM	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-70(a)	I-D	NA	G	A
2-Ethyl-3-propylacrolein	EPA	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-C	NA	G	A
Formaldehyde solution (37% to 50%)	FMS	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	55-1(h)	I-B	NA	G	A
Furfural	FFA	Atmos.	Amb.	III	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(h)	I-C	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification				Tanks					Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
Glutaraldehyde solution (50% or less)	GTA	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	No	NA	NA	G	A
Hexamethylenediamine solution	HMC	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.55-1(c)	I-D	NA	G	A
Hexamethyleneimine	HMI	Atmos.	Amb.	II	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.56-1(b), (c)	I-C	NA	G	A
Hydrocarbon 5-9	HFN	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Isoprene	IPR	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Open	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Isoprene, Pentadiene mixture	IPN	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .55-1(c)	I-D	NA	G	A
Kraft pulping liquors (free alkali content 3% or more)(including: Black, Green, or White liquor)	KPL	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	NR	No	.50-73, .56-1(a), (c), (g)	NA	NA	G	A
Mesityl oxide	MSO	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Methyl acrylate	MAM	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Methylcyclopentadiene dimer	MCK	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-B	NA	G	A
Methyl diethanolamine	MDE	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	.56-1(b), (c)	I-C	NA	G	A
2-Methyl-5-ethylpyridine	MEP	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	.55-1(e)	I-D	NA	G	A
Methyl methacrylate	MMM	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
2-Methylpyridine	MPR	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.55-1(c)	I-D	NA	G	A
alpha-Methylstyrene	MSR	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-70(a), .50-81(a), (b)	I-D	NA	G	A
Morpholine	MPL	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	.55-1(c)	I-C	NA	G	A
1- or 2-Nitropropane	NPM	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	.50-81	I-C	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification					Tanks				Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
1,3-Pentadiene	PDE	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-70(a), 50-81	I-D	NA	G	A
Perchloroethylene	PER	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	No	NA	NA	G	A
Polyethylene polyamines	PEB	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(e)	NA	NA	G	A
iso-Propanolamine	MPA	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	I-D	NA	G	A
Propanolamine (iso-, n-)	PAX	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	56-1(b), (c)	I-D	NA	G	A
iso-Propylamine	IPP	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	Yes	55-1(c)	I-D	NA	G	A
Pyridine	PRD	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(e)	I-D	NA	G	A
Sodium chlorate solution (50% or less)	SDD	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	50-73	NA	NA	G	A
Sodium hypochlorite solution (15% or less)	SHP	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	50-73, 56-1(a), (b)	NA	NA	G	A
Sodium sulfide, hydrosulfide solution (H2S 15 ppm or less)	SSH	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	No	50-73, 55-1(b)	NA	NA	G	A
Sodium sulfide, hydrosulfide solution (H2S greater than 15 ppm but less than 200 ppm)	SSI	Atmos.	Amb.	III	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	50-73, 55-1(b)	NA	NA	G	A
Sodium sulfide, hydrosulfide solution (H2S greater than 200 ppm)	SSJ	Atmos.	Amb.	II	1ii 2i	Integral Gravity	PV	Closed	II	G-1	NR	Vent F	No	50-73, 55-1(b)	NA	NA	G	A
Styrene (crude)	STX	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
Styrene monomer	STY	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	50-70(a), 50-81(a), (b)	I-D	NA	G	A
1,1,2,2-Tetrachloroethane	TEC	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	No	NA	NA	G	A
Tetraethylenepentamine	TTP	Atmos.	Amb.	III	1i 2ii	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(c)	NA	NA	G	A
Tetrahydrofuran	THF	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-70(b)	I-C	NA	G	A

46 CFR Part 151 Cargo List

for: CBC 302, Trinity Ashland City 4375

Revised: 15-February-2001

Section 10, List of cargoes meeting the 46 CFR Table 151.05 Tank Group Characteristics described in Section 9:

Cargo Identification						Tanks			Cargo Transfer		Environmental Control							
Name	Chem Code	Press.	Temp.	Hull Type	Cargo Seg Tank	Type	Vent	Gauge	Pipe Clas	Cont	Tanks	Handling Space	Fire Prot Req	Special Requirements	Elec Haz	Temp Cont	Tank Intnl Insp Period	Tank Group
1,2,4-Trichlorobenzene	TCB	Atmos.	Amb.	III	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	No	I-D	NA	G	A
1,1,2-Trichloroethane	TCM	Atmos.	Amb.	III	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	50-73, 56-1(a)	I-D	NA	G	A
Trichloroethylene	TCL	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	No	I-D	NA	G	A
1,2,3-Trichloropropane	TCN	Atmos.	Amb.	II	1ii 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-73, 56-1(a)	I-D	NA	G	A
Triethanolamine	TEA	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(b)	I-C	NA	G	A
Triethylamine	TEN	Atmos.	Amb.	II	1ii 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	55-1(e)	I-C	NA	G	A
Triethylenetetramine	TET	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	Vent N	Yes	55-1(b)	I-C	NA	G	A
Triphenylborane (10% or less), caustic soda solution	TPB	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	NR	No	56-1(a), (b), (c)	NA	NA	G	A
Urea, Ammonium nitrate solution (containing more than 2% NH3)	UAS	Atmos.	Amb.	III	1i 2i	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	No	56-1(b)	I-D	NA	G	A
Vanillin black liquor (free alkali content, 3% or more)	VBL	Atmos.	Amb.	III	1i 2i	Integral Gravity	Open	Open	II	G-1	NR	NR	No	50-73, 56-1(a), (c), (g)	NA	NA	G	A
Vinyl acetate	VAM	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Open	II	G-1	NR	Vent F	Yes	50-70(a), 50-81(a), (b)	I-D	NA	G	A
Vinyltoluene	VNT	Atmos.	Amb.	III	1i 2ii	Integral Gravity	PV	Restr.	II	G-1	NR	Vent F	Yes	50-70(a), 50-81, 56-1(a), (b), (c), (g)	I-D	NA	G	A

STRENGTH AND STABILITY CALCULATIONS

FOR

TRINITY MARINE PRODUCT, ASHLAND CITY YARD
TRINITY TAG 96046
HULL 4375

January 23, 2001

EXAMINED
Subject to comments in
Marine Safety Center letter of
FEB 15 2001
Commanding Officer
USCG Marine Safety Center

Prepared by: Chetan Kumaria, PE
Trinity -Ashland City
1050 Trinity Road,
Ashland City, TN 37015.

TABLE OF CONTENTS

SUMMARY

THESE CALCULATIONS WERE PERFORMED TO SHOW THAT THE HULL 4375 MEET STRENGTH AND STABILITY CRITERIA OF SUBCHAPTER "O" FOR TYPE II HULL. THIS HULL WILL BE USED TO CARRY 46 CFR SUBCHAPTER "D" GRADE A AND LOWER CARGOES AND LIMITED SUBCHAPTER "O" PRODUCTS ON INLAND RIVERS, LAKES, BAYS AND SOUNDS.

1. INTACT STABILITY CALCULATIONS WERE PERFORMED TO DEMONSTRATE COMPLIANCE WITH 46 CFR 172.090 (b) FOR CARGO WITH 1.63 MAXIMUM SPECIFIC GRAVITY AND FOR THE FOLLOWING CONDITIONS:

   a. LAKES, BAYS AND SOUND SERVICE AT 11'-6" MAXIMUM FRESH WATER DRAFT.

   b. RIVERS SERVICE AT 11'-6" MAXIMUM DRAFT.

   BOTH OF THE ABOVE CONDITIONS WERE FOUND TO SATISFY THE REQUIREMENTS OF 46 CFR SUBPART 172.090 (b), FOR MINIMUM TRANSV. METACENTER HEIGHT (GM) AND SUBPART 172.095, FOR MINIMUM LONGITUDINAL METACENTRIC HEIGHT (GML).

2. AN ASSUMED GROUNDING CONDITION WAS PERFORMED WITH THE FORWARD BOW BULKHEAD RESTING UPON A PINNACLE AT THE WATER SURFACE AS PER 46 CFR SUBPART 151.10-20 (b) FOR AN INITIAL DRAFT OF 9'-6". THE MAXIMUM HULL BENDING MOMENT OBTAINED FOR THE ABOVE CONDITION RESULTED IN A HULL BENDING STRESS OF 8951 PSI. THIS STRESS DOES NOT EXCEED THE STRESS LEVELS SPECIFIED ON SUBPART 151.10-20 (b)(2)(i) NOR IT EXCEED PERMISSIBLE STRESS PER ABS 3/5.7.3 (c) 1995 RULE.

3. DAMAGE STABILITY CALCULATIONS WERE PERFORMED FOR TYPE II BARGE HULL TO DEMONSTRATE COMPLIANCE WITH SUBPART 151.10 (b) (3) (I) WHICH REQUIRES A MODIFIED ONE COMPARTMENT STANDARD OF SUBDIVISION AND DAMAGE STABILITY AS SPECIFIED IN SUBPART "E" OF PART 172 OF 46 CFR.

   EIGHT CASES OF DAMAGE STABILITY WITH AN INITIAL DRAFT OF 9'-6" WERE PERFORMED. SINCE NO W.T. CENTER LINE BULKHEAD EXISTS, ALL FLOODING WAS CONSIDERED SYMMETRICAL AND OCCURRING IN ANY COMPARTMENT ALONG THE LENGTH OF THE BARGE.

   ALL DAMAGED CASES STUDIED MEET THE SURVIVAL CONDITIONS SPECIFIED IN 46 CFR SUBPART 172.110 (e) & (f).

VESSEL PARTICULARS

TAG NO.	96046
LENGTH:	297'-6"
BREADTH:	54'-0"
HEIGHT @ SIDE:	12'-0"
LIGHTSHIP DISPLACEMENT:	853 S.TON.
LONGITUDINAL CENTER OF GRAVITY:	157.25 FT AFT OF HEADLOG
VERTICAL CENTER OF GRAVITY:	10.32 FT
DRAFT FOR TYPE III HULL:	11'-6" (FRESH WATER)
DISPLACEMENT @ 11'-6" DRAFT:	5573.20 S.TON
DRAFT FOR TYPE II HULL:	9'-6" (FRESH WATER)
DISPLACEMENT @ 9'-6" DRAFT:	4572.51 S.TON

CARGOES: SUBCHAPTER "D" GRADE A AND LOWER AND LIMITED SUBCHAPTER "O" PRODUCTS

OPERATING AREAS: RIVERS, LAKES, BAYS AND SOUNDS

HULL STRUCTURE: BUILT IN ACCORDANCE WITH 1997 ABS RULES

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046a

Tue Jan 23 13:31 2001

Intact: Yes | Grounded: No | Damaged: No

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

USCG Intact Stability Criteria 46CFR/172.090 Sub 'O' Vessel

LOA	(L) = 297.50 Ft	Trunk Length	(a) = 239.75 Ft
Beam	(B) = 54.00 Ft	Trunk Width	(b) = 47.00 Ft 48'
Molded Depth	(D) = 12.00 Ft	Trunk Height	(h) = 4.17 Ft
Midship Draft	(d) = 11.54 Ft	Freeboard	(f = D - d) = 0.46 Ft

fa = MINIMUM(h, 1.25*(a/L)*(2*(b/B)-1)*h) = 3.11 Ft
Fe = MINIMUM(d, f + fa) = 3.57 Ft
K = 0.3 (River Service)
Required Transverse GM = (K * B) / Fe = 4.54 Ft
Required Longitudinal GM = 0.02 * L * L / d = 153.37 Ft

Initial Stability

Displacement (DISPL)	5573.20	STons
Keel Draft @ LCF (DM)	11.54	Ft
Transverse Metacentric Height (KMT)	27.95	Ft
Center of Gravity Above Keel (KG)	6.81	Ft
Metacentric Height, Transverse (GMT)	21.14	Ft
Free Surface Moment Correction (FSMC)	5.52	Ft
Corrected Metacentric Height (GMC)	15.62	Ft
Required Metacentric Height (GMTREQD)	4.54	Ft
	3.44	Times GMTREQD
Metacentric Height, Longitudinal (GML)	661.48	Ft
Required Longitudinal Metacentric Height (GMLREQD)	153.37	Ft
	4.31	Times GMLREQD
Heeling Moment (HEELMOM)	-0.00	STons-Ft
Heel Angle (HEEL)	0.00	° Stbd

(4)

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046a

Tue Jan 23 13:31 2001

Intact: Yes | Grounded: No | Damaged: No

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

USCG Intact Stability Criteria 46CFR/172.090 Sub 'O' Vessel

LOA	(L) = 297.50 Ft	Trunk Length	(a) = 239.75 Ft
Beam	(B) = 54.00 Ft	Trunk Width	(b) = ~~47.00 Ft~~ 48'
Molded Depth	(D) = 12.00 Ft	Trunk Height	(h) = 4.17 Ft
Midship Draft	(d) = 11.54 Ft	Freeboard	(f = D - d) = 0.46 Ft

fa = MINIMUM(h, 1.25*(a/L)*(2*(b/B)-1)*h) = 3.11 Ft
Fe = MINIMUM(d, f + fa) = 3.57 Ft
K = 0.4 (Lakes, Bays, Sounds (Great Lakes - Summer) Service)
Required Transverse GM = (K * B) / Fe = 6.05 Ft
Required Longitudinal GM = 0.02 * L * L / d = 153.37 Ft

Initial Stability

Displacement (DISPL)	5573.20 STons
Keel Draft @ LCF (DM)	11.54 Ft
Transverse Metacentric Height (KMT)	27.95 Ft
Center of Gravity Above Keel (KG)	6.81 Ft
Metacentric Height, Transverse (GMT)	21.14 Ft
Free Surface Moment Correction (FSMC)	5.52 Ft
Corrected Metacentric Height (GMC)	15.62 Ft
Required Metacentric Height (GMTREQD)	6.05 Ft
	2.58 Times GMTREQD
Metacentric Height, Longitudinal (GML)	661.48 Ft
Required Longitudinal Metacentric Height (GMLREQD)	153.37 Ft
	4.31 Times GMLREQD
Heeling Moment (HEELMOM)	-0.00 STons-Ft
Heel Angle (HEEL)	0.00 ° Stbd

(5)

INTACT STABILITY CALCULATIONS

PINNACLE GROUNDING CALCULATIONS

BARGE LOADED TO 9'-6" DRAFT

GROUNDING CONDITION CALCULATION

REF: 46CFR 151.10-20 (b) (2)

THE SUBJECT BARGE MEETS THE CRITERIA OF ABOVE REFERENCED REGULATIONS, AS THE MAXIMUM MOMENT IMPOSED DOES NOT INDUCE STRESSES EXCEEDING ALLOWABLE VALUES.

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:33 2001

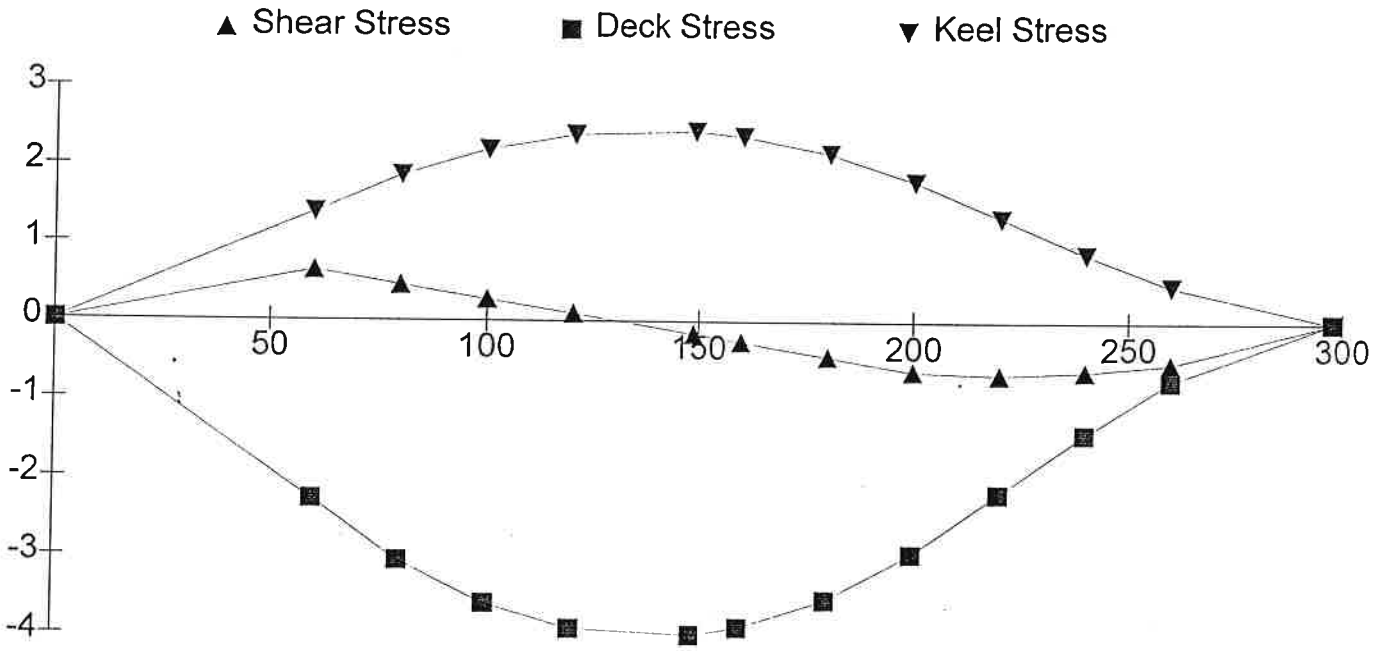
Intact: Yes | Grounded: Yes | Damaged: No

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Hull Stresses

Deadweight: 3719.50 STons | Draft @ LCF: 9.50 Ft | Trim: 0.00 Ft

Shear Stress Max = -0.677 LTons/In² = -11.3% @ 220.000 Ft F.P.
Deck Stress Max = -3.996 LTons/In² = -40.0% @ 148.750 Ft F.P.
Keel Stress Max = 2.437 LTons/In² = 24.4% @ 148.750 Ft F.P.



Stress LTons/In² vs. Distance Ft F.P.

(2)

GROUNDING CALCULATIONS

A. **46 CFR 151.10-20 (b)(2)(iii):**

HULL STRESS SHALL NOT EXCEED 50% OF THE MINIMUM ULTIMATE TENSILE STRENGTH OR 70% OF THE YIELD STRENGTH, WHICHEVER IS GREATER.

0.50 X 58000 (ULT) = 29000 PSI MAX

0.70 X 36000 (YIELD) = 25200 PSI

a. STRESS IN BOTTOM PLATE = 5458.8 PSI (TENSION)

b. STRESS IN DECK PLATE = 8951 PSI (COMPRESSION)

HULL SECTION MODULUS IS ADEQUATE.

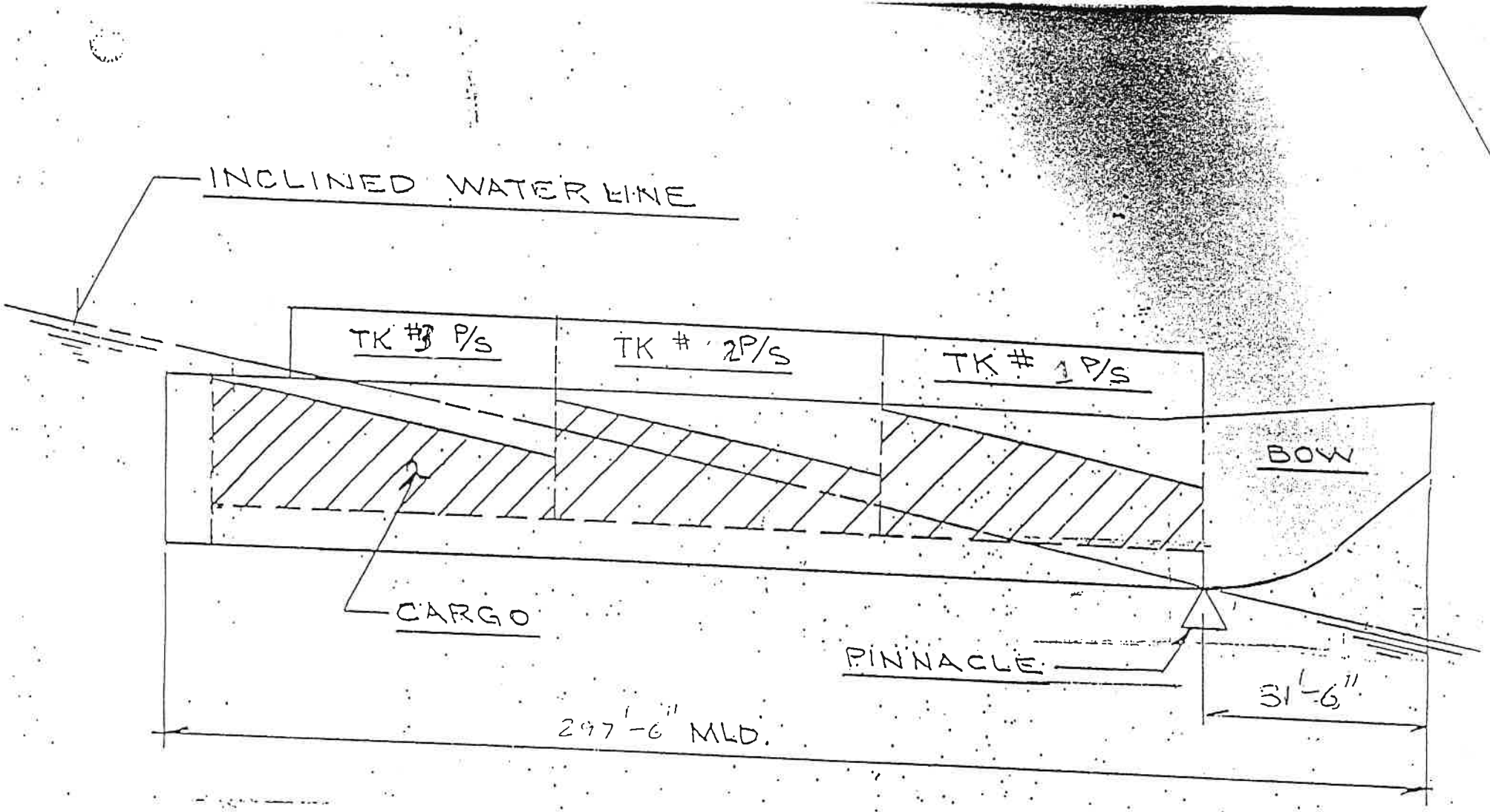
B. **1995 ABS "STEEL VESSEL RULES FOR SERVICE ON RIVERS AND INTRACOASTAL WATERWAYS" 3/5.7.3 (c):**

PERMISSIBLE STRESS:

P = 3 PSI, P0 = 3 PSI, l= 81", r = 1.33", Y = 36000 PSI

f = (1-0.25 P/P0) (1.09 - 0.00427 (l/r)) Y = (1-.25 (3/3)) (1.09-0.00427 (81/1.33)) 36000
= 22408.58 PSI

HULL SECTION MODULUS IS ADEQUATE.



HULL GROUNDING LOCATION

(10)

DAMAGE STABILITY CALCULATIONS - TYPE II HULL

WITH BARGE AT 9'-6" DRAFT PRIOR TO A DAMAGE CONDITION

SUBDIVISION & DAMAGE STABILITY

REF. 46 CFR 151.10

THE RESULTS OF CALCULATIONS ON PAGES 13 THRU 20 INDICATE THAT THE SUBJECT HULL DOES NOT REACH A CONDITION WHERE THE INTERSECTION OF THE DECK AND THE TRUNK IS BELOW THE WATERLINE WHEN COMPARTMENTS ARE FLOODED IN ACCORDANCE WITH THE CRITERIA OF THE ABOVE REGULATIONS FOR TYPE II HULL.

THE CALCULATIONS WHICH PRODUCED THESE RESULTS WERE BASED ON THE FOLLOWING CONDITIONS:

1. THE BARGE WAS LOADED TO A LEVEL DRAFT OF 9'-6" IN FRESH WATER FOR A TYPE II HULL.

2. CARGO SPECIFIC GRAVITY IS 1.65

3. BARGE DEPTH AT SHEER POINT= 12.067 FT

   12.00 FT = MOLDED DEPTH
   0.067 FT = DECK PLATE + BOTTOM PLATE
   12.067 FT = TOTAL

6. ESTIMATED VCG= 10.32 FT

Bow

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:36 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	158.38	Feet F.P.
Draft at Fwd Marks	12.09	Feet
Draft at Loadline	10.46	Feet
Draft at Aft Marks	8.82	Feet
Trim by the Head Between A.P. and F.P.	3.26	Feet

13

VOID

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:36 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	156.50	Feet F.P.
Draft at Fwd Marks	10.29	Feet
Draft at Loadline	9.95	Feet
Draft at Aft Marks	9.61	Feet
Trim by the Head Between A.P. and F.P.	0.68	Feet

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:37 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	155.90	Feet F.P.
Draft at Fwd Marks	10.13	Feet
Draft at Loadline	9.96	Feet
Draft at Aft Marks	9.78	Feet
Trim by the Head Between A.P. and F.P.	0.35	Feet

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:38 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	155.36	Feet F.P.
Draft at Fwd Marks	9.61	Feet
Draft at Loadline	9.54	Feet
Draft at Aft Marks	9.48	Feet
Trim by the Head Between A.P. and F.P.	0.13	Feet

(15)

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:40 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	155.36	Feet F.P.
Draft at Fwd Marks	9.61	Feet
Draft at Loadline	9.54	Feet
Draft at Aft Marks	9.48	Feet
Trim by the Head Between A.P. and F.P.	0.13	Feet

(17)

VOID #5

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:41 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	155.36	Feet F.P.
Draft at Fwd Marks	9.61	Feet
Draft at Loadline	9.54	Feet
Draft at Aft Marks	9.48	Feet
Trim by the Head Between A.P. and F.P.	0.13	Feet

(18)

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:43 2001

Intact: No	Grounded: No	Damaged: Yes

Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	155.36	Feet F.P.
Draft at Fwd Marks	9.61	Feet
Draft at Loadline	9.54	Feet
Draft at Aft Marks	9.48	Feet
Trim by the Head Between A.P. and F.P.	0.13	Feet

STCPLT

Ship: Tag 96046, Canal Trail
Loading Condition: tag96046b

Tue Jan 23 13:43 2001

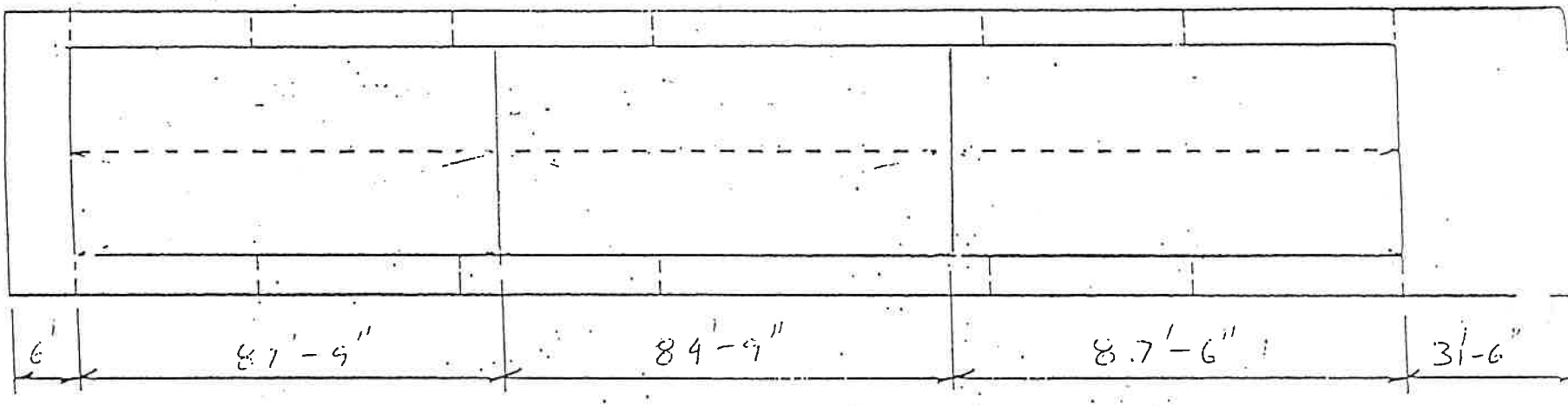
Intact: No	Grounded: No	Damaged: Yes

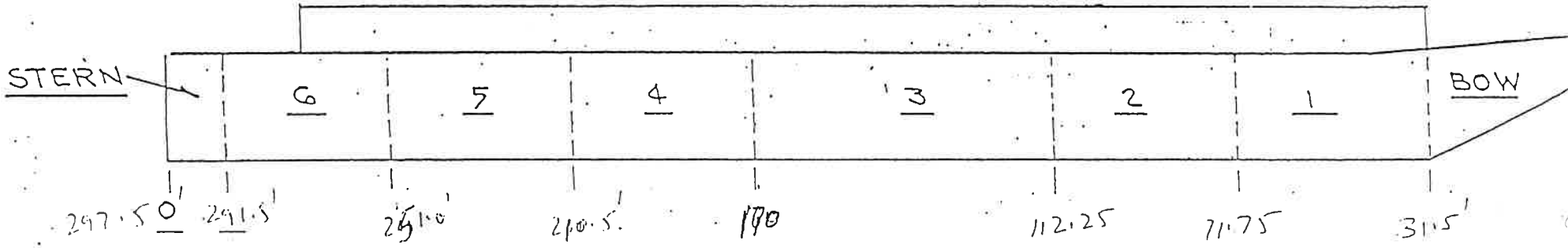
Wave Height:	0.00 Ft	Sea SG:	1.0000
Wave Length:	0.00 Ft	Ship Speed:	0.00 Kt
Crest Location:	0.00 Ft F.P.	Heel:	0.00 ° Port
Encounter Angle:	0.00 ° Port		

Deadweight, Draft and Trim

Deadweight	3719.50	Short Tons
Displacement	4572.50	Short Tons
Longitudinal Center of Gravity	153.09	Feet F.P.
Draft at Fwd Marks	9.32	Feet
Draft at Loadline	9.75	Feet
Draft at Aft Marks	10.17	Feet
Trim by the Stern Between A.P. and F.P.	0.86	Feet

20





HULL VOID LOCATIONS

VOIDS 1 THRU 6 INCLUDE WING TANK P/S AND INNERBOTTOM.

INPUT

Level Trim Hydrostatics

Ship: Tag 96046. Canal Tra
SG Sea: 1.00000
LOA (Ft): 297.50
LBP (Ft): 297.50
AFTXTM (Ft): 0.0

Draft Molded Ft	Keel Ft	Displacement Molded STons	Displacement Extreme STons	WPA Ft²	TPI STons/I	MCT1 STons-F	LCB Ft F.P.	VCB Ft ABL	TCB Ft +Port	LCF Ft F.P.	TCF Ft +Port	ILL Ft^4 abt	KML Ft	ITT Ft^4 abt	KMT Ft
1.000	1.042	438.34	438.34	14401.90	37.38	744.81	167.15	0.50	0.00	164.15	0.00	5367184	6066.01	3499663	249.16
1.100	1.142	483.28	483.28	14455.99	37.52	753.25	166.85	0.56	0.00	163.65	0.00	6332658	5564.30	3512807	226.94
1.200	1.242	528.40	528.40	14520.66	37.69	763.42	166.55	0.61	0.00	163.05	0.00	7496509	5157.82	3528522	208.58
1.300	1.342	573.72	573.72	14574.60	37.83	771.97	166.25	0.66	0.00	162.55	0.00	8475121	4803.64	3541628	192.92
1.400	1.442	619.18	619.18	14617.80	37.94	778.87	165.96	0.71	0.00	162.15	0.00	9264193	4490.75	3552125	179.38
1.500	1.542	664.77	664.77	14661.00	38.05	785.82	165.69	0.76	0.00	161.75	0.00	0057941	4220.03	3562623	167.67
1.600	1.642	710.50	710.50	14704.20	38.16	792.80	165.42	0.81	0.00	161.35	0.00	0856382	3983.52	3573121	157.44
1.700	1.742	756.37	756.37	14747.40	38.28	799.83	165.16	0.86	0.00	160.95	0.00	1659528	3775.15	3583618	148.42
1.800	1.842	802.36	802.36	14790.60	38.39	806.90	164.91	0.91	0.00	160.55	0.00	2467392	3590.18	3594116	140.42
1.900	1.942	848.50	848.50	14833.80	38.50	814.01	164.66	0.96	0.00	160.15	0.00	3279990	3424.91	3604613	133.27
2.000	2.042	894.76	894.76	14877.00	38.61	821.17	164.42	1.01	0.00	159.75	0.00	4097335	3276.36	3615111	126.85
2.100	2.142	941.15	941.15	14909.43	38.70	826.58	164.18	1.06	0.00	159.45	0.00	4714085	3135.40	3622992	120.96
2.200	2.242	987.63	987.63	14941.86	38.78	832.01	163.95	1.12	0.00	159.15	0.00	5333524	3007.46	3630873	115.62
2.300	2.342	1034.22	1034.22	14974.30	38.86	837.46	163.73	1.17	0.00	158.85	0.00	5955658	2890.82	3638754	110.75
2.400	2.442	1080.91	1080.91	15006.66	38.95	842.94	163.51	1.22	0.00	158.55	0.00	6579237	2784.03	3646620	106.29
2.500	2.542	1127.70	1127.70	15039.00	39.03	848.43	163.30	1.27	0.00	158.25	0.00	7204890	2685.90	3654477	102.20
2.600	2.642	1174.59	1174.59	15071.34	39.12	853.94	163.09	1.32	0.00	157.95	0.00	7833239	2595.44	3662334	98.43
2.700	2.742	1221.58	1221.58	15103.70	39.20	859.49	162.89	1.37	0.00	157.65	0.00	8464917	2511.81	3670200	94.95
2.800	2.842	1268.67	1268.67	15136.14	39.28	865.07	162.69	1.42	0.00	157.35	0.00	9100586	2434.28	3678081	91.72
2.900	2.942	1315.86	1315.86	15168.57	39.37	870.68	162.49	1.47	0.00	157.05	0.00	9738985	2362.19	3685962	88.72
3.000	3.042	1363.15	1363.15	15201.00	39.45	876.31	162.30	1.53	0.00	156.75	0.00	0380120	2294.99	3693843	85.92
3.100	3.142	1410.54	1410.54	15226.96	39.52	880.84	162.11	1.58	0.00	156.51	0.00	0895312	2229.37	3700152	83.28
3.200	3.242	1458.00	1458.00	15252.92	39.59	885.40	161.92	1.63	0.00	156.27	0.00	1412263	2167.94	3706460	80.80
3.300	3.342	1505.55	1505.55	15278.88	39.66	889.96	161.74	1.68	0.00	156.03	0.00	1930977	2110.31	3712769	78.48
3.400	3.442	1553.17	1553.17	15304.85	39.72	894.55	161.56	1.73	0.00	155.79	0.00	2451457	2056.14	3719078	76.31
3.500	3.542	1600.89	1600.89	15336.16	39.80	900.09	161.38	1.78	0.00	155.50	0.00	3081628	2007.22	3726687	74.28
3.600	3.642	1648.70	1648.70	15368.50	39.89	905.84	161.21	1.83	0.00	155.20	0.00	3735027	1961.45	3734545	72.38
3.700	3.742	1696.62	1696.62	15400.83	39.97	911.61	161.03	1.88	0.00	154.90	0.00	4391181	1918.20	3742402	70.58
3.800	3.842	1744.63	1744.63	15429.95	40.05	916.84	160.86	1.94	0.00	154.63	0.00	4984398	1876.11	3749478	68.87
3.900	3.942	1792.73	1792.73	15455.85	40.11	921.51	160.69	1.99	0.00	154.39	0.00	5513937	1835.08	3755771	67.24
4.000	4.042	1840.91	1840.91	15481.75	40.18	926.20	160.52	2.04	0.00	154.15	0.00	6045253	1796.14	3762065	65.69
4.100	4.142	1889.17	1889.17	15507.65	40.25	930.91	160.36	2.09	0.00	153.91	0.00	6578351	1759.15	3768358	64.21
4.200	4.242	1937.50	1937.50	15533.57	40.32	935.63	160.19	2.14	0.00	153.67	0.00	7113657	1723.97	3774657	62.82
4.300	4.342	1985.92	1985.92	15559.53	40.38	940.38	160.03	2.19	0.00	153.43	0.00	7651618	1690.48	3780966	61.49
4.400	4.442	2034.43	2034.43	15585.49	40.45	945.15	159.87	2.24	0.00	153.19	0.00	8191377	1658.55	3787274	60.22
4.500	4.542	2083.01	2083.01	15611.45	40.52	949.94	159.71	2.30	0.00	152.95	0.00	8732938	1628.07	3793583	59.02
4.600	4.642	2131.67	2131.67	15637.40	40.59	954.74	159.56	2.35	0.00	152.71	0.00	9276081	1598.94	3799889	57.87
4.700	4.742	2180.41	2180.41	15663.30	40.65	959.54	159.40	2.40	0.00	152.47	0.00	9819943	1571.07	3806182	56.77

BARGE LOADING FOR LEVEL TRIM

23-Jan-01

TAG NO. 96046
CLIENT: Canal, Trail

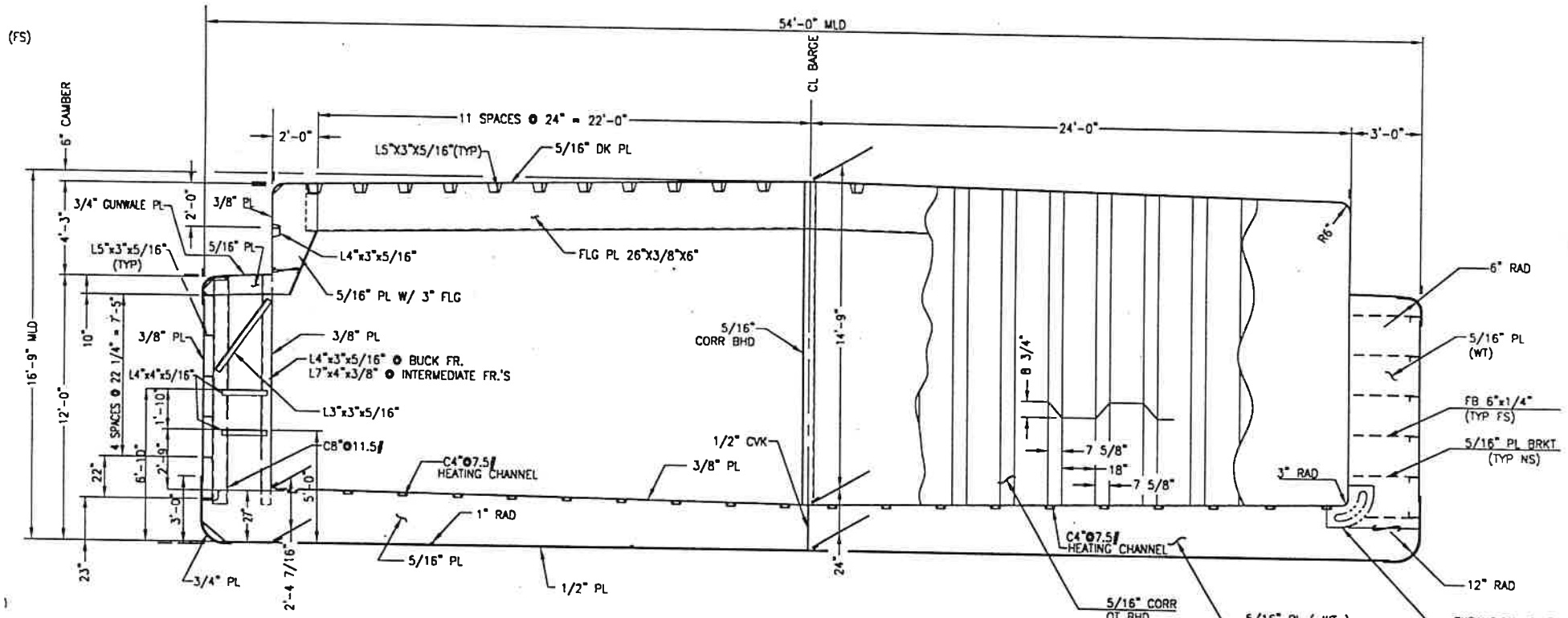
DRAFT = 9.50 Ft

ITEM	WEIGHT Short Ton	LCG FWD OF STERN Ft	LONGITUDINAL MOMENT Ft - ST
DISPLACEMENT	4572.51	143.37	655561
LT SHIP	853	140.25	119633
CARGO DWT	3719.51	144.09	535928

TANK	LENGTH Ft	LCG FWD OF STERN Ft	TONNAGE WITH UNIFORM CARGO DEPTH Short Ton	CARGO DWT MOMENT WITH UNIFORM DEPTH Ft - ST	DELTA LEVER ARM Ft	ADJUSTED VALUES FOR LEVEL TRIM TONNAGE Short Ton	ADJUSTED VALUES FOR LEVEL TRIM LONG'L MOM Ft
TANK #3 P/S	87.75	49.875	1266.3	63156	49.88	997.9	49768
TANK #2 P/S	82.50	135.000	1190.5	160722	67.50	1324.7	178841
TANK #1 P/S	87.50	220.000	1262.7	277791	110.00	1396.9	307318
			...	...	...	...	...
			...	...	...	...	...
			...	...	...	...	...
TOTAL	257.75		3719.5	501669	127.63	3719.5	535928

REQUIRED CARGO DWT MOMENT= 535928 Ft - ST
UNIFORMLY LOADED CARGO DWT MOMENT = 501669 Ft - ST
MOMENT TO SHIFT TO GET LEVEL TRIM = 34259 Ft - ST

TONNAGE TO TRANSFER FROM AFT TO FWD TANKS = 268.43 Short Ton



HALF SECTION @ TRANSV BUCK FRAMES

(LOOKING FWD)

HALF SECTION @ TRANSV BHDS

(LOOKING FWD)

Tag 96046, Canal Trail

Tue Jan 23 14:23 2001

Wastage: 0 %

	Distance Ft F.P.	CSA In^2	Shear Area In^2	Weight STons/Ft	Y Keel Ft	Y Deck Ft	INA In^2-Ft^2
1	60.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
2	80.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
3	100.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
4	120.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
5	148.8	967.3	381.4	1.6458	6.35	10.40	42,483.5
6	160.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
7	180.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
8	200.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
9	220.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
10	240.0	967.3	381.4	1.6458	6.35	10.40	42,483.5
11	260.0	967.3	381.4	1.6458	6.35	10.40	42,483.5