2

TRIBUNAL MARÍTIMO

Anexo C - (continuação)
Processo 19489/01 - P 36
STABILITY BOOK

Representado(s): _____

_____

_____

_____

É CÓPIA FIEL DO DOCUMENTO ORIGINAL

JOSÉ CARLOS FAGUNDES GUSMÃO
DIRETOR
DIVISÃO DE SERVIÇOS CARTORIAIS

AUTUAÇÃO

Aos 09 de março de dois mil e 01 na Secretaria do Tribunal Marítimo autuo os presentes autos.

Do que fiz este termo

Diretor - Geral da Secretaria

CERTIDÃO

CERTIFICO que, nesta data foi juntado o 4º Volume 29 ao anexo 2 - (continuação) do Processo 19489/04 - 2-SF.

O referido é verdade e dou fé.

Aos 09 de abril de 2007.

CÓPIA FIEL DO DOCUMENTO ORIGINAL

JOSÉ CARLOS MENTEL GUSMÃO
DIRETOR
DIVISÃO DE SERVIÇOS CARTORIAIS

NOBLE DENTON

Determination of Lightship

Description	Weight	LCG	TCG	VCG	I_{Tran}	I_{Long}
Liquids						
SW Ballast	-19269.20	51.15	0.71	5.74	3444.6	10976.1
Oils	-261.20	75.91	-4.67	38.11	525.4	227.2
PW, Misc	-311.20	84.31	0.67	25.74	127.8	575.3
Packages	-16.20	89.71	-5.45	49.25	0.0	0.0
Additions	50.53	72.67	9.06	42.38	0.0	0.0
Solids						
Deductions	-941.83	49.98	-4.18	27.45	0.0	0.0
Additions	93.23	71.32	2.54	52.32	0.0	0.0
Displacement	51820.40	57.10	-0.02	20.70	4097.8	11778.6
Lightship	31164.53	60.621	-0.296	29.669		

Summary of Lightship on the 17th October 1999

		(SCPC Predicted)
Lightship	31164.5 Tonnes	31421.4 Tonnes
LCG (Fr Fpp)	60.62 m	60.83 m
TCG (+ve Stbd)	-0.30 m	0.20 m
VCG (Fr USK)	29.67 m	30.07 m

Appendix D

Stability Loading Conditions for the Petrobras 36

NOBLE DENTON

Determination of Lightship

Description	Weight	LCG	TCG	VCG	I_{Tran}	I_{Long}
Liquids						
SW Ballast	-19269.20	51.15	0.71	5.74	3046.3	10703.6
Oils	-261.20	75.91	-4.67	38.11	0.0	0.0
PW, Misc	-292.50	84.45	0.57	25.38	127.8	575.3
Packages	-16.20	89.71	-5.45	49.25	0.0	0.0
Additions	50.53	72.67	9.06	42.38	0.0	0.0
Solids						
Deductions	-941.85	40.78	-4.18	28.37	0.0	0.0
Additions	93.86	70.48	3.70	52.21	0.0	0.0
Displacement	51820.40	57.10	-0.02	20.68	0.0	0.0
Lightship	31183.83	60.910	-0.291	29.609	3174.1	11278.9

Summary of Lightship on the 17th October 1999

Lightship	31183.83 Tonnes
LCG (Fr Fpp)	60.910 m
TCG (+ve Stbd)	-0.291 m
VCG (Fr USK)	29.609 m

By: Checked

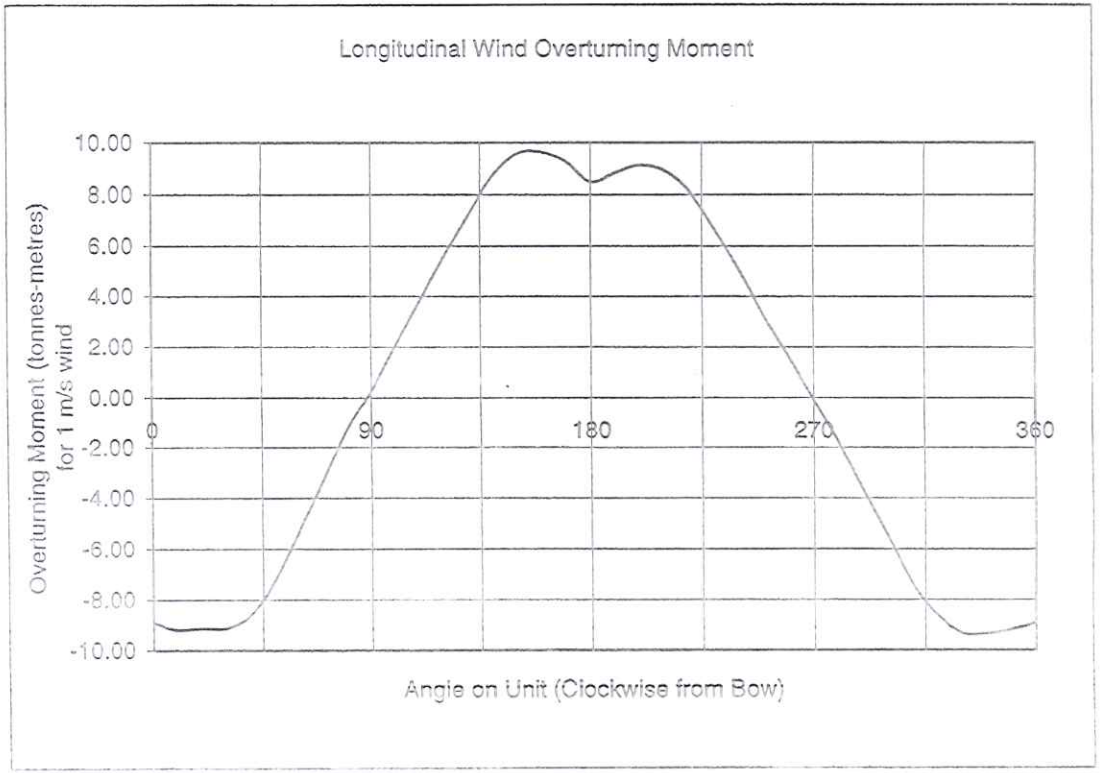
Appendix E

Explanation of Wind Correction Calculations

Effect Wind Overturning Moment on Inclining t Results

NOB DENTON

PSI [deg]	Long. Force [tonnes]	VCofW Keel	VCB [metres]	Long. OTM [tonne-m]
0	-0.235	45.82	7.92	-8.91
10	-0.243	45.82	7.92	-9.20
20	-0.241	45.82	7.92	-9.13
30	-0.241	45.82	7.92	-9.13
40	-0.228	45.82	7.92	-8.62
50	-0.191	45.82	7.92	-7.25
60	-0.140	45.82	7.92	-5.32
70	-0.089	45.82	7.92	-3.35
80	-0.035	45.82	7.92	-1.32
90	0.006	45.82	7.92	0.23
100	0.053	45.82	7.92	2.01
110	0.099	45.82	7.92	3.75
120	0.146	45.82	7.92	5.54
130	0.189	45.82	7.92	7.16
140	0.229	45.82	7.92	8.69
150	0.252	45.82	7.92	9.56
160	0.254	45.82	7.92	9.64
170	0.245	45.82	7.92	9.27
180	0.224	45.82	7.92	8.48
190	0.233	45.82	7.92	8.84
200	0.241	45.82	7.92	9.13
210	0.235	45.82	7.92	8.91
220	0.214	45.82	7.92	8.12
230	0.176	45.82	7.92	6.67
240	0.133	45.82	7.92	5.05
250	0.085	45.82	7.92	3.20
260	0.043	45.82	7.92	1.63
270	-0.002	45.82	7.92	-0.09
280	-0.047	45.82	7.92	-1.80
290	-0.097	45.82	7.92	-3.69
300	-0.145	45.82	7.92	-5.51
310	-0.195	45.82	7.92	-7.39
320	-0.228	45.82	7.92	-8.62
330	-0.247	45.82	7.92	-9.35
340	-0.247	45.82	7.92	-9.35
350	-0.243	45.82	7.92	-9.20
360	-0.235	45.82	7.92	-8.91



1. The Unit longitudinal wind force coefficients have been extracted from the Force and Motion Analysis Report. (The transverse wind loads do not affect the inclining moments and can therefore be ignored).
2. The longitidinal overturning moment calculated in the table on the left is for a wind speed of 1 m/s, thus this number is mulitplied by the square of the corrected wind speed.
3. No account has been taken of the horizontal faces that become exposed as the vessel is inclined. For angles less than 1 degree this is negligible.
4. The point of rotation is considered to be the vertical centre of buoyancy of the unit.
5. The wind speeds recorded onboard the P36 during the inclining test are considered as 1 minute mean and have been corrected for height using the DNV formula

$$V_{wind}(h) = V_R \cdot \left[\frac{h}{V_R}\right]^{0.09}$$ where V = wind speed in m/s

Appendix F

Site Calculations

NOBLE DENTON

Ship Data

Length Between Perpendiculars (Fr 74 - Fr 0)	LBP:	112.776 m
Breadth Between Pontoons at Ends	BP:	77.75 m
Height to Main Deck at Centreline	DM:	42.980 m
Breadth of Deck	BD:	68.580 m

Data of Inclining Test

Date of Experiment	*Sunday 17th October 1999*			
Place of Test	*Sept Îles, Canada*			
Start of Test	*1130hrs*			
Finish of Test	*0010hrs*			
Wind	Speed	*4.5* m/s	Hdg (T):	*0* Deg
Tide	Speed:	*0* m/s	Hdg (T):	*0* Deg
Waves/Swell	HS:	*0.15* m	Hdg (T):	*0* Deg
Mean Water Density	$\rho_{sea\ water}$	*1.0255* tonnes/m^3		

Unit Status

Location of Unit	*50°11.14N*	66°27.8W	Unit Heading (T):	*321°*
Movable Weights	*Free Hanging*		Water Depth	*32.00 m*
Situation of Bilges	*Clean*			
Mooring Anchors	*Slackened*			
Mooring Ropes	*None*			

By: Checked

In ing Test Results & Determination of GM Flu without Wind)

NOBLE DENTON

Pendulum Lengths	P1	P2	P3
	17665	19677	19595

Δ (MT)	51820.4 Tonnes

		Weight Shift	Shift from Origin (mm)	Tangent *1000	Mean Tangent *1000	Shifted Weight (tonnes)	Lever Arm (m)	Heeling Moment (tonne - m)	Moment Causing Trim (tonne-m)	GM Fluid (m)
1st Shift	P1	A-F	147.0	8.322	8.342	17.49	78.49	1372.8	2932.1	6.783
	P2		165.0	8.385		26.71	58.37	1559.2		
	P3		163.0	8.318						
2nd Shift	P1	A-F	311.5	17.634	17.600	49.48	67.17	3323.5	6255.6	6.859
	P2		346.0	17.584						
	P3		344.5	17.581						
3rd Shift	P1	F-A	170.0	9.624	9.616	17.49	-78.49	-1372.8	3323.5	6.670
	P2		189.0	9.605		26.71	-58.37	-1559.2		
	P3		188.5	9.620						
4th Shift	P1	F-A	7.0	0.396	0.387	49.48	-67.17	-3323.5	0.0	-
	P2		8.0	0.407						
	P3		7.0	0.357						
5th Shift	P1	F-A	-126.0	-7.133	-7.233	15.92	-78.49	-1249.1	-2690.9	7.180
	P2		-143.0	-7.267		24.70	-58.37	-1441.7		
	P3		-143.0	-7.298						
6th Shift	P1	F-A	-303.5	-17.161	-17.202	53.07	-67.17	-3564.4	-6255.3	7.017
	P2		-339.0	-17.228						
	P3		-337.0	-17.198						
7th Shift	P1	A-F	-174.5	-9.878	-9.964	15.92	78.49	1249.1	-3564.4	6.903
	P2		-197.0	-10.012		24.70	58.37	1441.7		
	P3		-196.0	-10.003						
8th Shift	P1	A-F	7.0	0.396	0.319	53.07	67.17	3564.4	0.0	-
	P2		6.0	0.305						
	P3		5.0	0.255						
										6.902

NOBLE DENTON

Determination of Displacement After 4th Shift

Average Water Density in Test Place 1.0255 tonnes/m³
Length Between Perpendiculars (LBP) = 112.776 m
Distance Between Draft Marks (LM) = 79.25 m (See sketch attached)

DRAFTS FROM U.S.K. (metres)

	Aft	Midships	Fore
Starboard	18.860	18.940	18.920
Port	18.870	18.950	18.950
Average	18.865	18.945	18.935
	(Taft)	(Tmid)	(T_{Fwd})

Draft calculations on perpendiculars

C1, C2, C3 values *
*(see sketch attached)

$T_{AP} = T_{aft} + C1*(T_{aft}-T_{fwd})/Lm$ T_{AP} = 18.85 m C1 = 16.76 m

$T_{\otimes} = T_{mid} - C2*(T_{aft}-T_{fwd})/Lm$ $T_{\otimes}$ = 18.95 m C2 = 0.70 m

$T_{FP} = T_{fwd} - C3*(T_{aft}-T_{fwd})/Lm$ T_{FP} = 18.95 m C3 = 16.76 m

Average Draft from USK:	$T_{MEAN} = (T_{AP} + 4*T_{\otimes} + T_{FP})/6$	18.93 m
Draft Correction of SW Density	$T'_{MEAN} = T_{MEAN}*(SW_{actual}/1.025)$	18.94 m
Unit's Trim	Trim = $T_{fwd} - T_{aft}$	-0.10 m
Longitudinal Centre of Flotation	LCF (from ⊗) =	-0.04 m
Layer Correction	t = LCF/LBP x Trim	0.000 m
Draft at LCF (inc Layer Correction)	Draft at LCF (T'_{LCF})	18.940 m
Displacement (at Draft T'_{LCF})	Displacement (Δ)=	51820.4 Tonnes

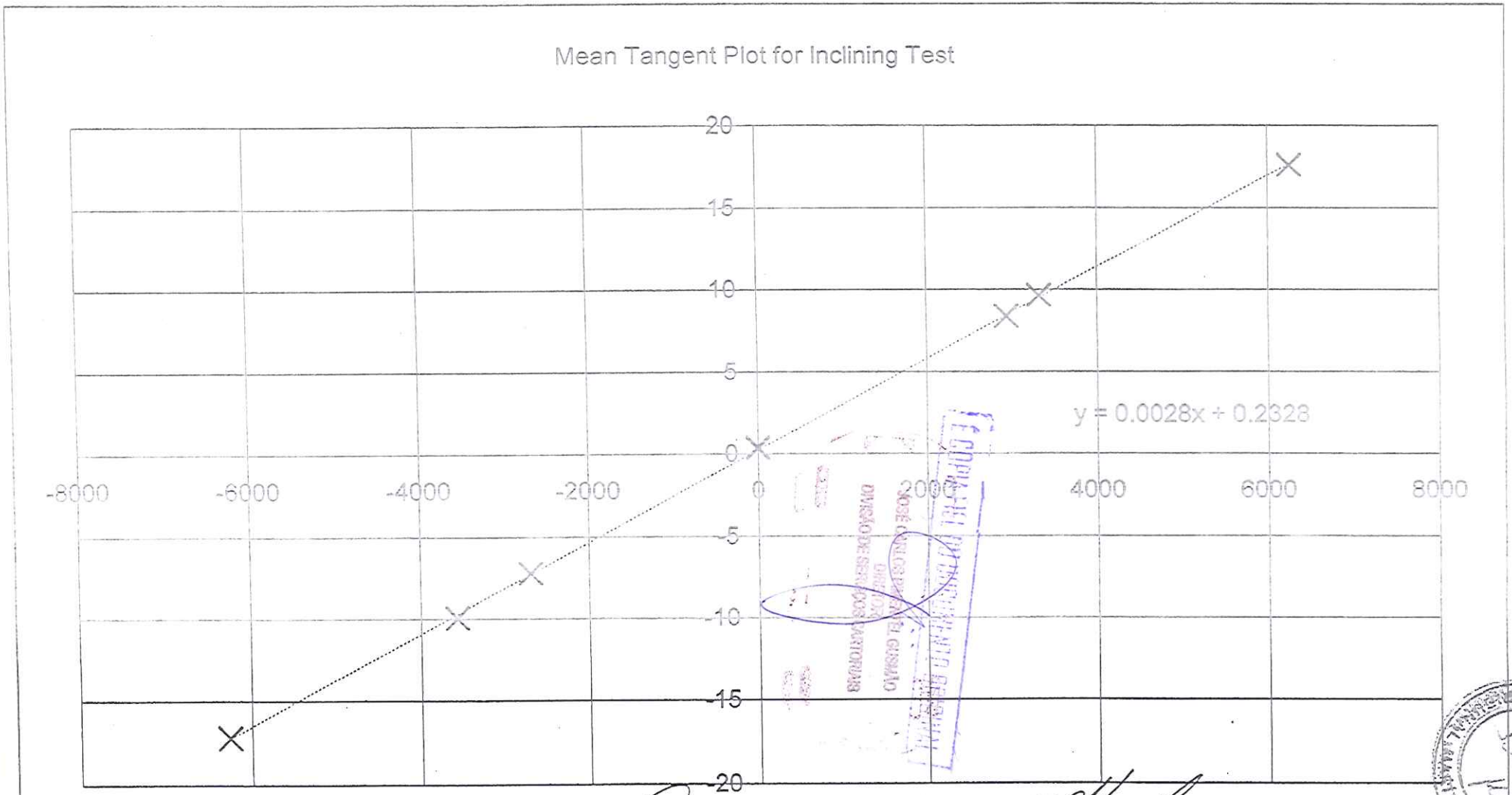
Hydrostatic Properties of Unit

DRAFT (m)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)
18.94	51820.4	-0.72	-0.02	7.92	1485.1	-0.04	-0.04	27.30	27.80

By: Checked

NOBLE DENTON

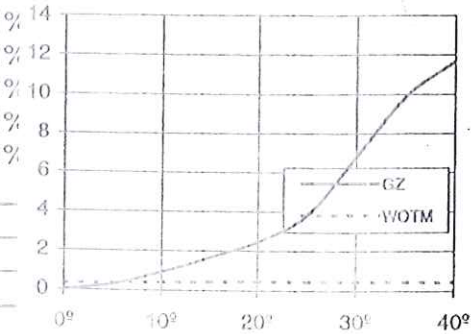
Graphical Control Results & Centre of Gravity



NOBLE DENTON

Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%TCG rom CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99%-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99%0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	1%0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	76%0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	1%-3.5	39.0	0.001	0.000
SW Ballast 3S	728.7	1.025	1%6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	99%-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	99%6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1%4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1%0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1%8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	1%5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	62%11.7	43.7	0.005	0.014
SW Ballast 7S	555.2	1.025	1%1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	1%0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	1%2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	1%0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	5%0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1%1.88	5.33	0.012	0.041
SW Ballast 16S	249.7	1.025	1%			
SW Ballast 17P	523.9	1.025	1%0.02	24.12	0.017	0.056
SW Ballast 17S	523.9	1.025	1%			
SW Ballast 18P	555.2	1.025	1%ical Stability			
SW Ballast 18S	555.2	1.025	1%			
SW Ballast 19P	728.8	1.025	1%rected VCG =		24.14 m	24.18 m
SW Ballast 19S	728.8	1.025	1%T / KML =		27.60 m	28.10 m
SW Ballast 20P	768.2	1.025	1%T / GML =		3.46 m	3.92 m
SW Ballast 20S	768.2	1.025	1%			
SW Ballast 21P	963.7	1.025	1%ility Margin			
SW Ballast 21S	963.7	1.025	1%			
SW Ballast 22P	1067.3	1.025	1%wable VCG =			25.23 m
SW Ballast 22S	1067.3	1.025	1%ility Margin =			1.05 m
SW Ballast 23P	665.6	1.025	1%			
SW Ballast 23S	665.6	1.025	1%			
SW Ballast 24P	980.8	1.025	1%			
SW Ballast 24S	980.8	1.025	1%			
SW Ballast 25P	665.6	1.025	1%			
SW Ballast 25S	665.6	1.025	1%			
SW Ballast 26P	980.8	1.025	1%			
SW Ballast 26S	980.8	1.025	1%			
SW Ballast Total						

Righting Arm & Overturning Arm Curve



	BY
Prepared	
Checked	

NOBLE DENTON

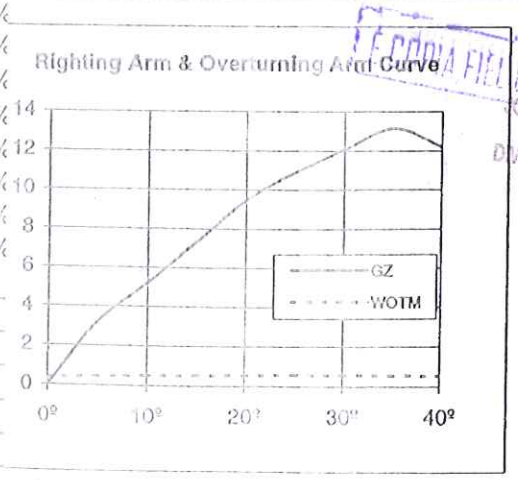
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	TCG rom CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99%	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99%	0.0	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	1%	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	1%	1.7	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	1%	-3.6	39.1	0.001	0.000
SW Ballast 3S	728.7	1.025	1%	-1.6	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	1%	-6.1	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	21%	-9.0	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	1%	1.4	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1%	-0.6	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	1%	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	1%	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	87%	0.0	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	99%	0.0	0.0	-	-
SW Ballast 11P	644.7	1.025	1%	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	1%	0.0	0.0	-	-
SW Ballast 13P	644.7	1.025	1%	0.0	12.2	0.000	0.000
SW Ballast 13S	644.7	1.025	1%	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1%	2.53	5.39	0.007	0.071
SW Ballast 16S	249.7	1.025	1%				
SW Ballast 17P	523.9	1.025	1%	0.02	26.99	0.010	0.072
SW Ballast 17S	523.9	1.025	1%				
SW Ballast 18P	555.2	1.025	1%				
SW Ballast 18S	555.2	1.025	1%				
SW Ballast 19P	728.8	1.025	1%				
SW Ballast 19S	728.8	1.025	1%				
SW Ballast 20P	768.2	1.025	1%				
SW Ballast 20S	768.2	1.025	1%				
SW Ballast 21P	963.7	1.025	1%				
SW Ballast 21S	963.7	1.025	1%				
SW Ballast 22P	1067.3	1.025	1%				
SW Ballast 22S	1067.3	1.025	1%				
SW Ballast 23P	665.6	1.025	1%				
SW Ballast 23S	665.6	1.025	1%				
SW Ballast 24P	980.8	1.025	1%				
SW Ballast 24S	980.8	1.025	1%				
SW Ballast 25P	665.6	1.025	1%				
SW Ballast 25S	665.6	1.025	1%				
SW Ballast 26P	980.8	1.025	1%				
SW Ballast 26S	980.8	1.025	1%				
SW Ballast Total							

ical Stability

rected VCG =	27.00 m	27.06 m
T / KML =	70.50 m	109.20 m
T / GML =	43.50 m	82.14 m

ility Margin

wable VCG =	44.90 m
ility Margin =	17.84 m



	BY
Prepared	
Checked	

NOBLE DENTON

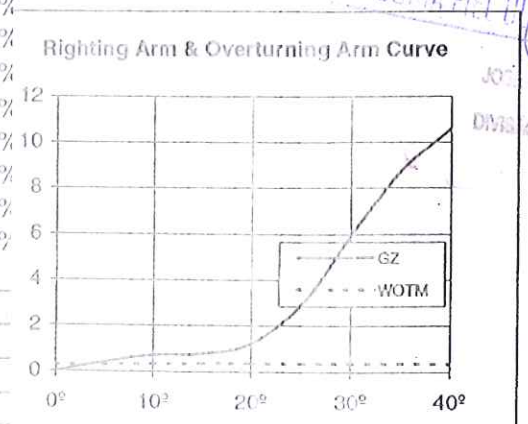
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%FCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99%-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99%0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	99%0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99%0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	1%-3.5	39.0	0.000	0.000
SW Ballast 3S	728.7	1.025	1%6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	99%-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	99%6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1%4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1%0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1%8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	47%5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99%11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	1%1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99%0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99%2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	99%0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99%0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1%0.80	5.42	0.007	0.055
SW Ballast 16S	249.7	1.025	1%			
SW Ballast 17P	523.9	1.025	31%0.02	22.11	0.012	0.069
SW Ballast 17S	523.9	1.025	1%			
SW Ballast 18P	555.2	1.025	99%			
SW Ballast 18S	555.2	1.025	99%			
SW Ballast 19P	728.8	1.025	1%			
SW Ballast 19S	728.8	1.025	1%			
SW Ballast 20P	768.2	1.025	1%			
SW Ballast 20S	768.2	1.025	92%			
SW Ballast 21P	963.7	1.025	1%			
SW Ballast 21S	963.7	1.025	1%			
SW Ballast 22P	1067.3	1.025	1%			
SW Ballast 22S	1067.3	1.025	1%			
SW Ballast 23P	665.6	1.025	1%			
SW Ballast 23S	665.6	1.025	1%			
SW Ballast 24P	980.8	1.025	1%			
SW Ballast 24S	980.8	1.025	1%			
SW Ballast 25P	665.6	1.025	1%			
SW Ballast 25S	665.6	1.025	1%			
SW Ballast 26P	980.8	1.025	1%			
SW Ballast 26S	980.8	1.025	1%			
SW Ballast Total						

ical Stability

rected VCG =	22.12 m	22.18 m
T / KML =	26.80 m	27.20 m
T / GML =	4.68 m	5.02 m

bility Margin

wable VCG =	23.04 m
bility Margin =	0.86 m



	BY
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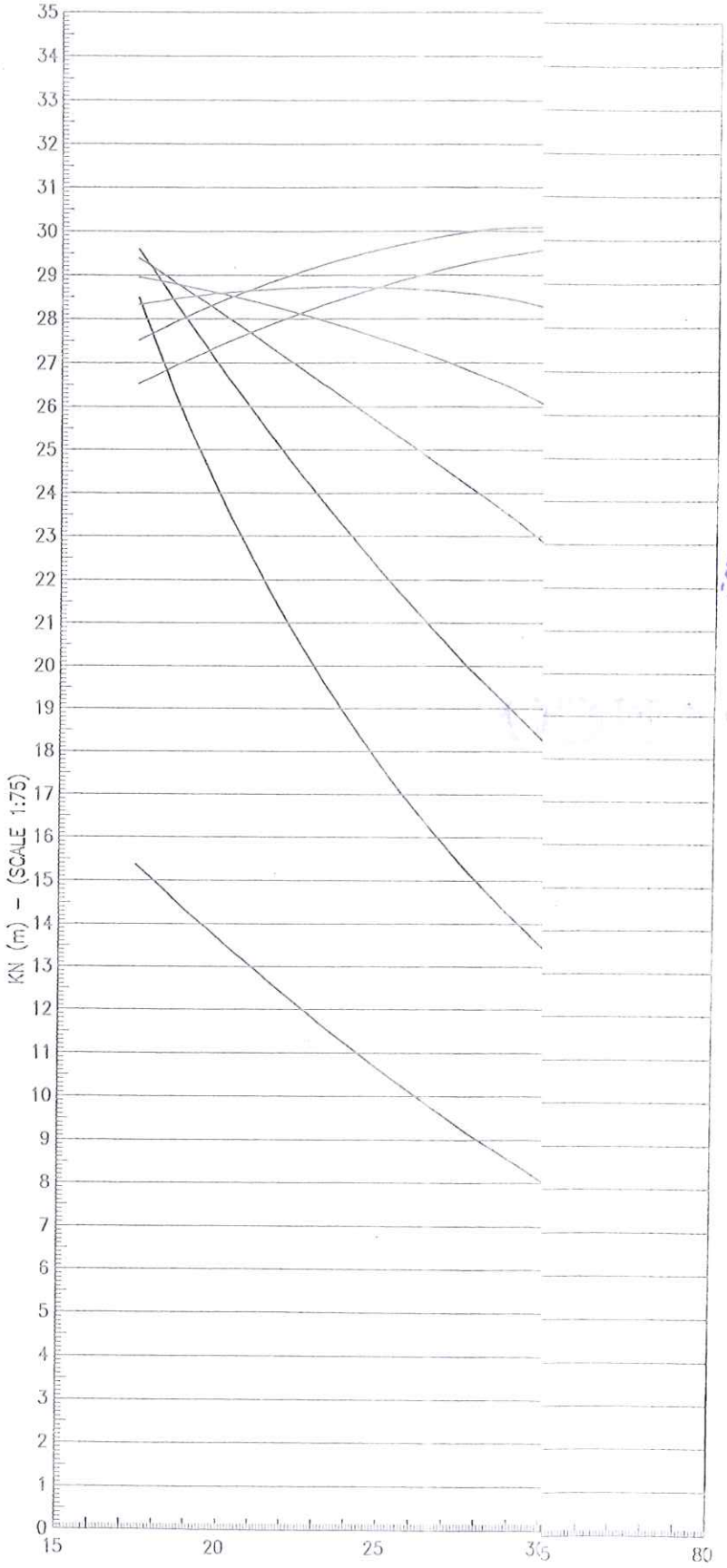
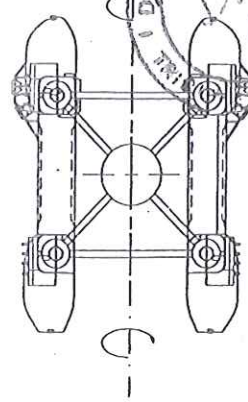
Checked	

7.16 CROSS CURVES OF STABILITY





ROLL AXIS

DRAWING NUMBER	DRAWING TITLE
DE-3010.98-1320-941-NBD-370-01	HYDROSTATIC CURVES
DE-3010.98-1320-941-NBD-371-03	CROSS CURVES OF STABILITY FOR 0/7 ROLL AXIS
DE-3010.98-1320-941-NBD-371-02	CROSS CURVES OF STABILITY FOR 45° ROLL AXIS

REFERENCE DRAWINGS

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
A	25.01.99	A.F.C.	SCE	MSE	AT	
0	10/97	I.D.C.	SCE	MSE	MSE	

BR PETROBRAS

P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

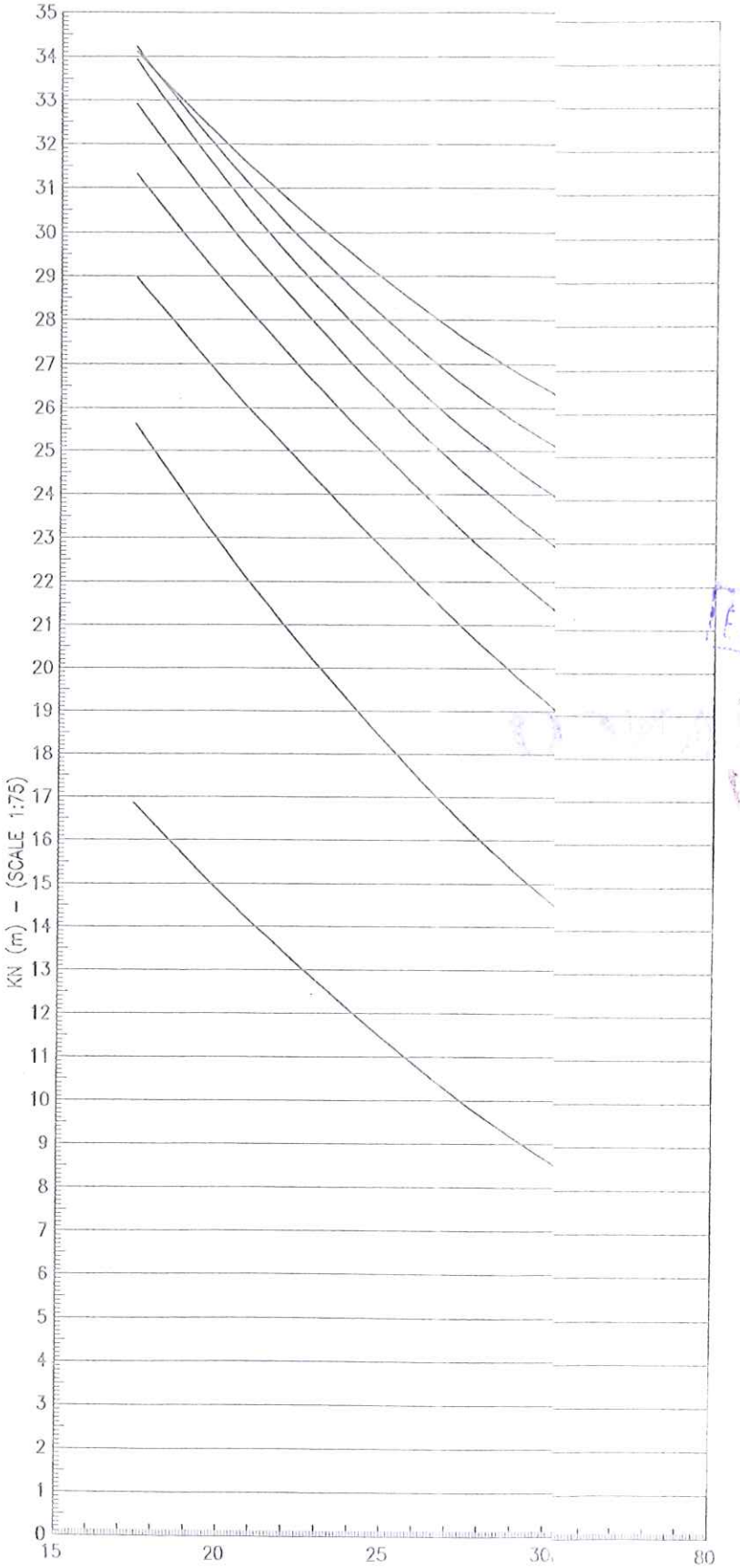
NOBLE DENTON | Petromec | AMEC

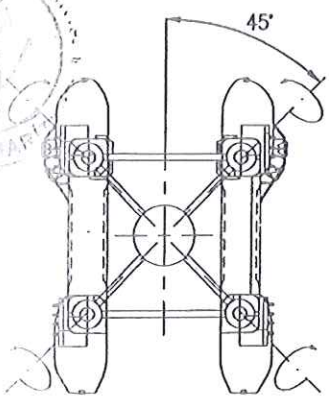
TITLE

CROSS CURVES OF STABILITY
FOR 0 DEG ROLL AXIS
FOR UNIT PETROBRAS 36

DRAWN/DATE: SCE/OCT.97
CHECKED/DATE: MSE/24.3.99
APPROVED/DATE: AT/24.3.99
SCALE: AS NOTED (A1)

DRAWING NUMBER: DE-3010.98-1320-941-NBD-371-01
REV: A





ROLL AXIS

DRAWING NUMBER	DRAWING TITLE
DE-3010.38-1320-941-NBD-370-01	HYDROSTATIC CURVES
DE-3010.38-1320-941-NBD-371-03	CROSS CURVES OF STABILITY FOR 90° ROLL AXIS
DE-3010.38-1320-941-NBD-371-01	CROSS CURVES OF STABILITY FOR 0° ROLL AXIS

REFERENCE DRAWINGS

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
A	25.01.99	A.F.C.	SCE	MSE	AT	
0	10/97	I.D.C	SCE	MSE	MSE	

BR PETROBRAS

P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

TITLE

CROSS CURVES OF STABILITY
FOR 45 DEG ROLL AXIS
FOR UNIT PETROBRAS 36

DRAWN/DATE: SCE/OCT.97
CHECKED/DATE: MSE/24.3.99
APPROVED/DATE: AT/24.3.99
SCALE: AS NOTED (A1)

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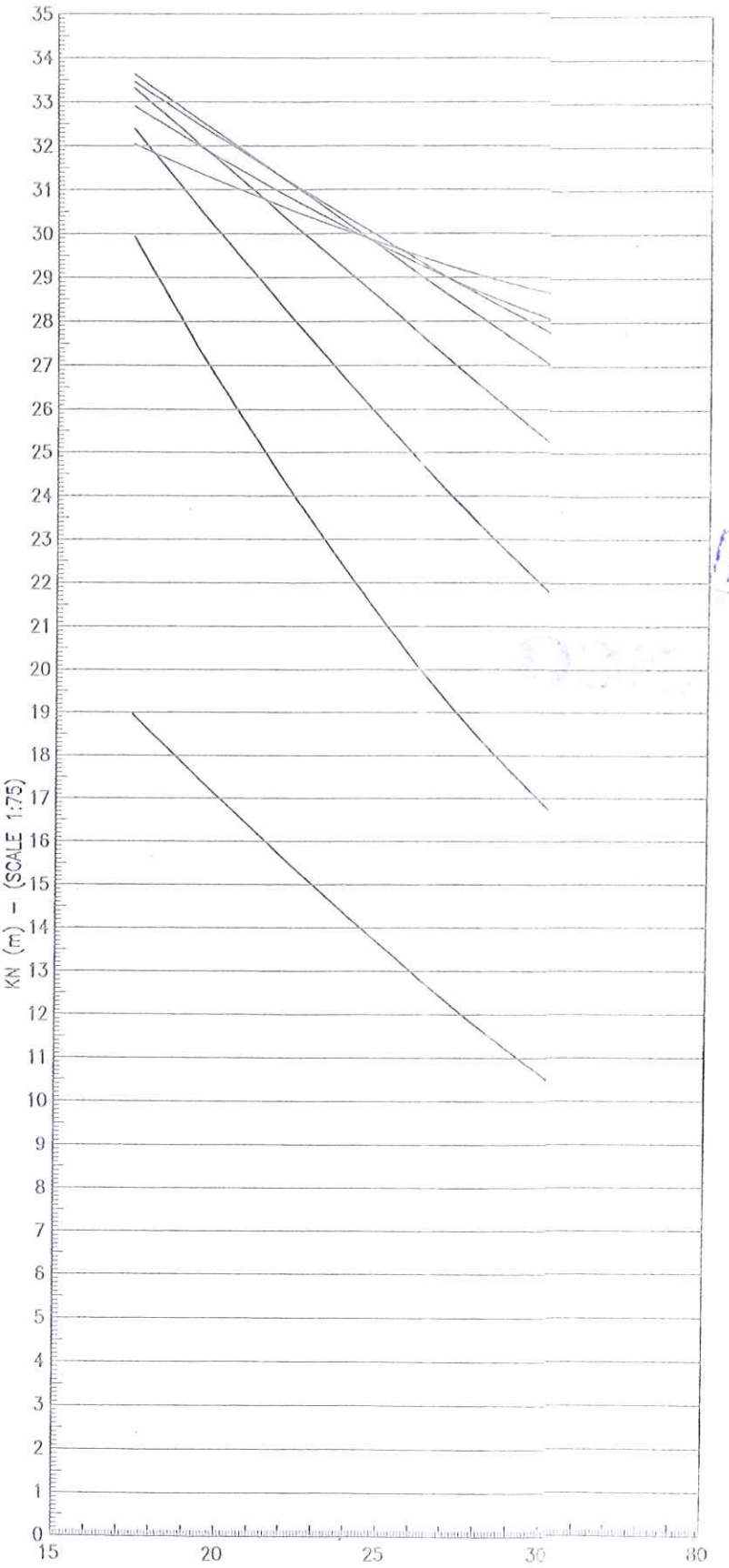
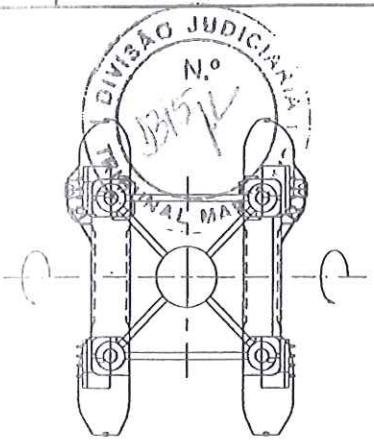
REV: A





ROLL AXIS

DRAWING NUMBER	DRAWING TITLE
DE-3010.38-1320-941-NBD-370-01	HYDROSTATIC CURVES
DE-3010.38-1320-941-NBD-371-02	CROSS CURVES OF STABILITY FOR 45° ROLL AXIS
DE-3010.38-1320-941-NBD-371-01	CROSS CURVES OF STABILITY FOR 0° ROLL AXIS

REFERENCE DRAWINGS

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
A	25.01.99	I.F.C.	SCE	MSE	AT	
0	10/97	I.D.C	SCE	MSE	MSE	

BRASOIL

P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

TITLE

CROSS CURVES OF STABILITY
FOR 90 DEG ROLL AXIS
FOR UNIT PETROBRAS 36

DRAWN/DATE: SCE/OCT.97
CHECKED/DATE: MSE/24.3.99
APPROVED/DATE: AT/24.3.99
SCALE: AS NOTED (A1)

DRAWING NUMBER: DE-3010.38-1320-941-NBD-371-03
REV: A

7.12 STABILITY ANALYSIS - RINA (1999)

AMEC Process and Energy

NOBLE DENTON

P36 - RONCADOR FIELD DEVELOPMENT

Contract No: 7/15/2151

Document No. RL-3010.38-1320-960-NBD-908	Issue: C	Page: 1 of 204

Document Title:

STABILITY ANALYSIS

Issue Rev	Issue or Revision Description	Orig. By	Date	Ch'kd By	Date	App'd By	Date	App'd By	Date
C	Final		1.12.99		1.12.99		1.12.99		
B	Revised AFD	MSE	15.3.99	AT	15.3.99	AT	15.3.99		
A	Approved for Design	MSE	11/9/97	DHL	11/9/97	AT	11/9/97		
O	Issued for IDC	MSE	30/7/97	AT	31/7/97	AT	31/7/97		
		NDE						PETROMEC	

REVISION CHANGE NOTICES

Rev.	Location Changes	Brief Description of Change
A	All Areas	Report updated to reflect comments by Petrobras (COM-P36-NO21/97) and substantial increase in weight/vcg leading to a new hull envelope.
B	All Areas	Re-analysis as a result of re-location and change in anchoring system, addition of Production Caisson; change of export risers to SCRs. GENSTAB Model updated to reflect structural additions; Allowable VCG Curves updated; loadcases derived as per Brasoil Memo(Ref 9); Additional loadcases removed for inclusion in Operations Manual; ballast sequences also removed for inclusion in Operations Manual.
C	Section 6.2 Appendix F Appendix G Appendix K Addendum 4	Riser Loading Table Revised Revised for new lightship weight Revised loading condition VCG's plotted Revised for new lightship weight New Addendum.

CONTENTS

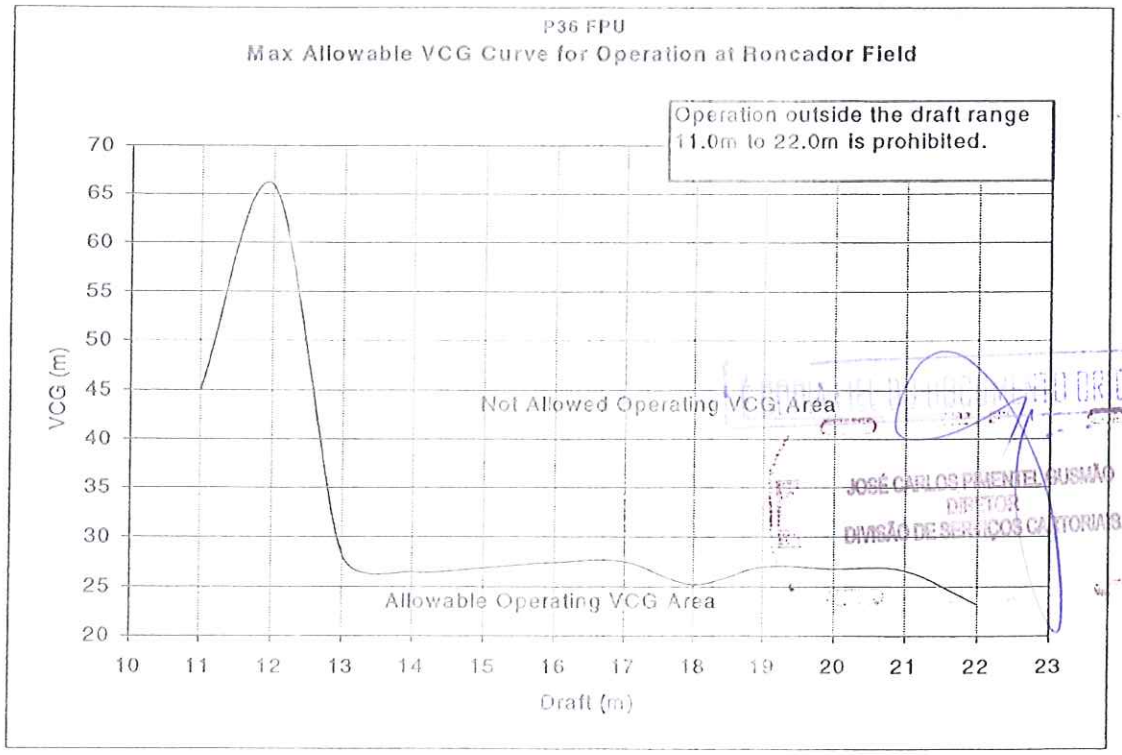
SECTION PAGE NO.

1 SUMMARY

The P36 (formerly the Spirit of Columbus) is upgraded for production operations in the Roncador Field. To accommodate the additional equipment and fluids, the hull of the P36 has required modification.

A stability analysis of the modified P36 FPU has been performed in accordance with the RINa rules for *Column Stabilised Units* (Ref. 6) and IMO MODU Code 1991 (Ref 8). Three drafts corresponding to 22.0m, 18.0m, 11.0m have been analysed and show that after the unit has been modified and subdivided it meets all stability requirements and has an adequate positive stability margin.

Draft	Assumed KG	GMT_{corr} / GML_{corr}	Allowable VCG Range	Limiting Condition
22.00	22.41	4.37/4.69	23.04	Damaged Stability
18.00	24.56	3.03/3.37	25.23	Damaged Stability
11.00	27.08	44.31/82.17	44.90	Damaged Stability



2 INTRODUCTION

The semi-submersible unit P36 (hereinafter referred to as the Unit) is upgraded for production duties offshore Brazil in the Roncador Field. The average water depth at this location is 1362 m. Following revisions to the reservoir and seabed characteristics the Unit has been relocated and a number of appendages added (Ref 9). Therefore a re-assessment of the Unit's stability is required.

The Stability Analysis has been performed in accordance with RINa Rules (Ref. 6), Brasoil Naval Design Premise (Ref. 2) and the IMO MODU Code (Ref.8).

3 REFERENCE DOCUMENTS

1	ET-3010.56-1200.941-PPC-001	Metocean Data
2	ET-3010.38-1200-940-PPC-001	Naval Design Premise
3	RL-3010.38-1320-960-NBD-904	Force and Motion Analysis Rev D
4	---	F&G Stability Report For Spirit of Columbus
5	ET-3010.38-1200-940-PPC-001	General Technical Specifications (Annex X: Deviations to Design)
6	Registro Italiano Navale	Rules for the Classification of Mobile Offshore Drilling Units and other similar units
7	RL-1320-915-NBD-903-01	Weight Control Report (Jan 99, Rev R)
8		International Maritime Organisation Code for the Construction and Equipment of Mobile Offshore Drilling Units 1989 & 1991 Amendments
9	Brasoil Memorandum (23/6/98)	Modifications Due to New Reservoir Data

4 CHARACTERISTICS OF UNIT

Length Overall	112.776 m
Width Overall	77.724 m
Elevation to Main Deck	42.672 m
Elevation to U/S Tank	35.052 m
Elevation to Spider Deck	29.250 m
Main Deck Length (inc. Ext.)	83.104 m
Main Deck Width	70.580 m
Pontoon Length	112.776 m
Pontoon Width	14.110 m
Pontoon Height outboard/inboard of columns	12.192 /9.144 m
Column Width	13.716 m
Transverse Distance between Columns	54.864 m
Longitudinal Distance Between Columns	56.388 m
Transit Draft	11.0 m
Transit Displacement	37083 tonnes
Inspection Draft	18.0 m
Inspection Displacement	50390 tonnes
Operational/Survival Draft	22.0 m
Operational/Survival Displacement	56503 tonnes

5 ANALYSIS METHODOLOGY

Stability analysis of the P36 was performed using the Noble Denton in-house software, GENSTAB Suite. Features of the program include:

GZ curves, Area ratios, Allowable KGs, Downflood angles and Angles of wind intercepts.

The analysis was carried out in accordance with RINa and Brasoil stipulated requirements (ref. 2).

5.1 GENSTAB MODEL

A computer model of the P36 was created using the as-built lightship as a base model (the verification of this model is in Appendix B). Lightship modifications include upper, lower and lateral extension of fairlead boxes (see drawings in Appendix A); a floored central caisson, pontoon stability boxes, pontoon, forward and SCR riser supports, chain pipes, sea water lift and disposal caissons, and the new production caisson. Further individual tanks have been modelled in order to assess damage to the unit.

Plots in Appendix A show the modified Unit. Appendix A also shows model axes, heel axes and wind axes for the unit.

5.2 HYDROSTATICS

(Ref. Brasoil NDP sect. 5 sheet 3/13)

Hydrostatic data produced by GENSTAB is attached in Appendix C. This includes:

Displacement, LCB, TCB, VCB, WPA, LCF, TCF, KMT, KML, TPC, MCTC & MCHC.

The last two values are reported as a function of the Metacentric Height GM.

5.3 STABILITY ANALYSIS

5.3.1 Wind Overturning Moments (WOTM)
(Ref. RINa 3.3.2/3.3.3)

Calculations for WOTM have been carried out over a range of heel angles from 0 to 40 degrees in 2.5° intervals. The projected horizontal and vertical wind areas have been calculated based on DMI model test data for projected beam and bow areas and modified according to the additional areas.

In calculating wind forces, the following procedures were taken:

- The projected areas of all columns was included; i.e. no shielding allowances were made
- The block projected area of a clustering of deckhouses was used in lieu of the calculation of each individual area
- For wind heeling moments, the levers of the wind overturning force were taken vertically from the centre of pressure of all surfaces exposed to the wind to the centre of lateral resistance or, when available, the centre of hydrodynamic pressure

Horizontal and vertical areas for a specific heel axis can be combined to produce a WOTM curve for range of heel axes using the following equation:

$$GZ_{\omega} = GZ_V \cos^2\omega + GZ_H \sin\omega \cos\omega$$

Once WOTM curves have been produced for bow and beam winds, the GENSTAB software can interpolate to create WOTM curves for a variety of heel axes. For this it uses the API-RP-2SK equation 'A.5':

$$F_\phi = F_x \left[\frac{2\cos^2\phi}{1+\cos^2\phi} \right] + F_y \left[\frac{2\sin^2\phi}{1+\sin^2\phi} \right]$$ where

F_ϕ = force due to oblique movement
F_x = force on bow due to a bow environment
F_y = force on beam due to beam environment
ϕ = direction of approaching environment (degree off bow)

5.3.2 Loading conditions (Ref. Brasoil NDP sect. 4 sheet 2/13)

There are two main groups for the consideration of loading conditions:

- Lightship of Unit
- Variable load

The original lightweight is updated to consider all modifications in the platform. The latest modified lightship condition has been extracted from the January 1999 weight control report (Revision R - Ref. 7).

The variable loads consider:

- All the related items presented in the Operations Manual with the required modifications
- Risers vertical loads
- Mooring lines vertical tension
- Mooring + miscellaneous loads on board
- Operational and Process Related Liquids
- Crew and Stores
- Sea Water Ballast

The following loading conditions have been considered in the stability analysis. These are used purely for the determination of the allowable VCG values.

Draft (m)	Condition	Displacement (tonnes)	LCG from FP (m)	TCG to Port (m)	VCG from Keel (m)
22.0 m	Operating/Survival	56503	57.05	0.03	22.41
18.0 m	Inspection of Fairleads	50390	57.12	0.03	24.56
11.0 m	Transit	37083	57.18	0.02	27.08

A detailed breakdown of variable loads and loading conditions is contained in Appendix D.

5.3.3 Environmental conditions

For the intact stability storm condition analysis, the operational wind speed to be considered is the 100 year extreme 1 minute mean in accordance with Brasoil NDP. For temporary and damage stability conditions, a wind velocity of 50 knots is considered. The table below summarises the wind speeds used to assess the intact and damaged stability conditions. The wind data extracted from the Metocean Report (Ref. 1) is shown in Appendix E.

Draft	Intact Wind Speed (m/s)	Damaged Wind Speed (m/s)
22.0	41.70	25.7
18.0	41.70	25.7
11.0	35.0	25.7

5.3.4 Intact stability

The intact analysis is performed for 3 drafts (22, 18, and 11 metres). Environmental headings for the range: 0 to 180 degrees in 10 degree increments are investigated.

The aim of analysis is to :

- Demonstrate adequate stability for all cases
- Identify most critical heel axis for each condition
- Determine allowable VCG curves
- Check downflooding clearances

Intact Criteria to be met:

- Minimum area ratio of 1.3
- Maintain a minimum GM of 1.5m for operations; GM = 0.3m for temporary conditions.

5.3.5 Damage stability

Similar analyses to be undertaken as intact case, except a range of tanks need to be damaged in each case, according to RINa criteria (Ref. RINa 3.6.3) and the following criteria met:

- The angle of inclination after damage shall not be greater than 17°.
- Any openings within 4m of the water line shall be made weathertight.
- The righting moment curve shall have from the first intercept to the lesser of the second intercept or angle of downflooding a range of at least 7°. Within this range the righting moment curve shall reach a value of twice the wind heeling moment curve, both being measured at the same angle. (i.e GZ/WOTM > 2)

In assessing the damage stability of column-stabilised units, the following extent of damage is considered per RINa rules Para. 3.5.2 and 3.6.3.

COMPARTMENT / TANK	22.0m	18.0m	11.0m
S.W. Bal Tk 1s			✓
S.W. Bal Tk 4s			✓
S.W. Bal Tk 13s			✓
S.W. Bal Tk 18s			✓
S.W. Bal Tk 20s			✓
S.W. Bal Tk 21s			✓
S.W. Bal Tk 22s			✓
S.W. Bal Tk 18s & Chain Locker 10S			✓
Void Space 46S	✓	✓	
Void Space 45S	✓	✓	
Void Space 65S	✓	✓	
Void Space 64S	✓	✓	
Void Space 32 Stbd 3	✓	✓	
Void Space 46aS	✓	✓	
Void Space 45aS	✓	✓	
Base Oil Tank N1	✓	✓	

5.3.6 Accidental Flooding Stability

A similar analysis to the damaged is undertaken whereby any tank could be damaged and the resulting heel angle is determined. In accordance with IMO MODU Code section 3.4.4 no wind heeling effect has been added.

The vessel must however satisfy the following criteria:

- Angle of inclination after flooding should not be greater than 25°
- Any opening below the waterline should be made watertight
- A range of positive stability should be provided, beyond the calculated angle of inclination in these conditions of at least 7°.

From inspection of the ballast arrangements in Appendix D and the tank/compartment plans in Appendix A the worst possible tanks to accidentally flood are Sea Water Ballast tanks no's 21 and 22. As all other tanks are inboard and of less capacity, these two tanks could cause the greatest angle of inclination. Therefore they have been assessed for accidental flooding.

5.4 Minimum Freeboard Requirements

The minimum freeboard requirements shall comply with section 3.9.4 of RINa rules.

6 RESULTS

6.1 HYDROSTATICS

Hydrostatics for the modified unit are reported in Appendix C.

6.2 LOADING CONDITIONS/BALLAST SEQUENCES

Loading Conditions for 22.0m, 18.0m and 11.0m draft have been computed based on the variable loads summarised in Appendix D.

For the 22.0m draft all riser installation sequence scenarios specified have been checked (Ref. 9).

Riser Configuration	Total Riser Weight (Tonnes)	LCG (metres)	TCG (metres)	VCG (metres)	Stability Margin (metres)
2 x SCR & Port Risers installed	737	56.77	-26.97	6.23	+1.76
2 x SCR & Port and Aft risers installed	2632	82.45	-7.47	22.80	+0.94
2 x SCR & Port, Aft and Starboard Risers Installed	4452	71.92	3.19	16.06	+0.94
2 x SCR & All Risers Installed	5052	66.26	2.77	15.15	+0.86

6.3 INTACT STABILITY RESULTS

The following limiting intact stability results were determined, including the allowable increase in KG. The full results are contained in Appendices H, I,& J.

Draft (m)	Heel Axis (Deg)	Wind Heading (Deg)	1st Intercept (Deg)	2nd Intercept (Deg)	DF Angle (Deg)	DF Clearance (m)	Area Ratio	Allow KG (m)
22.0	40	50	4.80	>40	18.02	10.89	1.79	23.18
18.0	20	70	7.95	>40	23.94	14.56	2.68	27.61
11.0	0	90	0.54	>40	30.37	22.75	12.85	23.18

Summary of Intact Stability Assessment **for Unit**

6.4 DAMAGED STABILITY RESULTS

The limiting results of the damaged stability assessment are summarised below for each of the three drafts analysed:

Draft (m)	Damaged Compartment	Heel Axis (Deg)	Angle of Loll (Deg)	1st Intercept (Deg)	2nd Intercept (Deg)	Angle @ IMO Dam. Ratio >2 (Deg)	DF Angle (Deg)	DF Clear. (m)	Allow KG (m)
22.0	Base Oil N1	40	1.07	3.39	>40	11.0	17.70	11.02	23.04
18.0	VS 64S	340	<1.0	2.93	>40	8.0	23.96	15.65	25.23
11.0	SW18/CL10S	0	<1.0	1.00	>40	2.0	29.17	22.50	44.90

Summary of Damaged Stability Assessment

6.5 ACCIDENTAL FLOODING STABILITY

Accidental flooding assessment has been carried out for both 22.0m and 18.0m drafts on the largest sea water ballast tanks SW 21S and SW 22S. All criteria have been met.

Draft (m)	Compartment	Heel Axis (Deg)	Angle of Loll (Deg)	Angle of Vanish. Stab. (Deg)	+ve Stability Range (deg)
22.0	SW 22S	50	13.28	>40	26.72
18.0	SW 22S	50	9.44	>40	30.56

Summary of Accidental Flooding Results

The central caisson has not been considered in the accidental flooding assessment as it will not cause any significant heel, only a loss of volume resulting in parallel sinkage of the unit.

6.6 DOWNFLOODING POINTS

Downflooding clearance is assessed at all stages of the stability analysis and reported in Appendices H, I, & J. The location of the downflooding points is shown in Appendix E.

6.7 TRANSITION DRAFTS

For the transition drafts of 12.5m, 14.5m and 20.0m the loading conditions have been checked in order to ensure that the GM is greater than the minimum allowable of 0.3m. The results are presenterd in Appendix K, along with the 22.0m draft – temporary condition - prior to riser installation and production.

6.8 MAXIMUM ALLOWABLE VCG CURVES

From the results reported above the Allowable VCG curve can be plotted for operations at Roncador. This is based upon a full stability analysis of the above three loading conditions and GM limitations at other drafts assuming that these only occurred during transition stages of ballasting.

DRAFT	Assumed KG	KM_{solid}	GM_{solid}	Allow VCG	Limiting Condition
22.00	22.41	26.80	4.37	23.04	**Damaged Stability**
21.00	-	26.90	-	26.60	GM>0.3m (Transition)
20.00	-	27.10	-	26.80	GM>0.3m (Transition)
19.00	-	27.30	-	27.00	GM>0.3m (Transition)
18.00	24.56	27.60	3.03	25.23	**Damaged Stabiity**
17.00	-	27.80	-	27.50	GM>0.3m (Transition)
16.00	-	27.70	-	27.40	GM>0.3m (Transition)
15.00	-	27.20	-	26.90	GM>0.3m (Transition)
14.00	-	26.80	-	26.50	GM>0.3m (Transition)
13.00	-	28.50	-	28.20	GM>0.3m (Transition)
12.00	-	66.20	-	65.90	GM>0.3m (Transition)
11.00	27.08	70.50	43.41	44.90	**Damaged Stability**

7 CONCLUSIONS

The analysis demonstrates that with the additional structures added to the profile of the unit and with the necessary subdivision of tanks, the unit will have adequate stability for operations at the Roncador Field.

The allowable VCG curves derived in this analysis are only suitable for operations at the Roncador Field in the range 11.0m to 22.0m. Within this range the drafts not analysed in this report are assumed only to occur during transition ballast conditions.

APPENDIX A

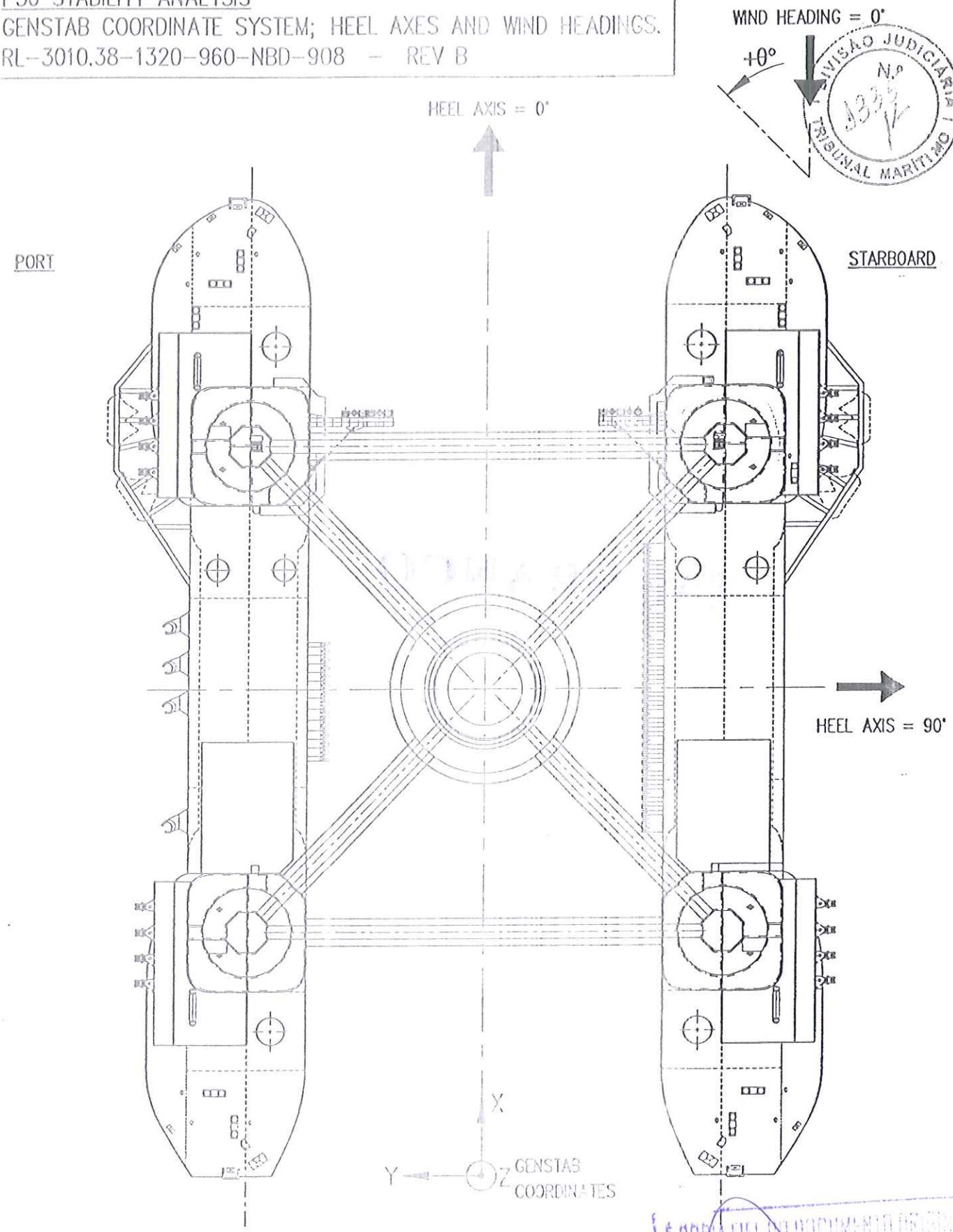
DRAWINGS

(18 PAGES)

P36 STABILITY ANALYSIS

GENSTAB COORDINATE SYSTEM; HEEL AXES AND WIND HEADINGS.

RL-3010.38-1320-960-NBD-908 - REV B



ROTATION ABOUT HEEL AXIS IS BY RH SCREW RULE

HEEL AXES OF IMPORTANCE 270°-350° (TRIM BY BOW)

0° (ROLL TO STBD)

10°-90° (TRIM BY STERN)

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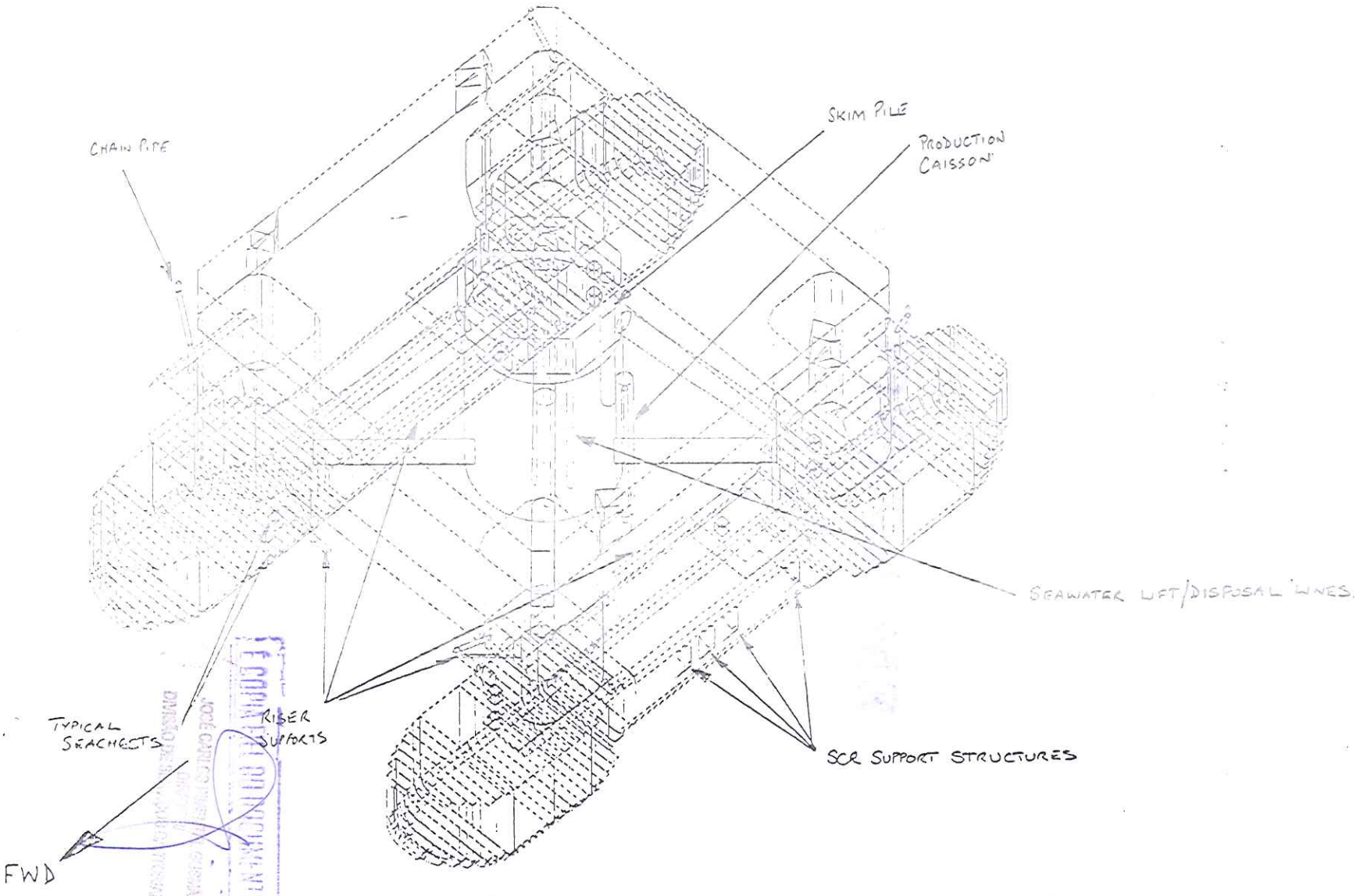

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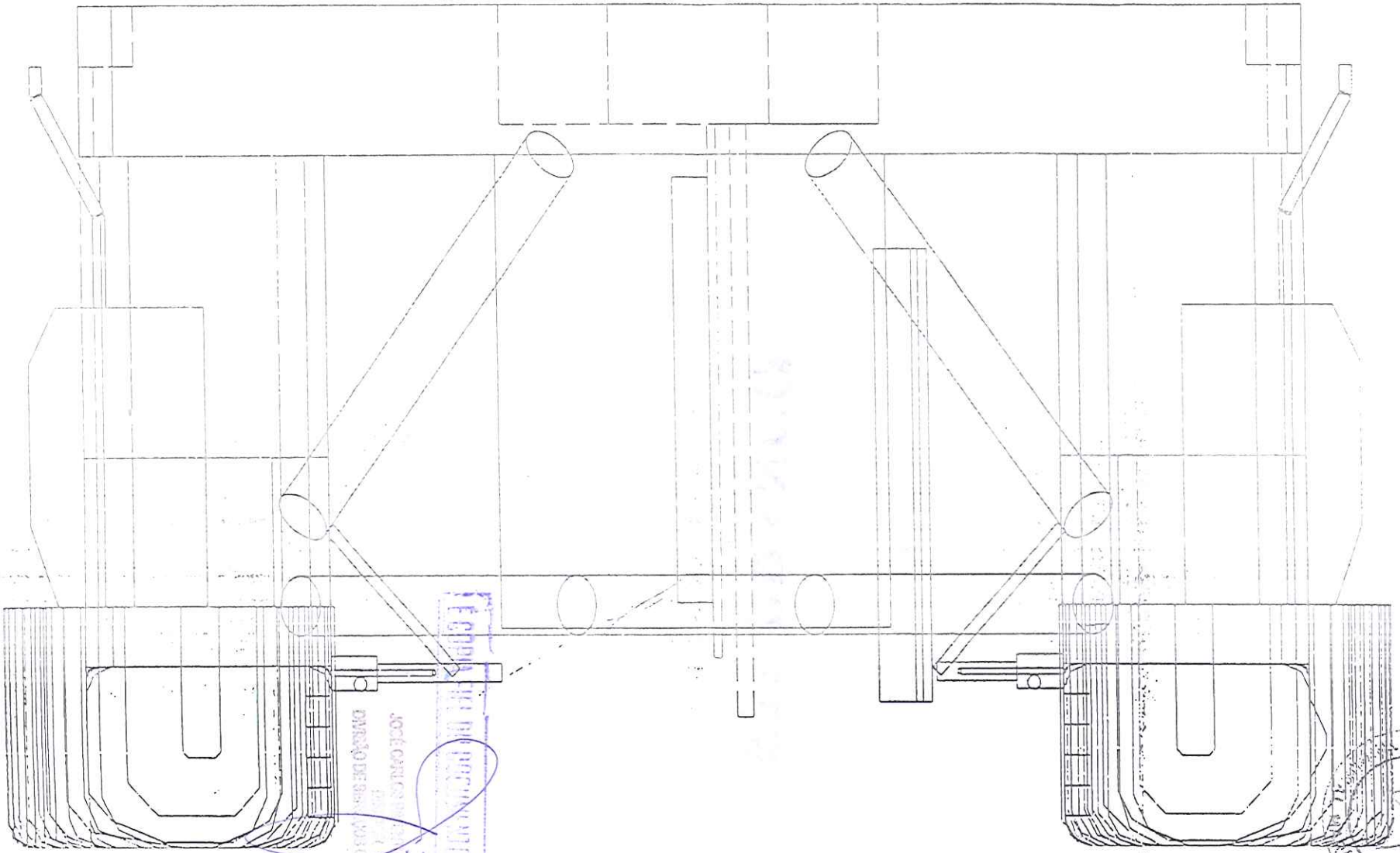

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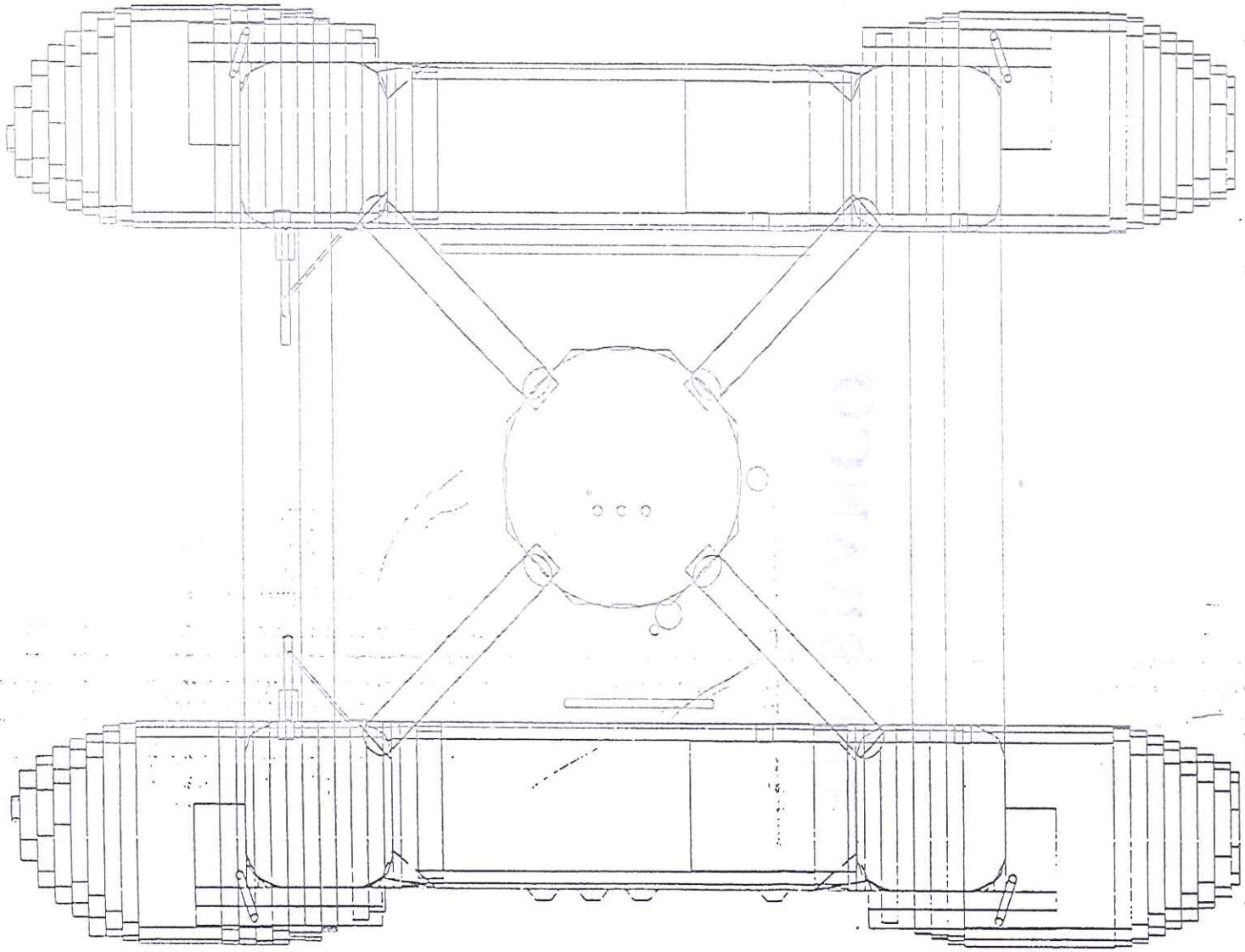

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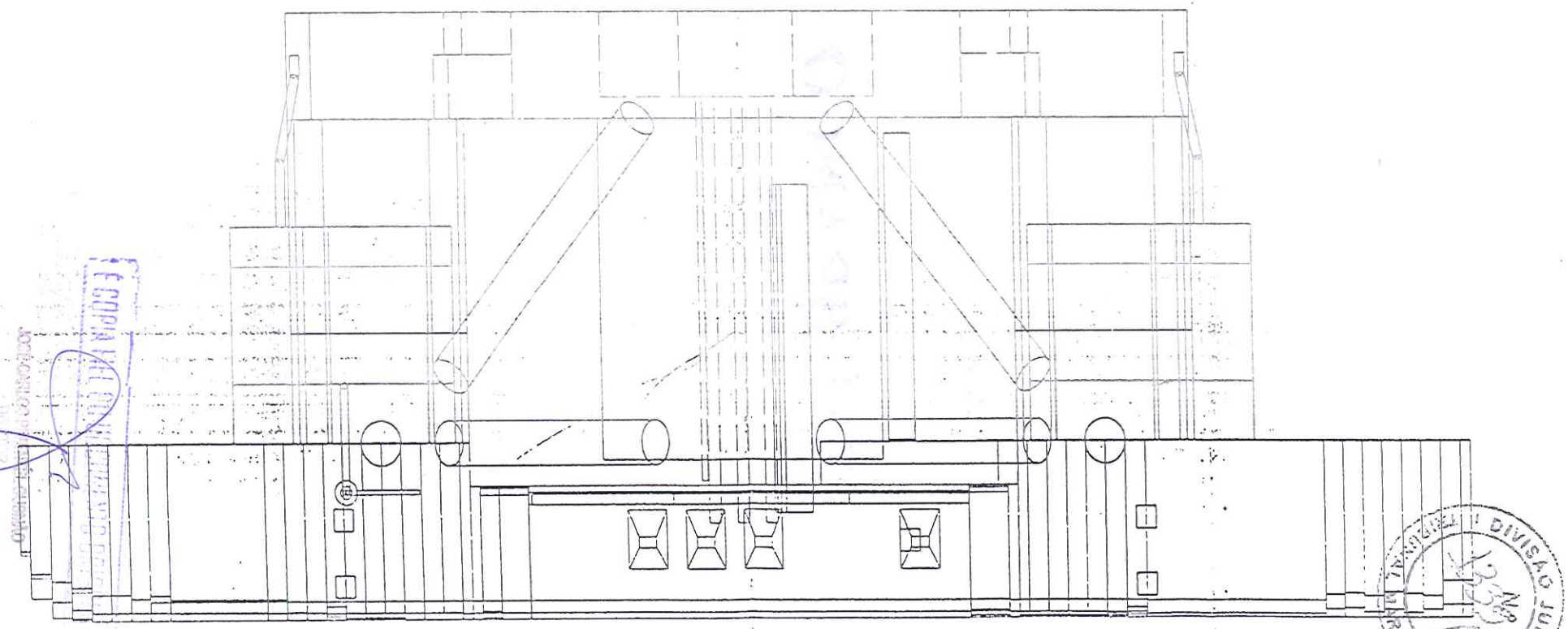
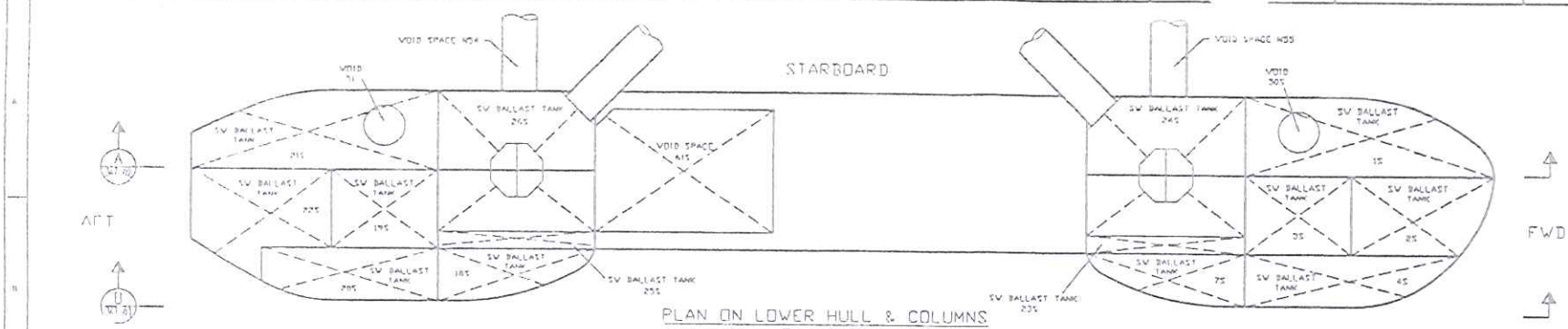
NOBLE DENTON

PL JOB IDENTIFIER: HYDR

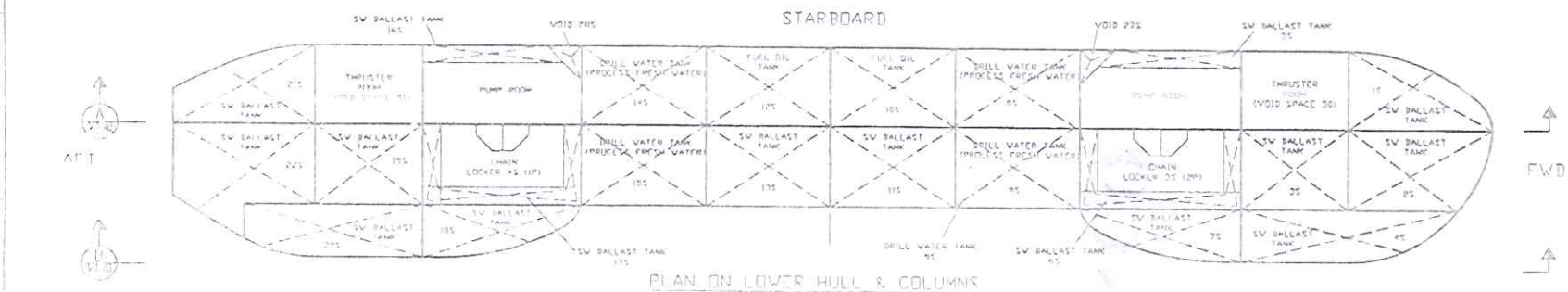


NOBLE DENTON 13.JAN.1999 TIME 10.51.57

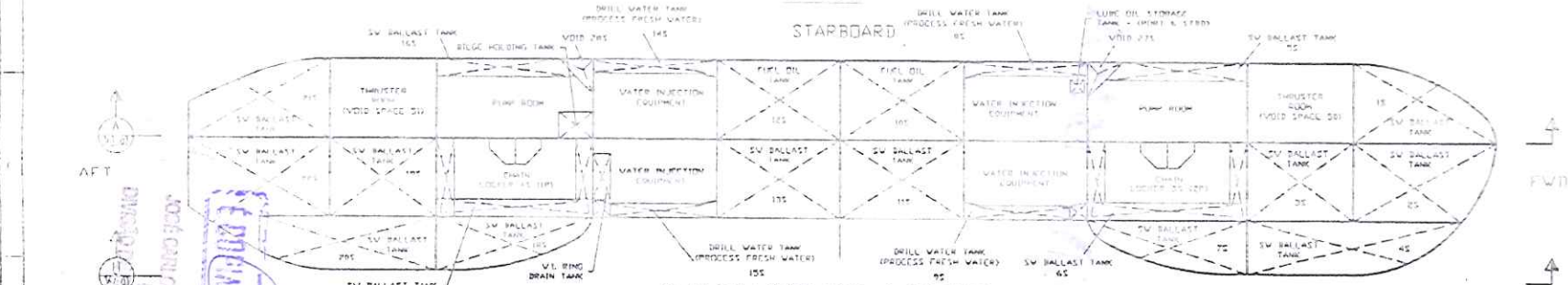
NOBLE DENTON



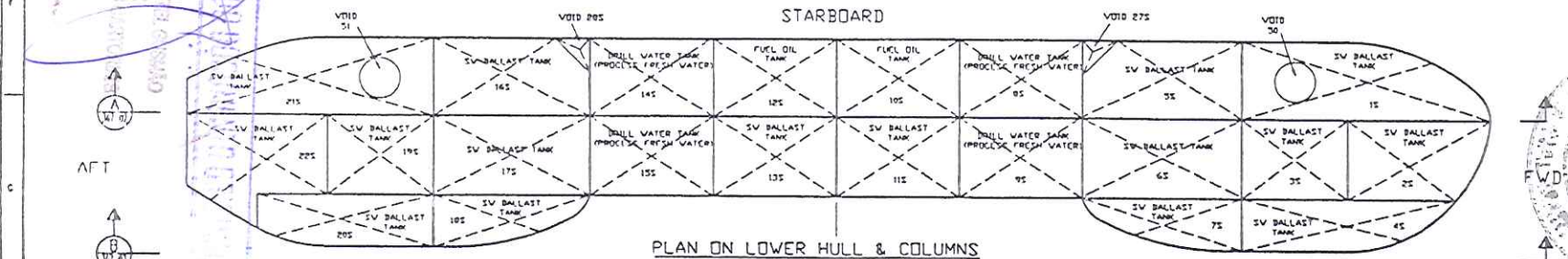
PLAN ON LOWER HULL & COLUMNS
EL. 12192



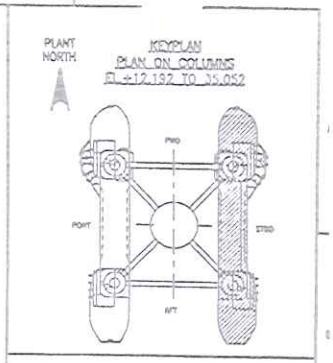
PLAN ON LOWER HULL & COLUMNS
EL. 9144



PLAN ON LOWER HULL & COLUMNS
EL. 2570



PLAN ON LOWER HULL & COLUMNS
EL. 1524



REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
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B	15.09.99	REVISED AFC	SCE	MSC	MEC	
C	29.01.99	AFC	SCE	MSC	AT	
B	12.12.97	REVISED AFD	SCE	MSC	AT	
A	08.10.97	AFD	SCE	MSC	AT	
0	11.9.97	IDC	MWS	MSC	AT	

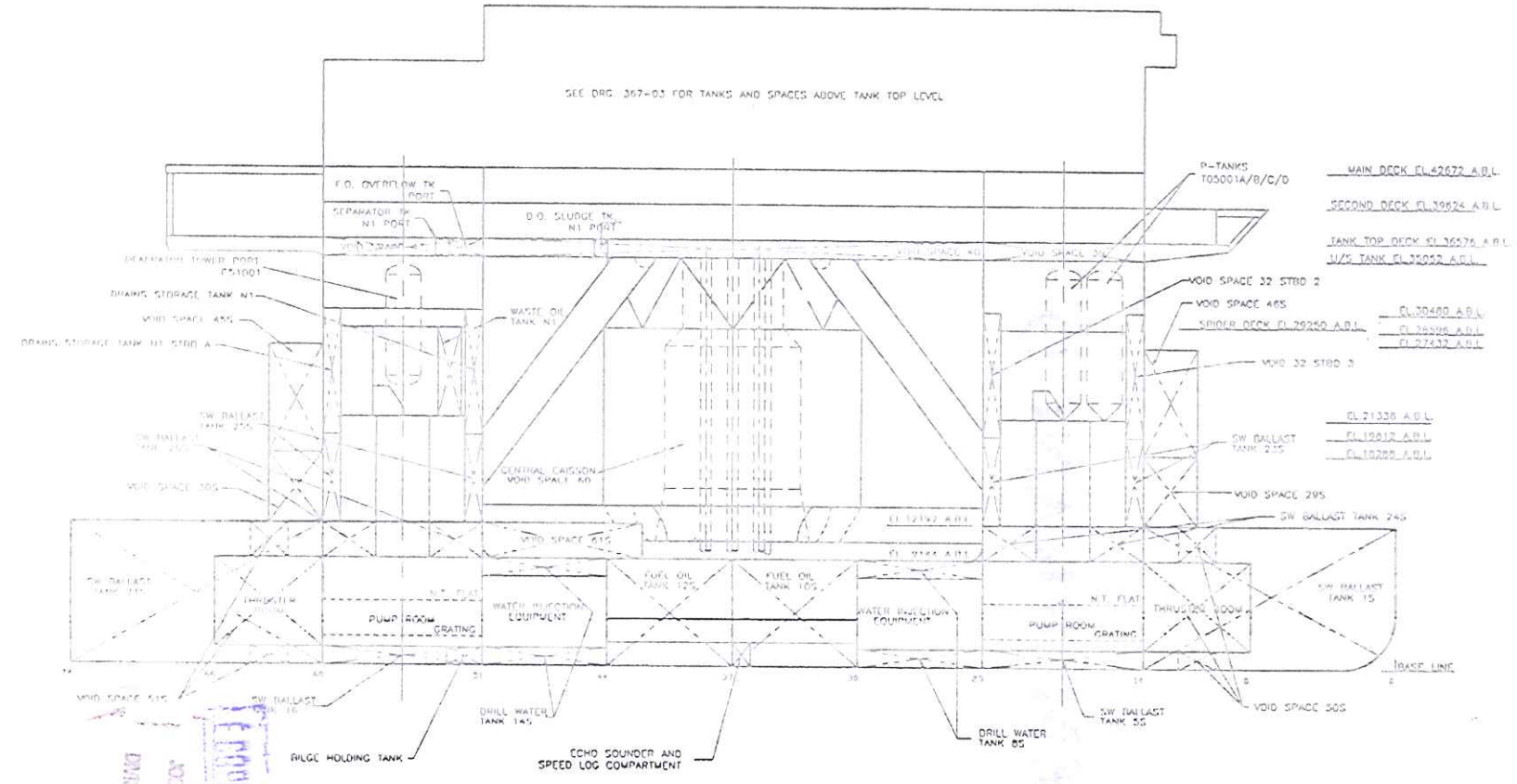
P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMC

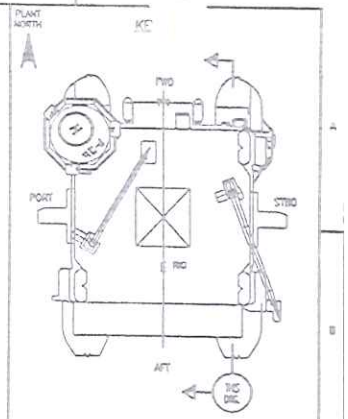
TITLE
P36-RONCADOR
G.A. of PONTOON
TANKS & SPACES
PLANS SHT.1

DRAWN/DATE SCE/DEC.97
CHECKED/DATE
APPROVED/DATE
SCALE 1:200 (A1)

DRAWING NUMBER DF-3010.28-1320-962-NBD-367-01 REV C



SECTION A-A
STARBOARD SIDE (PORT SIDE SIMILAR)



REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
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D	15.09.97	REVISED AFC	SCE	MEE	MEE	
C	29.05.97	AFC	SCE	MEE	AT	
B	12.12.97	REVISED AFB	SCE	MEE	AT	
A	29.11.97	AFB	SCE	MEE	AT	
0	11.9.97	IDC	SME	MEE	AT	

BR BRANGE

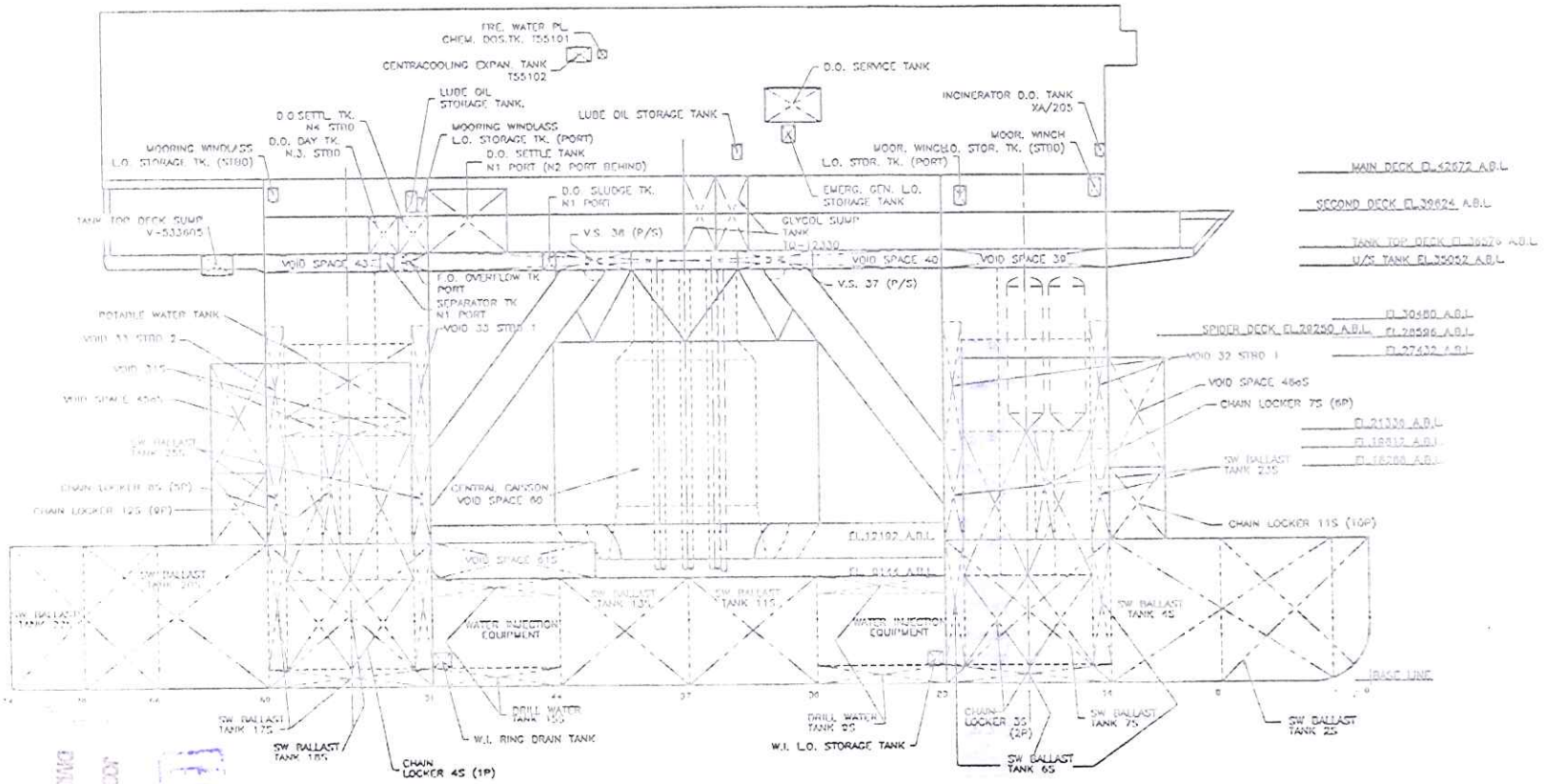
P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

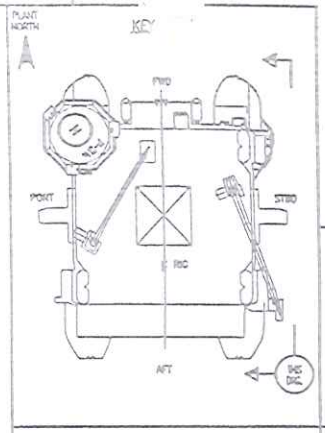
TITLE
P36. RONCADOR
G.A. OF PONTOON
TANKS & SPACES
ELEVATION SHT.2

DRAWN/DATE SCE/DEC.97
CHECKED/DATE
APPROVED/DATE
SCALE 1:200 (A3)

DRAWING NUMBER DE-3010.38-1320-962-NBD-367-02
REV E



ELEVATION B-B
STARBOARD SIDE (PORT SIDE MIRROR IMAGE)



REV	TITLE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
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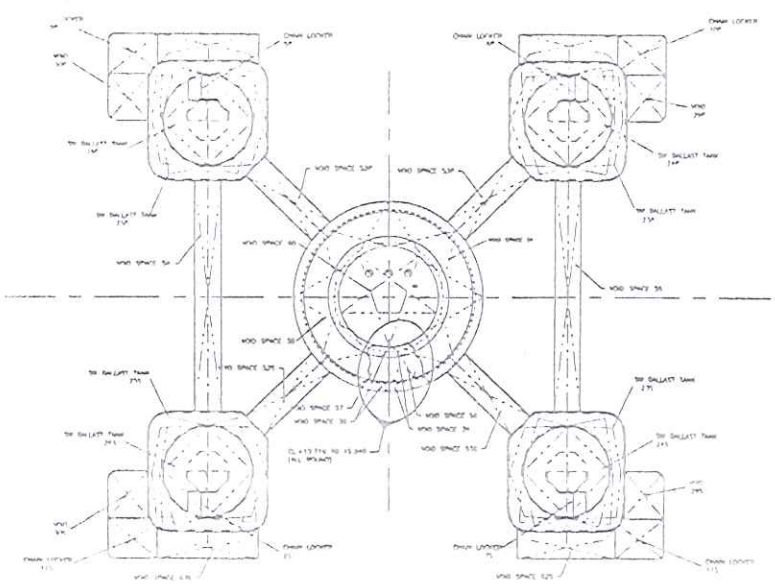
D	01.09.99	REVISED AFC	ZCC	WBC	WBT	
C	29.01.99	AFC	BCK	WBC	AT	
B	12.12.97	REVISED AFD	ZCC	WBC	AT	
A	29.10.97	AFD	BCK	WBC	AT	
0	11.9.97	IDC	BMB	WBC	AT	

BALDOR
P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150
NOBLE DENTON
Petromec
AMEC

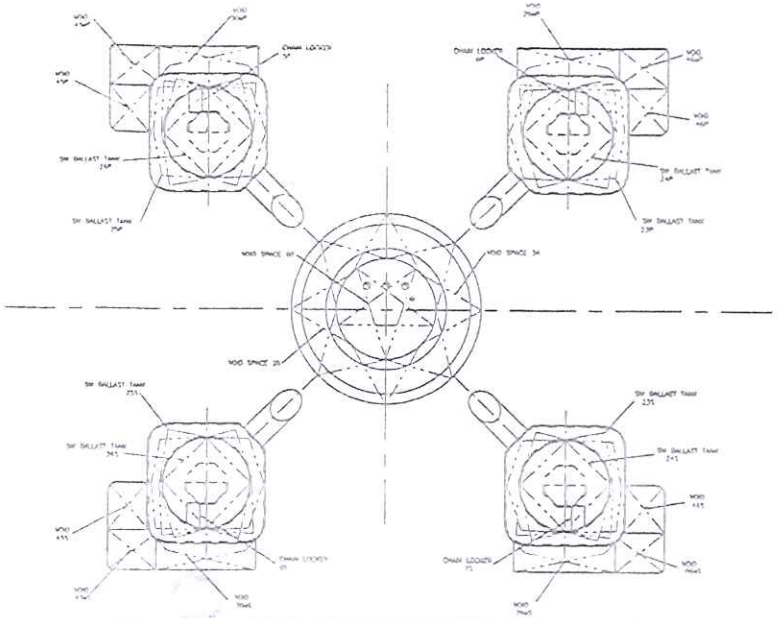
TITLE
P36 RONCADOR
G.A. of PONTOON
TANKS & SPACES
ELEVATION SHT.3

DRAWN/DATE ZCC/OCT.97
CHECKED/DATE
APPROVED/DATE
SCALE 1:200 (A4)

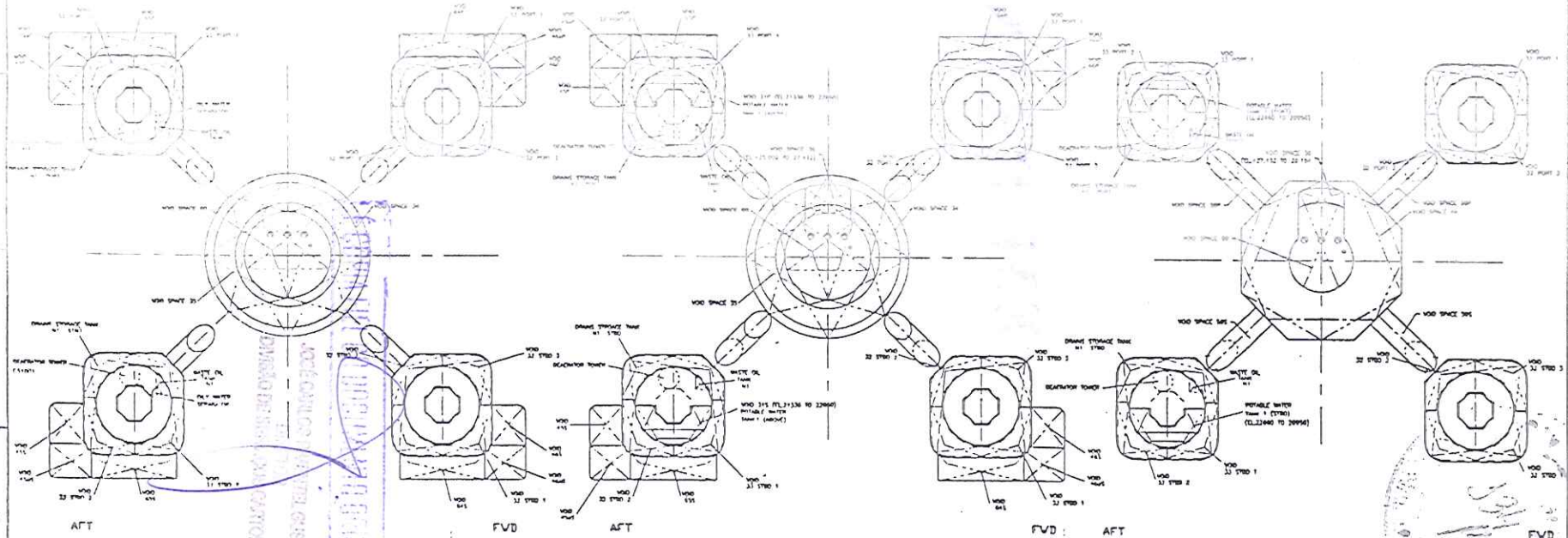
DRAWING NUMBER DE-3010.38-1320-962-NDD-367-03
REV E



AFT — PLAN ON COLUMNS, BRACES AND CENTRE CAISSON — FWD
ELEVATION BETWEEN 12192 & 19812 ABL



AFT — PLAN ON COLUMNS, BRACES AND CENTRE CAISSON — FWD
ELEVATION BETWEEN 19812 & 21336 ABL



AFT — FWD — AFT — FWD — AFT — FWD

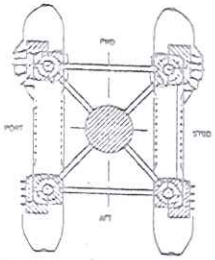
PLAN ON COLUMNS, BRACES AND CENTRE CAISSON
ELEVATION BETWEEN 19812 & 21336 ABL

PLAN ON COLUMNS, BRACES AND CENTRE CAISSON
ELEVATION BETWEEN 21336 & 27432 ABL

PLAN ON COLUMNS, BRACES AND CENTRE CAISSON
ELEVATION BETWEEN 27432 & 35052 ABL

PLANT NORTH

KEYPLAN
ON COLUMNS
12192 TO 35.052



NOTES
1. FOR ELEVATIONS OF TANKS REFER TO SHEETS 2

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
C	02.10.99	AS BUILT	SCC	MSC	AT
B	01.09.99	REVISED AFC	SCC	MSC	AT
C	07.03.99	AFC	SCC	MSC	AT
B	16.12.97	REVISED AFD	SCC	MSC	AT
A	29.10.97	AFD	SCC	MSC	AT
0	11.9.97	IDC	RHS	MSC	AT

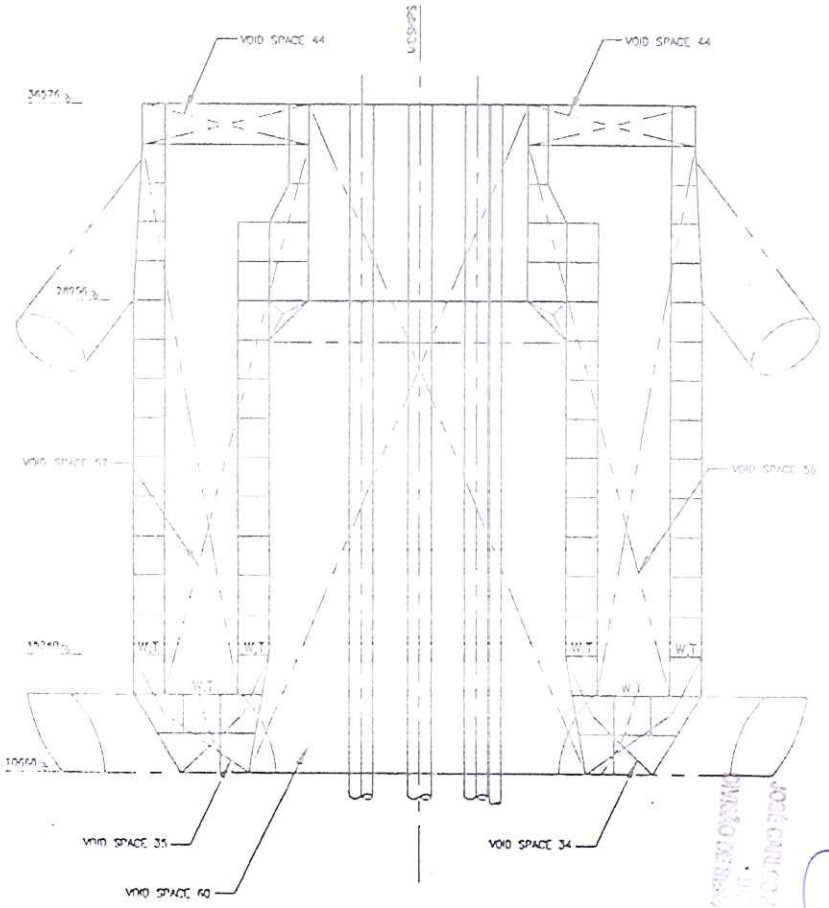
BR DRAGOR — P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON — Petromec — AMDC

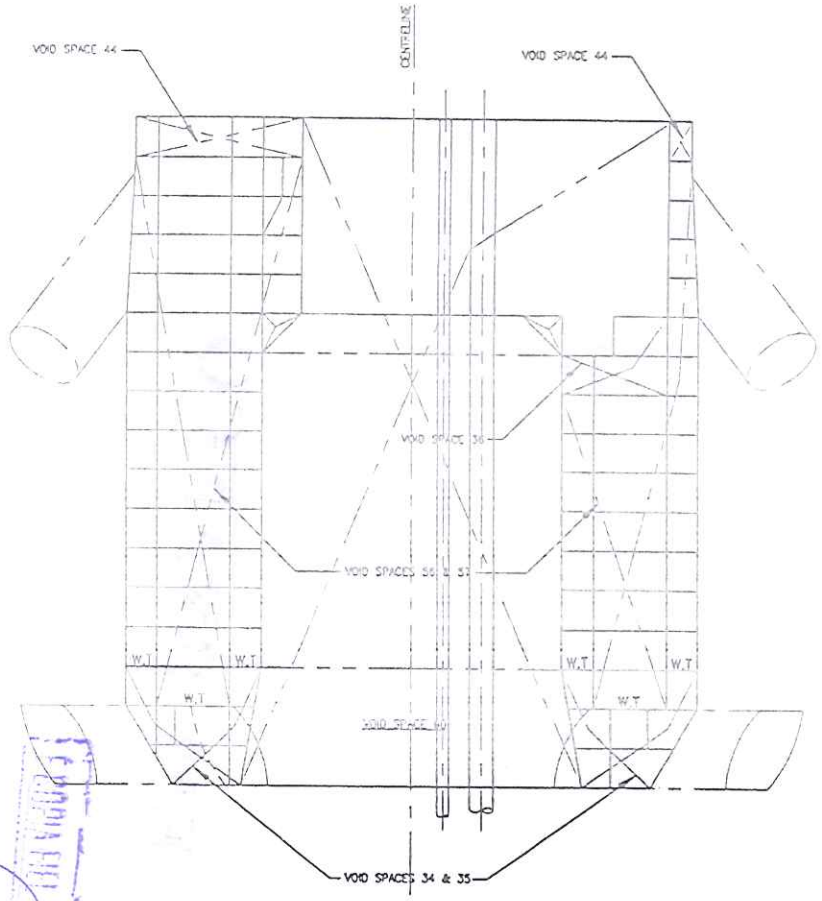
P36 RONCADOR
G.A. of PONTOON
TANKS & SPACES
COLUMN PLANS SHT.4

DRAWN/DATE SCC/DCC.9
CHECKED/DATE MSC/02 OCT
APPROVED/DATE AT/02 OCT.
SCALE N.T.S.

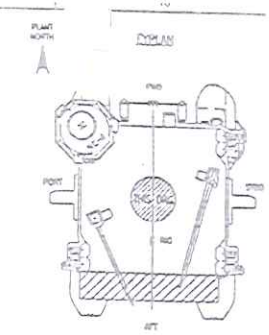
DRAWING NUMBER DE-3010.38-1320-962-NDD-367-04 REV F



CENTRAL CAISSON LKG. TO PORT



CENTRAL CAISSON LKG. AFT



REV	CALC DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
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2	4.10.97	AFC	SCE	MSC	AT
1	2.10.97	AFD	SCE	MSC	AT
A	2.10.97	AFD	SCE	CHL	AT
0	1.10.97	DC	SCE	MSC	AT

BR BRASOIL — P36-RONCADOR FIELD DEVELOPM
CONTRACT No :- 7/15/2150

NOBLE DENTON — Petromec — AMEC

TITLE: CENTRAL CAISSON CAPACITY TANK LAYOUT

DRAWN/DATE: SCE/OCT.
CHECKED/DATE: MSC/OCT.
APPROVED/DATE: AT/OCT. 1
SCALE: 1:100 (

DRAWING NUMBER: DE-3010.38-1320-962-ABD-367-05

Potable Water Tanks	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Pot Water Tk	1P	194.0	194.0	1.000	84.58	-.29	5.00	55 & 56
Pot Water Tk	1S	194.0	194.0	1.000	84.58	.29	25.90	55 & 56
Pot Water Day Tk		15.2	15.2	1.000	78.87	4.98	38.10	51 & 52
Potable Water Tanks		403.1	403.1		84.36	0.19	26.37	

Drill Water Tanks (Process FW)	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Drill Water Tanks	8P	276.5	276.5	1.000	40.25	-23.31	4.41	26 & 27
Drill Water Tanks	8S	276.5	276.5	1.000	40.25	23.31	4.41	26 & 27
Drill Water Tanks	9P	248.7	248.7	1.000	40.53	-31.35	4.38	26 & 27
Drill Water Tanks	9S	248.7	248.7	1.000	40.53	31.35	4.38	26 & 27
Drill Water Tanks	14P	272.3	272.3	1.000	72.39	-24.38	4.56	47 & 48
Drill Water Tanks	14S	272.3	272.3	1.000	72.39	24.38	4.56	47 & 48
Drill Water Tanks	15P	260.3	260.3	1.000	72.34	-30.45	4.62	47 & 48
Drill Water Tanks	15S	260.3	260.3	1.000	72.34	30.45	4.62	47 & 48
Drill Water Tanks (Process FW)		2115.5	2115.5		56.49	0.00	4.49	

Fuel Oil	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
FO Tank	10P	586.9	611.3	0.960	51.05	-23.91	4.67	33 & 34
FO Tank	10S	586.9	611.3	0.960	51.05	23.91	4.67	33 & 34
FO Tank	12P	590.1	614.7	0.960	61.72	-25.68	4.64	40 & 41
FO Tank	12S	590.1	614.7	0.960	61.72	25.68	4.64	40 & 41
FO Overflow	P	16.4	17.1	0.960	78.94	-10.72	35.81	51 & 52
FO Overflow	S	15.1	15.8	0.960	78.87	22.86	35.81	51 & 52
Fuel Oil		2358.4	2452.0		56.70	0.04	5.06	

Diesel Oils	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
DO Storage	N1P	3.6	4.1	0.870	67.61	-15.62	35.81	44 & 45
DO Storage	N1S	3.6	4.1	0.870	78.98	10.10	35.81	51 & 52
DO Settle	N1P	105.5	121.2	0.870	74.52	-13.90	39.39	48 & 49
DO Settle	N1S	110.7	127.2	0.870	74.60	13.44	39.37	48 & 49
DO Service	N1P	73.5	84.5	0.870	82.01	-15.62	38.10	53 & 54
DO Service	N1S	73.5	84.5	0.870	79.15	15.62	38.10	51 & 52
DO Service		11.2	12.9	0.870	46.01	-21.15	47.01	31 & 32
Diesel Oils		301.6	341.2		76.06	-3.55	39.05	

Lub Oils	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Diesel Storage Tank Port	N1P	405.3	451.4	0.900	84.85	-22.94	25.23	55 & 56
Diesel Storage Tank Stbd	N1S	405.3	451.4	0.900	84.85	22.94	25.23	55 & 56
Waste Oil	N1P	10.7	10.7	1.000	80.73	-24.55	25.15	55 & 56
Waste Oil	N1S	19.2	19.2	1.000	80.72	24.55	25.15	55 & 56
Air Compressor LO Storage	T65101	0.5	0.5	0.900	28.57	1.15	40.77	24 & 25
Mooring Winch LO Storage	T65105	0.3	0.3	0.900	78.17	-30.43	40.77	54 & 55
Mooring Winch LO Storage	T65106	0.3	0.3	0.900	34.65	-30.07	40.87	22 & 23
Mooring Winch LO Storage	T65107	0.3	0.3	0.900	23.33	28.10	40.87	15 & 16
Mooring Winch LO Storage	T65108	0.3	0.3	0.900	91.04	30.07	40.98	59 & 60
Em. Gen. LO Storage	T65109	0.5	0.6	0.900	48.60	-22.17	45.00	31 & 32
WT Room LO Storage	T65110	0.8	0.9	0.900	35.87	-22.20	3.43	23 & 24
WT Room LO Storage	T65111	0.8	0.9	0.900	35.87	22.20	3.44	23 & 24
Turbine Lube Oil Console C	UO-122308	15.0	16.7	0.900	89.67	24.55	49.23	58 & 59
Turbine Lube Oil Console B	UO-122306	15.0	16.7	0.900	89.68	9.55	49.24	58 & 59
Turbine Lube Oil Console A	UO-122304	15.0	16.7	0.900	89.71	-5.45	49.25	58 & 59
Lub Oils		900.1	995.7		84.77	0.46	26.43	

Miscellaneous Tanks	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Bilge Holding Tank	P	5.3	5.27	1.000	78.49	-26.31	0.76	51 & 52
Bilge Holding Tank	S	5.3	5.27	1.000	78.49	26.31	0.76	51 & 52
WTL Ring Drain Tank	P	2.8	2.80	1.000	77.13	-30.77	4.22	50 & 51
WTL Ring Drain Tank	S	2.8	2.80	1.000	77.13	30.77	4.22	50 & 51
Generator Tower -Port	C-51001	38.0	37.96	1.000	85.08	-23.73	27.60	55 & 56
Generator Tower -Stbd	C-52001	38.0	37.96	1.000	85.08	23.73	27.60	55 & 56
Auxiliary Generator DO	GC-514001	1.0	1.15	0.870	54.39	-12.50	53.00	35 & 36
Aft Column Separator Tank	N1P	13.8	13.80	1.000	79.72	-26.29	35.10	52 & 53
Aft Column Separator Tank	N1S	13.8	13.80	1.000	79.72	26.29	35.10	52 & 53
Miscellaneous Tanks		120.7	120.8		82.65	-0.10	25.96	

Non Structural Tanks	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Fwd clmn p-tk	T05001A	109.9	[illegible]	1.316	25.00	26.70	27.00	16 & 17
Fwd clmn p-tk	T05001B	109.9	83.5	1.316	26.15	24.23	27.00	16 & 17
Fwd clmn p-tk	T05001A	109.9	83.5	1.316	26.15	-24.23	27.00	16 & 17
Fwd clmn p-tk	T05001B	109.9	83.5	1.316	25.00	-26.70	27.00	16 & 17
Helifuel Refuel	A56001	7.9	7.9	1.000	34.55	-12.53	43.92	22 & 23
Helifuel Disp	A56002	0.1	0.1	1.000	25.91	-19.20	45.10	17 & 18
Incinerator DO Day Tank	T55105	0.2	0.2	0.870	21.66	26.76	43.94	14 & 15
FW Chem Dosing Tank FW	T55101	2.0	2.0	1.000	52.02	-5.99	52.21	41 & 42
Cooling Expansion Tank	T55102	0.5	0.5	1.000	64.97	-6.20	52.01	42 & 43
Oily Water Separators	V-66201/V-66202	1.4	1.6	0.900	80.77	0.00	29.80	52 & 53
Glycol Sump Tank	TG-123301	20.1	18.6	1.080	55.23	21.53	37.08	36 & 37
Tank Top Sump Tank	V-533605	16.0	16.0	1.000	76.22	6.44	46.47	50 & 51
Non Structural Tanks		467.8	360.9		29.85	0.87	26.48	

Process Content	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Oil Separation - Train A	UO-122301	468.3	550.9	0.850	92.29	-28.51	47.27	60 & 61
Oil Separation - Train B	UO-122302	467.9	550.5	0.850	92.28	-18.53	47.34	60 & 61
Oil Separation - Heating	UO-122303	78.8	92.7	0.850	77.27	-20.01	47.49	50 & 51
Production Caisson	TD-533601	42.6	52.2	0.900	64.74	-16.71	19.81	42 & 43
Turbine Cooling Water	UO-122308	5.6	5.6	1.000	89.67	24.55	49.23	58 & 59
Turbine Cooling Water	UO-122306	5.6	5.6	1.000	89.68	9.55	49.24	58 & 59
Turbine Cooling Water	UO-122304	5.6	5.6	1.000	89.71	-5.45	49.25	58 & 59
Gas/Cond. Chemical Injection Package	UO-682503	38.5	42.8	0.900	58.48	13.14	44.98	38 & 39
Oil Chemical Injection -Skid 2	UO-682501-02	28.4	31.5	0.900	61.79	13.04	37.74	40 & 41
Sea Water Chemical Injection	UO-682502	19.2	21.3	0.900	54.46	18.66	37.36	35 & 36
Oil Chemical Injection -Skid 1	UO-682501-01	16.5	18.3	0.900	50.68	17.60	37.52	33 & 34
Chemical Injtn Package -Water Inj	A42001	1.7	1.9	0.900	61.56	17.00	38.33	40 & 41
Chemical Injection Package -Prod	A42002	1.5	1.7	0.900	55.56	13.40	38.33	36 & 37
Heating Med. Exp Vessel	V-512501	18.0	20.3	0.935	49.12	2.53	63.78	31 & 32
Cooling Med. Exp Vessel	V-512401	5.8	6.6	1.000	46.10	-3.216	63.78	31 & 32
Skim Pile Matrix Separator	V-66212	10.6	11.8	0.900	59.51	-13.30	43.92	39 & 40
Glycol Regeneration Package	UO-123302	13.4	12.4	1.080	57.13	16.93	45.38	37 & 38
TEG Contactor Towers	UO-123301	8.3	7.7	1.080	57.44	12.87	45.38	37 & 38
Safety Gas KO Drum Package	V-122301	14.5	14.9	0.975	67.88	30.50	[illegible]	41 & 42
Drains Treatment Package	A45001	14.4	14.4	1.000	97.69	14.72	39.08	64 & 65
Fuel Gas Treatment Package	UO-513501	9.4	9.4	1.000	97.93	23.58	38.55	64 & 65
LP KO Drum Package + Pumps	UO-512202	7.9	9.6	0.820	63.87	-15.56	44.23	41 & 42
Booster Comp Process Pkg	A30001	5.5	5.5	1.000	56.94	22.88	46.10	37 & 38
Caisson Pumps Antifouling Package	UO-512101	8.2	8.0	1.025	32.98	15.20	44.42	21 & 22
Seawater Pumps and Piping	B-11102A/B/C	39.9	38.5	1.025	36.32	5.25	29.00	37 & 38
Water Injection System -Inc Piping	UO-125101	49.3	48.1	1.025	60.00	0.00	36.20	39 & 40
Process Piping & Valves		104.4	121.3	0.860	55.40	6.84	46.92	36 & 37
HP Flare KO Drum (Skid)	A43001	8.4	10.2	0.820	59.66	-21.50	44.79	39 & 40
Cooling Medium Package	UO-542601-01	26.8	29.8	0.900	26.01	17.56	45.23	17 & 18
Cooling Medium Package & Piping	UO-512001-01	43.3	44.9	0.965	31.81	23.90	46.74	21 & 22
Process Gas Module C	UO-122309	8.9	12.3	0.820	79.28	31.85	46.86	52 & 53
Process Gas Module B	UO-122307	8.0	12.3	0.650	79.28	16.85	46.86	52 & 53
Process Gas Module A	UO-122305	8.0	12.3	0.650	79.28	2.06	46.86	52 & 53
Industrial Water System Piping		49.1	49.1	1.000	56.39	0.00	45.00	31 & 36
Process Content		1268.8	[illegible]		78.61	-11.67	43.75	

SW Ballast Tanks	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
SW Ballast	1P	906.9	886.7	1.025	9.50	-24.47	8.27	6 & 7
SW Ballast	1S	906.9	886.7	1.025	9.50	24.47	8.27	6 & 7
SW Ballast	2P	891.5	872.8	1.025	5.78	-30.71	8.21	4 & 5
SW Ballast	2S	895.5	877.6	1.025	6.28	30.71	8.21	4 & 5
SW Ballast	3P	746.9	728.7	1.025	16.71	-30.88	8.16	10 & 11
SW Ballast	3S	746.9	728.7	1.025	16.71	30.88	8.16	10 & 11
SW Ballast	4P	838.2	818.3	1.025	12.72	-30.88	8.25	9 & 10
SW Ballast	4S	838.2	818.3	1.025	12.72	30.88	8.25	9 & 10
SW Ballast	5P	263.0	256.6	1.025	27.71	-22.82	2.98	18 & 19
SW Ballast	5S	263.0	256.6	1.025	27.71	22.82	2.98	18 & 19
SW Ballast	6P	537.0	523.9	1.025	28.19	-31.74	5.27	17 & 18
SW Ballast	6S	537.0	523.9	1.025	28.19	31.74	5.27	17 & 18
SW Ballast	7P	547.1	533.8	1.025	26.94	-36.18	6.11	17 & 18
SW Ballast	7S	547.1	533.8	1.025	26.94	36.18	6.11	17 & 18
SW Ballast	11P	660.8	644.7	1.025	51.06	-30.81	4.57	33 & 34
SW Ballast	11S	660.8	644.7	1.025	51.06	30.81	4.57	33 & 34
SW Ballast	13P	660.8	644.7	1.025	61.72	-30.81	4.57	40 & 41
SW Ballast	13S	660.8	644.7	1.025	61.72	30.81	4.57	40 & 41
SW Ballast	16P	255.9	249.7	1.025	85.17	-22.72	3.04	55 & 56
SW Ballast	16S	255.9	249.7	1.025	85.17	22.72	3.04	55 & 56
SW Ballast	17P	537.0	523.9	1.025	84.58	-31.74	5.27	55 & 56
SW Ballast	17S	537.0	523.9	1.025	84.58	31.74	5.27	55 & 56
SW Ballast	18P	569.0	555.2	1.025	85.84	-36.18	6.11	56 & 57
SW Ballast	18S	569.0	555.2	1.025	85.84	36.18	6.11	56 & 57
SW Ballast	19P	747.0	728.8	1.025	96.07	-30.88	6.16	63 & 64
SW Ballast	19S	747.0	728.8	1.025	96.07	30.88	6.16	63 & 64
SW Ballast	20P	787.4	768.2	1.025	98.66	-36.37	6.16	64 & 65
SW Ballast	20S	787.4	768.2	1.025	98.59	36.27	6.16	64 & 65
SW Ballast	21P	987.8	963.7	1.025	103.87	-24.48	6.68	68 & 69
SW Ballast	21S	987.8	963.7	1.025	103.87	24.48	6.68	68 & 69
SW Ballast	22P	1094.0	1067.3	1.025	106.75	-31.15	6.13	70 & 71
SW Ballast	22S	1094.0	1067.3	1.025	106.75	31.15	6.13	70 & 71
SW Ballast	23P	682.3	665.6	1.025	28.02	-27.55	16.00	18 & 19
SW Ballast	23S	682.3	665.6	1.025	28.02	27.55	16.00	18 & 19
SW Ballast	24P	1005.3	980.8	1.025	28.00	-26.33	14.37	18 & 19
SW Ballast	24S	1005.3	980.8	1.025	28.00	26.33	14.37	18 & 19
SW Ballast	25P	682.3	665.6	1.025	84.76	-27.55	16.00	55 & 56
SW Ballast	25S	682.3	665.6	1.025	84.76	27.55	16.00	55 & 56
SW Ballast	26P	1005.3	980.8	1.025	84.77	-26.33	14.37	55 & 56
SW Ballast	26S	1005.3	980.8	1.025	84.77	26.33	14.37	55 & 56
Chain Locker	1P	372.2	363.1	1.025	84.58	-30.41	5.29	55 & 56
Chain Locker	2P	372.2	363.1	1.025	28.2	-30.41	5.29	18 & 19
Chain Locker	3S	372.2	363.1	1.025	28.2	30.41	5.29	18 & 19
Chain Locker	4S	372.2	363.1	1.025	84.58	30.41	5.29	55 & 56
Chain Locker	5P	53.5	52.2	1.025	86.47	-31.12	16.76	56 & 57
Chain Locker	6P	53.5	52.2	1.025	26.31	-31.12	16.76	17 & 18
Chain Locker	7S	53.5	52.2	1.025	26.31	31.12	16.76	17 & 18
Chain Locker	8S	53.5	52.2	1.025	86.47	31.12	16.76	56 & 57
SW Ballast Total		30537.8			57.24	0.00	7.91	

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
E	22.10.99	AS BUILT	SCC	WSE	AT
D	21.06.99	REVISED AFC	SCC	WSE	AT
C	25.03.99	AFC	SCC	WSE	AT
B	10.12.97	REVISED AFD	SCC	WSE	AT
A	29.10.97	AFD	SCC	WSE	AT
0	11.9.97	IDC	RWS	WSE	AT

REFERENCE DRAWINGS

DRAWING TITLE

BR PRASOIL

P36-RONCADOR FIELD DEVELOPME
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

P36 RONCADOR
TANK CAPACITY
TABLES

DRAWN/DATE SCC/DEC.
CHECKED/DATE WSE/OCT.
APPROVED/DATE AT/OCT.
SCALE N.T.S.

DRAWING NUMBER DF-3010.38-1320-962-ARD-367-06

Helicopter & Laydown Areas	ID	Max Wt (M.T)	Area (m2)	Max Load (kN/m2)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Helicopter	HD	24.0	623.1		21.10	−35.80	48.90	13 & 14
Tote Tank Laydown	LD-01	76.0	57.3	13.0	37.14	10.07	43.00	24 & 25
Misc Laydown 1	LD-02	75.0	56.6	13.0	38.55	−3.52	43.00	25 & 26
Misc Laydown 2	LD-03	53.3	40.2	13.0	39.27	−11.28	43.00	25 & 26
Compression A Laydown	LD-04	59.1	44.6	13.0	95.42	0.43	43.00	62 & 63
Compression B Laydown	LD-05	56.5	42.7	13.0	95.44	15.43	43.00	62 & 63
Compression C Laydown	LD-06	61.8	46.1	13.0	95.44	30.80	43.00	62 & 63
Turbine A Laydown	LD-07	19.9	15.0	13.0	73.34	−5.46	43.00	48 & 49
Turbine B Laydown	LD-08	19.9	15.0	13.0	73.34	9.54	43.00	48 & 49
Turbine C Laydown	LD-09	19.9	15.0	13.0	73.34	24.54	43.00	48 & 49
Pig Launcher Laydown	LD-10	67.4	50.9	13.0	106.05	−19.00	36.58	69 & 70
Multipurpose Court	LD-11	212.0	160.0	13.0	30.37	1.29	43.00	19 & 20
Helicopter & Laydown Areas		747.0			58.12	1.96	42.61	38 & 39

Crew & Stores @ Main Deck	ID	Max Wt (M.T)	Area (m2)	Max Load (kN/m2)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Paint Locker	MD-01	27.8	21.0	13	65.80	8.51	43.87	43 & 44
Tank Locker	MD-02	27.8	21.5	13	48.02	8.51	43.87	32 & 33
Marine Equipment Storage	MD-03	45.0	34.7	13	48.02	8.51	43.87	32 & 33
Crew & Stores @ Main Deck		101.6	76.7		53.55	8.51	43.87	35 & 36

Crew & Stores @ Second Deck	ID	Max Wt (M.T)	Area (m2)	Max Load (kN/m2)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Weld Shop	SD-01	124.2	94.1	13.0	84.58	−24.00	40.52	55 & 56
Production Warehouse	SD-02	51.8	39.0	13.0	88.60	24.00	41.32	58 & 59
Warehouse	SD-03	144.9	113.1	13.0	85.71	−15.63	41.32	56 & 57
Main Store	SD-04	109.6	83.0	13.0	69.41	−0.23	41.02	45 & 46
Misc Store 1	SD-05	[illegible]	47.1	13.0	49.41	8.58	40.52	26 & 27
Misc Store 2	SD-06	45.9	34.6	13.0	37.31	15.03	40.52	24 & 25
Chilling Room / Freezer	SD-07	51.8	46.7	13.0	42.47	15.03	41.02	27 & 28
Crew & Effects		30.0			45.72	0.00	41.62	30 & 31
Crew & Stores @ 2nd Deck		632.2	456.6		68.28	−1.15	[illegible]	[illegible]

Crew & Stores @ Tank Top	ID	Max Wt (M.T)	Area (m2)	Max Load (kN/m2)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
Pump Store Aft	TT-01	8.0	6.1	13.0	63.51	9.85	37.88	41 & 42
Pump Store Fwd	TT-02	8.0	6.1	13.0	49.26	9.85	37.88	32 & 33
Mech Store 1	TT-03	42.5	32.1	13.0	88.40	−31.10	37.88	58 & 59
Mech Store 2	TT-04	31.0	23.4	13.0	81.40	−32.18	37.88	53 & 54
Mech Workshop	TT-05	99.6	75.1	13.0	85.97	−23.86	37.58	56 & 57
Production Warehouse	TT-06	51.4	38.8	13.0	88.61	24.15	37.58	58 & 59
Production Warehouse	TT-07	52.3	39.5	13.0	80.51	24.00	37.58	52 & 53
Store	TT-08	81.7	61.6	13.0	82.90	31.44	37.88	54 & 55
Store	TT-09	60.3	45.5	13.0	69.19	−5.33	37.88	45 & 46
Electrical Workshop	TT-10	32.5	24.6	13.0	75.27	−8.16	37.78	49 & 50
Electrical Store	TT-11	43.5	32.8	13.0	75.27	−1.02	37.78	49 & 50
Hydraulic Workshop	TT-12	31.1	23.5	13.0	75.37	4.83	37.68	49 & 50
Central Caisson Laydown Area	TT-13	5.5	6.0	9.0	61.89	−2.75	37.58	40 & 41
Starboard Forward Laydown Area	TT-14	19.8	21.6	9.0	37.67	22.62	37.58	24 & 25
Instrumentation Workshop	TT-15	61.3	46.3	13.0	73.19	23.30	37.58	48 & 49
Crew & Stores @ Tank Top		628.6	482.8		78.11	3.04	37.72	51 & 52

Void Spaces	ID	Max Wt (M.T)	Volume (m3)	Density (MT/m3)	LCG (m)	TCG (m)	VCG (m)	Between Frame No.s
VOID SPACE	N.27P	34.7	33.9	1.025	33.53	−21.3	5.33	22 & 23
VOID SPACE	N.27S	34.7	33.9	1.025	33.53	21.3	5.33	22 & 23
VOID SPACE	N.28P	34.7	33.9	1.025	79.25	−21.3	5.33	52 & 53
VOID SPACE	N.28S	34.7	33.9	1.025	79.25	21.3	5.33	52 & 53
VOID SPACE	N.29P	142.1	138.7	1.025	19.06	−30.1	15.24	12 & 13
VOID SPACE	N.29S	142.1	138.7	1.025	19.06	30.1	15.24	12 & 13
VOID SPACE	N.29aP	166.8	162.7	1.025	28.2	−35.7	18.36	18 & 19
VOID SPACE	N.29aS	166.8	162.7	1.025	28.2	35.7	18.36	18 & 19
VOID SPACE	N.30P	142.1	138.7	1.025	93.72	−30.1	15.24	61 & 62
VOID SPACE	N.30S	142.1	138.7	1.025	93.72	30.1	15.24	61 & 62
VOID SPACE	N.30aP	166.8	162.7	1.025	84.58	−35.7	18.36	55 & 56
VOID SPACE	N.30aS	166.8	162.7	1.025	84.58	35.7	18.36	55 & 56
VOID SPACE	N.31P	48.8	47.6	1.025	84.58	−30.0	22.10	55 & 56
VOID SPACE	N.31S	48.8	47.6	1.025	84.58	30.0	22.10	55 & 56
VOID SPACE	N.32P1	238.8	233.0	1.025	23.75	−16.8	25.15	15 & 16
VOID SPACE	N.32S1	238.8	233.0	1.025	23.75	16.8	25.15	15 & 16
VOID SPACE	N.32P2	239.0	234.0	1.025	32.47	−23.1	25.30	21 & 22
VOID SPACE	N.32S2	239.0	234.0	1.025	32.47	23.1	25.30	21 & 22
VOID SPACE	N.32P3	477.7	466.0	1.025	28.19	−26.1	25.15	18 & 19
VOID SPACE	N.32S3	477.7	466.0	1.025	28.19	26.1	25.15	18 & 19
VOID SPACE	N.33P1	252.7	246.5	1.025	80.29	−31.4	25.15	52 & 53
VOID SPACE	N.33S1	252.7	246.5	1.025	80.29	31.4	25.15	52 & 53
VOID SPACE	N.33P2	252.7	246.5	1.025	88.88	−31.4	25.15	58 & 59
VOID SPACE	N.33S2	252.7	246.5	1.025	88.88	31.4	25.15	58 & 59
VOID SPACE	N.34	361.8	353.0	1.025	50.56	0.0	12.95	33 & 34
VOID SPACE	N.35	361.8	353.0	1.025	55.52	0.0	12.95	40 & 41
VOID SPACE	N.36	59.5	58.0	1.025	56.39	−7.5	27.43	37 & 38
VOID SPACE	N.37P	130.2	127.0	1.025	48.65	−9.2	38.86	31 & 32
VOID SPACE	N.37S	113.0	110.2	1.025	48.56	9.1	38.68	31 & 32
VOID SPACE	N.38P	130.2	127.0	1.025	64.13	−9.2	38.86	42 & 43
VOID SPACE	N.38S	113.0	110.2	1.025	64.22	9.1	38.98	42 & 43
VOID SPACE	N.39	1404.9	1370.6	1.025	28.2	0.0	35.81	18 & 19
VOID SPACE	N.40	1987.0	1938.4	1.025	31.56	−5.1	35.81	33 & 34
VOID SPACE	N.41	220.8	215.4	1.025	56.39	24.0	35.81	37 & 38
VOID SPACE	N.42P	441.5	430.7	1.025	56.39	−30.9	35.81	37 & 38
VOID SPACE	N.42S	441.5	430.7	1.025	56.39	30.1	35.81	37 & 38
VOID SPACE	N.43	1911.9	1865.3	1.025	80.91	2.5	35.81	53 & 54
VOID SPACE	N.44	447.3	436.4	1.025	56.39	0.8	35.81	37 & 38
VOID SPACE	N.45P	226.5	220.9	1.025	93.72	−22.9	30.10	61 & 62
VOID SPACE	N.45S	226.5	220.9	1.025	93.72	22.9	30.10	61 & 62
VOID SPACE	N.45aP	183.2	178.7	1.025	93.72	−35.0	22.71	61 & 62
VOID SPACE	N.45aS	184.2	179.7	1.025	93.72	35.0	22.71	61 & 62
VOID SPACE	N.46P	226.5	220.9	1.025	19.06	−22.9	30.10	12 & 13
VOID SPACE	N.46S	226.5	220.9	1.025	19.06	22.9	30.10	12 & 13
VOID SPACE	N.46aP	183.2	178.7	1.025	19.06	−35.0	22.71	12 & 13
VOID SPACE	N.46aS	184.2	179.7	1.025	19.06	35.0	22.71	12 & 13
VOID SPACE	N.50P	48.6	47.4	1.025	16.77	−24.8	0.76	11 & 12
VOID SPACE	N.50S	48.6	47.4	1.025	16.77	24.8	0.76	11 & 12
VOID SPACE	N.51P	48.6	47.4	1.025	96.01	−24.8	0.76	62 & 63
VOID SPACE	N.51S	48.6	47.4	1.025	96.01	24.8	0.76	62 & 63
VOID SPACE	N.52P	146.0	142.4	1.025	71.57	−15.0	12.19	46 & 47
VOID SPACE	N.52S	146.0	142.4	1.025	71.57	15.0	12.19	46 & 47
VOID SPACE	N.53P	146.0	142.4	1.025	41.22	−15.0	12.19	27 & 28
VOID SPACE	N.53S	146.0	142.4	1.025	41.22	15.0	12.19	27 & 28
VOID SPACE	N.54	297.3	290.0	1.025	84.58	0.0	12.19	55 & 56
VOID SPACE	N.55	297.3	290.0	1.025	28.19	0.0	12.19	18 & 19
VOID SPACE	N.56	2639.9	2575.5	1.025	51.11	0.0	24.64	33 & 34
VOID SPACE	N.57	2639.9	2575.5	1.025	61.67	0.0	24.64	40 & 41
VOID SPACE	N.58S	205.0	200.0	1.025	42.3	15.0	12.19	27 & 28
VOID SPACE	N.58P	205.0	200.0	1.025	42.3	−15.0	12.19	27 & 28
VOID SPACE	N.59S	205.0	200.0	1.025	70.48	15.0	12.19	46 & 47
VOID SPACE	N.59P	205.0	200.0	1.025	70.48	−15.0	12.19	46 & 47
VOID SPACE	N.60	3222.1	3143.5	1.025	56.39	−0.6	24.76	37 & 38
VOID SPACE	N.61P	499.3	487.1	1.025	70.89	−27.4	10.67	46 & 47
VOID SPACE	N.61S	499.3	487.1	1.025	70.89	27.4	10.67	46 & 47
VOID SPACE	N.62S	118.8	115.9	1.025	27.69	29.9	14.50	18 & 19
VOID SPACE	N.62P	118.8	115.9	1.025	27.69	−29.9	14.50	18 & 19
VOID SPACE	N.63S	118.8	115.9	1.025	84.58	29.9	14.50	55 & 56
VOID SPACE	N.63P	118.8	115.9	1.025	84.58	−29.9	14.50	55 & 56
VOID SPACE	N.64S	256.3	252.0	1.025	27.69	29.9	22.95	18 & 19
VOID SPACE	N.64P	258.3	252.0	1.025	27.69	−29.9	22.95	18 & 19
VOID SPACE	N.65S	258.3	252.0	1.025	84.58	29.9	22.95	55 & 56
VOID SPACE	N.65P	258.3	252.0	1.025	84.58	−29.9	22.95	55 & 56
CHAIN LOCKER	9P	116.1	113.3	1.025	93.73	−34.8	15.40	61 & 62
CHAIN LOCKER	10P	116.1	113.3	1.025	19.05	−34.8	15.40	12 & 13
CHAIN LOCKER	11S	116.1	113.3	1.025	19.05	34.8	15.40	12 & 13
CHAIN LOCKER	12S	116.1	113.3	1.025	93.73	34.8	15.40	61 & 62
Void Spaces		27828.1	27149.37		56.00	−0.08	25.14	36 & 37

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
C	02.10.99	AS BUILT	SCE	MSC	AT
D	14.09.99	REVISED AFD	SCE	MSC	AT
C	05.03.99	AFC	SCE	MSC	AT
B	10.12.97	REVISED AFD	SCE	MSC	AT
A	29.10.97	AFD	SCE	MSC	AT
0	11.9.97	IDC	BHS	MSC	AT

BR BRADER

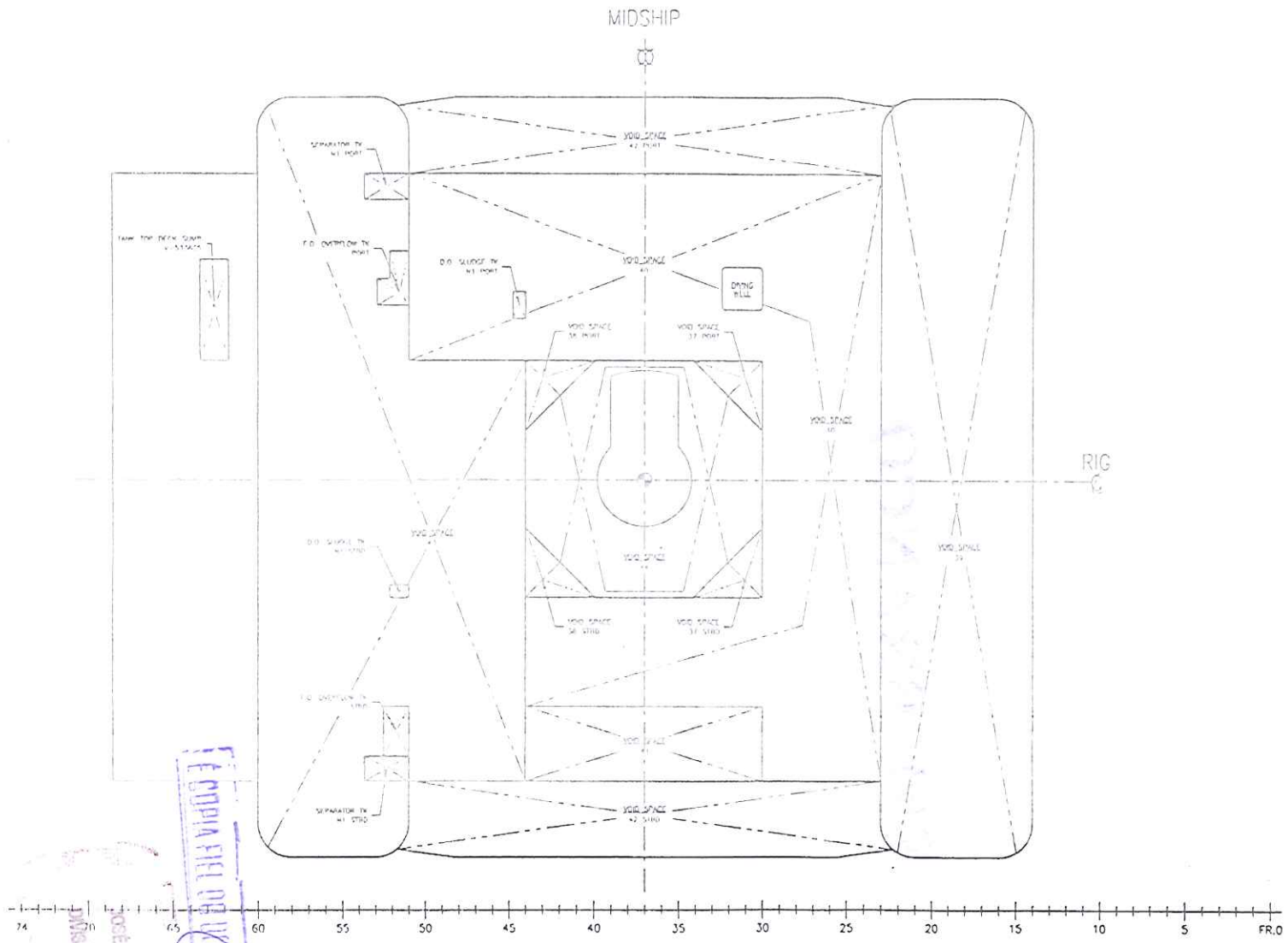
P36-RONCADOR FIELD DEVELOPMEN
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMDC

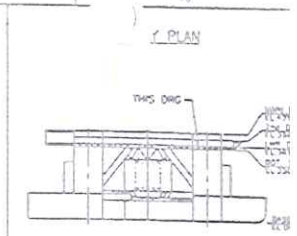
P36 RONCADOR
TANK CAPACITY
TABLES

DRAWN/DATE SCE/DEC.9
CHECKED/DATE MSC/OCT.9
APPROVED/DATE AT/OCT.9
SCALE N.T.S.

DRAWING NUMBER DE-3010.38-1320-967-NBD-367-07



PLAN ON DOUBLE BOTTOM
(EL.+35052 A.B.L.)



REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
B	12.10.99	AS BUILT	SCE	MSC	AT
A	01.09.99	A.F.C.	SCE	MSC	MSC

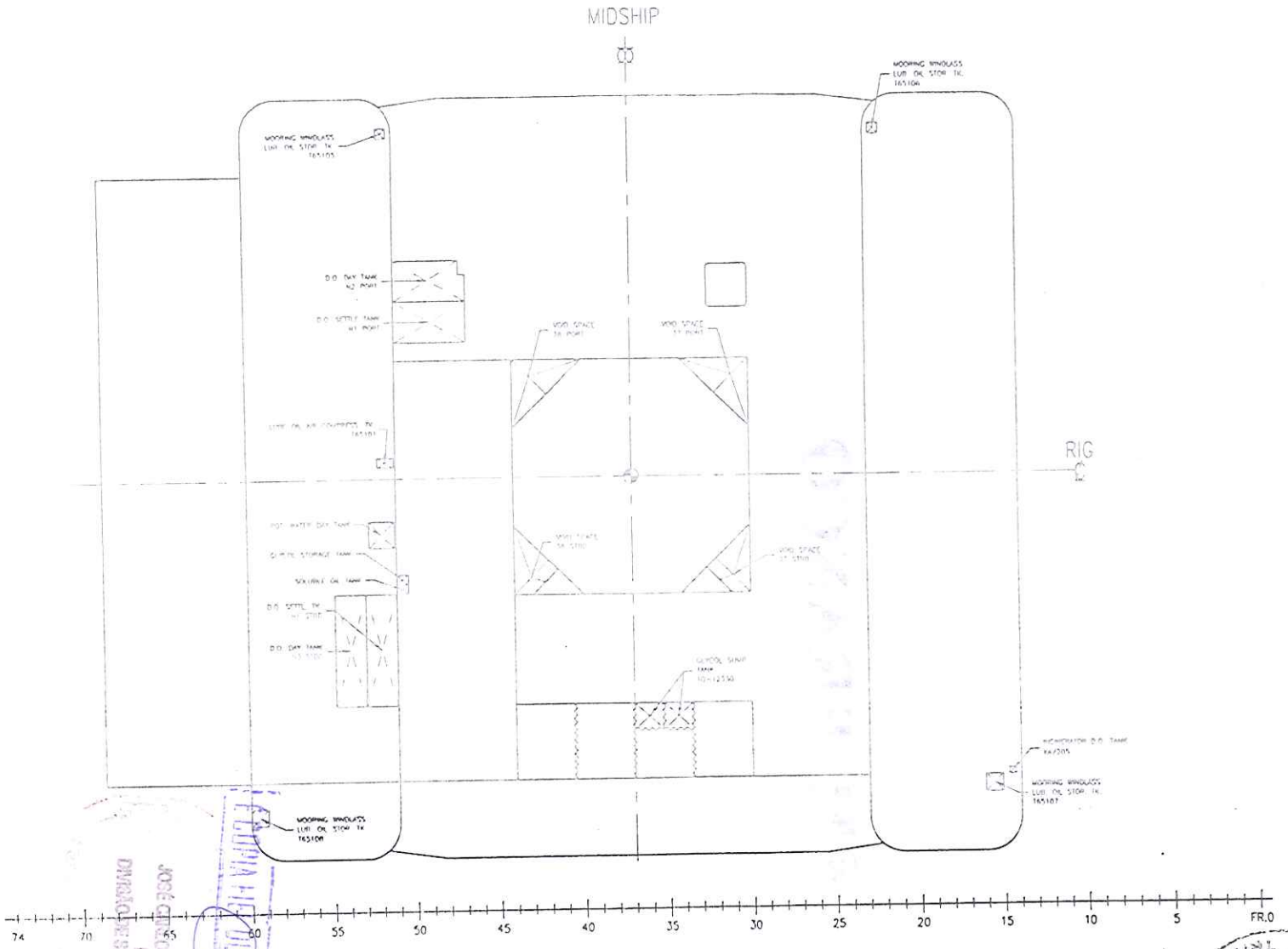
BR PETROBRAS — P36-RONCADOR FIELD DEVELOPME
CONTRACT No :- 7/15/2150

NOBLE DENTON — Petromec — AMEC

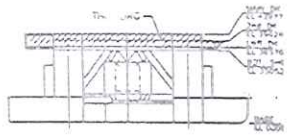
TITLE
CAPACITY PLAN
DOUBLE BOTTOM
EL.+35052 – EL.+36576 A.B.L.

DRAWN/DATE SCE/AUG
CHECKED/DATE MSC/OCT
APPROVED/DATE AT/OCT.9
SCALE 1:200

DRAWING NUMBER DE-3010.30-1320-962-WBD-367-08 REV



PLAN AT TANK TOP TO U/S MAIN DECK
(EL.+36576 A.B.L.)



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A	02.10.99	AS BUILT	SCE	WSE	AT
0	01.09.99	A.F.C.	SCE	WSE	WSE

BR BRAPOIL

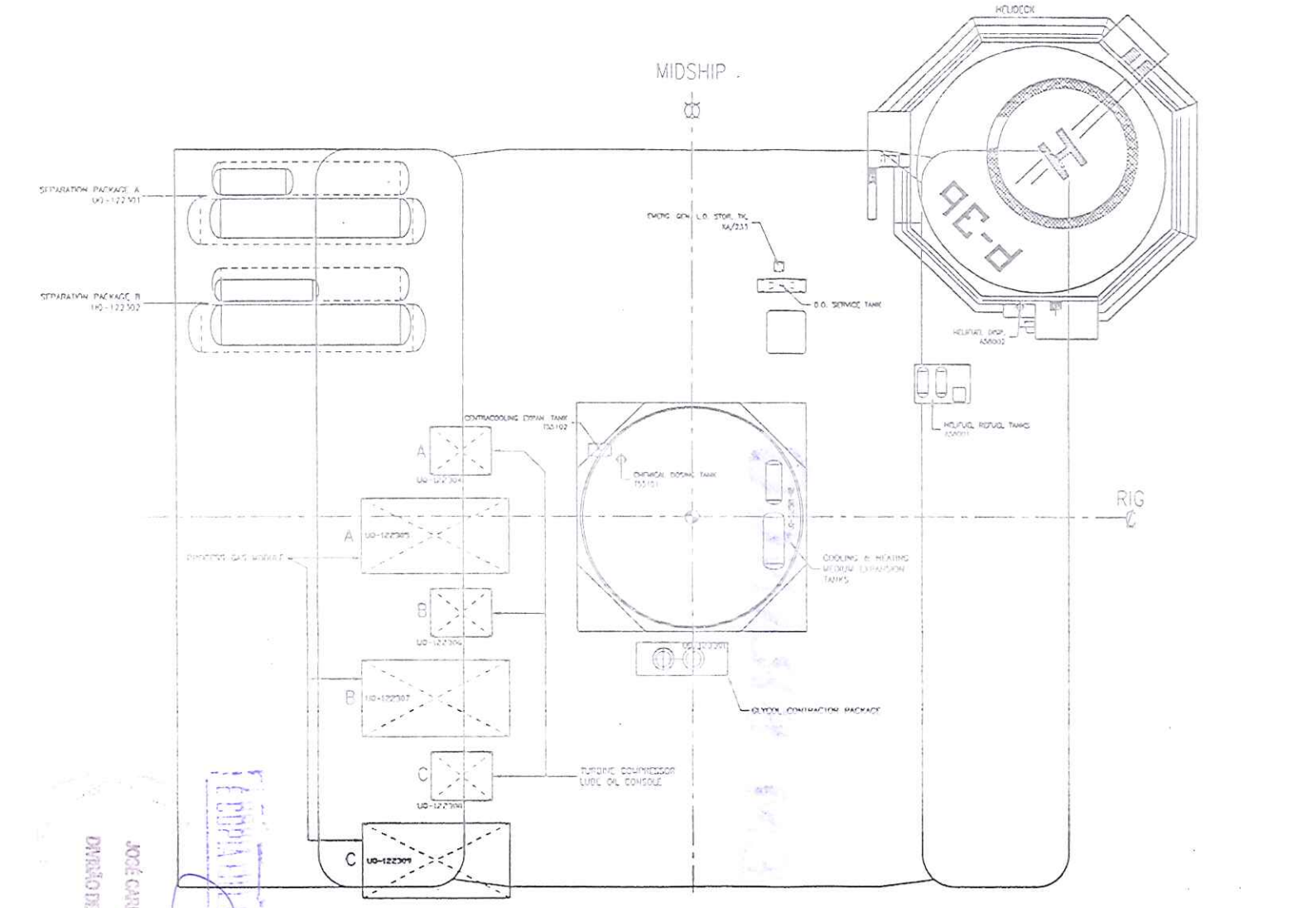
P36-RONCADOR FIELD DEVELOPM
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

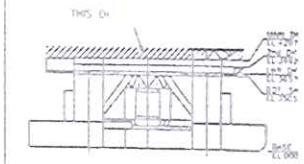
CAPACITY PLAN
TANK TOP TO U/S MAIN DECK
EL.+36576 - EL.+42977 A.B.L.

DRAWN/DATE SCE/AU
CHECKED/DATE WSE/OC
APPROVED/DATE AT/OCT
SCALE 1:200

DC-3010.38-1320-962-ABD-367-09



PLAN AT AND ABOVE MAIN DECK
(EL+42.672 A.B.L. & ABOVE)



REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
A	07.10.99	AS BUILT	SCE	MSE	AT
0	01.09.99	A.F.C.	SCE	MSE	MSE

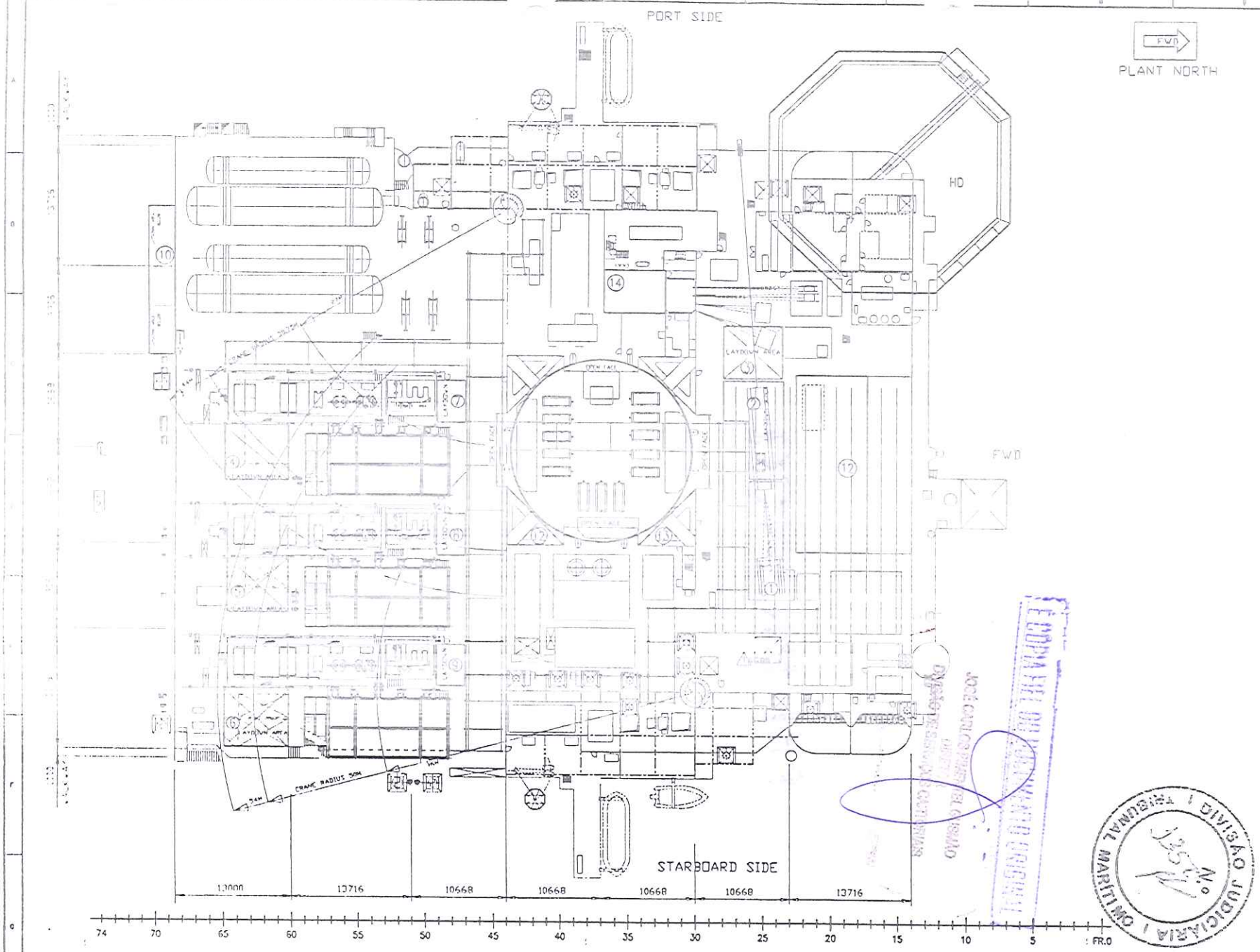
BR BRASOIL — P36-RONCADOR FIELD DEVELOPMEN
CONTRACT No :- 7/15/2150

NOBLE DENTON — Petromec — AMEC

CAPACITY PLAN
MAIN DECK AND ABOVE
EL+42977 A.B.L. AND UPWARDS

DRAWN/DATE SCE/AUG.9
CHECKED/DATE MSE/OCT.9
APPROVED/DATE AT/OCT.99
SCALE 1:200

DRAWING NUMBER DC-3010.38-1320-062-ABD-367-10



PLAN ON MAIN DECK EL 42672 ABL.

AREA No.	DESCRIPTION	X WL (1)	CONTROID	
1	TOTL TANK LAYD.	75.0	A S D.	37.14 10.07 43.00
2	MISC LAYDOWN 1	75.0	A S D.	38.56 -3.02 43.00
3	MISC LAYDOWN 2	53.3	A S D.	38.27 -11.28 43.00
4	COMPRESSOR A LAYDOWN	56.1	A S D.	95.42 0.43 43.00
5	COMPRESSOR B LAYDOWN	56.5	A S D.	95.44 15.43 43.00
6	COMPRESSOR C LAYDOWN	63.0	A S D.	95.44 30.80 43.00
7	TURBINE A LAYDOWN	19.0	A S D.	73.34 -5.46 43.00
8	TURBINE B LAYDOWN	19.0	A S D.	73.34 9.54 43.00
9	TURBINE C LAYDOWN	19.0	A S D.	73.34 24.54 43.00
10	PIG LAUNCHER LAYDOWN	67.4	A S D.	106.05 -19.00 38.58
11	MULTIPURPOSE COURT	212.0	A S D.	30.37 1.29 43.00
HO	HELIDECK	24.0	A S D.	23.90 -32.40 48.90
12	PAINT LOCKER	27.83	A S D.	65.89 8.51 43.87
13	DECK LOCKER	27.83	A S D.	48.89 8.51 43.87
14	FROM PULL-IN EQUIP. STORAGE AREA	45.64	A S D.	53.87 -18.10 43.00
	TOTAL	848.4	A S D.	63.09 -13.32 43.00

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
A	27.10.99	AS BUILT	SCC	MSC	AT	
0	01.06.99	A.F.C.	SCC	MSC	MSC	

BR BRASCONE

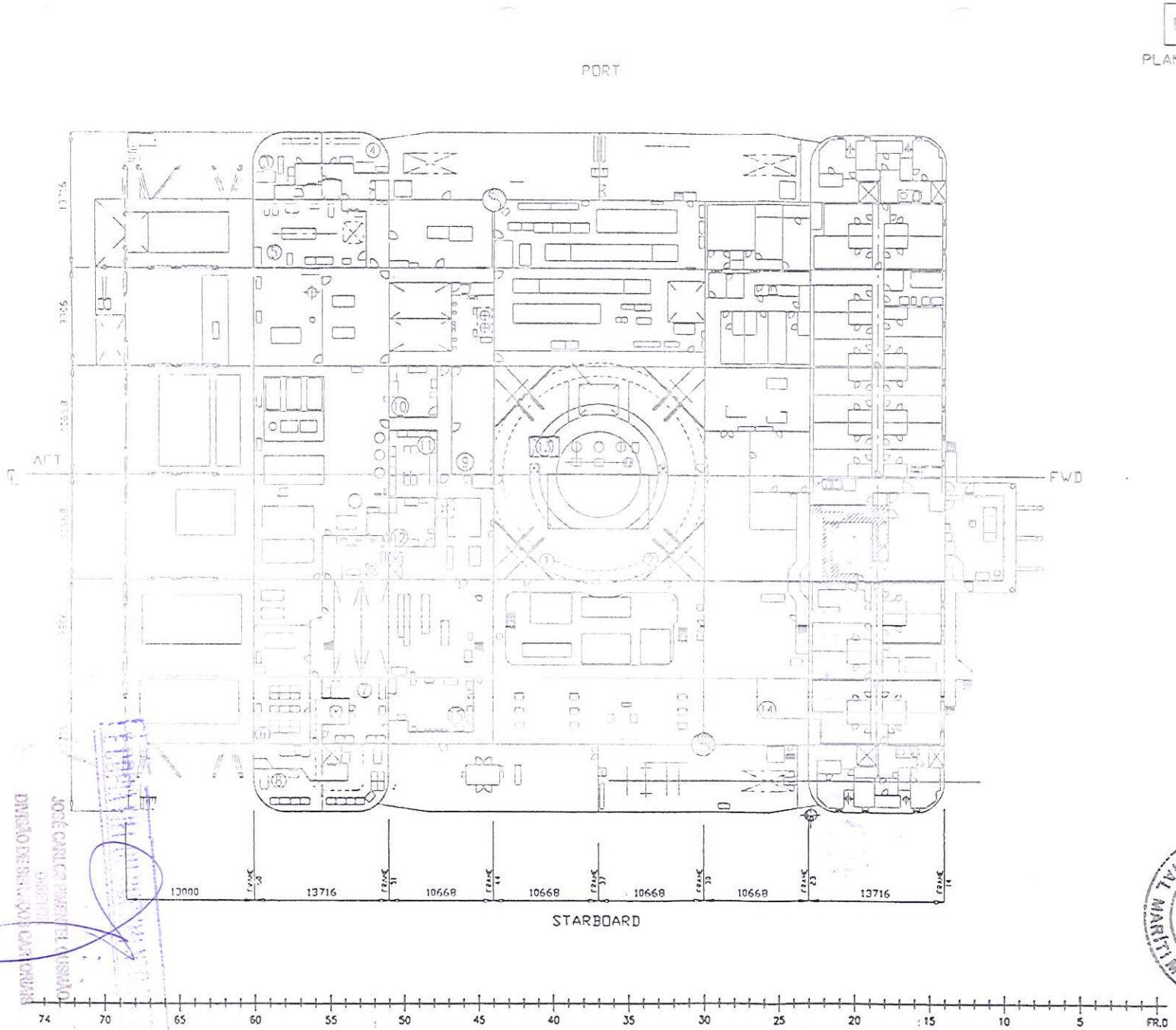
PJ6—RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

TITLE
STORAGE & LAYDOWN AREAS
@ MAIN DECK LEVEL
EL. 42.672 A.B.L.

DRAWN/DATE SCC/AUG.99
CHECKED/DATE MSC/OCT.99
APPROVED/DATE AT/OCT.99
SCALE 1:200

DRAWING NUMBER DC-3010.35-1320-962-MED-367-11 REV A



PLAN ON TANK TOP
EL. 36576

AREA No.		MAX WL (t)	CC
1	PUM[illegible]	8.04	A S EL
2	PUMP [illegible] FWD	8.04	A S EL
3	MECH STORE 1	42.48	A S EL
4	MECH STORE 2	30.96	A S EL
5	MECH WORKSHOP	99.56	A S EL
6	PRODUCTION WAREHOUSE	51.42	A S EL
7	PRODUCTION WAREHOUSE	52.31	A S EL
8	STORE	81.68	A S EL
9	STORE	60.34	A S EL
10	ELECTRICAL WORKSHOP	32.54	A S EL
11	ELECTRICAL STORE	43.51	A S EL
12	HYDRAULIC WORKSHOP	31.14	A S EL
13	CENTRAL CAISSON LAYDOWN AREA	5.50	A S EL
14	STARBOARD FORWARD LAYDOWN AREA	19.85	A S EL
15	INSTRUMENTATION WORKSHOP	61.29	A S EL
	TOTAL	626.81	A S EL

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APP'D BY
A	02.10.99	AS BUILT	SCE		
0	01.09.99	A.F.C.	SCE	MCC	MC

BR BRASOIL

P36-RONCADOR FIELD DEVELOP
CONTRACT No :- 7/15/215

NOBLE DENTON | Petromec | IMC

TITLE

STORAGE & LAYDOWN AREAS
@ TANK TOP LEVEL

EL. 36.576 A.B.L.

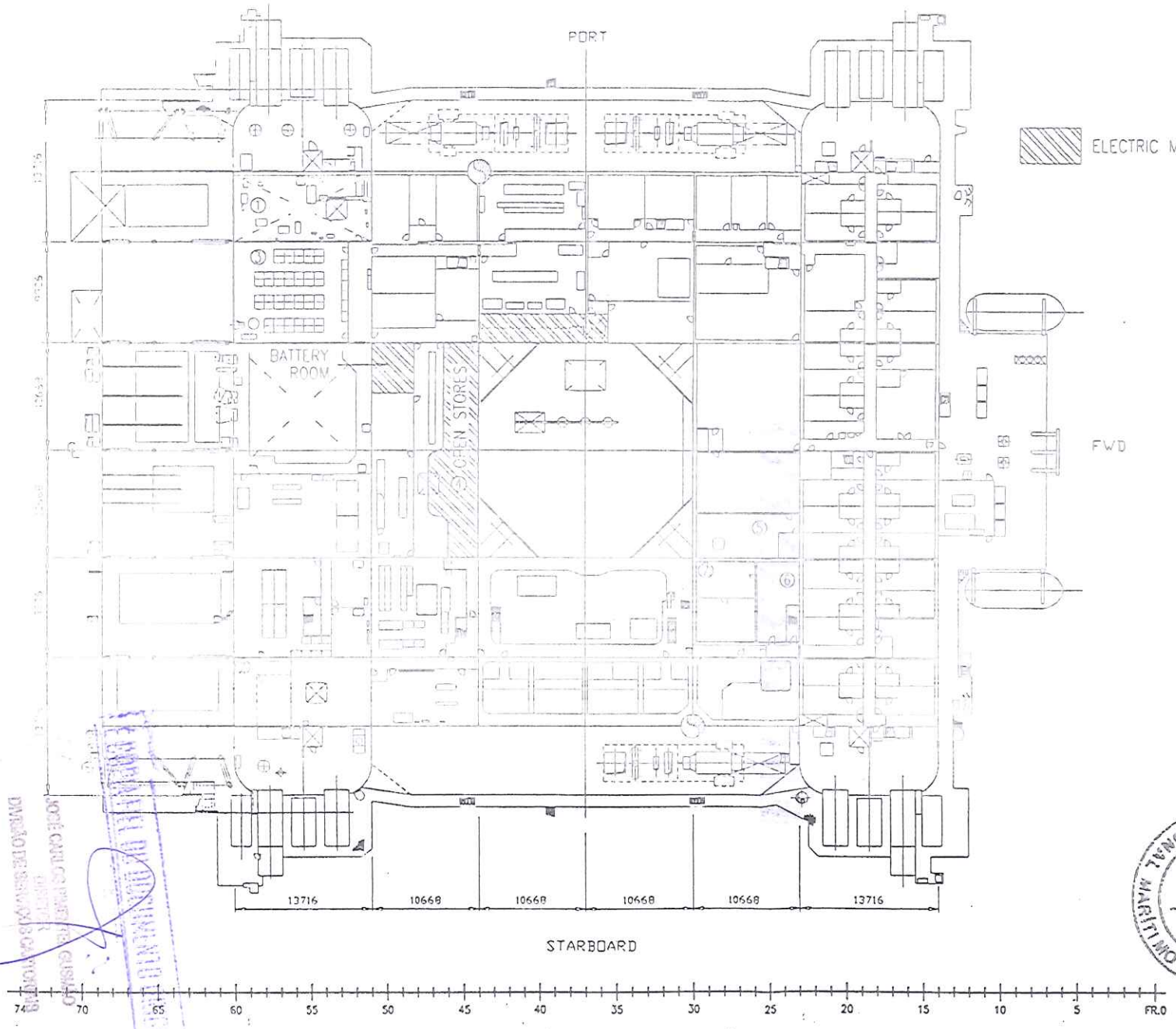
DRAWN/DATE SCE/A

CHECKED/D

APPROVED/

SCALE 1:200

DRAWING NUMBER
DC-3010.30-1320-062-MDD-367-12



PLAN ON SECOND DECK
EL. 39624

AREA NO		MAX WL (t)	CENTR
1	WELD	124.65	A 64 S 1. D 40
2	PRODUCT WAREHOUSE	51.65	A 68 S 24 D 41
3	WAREHOUSE	149.86	A 1.0 S 41
4	OPEN STORE	108.44	A 69 S 1.0 D 41
5	DRY STORE 1	59.78	A 60 S 8. D 40
6	DRY STORE 2	45.92	A 37 S 15. D 40
7	CHILLING ROOM/ FREEZER	61.84	A 42 S 15. D 41.
	CREW & EFFECTS	3.06	A 65 S 0.0 D 41.
	TOTAL	605.19	A 70 S 1.3 D 40

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY
A	29 09 99	AS BUILT	SCE		
0	01 09 99	A.F.C.	SCE	MSE	MSE

BR BRADOIL

P36-RONCADOR FIELD DEVELOPMEN
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

TITLE
STORAGE & LAYDOWN AREAS
@ SECOND DECK LEVEL
EL. 39.624 A.B.L.

DRAWN/DATE SCE/AUG.9
CHECKED/DATE
APPROVED/DATE
SCALE 1:200

DRAWING NUMBER DE-3010.38-1320-962-NDD-367-13
REV A

APPENDIX B

GENSTAB VERIFICATION OF AS-BUILT MODEL

(11 PAGES)

P-36 Roncador Field Development
As-Built Hydrostatic Comparison between Stability Book and NDA Genstab Program

	DISPLACEMENT (t)			LCB (m) from FP			VCB (m) ABL			WPA (m^2)			LCF (m) from FP			KMT (m)			KML (m)		
DRAFT	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error
0.26	779.33	823.8	-44.47	57.8644	57.94	-0.08	0.13	0.13	0.00	3053.53	3108.293	-54.76268	57.99	57.77	0.22	3409.2	3279.26	129.94	4023.5	3894.82	128.68
0.51	1588.62	1638.52	-49.90	57.7531	57.79	-0.04	0.26	0.26	0.00	3225.76	3240	-14.24	57.52	57.55	-0.03	1764.7	1719.17	45.53	2119.8	2065.59	54.21
0.76	2424.17	2479.58	-55.41	57.6681	57.7	-0.03	0.39	0.38	0.01	3293.09	3321.951	-28.86122	57.49	57.48	0.01	1180.8	1164.45	16.35	1432	1408.83	23.17
1.01	3275.54	3337.71	-62.17	57.6193	57.63	-0.01	0.52	0.51	0.01	3350.17	3373.659	-23.48854	57.46	57.44	0.02	888.7	878.69	10.01	1083.5	1068.63	14.87
1.26	4140.86	4207.17	-66.31	57.5801	57.58	0.00	0.65	0.64	0.01	3400.98	3413.659	-12.67854	57.38	57.30	0.08	713.3	705.35	7.95	872.8	865.47	7.33
1.51	5014.53	5084.86	-70.33	57.5404	57.52	0.02	0.78	0.77	0.01	3415.93	3435.122	-19.19195	57.34	57.20	0.14	592.2	587.50	4.70	728.2	725.33	2.87
1.76	5893.07	5966.27	-73.20	57.4892	57.47	0.02	0.9	0.9	0.00	3438.2	3443.902	-5.702439	57.08	57.13	-0.05	507.4	502.40	5.00	631.2	623.14	8.06
2.01	6774.85	6849.69	-74.84	57.4322	57.42	0.01	1.03	1.03	0.00	3443.62	3450.732	-7.111707	57.03	57.08	-0.05	442.3	438.72	3.58	551.7	545.77	5.93
2.26	7657.83	7734.48	-76.65	57.3835	57.38	0.00	1.16	1.15	0.01	3447.89	3454.634	-6.744146	56.99	57.04	-0.05	392.1	389.29	2.81	490	485.24	4.76
2.51	8541.84	8620.2	-78.36	57.3413	57.35	-0.01	1.29	1.28	0.01	3451.64	3457.561	-5.920976	56.96	57.01	-0.05	352.2	349.84	2.36	440.9	436.6	4.30
2.76	9426.71	9506.5	-79.79	57.304	57.31	-0.01	1.41	1.41	0.00	3454.43	3459.512	-5.082195	56.92	56.99	-0.07	319.6	317.64	1.96	400.7	396.7	4.00
3.01	10312.13	10393.16	-81.03	57.2703	57.29	-0.02	1.54	1.53	0.01	3456.05	3460.488	-4.437805	56.9	56.97	-0.07	292.6	290.89	1.71	367	363.42	3.58
3.26	11197.84	11280.05	-82.21	57.2402	57.26	-0.02	1.67	1.66	0.01	3456.93	3461.463	-4.533415	56.88	56.96	-0.08	269.8	268.32	1.48	338.5	335.26	3.24
3.51	12083.74	12167.08	-83.34	57.2139	57.24	-0.03	1.79	1.78	0.01	3457.12	3461.463	-4.343415	56.88	56.96	-0.08	250.2	249.03	1.17	314	311.16	2.84
3.76	12969.59	13054.17	-84.58	57.1911	57.22	-0.03	1.92	1.91	0.01	3457.12	3461.463	-4.343415	56.88	56.96	-0.08	233.4	232.37	1.03	292.8	290.3	2.50
4.01	13855.49	13941.29	-85.80	57.1714	57.2	-0.03	2.04	2.04	0.00	3457.12	3462.439	-5.319024	56.88	56.95	-0.07	218.7	217.83	0.87	274.3	272.08	2.22
4.26	14741.39	14828.42	-87.03	57.1539	57.19	-0.04	2.17	2.16	0.01	3457.11	3462.439	-5.329024	56.88	56.95	-0.07	205.8	205.05	0.75	258.1	256.05	2.05
4.51	15627.3	15715.55	-88.25	57.1385	57.18	-0.04	2.29	2.29	0.00	3457.11	3462.439	-5.329024	56.88	56.95	-0.07	194.4	193.72	0.68	243.7	241.85	1.85
4.76	16513.67	16602.86	-89.19	57.123	57.16	-0.04	2.42	2.41	0.01	3460.02	3463.415	-3.394634	56.83	56.94	-0.11	184.4	183.66	0.74	231.4	229.36	2.04
5.01	17400.4	17490.24	-89.84	57.108	57.15	-0.04	2.55	2.54	0.01	3460.37	3463.415	-3.044634	56.83	56.94	-0.11	175.2	174.59	0.61	219.9	217.97	1.93
5.26	18287.12	18377.62	-90.50	57.0945	57.14	-0.05	2.67	2.66	0.01	3460.37	3463.415	-3.044634	56.83	56.94	-0.11	167	166.41	0.59	209.5	207.7	1.80
5.51	19173.8	19265.01	-91.21	57.0821	57.13	-0.05	2.8	2.79	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	159.5	158.99	0.51	200.1	198.38	1.72
5.76	20060.54	20152.39	-91.85	57.0709	57.12	-0.05	2.92	2.91	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	152.7	152.24	0.46	191.5	189.89	1.61
6.01	20947.21	21039.77	-92.56	57.0607	57.11	-0.05	3.05	3.04	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	146.5	146.07	0.43	183.6	182.13	1.47
6.26	21833.96	21927.15	-93.19	57.0512	57.1	-0.05	3.17	3.16	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	140.8	140.40	0.40	176.4	175.01	1.39
6.51	22720.67	22814.53	-93.86	57.0420	57.1	-0.06	3.3	3.29	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	135.5	135.19	0.31	169.8	168.45	1.35
6.76	23607.38	23701.91	-94.53	57.0344	57.09	-0.06	3.42	3.41	0.01	3460.37	3463.415	-3.044634	56.83	56.94	-0.11	130.7	130.38	0.32	163.7	162.39	1.31
7.01	24494.09	24589.29	-95.20	57.0269	57.08	-0.05	3.55	3.54	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	126.2	125.92	0.28	158	156.78	1.22
7.26	25380.86	25476.67	-95.81	57.0201	57.08	-0.06	3.67	3.67	0.00	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	122.1	121.78	0.32	152.7	151.57	1.13
7.51	26267.57	26364.05	-96.48	57.0137	57.07	-0.06	3.8	3.79	0.01	3460.36	3463.415	-3.054634	56.83	56.94	-0.11	118.2	117.93	0.27	147.8	146.71	1.09
7.76	27154.24	27251.37	-97.13	57.0075	57.07	-0.06	3.92	3.92	0.00	3460.36	3462.439	-2.079024	56.83	56.94	-0.11	114.6	114.32	0.28	143.2	142.18	1.02
8.01	28040.29	28137.38	-97.09	57.0017	57.07	-0.07	4.05	4.04	0.01	3451.21	3455.61	-4.399756	56.83	56.94	-0.11	110.9	110.77	0.13	138.9	137.93	0.97
8.26	28922.57	29021.9	-99.33	56.9965	57.06	-0.06	4.17	4.17	0.00	3434.86	3442.927	-8.066829	56.83	56.94	-0.11	107.3	107.30	0.00	134.9	133.93	0.97
8.51	29800.63	29901.73	-101.10	56.9915	57.06	-0.07	4.3	4.29	0.01	3418.52	3421.463	-2.943415	56.83	56.94	-0.11	104	103.81	0.19	131.1	130.16	0.94
8.76	30674.25	30774.81	-100.56	56.9871	57.06	-0.07	4.42	4.41	0.01	3391.65	3388.293	3.357317	56.83	56.95	-0.12	100.5	101.24	-0.74	127.5	126.59	0.91
9.01	31532.35	31636.98	-104.63	56.983	57.06	-0.08	4.54	4.53	0.01	3304.84	3329.756	-24.9161	56.84	56.96	-0.12	95.8	96.28	-0.48	124	123.17	0.83
9.26	32251.03	32372.71	-121.68	56.9818	57.06	-0.08	4.65	4.64	0.01	2289.44	2270.244	19.1961	57.05	57.23	-0.18	69.2	68.77	0.43	116.3	115.1	1.20
9.51	32837.67	32954.53	-116.86	56.9829	57.06	-0.08	4.73	4.72	0.01	2289.45	2270.244	19.21	57.05	57.23	-0.18	68.2	67.72	0.48	114.4	113.23	1.17
9.76	33424.3	33536.34	-112.04	56.9841	57.06	-0.08	4.82	4.81	0.01	2289.44	2270.244	19.20	57.05	57.23	-0.18	67.1	66.71	0.39	112.5	111.43	1.07
10.01	34010.99	34118.15	-107.16	56.9853	57.07	-0.08	4.9	4.89	0.01	2289.44	2270.244	19.20	57.05	57.23	-0.18	66.1	65.74	0.36	110.8	109.7	1.10
10.26	34597.73	34699.97	-102.24	56.9865	57.07	-0.08	4.99	4.98	0.01	2289.45	2270.244	19.21	57.05	57.23	-0.18	65.2	64.81	0.39	109.1	108.03	1.07
10.51	35184.36	35281.78	-97.42	56.9876	57.07	-0.08	5.08	5.07	0.01	2289.44	2270.244	19.20	57.05	57.23	-0.18	64.3	63.91	0.39	107.4	106.42	0.98
10.76	35787.98	35908.77	-120.79	56.9884	57.07	-0.08	5.18	5.17	0.01	2494.78	2657.561	-162.78	57	57.10	-0.10	64.5	64.54	-0.04	108.8	108.29	0.51
11.01	36452.03	36607.09	-155.06	56.9881	57.07	-0.08	5.28	5.28	0.00	2868.76	2786.341	82.42	56.92	57.07	-0.15	64.5	64.14	0.36	109.3	108.26	1.04
11.26	37198.27	37332.09	-133.82	56.9865	57.07	-0.08	5.4	5.29	0.11	2949.44	2870.244	79.20	56.9	57.05	-0.15	63.9	63.51	0.39	108.4	107.45	0.95
11.51	37961.26	38075.29	-114.03	56.9847	57.07	-0.09	5.52	5.51	0.01	3001.93	2929.756	72.17	56.9	57.04	-0.14	63.1	62.75	0.35	107.2	106.28	0.92
11.76	38735.12	38831.38	-96.26	56.9829	57.07	-0.09	5.64	5.63	0.01	3035	2970.732	64.27	56.89	57.03	-0.14	62.2	61.92	0.28	105.7	104.88	0.82

P-36 Roncador Field Development

As-Bu[illegible] Hydrostatic Comparison between Stability Book and NDA Genstab Program

DRAFT	DISPLACEMENT (t)			LCB (m) from FP			VCB (m) ABL			WPA (m^2)			LCF (m) from FP			KMT (m)			KML (m)		
	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error
12.01	39515.41	39596.3	-80.89	56.9809	57.07	-0.09	5.76	5.75	0.01	3052.29	2998.05	54.24	56.89	57.02	-0.13	61.3	61.05	0.25	104.1	103.32	0.78
12.26	40191.77	40285.43	-93.66	56.978	57.07	-0.09	5.87	5.86	0.01	1572.65	1591.22	-18.57	56.39	56.39	0.00	24.9	25.55	-0.65	31.3	32.88	-1.58
12.51	40593.77	40693.53	-99.76	56.9723	57.06	-0.09	5.93	5.92	0.01	1561.73	1592.195	-30.47	56.39	56.39	0.00	24.7	25.39	-0.69	30.9	32.54	-1.64
12.76	40990.95	41100.17	-109.22	56.9666	57.05	-0.08	6	5.99	0.01	1535.89	1578.537	-42.65	56.39	56.39	0.00	24.5	25.16	-0.66	30.4	32.05	-1.65
13.01	41379.38	41499.04	-119.66	56.9611	57.05	-0.09	6.06	6.06	0.00	1492.61	1510.244	-17.63	56.39	56.39	0.00	24.2	24.27	-0.07	29.7	29.8	-0.10
13.26	41754.05	41880.36	-126.31	56.9563	57.04	-0.08	6.13	6.12	0.01	1426.03	1460.488	-34.46	56.39	56.39	0.00	23.8	23.91	-0.11	28.7	28.88	-0.18
13.51	42111.21	42245.26	-134.05	56.9511	57.04	-0.09	6.19	6.18	0.01	1354.78	1376.585	-21.81	56.39	56.39	0.00	23.2	23.41	-0.21	27.3	27.54	-0.24
13.76	42431.52	42579.63	-148.11	56.947	57.03	-0.08	6.25	6.24	0.01	1075.79	1182.439	-106.65	56.39	56.39	0.00	21.9	22.52	-0.62	23.8	24.71	-0.91
14.01	42707.24	42861.75	-154.51	56.9436	57.03	-0.09	6.3	6.29	0.01	1075.79	1078.049	-2.26	56.39	56.39	0.00	21.8	21.81	-0.01	23.7	23.67	0.03
14.26	42982.83	43138.14	-155.31	56.9399	57.02	-0.08	6.35	6.34	0.01	1075.79	1079.024	-3.23	56.39	56.39	0.00	21.8	21.76	0.04	23.7	23.61	0.09
14.51	43258.47	43414.94	-156.47	56.9363	57.02	-0.08	6.4	6.39	0.01	1075.79	1080.976	-5.19	56.39	56.39	0.00	21.7	21.71	-0.01	23.6	23.55	0.05
14.76	43534.09	43692.14	-158.05	56.9328	57.02	-0.09	6.45	6.45	0.00	1075.79	1082.927	-7.14	56.39	56.39	0.00	21.7	21.67	0.03	23.5	23.49	0.01
15.01	43809.75	43969.73	-159.98	56.9294	57.01	-0.08	6.5	6.5	0.00	1075.79	1083.902	-8.11	56.39	56.39	0.00	21.6	21.62	-0.02	23.5	23.44	0.06
15.26	44089.92	44247.92	-158.00	56.9259	57.01	-0.09	6.56	6.55	0.01	1121.63	1091.707	30.12	56.39	56.39	0.00	22.9	21.76	1.14	24.3	23.5	0.80
15.51	44382.02	44531.84	-149.82	56.9225	57	-0.08	6.61	6.61	0.00	1157.61	1125.854	31.76	56.39	56.39	0.00	23.7	22.65	1.05	24.8	24.07	0.73
15.76	44682.51	44824.39	-141.88	56.9188	57	-0.08	6.68	6.67	0.01	1189.25	1160	29.25	56.39	56.39	0.00	24.6	23.57	1.03	25.3	24.65	0.65
16.01	44991.7	45126.15	-134.45	56.9153	57	-0.08	6.74	6.73	0.01	1223.59	1197.073	26.52	56.39	56.39	0.00	25.5	24.56	0.94	25.9	25.24	0.66
16.26	45300.7	45427.64	-127.94	56.9114	56.99	-0.08	6.8	6.79	0.01	1259.12	1236.098	23.02	56.39	56.39	0.00	26.5	25.58	0.92	26.4	25.85	0.55
16.51	45634.48	45755.84	-121.36	56.9078	56.99	-0.08	6.87	6.86	0.01	1271.07	1244.878	26.19	56.39	56.39	0.00	26.7	25.71	0.99	26.5	25.92	0.58
16.76	45960.96	46075.66	-114.70	56.9041	56.98	-0.08	6.94	6.93	0.01	1276.65	1251.707	24.94	56.39	56.39	0.00	26.7	25.71	0.99	26.5	25.93	0.57
17.01	46288.6	46396.43	-107.83	56.9004	56.98	-0.08	7.01	7	0.01	1280.65	1253.659	26.99	56.39	56.39	0.00	26.6	25.65	0.95	26.4	25.81	0.59
17.26	46617.27	46718.52	-101.25	56.8969	56.97	-0.07	7.08	7.07	0.01	1284.34	1259.512	24.83	56.39	56.39	0.00	26.6	25.65	0.95	26.3	25.82	0.48
17.51	46946.93	47042.03	-95.10	56.8935	56.97	-0.08	7.15	7.14	0.02	1287.37	1265.366	22.00	56.39	56.39	0.00	26.5	25.64	0.86	26.2	25.81	0.39
17.76	47277.03	47365.4	-88.37	56.8899	56.97	-0.08	7.23	7.21	0.02	1289.22	1262.439	26.78	56.39	56.39	0.00	26.4	25.50	0.90	26.1	25.58	0.52
18.01	47607.34	47689.12	-81.78	56.8864	56.96	-0.07	7.3	7.28	0.02	1290.37	1263.415	24.96	56.39	56.39	0.00	26.3	25.45	0.85	26	25.53	0.47
18.26	47937.25	48012.95	-75.70	56.883	56.96	-0.08	7.38	7.36	0.02	1286.17	1263.415	22.76	56.39	56.39	0.00	26.2	25.39	0.81	25.9	25.47	0.43
18.51	48266.48	48335.35	-68.87	56.8796	56.96	-0.08	7.45	7.43	0.02	1280.97	1257.561	23.41	56.39	56.39	0.00	26.1	25.21	0.89	25.8	25.21	0.59
18.76	48595.28	48657.5	-62.22	56.8763	56.95	-0.07	7.53	7.5	0.03	1281.78	1257.561	24.22	56.39	56.39	0.00	26	25.16	0.84	25.6	25.16	0.44
19.01	48923.46	48979.65	-56.19	56.873	56.95	-0.08	7.6	7.58	0.02	1279.57	1257.561	22.01	56.39	56.39	0.00	25.9	25.11	0.79	25.5	25.11	0.39
19.26	49251.09	49300.64	-49.55	56.87	56.94	-0.07	7.68	7.65	0.03	1277.37	1250.732	26.64	56.39	56.39	0.00	25.8	24.94	0.86	25.4	24.94	0.46
19.51	49578.04	49620.9	-42.86	56.8666	56.94	-0.07	7.76	7.73	0.03	1275.17	1250.732	24.44	56.39	56.39	0.00	25.7	24.90	0.80	25.3	24.9	0.40
19.76	49904.51	49941.36	-36.85	56.8634	56.94	-0.08	7.84	7.81	0.03	1272.97	1250.732	22.24	56.39	56.39	0.00	25.6	24.86	0.74	25.2	24.86	0.34
20.01	50232.8	50260.54	-27.74	56.8605	56.93	-0.07	7.92	7.88	0.04	1281.86	1243.902	37.96	56.39	56.39	0.00	25.7	24.70	1.00	25.2	24.7	0.50
20.26	50560.3	50579.34	-19.44	56.8573	56.93	-0.07	7.99	7.96	0.03	1279.67	1243.902	35.77	56.39	56.39	0.00	25.6	24.67	0.93	25.1	24.5	0.60
20.51	50888.62	50898.2	-9.58	56.8543	56.93	-0.08	8.07	8.04	0.03	1277.47	1244.878	32.59	56.39	56.39	0.00	25.5	24.63	0.87	25	24.47	0.53
20.76	51212.27	51213.27	-1.00	56.8514	56.92	-0.07	8.15	8.12	0.03	1240.58	1205.854	34.73	56.39	56.39	0.00	24.4	23.62	0.78	24.3	23.75	0.55
21.01	51524.12	51516.6	7.52	56.8486	56.92	-0.07	8.23	8.19	0.04	1192.75	1160	32.75	56.39	56.39	0.00	23.1	22.38	0.72	23.5	22.97	0.53
21.26	51823.48	51808.04	15.44	56.8459	56.92	-0.07	8.31	8.26	0.05	1144.92	1113.171	31.75	56.39	56.39	0.00	21.9	21.21	0.69	22.7	22.21	0.49
21.51	52107.87	52088.78	19.09	56.8434	56.91	-0.07	8.38	8.33	0.05	1095.4	1089.756	5.64	56.39	56.39	0.00	20.8	20.68	0.12	21.8	21.73	0.07
21.76	52388.24	52368	20.24	56.841	56.91	-0.07	8.45	8.4	0.05	1093.2	1089.756	3.44	56.39	56.39	0.00	20.7	20.68	0.02	21.8	21.73	0.07
22.01	52668.13	52647.4	20.73	56.8387	56.91	-0.07	8.52	8.48	0.04	1091	1090.732	0.27	56.39	56.39	0.00	20.7	20.69	0.01	21.7	21.73	-0.03
22.26	52947.4	52925.96	21.44	56.8363	56.91	-0.07	8.59	8.55	0.04	1088.8	1084.878	3.92	56.39	56.39	0.00	20.6	20.58	0.02	21.6	21.56	0.04
22.51	53226.12	53204.03	22.09	56.8339	56.9	-0.07	8.66	8.62	0.04	1086.6	1085.854	0.75	56.39	56.39	0.00	20.6	20.59	0.01	21.6	21.56	0.04
22.76	53504.21	53482.29	21.92	56.8315	56.9	-0.07	8.74	8.69	0.05	1084.4	1085.854	-1.45	56.39	56.39	0.00	20.6	20.60	0.00	21.5	21.57	-0.07
23.01	53781.92	53759.74	22.18	56.8294	56.9	-0.07	8.81	8.77	0.04	1082.2	1080	2.20	56.39	56.39	0.00	20.5	20.50	0.00	21.5	21.4	0.10
23.26	54058.83	54036.62	22.21	56.827	56.9	-0.07	8.88	8.84	0.04	1080.01	1080.976	-0.97	56.39	56.39	0.00	20.5	20.51	-0.01	21.4	21.41	-0.01
23.51	54335.27	54313.65	21.62	56.8247	56.89	-0.07	8.96	8.91	0.05	1077.8	1080.976	-3.18	56.39	56.39	0.00	20.5	20.53	-0.03	21.4	21.42	-0.02
23.76	54611.19	54589.94	21.25	56.8225	56.89	-0.07	9.03	8.99	0.04	1075.61	1075.122	0.49	56.39	56.39	0.00	20.4	20.43	-0.03	21.3	21.26	0.04

P-36 Roncador Field Development

As-Built Hydrostatic Comparison between Stability Book and NDA Genstab Program

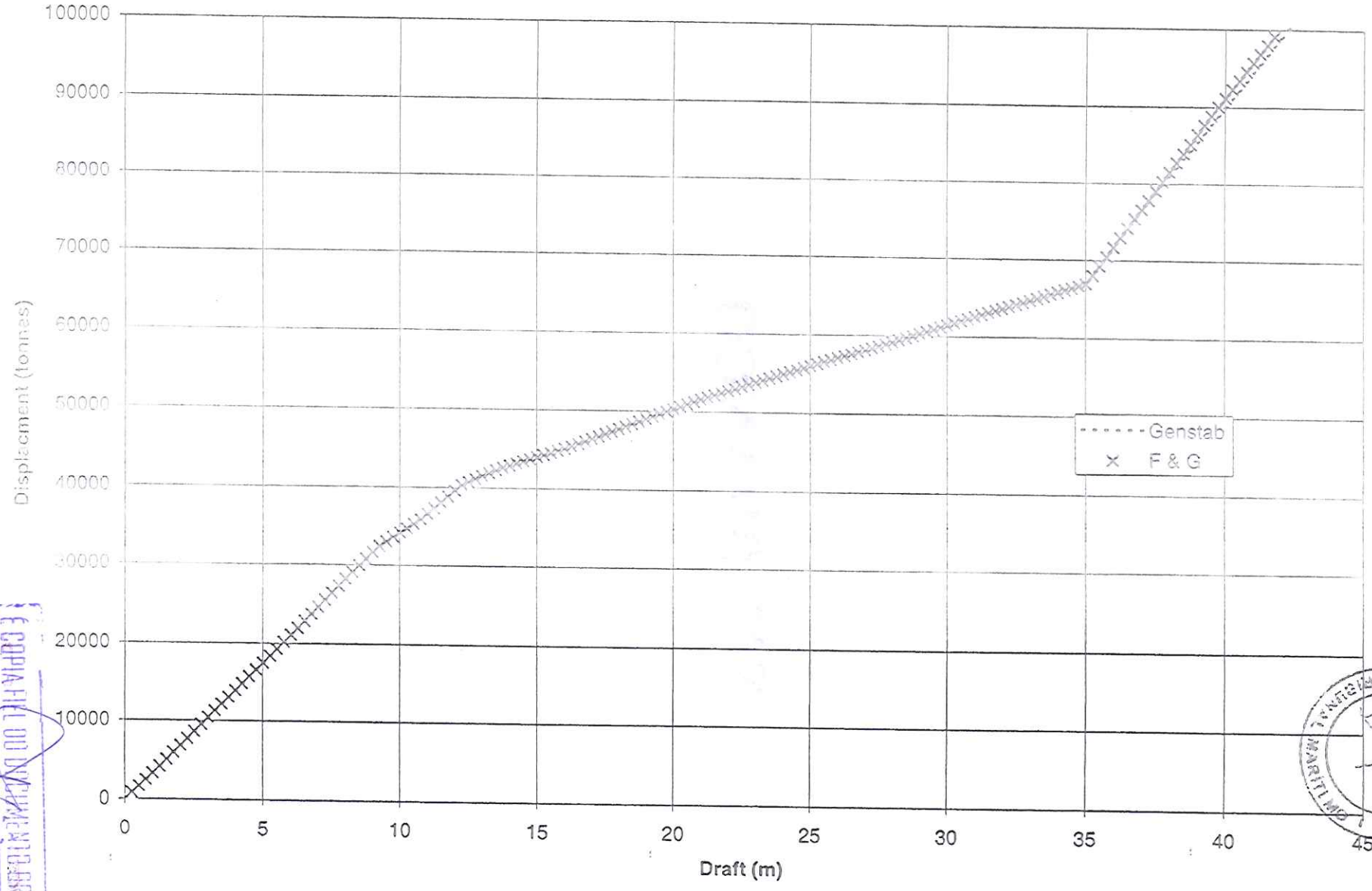
	DISPLACEMENT (t)			LCB (m) from FP			VCB (m) ABL			WPA (m^2)			LCF (m) from FP			KMT (m)			KML (m)		
DRAFT	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error
24.01	54866.54	54865.52	21.02	56.8204	56.89	-0.07	9.1	9.06	0.04	1073.41	1075.122	-1.71	56.39	56.39	0.00	20.4	20.44	-0.04	21.3	21.27	0.03
24.26	55161.28	55141.16	20.12	56.8182	56.89	-0.07	9.18	9.14	0.04	1071.2	1076.098	-4.90	56.39	56.39	0.00	20.4	20.46	-0.06	21.2	21.28	-0.08
24.51	55435.53	55416.25	19.28	56.8161	56.88	-0.06	9.25	9.21	0.04	1069	1071.22	-2.22	56.39	56.39	0.00	20.4	20.39	0.01	21.2	21.17	0.03
24.76	55709.17	55690.18	18.99	56.8141	56.88	-0.07	9.33	9.29	0.04	1065.86	1062.439	3.42	56.39	56.39	0.00	20.3	20.26	0.04	21.1	20.98	0.12
25.01	55981.56	55962.42	19.14	56.8119	56.88	-0.07	9.41	9.37	0.04	1060.26	1062.439	-2.18	56.39	56.39	0.00	20.3	20.28	0.02	21	20.99	0.01
25.26	56252.55	56234.66	17.89	56.8099	56.88	-0.07	9.48	9.44	0.04	1054.67	1062.439	-7.77	56.39	56.39	0.00	20.2	20.30	-0.10	20.9	21	-0.10
25.51	56522.08	56503.92	18.16	56.8079	56.87	-0.06	9.56	9.52	0.04	1049.07	1047.805	1.27	56.39	56.39	0.00	20.1	20.08	0.02	20.8	20.68	0.12
25.76	56790.22	56772.42	17.80	56.8059	56.87	-0.06	9.63	9.6	0.03	1043.48	1047.805	-4.32	56.39	56.39	0.00	20	20.10	-0.10	20.6	20.7	-0.10
26.01	57056.48	57040.25	16.23	56.804	56.87	-0.07	9.71	9.67	0.04	1036.62	1040.976	-4.36	56.39	56.39	0.00	20	20.00	0.00	20.5	20.56	-0.06
26.26	57322.15	57306.89	15.26	56.8021	56.87	-0.07	9.79	9.75	0.04	1036.62	1040.976	-4.36	56.39	56.39	0.00	20	20.03	-0.03	20.5	20.58	-0.08
26.51	57587.77	57573.53	14.24	56.8002	56.86	-0.06	9.86	9.83	0.03	1036.62	1040.976	-4.36	56.39	56.39	0.00	20	20.05	-0.05	20.6	20.6	0.00
26.76	57853.41	57840.16	13.25	56.7983	56.86	-0.06	9.94	9.9	0.04	1036.62	1040.976	-4.36	56.39	56.39	0.00	20	20.08	-0.08	20.6	20.62	-0.02
27.01	58119.05	58106.8	12.25	56.7965	56.86	-0.06	10.02	9.98	0.04	1036.62	1040.976	-4.36	56.39	56.39	0.00	20.1	20.11	-0.01	20.6	20.65	-0.05
27.26	58384.7	58373.43	11.27	56.7946	56.86	-0.07	10.09	10.06	0.03	1036.62	1040.976	-4.36	56.39	56.39	0.00	20.1	20.13	-0.03	20.6	20.67	-0.07
27.51	58655.78	58640.18	15.60	56.7928	56.86	-0.07	10.17	10.14	0.03	1061.95	1043.902	18.05	56.39	56.39	0.00	20.1	20.16	-0.06	20.7	20.7	0.00
27.76	58927.91	58908.76	19.15	56.7909	56.85	-0.06	10.25	10.22	0.03	1061.95	1052.683	9.27	56.39	56.39	0.00	20.1	20.20	-0.10	20.7	20.73	-0.03
28.01	59200.02	59179.65	20.37	56.7891	56.85	-0.06	10.34	10.3	0.04	1061.95	1061.463	0.49	56.39	56.39	0.00	20.2	20.23	-0.03	20.7	20.76	-0.06
28.26	59472.13	59452.73	19.40	56.7872	56.85	-0.06	10.42	10.38	0.04	1061.95	1070.244	-8.29	56.39	56.39	0.00	20.2	20.26	-0.06	20.7	20.79	-0.09
28.51	59744.29	59727.89	16.40	56.7854	56.85	-0.06	10.5	10.46	0.04	1061.95	1078.049	-16.10	56.39	56.39	0.00	20.2	20.30	-0.10	20.8	20.83	-0.03
28.76	60016.41	60005.01	11.40	56.7836	56.85	-0.07	10.58	10.55	0.03	1061.95	1084.878	-22.93	56.39	56.39	0.00	20.3	20.33	-0.03	20.8	20.86	-0.06
29.01	60288.48	60283.76	4.72	56.7818	56.84	-0.06	10.66	10.63	0.03	1061.95	1088.78	-26.83	56.39	56.39	0.00	20.3	20.37	-0.07	20.8	20.89	-0.09
29.26	60565.32	60562.7	2.62	56.78	56.84	-0.06	10.75	10.72	0.03	1083.74	1087.805	-4.06	56.39	56.39	0.00	20.4	20.41	-0.01	20.9	20.93	-0.03
29.51	60842.99	60841.42	1.57	56.7782	56.84	-0.06	10.83	10.8	0.03	1083.74	1086.829	-3.09	56.39	56.39	0.00	20.4	20.44	-0.04	20.9	20.96	-0.06
29.76	61120.73	61119.91	0.82	56.7765	56.84	-0.06	10.92	10.89	0.03	1083.74	1086.829	-3.09	56.39	56.39	0.00	20.4	20.46	-0.06	20.9	21	-0.10
30.01	61398.45	61398.19	0.26	56.7748	56.83	-0.06	11	10.97	0.03	1083.74	1085.854	-2.11	56.39	56.39	0.00	20.5	20.52	-0.02	21	21.03	-0.03
30.26	61676.12	61676.24	-0.12	56.773	56.83	-0.06	11.09	11.06	0.03	1083.74	1084.878	-1.14	56.39	56.39	0.00	20.5	20.56	-0.06	21	21.07	-0.07
30.51	61953.84	61954.06	-0.22	56.7713	56.83	-0.06	11.18	11.15	0.03	1083.74	1083.902	-0.16	56.39	56.39	0.00	20.6	20.60	0.00	21.1	21.1	0.00
30.76	62231.55	62231.66	-0.11	56.7696	56.83	-0.06	11.26	11.23	0.03	1083.74	1082.927	0.81	56.39	56.39	0.00	20.6	20.64	-0.04	21.1	21.14	-0.04
31.01	62509.3	62509.04	0.26	56.7679	56.83	-0.05	11.35	11.32	0.03	1083.74	1081.951	1.79	56.39	56.39	0.00	20.6	20.68	-0.08	21.1	21.18	-0.08
31.26	62787.03	62786.2	0.83	56.7663	56.83	-0.06	11.44	11.41	0.03	1083.74	1080.976	2.76	56.39	56.39	0.00	20.7	20.72	-0.02	21.2	21.22	-0.02
31.51	63064.72	63063.13	1.59	56.7646	56.82	-0.06	11.53	11.5	0.03	1083.74	1080	3.74	56.39	56.39	0.00	20.7	20.77	-0.07	21.2	21.26	-0.06
31.76	63342.44	63339.85	2.59	56.763	56.82	-0.06	11.61	11.59	0.02	1083.74	1079.024	4.72	56.39	56.39	0.00	20.8	20.81	-0.01	21.3	21.3	0.00
32.01	63620.16	63616.34	3.82	56.7614	56.82	-0.06	11.7	11.67	0.03	1083.74	1078.049	5.69	56.39	56.39	0.00	20.8	20.85	-0.05	21.3	21.35	-0.05
32.26	63897.89	63892.6	5.29	56.7598	56.82	-0.06	11.79	11.76	0.03	1083.74	1078.049	5.69	56.39	56.39	0.00	20.9	20.90	0.00	21.4	21.39	0.01
32.51	64175.62	64168.65	6.97	56.7582	56.82	-0.06	11.88	11.85	0.03	1083.74	1077.073	6.67	56.39	56.39	0.00	20.9	20.94	-0.04	21.4	21.43	-0.03
32.76	64453.31	64444.48	8.83	56.7566	56.81	-0.05	11.97	11.94	0.03	1083.74	1076.098	7.64	56.39	56.39	0.00	21	20.99	0.01	21.4	21.48	-0.08
33.01	64731.01	64720.08	10.93	56.755	56.81	-0.05	12.06	12.03	0.03	1083.74	1075.122	8.62	56.39	56.39	0.00	21	21.04	-0.04	21.5	21.52	-0.02
33.26	65008.72	64995.49	13.23	56.7534	56.81	-0.06	12.15	12.12	0.03	1083.74	1075.122	8.62	56.39	56.39	0.00	21.1	21.09	0.01	21.5	21.57	-0.07
33.51	65286.43	65270.78	15.65	56.7519	56.81	-0.06	12.24	12.21	0.03	1083.74	1074.146	9.59	56.39	56.39	0.00	21.1	21.14	-0.04	21.6	21.62	-0.02
33.76	65564.16	65545.86	18.30	56.7504	56.81	-0.06	12.33	12.3	0.03	1083.74	1073.171	10.57	56.39	56.39	0.00	21.2	21.19	0.01	21.6	21.67	-0.07
34.01	65841.84	65820.65	21.19	56.7489	56.81	-0.06	12.42	12.39	0.03	1082.86	1071.22	11.64	56.39	56.39	0.00	21.2	21.24	-0.04	21.7	21.71	-0.01
34.26	66118.83	66094.64	24.19	56.7473	56.8	-0.05	12.51	12.48	0.03	1079.09	1066.341	12.75	56.39	56.39	0.00	21.3	21.29	0.01	21.7	21.76	-0.06
34.51	66394.72	66367.28	27.44	56.7458	56.8	-0.05	12.6	12.57	0.03	1074	1060.488	13.51	56.39	56.39	0.00	21.3	21.33	-0.03	21.8	21.8	0.00
34.76	66669.22	66638.31	30.91	56.7444	56.8	-0.06	12.69	12.66	0.03	1068.18	1053.659	14.52	56.39	56.39	0.00	21.3	21.38	-0.08	21.8	21.85	-0.05
35.01	66942.11	66907.57	34.54	56.7429	56.8	-0.06	12.79	12.75	0.04	1062.02	1046.829	15.19	56.39	56.39	0.00	21.4	21.64	-0.24	21.9	22.3	-0.40
35.26	68009.11	68013.57	-4.46	56.7375	56.79	-0.05	13.14	13.11	0.03	4751.39	4756.098	-4.71	56.39	56.39	0.00	41.3	41.28	0.02	42.6	42.65	-0.05
35.51	69225.95	69231.52	-5.57	56.7315	56.78	-0.05	13.53	13.5	0.03	4745.43	4750.244	-4.81	56.39	56.39	0.00	41.1	41.17	-0.07	42.5	42.51	-0.01
35.76	70441.3	70448.02	-6.72	56.7256	56.78	-0.05	13.91	13.89	0.02	4740.06	4744.39	-4.33	56.39	56.39	0.00	41	41.07	-0.07	42.4	42.39	0.01

P-36 Roncador Field Development

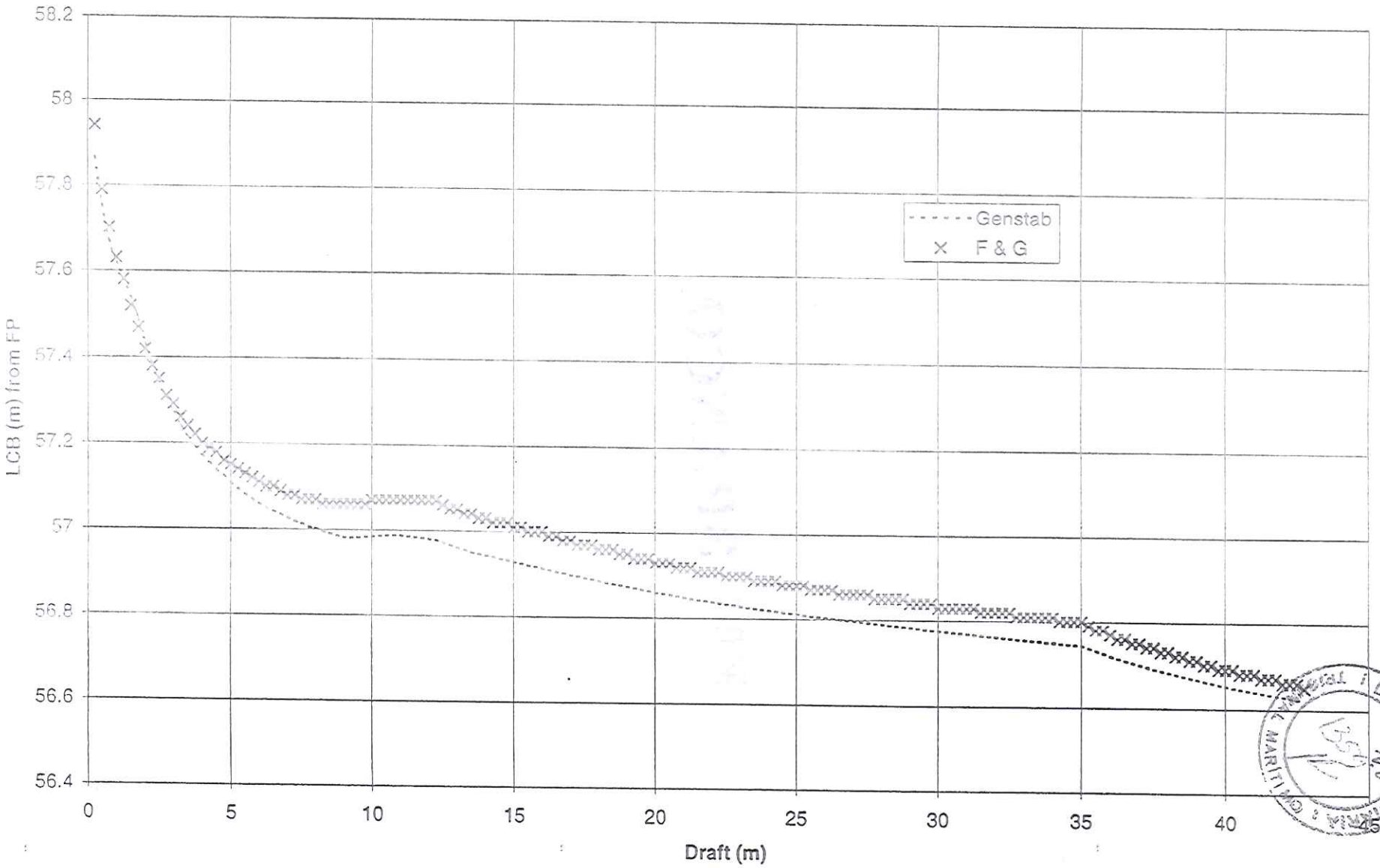
As-Built Hydrostatic Comparison between Stability Book and NDT Genstab Program

DRAFT	DISPLACEMENT (t)			LCB (m) from FP			VCB (m) ABL			WPA (m²)			LCF (m) from FP			KMT (m)			KML (m)		
	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error	Genstab	F & G	error
36.01	71655.33	71663.3	-7.97	56.7199	56.77	-0.05	14.28	14.26	0.02	4735.77	4740.488	-4.72	56.39	56.39	0.00	41	40.97	0.03	42.3	42.27	0.03
36.26	72868.56	72877.81	-9.25	56.7144	56.76	-0.05	14.64	14.62	0.02	4733.88	4739.512	-5.63	56.39	56.39	0.00	40.9	40.89	0.01	42.2	42.17	0.03
36.51	74081.63	74092.2	-10.57	56.7091	56.76	-0.05	15	14.98	0.02	4733.88	4739.512	-5.63	56.39	56.39	0.00	40.8	40.82	-0.02	42.1	42.07	0.03
36.76	75234.83	75317.34	-82.51	56.7042	56.75	-0.05	15.33	15.33	0.00	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.6	40.75	-0.15	41.8	41.99	-0.19
37.01	76364.75	76546.32	-181.57	56.6996	56.75	-0.05	15.65	15.68	-0.03	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.5	40.69	-0.19	41.7	41.91	-0.21
37.26	77494.78	77775.31	-280.53	56.6951	56.74	-0.04	15.96	16.02	-0.06	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.5	40.64	-0.14	41.7	41.83	-0.13
37.51	78624.56	79004.3	-379.74	56.6907	56.74	-0.05	16.27	16.35	-0.08	4409.55	4796.098	-386.55	56.39	56.39	0.00	40.4	40.58	-0.18	41.6	41.76	-0.16
37.76	79754.58	80233.29	-478.71	56.6865	56.73	-0.04	16.58	16.68	-0.10	4409.55	4796.098	-386.55	56.39	56.39	0.00	40.4	40.54	-0.14	41.6	41.7	-0.10
38.01	80884.58	81462.27	-577.69	56.6824	56.73	-0.05	16.87	17	-0.13	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.4	40.50	-0.10	41.5	41.64	-0.14
38.26	82014.81	82691.26	-676.45	56.6786	56.72	-0.04	17.17	17.31	-0.14	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.3	40.46	-0.16	41.5	41.59	-0.09
38.51	83144.7	83920.25	-775.55	56.6746	56.72	-0.05	17.45	17.62	-0.17	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.3	40.43	-0.13	41.4	41.54	-0.14
38.76	84274.73	85149.23	-874.50	56.6708	56.71	-0.04	17.74	17.92	-0.18	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.3	40.41	-0.11	41.4	41.5	-0.10
39.01	85404.75	86378.22	-973.47	56.6671	56.71	-0.04	18.02	18.22	-0.20	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.3	40.39	-0.09	41.4	41.46	-0.06
39.26	86534.75	87607.21	-1072.46	56.6635	56.7	-0.04	18.29	18.51	-0.22	4409.54	4796.098	-386.56	56.39	56.39	0.00	40.2	40.37	-0.17	41.3	41.43	-0.13
39.51	87664.67	88836.19	-1171.52	56.66	56.7	-0.04	18.57	18.8	-0.23	4409.55	4796.098	-386.55	56.39	56.39	0.00	40.2	40.36	-0.16	41.3	41.4	-0.10
39.76	88791.42	90018.07	-1226.65	56.6596	56.69	-0.03	18.83	19.08	-0.25	4387.06	4420.488	-33.43	56.39	56.39	0.00	39.9	36.24	3.66	41.2	37.99	3.21
40.01	89915.52	91150.73	-1235.21	56.6533	56.69	-0.04	19.1	19.33	-0.23	4387.06	4420.488	-33.43	56.39	56.39	0.00	39.9	36.28	3.62	41.2	38.01	3.19
40.26	91039.61	92283.4	-1243.79	56.65	56.69	-0.04	19.36	19.59	-0.23	4387.06	4420.488	-33.43	56.39	56.39	0.00	39.9	36.33	3.57	41.1	38.04	3.06
40.51	92163.92	93416.06	-1252.14	56.6469	56.68	-0.03	19.61	19.84	-0.23	4387.05	4420.488	-33.44	56.39	56.39	0.00	40	36.38	3.62	41.1	38.07	3.03
40.76	93288.08	94548.73	-1260.65	56.6438	56.68	-0.04	19.87	20.09	-0.22	4387.06	4420.488	-33.43	56.39	56.39	0.00	40	36.43	3.57	41.1	38.1	3.00
41.01	94412.25	95681.39	-1269.14	56.6408	56.68	-0.04	20.12	20.34	-0.22	4387.05	4420.488	-33.44	56.39	56.39	0.00	40	36.48	3.52	41.1	38.13	2.97
41.26	95536.36	96814.06	-1277.70	56.6378	56.67	-0.03	20.36	20.58	-0.22	4387.05	4420.488	-33.44	56.39	56.39	0.00	40	36.54	3.46	41.1	38.16	2.94
41.51	96660.61	97946.72	-1286.11	56.6349	56.67	-0.04	20.61	20.82	-0.21	4387.06	4420.488	-33.43	56.39	56.39	0.00	40	36.59	3.41	41.1	38.2	2.90
41.76	97784.61	99079.39	-1294.57	56.6322	56.67	-0.04	20.85	21.06	-0.21	4387.06	4420.488	-33.43	56.39	56.39	0.00	40	36.65	3.35	41.1	38.24	2.86
42.01	98908.95	100212.1	-1303.10	56.6294	56.66	-0.03	21.09	21.29	-0.20	4387.05	4420.488	-33.44	56.39	56.39	0.00	40	36.71	3.29	41.1	28.28	12.82
42.26	100033.2	101344.7	-1311.55	56.6267	56.66	-0.03	21.33	21.53	-0.20	4387.05	4420.488	-33.44	56.39	56.39	0.00	40.1	36.77	3.33	41.2	28.33	12.87
42.51	101157.6	102477.4	-1319.82	56.6242	56.66	-0.04	21.56	21.76	-0.20	4387.05	4420.488	-33.44	56.39	56.39	0.00	40.1	36.83	3.27	41.2	38.37	2.83
42.76	101877.1	103507.3	-1630.20	56.6226	56.65	-0.03	21.71	21.97	-0.26	0			56.39	56.39	0.00	21.7	26.10	-4.40	21.7	33.7	-12.00

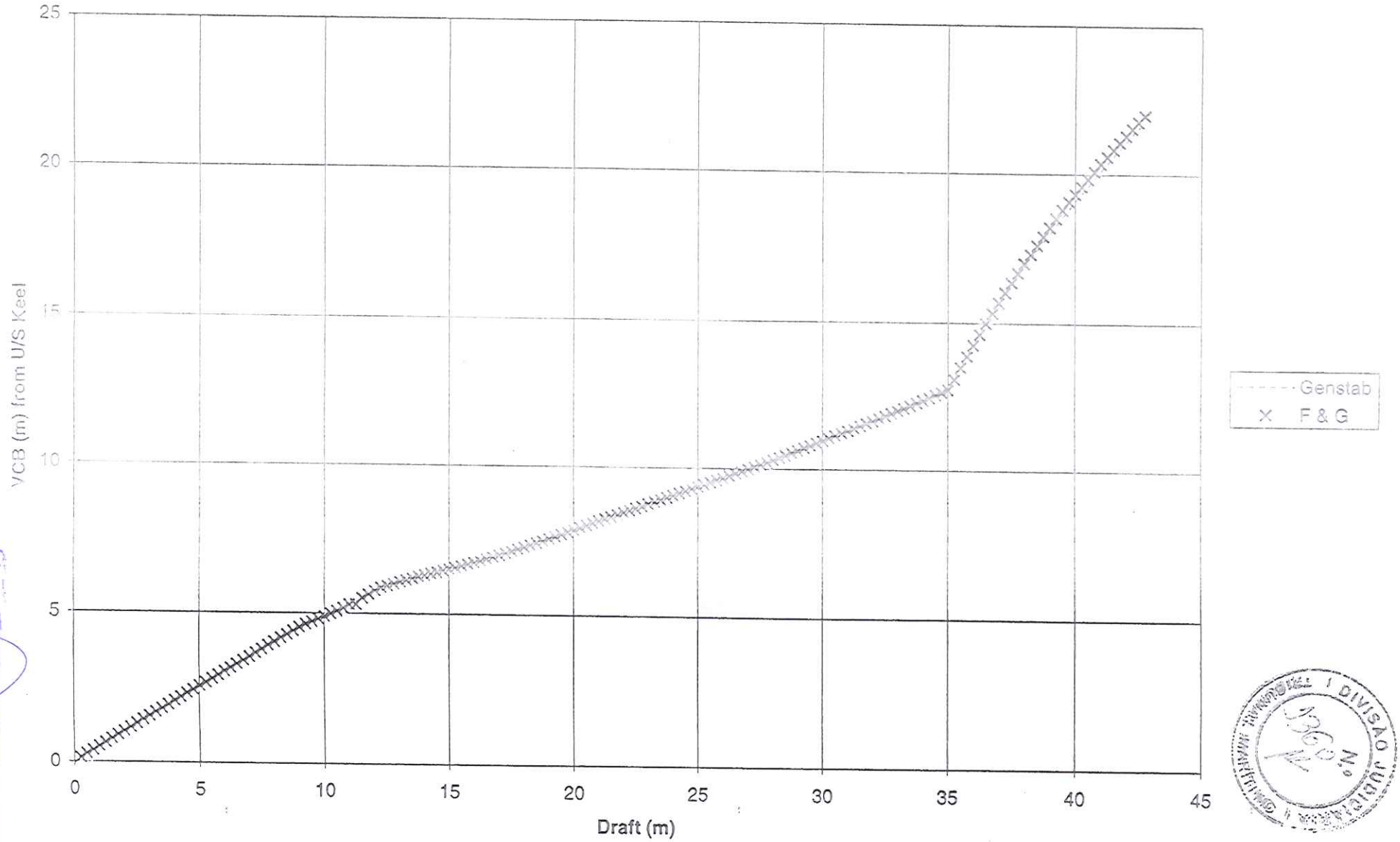
P-36 Fincanteri Hydrostatics - Displacement



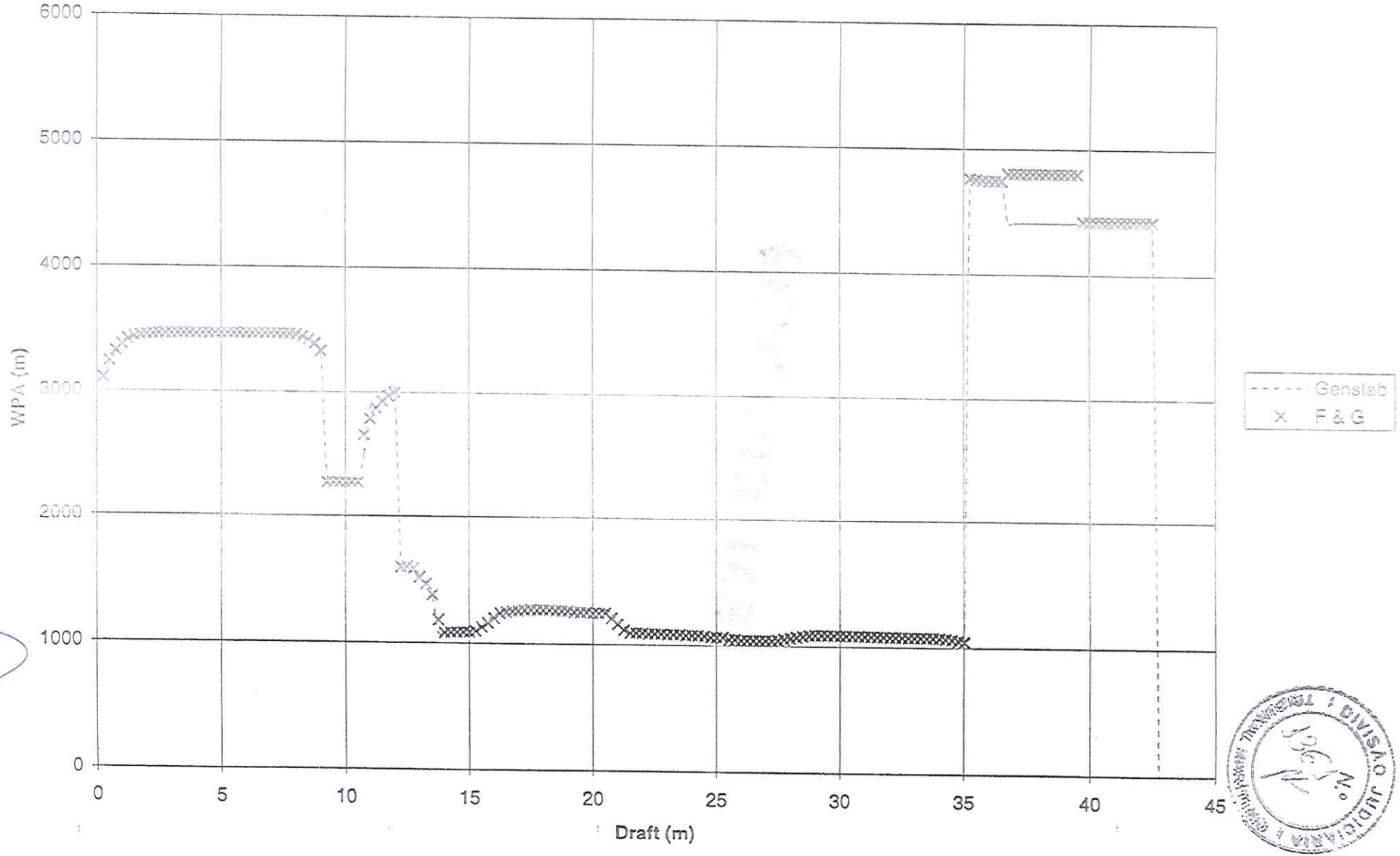
P-36 Fincanteri Hydrostatics - LCB



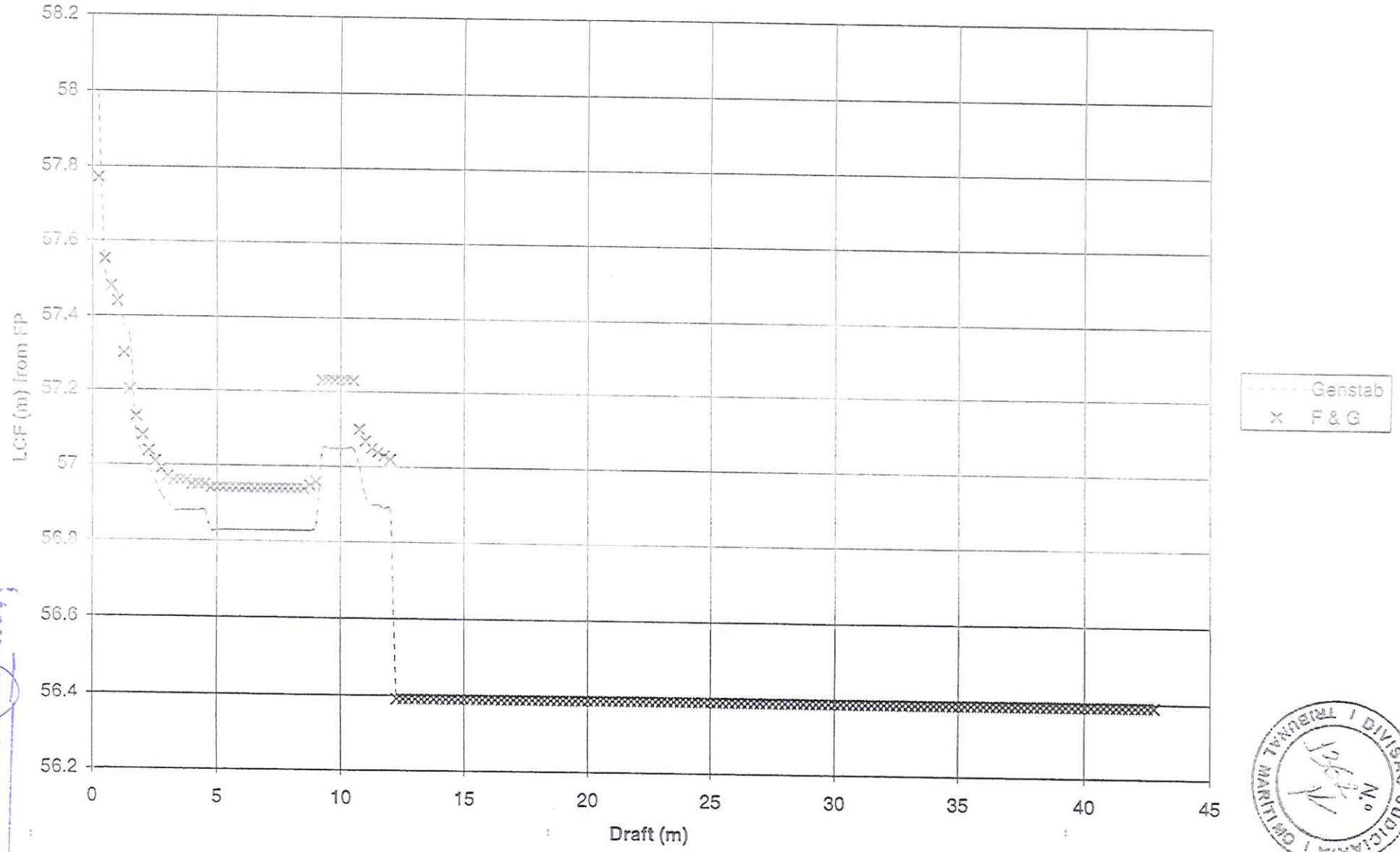
P-36 Fincanteri Hydrostatics - VCB



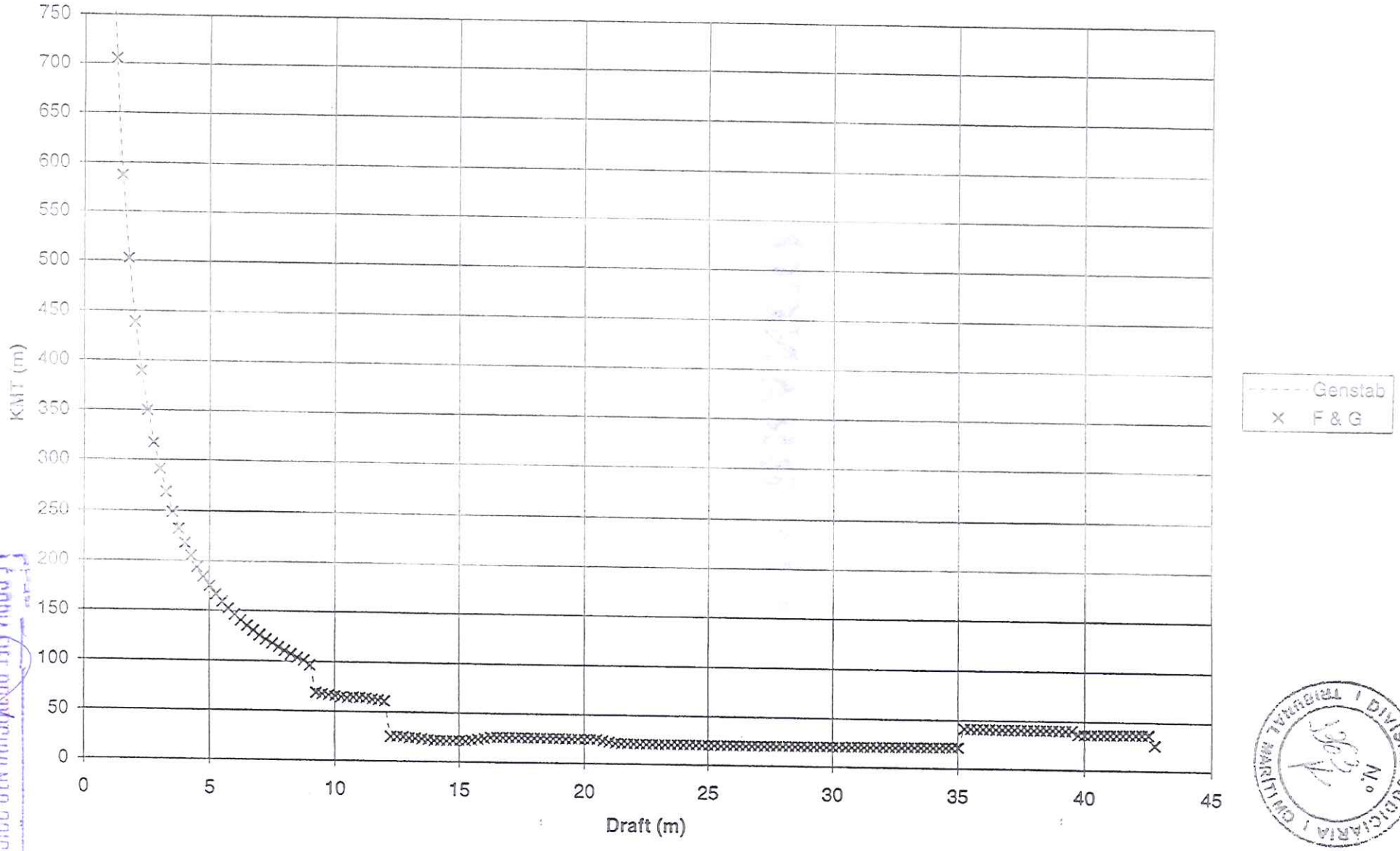
P-36 Fincanteri Hydrostatics - WPA



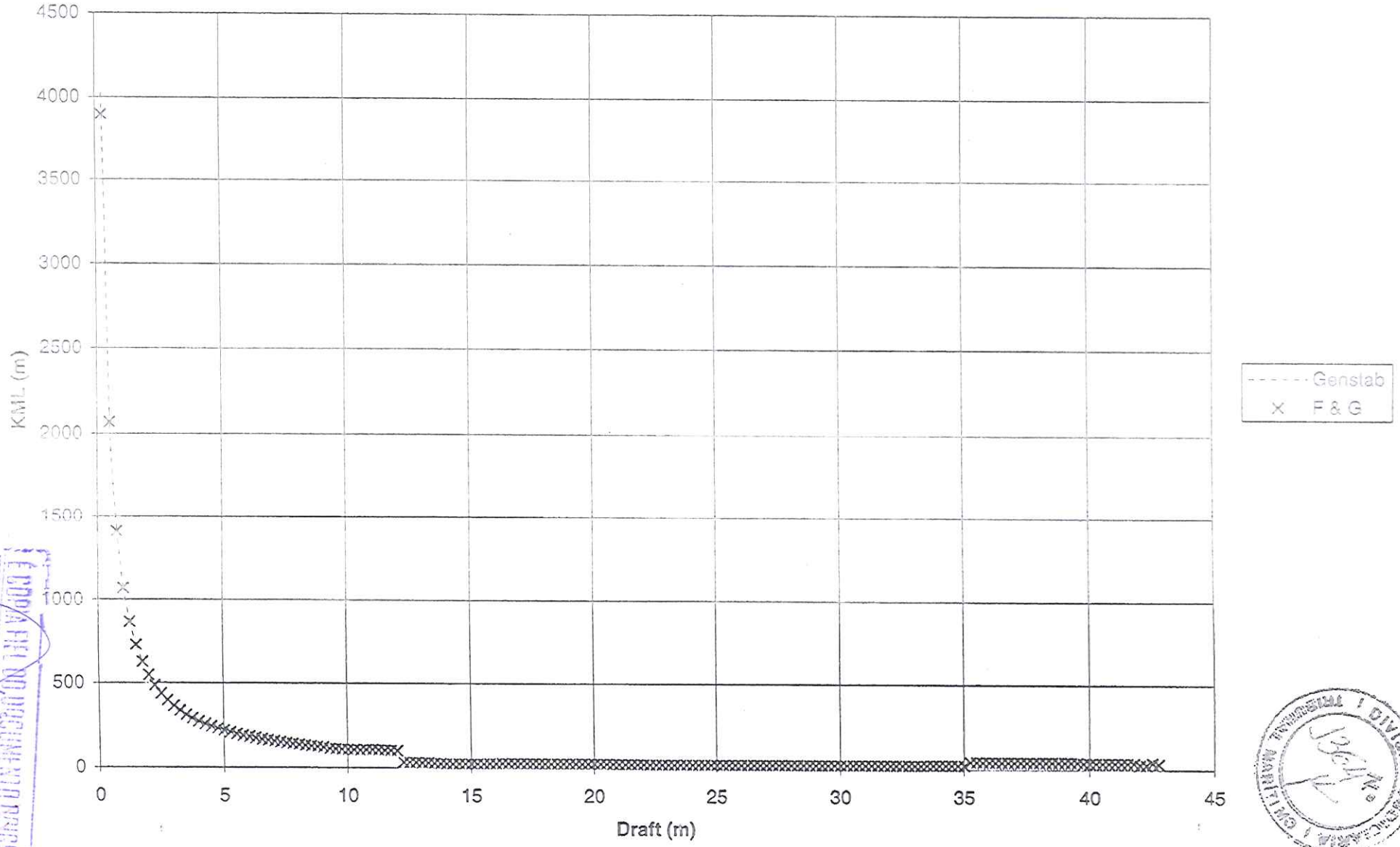
P-36 Fincanteri Hydrostatics - LCF



P-36 Fincanteri Hydrostatics KMT



P-36 Fincanteri Hydrostatics KML



APPENDIX C

HYDROSTATICS

(6 PAGES)

P[illegible] Roncador Field

Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft Is vertical Dist from Underside of Keel at midships to Cut Waterplane
Note: MCT and MCH are reported as a function of GML and GMT respectively

DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathcal{T}$(GML) (tm-cm)	MCH*$\mathcal{T}$(GMT) (tm-cm)	TPC (t)
0.25	729.83	748.08	-1.47	0.00	0.13	3045.3	-1.61	0.00	3542.4	4180.1	0.07	0.10	30.6
0.50	1517.63	1555.57	-1.37	0.00	0.26	3222.0	-1.13	0.00	1800.0	2160.6	0.14	0.20	32.4
0.75	2332.12	2390.43	-1.28	0.00	0.39	3290.5	-1.10	0.00	1196.5	1450.6	0.21	0.31	33.1
1.00	3162.17	3241.23	-1.23	0.00	0.51	3348.0	-1.07	0.00	897.5	1094.1	0.29	0.42	33.7
1.25	4005.84	4105.99	-1.19	0.00	0.64	3399.3	-0.99	0.00	719.0	879.6	0.36	0.53	34.2
1.50	4858.06	4979.51	-1.15	0.00	0.77	3415.5	-0.95	0.00	596.2	733.1	0.44	0.64	34.3
1.75	5712.85	5855.67	-1.10	0.00	0.90	3428.6	-0.70	0.00	509.9	633.5	0.52	0.75	34.5
2.00	6570.74	6735.01	-1.05	0.00	1.03	3434.1	-0.64	0.00	444.3	553.5	0.60	0.87	34.5
2.25	7429.83	7615.57	-1.00	0.00	1.15	3438.4	-0.60	0.00	393.7	491.5	0.68	0.98	34.6
2.50	8289.92	8497.17	-0.95	0.00	1.28	3442.2	-0.57	0.00	353.5	442.1	0.75	1.09	34.6
2.75	9150.85	9379.62	-0.92	0.00	1.41	3445.0	-0.54	0.00	320.8	401.7	0.83	1.21	34.6
3.00	10012.33	10262.64	-0.88	0.00	1.53	3446.7	-0.51	0.00	293.5	367.8	0.91	1.32	34.7
3.25	10870.01	11147.91	-0.85	0.00	1.66	3456.9	-0.49	0.00	270.9	340.0	0.99	1.43	34.8
3.50	11740.32	12033.83	-0.83	0.00	1.79	3457.8	-0.49	0.01	251.3	315.3	1.07	1.55	34.8
3.75	12605.00	12920.12	-0.80	0.00	1.91	3459.6	-0.49	0.02	234.5	293.9	1.15	1.66	34.8
4.00	13470.00	13806.84	-0.78	0.00	2.04	3461.1	-0.49	0.04	219.8	275.3	1.22	1.78	34.8
4.25	14335.55	14693.94	-0.77	0.01	2.16	3462.5	-0.49	0.05	206.9	258.9	1.30	1.89	34.8
4.50	15201.33	15581.36	-0.75	0.01	2.29	3463.7	-0.49	0.07	195.5	244.4	1.38	2.00	34.8
4.75	16067.03	16468.70	-0.73	0.01	2.42	3463.0	-0.43	0.08	185.3	232.0	1.46	2.12	34.8
5.00	16932.90	17356.23	-0.72	0.02	2.54	3463.7	-0.42	0.08	176.1	220.5	1.54	2.23	34.8
5.25	17798.82	18243.79	-0.70	0.02	2.67	3463.7	-0.42	0.08	167.8	210.0	1.62	2.35	34.8
5.50	18664.74	19131.36	-0.69	0.02	2.79	3463.7	-0.42	0.08	160.3	200.5	1.70	2.46	34.8
5.75	19530.62	20018.89	-0.68	0.02	2.92	3463.2	-0.42	0.08	153.4	191.9	1.78	2.58	34.8
6.00	20396.34	20906.25	-0.67	0.03	3.04	3462.5	-0.42	0.07	147.1	184.0	1.85	2.69	34.8
6.25	21261.13	21792.66	-0.66	0.03	3.17	3456.9	-0.44	0.06	141.2	176.3	1.93	2.80	34.8
6.50	22125.24	22678.37	-0.65	0.03	3.29	3455.9	-0.44	0.05	135.9	169.7	2.01	2.92	34.8
6.75	22988.65	23563.36	-0.64	0.03	3.42	3452.9	-0.44	0.04	130.9	163.6	2.09	3.03	34.7
7.00	23851.72	24448.01	-0.63	0.03	3.54	3451.7	-0.44	0.02	126.4	157.9	2.17	3.15	34.7
7.25	24714.47	25332.33	-0.63	0.03	3.67	3450.3	-0.44	0.01	122.2	152.6	2.25	3.26	34.7

P3 . Ioncador Field

Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft is vertical Dist from Underside of Keel at midships to Cut Waterplane
Note: MCT and MCH are reported as a function of GML and GMT respectively

DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathscr{F}$(GML) (tm-cm)	MCH*$\mathscr{F}$(GMT) (tm-cm)	TPC (t)
7.50	25578.21	26217.67	-0.62	0.03	3.79	3454.4	-0.45	0.02	118.3	147.7	2.32	3.37	34.7
7.75	26443.03	27104.10	-0.62	0.03	3.92	3463.7	-0.44	0.02	114.8	143.5	2.40	3.49	34.8
8.00	27312.17	27994.98	-0.61	0.03	4.05	3489.0	-0.41	-0.05	111.6	139.4	2.48	3.60	35.1
8.25	28183.85	28888.44	-0.60	0.02	4.17	3480.9	-0.38	-0.06	108.0	135.4	2.56	3.72	35.0
8.50	29052.22	29778.52	-0.60	0.02	4.30	3460.0	-0.29	-0.04	104.5	131.8	2.64	3.83	34.8
8.75	29911.74	30659.53	-0.59	0.02	4.42	3423.6	-0.22	0.01	101.0	128.4	2.72	3.94	34.4
9.00	30756.27	31525.18	-0.58	0.02	4.54	3330.9	-0.27	0.01	96.1	124.6	2.80	4.06	33.5
9.25	31507.86	32295.55	-0.59	0.02	4.65	2625.6	-2.17	0.02	77.1	118.2	2.86	4.16	26.4
9.50	32163.97	32968.06	-0.62	0.02	4.75	2623.0	-2.21	0.02	75.7	115.8	2.92	4.24	26.4
9.75	32818.90	33639.37	-0.65	0.02	4.85	2617.8	-2.27	0.02	74.3	113.6	2.98	4.33	26.3
10.00	33473.35	34310.19	-0.68	0.02	4.95	2617.8	-2.27	0.02	73.1	111.5	3.04	4.41	26.3
10.25	34127.79	34980.99	-0.71	0.02	5.04	2617.8	-2.27	0.02	71.9	109.6	3.10	4.50	26.3
10.50	34782.24	35651.80	-0.74	0.02	5.14	2617.8	-2.27	0.02	70.7	107.7	3.16	4.59	26.3
10.75	35451.23	36337.51	-0.77	0.02	5.25	2814.7	-2.11	0.02	70.6	108.7	3.22	4.68	28.3
11.00	36178.88	37083.35	-0.80	0.02	5.36	3337.2	-1.78	0.02	70.5	109.2	3.29	4.77	33.6
11.25	37024.22	37940.83	-0.82	0.02	5.49	3410.4	-1.74	0.02	69.5	108.0	3.37	4.88	34.4
11.50	37886.22	38833.37	-0.84	0.02	5.63	3472.8	-1.71	0.02	68.5	106.6	3.44	5.00	34.9
11.75	38753.99	39727.97	-0.86	0.02	5.76	3506.5	-1.70	0.02	67.4	104.9	3.52	5.11	35.3
12.00	39638.17	40629.13	-0.88	0.02	5.90	3524.4	-1.69	0.02	66.2	103.0	3.60	5.23	35.4
12.25	40419.64	41430.13	-0.89	0.02	6.02	1863.9	0.00	0.03	28.8	34.5	3.67	5.33	18.7
12.50	40885.97	41908.12	-0.88	0.02	6.09	1863.2	-0.02	0.03	28.8	34.3	3.72	5.39	18.7
12.75	41349.75	42383.50	-0.87	0.02	6.16	1844.5	-0.02	0.03	28.7	33.9	3.76	5.45	18.5
13.00	41806.78	42851.95	-0.86	0.02	6.24	1808.5	-0.02	0.03	28.5	33.3	3.80	5.51	18.2
13.25	42252.12	43308.42	-0.85	0.02	6.31	1749.6	-0.02	0.03	28.3	32.4	3.84	5.57	17.6
13.50	42678.47	43745.44	-0.84	0.02	6.38	1652.3	-0.02	0.03	27.9	31.1	3.88	5.63	16.6
13.75	43067.51	44144.20	-0.83	0.02	6.45	1374.3	-0.03	0.04	26.7	27.8	3.91	5.68	13.8
14.00	43411.91	44497.20	-0.83	0.02	6.50	1380.9	-0.03	0.04	26.8	27.8	3.95	5.73	13.9
14.25	43757.93	44851.88	-0.82	0.02	6.56	1387.4	-0.03	0.04	26.9	27.9	3.98	5.77	14.0
14.50	44105.59	45208.23	-0.82	0.02	6.63	1393.9	-0.03	0.04	27.0	27.9	4.01	5.82	14.0
14.75	44454.89	45566.26	-0.81	0.02	6.69	1400.4	-0.03	0.04	27.1	27.9	4.04	5.86	14.1

Roncador Field

Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft is vertical Dist from Underside of Keel at midships to Cut Waterplane
Note: MCT and MCH are reported as a function of GML and GMT respectively

DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathscr{F}$(GML) (tm-cm)	MCH*$\mathscr{F}$(GMT) (tm-cm)	TPC (t)
15.00	44805.81	45925.95	-0.80	0.02	6.75	1407.0	-0.03	0.04	27.2	28.0	4.07	5.91	14.1
15.25	45158.37	46287.33	-0.80	0.02	6.82	1413.5	-0.03	0.04	27.3	28.0	4.10	5.96	14.2
15.50	45512.55	46650.37	-0.79	0.02	6.89	1420.0	-0.03	0.04	27.4	28.1	4.14	6.00	14.3
15.75	45868.45	47015.16	-0.79	0.02	6.95	1427.8	-0.03	0.04	27.5	28.1	4.17	6.05	14.4
16.00	46226.67	47382.33	-0.78	0.02	7.02	1438.2	-0.03	0.04	27.7	28.2	4.20	6.10	14.5
16.25	46587.59	47752.28	-0.77	0.02	7.09	1449.3	-0.04	0.04	27.8	28.3	4.23	6.14	14.6
16.50	46950.82	48124.59	-0.77	0.02	7.16	1455.9	-0.04	0.04	27.8	28.3	4.27	6.19	14.6
16.75	47315.57	48498.45	-0.76	0.02	7.24	1462.1	-0.04	0.04	27.8	28.3	4.30	6.24	14.7
17.00	47681.87	48873.92	-0.76	0.02	7.31	1468.3	-0.04	0.04	27.8	28.2	4.33	6.29	14.8
17.25	48049.69	49250.94	-0.75	0.02	7.39	1474.2	-0.04	0.04	27.7	28.2	4.37	6.34	14.8
17.50	48418.92	49629.40	-0.75	0.02	7.46	1479.5	-0.04	0.04	27.7	28.2	4.40	6.39	14.9
17.75	48789.34	50009.08	-0.74	0.02	7.54	1483.6	-0.04	0.04	27.7	28.1	4.43	6.43	14.9
18.00	49160.51	50389.52	-0.74	0.02	7.62	1485.1	-0.04	0.04	27.6	28.1	4.47	6.48	14.9
18.25	49531.78	50770.08	-0.73	0.02	7.70	1485.1	-0.04	0.04	27.5	28.0	4.50	6.53	14.9
18.50	49903.05	51150.63	-0.72	0.02	7.78	1485.1	-0.04	0.04	27.4	27.9	4.54	6.58	14.9
18.75	50274.32	51531.18	-0.72	0.02	7.86	1485.1	-0.04	0.04	27.4	27.8	4.57	6.63	14.9
19.00	50645.59	51911.73	-0.71	0.02	7.94	1485.1	-0.04	0.04	27.3	27.8	4.60	6.68	14.9
19.25	51016.86	52292.28	-0.71	0.02	8.02	1485.1	-0.04	0.04	27.2	27.7	4.64	6.73	14.9
19.50	51388.13	52672.83	-0.71	0.02	8.10	1485.1	-0.04	0.04	27.2	27.6	4.67	6.78	14.9
19.75	51759.40	53053.38	-0.70	0.02	8.18	1485.1	-0.04	0.04	27.1	27.5	4.70	6.83	14.9
20.00	52132.78	53436.09	-0.70	0.02	8.27	1496.2	-0.04	0.04	27.1	27.6	4.74	6.88	15.0
20.25	52506.82	53819.49	-0.69	0.02	8.35	1496.2	-0.04	0.04	27.1	27.5	4.77	6.92	15.0
20.50	52880.86	54202.88	-0.69	0.02	8.44	1496.2	-0.04	0.04	27.0	27.5	4.81	6.97	15.0
20.75	53254.90	54586.28	-0.68	0.02	8.52	1496.2	-0.04	0.04	27.0	27.4	4.84	7.02	15.0
21.00	53628.95	54969.67	-0.68	0.02	8.61	1496.2	-0.04	0.04	26.9	27.4	4.87	7.07	15.0
21.25	54002.99	55353.06	-0.67	0.02	8.69	1496.2	-0.04	0.04	26.9	27.3	4.91	7.12	15.0
21.50	54377.03	55736.46	-0.67	0.02	8.78	1496.2	-0.04	0.04	26.8	27.3	4.94	7.17	15.0
21.75	54751.07	56119.85	-0.66	0.02	8.87	1496.2	-0.04	0.04	26.8	27.2	4.98	7.22	15.0
22.00	55125.12	56503.24	-0.66	0.02	8.96	1496.2	-0.04	0.04	26.8	27.2	5.01	7.27	15.0
22.25	55499.16	56886.64	-0.66	0.02	9.05	1496.2	-0.04	0.04	26.7	27.1	5.04	7.32	15.0

P3 Roncador Field
Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft is vertical Dist from Underside of Keel at midships to Cut Waterplane
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DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathcal{F}$(GML) (tm-cm)	MCH*$\mathcal{F}$(GMT) (tm-cm)	TPC (t)
22.50	55873.20	57270.03	-0.65	0.03	9.14	1496.2	-0.04	0.04	26.7	27.1	5.08	7.37	15.0
22.75	56247.24	57653.42	-0.65	0.03	9.23	1496.2	-0.04	0.04	26.7	27.1	5.11	7.42	15.0
23.00	56621.29	58036.82	-0.64	0.03	9.32	1496.2	-0.04	0.04	26.6	27.0	5.15	7.47	15.0
23.25	56995.33	58420.21	-0.64	0.03	9.41	1496.2	-0.04	0.04	26.6	27.0	5.18	7.52	15.0
23.50	57369.37	58803.60	-0.64	0.03	9.50	1496.2	-0.04	0.04	26.6	27.0	5.21	7.57	15.0
23.75	57743.41	59187.00	-0.63	0.03	9.59	1496.2	-0.04	0.04	26.6	27.0	5.25	7.62	15.0
24.00	58117.45	59570.39	-0.63	0.03	9.68	1496.2	-0.04	0.04	26.5	26.9	5.28	7.66	15.0
24.25	58491.50	59953.78	-0.62	0.03	9.77	1496.2	-0.04	0.04	26.5	26.9	5.32	7.71	15.0
24.50	58865.54	60337.18	-0.62	0.03	9.87	1496.2	-0.04	0.04	26.5	26.9	5.35	7.76	15.0
24.75	59238.98	60719.95	-0.62	0.03	9.96	1489.5	-0.04	0.04	26.3	26.7	5.38	7.81	15.0
25.00	59610.17	61100.43	-0.61	0.03	10.05	1480.1	-0.04	0.04	26.1	26.6	5.42	7.86	14.9
25.25	59979.04	61478.52	-0.61	0.03	10.14	1470.8	-0.04	0.04	25.9	26.4	5.45	7.91	14.8
25.50	60345.57	61854.21	-0.61	0.03	10.24	1461.5	-0.04	0.04	25.6	26.2	5.49	7.96	14.7
25.75	60709.77	62227.52	-0.60	0.03	10.33	1452.1	-0.04	0.04	25.4	26.1	5.52	8.01	14.6
26.00	61071.64	62598.43	-0.60	0.03	10.42	1442.8	-0.04	0.04	25.2	25.9	5.55	8.05	14.5
26.25	61431.17	62966.95	-0.60	0.03	10.51	1433.5	-0.04	0.04	25.0	25.8	5.58	8.10	14.4
26.50	61788.38	63333.09	-0.59	0.03	10.61	1424.2	-0.04	0.04	24.8	25.6	5.62	8.15	14.3
26.75	62143.25	63696.83	-0.59	0.03	10.70	1414.8	-0.04	0.04	24.6	25.5	5.65	8.20	14.2
27.00	62495.78	64058.18	-0.59	0.03	10.79	1405.5	-0.04	0.04	24.5	25.3	5.68	8.24	14.1
27.25	62845.99	64417.14	-0.58	0.03	10.88	1396.2	-0.04	0.04	24.3	25.2	5.71	8.29	14.0
27.50	63177.56	64757.00	-0.58	0.03	10.97	1148.4	-0.05	0.05	20.0	20.5	5.74	8.33	11.5
27.75	63464.67	65051.28	-0.58	0.03	11.04	1148.4	-0.05	0.05	20.1	20.5	5.77	8.37	11.5
28.00	63751.77	65345.56	-0.58	0.03	11.12	1148.4	-0.05	0.05	20.1	20.6	5.79	8.41	11.5
28.25	64038.87	65639.84	-0.57	0.03	11.19	1148.4	-0.05	0.05	20.1	20.6	5.82	8.45	11.5
28.50	64325.97	65934.12	-0.57	0.03	11.27	1148.4	-0.05	0.05	20.1	20.6	5.85	8.48	11.5
28.75	64613.08	66228.40	-0.57	0.03	11.35	1148.4	-0.05	0.05	20.2	20.7	5.87	8.52	11.5
29.00	64900.18	66522.68	-0.57	0.03	11.42	1148.4	-0.05	0.05	20.2	20.7	5.90	8.56	11.5
29.25	65187.28	66816.96	-0.56	0.03	11.50	1148.4	-0.05	0.05	20.3	20.7	5.92	8.60	11.5
29.50	65474.38	67111.24	-0.56	0.03	11.58	1148.4	-0.05	0.05	20.3	20.8	5.95	8.64	11.5
29.75	65761.49	67405.52	-0.56	0.03	11.66	1148.4	-0.05	0.05	20.3	20.8	5.98	8.67	11.5

P3 oncador Field

Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft is vertical Dist from Underside of Keel at midships to Cut Waterplane
Note: MCT and MCH are reported as a function of GML and GMT respectively

DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathcal{F}$(GML) (tm-cm)	MCH*$\mathcal{F}$(GMT) (tm-cm)	TPC (t)
30.00	66048.59	67699.80	-0.56	0.03	11.74	1148.4	-0.05	0.05	20.4	20.8	6.00	8.71	11.5
30.25	66335.69	67994.09	-0.56	0.03	11.82	1148.4	-0.05	0.05	20.4	20.9	6.03	8.75	11.5
30.50	66621.46	68287.00	-0.55	0.03	11.90	1143.1	-0.03	0.00	20.4	20.9	6.06	8.79	11.5
30.75	66907.24	68579.92	-0.55	0.03	11.98	1143.1	-0.03	0.00	20.5	20.9	6.08	8.82	11.5
31.00	67193.01	68872.83	-0.55	0.03	12.06	1143.1	-0.03	0.00	20.5	21.0	6.11	8.86	11.5
31.25	67478.78	69165.75	-0.55	0.03	12.14	1143.1	-0.03	0.00	20.6	21.0	6.13	8.90	11.5
31.50	67764.55	69458.66	-0.55	0.03	12.22	1143.1	-0.03	0.00	20.6	21.1	6.16	8.94	11.5
31.75	68050.32	69751.58	-0.54	0.03	12.30	1143.1	-0.03	0.00	20.6	21.1	6.18	8.97	11.5
32.00	68336.11	70044.51	-0.54	0.03	12.38	1143.5	-0.03	0.00	20.7	21.2	6.21	9.01	11.5
32.25	68621.91	70337.46	-0.54	0.03	12.47	1143.3	-0.03	0.00	20.7	21.2	6.24	9.05	11.5
32.50	68907.75	70630.44	-0.54	0.03	12.55	1143.4	-0.03	0.00	20.8	21.2	6.26	9.09	11.5
32.75	69193.59	70923.43	-0.53	0.03	12.63	1143.4	-0.03	0.00	20.8	21.3	6.29	9.13	11.5
33.00	69479.43	71216.42	-0.53	0.03	12.71	1143.4	-0.03	0.00	20.9	21.3	6.31	9.16	11.5
33.25	69765.27	71509.40	-0.53	0.03	12.80	1143.4	-0.03	0.00	20.9	21.4	6.34	9.20	11.5
33.50	70051.11	71802.39	-0.53	0.03	12.88	1143.4	-0.03	0.00	21.0	21.4	6.37	9.24	11.5
33.75	70336.95	72095.38	-0.53	0.03	12.97	1143.4	-0.03	0.00	21.0	21.5	6.39	9.28	11.5
34.00	70622.49	72388.05	-0.52	0.03	13.05	1139.5	0.00	0.00	21.1	21.5	6.42	9.31	11.5
34.25	70906.98	72679.60	-0.52	0.03	13.14	1135.8	0.00	0.00	21.1	21.6	6.44	9.35	11.4
34.50	71190.25	72970.01	-0.52	0.03	13.22	1130.7	0.00	0.00	21.2	21.6	6.47	9.39	11.4
34.75	71472.22	73259.02	-0.52	0.03	13.30	1124.9	0.00	0.00	21.2	21.6	6.50	9.43	11.3
35.00	71752.68	73546.49	-0.52	0.03	13.39	1118.7	0.00	-0.01	21.3	21.7	6.52	9.46	11.2
35.26	72642.97	74459.04	-0.50	0.00	13.69	4808.1	0.00	0.00	39.4	40.6	6.60	9.58	48.3
35.51	73844.26	75690.36	-0.50	0.00	14.05	4802.2	0.00	0.00	39.3	40.5	6.71	9.74	48.3
35.76	75044.13	76920.23	-0.49	0.00	14.39	4796.8	0.00	0.00	39.2	40.5	6.82	9.90	48.2
36.01	76242.77	78148.84	-0.48	0.00	14.73	4792.5	0.00	0.00	39.2	40.4	6.93	10.06	48.2
36.26	77440.66	79376.67	-0.47	0.00	15.06	4790.6	0.00	0.00	39.1	40.3	7.04	10.21	48.2
36.51	78638.34	80604.30	-0.47	0.00	15.39	4790.6	0.00	0.00	39.1	40.3	7.15	10.37	48.2
36.76	79767.38	81761.55	-0.46	0.00	15.69	4409.5	0.00	0.00	38.9	40.1	7.25	10.52	44.3
37.01	80869.73	82891.47	-0.45	0.00	15.98	4409.6	0.00	0.00	38.9	40.0	7.35	10.67	44.3
37.26	81972.10	84021.40	-0.45	0.00	16.26	4409.6	0.00	0.00	38.9	40.0	7.45	10.81	44.3

PC Roncador Field

Hydrostatics (Level Heel and Trim)

Trim = 0.0 degrees (Positive=Trim by Head)
Longitudinal Distances measured from Midships +ve forwards
Transverse Distances measured from C/L +ve to starboard
Draft is vertical Dist from Underside of Keel at midships to Cut Waterplane
Note: MCT and MCH are reported as a function of GML and GMT respectively

DRAFT (m)	VOLUME (m^3)	DISPL. (tonnes)	LCB (m)	TCB (m)	VCB (m)	WPA (m^2)	LCF (m)	TCF (m)	KMT (m)	KML (m)	MCT*$\mathcal{F}$(GML) (tm-cm)	MCH*$\mathcal{F}$(GMT) (tm-cm)	TPC (t)
37.51	83074.53	85151.39	-0.44	0.00	16.54	4409.6	0.00	0.00	38.8	39.9	7.55	10.96	44.3
37.76	84176.87	86281.29	-0.43	0.00	16.82	4409.5	0.00	0.00	38.8	39.9	7.65	11.10	44.3
38.01	85279.25	87411.23	-0.43	0.00	17.09	4409.5	0.00	0.00	38.8	39.9	7.75	11.25	44.3
38.26	86381.66	88541.20	-0.42	0.00	17.36	4409.6	0.00	0.00	38.8	39.9	7.85	11.39	44.3
38.51	87484.02	89671.13	-0.42	0.00	17.62	4409.5	0.00	0.00	38.8	39.8	7.95	11.54	44.3
38.76	88586.44	90801.09	-0.41	0.00	17.88	4409.6	0.00	0.00	38.8	39.8	8.05	11.68	44.3
39.01	89688.79	91931.01	-0.41	0.00	18.14	4409.5	0.00	0.00	38.8	39.8	8.15	11.83	44.3
39.26	90791.16	93060.94	-0.40	0.00	18.40	4409.5	0.00	0.00	38.8	39.8	8.25	11.97	44.3
39.51	91893.52	94190.86	-0.40	0.00	18.65	4409.6	0.00	0.00	38.8	39.8	8.35	12.12	44.3
39.76	92992.80	95317.62	-0.39	0.00	18.90	4387.1	0.00	0.00	38.6	39.7	8.45	12.26	44.1
40.01	94089.56	96441.80	-0.39	0.00	19.14	4387.1	0.00	0.00	38.6	39.7	8.55	12.41	44.1
40.26	95186.32	97565.98	-0.38	0.00	19.38	4387.1	0.00	0.00	38.6	39.7	8.65	12.55	44.1
40.51	96283.10	98690.18	-0.38	0.00	19.62	4387.1	0.00	0.00	38.6	39.7	8.75	12.70	44.1
40.76	97379.90	99814.39	-0.38	0.00	19.86	4387.1	0.00	0.00	38.6	39.7	8.85	12.84	44.1
41.01	98476.65	100938.56	-0.37	0.00	20.09	4387.1	0.00	0.00	38.7	39.7	8.95	12.99	44.1
41.26	99573.34	102062.66	-0.37	0.00	20.33	4387.1	0.00	0.00	38.7	39.8	9.05	13.13	44.1
41.51	100670.05	103186.80	-0.36	0.00	20.55	4387.1	0.00	0.00	38.7	39.8	9.15	13.28	44.1
41.76	101766.84	104311.02	-0.36	0.00	20.78	4387.1	0.00	0.00	38.8	39.8	9.25	13.42	44.1
42.01	102863.60	105435.19	-0.36	0.00	21.01	4387.1	0.00	0.00	38.8	39.8	9.35	13.57	44.1
42.26	103960.34	106559.34	-0.35	0.00	21.23	4387.1	0.00	0.00	38.8	39.8	9.45	13.71	44.1
42.51	105057.10	107683.52	-0.35	0.00	21.45	4387.1	0.00	0.00	38.9	39.9	9.55	13.86	44.1

APPENDIX D

ANALYSIS LOADING CONDITIONS

(18 PAGES)

Load Summary Table
Pot & Fuel

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG
Pot Water Tk	1P	194	100%	194	1	194	84.58	-29.99	25.91
Pot Water Tk	1S	194	100%	194	1	194	84.58	29.99	25.91
Pot Water Day Tk		15.2	100%	15.2	1	15.2	78.87	4.98	38.1
POT TOT		403.2				403.2	84.365	0.188	26.370
FO Tank	10P	586.9	100%	563.424	0.960	586.9	51.05	-23.91	4.67
FO Tank	10S	586.9	100%	563.424	0.960	586.9	51.05	23.91	4.67
FO Tank	12P	590.1	100%	566.496	0.960	590.1	61.72	-23.86	3.06
FO Tank	12S	590.1	100%	566.496	0.960	590.1	61.72	23.92	4.47
DO Settle	N1	105.5	100%	91.785	0.870	105.5	74.52	-13.9	39.39
DO Day Tk	N2	110.7	100%	96.309	0.870	110.7	74.6	-17.44	39.38
DO Day Tk	N3	73.5	100%	63.945	0.870	73.5	82.01	15.62	38.1
DOSettl	N4	73.5	100%	63.945	0.870	73.5	79.15	15.62	38.1
FO Overflow	P	16.4	100%	15.744	0.960	16.4	78.94	-17.79	35.81
FO Overflow	S	15.1	100%	14.496	0.960	15.1	78.87	22.86	35.81
DO Service		11.2	100%	9.744	0.870	11.2	48.01	-21.15	47.01
DO Sludge	P	3.6	100%	3.132	0.870	3.6	67.61	-15.62	35.81
DO Sludge	S	2.6	100%	2.262	0.870	2.6	78.58	10.1	35.81
Helifuel	1P	7.9	100%	7.9	1.000	7.9	34.55	-12.53	43.92
Helifuel	1S	0.1	100%	0.1	1.000	0.1	25.91	-19.2	45.1
Aft Column sep	P	13.8	100%	13.8	1.000	13.8	79.72	-26.29	35.1
Aft Column sep	S	13.8	100%	13.8	1.000	13.8	79.72	26.29	35.1
Waste Oil	1p	19.2	50%	9.6	1.000	9.6	80.72	-24.55	21.59
Waste Oil	1S	19.2	50%	9.6	1.000	9.6	80.72	24.55	21.59
Inclin DO tk		0.2	100%	0.174	0.870	0.2	21.66	26.76	43.94
FO TOTAL		2840.3				2821.1	59.633	-0.487	9.805

Load Summary Table
Lub Oils

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG
LO Air Comp		0.8	100%	0.72	0.9	0.8	78.47	-1.35	40.72
LO Cem Unit		0.3	0%	0	0.9	0	52.69	-20.84	44.12
LO Gas Turb		0.8	100%	0.72	0.9	0.8	88.95	24.02	44.14
LO Daily Serv		0.6	0%	0	0.9	0	62.27	-9.74	53.02
Moor Windlass st	A	0.3	100%	0.27	0.9	0.3	78.17	-30.43	40.77
Moor Windlass st	B	0.3	100%	0.27	0.9	0.3	34.65	-30.07	40.87
Moor Windlass st	C	0.3	100%	0.27	0.9	0.3	23.33	28.1	40.87
Moor Windlass st	D	0.3	100%	0.27	0.9	0.3	91.04	30.07	40.96
Em. Gen. LO stor		0.5	100%	0.45	0.9	0.5	48.60	-22.17	45
LO Storage	P	0.8	100%	0.72	0.9	0.8	35.87	-22.2	3.43
LO Storage	S	0.8	100%	0.72	0.9	0.8	35.87	22.2	3.436
Oily Water Sep		0.7	100%	0.63	0.9	0.7	80.77	25.44	29.8
						5.60	60.77	4.31	29.60

Load Summary Table
Drilling Tanks (Process Fresh Water)

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG
Drill Water	8p	276.5	100%	276.5	1	276.5	40.25	-23.31	4.41
Drill Water	8S	276.5	100%	276.5	1	276.5	40.25	23.31	4.41
Drill Water	9P	248.7	100%	248.7	1	248.7	40.53	-31.35	4.38
Drill Water	9S	248.7	100%	248.7	1	248.7	40.53	31.35	4.38
Drill Water	14P	272.3		0	1	0	72.39	-24.38	0.26
Drill Water	14S	272.3		0	1	0	72.39	24.38	0.26
Drill Water	15P	260.3		0	1	0	72.34	-30.45	0.26
Drill Water	15S	260.3		0	1	0	72.34	30.45	0.26
Fwd clmn p-tk	A	109.9		0	1.316	0	25	26.7	27
Fwd clmn p-tk	B	109.9		0	1.316	0	28.15	24.23	27
Fwd clmn p-tk	C	109.9		0	1.316	0	28.15	-24.23	27
Fwd clmn p-tk	D	109.9		0	1.316	0	25	-26.7	27
Base Oil No.	1P	406.3		0	0.9	0	84.85	-22.94	21.41
Base Oil No.	1S	406.3		0	0.9	0	84.85	22.94	21.41
		2115.6				1050.4	40.38	0.00	4.40

Load Summary Table
Crew &Stores

Compartment		Max Wt	%	Weight	LCG	TCG	VCG
Crew & Effects		30	100%	30	45.72	0.00	41.82
TT Mec Stores		20	100%	20	84.55	-30.45	37.88
TT Machine Shop		20	100%	20	86.10	-24.00	37.58
TT Prod whse		60	100%	60	88.55	23.60	37.58
TT Stores		20	100%	20	84.55	31.75	37.88
TT Elec. str		15	100%	15	75.40	-5.00	37.78
TT BOP cont.		0	0%	0	71.60	7.70	37.68
TT Cellar Deck	A	20	100%	20	64.00	0.00	37.58
TT Cellar Deck	F	20	100%	20	48.70	0.00	37.58
TT Pump Store	A	10	100%	10	64.70	9.10	37.88
TT Pump Store	F	10	100%	10	47.50	9.10	37.88
TT Sack and Drum		0	0%	0	42.37	10.37	37.58
2 Dk Drill Whse		35	100%	35	85.30	-15.90	41.12
2 Dk Prod Whse		35	30%	10.5	85.44	19.00	41.12
Dk Open Store		0	0%	0	70.10	0.00	41.02
Dry/chill/Freezer		40	100%	40	39.93	13.02	40.69
2 Dk Weld Shop		10	100%	10	85.09	-24.50	40.62
MD Drilling Store		0	0%	0	51.39	15.00	43.67
MD Paint Locker		5	100%	5	64.19	7.20	43.87
MD Deck Locker		10	100%	10	48.59	7.20	43.47
		360		335.5	69.85	3.27	39.23

Compartment		Max Wt	%	Weight	LCG	TCG	VCG
Well Control Panel / Hyd Unit	UQ-121001	20.0	100%	20.0	65.9	37.1	35.5
Turbine / Compr Pkg Train 'C' (01)	UQ-122308	25.4	100%	25.4	89.7	24.5	49.2
Comp Process Pkg Train 'C' (02)	UQ-122309	8.0	100%	8.0	79.3	31.9	48.9
Turbine / Compr Pkg Train 'B' (03)	UQ-122306	25.4	100%	25.4	89.7	9.5	49.2
Comp Process Pkg Train 'B' (04)	UQ-122307	8.0	100%	8.0	79.3	16.9	48.9
Turbine / Compr Pkg Train 'A' (05)	UQ-122304	25.4	100%	25.4	89.7	-5.5	49.3
Comp Process Pkg Train 'A' (06)	UQ-122305	8.0	100%	8.0	79.3	2.1	48.9
Gas Comp. Starter Skid (26)	UQ-122310	0.3	100%	0.3	101.0	16.8	44.3
Oil Separation - Train A (07)	UQ-122301	468.3	100%	468.3	92.3	-28.5	47.3
Oil Separation - Train B (08)	UQ-122302	467.9	100%	467.9	92.3	-18.5	47.3
Oil Separation - Heating (09)	UQ-122303	78.8	100%	78.8	77.3	-20.0	47.5
Crude Oil Export Pumps (10)	UQ-122312-01	0.8	100%	0.8	96.9	-5.2	37.4
Crude Oil Exp Pump Header Skid (10A)	UQ-122312-02	5.6	100%	5.6	94.0	-5.5	38.7
Crude Oil Booster Pumps (11)	UQ-122311	2.6	100%	2.6	96.8	4.8	38.1
Glycol Regeneration Package (12)	UQ-123302	13.2	100%	13.2	57.1	16.9	45.4
TEG Contactor Towers (13)	UQ-123301	8.3	100%	8.3	57.4	12.9	48.4
Glycol Sump Tank	TQ-123301	4.0	100%	4.0	55.2	21.5	37.1
Safety Gas KO Drum Package (14)	V-122301	14.5	100%	14.5	62.9	30.5	46.0
Heating Medium Package (15)	UQ-512501-01	5.8	100%	5.8	31.8	23.9	46.6
Cooling & Heating Med Exp Vessels (15A)	UQ-512501-02	26.1	100%	26.1	48.0	0.2	63.8
Booster Compressor Package (16)	A30005	3.2	100%	3.2	64.6	16.1	44.4
Fuel Gas Treatment Package (17)	UQ-513501	9.4	100%	9.4	97.9	23.1	38.6
Booster Comp Process Pkg (18)	A30003	6.4	100%	6.4	56.9	22.7	46.1
Export Compressor Seal Consule	A31010	2.0	100%	2.0	72.4	21.9	43.7
Production/Test Manifold (19)	UQ-122101-01	6.1	100%	6.1	56.4	1.4	43.8
Flowline Launchers Package (19A)	UQ-121001-02	0.9	100%	0.9	60.9	5.3	52.9
Flowline Receiver Package (19B)	UQ-121001-03	0.3	100%	0.3	51.2	-7.5	43.8
Water Injection Manifold Package (21)	UQ-125101	2.8	100%	2.8	56.4	0.0	37.4
Gas Export Pig Launchers Package	UQ-122314-01	0.7	100%	0.7	45.8	-1.1	52.8
Fuel Gas Export Pig Launchers Package	UQ-122314-02	0.1	100%	0.1	63.4	-7.5	52.6
Export Pig Launcher Package (29)	UQ-122313	1.9	100%	1.9	96.0	-23.9	38.6
Cooling Medium Package (20)	UQ-512401-01	26.8	100%	26.8	26.8	17.0	48.2
Sea Water Chemical Injection (23)	UQ-682502	19.2	100%	19.2	54.5	18.7	37.4
Chemical Injtn Package (Water Inj)	A42001	1.7	100%	1.7	61.6	17.8	38.3
Oil Chemical Injection (Skid 1)	UQ-682501-01	16.5	100%	16.5	50.7	17.6	37.5
Oil Chemical Injection (Skid 2)	UQ-682501-02	28.4	100%	28.4	61.8	13.0	37.7
Chemical Injection Package (Prod)	A42002	1.5	100%	1.5	55.6	13.4	38.3
Gas/Cond. Chemical Injection Package	UQ-682503	38.5	100%	38.5	58.5	13.1	45.0
LP KO Drum Package (27)	UQ-541202	7.8	100%	7.8	63.8	-16.4	44.2
LP KO Drum Pumps Skid (27A)	B-541202A/B	0.1	100%	0.1	66.0	-12.5	43.9
Drains Treatment Package	A45001	14.4	100%	14.4	97.7	14.7	39.1
Seawater Supply Pumps contents	B-511102A/B/C	5.5	100%	5.5	56.4	5.3	20.0
S/Water Pmps Oil Circ Units		0.4	100%	0.4	56.4	-1.3	37.4
LPG Skid	Z-TA-541201	0.1	100%	0.1	60.5	9.5	52.4
Deluge Valve Skids (Tank Top)	Z-542301-5,7-12	1.1	100%	1.1	56.6	24.1	37.6
Deluge Valve Skid (Main Deck)	Z-542306	0.0	100%	0.0	43.8	16.8	44.3
Caisson Pumps Antifouling Package	UE-512101	8.2	100%	8.2	33.0	15.2	44.4
Designated structural steel		16.0	100%	16.0	76.2	6.4	46.5
Piping & Valves		123.0	100%	123.0	60.8	7.9	47.9
Multi-Purpose Court		9.8	100%	9.8	27.8	1.3	43.5
Production Caisson	TD-533601	47.0	100%	47.0	64.7	-16.7	19.8
Production Caisson Skim Oil Pump	B-533605A/B	0.5	100%	0.5	64.8	-13.0	30.3
Risers (Contents)		32.7	100%	32.7	52.2	-1.9	33.7
Umbilical Risers (Contents)		1.8	100%	1.8	70.7	11.4	32.7
Total New Process Content				1650.3	80.5	-11.1	45.6
Total New Process Content (Factored 5%)				733.4	80.5	-11.1	45.6
EXISTING EQUIPMENT (Below Tank Top EL +36.576)							
Compartment		Max Wt	%	Weight	LCG	TCG	VCG
Water Inj. Pump Package (Port)	A-51003B			0.31	40.09	-31.13	4.02
Water Inj. Pump Package (Port)	A-51003A			0.31	40.09	-23.73	4.02
Water Inj. Pump Package (Starb)	A-52003A			0.31	40.09	23.73	4.02
Water Inj. Pump Package (Starb)	A-52003B			0.31	40.09	31.13	4.02
Water Inj. Booster Pump Skid (Port)	A-51004			0.48	75.46	-23.30	2.30
Water Inj. Booster Pump Skid (Starb)	A-52004			0.48	75.46	23.30	2.30
Deaerator Tower (Port)	A-51001			37.96	85.08	-23.73	27.60
Deaerator Tower (Starb)	A-52001			37.96	85.08	23.73	27.60
Piping for Water Injection System				34.14	77.72	0.00	15.50
EXIST EQUIPT (Below Tank Top) TOTAL CONTENT WEIGHT				112.2	82.27	0.00	23.45

Load Summary Table
Deck Loads

Compartment	Max Wt	%	Weight	LCG	TCG	VCG
Miscellaneous Deck Load	300	100%	300	56.39	0	44.5
Helicopter	24	0%	0	21.1	-35	48.9
			300	56.39	0	44.5

Load Summary Table
Mooring Tensions

Vertical Loads from Mooring Lines (Extracted from MECA Output)									
Line ID	Tension	Angle	Vertical Tension	LCG	TCG	VCG	L*mmt	T*mmt	V*mmt
S1	140.00	52.93	111.71	24.634	34.838	18.288	2751.76	3891.61	2042.88
S2	140.00	53.20	112.10	28.194	34.838	18.288	3160.61	3905.42	2050.13
S3	140.00	53.33	112.29	31.754	34.838	18.288	3565.73	3912.04	2053.60
S4	140.00	53.42	112.42	35.314	34.838	18.288	3970.13	3916.61	2056.00
S5	140.00	53.36	112.34	81.022	34.838	18.288	9101.70	3913.57	2054.40
S6	140.00	53.51	112.55	84.582	34.838	18.288	9520.08	3921.17	2058.40
S7	140.00	53.54	112.60	88.142	34.838	18.288	9924.62	3922.69	2059.19
S8	140.00	53.45	112.47	91.702	34.838	18.288	10313.47	3918.13	2056.80
P1	140.00	49.87	107.04	24.634	-34.838	18.288	2636.87	-3729.12	1957.58
P2	140.00	49.52	106.49	28.194	-34.838	18.288	3002.34	-3709.85	1947.46
P3	140.00	49.26	106.08	31.754	-34.838	18.288	3368.31	-3695.44	1939.90
P4	140.00	48.88	105.47	35.314	-34.838	18.288	3724.45	-3674.25	1928.78
P5	140.00	45.35	99.60	81.022	-34.838	18.288	8069.61	-3469.79	1821.45
P6	140.00	45.82	100.40	84.582	-34.838	18.288	8492.16	-3497.79	1836.14
P7	140.00	46.31	101.23	88.142	-34.838	18.288	8922.82	-3526.73	1851.34
P8	140.00	47.00	102.39	91.702	-34.838	18.288	9389.32	-3567.05	1872.50
Total			1727.17	57.85	1.41	18.29	99913.99	2431.24	31586.55

Load Summary Table
Chain on Board

Mooring Chain Onboard (Operational)									
Locker	Weight kg/m	Length (m)	Weight (t)	LCG	TCG	VCG	Lmmt	Tmmt	Vmmt
Port Aft									
1aP	180.5	300	56.86	87.52	-30.50	4.60	4976.168	-1734.15	261.5445
1bP	180.5	300	56.86	81.65	-30.50	4.60	4642.415	-1734.15	261.5445
5P	180.5	300	56.86	86.47	-31.12	16.19	4916.468	-1769.41	920.6366
9P	180.5	300	56.86	91.05	-33.48	13.72	5176.705	-1903.65	779.8575
Port Fwd									
2aP	180.5	300	56.86	31.13	-30.50	4.60	1769.974	-1734.15	261.5445
2bP	180.5	300	56.86	25.26	-30.50	4.60	1436.22	-1734.15	261.5445
6P	180.5	300	56.86	26.31	-31.12	16.19	1495.921	-1769.41	920.6366
10P	180.5	300	56.86	21.73	-33.48	13.72	1235.684	-1903.65	779.8575
Stbd Aft									
4aS	180.5	300	56.86	81.65	30.50	4.60	4642.415	1734.154	261.5445
4bS	180.5	300	56.86	87.52	30.50	4.60	4976.168	1734.154	261.5445
8S	180.5	300	56.86	86.47	31.12	16.19	4916.468	1769.405	920.6366
12S	180.5	300	56.86	91.05	33.48	13.72	5176.705	1903.646	779.8575
Stbd Fwd									
3aS	180.5	300	56.86	25.26	30.50	4.60	1436.22	1734.154	261.5445
3bS	180.5	300	56.86	31.13	30.50	4.60	1769.974	1734.154	261.5445
7S	180.5	300	56.86	26.31	31.12	16.19	1495.921	1769.405	920.6366
11S	180.5	300	56.86	21.73	33.48	13.72	1235.684	1903.646	779.8575
Total			909.72	56.39	0.00	9.78	51299.11	0.00	8894.33

WS 7/15/2177
Proj P36-Roncador
Client Petromec
Date Dec-98
By AT
Chkd

Subj Riser Hang-off Loads - Stability Summary - 8 load Conditions

Ref Ref Drg: DE-3010.38-6000-942-NBD-100 Rev F

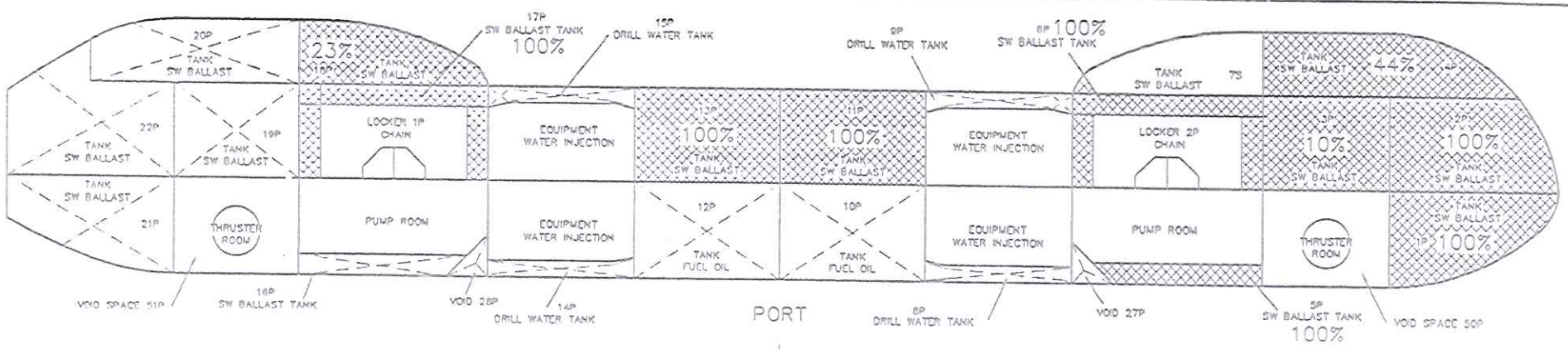
	Total Riser Weight (Tonnes)	LCG (metres)	TCG (metres)	VCG (metres)
2xSCR & Port Risers installed	737	58.99	-27.04	6.23
2xSCR & Port and Aft risers installed	2632	83.07	-7.47	22.80
2xSCR & Port, Aft and Starboard Risers Installed	4451	72.28	3.18	16.06
2xSCR & All Risers Installed	5052	66.59	2.76	15.15
4xSCR & Port Risers installed	844	57.95	-34.36	6.03
4xSCR & Port and Aft risers installed	2738	81.82	-10.49	22.10
4xSCR & Port, Aft and Starboard Risers Installed	4558	71.78	1.11	15.79
4xSCR & All Risers Installed	5158	66.26	0.95	14.93

Operational Load Condition - 4 x SCRs @ 20 Deg & Risers Installed

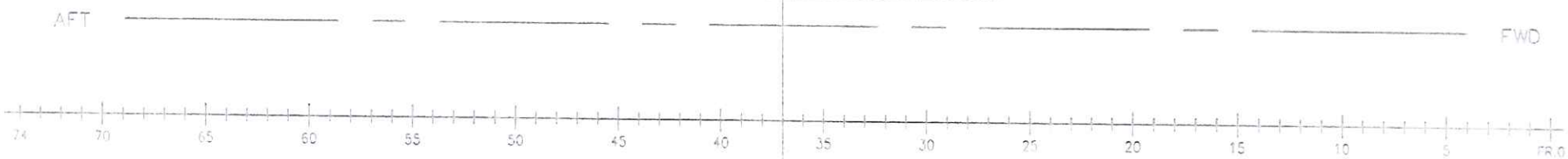
Worst Case Scenario - Maximum Loads - Based on Weight Control Report R

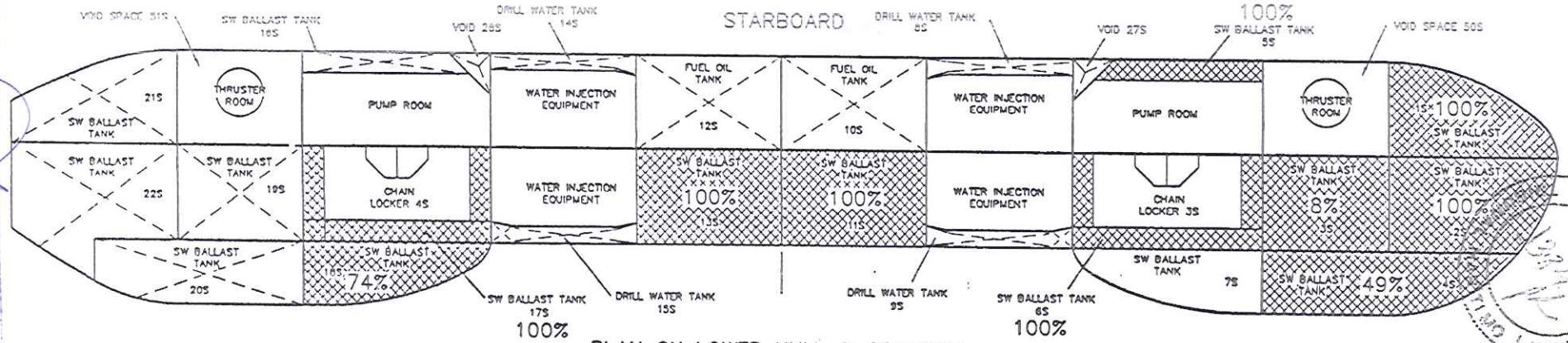
Item	Weight	LCG	TCG	VCG	LCGmmt	TCGmmt	VCGmmt	I (m^4)	I (m^4)
	tonnes	from FP	m from CL	m	tm	tm	tm	trans	long
Modified Lightship (Rev R)	31482.0	60.74	0.05	30.11	1912091	1637	948017		
Potable Water tanks	403.2	84.37	0.19	26.37	34016	76	10632		
Process Fresh Water	1050.4	40.38	0.00	4.40	42415	0	4622		
Fuel/sep/waste oil	2821.1	59.63	-0.49	9.81	168231	-1374	27661		
Lub oil	5.6	60.77	4.31	29.60	340	24	166		
Crew & Stores	335.5	69.85	3.27	39.23	23433	1096	13162		
Proc Related loads	1733.4	80.52	-11.10	45.60	139573	-19241	79043		
Below Tank Top Process loads	112.2	82.27	0.00	23.45	9231	0	2631		
Deck Loads	300.0	56.39	0.00	44.50	16917	0	13350		
Chain onboard	909.7	56.39	0.00	9.78	51298	0	8894		
Riser loads (4SCR)	5158.0	66.26	0.95	14.93	341769	4900	77009		
Mooring tension	1727.2	57.85	1.41	18.29	99917	2435	31586		
Water Ballast	10465.0	36.71	1.13	4.74	384166	11853	49589	856.9	5300.6
Displacement	56503.24	57.048	0.025	22.412	3223397	1407	1266364	857	5301
Target data	56503.24	57.048	0.025				Correction for Free Surface* =	0.02	0.09
							corrected VCG =	22.43	22.506
LCG Genstab		55.732					KMT / KML =	26.8	27.2
							GMT / GML =	4.37	4.69
Mean Draught	22.10 m								

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG	I mmt	t mmt	v mmt	trans mom inertia	long mom inertia	trans freesurface	long freesurface
SW Ballast	1P	908.9	99%	877.86	1.025	899.81	9.5	-24.47	6.722607	8548.205	-22018.38	5988.585	0	0	0.0000	0.0000
SW Ballast	1S	908.9	99%	877.86	1.025	899.81	9.5	24.47	6.722607	8548.205	22018.38	5988.585	0	0	0.0000	0.0000
SW Ballast	2P	899.5	99%	868.79	1.025	890.51	6.78	-30.71	6.159246	6037.624	-27347.41	5429.991	0	0	0.0000	0.0000
SW Ballast	2S	899.5	99%	868.79	1.025	890.51	6.78	30.71	6.159246	6037.624	27347.41	5429.991	0	0	0.0000	0.0000
SW Ballast	3P	747	10%	70.39	1.025	72.15	16.71	-30.88	0.47	1205.692	-2228.113	3.295311	245.77	436.95	0.0043	0.0077
SW Ballast	3S	747	8%	58.12	1.025	59.57	16.71	30.88	0.472821	995.4157	1839.523	2.246118	245.77	436.95	0.0043	0.0077
SW Ballast	4P	818.2	44%	348.54	1.025	357.26	13.73	-36.66	2.81987	4905.145	-13097.06	439.878	112.4694459	1436.961108	0.0020	0.0254
SW Ballast	4S	818.2	49%	394.73	1.025	404.60	13.73	36.66	3.170535	5555.127	14832.55	634.3368	112.4732494	1436.973501	0.0020	0.0254
SW Ballast	5P	263	99%	254.02	1.025	260.37	27.71	-22.82	2.925676	7214.853	-5941.643	754.1408	3.36	194.72	0.0001	0.0034
SW Ballast	5S	263	99%	253.31	1.025	259.64	27.71	22.82	2.908745	7194.654	5925.009	745.5841	3.36	194.72	0.0001	0.0034
SW Ballast	6P	537	99%	518.66	1.025	531.63	28.19	-31.74	5.209063	14986.65	-16873.94	2741.601	0	0	0.0000	0.0000
SW Ballast	6S	537	99%	518.66	1.025	531.63	28.19	31.74	5.209063	14986.65	16873.94	2741.601	0	0	0.0000	0.0000
SW Ballast	7P	569.1	1%	5.55	1.025	5.69	26.94	-36.18	0.067333	153.3155	-205.9004	0.003832	0	0	0.0000	0.0000
SW Ballast	7S	569.1	1%	5.55	1.025	5.69	26.94	36.18	0.067333	153.3155	205.9004	0.003832	0	0	0.0000	0.0000
SW Ballast	11P	660.8	99%	638.24	1.025	654.19	51.06	-30.81	4.526443	33403.04	-20155.66	2931.551	0	0	0.0000	0.0000
SW Ballast	11S	660.8	99%	638.24	1.025	654.19	51.06	30.81	4.526443	33403.04	20155.66	2931.551	0	0	0.0000	0.0000
SW Ballast	13P	660.8	99%	638.24	1.025	654.19	61.72	-30.81	4.526443	40376.73	-20155.66	2931.551	0	0	0.0000	0.0000
SW Ballast	13S	660.8	99%	638.24	1.025	654.19	61.72	30.81	4.526443	40376.73	20155.66	2931.551	0	0	0.0000	0.0000
SW Ballast	16P	255.9	1%	2.50	1.025	2.56	85.17	-22.72	0.016301	217.95	-58.14048	0.000417	0	0	0.0000	0.0000
SW Ballast	16S	255.9	1%	2.50	1.025	2.56	85.17	22.72	0.016301	217.95	58.14048	0.000417	0	0	0.0000	0.0000
SW Ballast	17P	537	99%	518.66	1.025	531.63	84.58	-31.74	5.209063	44965.27	-16873.94	2741.601	0	0	0.0000	0.0000
SW Ballast	17S	537	99%	518.66	1.025	531.63	84.58	31.74	5.209063	44965.27	16873.94	2741.601	0	0	0.0000	0.0000
SW Ballast	18P	569	23%	128.09	1.025	131.60	85.84	-36.18	1.445866	11296.56	-4761.296	44.00772	66.85	581.66	0.0012	0.0103
SW Ballast	18S	569	74%	412.20	1.025	422.50	85.84	36.18	4.553244	36257.7	15286.18	1428.464	66.85	581.6487102	0.0012	0.0103
SW Ballast	19P	747	1%	7.20	1.025	7.47	96.07	-30.88	0.05929	717.6429	-230.6736	0.004429	0	0	0.0000	0.0000
SW Ballast	19S	747	1%	7.29	1.025	7.47	96.07	30.88	0.05929	717.6429	230.6736	0.004429	0	0	0.0000	0.0000
SW Ballast	20P	787.4	1%	7.68	1.025	7.87	98.66	-36.37	0.077198	776.8486	-286.3774	0.006079	0	0	0.0000	0.0000
SW Ballast	20S	787.4	1%	7.68	1.025	7.87	98.59	36.27	0.077198	776.2977	285.59	0.006079	0	0	0.0000	0.0000
SW Ballast	21P	987.8	1%	9.64	1.025	9.88	103.87	-24.48	0.069693	1026.028	-241.8134	0.006884	0	0	0.0000	0.0000
SW Ballast	21S	987.8	1%	9.64	1.025	9.88	103.87	24.48	0.069693	1026.028	241.8134	0.006884	0	0	0.0000	0.0000
SW Ballast	22P	1094	1%	10.67	1.025	10.94	106.75	-31.15	0.068458	1167.845	-340.781	0.007489	0	0	0.0000	0.0000
SW Ballast	22S	1094	1%	10.67	1.025	10.94	106.75	31.15	0.068458	1167.845	340.781	0.007489	0	0	0.0000	0.0000
SW Ballast	23P	682.3	1%	6.66	1.025	6.82	28.02	-27.55	12.2301	191.1805	-187.9737	0.83446	0	0	0.0000	0.0000
SW Ballast	23S	682.3	1%	6.66	1.025	6.82	28.02	27.55	12.2301	191.1805	187.9737	0.83446	0	0	0.0000	0.0000
SW Ballast	24P	1005.3	1%	9.81	1.025	10.05	28	-26.33	9.182852	281.484	-264.6955	0.923152	0	0	0.0000	0.0000
SW Ballast	24S	1005.3	1%	9.81	1.025	10.05	28	26.33	9.182852	281.484	264.6955	0.923152	0	0	0.0000	0.0000
SW Ballast	25P	682.3	1%	6.66	1.025	6.82	84.76	-27.55	12.2301	578.3175	-187.9737	0.83446	0	0	0.0000	0.0000
SW Ballast	25S	682.3	1%	6.66	1.025	6.82	84.76	27.55	12.2301	578.3175	187.9737	0.83446	0	0	0.0000	0.0000
SW Ballast	26P	1005.3	1%	9.81	1.025	10.05	84.77	-26.33	9.182852	852.1928	-264.6955	0.923152	0	0	0.0000	0.0000
SW Ballast	26S	1005.3	1%	9.81	1.025	10.05	84.77	26.33	9.182852	852.1928	264.6955	0.923152	0	0	0.0000	0.0000
Chain Locker	1P	372.2	1%	3.63	1.025	3.72	84.58	-30.41	1.057287	314.8068	-113.186	0.039352	0	0	0.0000	0.0000
Chain Locker	2P	372.2	1%	3.63	1.025	3.72	28.2	-30.41	1.057287	104.9604	-113.186	0.039352	0	0	0.0000	0.0000
Chain Locker	3S	372.2	1%	3.63	1.025	3.72	28.2	30.41	1.057287	104.9604	113.186	0.039352	0	0	0.0000	0.0000
Chain Locker	4S	372.2	1%	3.63	1.025	3.72	84.58	30.41	1.057287	314.8068	113.186	0.039352	0	0	0.0000	0.0000
Chain Locker	5P	53.5	1%	0.52	1.025	0.54	86.47	-31.12	12.23772	46.26145	-16.6492	0.065472	0	0	0.0000	0.0000
Chain Locker	6P	53.5	1%	0.52	1.025	0.54	26.31	-31.12	12.23772	14.07585	-16.6492	0.065472	0	0	0.0000	0.0000
Chain Locker	7S	53.5	1%	0.52	1.025	0.54	26.31	31.12	12.23772	14.07585	16.6492	0.065472	0	0	0.0000	0.0000
Chain Locker	8S	53.5	1%	0.52	1.025	0.54	86.47	31.12	12.23772	46.26145	16.6492	0.065472	0	0	0.0000	0.0000
		30538				10464.97										
							36.709	1.132766	4.738592	384155.5	11854.36	49589.22	856.9026953	5300.60332	0.0152	0.0938
					Target	10464.970	36.710	1.1327								



ASSUMED BALLAST ARRANGEMENT @22.0m
DRAUGHT – OPERATING/SURVIVAL CONDITION



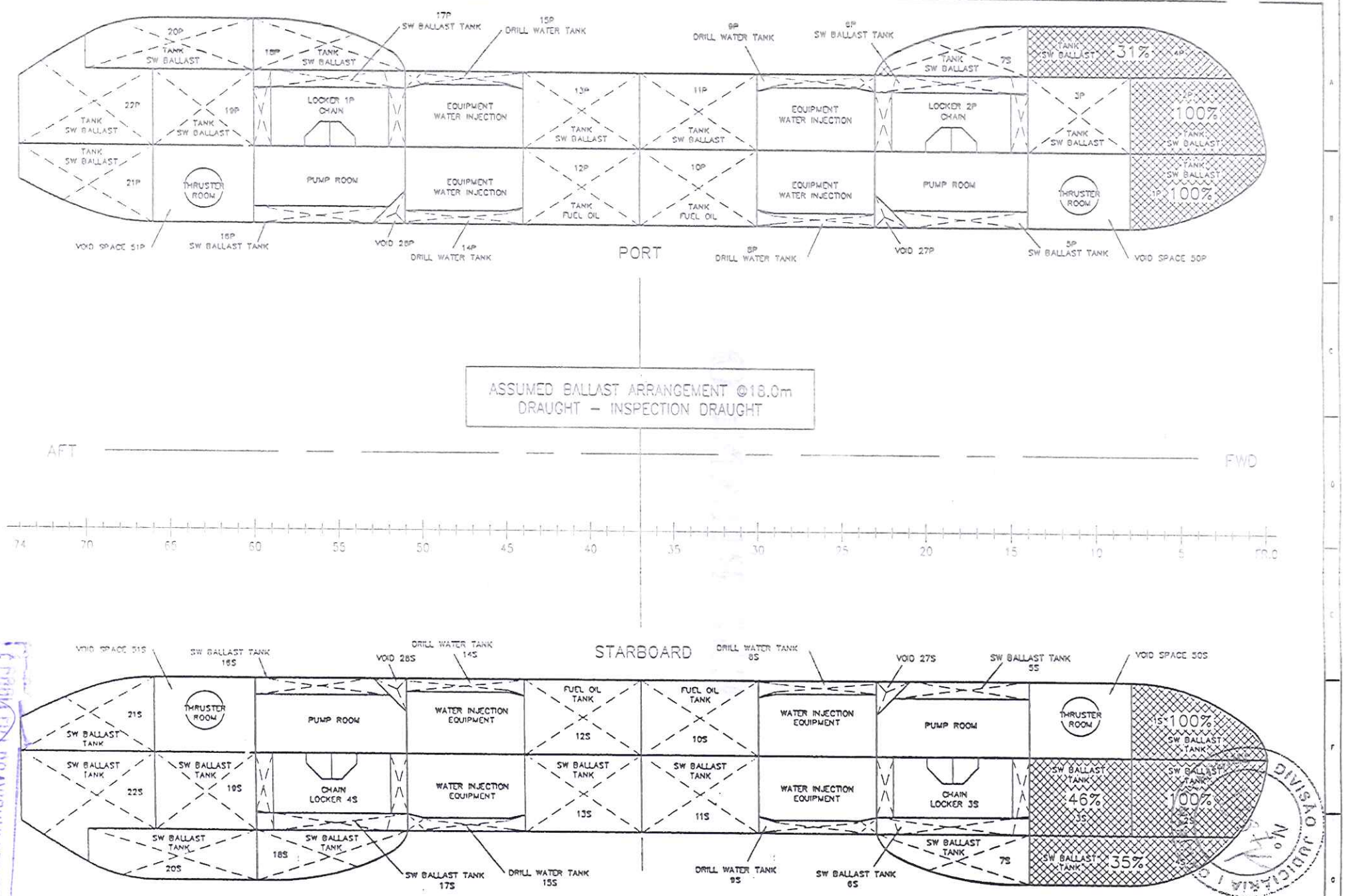


PLAN ON LOWER HULL & COLUMNS
EL. 2570

Inspection Load Condition - 4 x SCRs @ 20 Deg & Risers Installed
Worst Case Scenario - Maximum Loads - Based on Weight Control Report R

Item	Weight	LCG	TCG	VCG	LCGmmt	TCGmmt	VCGmmt	I (m^4)	I (m^4)
	tonnes	from FP	m from CL	m	tm	tm	tm	trans	long
Modified Lightship (Rev R)	31482.0	60.74	0.05	30.11	1912091	1637	948017		
Potable Water tanks	403.2	84.37	0.19	26.37	34016	76	10632		
Process Fresh Water	1050.4	40.38	0.00	4.40	42415	0	4622		
Fuel/sep/waste oil (85% in Main Tks)	2468.0	60.10	-0.56	10.61	148317	-1380	26173		
Lub oil	5.6	60.77	4.31	29.60	340	24	166		
Crew & Stores	335.5	69.85	3.27	39.23	23433	1096	13162		
Proc Related loads(26/3/98)	1733.4	80.52	-11.10	45.60	139573	-19241	79043		
Below Tank Top Process loads	112.2	82.27	0.00	23.45	9231	0	2631		
Deck Loads	300.0	56.39	0.00	44.50	16917	0	13350		
Chain onboard	909.7	56.39	0.00	9.78	51298	0	8894		
Riser loads(5/2/98)	5158.0	66.26	0.95	14.93	341769	4900	77009		
Mooring tension	1727.2	57.85	1.41	18.29	99917	2435	31586		
Water Ballast	4704.4	12.56	2.47	4.74	59083	11621	22292		
Displacement	50389.52	57.12	0.02	24.56	2878401	1169	1237579	0	0
Target data	50389.52	57.12	0.02			Correction for Free Surface* =		0.01	0.07
							corrected VCG =	24.57	24.63
GenStab LCG		55.6570					KMT / KML =	27.60	28.00
							GMT / GML =	3.03	3.37
Mean Draught	18.								

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG	l mmt	t mmt	v mmt	trans mom inertia	long mom inertia	trans freesurface	long freesurface			
SW Ballast	1P	908.9	99%	877.864	1.025	899.811	9.5	-24.47	6.722607	8548.205	22018.38	5988.585	0	0	0	0			74%
SW Ballast	1S	908.9	99%	877.864	1.025	899.811	9.5	24.47	6.722607	8548.205	22018.38	5988.585	0	0	0	0			84%
SW Ballast	2P	899.5	99%	868.785	1.025	890.505	6.78	-30.71	6.159246	6037.624	-27347.41	5429.991	0	0	0	0			73%
SW Ballast	2S	899.5	99%	868.785	1.025	890.505	6.78	30.71	6.159246	6037.624	27347.41	5429.991	0	0	0	0			90%
SW Ballast	3P	747	1%	7.215	1.025	7.3953	16.71	-30.88	2.822682	123.5755	-228.3669	0.206658	245.77	436.95	0.004877403	0.008671446			45%
SW Ballast	3S	747	46%	333.113	1.025	341.4411	16.71	30.88	2.822682	5705.481	10543.7	440.5275	245.77	436.95	0.004877403	0.008671446			60%
SW Ballast	4P	818.2	31%	244.551	1.025	250.6651	13.73	-36.66	2.023652	3441.632	-9189.362	155.4047	107.8079616	1324.482038	0.002139492	0.026284871			53%
SW Ballast	4S	818.2	35%	279.325	1.025	286.3085	13.73	36.66	2.291006	3931.015	10496.07	229.5277	111.8625166	1422.559616	0.002219956	0.02823126			57%
SW Ballast	5P	203	1%	2.566	1.025	2.63	27.71	-22.82	0.016046	72.8773	-60.0166	0.000422	0	0	0	0			
SW Ballast	5S	203	1%	2.566	1.025	2.63	27.71	22.82	0.016046	72.8773	60.0166	0.000422	0	0	0	0			
SW Ballast	6P	537	1%	5.239	1.025	5.37	28.19	-31.74	0.028417	151.3803	-170.4438	0.001526	0	0	0	0			
SW Ballast	6S	537	1%	5.239	1.025	5.37	28.19	31.74	0.028417	151.3803	170.4438	0.001526	0	0	0	0			
SW Ballast	7P	569.1	1%	5.552	1.025	5.691	26.94	-36.18	0.067333	153.3155	-205.9004	0.003832	0	0	0	0			
SW Ballast	7S	569.1	1%	5.552	1.025	5.691	26.94	36.18	0.067333	153.3155	205.9004	0.003832	0	0	0	0			
SW Ballast	11P	660.8	1%	6.447	1.025	6.608	51.06	-30.81	0.051837	337.4045	-203.5925	0.003425	0	0	0	0			
SW Ballast	11S	660.8	1%	6.447	1.025	6.608	51.06	30.81	0.051837	337.4045	203.5925	0.003425	0	0	0	0			
SW Ballast	13P	660.8	1%	6.447	1.025	6.608	61.72	-30.81	0.051837	407.8458	-203.5925	0.003425	0	0	0	0			
SW Ballast	13S	660.8	1%	6.447	1.025	6.608	61.72	30.81	0.051837	407.8458	203.5925	0.003425	0	0	0	0			
SW Ballast	16P	255.9	1%	2.497	1.025	2.559	85.17	-22.72	0.016301	217.95	-58.14048	0.000417	0	0	0	0			
SW Ballast	16S	255.9	1%	2.497	1.025	2.559	85.17	22.72	0.016301	217.95	58.14048	0.000417	0	0	0	0			
SW Ballast	17P	537	1%	5.239	1.025	5.37	84.58	-31.74	0.028417	454.1946	-170.4438	0.001526	0	0	0	0			
SW Ballast	17S	537	1%	5.239	1.025	5.37	84.58	31.74	0.028417	454.1946	170.4438	0.001526	0	0	0	0			
SW Ballast	18P	569	1%	5.551	1.025	5.69	85.84	-36.18	0.067261	488.4296	-205.8642	0.003827	0	0	0	0			
SW Ballast	18S	569	1%	5.551	1.025	5.69	85.84	36.18	0.067261	488.4296	205.8642	0.003827	0	0	0	0			
SW Ballast	19P	747	1%	7.288	1.025	7.47	96.07	-30.88	0.05929	717.6429	-230.6736	0.004429	0	0	0	0			
SW Ballast	19S	747	1%	7.288	1.025	7.47	96.07	30.88	0.05929	717.6429	230.6736	0.004429	0	0	0	0			
SW Ballast	20P	787.4	1%	7.682	1.025	7.874	96.66	-36.27	0.077198	776.8488	-286.3774	0.006079	0	0	0	0			
SW Ballast	20S	787.4	1%	7.682	1.025	7.874	96.59	36.27	0.077198	776.2977	285.59	0.006079	0	0	0	0			
SW Ballast	21P	987.8	1%	9.637	1.025	9.878	103.87	-24.48	0.069693	1026.028	-241.8134	0.006884	0	0	0	0			
SW Ballast	21S	987.8	1%	9.637	1.025	9.878	103.87	24.48	0.069693	1026.028	241.8134	0.006884	0	0	0	0			
SW Ballast	22P	1094	1%	10.673	1.025	10.94	106.75	-31.15	0.008458	1167.845	-340.781	0.007489	0	0	0	0			
SW Ballast	22S	1094	1%	10.673	1.025	10.94	106.75	31.15	0.008458	1167.845	340.781	0.007489	0	0	0	0			
SW Ballast	23P	682.3	1%	6.657	1.025	6.823	28.02	-27.55	12.2301	191.1805	-187.9737	0.83446	0	0	0	0			
SW Ballast	23S	682.3	1%	6.657	1.025	6.823	28.02	27.55	12.2301	191.1805	187.9737	0.83446	0	0	0	0			
SW Ballast	24P	1005.3	1%	9.808	1.025	10.053	28	-26.33	9.182852	281.484	-264.6955	0.923152	0	0	0	0			
SW Ballast	24S	1005.3	1%	9.808	1.025	10.053	28	26.33	9.182852	281.484	264.6955	0.923152	0	0	0	0			
SW Ballast	25P	682.3	1%	6.657	1.025	6.823	84.76	-27.55	12.2301	578.3175	-187.9737	0.83446	0	0	0	0			
SW Ballast	25S	682.3	1%	6.657	1.025	6.823	84.76	27.55	12.2301	578.3175	187.9737	0.83446	0	0	0	0			
SW Ballast	26P	1005.3	1%	9.808	1.025	10.053	84.77	-26.33	9.182852	852.1928	-264.6955	0.923152	0	0	0	0			
SW Ballast	26S	1005.3	1%	9.808	1.025	10.053	84.77	26.33	9.182852	852.1928	264.6955	0.923152	0	0	0	0			
Chain Locker	1P	372.2	1%	3.631	1.025	3.722	84.58	-30.41	1.057287	314.8068	-113.186	0.039352	0	0	0	0			
Chain Locker	2P	372.2	1%	3.631	1.025	3.722	28.2	-30.41	1.057287	104.9604	-113.186	0.039352	0	0	0	0			
Chain Locker	3S	372.2	1%	3.631	1.025	3.722	28.2	30.41	1.057287	104.9604	113.186	0.039352	0	0	0	0			
Chain Locker	4S	372.2	1%	3.631	1.025	3.722	84.58	30.41	1.057287	314.8068	113.186	0.039352	0	0	0	0			
Chain Locker	5P	53.5	1%	0.522	1.025	0.535	86.47	-31.12	12.23772	46.26145	-16.6492	0.065472	0	0	0	0			
Chain Locker	6P	53.5	1%	0.522	1.025	0.535	26.31	-31.12	12.23772	14.07585	-16.6492	0.065472	0	0	0	0			
Chain Locker	7S	53.5	1%	0.522	1.025	0.535	26.31	31.12	12.23772	14.07585	16.6492	0.065472	0	0	0	0			
Chain Locker	8S	53.5	1%	0.522	1.025	0.535	86.47	31.12	12.23772	46.26145	16.6492	0.065472	0	0	0	0			
		30538				4704.350													
							12.5592	2.470317	5.031589	59082.89	11621.23	23670.36	711.2104782	3620.941654	0.014114254	0.071859023			
					Target	4704.350	12.55930	2.470317											



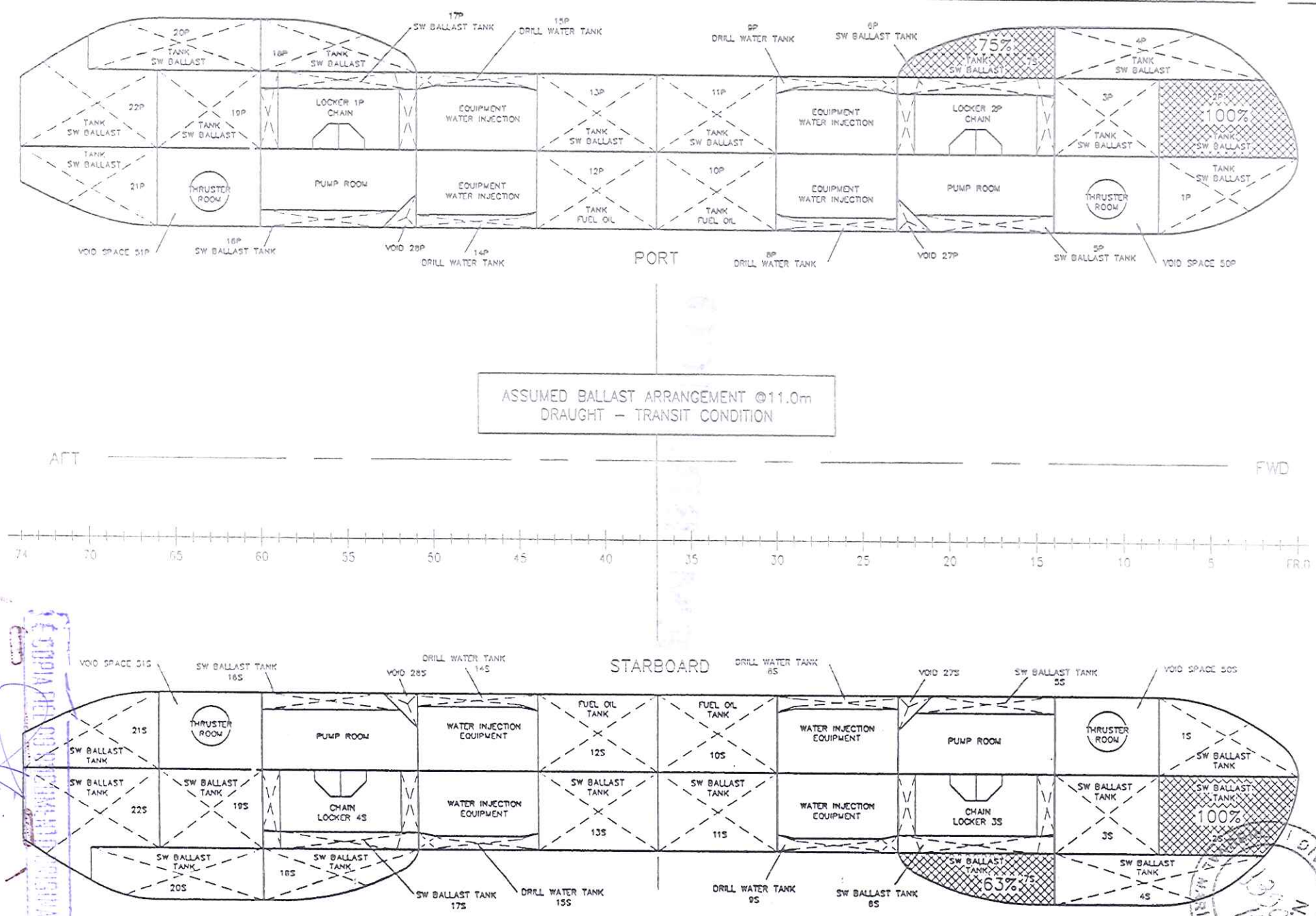
PLAN ON LOWER HULL & COLUMNS

Transit Loadcase

Worst Case Scenario - Maximum Loads - Based on Weight Control Report R

Item	Weight	LCG	TCG	VCG	LCGmmt	TCGmmt	VCGmmt	I (m^4)	I (m^4)
	tonnes	from FP	m from CL	m	tm	tm	tm	trans	long
Modified Lightship	31482.0	60.74	0.05	30.11	1912091	1637	948017		
Potable Water tanks	403.2	84.37	0.19	26.37	34016	76	10632		
Process Fresh Water	0.0	40.34	0.00	4.40	0	0	0		
Fuel/sep/waste oil	631.1	52.34	-0.33	4.96	33031	-209	3129		
Lub oil	5.6	60.77	4.31	29.60	340	24	166		
Crew & Stores	67.0	48.06	12.51	40.56	3220	838	2717		
Proc Related loads	0.0	0.00	0.00	0.00	0	0	0		
Dock Loads	300.0	35.81	3.68	44.15	10742	1104	13245		
Chain onboard	1364.6	56.39	0.00	9.78	76949	0	13341		
Riser loads	0.0	64.25	2.90	15.55	0	0	0		
Mooring tension	0.0	56.39	0.00	18.29	0	0	0		
Water Ballast	2829.9	17.74	-0.96	4.59	50193	-2706	12992	414	1883
Displacement	37083.35	57.1842	0.0206	27.081	2120582	763.917	1004240	414	1883
Target data	37083.35	57.1842	0.0206			Correction for Free Surface* =		0.01	0.05
							corrected VCG =	27.09	27.131
	Genstab	55.5918					KMT / KML =	70.5	109.2
							GMT / GML =	43.41	82.07
Mean Draught	11	m							

Compartment		Max Wt	%	Volume	Sp. Gr.	Weight	LCG	TCG	VCG	l mmt	t mmt	v mmt	trans mom inertia	long mom inertia	trans freesurface	long freesurface
SW Ballast	1P	908.9	1%	8.867317	1.025	9.089	9.5	-24.47	0.078172	86.3455	-222.4078	0.007105	0	0	0	0
SW Ballast	1S	908.9	1%	8.867317	1.025	9.089	9.5	24.47	0.078172	86.3455	222.4078	0.007105	0	0	0	0
SW Ballast	2P	899.5	99%	868.7854	1.025	890.505	6.78	-30.71	6.159246	6037.624	-27347.41	5429.991	0	0	0	0
SW Ballast	2S	899.5	98%	857.5908	1.025	879.0306	6.78	30.71	6.083156	5959.827	26995.03	5225.595	280.05	718.67	0.007551907	0.019379856
SW Ballast	3P	747	1%	7.287805	1.025	7.47	16.71	-30.88	0.05929	124.8237	-230.6736	0.004429	0	0	0	0
SW Ballast	3S	747	1%	7.287805	1.025	7.47	16.71	30.88	0.05929	124.8237	230.6736	0.004429	0	0	0	0
SW Ballast	4P	818.2	1%	7.982439	1.025	8.182	13.73	-36.66	0.086709	112.3389	-299.9521	0.007095	0	0	0	0
SW Ballast	4S	818.2	1%	7.982439	1.025	8.182	13.73	36.66	0.086709	112.3389	299.9521	0.007095	0	0	0	0
SW Ballast	5P	263	1%	2.565854	1.025	2.63	27.71	-22.82	0.016046	72.8773	-60.0166	0.000422	0	0	0	0
SW Ballast	5S	263	1%	2.565854	1.025	2.63	27.71	22.82	0.016046	72.8773	60.0166	0.000422	0	0	0	0
SW Ballast	6P	537	1%	5.239024	1.025	5.37	28.19	-31.74	0.028417	151.3803	-170.4438	0.001526	0	0	0	0
SW Ballast	6S	537	1%	5.239024	1.025	5.37	28.19	31.74	0.028417	151.3803	170.4438	0.001526	0	0	0	0
SW Ballast	7P	569.1	75%	414.2759	1.025	424.6328	26.94	-36.18	4.576194	11439.61	-15363.21	1449.916	66.86	582.0209806	0.001802965	0.015694941
SW Ballast	7S	569.1	63%	350.3379	1.025	359.0963	26.94	36.18	3.87688	9674.056	12992.11	876.4473	66.86	582.2964384	0.001802965	0.015702369
SW Ballast	11P	660.8	1%	6.446829	1.025	6.608	51.06	-30.81	0.051837	337.4045	-203.5925	0.003425	0	0	0	0
SW Ballast	11S	660.8	1%	7.010008	1.025	7.18532	51.06	30.81	0.056366	366.8824	221.3797	0.004404	0	0	0	0
SW Ballast	13P	660.8	1%	6.446829	1.025	6.608	61.72	-30.81	0.051837	407.8458	-203.5925	0.003425	0	0	0	0
SW Ballast	13S	660.8	1%	6.446829	1.025	6.608	61.72	30.81	0.051837	407.8458	203.5925	0.003425	0	0	0	0
SW Ballast	16P	255.9	1%	2.496585	1.025	2.559	85.17	-22.72	0.016301	217.95	-58.14048	0.000417	0	0	0	0
SW Ballast	16S	255.9	1%	2.496585	1.025	2.559	85.17	22.72	0.016301	217.95	58.14048	0.000417	0	0	0	0
SW Ballast	17P	537	1%	5.239024	1.025	5.37	84.58	-31.74	0.028417	454.1946	-170.4438	0.001526	0	0	0	0
SW Ballast	17S	537	1%	5.239024	1.025	5.37	84.58	31.74	0.028417	454.1946	170.4438	0.001526	0	0	0	0
SW Ballast	18P	569	1%	5.55122	1.025	5.69	85.84	-36.18	0.067261	488.4296	-205.8642	0.003827	0	0	0	0
SW Ballast	18S	569	1%	5.55122	1.025	5.69	85.84	36.18	0.067261	488.4296	205.8642	0.003827	0	0	0	0
SW Ballast	19P	747	1%	7.287805	1.025	7.47	96.07	-30.88	0.05929	717.8429	-230.6736	0.004429	0	0	0	0
SW Ballast	19S	747	1%	7.287805	1.025	7.47	96.07	30.88	0.05929	717.8429	230.6736	0.004429	0	0	0	0
SW Ballast	20P	787.4	1%	7.681951	1.025	7.874	98.66	-36.37	0.077198	776.0488	-286.3774	0.006079	0	0	0	0
SW Ballast	20S	787.4	1%	7.681951	1.025	7.874	98.59	36.27	0.077198	776.2977	285.50	0.006079	0	0	0	0
SW Ballast	21P	987.8	1%	9.637073	1.025	9.878	103.87	-24.48	0.069693	1026.028	-241.8134	0.006884	0	0	0	0
SW Ballast	21S	987.8	1%	9.637073	1.025	9.878	103.87	24.48	0.069693	1026.028	241.8134	0.006884	0	0	0	0
SW Ballast	22P	1094	1%	10.67317	1.025	10.94	106.75	-31.15	0.068458	1167.845	-340.781	0.007489	0	0	0	0
SW Ballast	22S	1094	1%	10.67317	1.025	10.94	106.75	31.15	0.068458	1167.845	340.781	0.007489	0	0	0	0
SW Ballast	23P	682.3	1%	6.656585	1.025	6.823	28.02	-27.55	12.2301	191.1805	-187.9737	0.63446	0	0	0	0
SW Ballast	23S	682.3	1%	6.656585	1.025	6.823	28.02	27.55	12.2301	191.1805	187.9737	0.63446	0	0	0	0
SW Ballast	24P	1005.3	1%	9.807805	1.025	10.053	26	-26.33	9.182852	261.484	-264.6955	0.923152	0	0	0	0
SW Ballast	24S	1005.3	1%	9.807805	1.025	10.053	26	26.33	9.182852	261.484	264.6955	0.923152	0	0	0	0
SW Ballast	25P	682.3	1%	6.656585	1.025	6.823	84.76	-27.55	12.2301	578.3175	-187.9737	0.63446	0	0	0	0
SW Ballast	25S	682.3	1%	6.656585	1.025	6.823	84.76	27.55	12.2301	578.3175	187.9737	0.63446	0	0	0	0
SW Ballast	26P	1005.3	1%	9.807805	1.025	10.053	84.77	-26.33	9.182852	852.1928	-264.6955	0.923152	0	0	0	0
SW Ballast	26S	1005.3	1%	9.807805	1.025	10.053	84.77	26.33	9.182852	852.1928	264.6955	0.923152	0	0	0	0
Chain Locker	1P	372.2	1%	3.63122	1.025	3.722	84.58	-30.41	1.057287	314.8068	-113.186	0.039352	0	0	0	0
Chain Locker	2P	372.2	1%	3.63122	1.025	3.722	28.2	-30.41	1.057287	104.9604	-113.186	0.039352	0	0	0	0
Chain Locker	3S	372.2	1%	3.63122	1.025	3.722	28.2	30.41	1.057287	104.9604	113.186	0.039352	0	0	0	0
Chain Locker	4S	372.2	1%	3.63122	1.025	3.722	84.58	30.41	1.057287	314.8068	113.186	0.039352	0	0	0	0
Chain Locker	5P	53.5	1%	0.521951	1.025	0.535	86.47	-31.12	12.23772	46.26145	-16.6492	0.065472	0	0	0	0
Chain Locker	6P	53.5	1%	0.521951	1.025	0.535	26.31	-31.12	12.23772	14.07585	-16.6492	0.065472	0	0	0	0
Chain Locker	7S	53.5	1%	0.521951	1.025	0.535	26.31	31.12	12.23772	14.07585	16.6492	0.065472	0	0	0	0
Chain Locker	8S	53.5	1%	0.521951	1.025	0.535	86.47	31.12	12.23772	46.26145	16.6492	0.065472	0	0	0	0
		30538				2829.85										
							17.7361	-0.956407	4.590885	50190.51	-2706.487	12991.52	413.77	1882.987419	0.011157838	0.050777166
					Target	2829.85	17.74	-0.96								



PLAN ON LOWER HULL & COLUMNS

FL 2570

APPENDIX E

WIND OVERTURNING MOMENTS & DOWNFLOOD POINTS

(15 PAGES)

3.4.2 - Characteristics Monthly Values (°C)

MONTH	MINIMUM	MEAN	MAXIMUM
JAN	22,0	26,7	33,0
FEB	24,0	27,5	34,0
MAR	22,0	28,0	33,0
APR	20,0	27,4	33,0
MAY	17,0	25,1	31,0
JUN	18,0	23,6	21,1
JUL	17,0	22,6	30,0
AUG	14,0	21,8	29,0
SEP	19,0	23,2	31,0
OCT	16,0	24,0	33,0
NOV	18,0	25,2	36,0
DEC	20,0	26,1	32,0

SOURCE: SIMO

Collected data in Campos Basin in the period from 06/87 to 05/91.

3.5 - Wind

The wind values are referred to 10 meters above mean sea level and ten minutes duration. Transformations to different heights and durations may be used as indicates in DNV rules or in the Shore Protection Manual.

3.5.1 - Wind Speed by Return Period (m/s)

1 min mean — 1.108
1 hr mean — 0.916.

DIRECTION	RETURN PERIOD (YEARS)					
	1	10	20	30	50	100
N	20,87	27,20	29,10	30,22	31,62	33,52
NE	19,88	25,06	26,61	27,52	28,67	30,23
E	14,02	18,03	19,23	19,94	20,82	22,03
SE	15,00	19,92	21,40	22,26	23,35	24,83
S	16,15	21,68	23,35	24,32	25,54	27,20
SW	21,22	29,23	31,63	33,04	34,81	37,22
W	15,56	22,07	24,02	25,16	26,60	28,55
NW	11,41	16,91	18,55	19,51	20,72	22,36

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	22 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.22 tonnes	39.19
Horizontal	0.40 tonnes	33.65

Moment due to a 1m/s wind	
Vertical	8.79 tm
Horizontal	13.36 tm

Moment due to a 41.2m/s wind	
Vertical	14918.26 tm
Horizontal	22670.24 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	14918.26
2.5	0.044	15877.79
5	0.087	16773.26
7.5	0.131	17597.84
10	0.175	18345.26
12.5	0.218	19009.82
15	0.262	19586.48
17.5	0.305	20070.85
20	0.349	20459.23
22.5	0.393	20748.67
25	0.436	20936.97
27.5	0.480	21022.70
30	0.524	21005.19
32.5	0.567	20884.60
35	0.611	20661.83
37.5	0.654	20338.58
40	0.698	19917.31

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	22 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.21 tonnes	35.94
Horizontal	0.39 tonnes	33.94

Moment due to a 1m/s wind	
Vertical	7.67 tm
Horizontal	13.15 tm

Moment due to a 41.2m/s wind	
Vertical	13015.33 tm
Horizontal	22326.21 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	13015.33
2.5	0.044	13963.50
5	0.087	14854.92
7.5	0.131	15682.81
10	0.175	16440.88
12.5	0.218	17123.35
15	0.262	17725.02
17.5	0.305	18241.33
20	0.349	18668.33
22.5	0.393	19002.79
25	0.436	19242.15
27.5	0.480	19384.59
30	0.524	19429.03
32.5	0.567	19375.13
35	0.611	19223.31
37.5	0.654	18974.71
40	0.698	18631.22

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	22 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.22 tonnes	39.19
Horizontal	0.40 tonnes	33.65

Moment due to a 1m/s wind	
Vertical	8.79 tm
Horizontal	13.36 tm

Moment due to a 25.7m/s wind	
Vertical	5804.84 tm
Horizontal	8821.20 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	5804.84
2.5	0.044	6178.20
5	0.087	6526.63
7.5	0.131	6847.49
10	0.175	7138.31
12.5	0.218	7396.90
15	0.262	7621.29
17.5	0.305	7809.76
20	0.349	7960.88
22.5	0.393	8073.50
25	0.436	8146.77
27.5	0.480	8180.13
30	0.524	8173.32
32.5	0.567	8126.40
35	0.611	8039.71
37.5	0.654	7913.93
40	0.698	7750.01

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	22 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.21 tonnes	35.94
Horizontal	0.39 tonnes	33.94

Moment due to a 1m/s wind	
Vertical	7.67 tm
Horizontal	13.15 tm

Moment due to a 25.7m/s wind	
Vertical	5064.39 tm
Horizontal	8687.34 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	5064.39
2.5	0.044	5433.33
5	0.087	5780.19
7.5	0.131	6102.33
10	0.175	6397.30
12.5	0.218	6662.86
15	0.262	6896.97
17.5	0.305	7097.87
20	0.349	7264.03
22.5	0.393	7394.17
25	0.436	7487.30
27.5	0.480	7542.73
30	0.524	7560.02
32.5	0.567	7539.05
35	0.611	7479.97
37.5	0.654	7383.24
40	0.698	7249.59

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	18 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.25 tonnes	38.76
Horizontal	0.40 tonnes	34.99

Moment due to a 1m/s wind	
Vertical	9.73 tm
Horizontal	13.98 tm

Moment due to a 41.2m/s wind (100 Year storm)	
Vertical	16516.13 tm
Horizontal	23728.46 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	16516.13
2.5	0.044	17518.74
5	0.087	18450.87
7.5	0.131	19305.43
10	0.175	20075.91
12.5	0.218	20756.45
15	0.262	21341.87
17.5	0.305	21827.72
20	0.349	22210.29
22.5	0.393	22486.68
25	0.436	22654.77
27.5	0.480	22713.30
30	0.524	22661.82
32.5	0.567	22500.72
35	0.611	22231.22
37.5	0.654	21855.38
40	0.698	21376.05

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	18 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.24 tonnes	37.72
Horizontal	0.39 tonnes	35.31

Moment due to a 1m/s wind	
Vertical	8.88 tm
Horizontal	13.68 tm

Moment due to a 41.2m/s wind (100 Year storm)	
Vertical	15067.20 tm
Horizontal	23224.79 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	15067.20
2.5	0.044	16050.62
5	0.087	16969.22
7.5	0.131	17816.00
10	0.175	18584.54
12.5	0.218	19268.97
15	0.262	19864.08
17.5	0.305	20365.36
20	0.349	20768.97
22.5	0.393	21071.86
25	0.436	21271.71
27.5	0.480	21367.01
30	0.524	21357.03
32.5	0.567	21241.84
35	0.611	21022.32
37.5	0.654	20700.15
40	0.698	20277.77

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	18 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.25 tonnes	38.76
Horizontal	0.40 tonnes	34.99

Moment due to a 1m/s wind	
Vertical	9.73 tm
Horizontal	13.98 tm

Moment due to a 25.7m/s wind (100 Year storm)	
Vertical	6426.58 tm
Horizontal	9232.97 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	6426.58
2.5	0.044	6816.71
5	0.087	7179.41
7.5	0.131	7511.93
10	0.175	7811.73
12.5	0.218	8076.53
15	0.262	8304.33
17.5	0.305	8493.37
20	0.349	8642.23
22.5	0.393	8749.78
25	0.436	8815.19
27.5	0.480	8837.96
30	0.524	8817.93
32.5	0.567	8755.24
35	0.611	8650.38
37.5	0.654	8504.13
40	0.698	8317.62

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	18 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.24 tonnes	37.72
Horizontal	0.39 tonnes	35.31

Moment due to a 1m/s wind	
Vertical	8.88 tm
Horizontal	13.68 tm

Moment due to a 25.7m/s wind (100 Year storm)	
Vertical	5862.79 tm
Horizontal	9036.99 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	5862.79
2.5	0.044	6245.45
5	0.087	6602.88
7.5	0.131	6932.38
10	0.175	7231.42
12.5	0.218	7497.74
15	0.262	7729.30
17.5	0.305	7924.35
20	0.349	8081.40
22.5	0.393	8199.26
25	0.436	8277.02
27.5	0.480	8314.11
30	0.524	8310.22
32.5	0.567	8265.40
35	0.611	8179.98
37.5	0.654	8054.62
40	0.698	7890.27

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	11 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.359 tonnes	33.88
Horizontal	0.422 tonnes	42.258

Moment due to a 1m/s wind	
Vertical	12.18 tm
Horizontal	17.82 tm

Moment due to a 35m/s wind	
Vertical	14917.50 tm
Horizontal	21834.30 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	14917.50
2.5	0.044	15840.61
5	0.087	16699.93
7.5	0.131	17488.92
10	0.175	18201.57
12.5	0.218	18832.46
15	0.262	19376.79
17.5	0.305	19830.42
20	0.349	20189.89
22.5	0.393	20452.47
25	0.436	20616.16
27.5	0.480	20679.72
30	0.524	20642.65
32.5	0.567	20505.25
35	0.611	20268.56
37.5	0.654	19934.37
40	0.698	19505.24

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Intact WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	11 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.315 tonnes	33.54
Horizontal	0.410 tonnes	41.33

Moment due to a 1m/s wind	
Vertical	10.55 tm
Horizontal	16.93 tm

Moment due to a 35m/s wind	
Vertical	12929.47 tm
Horizontal	20745.37 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	12929.47
2.5	0.044	13808.91
5	0.087	14632.45
7.5	0.131	15393.84
10	0.175	16087.26
12.5	0.218	16707.46
15	0.262	17249.70
17.5	0.305	17709.86
20	0.349	18084.44
22.5	0.393	18370.59
25	0.436	18566.12
27.5	0.480	18669.56
30	0.524	18680.11
32.5	0.567	18597.69
35	0.611	18422.94
37.5	0.654	18157.18
40	0.698	17802.42

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	0 degrees
Wind Direction	90 degrees
Draft	11 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.359 tonnes	33.876
Horizontal	0.422 tonnes	42.258

Moment due to a 1m/s wind	
Vertical	12.18 tm
Horizontal	17.82 tm

Moment due to a 25.7m/s wind	
Vertical	8043.15 tm
Horizontal	11772.52 tm

Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert}\,Cos^2\theta + Moment_{horiz}\,Sin\theta Cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	8043.15
2.5	0.044	8540.87
5	0.087	9004.19
7.5	0.131	9429.60
10	0.175	9813.84
12.5	0.218	10154.00
15	0.262	10447.49
17.5	0.305	10692.08
20	0.349	10885.90
22.5	0.393	11027.47
25	0.436	11115.73
27.5	0.480	11150.00
30	0.524	11130.01
32.5	0.567	11055.93
35	0.611	10928.31
37.5	0.654	10748.13
40	0.698	10516.75

WS	7/15/2146
Proj	P36 Roncador
Client	Petromec
Date	27-Aug-97
By	SCE
Chkd	

Title Damaged WOTM Calculation

Heel Axis	90 degrees
Wind Direction	0 degrees
Draft	11 m

Forces due to a 1m/s wind		Wind Lever (m)
Vertical	0.315 tonnes	33.539
Horizontal	0.410 tonnes	41.330

Moment due to a 1m/s wind	
Vertical	10.55 tm
Horizontal	16.93 tm

Moment due to a 25.7m/s wind	
Vertical	6971.25 tm
Horizontal	11185.40 tm

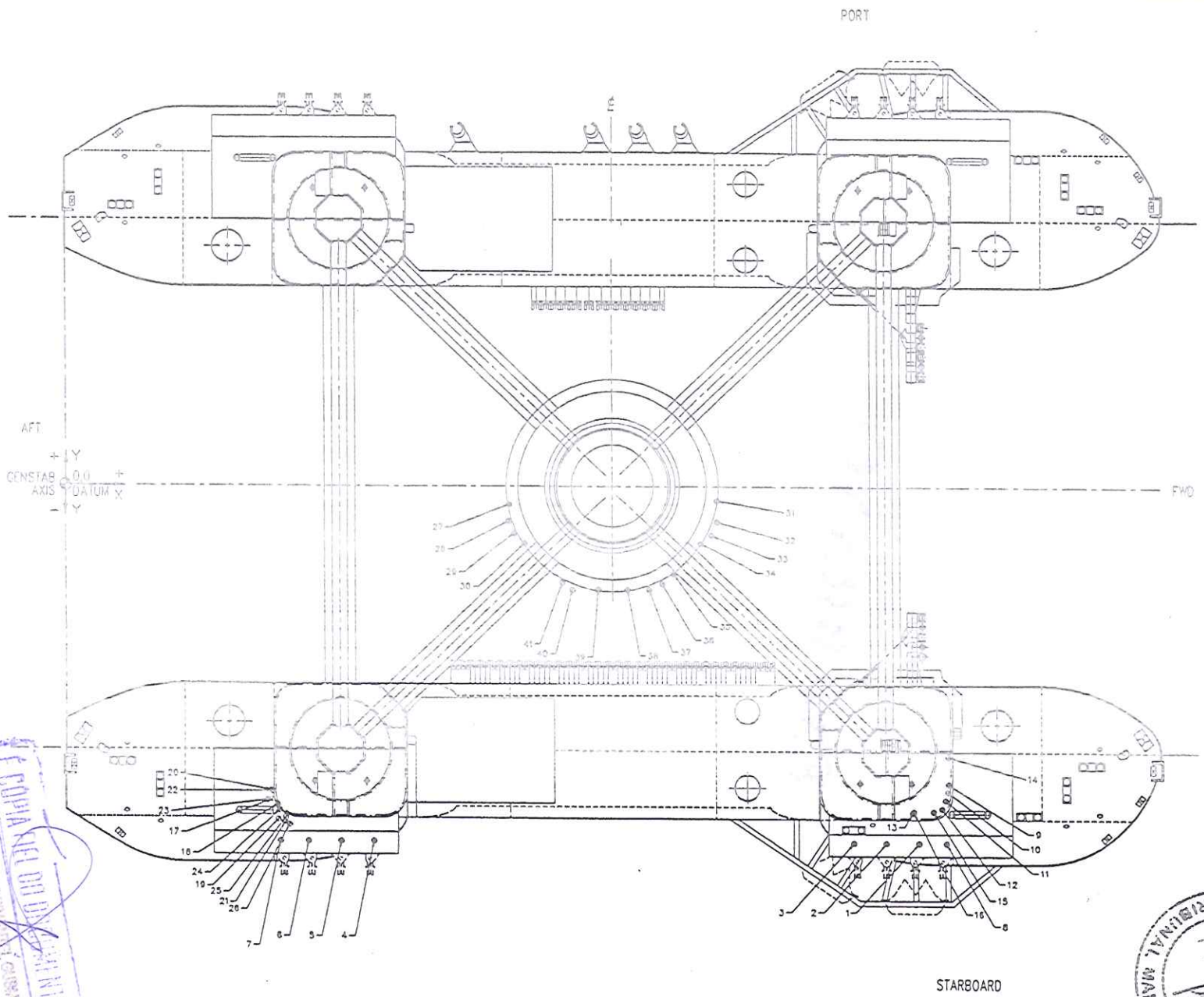
Horizontal and vertical moments combined using the following equation:

$$Moment_{\theta} = Moment_{vert} \cos^2\theta + Moment_{horiz} \sin\theta\cos\theta$$

Heel Angle (θ)		Moment
degrees	radians	
0	0.000	6971.25
2.5	0.044	7445.42
5	0.087	7889.46
7.5	0.131	8299.98
10	0.175	8673.86
12.5	0.218	9008.25
15	0.262	9300.62
17.5	0.305	9548.72
20	0.349	9750.69
22.5	0.393	9904.97
25	0.436	10010.40
27.5	0.480	10066.17
30	0.524	10071.86
32.5	0.567	10027.42
35	0.611	9933.20
37.5	0.654	9789.90
40	0.698	9598.63

P36 Roncador
Stability Analysis
Downflooding Points

No.	Type	LCG fr AP	TCG +stbd	VCG (abl)
1	Chain Pipe	87.93	-36.73	39.62
2	Chain Pipe	84.58	-36.73	39.62
3	Chain Pipe	81.23	-36.73	39.62
4	Chain Pipe	31.55	-36.73	39.62
5	Chain Pipe	28.20	-36.73	39.62
6	Chain Pipe	24.85	-36.73	39.62
7	Chain Pipe	21.98	-36.73	39.62
8	Chain Pipe	90.79	-36.73	39.62
9	Vent	91.04	-30.68	40.38
10	Vent	90.96	-31.45	40.38
11	Vent	90.72	-32.29	40.38
12	Vent	90.34	-33.17	40.38
13	Vent	87.30	-33.59	40.38
14	Vent	90.97	-27.91	40.38
15	Vent	89.47	-33.48	40.38
16	Vent	87.39	-33.49	40.38
17	Vent	21.14	-32.46	40.38
18	Vent	21.64	-32.99	40.38
19	Vent	21.74	-34.51	40.38
20	Vent	21.06	-31.52	40.38
21	Vent	22.46	-34.79	40.38
22	Vent	21.14	-31.63	40.38
23	Vent	20.64	-32.54	40.38
24	Vent	21.87	-33.57	40.38
25	Vent	22.51	-34.29	40.38
26	Vent	22.88	-35.03	40.38
27	Caisson Penetration	45.67	1.95	33.81
28	Caisson Penetration	45.67	3.68	33.81
29	Caisson Penetration	46.19	4.95	33.81
30	Caisson Penetration	47.27	6.00	33.81
31	Caisson Penetration	67.19	1.50	34.37
32	Caisson Penetration	67.19	3.75	34.37
33	Caisson Penetration	66.59	5.10	34.37
34	Caisson Penetration	65.54	6.00	34.37
35	Caisson Penetration	62.69	9.15	34.37
36	Caisson Penetration	61.49	10.20	34.37
37	Caisson Penetration	60.14	10.80	34.37
38	Caisson Penetration	57.89	10.80	34.37
39	Caisson Penetration	54.89	10.80	34.37
40	Caisson Penetration	52.19	10.80	34.37
41	Caisson Penetration	51.14	10.05	34.37



OF POINT	DESCRIPTION	COORDINATES FROM GENSTAB ORIGIN X	Y	Z
1	Chain Pipe	87.93	-36.73	39.62
2	Chain Pipe	84.58	-36.73	39.62
3	Chain Pipe	81.23	-36.73	39.62
4	Chain Pipe	31.55	-36.73	39.62
5	Chain Pipe	28.20	-36.73	39.62
6	Chain Pipe	24.85	-36.73	39.62
7	Chain Pipe	21.58	-36.73	39.62
8	Chain Pipe	90.79	-36.73	39.62
9	Vent	91.04	-30.68	40.38
10	Vent	90.96	-31.45	40.38
11	Vent	90.72	-32.29	40.38
12	Vent	90.34	-33.17	40.38
13	Vent	87.30	-33.59	40.38
14	Vent	90.97	-27.91	40.38
15	Vent	89.47	-33.48	40.38
16	Vent	87.39	-33.49	40.38
17	Vent	21.14	-32.46	40.38
18	Vent	21.64	-32.99	40.38
19	Vent	21.74	-34.51	40.38
20	Vent	21.06	-31.52	40.38
21	Vent	22.46	-34.79	40.38
22	Vent	21.14	-31.63	40.38
23	Vent	20.64	-32.54	40.38
24	Vent	21.87	-33.57	40.38
25	Vent	22.51	-34.29	40.38
26	Vent	22.88	-35.03	40.38
27	Caisson Penetration	45.67	-1.95	33.81
28	Caisson Penetration	45.67	-3.68	33.81
29	Caisson Penetration	46.10	-4.95	33.81
30	Caisson Penetration	47.27	-6.00	33.81
31	Caisson Penetration	67.19	-1.50	34.37
32	Caisson Penetration	67.19	-3.75	34.37
33	Caisson Penetration	66.59	-5.10	34.37
34	Caisson Penetration	65.54	-6.00	34.37
35	Caisson Penetration	62.69	-8.15	34.37
36	Caisson Penetration	61.40	-10.20	34.37
37	Caisson Penetration	60.14	-10.80	34.37
38	Caisson Penetration	57.89	-10.80	34.37
39	Caisson Penetration	54.89	-10.80	34.37
40	Caisson Penetration	52.19	-10.80	34.37
41	Caisson Penetration	51.14	-10.05	34.37

PLAN P36 DOWNFLOODING POINTS & GENSTAB AXIS SYSTEM

KEEL = Z DATUM 0,0 (+Z UPWARD)

REV	STATUS DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
-	-	-	SCE			

BR BRASPETRO

P36-RONCADOR FIELD DEVELOPMENT

CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMCC

TITLE: LOCATIONS OF DOWNFLOODING POINTS

DRAWN/DATE: SCE/JAN.99

CHECKED/DATE:

APPROVED/DATE:

SCALE: 1:200

DRAWING NUMBER

REV

APPENDIX F

LOADING CONDITIONS FOR WORST RISER INSTALLATION SEQUENCES

(9 PAGES)

WS 7/15/2177
Proj P36-Roncador
Client Petromec
Date Dec-98
By AT
Chkd MSE
Subj Riser Hang-off Loads - Stability Summary - 4 load Conditions

Ref Ref Drg: DE-3010.38-6000-942-NBD-100 Rev F

SCR Top Angle 20°

	Total Riser Weight (Tonnes)	LCG (metres)	TCG (metres)	VCG (metres)
2xSCR & Port Risers installed	737	56.77	-26.97	6.23
2xSCR & Port and Aft risers installed	2632	82.45	-7.47	22.80
2xSCR & Port, Aft and Starboard Risers Installed	4452	71.92	3.19	16.06
2xSCR & All Risers Installed	5052	66.26	2.77	15.15

NOBLE DENTON

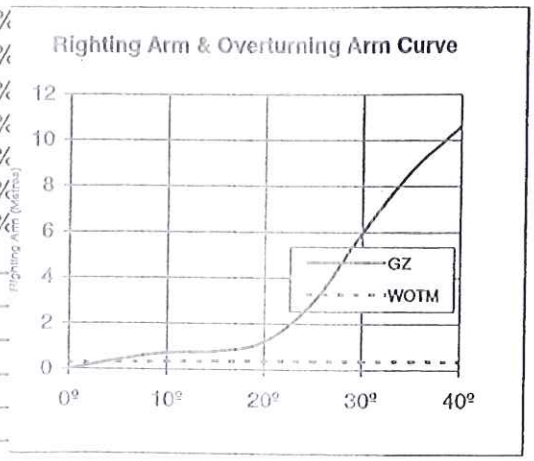
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	TCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99	0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	99	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99	0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	1	-3.5	39.0	0.000	0.000
SW Ballast 3S	728.7	1.025	1	6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	99	-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	99	6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1	4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1	0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	47	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99	-11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	1	1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99	2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	99	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1	0.80	5.42	0.007	0.055
SW Ballast 16S	249.7	1.025	1				
SW Ballast 17P	523.9	1.025	31	-0.02	22.11	0.012	0.069
SW Ballast 17S	523.9	1.025	1				
SW Ballast 18P	555.2	1.025	99				
SW Ballast 18S	555.2	1.025	99				
SW Ballast 19P	728.8	1.025	1				
SW Ballast 19S	728.8	1.025	1				
SW Ballast 20P	768.2	1.025	1				
SW Ballast 20S	768.2	1.025	92				
SW Ballast 21P	963.7	1.025	1				
SW Ballast 21S	963.7	1.025	1				
SW Ballast 22P	1067.3	1.025	1				
SW Ballast 22S	1067.3	1.025	1				
SW Ballast 23P	665.6	1.025	1				
SW Ballast 23S	665.6	1.025	1				
SW Ballast 24P	980.8	1.025	1				
SW Ballast 24S	980.8	1.025	1				
SW Ballast 25P	665.6	1.025	1				
SW Ballast 25S	665.6	1.025	1				
SW Ballast 26P	980.8	1.025	1				
SW Ballast 26S	980.8	1.025	1				
SW Ballast Total							

atical Stability

rrected VCG =	22.12 m	22.18 m
IT / KML =	26.80 m	27.20 m
IT / GML =	4.68 m	5.02 m

ability Margin

owable VCG =	23.04 m
ability Margin =	0.86 m



	BY
Prepared	
Checked	

Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Loading Condition: Maximum Operating Condition 2 Off SCR 8

NOBLE DENTON

...ks	ID	%	Density	Weight	LCG
Drill ... Tanks	8p	100%	1.000	276.2	40.25
Drill ... Tanks	8S	100%	1.000	276.2	40.25
Drill Water Tanks	9P	100%	1.000	248.5	40.53
Drill Water Tanks	9S	100%	1.000	248.5	40.53
Drill Water Tanks	14P	0%	1.000	0.0	72.39
Drill Water Tanks	14S	0%	1.000	0.0	72.39
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			1049.3	40.38

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.58
Pot Water Tk	1S	100%	1.000	193.8	84.58
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
O Tank	10P	100%	0.960	586.3	51.05
O Tank	10S	100%	0.960	586.3	51.05
O Tank	12P	100%	0.960	589.5	61.72
O Tank	12S	100%	0.960	589.5	61.72
O Overflow	P	100%	0.960	16.4	78.94
O Overflow	S	100%	0.960	15.1	78.87
Fuel Oil	0			2383.0	56.70

...	ID	%	Density	Weight	LCG
...	N1P	100%	0.870	3.6	67.61
O ...	N1S	100%	0.870	3.6	78.58
O S...	N1P	100%	0.870	105.3	74.52
O Day Tk	N2P	100%	0.870	110.6	74.60
O Day Tk	N3S	100%	0.870	73.5	82.01
OSetll	N4S	100%	0.870	73.5	79.15
O Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			381.2	76.08

Lub Oils	ID	%	Density	Weight	LCG
rains Storage Tank Port	N1P	0%	0.900	0.0	84.85
rains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
aste Oil	N1P	50%	1.000	9.6	80.72
aste Oil	N1S	50%	1.000	9.6	80.72
r Compressors LO Storage	T65101	100%	0.900	0.8	78.47
oring Winch LO Storage	T65105	100%	0.900	0.3	78.17
oring Winch LO Storage	T65106	100%	0.900	0.3	34.65
oring Winch LO Storage	T65107	100%	0.900	0.3	23.33
oring Winch LO Storage	T65108	100%	0.900	0.3	91.04
n. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
Room LO Storage	T65110	100%	0.900	0.8	35.87
Room LO Storage	T65111	100%	0.900	0.8	35.87
rbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.67
rbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.68
rbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.71
Lub Oils	0			68.2	84.90

Miscellaneous Tanks	ID	%	Density	Weight	LCG
... Oil ... k	P	50%	1.000	2.6	78.49
... ing ... nk	S	50%	1.000	2.6	78.49
... Drain Tank	P	50%	1.000	1.4	77.13
... ing Drain Tank	S	50%	1.000	1.4	77.13
aerator Tower (Port)	C-51001	100%	1.000	37.9	85.08
aerator Tower (Starb)	C-52001	100%	1.000	37.9	85.08
xiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Column Separator Tank	N1P	100%	1.000	13.8	79.72
Column Separator Tank	N1S	100%	1.000	13.8	79.72
Miscellaneous Tanks	0			112.5	82.99

Main Structural Tanks	ID	%	Density	Weight	LCG
Column p-tk	T05001A	0%	1.316	0.0	25.00
Column p-tk	T05001B	0%	1.316	0.0	28.15
Column p-tk	T05001A	0%	1.316	0.0	28.15
Column p-tk	T05001B	0%	1.316	0.0	25.00
fuel Refuel	A58001	100%	1.000	7.9	34.55
fuel Disp	A58002	100%	1.000	0.1	25.91
erator DO Day Tank	T59305	100%	0.870	0.2	21.66
Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
oil Sump Tank	TQ-123301	60%	1.080	12.1	55.23
k Top Sump Tank	V-533605	50%	1.000	8.0	76.22
Structural Tanks	0			32.1	56.82

	ID	Grade	Weight	LCG	TCG	VCG
ort Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
ort Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
ort Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
ort Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
ort Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
ort Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
ort Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
ort Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
tbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
tbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
tbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
tbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
tbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
tbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
tbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
tbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0	5392	1021.9	56.39	0.00	9.78

Forces	ID	Tension	Weight	LCG	TCG	VCG
nch 9)	S1	140	111.7	24.63	38.00	18.29
nch 10)	S2	140	112.1	28.19	38.00	18.29
nch 11)	S3	140	112.3	31.75	38.00	18.29
nch 12)	S4	140	112.4	35.31	38.00	18.29
nch 13)	S5	140	112.3	81.02	38.00	18.29
nch 14)	S6	140	112.6	84.58	38.00	18.29
nch 15)	S7	140	112.6	88.14	38.00	18.29
nch 16)	S8	140	112.5	91.70	38.00	18.29
nch 8)	P1	140	107.0	24.63	-38.00	18.29
nch 7)	P2	140	106.5	28.19	-38.00	18.29
nch 6)	P3	140	106.1	31.75	-38.00	18.29
nch 5)	P4	140	105.5	35.31	-38.00	18.29
nch 4)	P5	140	99.6	81.02	-38.00	18.29
nch 3)	P6	140	100.4	84.58	-38.00	18.29
nch 2)	P7	140	101.2	88.14	-38.00	18.29
nch 1)	P8	140	102.4	91.70	-38.00	18.29
Forces	0		1727.2	57.85	1.54	18.29

TT	ID	%	Weight	LCG	TCG	VCG
	TT-01	99%	8.0	63.51	9.85	37.88
	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
	TT-05	20%	19.9	85.97	-23.86	37.58
ouse	TT-06	60%	30.9	88.61	24.15	37.58
ouse	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
op	TT-10	50%	16.3	75.27	-8.16	37.78
	TT-11	30%	13.1	75.27	-1.02	37.78
op	TT-12	20%	6.2	75.37	4.83	37.68
aydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
d Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
Workshop	TT-15	10%	6.1	73.19	23.30	37.58
TT	0		169.3	78.84	4.33	37.69

MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
t Storage	MD-03	60%	27.6	48.89	8.51	43.87
MD	0		42.9	51.10	8.51	43.87

down Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
m	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
aydown	LD-04	50%	29.6	95.42	0.43	43.00
aydown	LD-05	50%	28.3	95.44	15.43	43.00
aydown	LD-06	50%	31.9	95.44	30.80	43.00
n	LD-07	0%	0.0	73.34	-5.46	43.00
n	LD-08	0%	0.0	73.34	9.54	43.00
n	LD-09	0%	0.0	73.34	24.54	43.00
down	LD-10	0%	0.0	106.05	-19.00	36.58
d	LD-11	60%	127.2	30.37	1.29	43.00
own Areas	0		298.7	52.07	5.21	43.00

ems	ID		Weight	LCG	TCG	VCG
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
			0.0	0.00	0.00	0.00

...ts are as follows: Weight - metric tonnes, density - metric tonnes per cubic met...

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r Tanks	ID	%	Density	Weight	LCG
ater Tanks	8p	100%	1.000	276.2	40.25
ater Tanks	8S	100%	1.000	276.2	40.25
Drill Water Tanks	9P	100%	1.000	248.5	40.53
Drill Water Tanks	9S	100%	1.000	248.5	40.53
Drill Water Tanks	14P	0%	1.000	0.0	72.39
Drill Water Tanks	14S	0%	1.000	0.0	72.39
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			1049.3	40.38

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.58
Pot Water Tk	1S	100%	1.000	193.8	84.58
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	100%	0.960	586.3	51.05
FO Tank	10S	100%	0.960	586.3	51.05
FO Tank	12P	100%	0.960	589.5	61.72
FO Tank	12S	100%	0.960	589.5	61.72
FO Overflow	P	100%	0.960	16.4	78.94
FO Overflow	S	100%	0.960	15.1	78.87
Fuel Oil	0			2383.0	56.70

...sel	ID	%	Density	Weight	LCG
D...	N1P	100%	0.870	3.6	67.61
DO ...ale	N1S	100%	0.870	3.6	78.58
DO Day Tk	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DOSetil	N3S	100%	0.870	73.5	82.01
DO Service	N4S	100%	0.870	73.5	79.15
Diesel Oil	0	100%	0.870	11.2	48.01
				381.2	76.03

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	50%	1.000	9.6	80.72
Waste Oil	N1S	50%	1.000	9.6	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
Wt Room LO Storage	T65110	100%	0.900	0.8	35.87
Wt Room LO Storage	T65111	100%	0.900	0.8	35.87
Turbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.67
Turbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.68
Turbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.71
Lub Oils	0			68.2	84.90

Miscellaneous Tanks	ID	%	Density	Weight	LCG
...ank	P	50%	1.000	2.6	78.49
...ank	S	50%	1.000	2.6	78.49
... Drain Tank	P	50%	1.000	1.4	77.13
...ng Drain Tank	S	50%	1.000	1.4	77.13
...eaerator Tower (Port)	C-51001	100%	1.000	37.9	85.08
...eaerator Tower (Starb)	C-52001	100%	1.000	37.9	85.08
...uxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
...ft Column Separator Tank	N1P	100%	1.000	13.8	79.72
...ft Column Separator Tank	N1S	100%	1.000	13.8	79.72
...iscellaneous Tanks	0			112.5	82.99

...on Structural Tanks	ID	%	Density	Weight	LCG
...vd clmn p-tk	T05001A	0%	1.316	0.0	25.00
...vd clmn p-tk	T05001B	0%	1.316	0.0	28.15
...vd clmn p-tk	T05001A	0%	1.316	0.0	28.15
...vd clmn p-tk	T05001B	0%	1.316	0.0	25.00
...elifuel Refuel	A58001	100%	1.000	7.9	34.55
...elifuel Disp	A58002	100%	1.000	0.1	25.91
...inerator DO Day Tank	T59305	100%	0.870	0.2	21.65
...y Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
...y Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
...y Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
...ool Sump Tank	TQ-123301	60%	1.080	12.1	55.23
...k Top Sump Tank	V-533605	50%	1.000	8.0	76.22
...n Structural Tanks	0			32.1	56.82

	ID	Chain.	Weight	LCG	TCG	VCG
...ort Aft (Winch 2)	1aP	337	[illegible]	87.52	-30.50	4.60
...ort Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
...ort Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
...ort Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
...ort Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
...ort Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
...ort Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
...ort Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
...tbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
...tbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
...tbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
...tbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
...tbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
...tbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
...tbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
...tbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0		5392	1021.9	56.39	0.00	9.78

...g Forces	ID	Tension	Weight	LCG	TCG	VCG
...inch 9)	S1	140	111.7	24.63	38.00	18.29
...inch 10)	S2	140	112.1	28.19	38.00	18.29
...inch 11)	S3	140	112.3	31.75	38.00	18.29
...inch 12)	S4	140	112.4	35.31	38.00	18.29
...inch 13)	S5	140	112.3	81.02	38.00	18.29
...inch 14)	S6	140	112.6	84.58	38.00	18.29
...inch 15)	S7	140	112.6	88.14	38.00	18.29
...inch 16)	S8	140	112.5	91.70	38.00	18.29
...inch 8)	P1	140	107.0	24.63	-38.00	18.29
...inch 7)	P2	140	106.5	28.19	-38.00	18.29
...inch 6)	P3	140	106.1	31.75	-38.00	18.29
...inch 5)	P4	140	105.5	35.31	-38.00	18.29
...inch 4)	P5	140	99.6	81.02	-38.00	18.29
...inch 3)	P6	140	100.4	84.58	-38.00	18.29
...inch 2)	P7	140	101.2	88.14	-38.00	18.29
...inch 1)	P8	140	102.4	91.70	-38.00	18.29
...Forces	0		1727.2	57.85	1.54	18.29

...@TT	ID	%	Weight	LCG	TCG	VCG
...	TT-01	99%	8.0	63.51	9.85	37.88
...	TT-02	99%	8.0	49.26	9.85	37.88
...	TT-03	25%	10.6	88.40	-31.10	37.88
...	TT-04	30%	9.3	81.40	-32.18	37.88
...house	TT-05	20%	19.9	85.97	-23.86	37.58
...house	TT-06	60%	30.9	88.61	24.15	37.58
...	TT-07	60%	31.4	80.51	24.00	37.58
...	TT-08	5%	4.1	82.90	31.44	37.88
...	TT-09	5%	3.0	69.19	-5.33	37.88
...hop	TT-10	50%	16.3	75.27	-8.16	37.78
...	TT-11	30%	13.1	75.27	-1.02	37.78
...hop	TT-12	20%	6.2	75.37	4.83	37.68
...Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
...rd Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
...Workshop	TT-15	10%	6.1	73.19	23.30	37.58
...TT	0		169.3	78.84	4.33	37.69

...@ MD	ID	%	Weight	LCG	TCG	VCG
...	MD-01	20%	5.6	65.89	8.51	43.87
...nt Storage	MD-02	35%	9.7	48.89	8.51	43.87
	MD-03	60%	27.6	48.89	8.51	43.87
...MD	0		42.9	51.10	8.51	43.87

...ydown Areas	ID	%	Weight	LCG	TCG	VCG
...wn	HD	0%	0.0	21.10	-35.80	48.90
	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
...aydown	LD-04	50%	29.6	95.42	0.43	43.00
...aydown	LD-05	50%	28.3	95.44	15.43	43.00
...aydown	LD-06	50%	31.9	95.44	30.80	43.00
...wn	LD-07	0%	0.0	73.34	-5.46	43.00
...wn	LD-08	0%	0.0	73.34	9.54	43.00
...wn	LD-09	0%	0.0	73.34	24.54	43.00
...ydown	LD-10	0%	0.0	106.05	-19.00	36.58
...rd	LD-11	60%	127.2	30.37	1.29	43.00
...down Areas	0		298.7	52.07	5.21	43.00

...tems	ID	Weight	LCG	TCG	VCG
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
		0.0	0.00	0.00	0.00

...its are as follows: Weight - metric tonnes, density - metric tonnes per cubic me...

...RONCADOR\CALCS\STABIL\REV_C\RISER2\[LOADCASE.XLS]Detailed sum...

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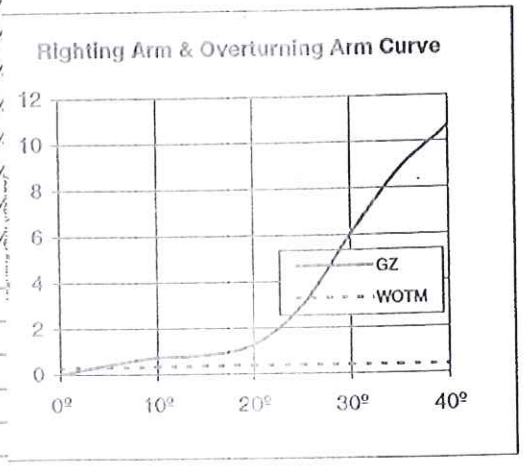
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%TCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99 -0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99 0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	99 0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99 0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	63 -3.5	39.0	0.000	0.000
SW Ballast 3S	728.7	1.025	70 6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	99 -0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	99 6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1 4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	12 0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1 8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	96 5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99 11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	33 1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99 0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99 -7.5	22.8	-	-
SW Ballast 13P	644.7	1.025	99 0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99 0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1 3.19	5.07	0.031	0.123
SW Ballast 16S	249.7	1.025	13			
SW Ballast 17P	523.9	1.025	71 0.02	21.97	0.036	0.136
SW Ballast 17S	523.9	1.025	32			
SW Ballast 18P	555.2	1.025	99			
SW Ballast 18S	555.2	1.025	99			
SW Ballast 19P	728.8	1.025	1			
SW Ballast 19S	728.8	1.025	68			
SW Ballast 20P	768.2	1.025	1			
SW Ballast 20S	768.2	1.025	99			
SW Ballast 21P	963.7	1.025	1			
SW Ballast 21S	963.7	1.025	1			
SW Ballast 22P	1067.3	1.025	1			
SW Ballast 22S	1067.3	1.025	1			
SW Ballast 23P	665.6	1.025	1			
SW Ballast 23S	665.6	1.025	1			
SW Ballast 24P	980.8	1.025	1			
SW Ballast 24S	980.8	1.025	1			
SW Ballast 25P	665.6	1.025	1			
SW Ballast 25S	665.6	1.025	1			
SW Ballast 26P	980.8	1.025	1			
SW Ballast 26S	980.8	1.025	1			
SW Ballast Total						

tical Stability

rected VCG =	22.00 m	22.10 m
T / KML =	26.80 m	27.20 m
T / GML =	4.80 m	5.10 m

bility Margin

wable VCG =	23.04 m
bility Margin =	0.94 m



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etrobras 36 - Roncador Field Development
peratons Manual - Volume 7
oading Condition: Maximum Operating Condition - 2 Off SCR

NOBLE DENTON

	ID	%	Density	Weight	LCG
Tanks	8p	100%	1.000	276.2	40.25
Tanks	8S	100%	1.000	276.2	40.25
Water Tanks	9P	100%	1.000	248.5	40.53
Water Tanks	9S	100%	1.000	248.5	40.53
Water Tanks	14P	0%	1.000	0.0	72.39
Water Tanks	14S	0%	1.000	0.0	72.39
Water Tanks	15P	0%	1.000	0.0	72.34
Water Tanks	15S	0%	1.000	0.0	72.34
Water Tanks (Process FW)	0			1049.3	40.38

	ID	Chain	Weight	LCG	TCG	VCG
Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0	5392	1021.9	56.39	0.00	9.78

able Water	ID	%	Density	Weight	LCG
Water Tk	1P	100%	1.000	193.8	84.58
Water Tk	1S	100%	1.000	193.8	84.58
Water Day Tk	0	100%	1.000	15.2	78.87
able Water	0			402.7	84.36

el Oil	ID	%	Density	Weight	LCG
Tank	10P	100%	0.960	586.3	51.05
Tank	10S	100%	0.960	586.3	51.05
Tank	12P	100%	0.960	589.5	61.72
Tank	12S	100%	0.960	589.5	61.72
Overflow	P	100%	0.960	16.4	78.94
Overflow	S	100%	0.960	15.1	78.87
l Oil	0			2383.0	56.70

orces	ID	Tension	Weight	LCG	TCG	VCG
9)	S1	140	111.7	24.63	38.00	18.29
10)	S2	140	112.1	28.19	38.00	18.29
11)	S3	140	112.3	31.75	38.00	18.29
12)	S4	140	112.4	35.31	38.00	18.29
13)	S5	140	112.3	81.02	38.00	18.29
14)	S6	140	112.6	84.58	38.00	18.29
15)	S7	140	112.6	88.14	38.00	18.29
16)	S8	140	112.5	91.70	38.00	18.29
8)	P1	140	107.0	24.63	-38.00	18.29
7)	P2	140	106.5	28.19	-38.00	18.29
6)	P3	140	106.1	31.75	-38.00	18.29
5)	P4	140	105.5	35.31	-38.00	18.29
4)	P5	140	99.6	81.02	-38.00	18.29
3)	P6	140	100.4	84.58	-38.00	18.29
2)	P7	140	101.2	88.14	-38.00	18.29
1)	P8	140	102.4	91.70	-38.00	18.29
ces	0		1727.2	57.85	1.54	18.29

	ID	%	Density	Weight	LCG
	N1P	100%	0.870	3.6	67.61
	N1S	100%	0.870	3.6	78.58
Ste	N1P	100%	0.870	105.3	74.52
Day Tk	N2P	100%	0.870	110.6	74.60
Day Tk	N3S	100%	0.870	73.5	82.01
Setll	N4S	100%	0.870	73.5	79.15
Service	0	100%	0.870	11.2	48.01
el Oil	0			381.2	76.08

	ID	%	Weight	LCG	TCG	VCG
	TT-01	99%	8.0	63.51	9.85	37.88
	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
	TT-05	20%	19.9	85.97	-23.86	37.58
se	TT-06	60%	30.9	88.61	24.15	37.58
se	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
	TT-10	50%	16.3	75.27	-8.16	37.78
	TT-11	30%	13.1	75.27	-1.02	37.78
	TT-12	20%	6.2	75.37	4.83	37.68
down Area	TT-13	10%	0.6	61.89	-2.75	37.58
aydown Area	TT-14	10%	2.0	37.67	22.62	37.58
kshop	TT-15	10%	6.1	73.19	23.30	37.58
	0		169.3	78.84	4.33	37.69

Oils	ID	%	Density	Weight	LCG
s Storage Tank Port	N1P	0%	0.900	0.0	84.85
s Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
e Oil	N1P	50%	1.000	9.6	80.72
e Oil	N1S	50%	1.000	9.6	80.72
ompressors LO Storage	T65101	100%	0.900	0.8	78.47
ing Winch LO Storage	T65105	100%	0.900	0.3	78.17
ing Winch LO Storage	T65106	100%	0.900	0.3	34.65
ing Winch LO Storage	T65107	100%	0.900	0.3	23.33
ing Winch LO Storage	T65108	100%	0.900	0.3	91.04
Gen. LO Storage	T65109	100%	0.900	0.5	48.60
oom LO Storage	T65110	100%	0.900	0.8	35.87
oom LO Storage	T65111	100%	0.900	0.8	35.87
ne Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.67
ne Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.68
ne Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.71
Oils	0			68.2	84.90

10	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
torage	MD-03	60%	27.6	48.89	8.51	43.87
D	0		42.9	51.10	8.51	43.87

ellaneous nks	ID	%	Density	Weight	LCG
ng	P	50%	1.000	2.6	78.49
ng	S	50%	1.000	2.6	78.49
rain Tank	P	50%	1.000	1.4	77.13
ing Drain Tank	S	50%	1.000	1.4	77.13
rator Tower (Port)	C-51001	100%	1.000	37.9	85.08
rator Tower (Starb)	C-52001	100%	1.000	37.9	85.08
ary Generator DO	GE-514001	100%	0.870	1.0	54.39
turn Separator Tank	N1P	100%	1.000	13.8	79.72
turn Separator Tank	N1S	100%	1.000	13.8	79.72
laneous Tanks	0			112.5	82.99

wn Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
down	LD-04	50%	29.6	95.42	0.43	43.00
down	LD-05	50%	28.3	95.44	15.43	43.00
down	LD-06	50%	31.9	95.44	30.80	43.00
	LD-07	0%	0.0	73.34	-5.46	43.00
	LD-08	0%	0.0	73.34	9.54	43.00
	LD-09	0%	0.0	73.34	24.54	43.00
wn	LD-10	0%	0.0	106.05	-19.00	36.58
	LD-11	60%	127.2	30.37	1.29	43.00
m Areas	0		298.7	52.07	5.21	43.00

structural Tanks	ID	%	Density	Weight	LCG
mn p-tk	T05001A	0%	1.316	0.0	25.00
mn p-tk	T05001B	0%	1.316	0.0	28.15
mn p-tk	T05001A	0%	1.316	0.0	28.15
mn p-tk	T05001B	0%	1.316	0.0	25.00
t Refuel	A58001	100%	1.000	7.9	34.55
t Disp	A58002	100%	1.000	0.1	25.91
ator DO Day Tank	T59305	100%	0.870	0.2	21.66
em Dosing Tank	T55101	100%	1.000	2.0	63.02
eling ExansionTank	T55102	100%	1.000	0.5	64.97
ater Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Sump Tank	TQ-123301	60%	1.080	12.1	55.23
op Sump Tank	V-533605	50%	1.000	8.0	76.22
uctural Tanks	0			32.1	56.82

s	ID	Weight	LCG	TCG	VCG
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
		0.0	0.00	0.00	0.00

are as ws: Weight - metric tonnes, density - metric tonnes per cubic metre

NOBLE DENTON

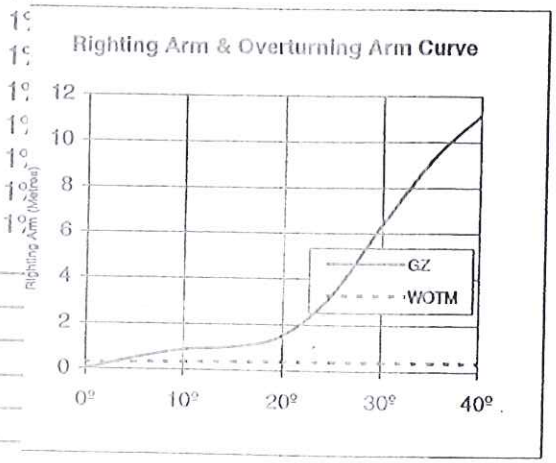
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³		TCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	9	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	9	0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	9	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	9	0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	4	-3.5	39.0	0.000	0.000
SW Ballast 3S	728.7	1.025	1	6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	9	-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	9	6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1	4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	9	0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	9	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	9	-11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	9	1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	9	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	9	-27.0	6.2	-	-
SW Ballast 13P	644.7	1.025	9	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	9	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1	2.81	5.24	0.018	0.064
SW Ballast 16S	249.7	1.025	9				
SW Ballast 17P	523.9	1.025	9	-0.02	21.20	0.022	0.077
SW Ballast 17S	523.9	1.025	9				
SW Ballast 18P	555.2	1.025	9				
SW Ballast 18S	555.2	1.025	9				
SW Ballast 19P	728.8	1.025	3				
SW Ballast 19S	728.8	1.025	9				
SW Ballast 20P	768.2	1.025	8				
SW Ballast 20S	768.2	1.025	9				
SW Ballast 21P	963.7	1.025	1				
SW Ballast 21S	963.7	1.025	1				
SW Ballast 22P	1067.3	1.025	1				
SW Ballast 22S	1067.3	1.025	1				
SW Ballast 23P	665.6	1.025	1				
SW Ballast 23S	665.6	1.025	1				
SW Ballast 24P	980.8	1.025	1				
SW Ballast 24S	980.8	1.025	1				
SW Ballast 25P	665.6	1.025	1				
SW Ballast 25S	665.6	1.025	1				
SW Ballast 26P	980.8	1.025	1				
SW Ballast 26S	980.8	1.025	1				
SW Ballast Total							

atical Stability

rrected VCG =	21.22 m	21.28 m
T / KML =	26.80 m	27.20 m
T / GML =	5.58 m	5.92 m

ability Margin

owable VCG =	23.04 m
ability Margin =	1.76 m



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Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Loading Condition: Maximum Operating Condition - 2 Off SC

NOBLE DENTON

Tanks	ID	%	Density	Weight	LCG
D anks	8p	100%	1.000	276.2	40.25
D ater Tanks	8S	100%	1.000	276.2	40.25
Drill Water Tanks	9P	100%	1.000	248.5	40.55
Drill Water Tanks	9S	100%	1.000	248.5	40.55
Drill Water Tanks	14P	0%	1.000	0.0	72.33
Drill Water Tanks	14S	0%	1.000	0.0	72.33
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			1049.3	40.38

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.59
Pot Water Tk	1S	100%	1.000	193.8	84.59
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	100%	0.960	586.3	51.05
FO Tank	10S	100%	0.960	586.3	51.05
FO Tank	12P	100%	0.960	589.5	61.72
FO Tank	12S	100%	0.960	589.5	61.72
FO Overflow	P	100%	0.960	16.4	78.94
FO Overflow	S	100%	0.960	15.1	78.87
Fuel Oil	0			2383.0	56.70

Diesel Oil	ID	%	Density	Weight	LCG
D e	N1P	100%	0.870	3.6	67.61
DO ..le	N1S	100%	0.870	3.6	78.58
DO Day Tk	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DOSetti	N3S	100%	0.870	73.5	82.01
DO Service	N4S	100%	0.870	73.5	79.15
	0	100%	0.870	11.2	48.01
Diesel Oil	0			381.2	76.08

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	50%	1.000	9.6	80.72
Waste Oil	N1S	50%	1.000	9.6	80.72
ir Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
m. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
/I Room LO Storage	T65110	100%	0.900	0.8	35.87
/I Room LO Storage	T65111	100%	0.900	0.8	35.87
urbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.67
urbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.68
urbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.71
ub Oils	0			68.2	84.90

Miscellaneous Tanks	ID	%	Density	Weight	LCG
..ldin nk	P	50%	1.000	2.6	78.49
..di k	S	50%	1.000	2.6	78.49
..g Dra.. Tank	P	50%	1.000	1.4	77.13
..g Drain Tank	S	50%	1.000	1.4	77.13
aerator Tower (Port)	C-51001	100%	1.000	37.9	85.08
aerator Tower (Starb)	C-52001	100%	1.000	37.9	85.08
xiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Column Separator Tank	N1P	100%	1.000	13.8	79.72
Column Separator Tank	N1S	100%	1.000	13.8	79.72
scellaneous Tanks	0			112.5	82.99

n Structural Tanks	ID	%	Density	Weight	LCG
d dmn p-tk	T05001A	0%	1.316	0.0	25.00
d dmn p-tk	T05001B	0%	1.316	0.0	28.15
d dmn p-tk	T05001A	0%	1.316	0.0	28.15
d dmn p-tk	T05001B	0%	1.316	0.0	25.00
fuel Refuel	A58001	100%	1.000	7.9	34.55
fuel Disp	A58002	100%	1.000	0.1	25.91
nerator DO Day Tank	T59305	100%	0.870	0.2	21.66
Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
ol Sump Tank	TQ-123301	60%	1.080	12.1	55.23
k Top Sump Tank	V-533605	50%	1.000	8.0	76.22
Structural Tanks	0			32.1	56.82

ts are as follows: Weight - metric tonnes, density - metric tonnes per cubic met

	ID	Chain	Weight	LCG	TCG	VCG
rt Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
rt Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
rt Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
rt Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
rt Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
rt Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
rt Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
rt Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
bd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
bd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
bd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
bd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
bd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
bd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
bd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
bd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0	5392	1021.9	56.39	0.00	9.78

Forces	ID	Tension	Weight	LCG	TCG	VCG
ch 9)	S1	140	111.7	24.63	38.00	18.29
ch 10)	S2	140	112.1	28.19	38.00	18.29
ch 11)	S3	140	112.3	31.75	38.00	18.29
ch 12)	S4	140	112.4	35.31	38.00	18.29
ch 13)	S5	140	112.3	81.02	38.00	18.29
ch 14)	S6	140	112.6	84.58	38.00	18.29
ch 15)	S7	140	112.6	88.14	38.00	18.29
ch 16)	S8	140	112.5	91.70	38.00	18.29
ch 8)	P1	140	107.0	24.63	-38.00	18.29
ch 7)	P2	140	106.5	28.19	-38.00	18.29
ch 6)	P3	140	106.1	31.75	-38.00	18.29
ch 5)	P4	140	105.5	35.31	-38.00	18.29
ch 4)	P5	140	99.6	81.02	-38.00	18.29
ch 3)	P6	140	100.4	84.58	-38.00	18.29
ch 2)	P7	140	101.2	88.14	-38.00	18.29
ch 1)	P8	140	102.4	91.70	-38.00	18.29
orces	0		1727.2	57.85	1.54	18.29

TT	ID	%	Weight	LCG	TCG	VCG
	TT-01	99%	8.0	63.51	9.85	37.88
	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
	TT-05	20%	19.9	85.97	-23.86	37.58
ouse	TT-06	60%	30.9	88.61	24.15	37.58
ouse	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
op	TT-10	50%	16.3	75.27	-8.16	37.78
	TT-11	30%	13.1	75.27	-1.02	37.78
op	TT-12	20%	6.2	75.37	4.83	37.68
aydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
d Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
/orkshop	TT-15	10%	6.1	73.19	23.30	37.58
TT	0		169.3	78.84	4.33	37.69

MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
Storage	MD-03	60%	27.6	48.89	8.51	43.87
MD	0		42.9	51.10	8.51	43.87

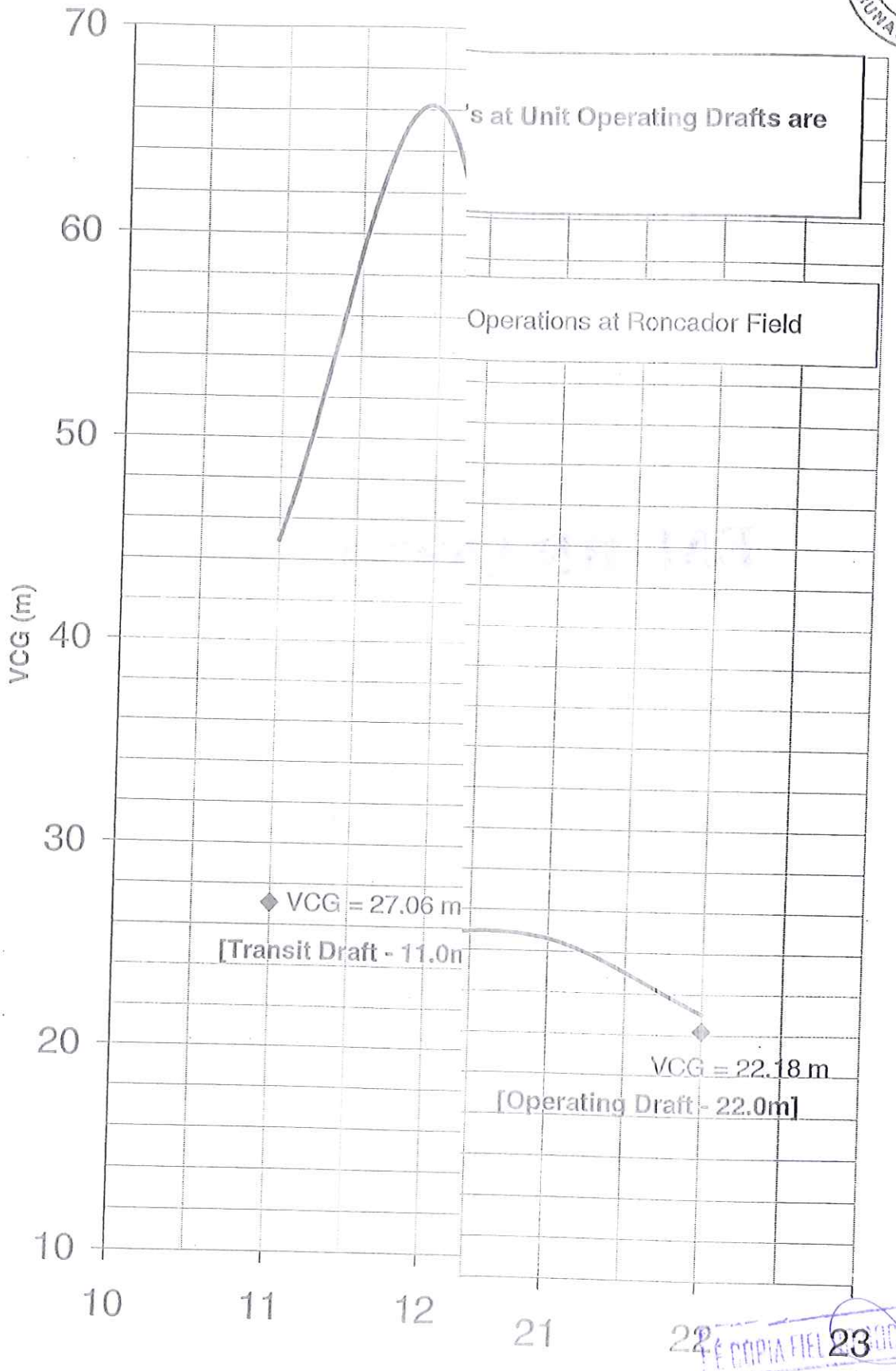
down Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
m	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
aydown	LD-04	50%	29.6	95.42	0.43	43.00
aydown	LD-05	50%	28.3	95.44	15.43	43.00
aydown	LD-06	50%	31.9	95.44	30.80	43.00
m	LD-07	0%	0.0	73.34	-5.46	43.00
m	LD-08	0%	0.0	73.34	9.54	43.00
m	LD-09	0%	0.0	73.34	24.54	43.00
down	LD-10	0%	0.0	106.05	-19.00	36.58
d	LD-11	60%	127.2	30.37	1.29	43.00
own Areas	0		298.7	52.07	5.21	43.00

ems	ID		Weight	LCG	TCG	VCG
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
			0.0	0.00	0.00	0.00

APPENDIX G

ALLOWABLE KG CURVES

(1 PAGES)



APPENDIX H

22.0M OPERATING/SURVIVAL CONDITION

RESULTS SUMMARY

(CRITICAL GZ FOR EACH CASE ATTACHED)

(23 PAGES)

WS No	7/15/2177
Project	P36 Roncador
Client	Petromec
Date	18-Jan-1999
By	MSE
Checked	

Title	Stability Analysis Results
Condition	Operational/Survival
Draft	22.00 m
Displacement	56503 mT
LCG (from FP)	57.05 m
TCG (+ve stbd)	0.03 m
VCG (abl)	22.41 m

Description	Genstab ID	Max Allowable VCG	Comments
Intact Condition			
Vessel Intact	I110	23.18	
Damaged Condition			
Columns			
Base Oil Tank N1	D127	23.042	
Void Space 32 Stbd 3 (subdivided)	D126	23.682	Formerly part of VS32 Stbd 1
Fairlead Boxes & Extensions			
Void Space 46S	D124	23.492	
Void Space 45S	D125	23.462	
Void Space 65S (modified)	D128	23.512	Formerly part of VS 46aS
Void Space 64S (modified)	D129	23.552	Formerly part of VS 45aS
Void Space 46aS (modified)	D130	23.662	
Void Space 45aS (modified)	D131	23.622	
Accidental Flooding			
Lower Hull			
S.W. Bal Tk 21s	A131	-	
S.W. Bal Tk 22s	A132	-	

* Values superceeded by modifications to tanks

Limiting KG	23.04 m for damage to Base Oil Tank
Actual KG	22.41 m
Stability Margin	0.63 m for weight control report R

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Intact	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	I110		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	Area Ratio	δ VCG
0	90	0.0	3.78	99.99	23.40	19.61	11.37	2.02	1.40
10	80	0.0	3.93	99.99	22.56	18.62	11.25	2.05	1.30
20	70	0.0	4.29	99.99	21.38	17.09	11.10	1.89	1.16
30	60	0.0	4.65	99.99	19.81	15.15	10.98	1.79	0.87
40	50	0.0	4.80	99.99	18.02	13.21	10.89	1.79	0.77
50	40	0.0	4.63	99.99	17.34	12.70	10.88	1.88	0.84
60	30	0.0	4.18	99.99	17.54	13.35	10.95	2.24	1.14
70	20	0.0	3.64	99.99	19.33	15.69	11.05	3.01	1.65
80	10	0.0	3.20	99.99	20.77	17.56	11.16	3.77	2.26
90	0	0.0	3.03	99.99	22.91	19.89	11.22	4.91	2.60
270	180	0.0	2.97	99.99	22.74	19.77	11.78	5.05	2.63
280	170	0.0	3.14	99.99	20.64	17.50	11.72	3.87	2.29
290	160	0.0	3.59	99.99	19.22	15.64	11.62	3.09	1.69
300	150	0.0	4.12	99.99	17.44	13.32	11.51	2.30	1.18
310	140	0.0	4.57	99.99	17.25	12.68	11.44	1.92	0.86
320	130	0.0	4.75	99.99	18.00	13.24	11.38	1.78	0.80
330	120	0.0	4.61	99.99	19.81	15.19	11.40	1.81	0.90
340	110	0.0	4.26	99.99	21.41	17.14	11.48	1.91	1.20
330	100	0.0	3.92	99.99	22.68	18.76	11.47	2.08	1.35

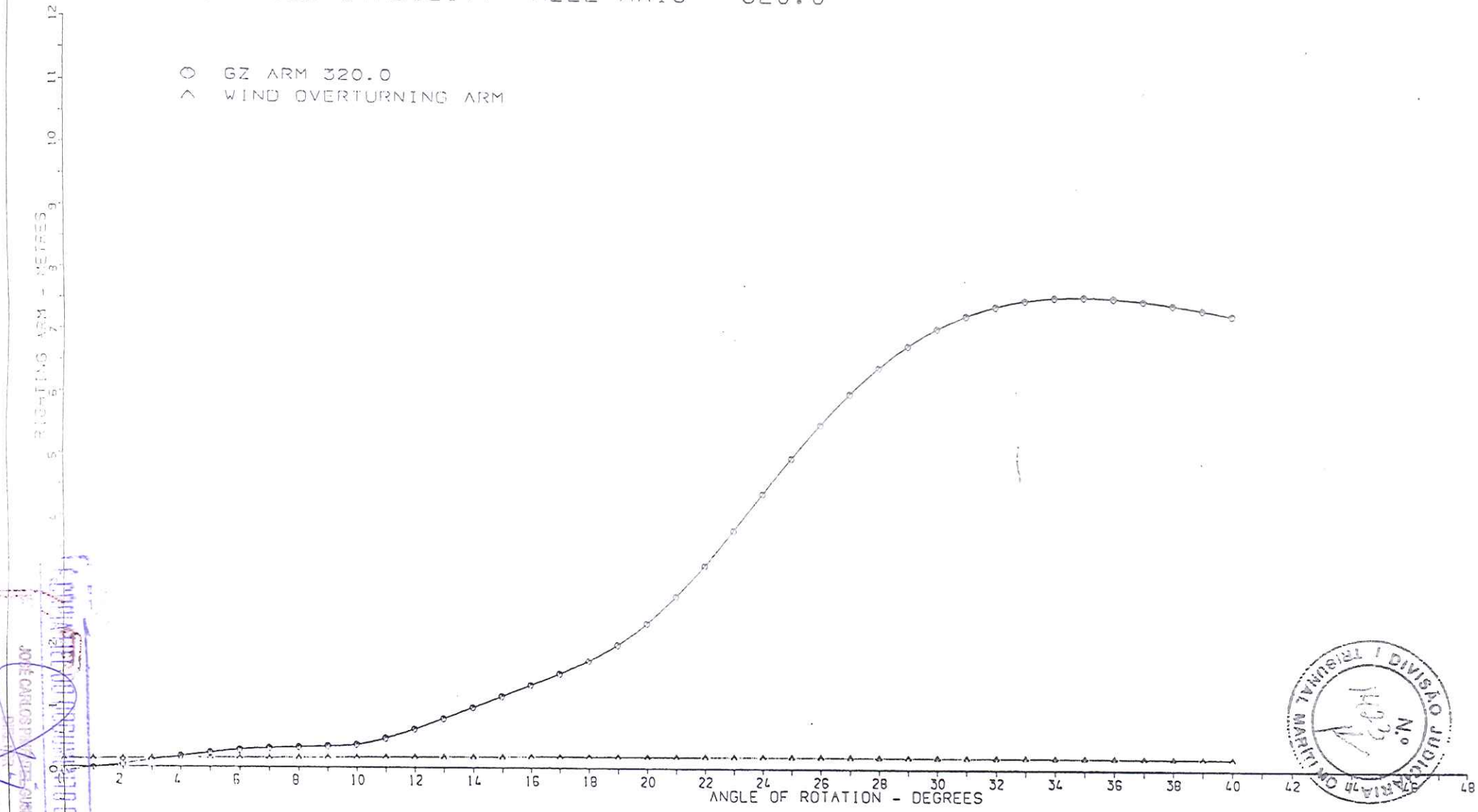
Minimum Increase in Allowable VCG = 0.77
Maximum Allowable VCG = 23.18

Title	Stability Analysis Results	WS No	7/15/217
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petronec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d124		
Space Damaged	Void Space 46S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.45	99.99	23.14	20.69	11.61	5.00	1.87
10	80	0.00	2.25	99.99	22.73	20.48	11.58	4.00	2.06
20	70	0.00	2.11	99.99	21.53	19.43	11.54	4.00	2.14
30	60	0.00	1.95	99.99	19.98	18.03	11.50	4.00	2.11
40	50	0.00	1.74	99.99	18.12	16.38	11.46	4.00	2.16
50	40	0.00	1.46	99.99	17.05	15.59	11.47	4.00	2.32
60	30	0.00	1.13	99.99	17.33	16.20	11.49	3.00	2.61
70	20	0.00	0.79	99.99	19.33	18.55	11.54	3.00	2.97
80	10	0.00	0.49	99.99	20.77	20.27	11.58	2.00	3.44
90	0	0.00	0.32	99.99	22.91	22.59	11.61	2.00	3.63
270	180	0.00	2.27	99.99	22.16	19.89	11.77	4.00	2.47
280	170	1.06	2.54	99.99	20.34	17.80	11.72	5.00	2.01
290	160	1.17	2.90	99.99	19.00	16.09	11.66	5.00	1.58
300	150	1.24	3.27	99.99	17.24	13.97	11.59	6.00	1.28
310	140	1.27	3.51	99.99	17.16	13.65	11.55	7.00	1.11
320	130	1.26	3.56	99.99	17.83	14.28	11.54	8.00	1.08
330	120	1.21	3.39	99.99	19.40	16.01	11.56	7.00	1.16
340	110	1.12	3.08	99.99	21.05	17.97	11.62	6.00	1.32
350	100	0.00	2.73	99.99	22.26	19.53	11.64	5.00	1.55

Minimum Increase in Allowable VCG = 1.08
Maximum Allowable VCG = 23.492

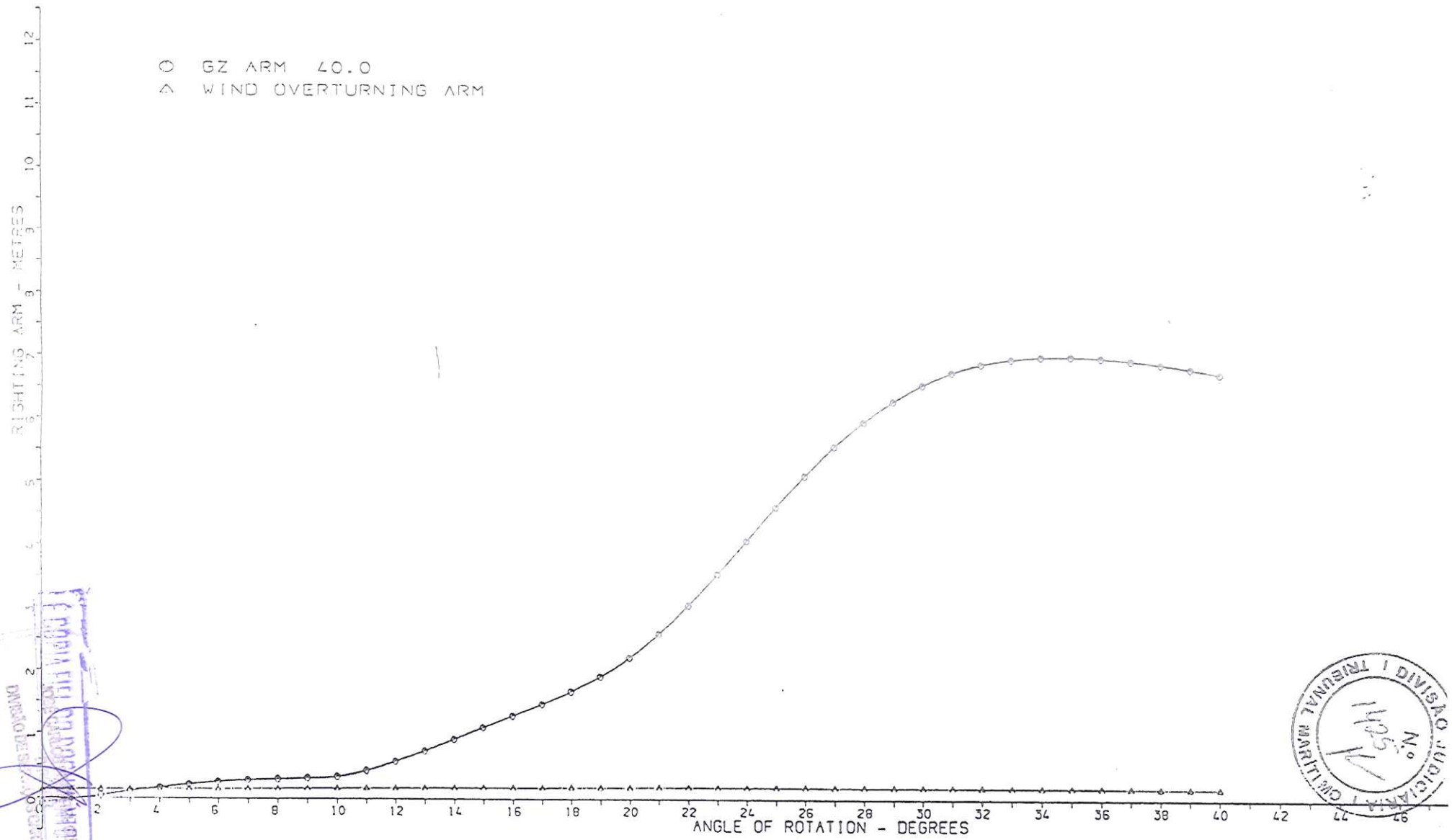
P-36 STABILITY ANALYSIS REV C JAN 99 -. Damage to VS 46S T=22.0m
DAMAGED STABILITY HEEL AXIS = 320.0



NOBLE DENTON 23.FEB.1999 TIME 11.58.56

NOBLE DENTON

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 45S T=22.0m
DAMAGED STABILITY HEEL AXIS = 40.0



NOBLE DENTON 23.FEB.1999 TIME 11.56.57

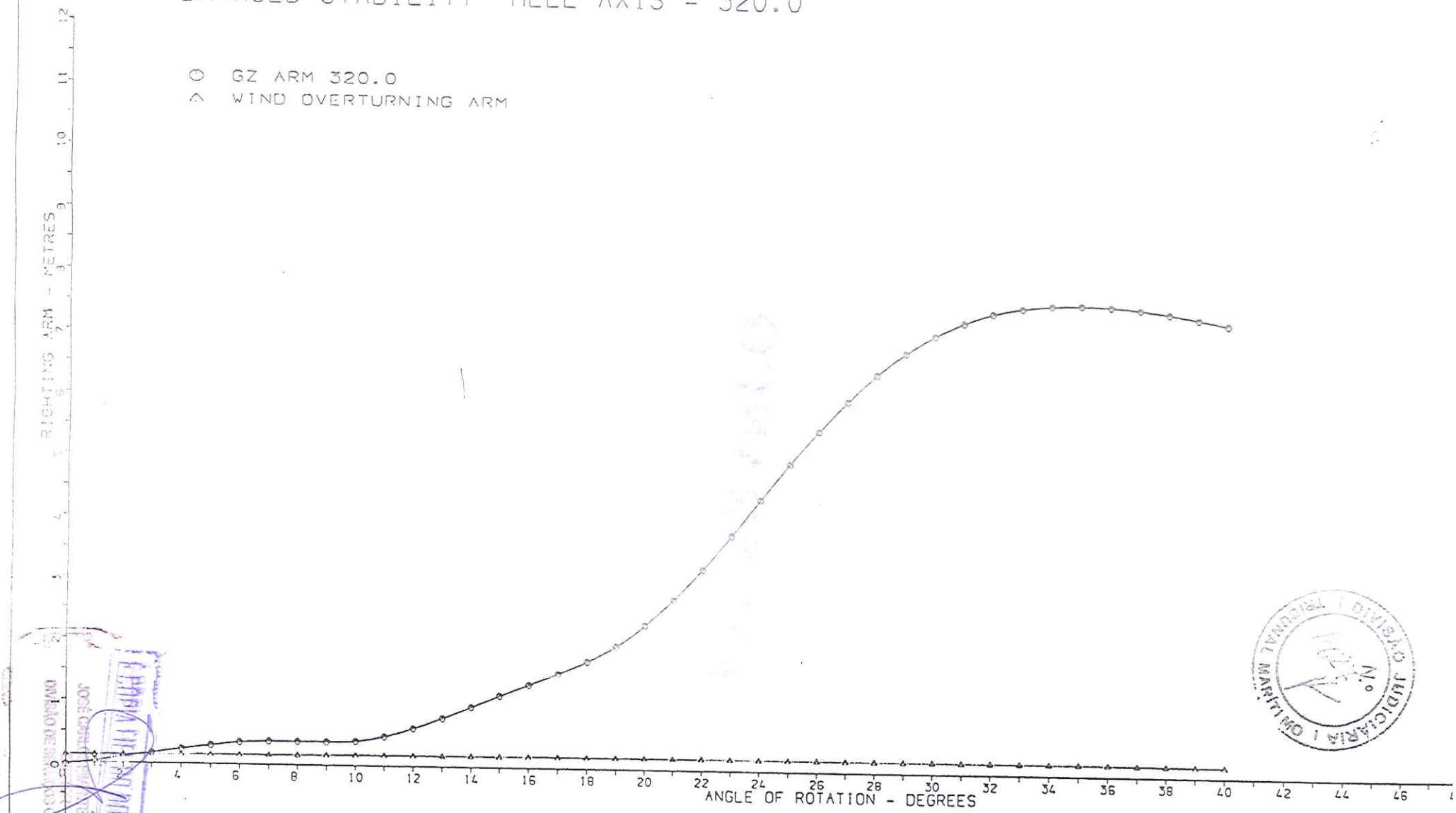
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d126		
Space Damaged	Void Space 32 Stbd 3 (New Subdivided Compartment)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	1.86	99.99	23.11	21.24	11.64	4.00	2.03
10	80	0.00	1.79	99.99	22.71	20.93	11.60	4.00	2.39
20	70	0.00	1.77	99.99	21.52	19.74	11.55	4.00	2.30
30	60	0.00	1.75	99.99	19.96	18.21	11.50	4.00	2.23
40	50	0.00	1.69	99.99	18.07	16.38	11.48	4.00	2.20
50	40	0.00	1.54	99.99	17.21	15.67	11.48	4.00	2.37
60	30	0.00	1.33	99.99	17.50	16.16	11.51	4.00	2.60
70	20	0.00	1.09	99.99	19.33	18.24	11.54	3.00	2.96
80	10	0.00	0.88	99.99	20.77	19.88	11.58	3.00	3.44
90	0	0.00	0.78	99.99	22.91	22.13	11.61	3.00	3.63
270	180	0.00	1.68	99.99	22.21	20.52	11.96	4.00	2.72
280	170	0.00	1.85	99.99	20.35	18.49	11.92	4.00	2.22
290	160	0.00	2.11	99.99	19.02	16.90	11.87	4.00	1.80
300	150	0.00	2.37	99.99	17.25	14.87	11.82	5.00	1.51
310	140	0.00	2.55	99.99	17.15	14.60	11.82	5.00	1.36
320	130	0.00	2.59	99.99	17.80	15.22	11.81	5.00	1.27
330	120	0.00	2.48	99.99	19.34	16.86	11.73	5.00	1.32
340	110	0.00	2.27	99.99	21.01	18.74	11.69	5.00	1.48
350	100	0.00	2.03	99.99	22.22	20.20	11.64	4.00	1.75

Minimum Increase in Allowable VCG = 1.27
Maximum Allowable VCG = 23.682

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage VS 32 Stbd 3 T=22.0m
DAMAGED STABILITY HEEL AXIS = 320.0



NOBLE DENTON 23.FEB.1999 TIME 11.55.46

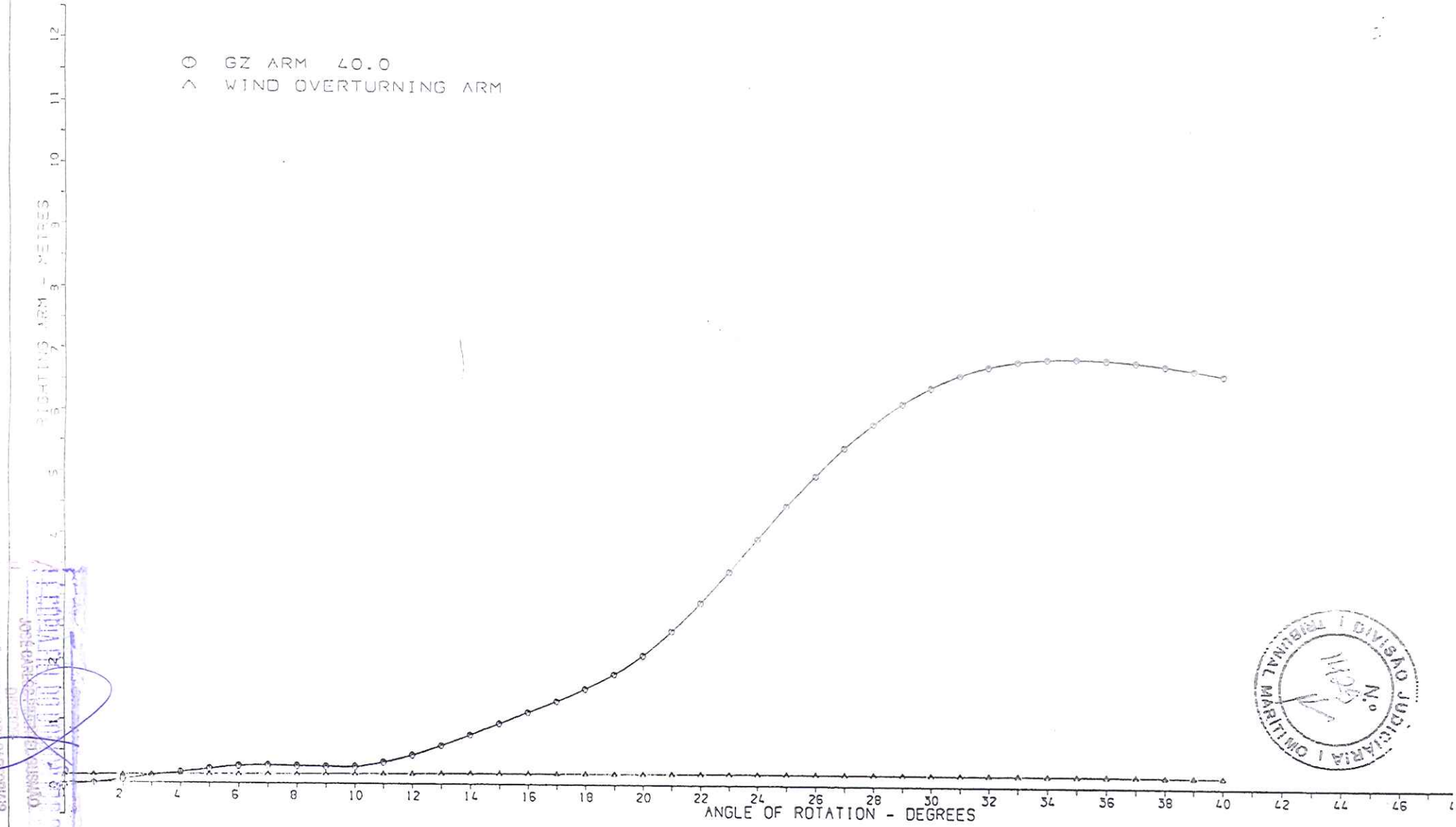
NOBLE DENTO

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d127		
Space Damaged	Base Oil Tank N1		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.30	99.99	22.56	20.26	11.29	5.00	1.39
10	80	0.00	2.57	99.99	21.83	19.26	11.23	5.00	1.09
20	70	0.00	2.91	99.99	20.69	17.79	11.16	6.00	0.86
30	60	1.02	3.22	99.99	18.95	15.73	11.08	7.00	0.70
40	50	1.07	3.39	99.99	17.70	14.32	11.02	11.00	0.63
50	40	1.08	3.34	99.99	17.13	13.79	11.01	11.00	0.69
60	30	1.06	3.11	99.99	17.16	14.05	11.06	6.00	0.87
70	20	0.00	2.76	99.99	18.88	16.12	11.12	5.00	1.09
80	10	0.00	2.41	99.99	20.21	17.80	11.19	5.00	1.45
90	0	0.00	2.16	99.99	21.96	19.80	11.23	4.00	1.95
270	180	0.00	0.45	99.99	22.74	22.28	11.75	2.00	3.66
280	170	0.00	0.60	99.99	20.64	20.04	11.72	3.00	3.46
290	160	0.00	0.86	99.99	19.22	18.37	11.69	3.00	3.00
300	150	0.00	1.17	99.99	17.25	16.08	11.65	3.00	2.63
310	140	0.00	1.46	99.99	16.94	15.48	11.60	4.00	2.38
320	130	0.00	1.70	99.99	18.07	16.38	11.54	4.00	2.18
330	120	0.00	1.88	99.99	19.96	18.08	11.45	4.00	2.13
340	110	0.00	2.01	99.99	21.60	19.60	11.39	4.00	2.17
350	100	0.00	2.13	99.99	22.90	20.77	11.34	4.00	1.71

Minimum Increase in Allowable VCG = 0.63
Maximum Allowable VCG = 23.042

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage Base OUL Tank N1T=22.0m
DAMAGED STABILITY HEEL AXIS = 40.0



NOBLE DENTON 23.FEB.1999 TIME 11.53.58

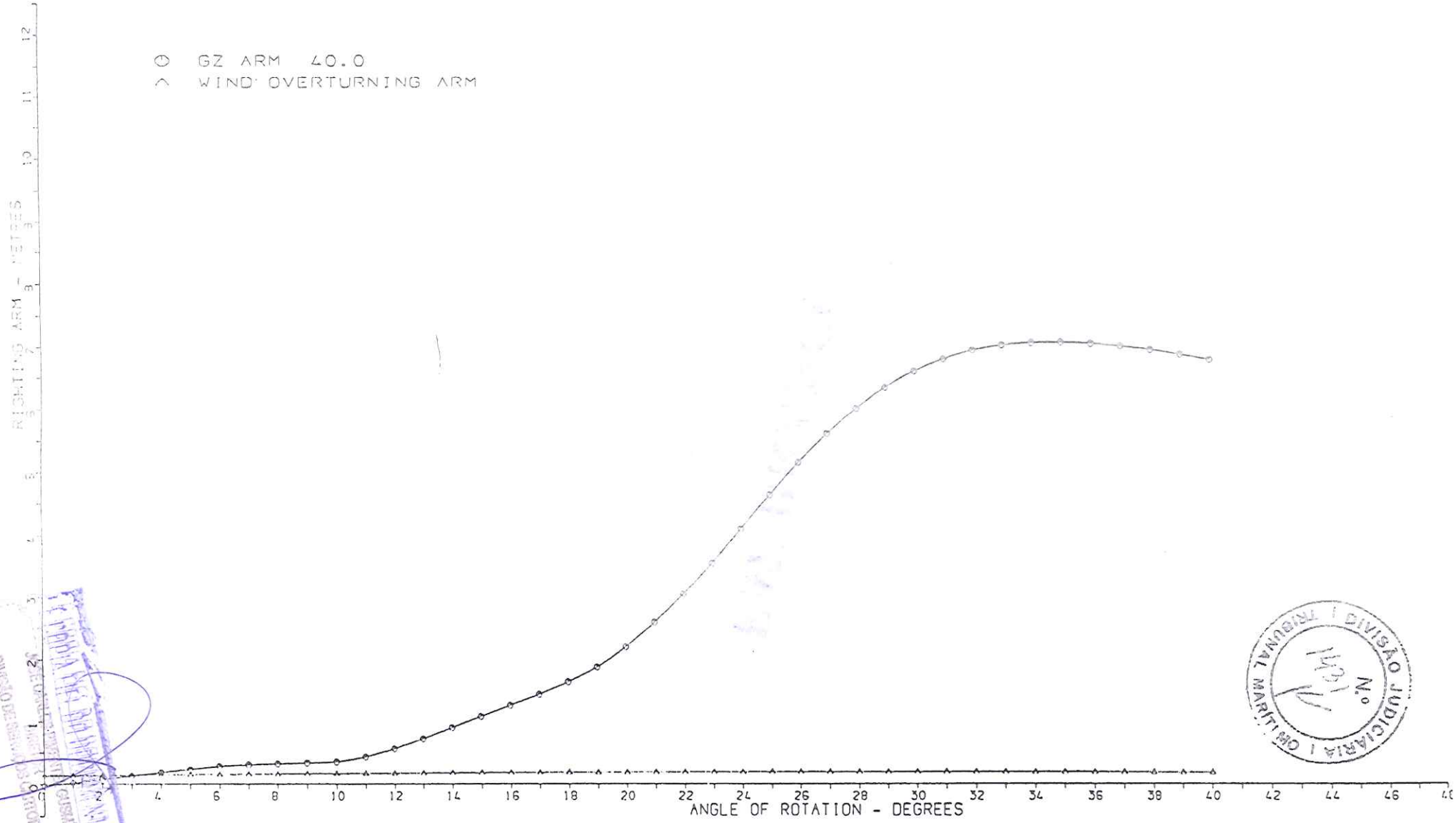
NOBLE DENTO

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d128		
Space Damaged	Void Space 65S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.41	99.99	23.02	20.62	11.35	5.00	1.80
10	80	0.00	2.65	99.99	22.26	19.61	11.29	5.00	1.57
20	70	0.00	2.97	99.99	21.13	18.16	11.21	6.00	1.31
30	60	0.00	3.22	99.99	19.52	16.30	11.16	7.00	1.15
40	50	0.00	3.32	99.99	17.89	14.57	11.09	7.00	1.10
50	40	0.00	3.19	99.99	17.20	14.01	11.10	7.00	1.17
60	30	0.00	2.86	99.99	17.23	14.36	11.15	6.00	1.33
70	20	0.00	2.43	99.99	19.00	16.57	11.23	5.00	1.63
80	10	0.00	2.02	99.99	20.38	18.35	11.30	4.00	2.10
90	0	0.00	1.74	99.99	22.24	20.50	11.36	4.00	2.61
270	180	0.00	0.89	99.99	22.71	21.82	11.90	3.00	3.66
280	170	0.00	0.94	99.99	20.64	19.70	11.84	3.00	3.46
290	160	0.00	1.15	99.99	19.22	18.07	11.82	3.00	2.99
300	150	0.00	1.41	99.99	16.98	15.57	11.77	4.00	2.57
310	140	0.00	1.66	99.99	16.92	15.27	11.73	4.00	2.23
320	130	0.00	1.89	99.99	18.08	16.19	11.61	4.00	2.01
330	120	0.00	2.06	99.99	19.93	17.87	11.52	5.00	1.90
340	110	0.00	2.17	99.99	21.53	19.36	11.45	5.00	1.92
350	100	0.00	2.26	99.99	22.82	20.55	11.40	5.00	1.87

Minimum Increase in Allowable VCG = 1.10
Maximum Allowable VCG = 23.512

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS65S T=22.0m
DAMAGED STABILITY HEEL AXIS = 40.0



NOBLE DENTON 23.FEB.1999 TIME 11.51.06

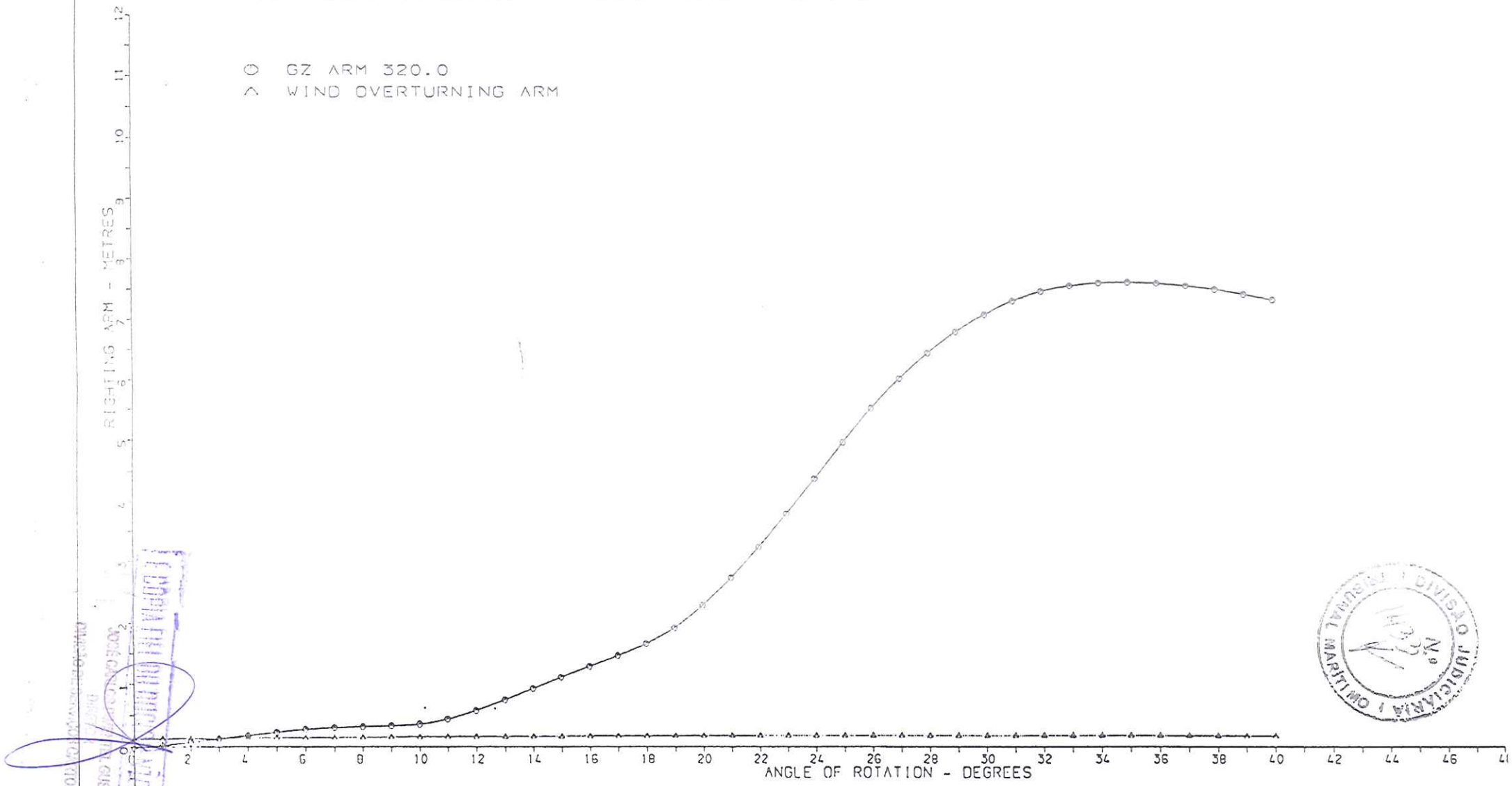
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d129		
Space Damaged	Void Space 64S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δVCG
0	90	0.00	2.39	99.99	23.24	20.85	11.58	5.00	1.81
10	80	0.00	2.26	99.99	22.67	20.41	11.54	5.00	1.87
20	70	0.00	2.18	99.99	21.50	19.32	11.50	5.00	1.91
30	60	0.00	2.08	99.99	19.96	17.88	11.46	5.00	1.88
40	50	0.00	1.92	99.99	18.10	16.18	11.44	4.00	1.99
50	40	0.00	1.70	99.99	17.00	15.30	11.45	4.00	2.18
60	30	0.00	1.46	99.99	17.09	15.63	11.48	4.00	2.53
70	20	0.00	1.21	99.99	19.33	18.13	11.52	3.00	2.95
80	10	0.00	1.00	99.99	20.77	19.77	11.56	3.00	3.44
90	0	0.00	0.95	99.99	22.88	21.93	11.60	3.00	3.62
270	180	0.00	1.68	99.99	22.14	20.46	11.92	4.00	2.65
280	170	0.00	1.96	99.99	20.27	18.31	11.87	4.00	2.14
290	160	0.00	2.36	99.99	18.91	16.54	11.79	5.00	1.69
300	150	0.00	2.79	99.99	17.13	14.34	11.72	6.00	1.36
310	140	0.00	3.13	99.99	17.12	13.99	11.65	7.00	1.19
320	130	0.00	3.26	99.99	17.88	14.61	11.61	7.00	1.14
330	120	0.00	3.17	99.99	19.54	16.37	11.64	7.00	1.18
340	110	0.00	2.94	99.99	21.14	18.21	11.63	6.00	1.33
350	100	0.00	2.62	99.99	22.36	19.74	11.59	5.00	1.59

Minimum Increase in Allowable VCG = 1.14
Maximum Allowable VCG = 23.552

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 64S T=22.0m
DAMAGED STABILITY HEEL AXIS = 320.0



NOBLE DENTON 23.FEB.1999 TIME 11.50.24

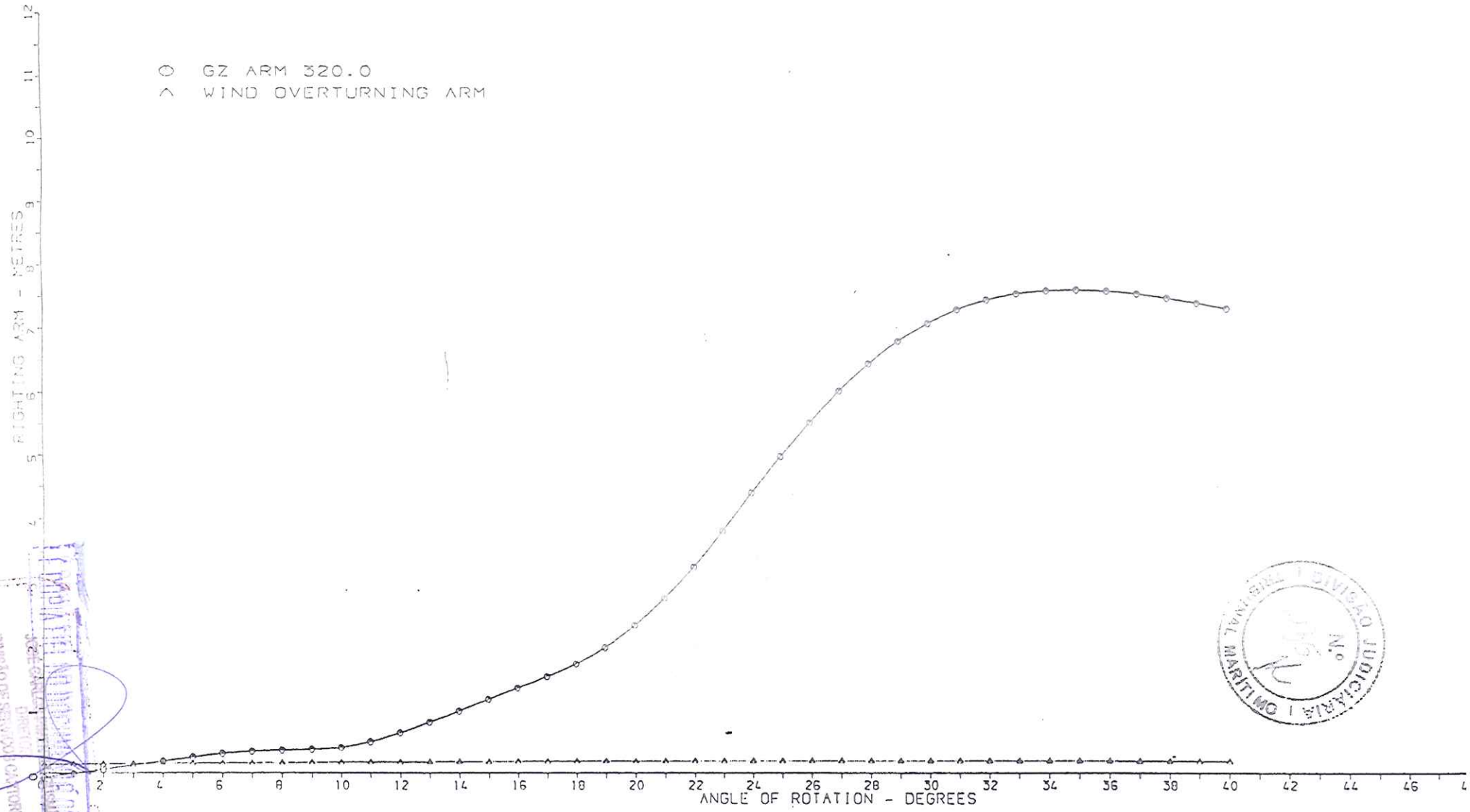
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d130		
Space Damaged	Void Space 46aS (Modified)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.46	99.99	23.24	20.78	11.60	5.00	1.96
10	80	0.00	2.30	99.99	22.69	20.40	11.57	5.00	2.09
20	70	0.00	2.18	99.99	21.52	19.34	11.52	4.00	2.10
30	60	0.00	2.04	99.99	19.97	17.93	11.49	4.00	2.04
40	50	0.00	1.83	99.99	18.11	16.28	11.45	4.00	2.12
50	40	0.00	1.57	99.99	17.05	15.48	11.46	4.00	2.28
60	30	0.00	1.24	99.99	17.27	16.02	11.48	3.00	2.58
70	20	0.00	0.90	99.99	19.33	18.43	11.53	3.00	2.96
80	10	0.00	0.61	99.99	20.77	20.16	11.57	2.00	3.44
90	0	0.00	0.44	99.99	22.91	22.47	11.60	2.00	3.63
270	180	0.00	2.09	99.99	22.21	20.12	11.81	4.00	2.69
280	170	0.00	2.36	99.99	20.36	18.00	11.77	4.00	2.22
290	160	1.02	2.72	99.99	19.00	16.28	11.71	5.00	1.78
300	150	1.11	3.09	99.99	17.23	14.15	11.64	6.00	1.46
310	140	1.15	3.34	99.99	17.16	13.82	11.61	6.00	1.29
320	130	1.16	3.43	99.99	17.87	14.45	11.57	7.00	1.25
330	120	1.13	3.30	99.99	19.51	16.20	11.59	6.00	1.30
340	110	1.06	3.04	99.99	21.13	18.09	11.64	6.00	1.45
350	100	0.00	2.72	99.99	22.35	19.63	11.63	5.00	1.71

Minimum Increase in Allowable VCG = 1.25
Maximum Allowable VCG = 23.662

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 46aS T=22.0m
DAMAGED STABILITY HEEL AXIS = 320.0



NOBLE DENTON 23.FEB.1999 TIME 11.47.35

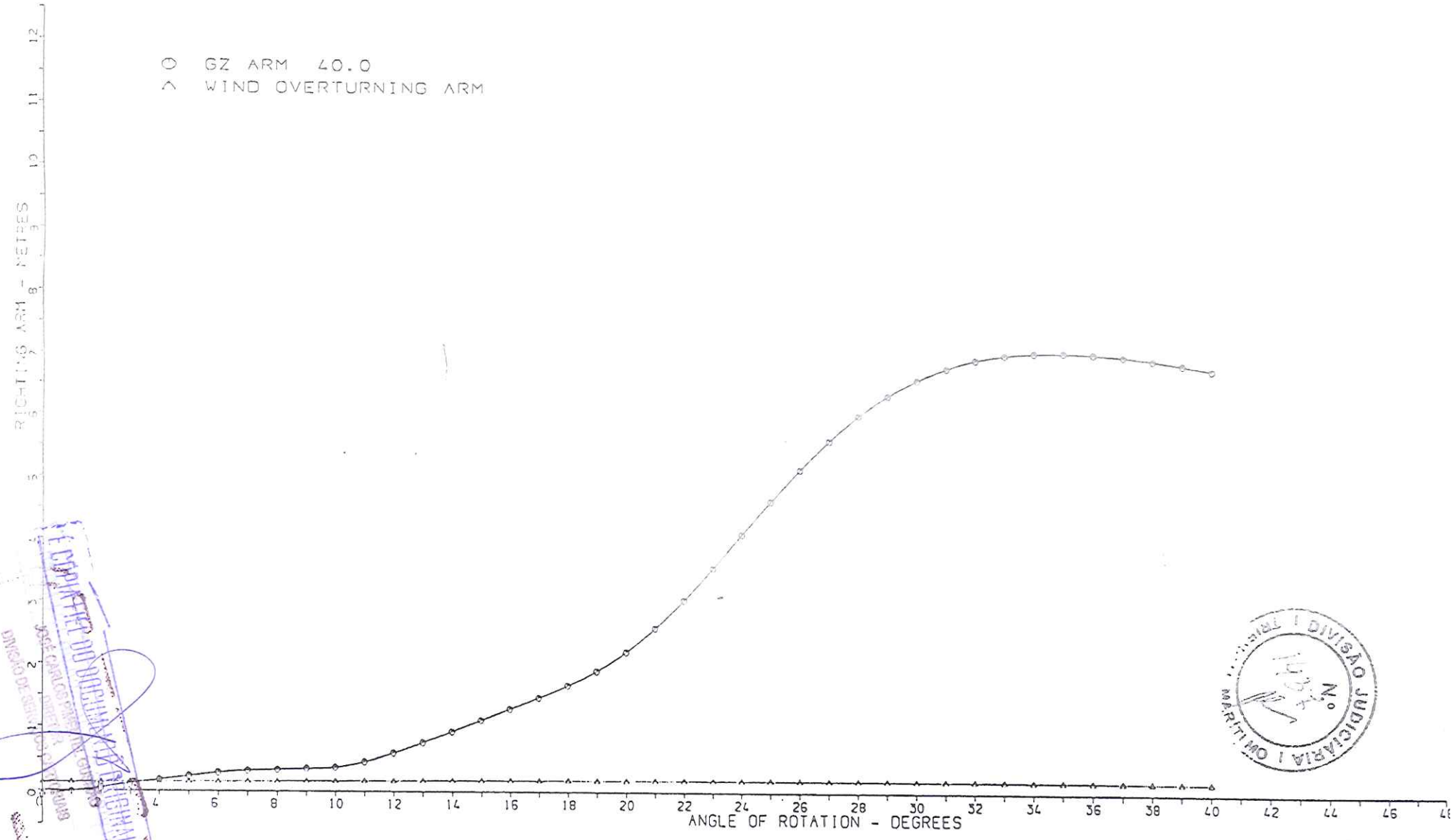
NOBLE DENTO

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Damaged	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	d131		
Space Damaged	Void Space 45S (Modified)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.47	99.99	23.00	20.52	11.29	5.00	1.95
10	80	0.00	2.74	99.99	22.25	19.51	11.24	5.00	1.69
20	70	1.09	3.07	99.99	21.12	18.05	11.16	6.00	1.43
30	60	1.17	3.35	99.99	19.49	16.14	11.09	6.00	1.26
40	50	1.21	3.48	99.99	17.89	14.42	11.04	7.00	1.21
50	40	1.20	3.40	99.99	17.24	13.84	11.04	7.00	1.27
60	30	1.16	3.15	99.99	17.34	14.19	11.08	6.00	1.43
70	20	1.08	2.78	99.99	19.10	16.32	11.14	5.00	1.73
80	10	0.00	2.42	99.99	20.47	18.05	11.21	4.00	2.16
90	0	0.00	2.15	99.99	22.37	20.22	11.25	4.00	2.64
270	180	0.00	0.38	99.99	22.75	22.37	11.73	2.00	3.66
280	170	0.00	0.55	99.99	20.64	20.09	11.70	2.00	3.47
290	160	0.00	0.85	99.99	19.22	18.38	11.67	3.00	3.01
300	150	0.00	1.19	99.99	17.17	15.98	11.64	3.00	2.61
310	140	0.00	1.52	99.99	16.96	15.44	11.59	4.00	2.34
320	130	0.00	1.79	99.99	18.09	16.29	11.53	4.00	2.14
330	120	0.00	2.01	99.99	19.94	17.93	11.44	4.00	2.06
340	110	0.00	2.16	99.99	21.55	19.39	11.38	4.00	2.09
350	100	0.00	2.29	99.99	22.84	20.55	11.34	5.00	2.09

Minimum Increase in Allowable VCG = 1.21
Maximum Allowable VCG = 23.622

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS45aS T=22.0m
DAMAGED STABILITY HEEL AXIS = 40.0



NOBLE DENTON 23.FEB.1999 TIME 11.45.47

NOBLE DENTON

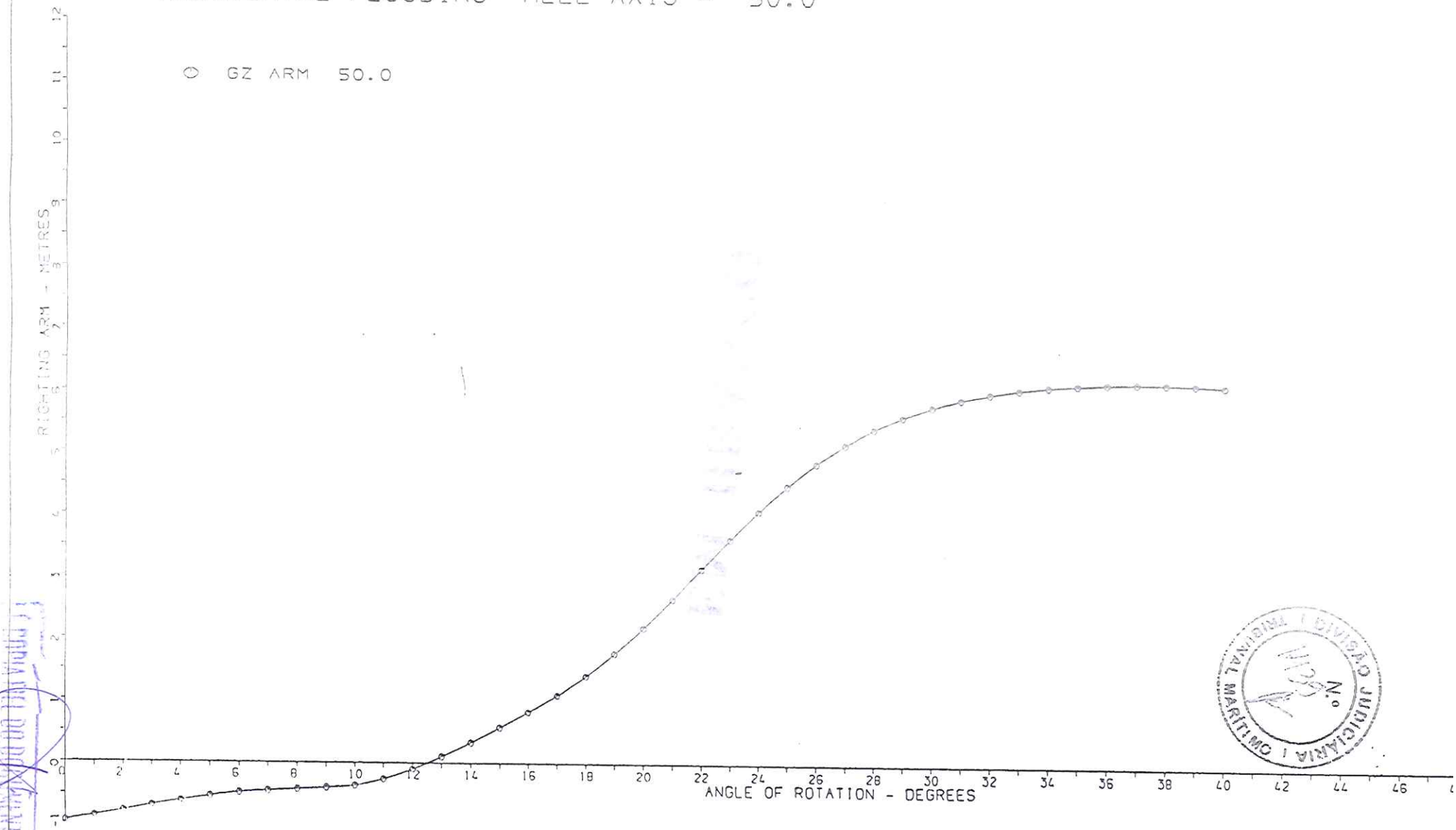
Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Accidental Flooding	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	a131		
Space Damaged	SW Ballast Tank 21S		

DIVISÃO JUDICIÁRIA N.º 1436 TRIBUNAL MARÍTIMO

Heel Axis	Angle of Loll	Angle of Vanishing Stability	Positive Stability Range beyond Angle of Loll
0	7.49	>40º	32.51
10	9.13	>40º	30.87
20	10.48	>40º	29.52
30	11.51	>40º	28.49
40	12.20	>40º	27.80
50	12.51	>40º	27.49
60	12.46	>40º	27.54
70	12.03	>40º	27.97
80	11.28	>40º	28.72
90	10.17	>40º	29.83
270	0.00	>40º	40.00
280	0.00	>40º	40.00
290	0.00	>40º	40.00
300	0.00	>40º	40.00
310	0.00	>40º	40.00
320	0.00	>40º	40.00
330	1.38	>40º	38.62
340	3.56	>40º	36.44
350	5.62	>40º	34.38

CÓPIA FIEL DO DOCUMENTO ORIGINAL
JOSÉ CARLOS PIMENTEL MUSMÃO
DIRETOR
DIVISÃO DE SERVIÇOS AUXILIARES

P-36 STABILITY ANALYSIS REV C JAN 99 - Accid Flooding Tk 21S T=22.0m
ACCIDENTAL FLOODING HEEL AXIS = 50.0



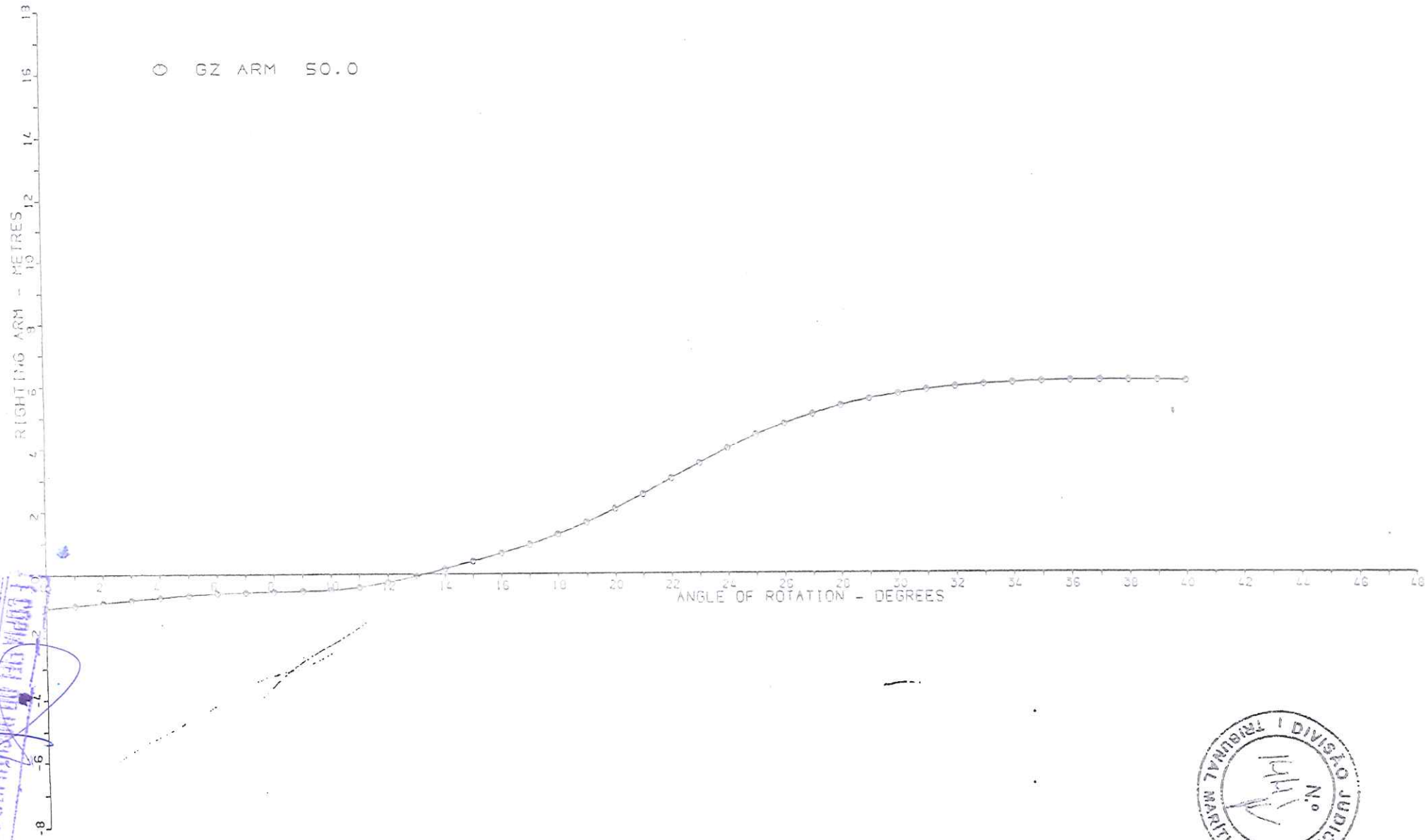
NOBLE DENTON 23.FEB.1999 TIME 11.32.44

NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Operational/Survival - Accidental Flooding	Project	P36 Roncador
Draft	22.00 m	Client	Petromec
Displacement	56503 mT	Date	18-Jan-1999
LCG (from FP)	57.05 m	By	M&E
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	22.41 m		
Genstab Run ID	a132		
Space Damaged	SW Ballast Tank 22S		

Heel Axis	Angle of Loll	Angle of Vanishing Stability	Positive Stability Range beyond Angle of Loll
0	8.64	>40°	31.36
10	10.26	>40°	29.74
20	11.56	>40°	28.44
30	12.51	>40°	27.49
40	13.10	>40°	26.90
50	13.28	>40°	26.72
60	13.09	>40°	26.91
70	12.48	>40°	27.52
80	11.55	>40°	28.45
90	10.24	>40°	29.76
270	0.00	>40°	40.00
280	0.00	>40°	40.00
290	0.00	>40°	40.00
300	0.00	>40°	40.00
310	0.00	>40°	40.00
320	0.00	>40°	40.00
330	2.36	>40°	37.64
340	4.63	>40°	35.37
350	6.74	>40°	33.26

P-36 STABILITY ANALYSIS REV C JAN 99 - Accid Flooding TK 22S T=22.0m
ACCIDENTAL FLOODING HEEL AXIS = 50.0



NOBLE DENTON 23.FEB.1999 TIME 11.31.52

NOBLE DENTON

APPENDIX I

18.0M OPERATING/INSPECTION CONDITION

RESULTS SUMMARY

(CRITICAL GZ FOR EACH CASE ATTACHED)

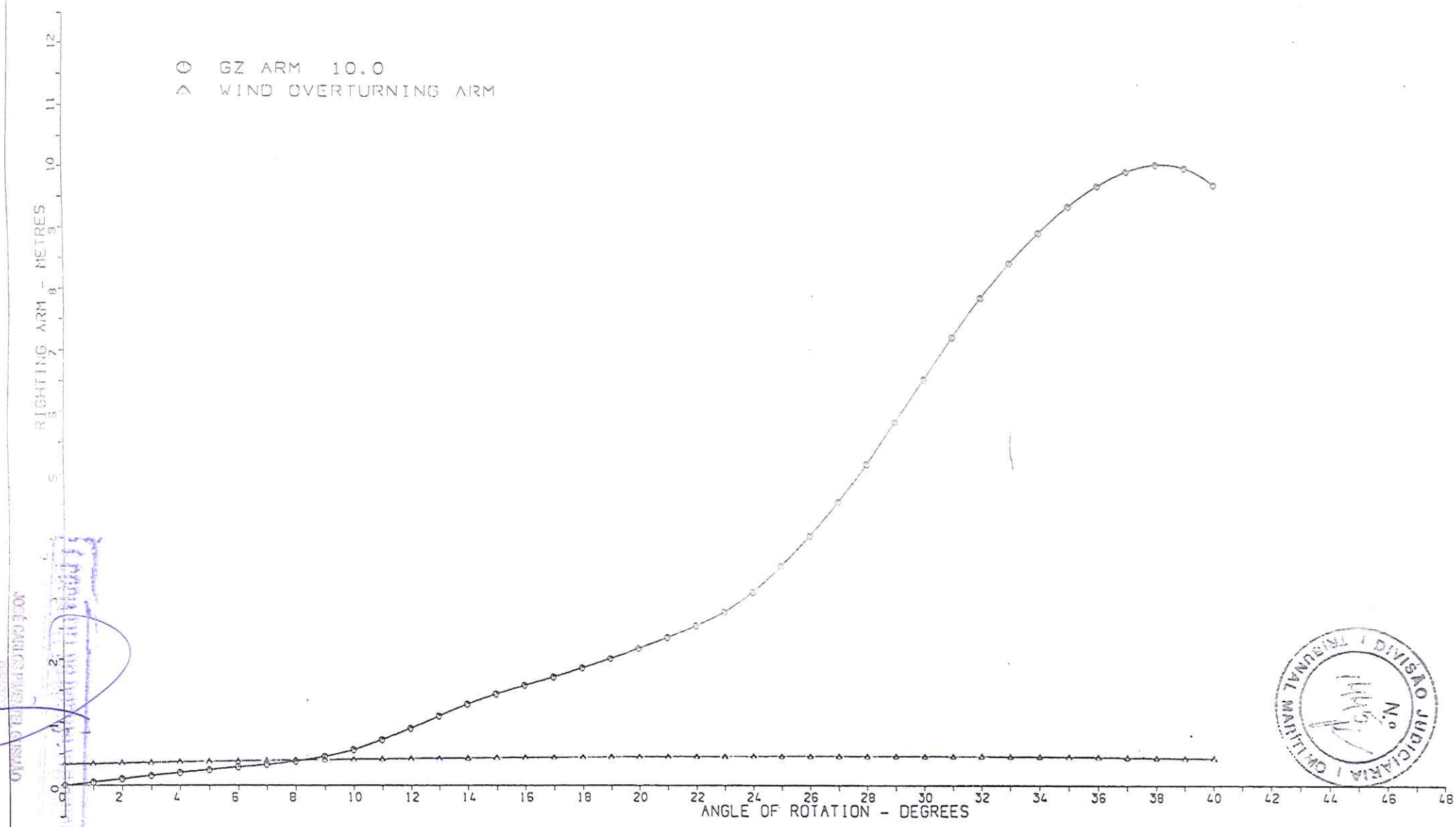
(23 PAGES)

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Intact	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	I210		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	Area Ratio	δ VCG
0	90	0.0	8.34	99.99	25.80	17.46	14.71	3.11	4.72
10	80	0.0	8.24	99.99	25.04	16.80	14.65	2.90	4.61
20	70	0.0	7.95	99.99	23.94	15.99	14.56	2.68	3.05
30	60	0.0	7.55	99.99	22.52	14.96	14.48	2.58	4.82
40	50	0.0	7.07	99.99	20.91	13.84	14.43	2.68	5.55
50	40	0.0	6.58	99.99	19.80	13.22	14.45	3.04	7.02
60	30	0.0	6.23	99.99	20.39	14.16	14.50	3.74	8.64
70	20	0.0	6.04	99.99	21.15	15.11	14.55	4.56	9.81
80	10	0.0	5.82	99.99	22.45	16.64	14.61	5.70	11.18
90	0	0.0	5.75	99.99	25.91	20.16	14.66	7.54	12.59
270	180	0.0	5.80	99.99	25.63	19.82	15.19	7.79	13.19
280	170	0.0	5.78	99.99	22.33	16.55	15.16	5.92	11.70
290	160	0.0	6.01	99.99	21.04	15.03	15.10	4.75	10.28
300	150	0.0	6.20	99.99	20.27	14.08	15.02	3.91	9.07
310	140	0.0	6.52	99.99	19.62	13.10	14.96	3.19	7.44
320	130	0.0	7.02	99.99	20.77	13.75	14.80	2.79	6.13
330	120	0.0	7.50	99.99	22.52	15.02	14.71	2.69	5.22
340	110	0.0	7.91	99.99	24.08	16.17	14.66	2.78	4.85
350	100	0.0	8.23	99.99	25.32	17.09	14.66	3.01	4.76

Minimum Increase in Allowable VCG = 3.05
Maximum Allowable VCG = 27.61

P-36 STABILITY ANALYSIS REV C JAN 99.- Intact Case T=18.0m
INTACT CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 15.10.48

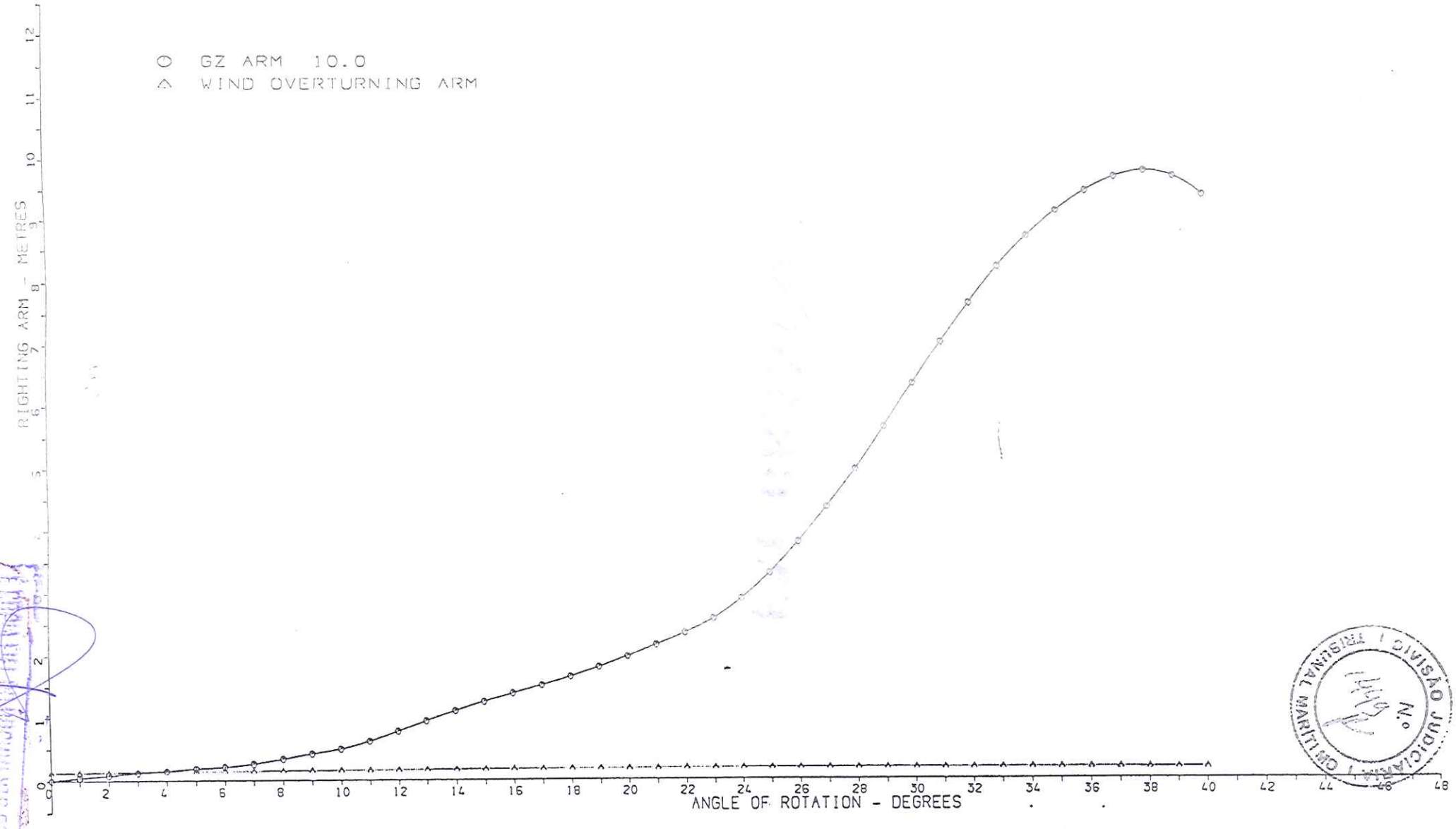
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D224		
Space Damaged	Void Space 46S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	3.16	99.99	25.92	22.76	15.52	8.00	4.95
10	80	0.00	2.96	99.99	25.12	22.16	15.43	8.00	4.90
20	70	0.00	3.05	99.99	23.98	20.93	15.34	8.00	5.07
30	60	0.00	3.19	99.99	22.50	19.31	15.27	8.00	5.57
40	50	0.00	3.24	99.99	20.79	17.55	15.21	7.00	6.48
50	40	0.00	3.10	99.99	19.32	16.22	15.21	7.00	8.08
60	30	0.00	2.78	99.99	20.39	17.61	15.25	6.00	9.96
70	20	0.00	2.40	99.99	21.15	18.75	15.32	6.00	10.95
80	10	0.00	2.09	99.99	22.45	20.36	15.39	5.00	12.13
90	0	0.00	1.97	99.99	25.91	23.93	15.43	5.00	13.37
270	180	0.00	2.60	99.99	24.81	22.21	15.80	6.00	12.87
280	170	0.00	3.00	99.99	22.04	19.04	15.70	6.00	11.46
290	160	0.00	3.78	99.99	20.87	17.10	15.53	7.00	10.13
300	150	0.00	4.77	99.99	20.11	15.34	15.33	7.00	9.07
310	140	0.00	5.20	99.99	19.54	14.34	15.26	7.00	7.60
320	130	0.00	5.38	99.99	20.69	15.31	15.20	8.00	6.45
330	120	0.00	5.22	99.99	22.42	17.19	15.22	8.00	5.68
340	110	0.00	4.42	99.99	23.93	19.51	15.39	8.00	5.17
350	100	0.00	3.60	99.99	25.11	21.52	15.57	8.00	4.94

Minimum Increase in Allowable VCG = 4.90
Maximum Allowable VCG = 29.460

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 45S T=18.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 15.25.37

NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177-1
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D226		
Space Damaged	Void Space 32 Stbd 3 (New Subdivided Compartment)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.58	99.99	25.91	23.33	15.52	7.00	5.11
10	80	0.00	2.68	99.99	25.11	22.44	15.43	7.00	5.10
20	70	0.00	2.91	99.99	23.97	21.06	15.34	7.00	5.34
30	60	0.00	3.15	99.99	22.50	19.34	15.27	7.00	5.89
40	50	0.00	3.24	99.99	20.81	17.57	15.21	7.00	6.78
50	40	0.00	3.10	99.99	19.60	16.50	15.21	7.00	8.39
60	30	0.00	2.78	99.99	20.39	17.61	15.25	6.00	9.96
70	20	0.00	2.40	99.99	21.15	18.75	15.32	6.00	10.95
80	10	0.00	2.09	99.99	22.45	20.36	15.39	5.00	12.13
90	0	0.00	1.97	99.99	25.91	23.93	15.43	5.00	13.37
270	180	0.00	2.04	99.99	24.84	22.81	15.97	5.00	12.79
280	170	0.00	2.16	99.99	22.06	19.91	15.93	6.00	11.45
290	160	0.00	2.49	99.99	20.88	18.39	15.85	6.00	10.23
300	150	0.00	2.95	99.99	20.12	17.17	15.76	7.00	9.24
310	140	0.00	3.38	99.99	19.54	16.15	15.69	7.00	7.89
320	130	0.00	3.52	99.99	20.67	17.15	15.64	7.00	6.74
330	120	0.00	3.31	99.99	22.40	19.09	15.67	8.00	5.91
340	110	0.00	2.94	99.99	23.92	20.97	15.65	8.00	5.35
350	100	0.00	2.69	99.99	25.10	22.41	15.58	8.00	5.10

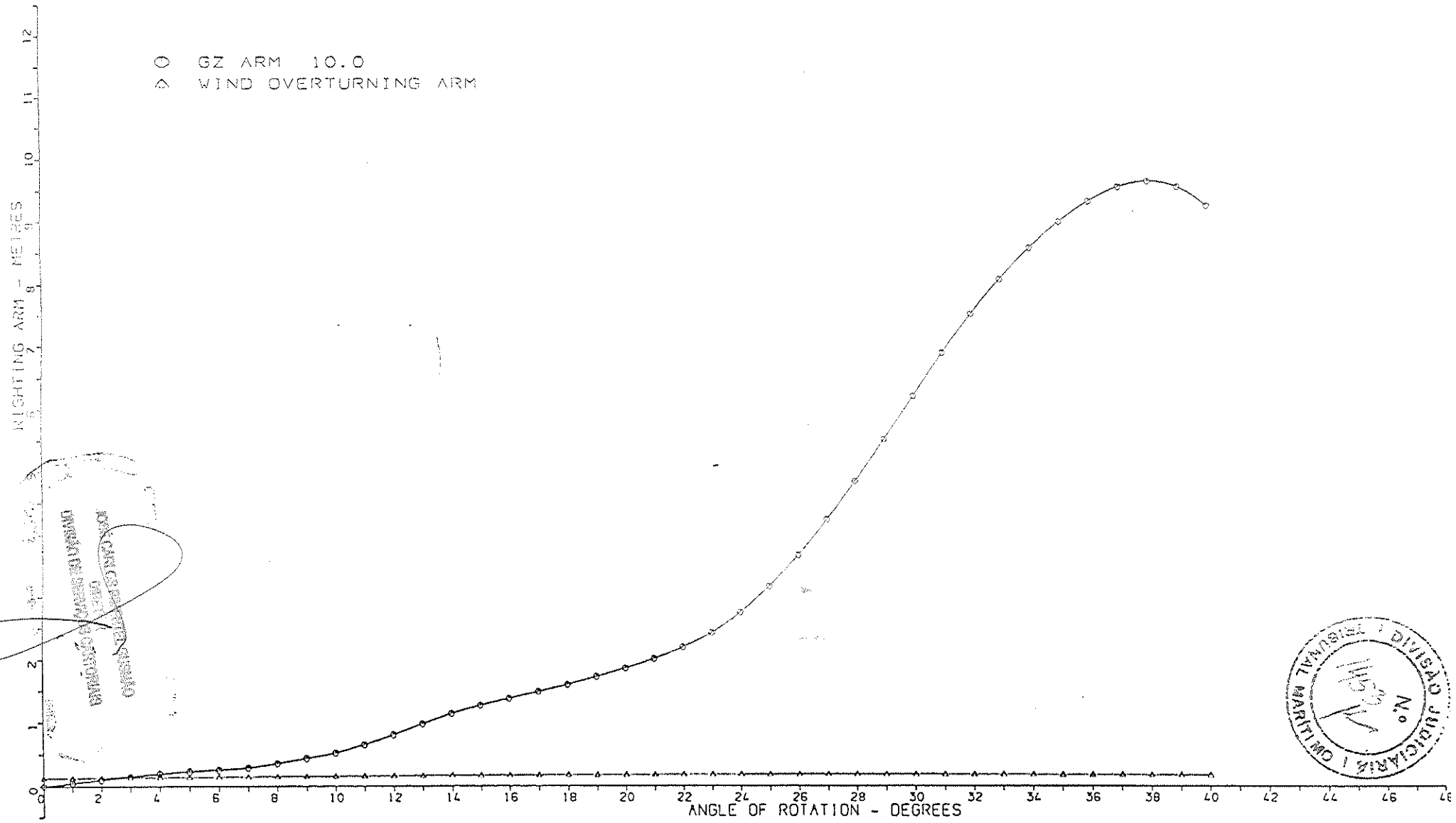
Minimum Increase in Allowable VCG = 5.10
Maximum Allowable VCG = 29.660

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D227		
Space Damaged	Base Oil Tank N1		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.58	99.99	25.33	22.75	15.52	7.00	4.61
10	80	0.00	2.68	99.99	24.69	22.01	15.43	8.00	4.57
20	70	0.00	2.92	99.99	23.68	20.76	15.34	8.00	4.73
30	60	0.00	3.27	99.99	22.32	19.05	15.24	8.00	5.11
40	50	0.00	3.53	99.99	20.75	17.22	15.14	7.00	5.78
50	40	0.00	3.36	99.99	19.62	16.26	15.15	7.00	6.93
60	30	0.00	2.87	99.99	20.05	17.18	15.23	7.00	8.19
70	20	0.00	2.43	99.99	20.83	18.40	15.31	6.00	9.17
80	10	0.00	2.09	99.99	21.95	19.86	15.39	6.00	10.33
90	0	0.00	1.97	99.99	24.57	22.60	15.43	5.00	11.62
270	180	0.00	2.04	99.99	25.63	23.59	15.97	5.00	13.97
280	170	0.00	2.15	99.99	22.33	20.18	15.93	5.00	12.66
290	160	0.00	2.45	99.99	21.04	18.59	15.86	6.00	11.43
300	150	0.00	2.84	99.99	20.27	17.43	15.79	6.00	10.39
310	140	0.00	3.15	99.99	19.11	15.96	15.75	7.00	8.62
320	130	0.00	3.28	99.99	20.59	17.30	15.70	7.00	6.97
330	120	0.00	3.18	99.99	22.48	19.30	15.70	7.00	5.84
340	110	0.00	2.93	99.99	24.12	21.19	15.65	7.00	5.15
350	100	0.00	2.69	99.99	25.42	22.73	15.58	7.00	4.84

Minimum Increase in Allowable VCG = 4.57
Maximum Allowable VCG = 29.130

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage Base OUL Tank N1T=18.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 15.27.38

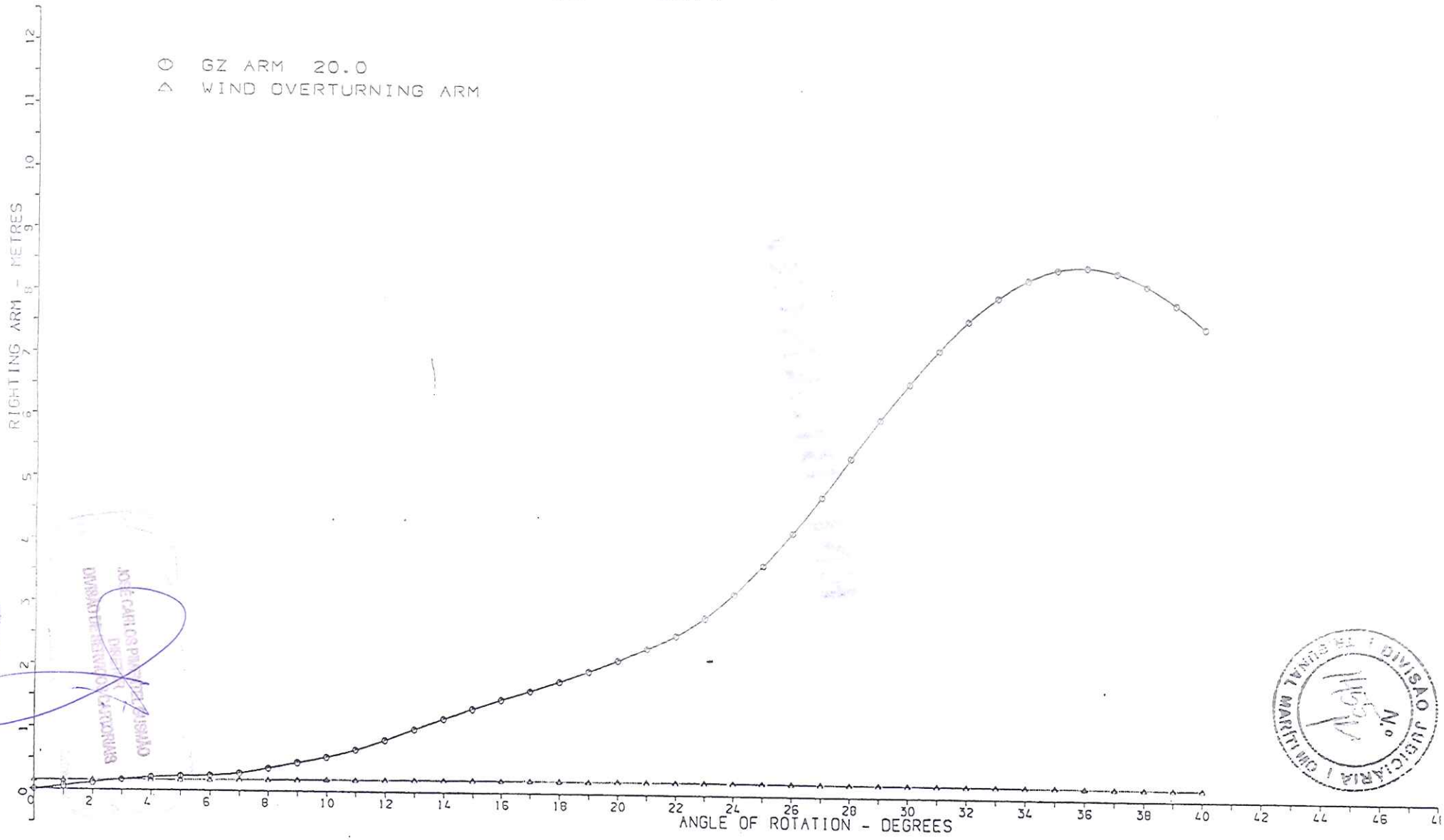
NOBLE DENTON

Title	Stability Analysis Results	W/S No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D228		
Space Damaged	Void Space 65S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.58	99.99	25.58	23.00	15.52	8.00	1.09
10	80	0.00	2.68	99.99	24.88	22.21	15.43	8.00	0.91
20	70	0.00	2.91	99.99	23.82	20.91	15.34	8.00	0.69
30	60	0.00	3.19	99.99	22.43	19.25	15.26	8.00	5.26
40	50	0.00	3.31	99.99	20.83	17.52	15.20	8.00	5.91
50	40	0.00	3.13	99.99	19.64	16.52	15.20	7.00	7.16
60	30	0.00	2.78	99.99	20.11	17.33	15.25	7.00	8.68
70	20	0.00	2.40	99.99	20.91	18.52	15.32	6.00	9.74
80	10	0.00	2.09	99.99	22.08	19.99	15.39	5.00	11.04
90	0	0.00	1.97	99.99	24.92	22.95	15.43	5.00	12.39
270	180	0.00	2.04	99.99	25.63	23.59	15.97	5.00	13.97
280	170	0.00	2.15	99.99	22.33	20.18	15.93	5.00	12.66
290	160	0.00	2.45	99.99	21.04	18.59	15.86	6.00	11.43
300	150	0.00	2.84	99.99	20.25	17.41	15.79	6.00	10.38
310	140	0.00	3.15	99.99	19.10	15.95	15.75	7.00	8.31
320	130	0.00	3.28	99.99	20.67	17.39	15.70	7.00	6.64
330	120	0.00	3.18	99.99	22.51	19.33	15.70	7.00	5.71
340	110	0.00	2.93	99.99	24.11	21.18	15.65	7.00	5.16
350	100	0.00	2.69	99.99	25.37	22.69	15.58	7.00	1.22

Minimum Increase in Allowable VCG = 0.69
Maximum Allowable VCG = 25.250

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS65S T=18.0m
DAMAGED CASE HEEL AXIS = 20.0



NOBLE DENTON 23.FEB.1999 TIME 15.28.16

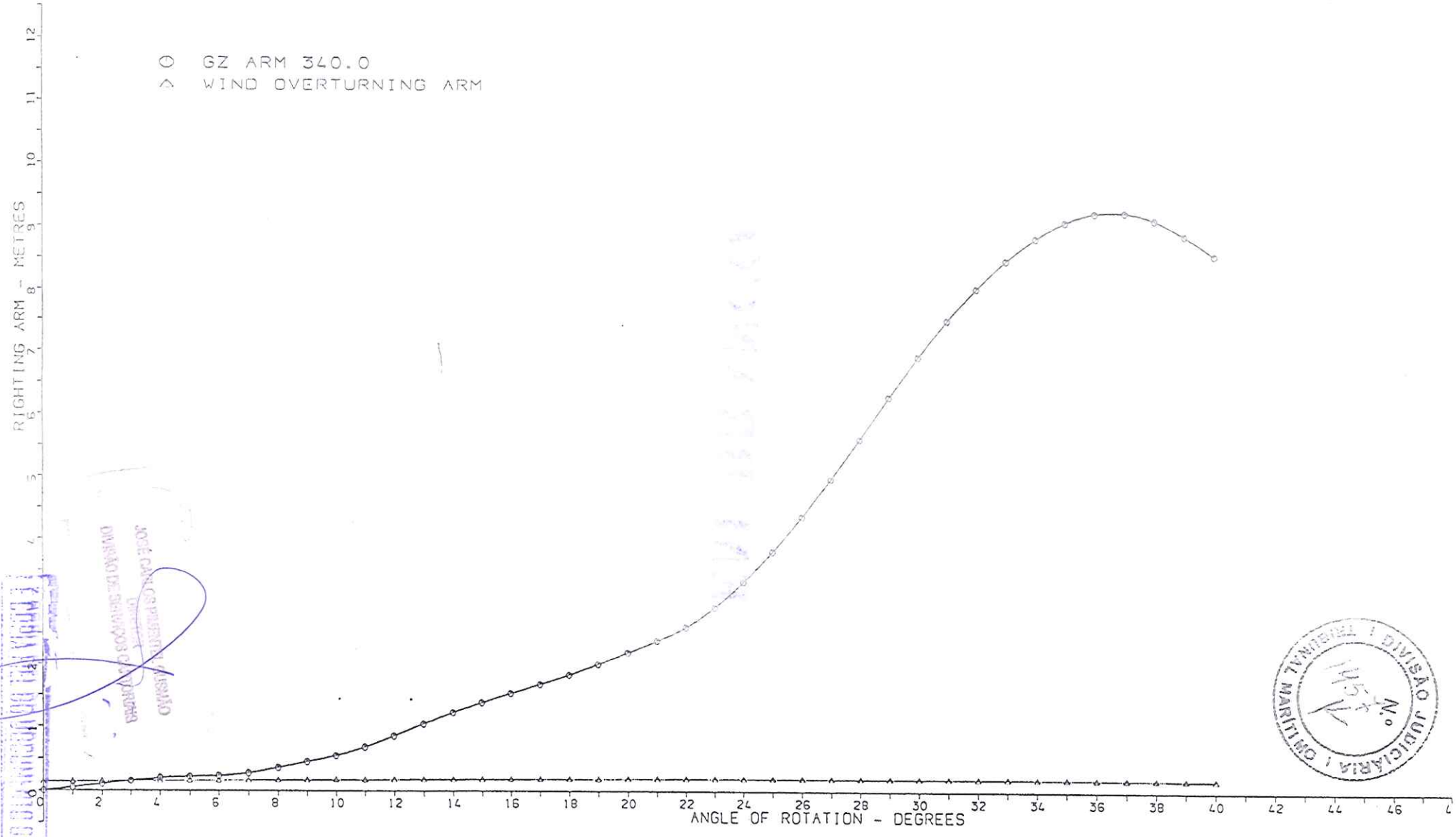
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D229		
Space Damaged	Void Space 64S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	2.58	99.99	25.87	23.29	15.52	8.00	1.08
10	80	0.00	2.68	99.99	25.09	22.42	15.43	8.00	1.21
20	70	0.00	2.91	99.99	23.97	21.05	15.34	7.00	4.98
30	60	0.00	3.15	99.99	22.50	19.35	15.27	7.00	5.43
40	50	0.00	3.24	99.99	20.80	17.56	15.21	7.00	6.21
50	40	0.00	3.10	99.99	19.32	16.22	15.21	7.00	7.87
60	30	0.00	2.78	99.99	20.35	17.57	15.25	6.00	9.94
70	20	0.00	2.40	99.99	21.15	18.75	15.32	6.00	10.95
80	10	0.00	2.09	99.99	22.45	20.36	15.39	5.00	12.13
90	0	0.00	1.97	99.99	25.91	23.93	15.43	5.00	13.37
270	180	0.00	2.04	99.99	24.71	22.67	15.97	5.00	12.97
280	170	0.00	2.15	99.99	21.98	19.83	15.93	5.00	11.55
290	160	0.00	2.45	99.99	20.82	18.37	15.86	6.00	10.20
300	150	0.00	2.84	99.99	20.02	17.19	15.79	7.00	9.11
310	140	0.00	3.19	99.99	19.47	16.29	15.74	7.00	7.56
320	130	0.00	3.36	99.99	20.69	17.32	15.68	8.00	6.38
330	120	0.00	3.22	99.99	22.44	19.21	15.69	8.00	5.61
340	110	0.00	2.93	99.99	23.96	21.03	15.65	8.00	0.67
350	100	0.00	2.69	99.99	25.16	22.47	15.58	8.00	0.91

Minimum Increase in Allowable VCG = 0.67
Maximum Allowable VCG = 25.230

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 64S T=18.0m
DAMAGED CASE HEEL AXIS = 340.0



NOBLE DENTON 23.FEB.1999 TIME 15.36.34

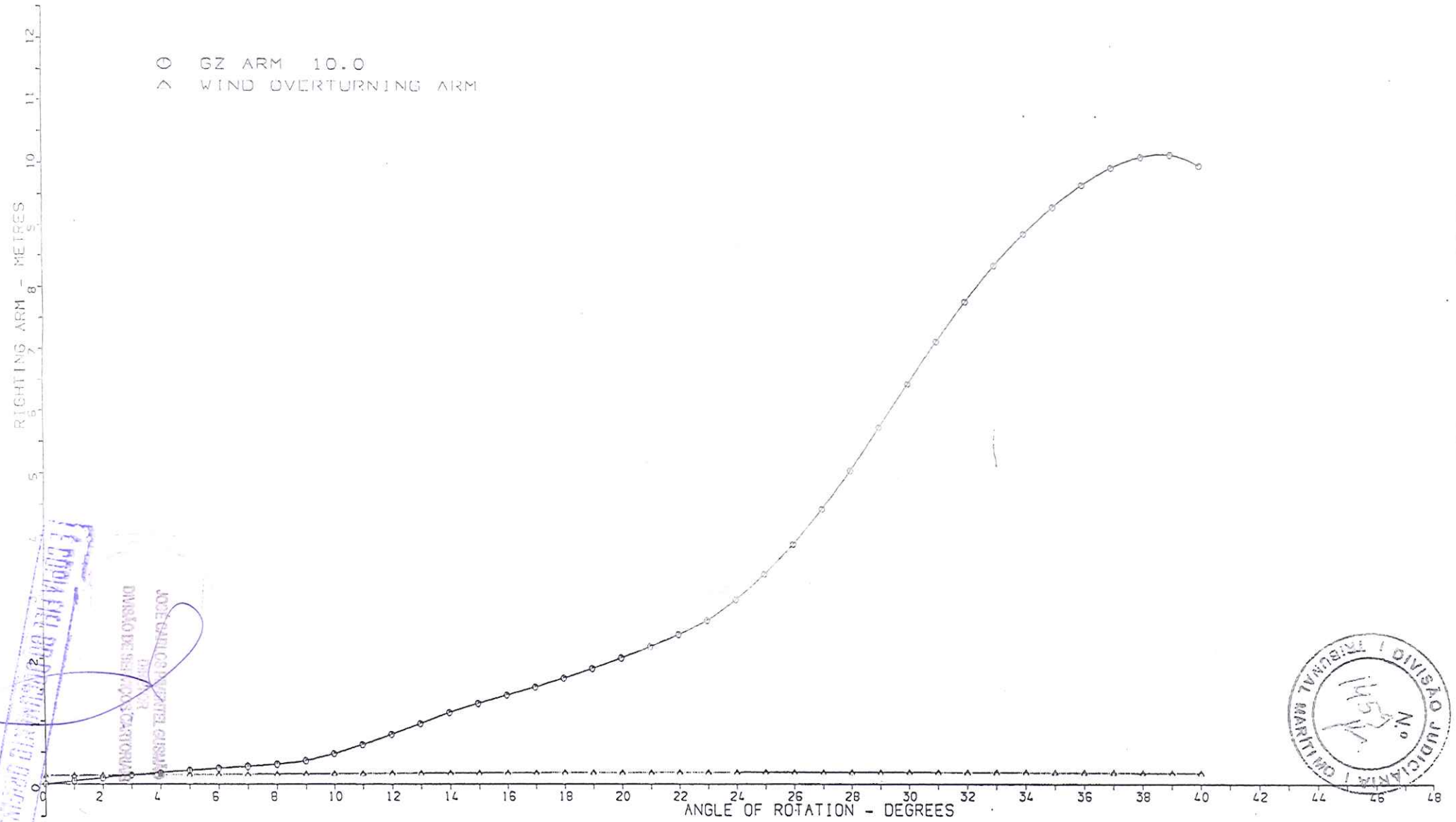
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D230		
Space Damaged	Void Space 46aS (Modified)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	3.27	99.99	25.89	22.62	15.51	8.00	5.01
10	80	0.00	3.12	99.99	25.11	21.99	15.44	9.00	4.96
20	70	0.00	3.14	99.99	23.98	20.84	15.33	8.00	5.13
30	60	0.00	3.24	99.99	22.51	19.27	15.25	8.00	5.60
40	50	0.00	3.24	99.99	20.81	17.57	15.21	7.00	6.43
50	40	0.00	3.10	99.99	19.37	16.27	15.21	7.00	8.00
60	30	0.00	2.78	99.99	20.39	17.61	15.25	6.00	9.95
70	20	0.00	2.40	99.99	21.15	18.75	15.32	6.00	10.95
80	10	0.00	2.09	99.99	22.45	20.36	15.39	5.00	12.13
90	0	0.00	1.97	99.99	25.91	23.93	15.43	5.00	13.37
270	180	0.00	2.51	99.99	24.87	22.35	15.82	6.00	13.04
280	170	0.00	2.91	99.99	22.06	19.15	15.72	6.00	11.65
290	160	0.00	3.68	99.99	20.88	17.20	15.55	7.00	10.32
300	150	0.00	4.69	99.99	20.11	15.43	15.35	7.00	9.26
310	140	0.00	5.20	99.99	19.54	14.34	15.26	7.00	7.76
320	130	0.00	5.45	99.99	20.70	15.26	15.19	8.00	6.57
330	120	0.00	5.32	99.99	22.44	17.12	15.20	8.00	5.78
340	110	0.00	4.51	99.99	23.96	19.46	15.38	8.00	5.25
350	100	0.00	3.72	99.99	25.16	21.43	15.55	8.00	5.02

Minimum Increase in Allowable VCG = 4.96
Maximum Allowable VCG = 29.520

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS 46aS T=18.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 15.37.16

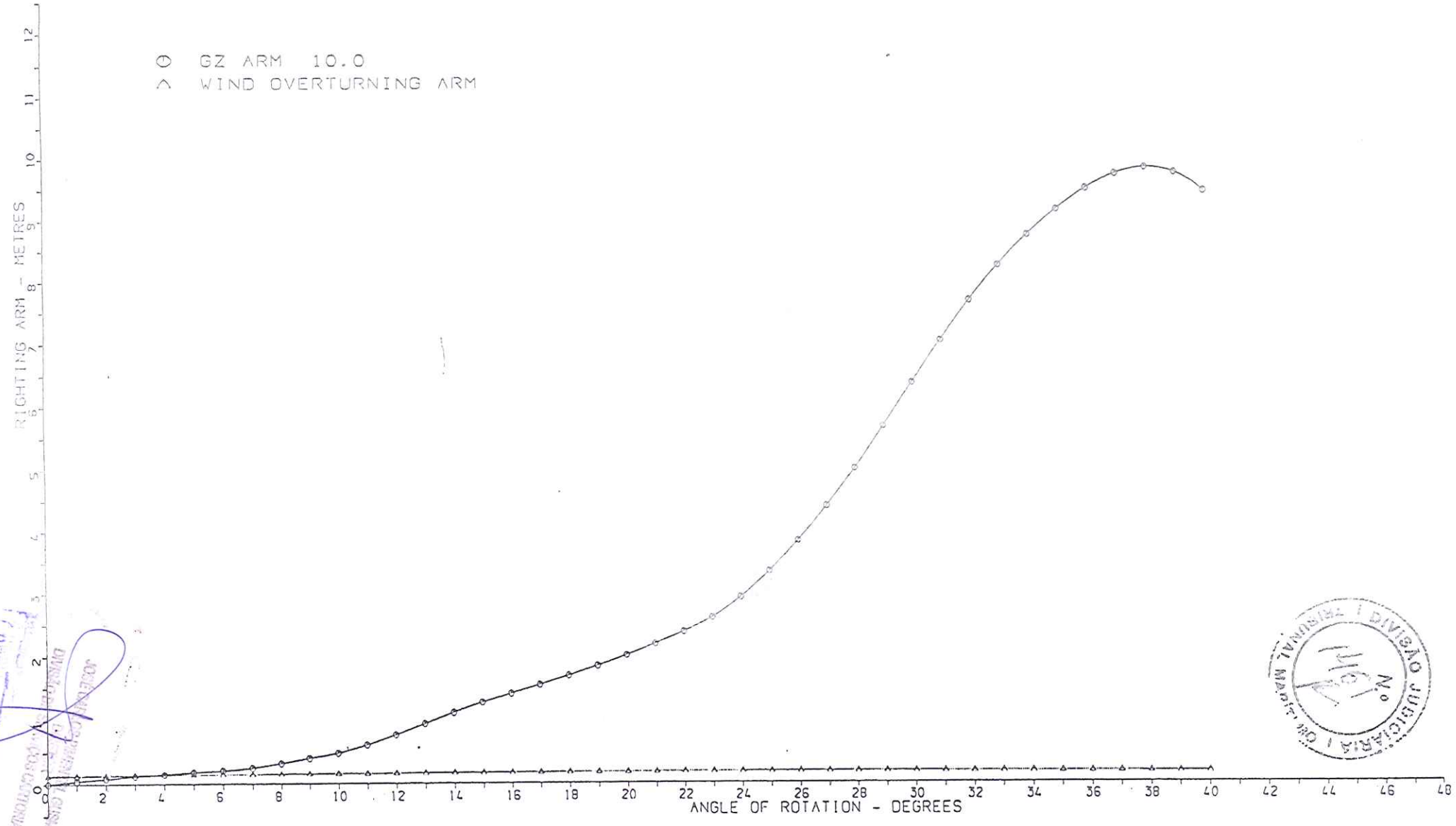
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Damaged	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	D231		
Space Damaged	Void Space 45Sa(Modified)		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	3.25	99.99	25.59	22.34	15.33	8.00	4.95
10	80	0.00	3.68	99.99	24.88	21.20	15.20	8.00	4.86
20	70	0.00	4.45	99.99	23.82	19.38	15.00	8.00	5.02
30	60	0.00	5.28	99.99	22.44	17.16	14.79	8.00	5.42
40	50	0.00	5.46	99.99	20.85	15.39	14.70	8.00	6.09
50	40	0.00	5.17	99.99	19.71	14.54	14.73	7.00	7.37
60	30	0.00	4.58	99.99	20.22	15.63	14.83	7.00	8.83
70	20	0.00	3.58	99.99	20.98	17.39	15.02	7.00	9.86
80	10	0.00	2.82	99.99	22.16	19.34	15.19	6.00	11.14
90	0	0.00	2.42	99.99	25.08	22.66	15.29	6.00	12.46
270	180	0.00	2.04	99.99	25.63	23.59	15.97	5.00	13.97
280	170	0.00	2.15	99.99	22.33	20.18	15.93	5.00	12.66
290	160	0.00	2.45	99.99	21.04	18.59	15.86	6.00	11.43
300	150	0.00	2.84	99.99	20.27	17.43	15.79	6.00	10.39
310	140	0.00	3.15	99.99	19.15	16.00	15.75	7.00	8.42
320	130	0.00	3.28	99.99	20.68	17.40	15.70	7.00	6.86
330	120	0.00	3.28	99.99	22.52	19.24	15.66	8.00	5.88
340	110	0.00	3.15	99.99	24.12	20.97	15.57	8.00	5.31
350	100	0.00	3.12	99.99	25.39	22.27	15.43	9.00	5.08

Minimum Increase in Allowable VCG = 4.86
Maximum Allowable VCG = 29.420

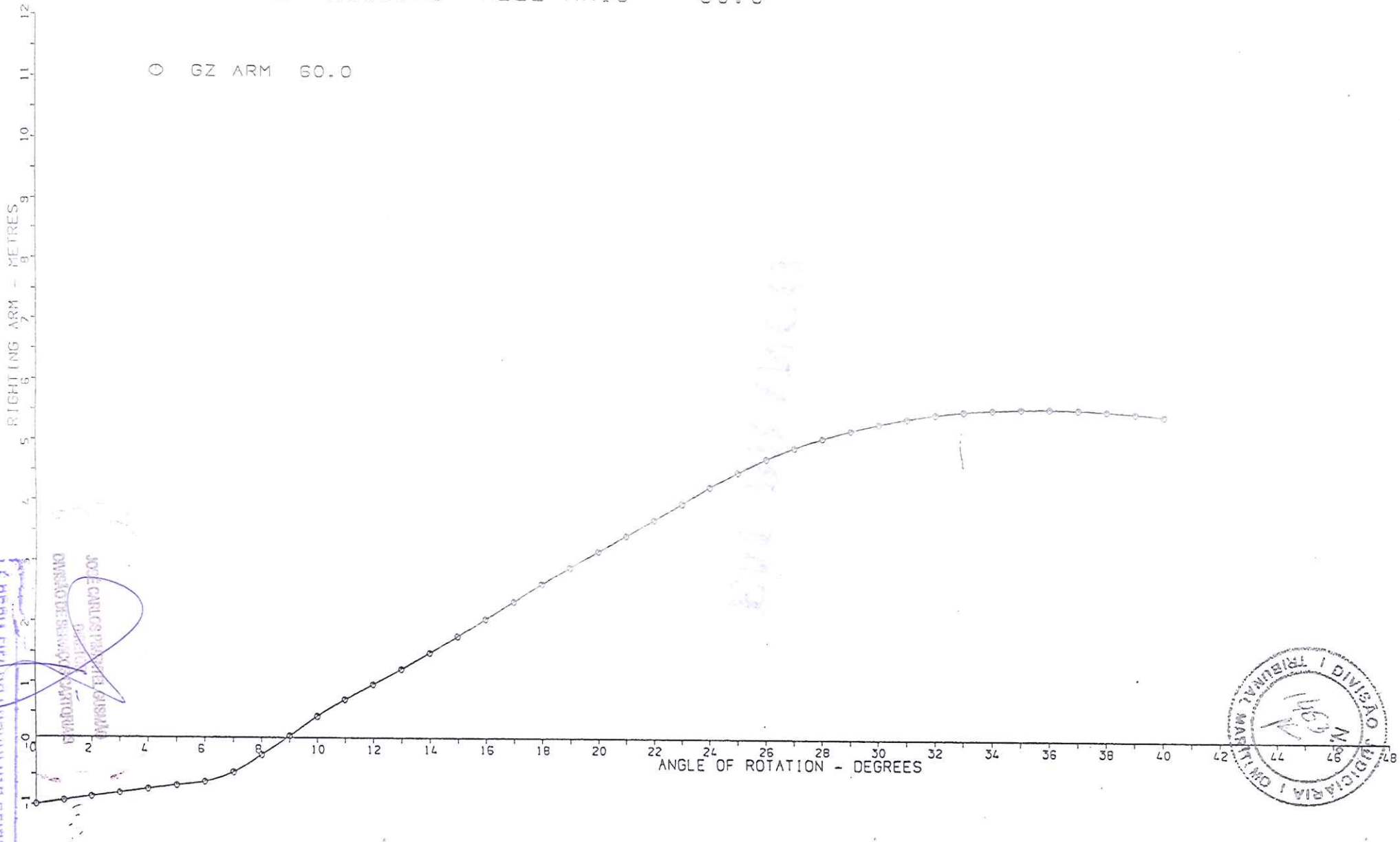
P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to VS45aS T=18.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 15.37.52

NOBLE DENTON

P-36 STABILITY ANALYSIS REV C JAN 99 - Accid Flooding Tk 21S T=18.0m
ACCIDENTAL FLOODING HEEL AXIS = 60.0



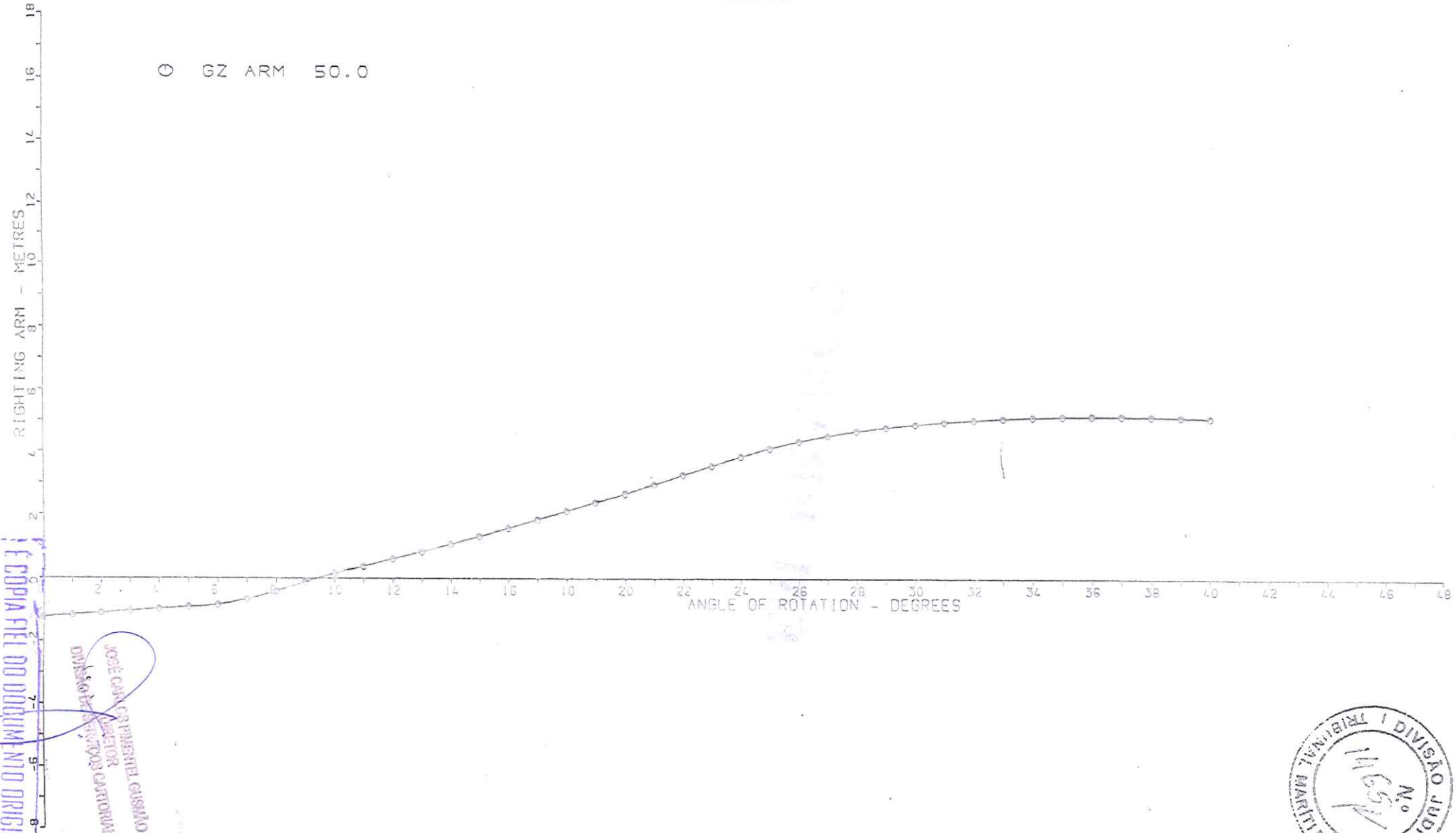
NOBLE DENTON 23.FEB.1999 TIME 15.40.43

NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Inspection - Accidental Flooding	Project	P36 Roncador
Draft	18.00 m	Client	Petromec
Displacement	50390 mT	Date	18-Jan-1999
LCG (from FP)	57.12 m	By	MSE
TCG (+ve stbd)	0.03 m	Checked	
VCG (abl)	24.56 m		
Genstab Run ID	A232		
Space Damaged	SW Ballast Tank 22S		

Heel Axis	Angle of Loll	Angle of Vanishing Stability	Positive Stability Range beyond Angle of Loll
0	5.61	>40º	34.39
10	6.85	>40º	33.15
20	7.87	>40º	32.13
30	8.66	>40º	31.34
40	9.18	>40º	30.82
50	9.44	>40º	30.56
60	9.40	>40º	30.60
70	9.08	>40º	30.92
80	8.50	>40º	31.50
90	7.68	>40º	32.32
270	0.00	>40º	40.00
280	0.00	>40º	40.00
290	0.00	>40º	40.00
300	0.00	>40º	40.00
310	0.00	>40º	40.00
320	0.00	>40º	40.00
330	1.01	>40º	38.99
340	2.64	>40º	37.36
350	4.19	>40º	35.81

P-36 STABILITY ANALYSIS REV C JAN 99 - Accid Flooding TK 22S T=18.0m
ACCIDENTAL FLOODING HEEL AXIS = 50.0



NOBLE DENTON 23.FEB.1999 TIME 15.41.26 NOBLE DENTON

APPENDIX J

11.0M TRANSIT CONDITION

RESULTS SUMMARY

(CRITICAL GZ FOR EACH CASE ATTACHED)

(19 PAGES)

WS No	7/15/2177
Project	P36 Roncador
Client	Petromec
Date	18-Jan-1999
By	MSE
Checked	

Title	Stability Analysis Results
Condition	Transit Condition
Draft	11.00 m
Displacement	37083 mT
LCG (from FP)	57.18 m
TCG (+ve stbd)	0.02 m
VCG (abl)	27.08 m

Description	Genstab ID	Max Allowable VCG	Comments
Intact Condition			
Vessel Intact	I310	50.26	
Damaged Condition			
Lower Hull			
S.W. Bal Tk 1s	D320	47.441	
S.W. Bal Tk 4s	D321	48.061	
S.W. Bal Tk 13s	D322	46.161	
S.W. Bal Tk 18s	D323	46.401	
S.W. Bal Tk 20s	D324	48.001	
S.W. Bal Tk 21s	D325	47.691	
S.W. Bal Tk 22s	D326	46.931	
S.W. Bal Tk 18s & C/L 10S	D327	44.901	

* Values superceeded by modifications to tanks

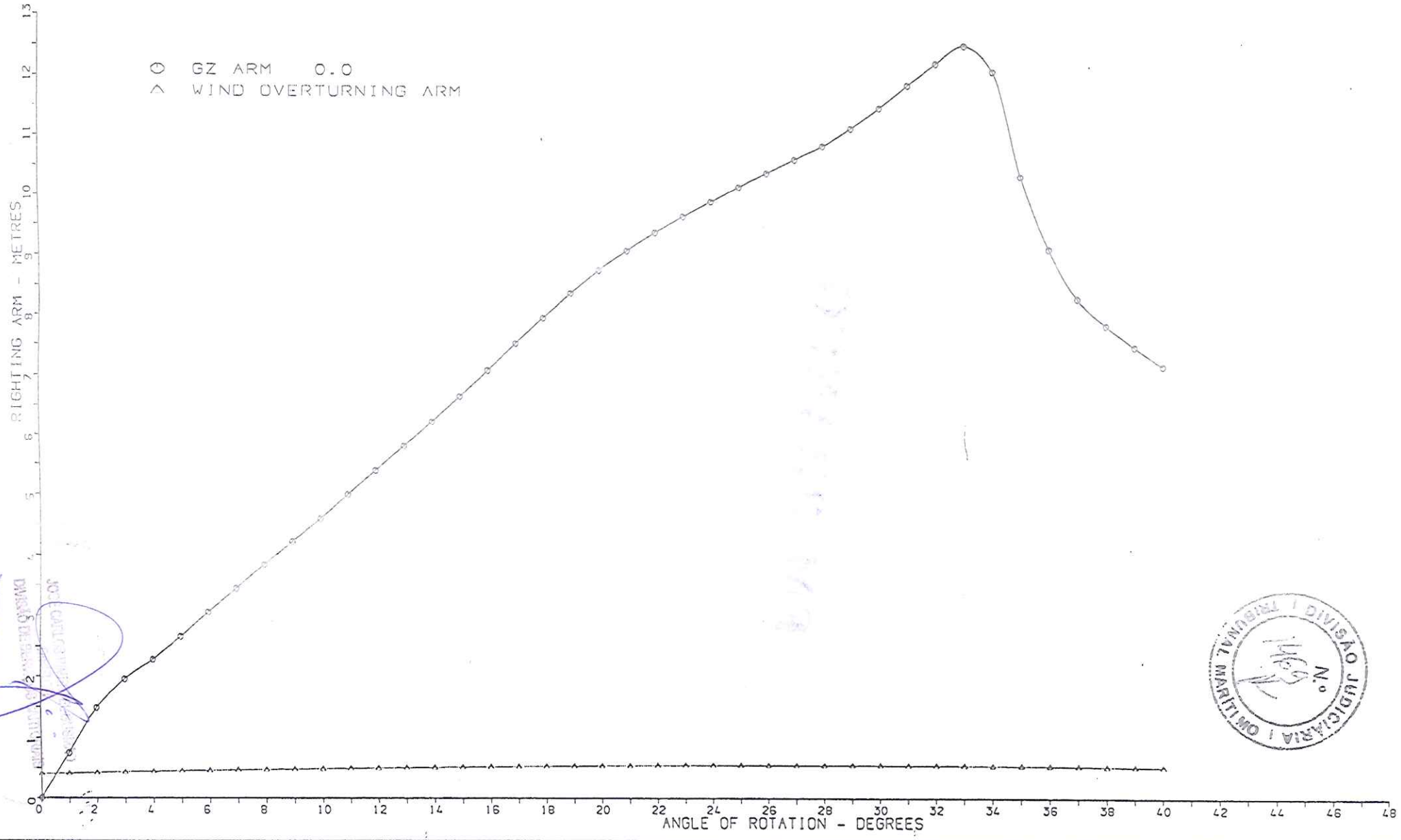
Limiting KG	44.90 m S.W. Bal Tk 18s & C/L 10S
Actual KG	27.08 m
Stability Margin	17.82 m

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Intact	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	i310		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	Area Ratio	δ VCG
0	90	0.0	0.54	99.99	30.37	29.83	22.75	12.85	23.18
10	80	0.0	0.55	99.99	28.43	27.88	22.75	11.81	23.26
20	70	0.0	0.57	99.99	27.69	27.12	22.74	10.72	23.78
30	60	0.0	0.57	99.99	27.39	26.82	22.73	9.92	24.97
40	50	0.0	0.54	99.99	27.14	26.60	22.73	9.63	27.00
50	40	0.0	0.48	99.99	26.73	26.25	22.73	9.99	29.70
60	30	0.0	0.40	99.99	26.16	25.76	22.74	11.12	33.62
70	20	0.0	0.32	99.99	25.55	25.22	22.76	13.13	37.96
80	10	0.0	0.27	99.99	25.22	24.95	22.77	15.83	40.64
90	0	0.0	0.25	99.99	26.34	26.09	22.78	18.25	41.68
270	180	0.0	0.24	99.99	35.94	35.70	22.84	20.31	40.85
280	170	0.0	0.26	99.99	25.19	24.93	22.84	16.33	40.22
290	160	0.0	0.32	99.99	25.35	25.04	22.83	13.57	38.46
300	150	0.0	0.40	99.99	25.94	25.54	22.82	11.50	34.68
310	140	0.0	0.48	99.99	26.55	26.07	22.80	10.32	30.78
320	130	0.0	0.54	99.99	27.00	26.46	22.79	9.94	27.85
330	120	0.0	0.57	99.99	27.29	26.72	22.78	10.19	25.56
340	110	0.0	0.57	99.99	27.70	27.13	22.77	10.95	24.15
350	100	0.0	0.55	99.99	28.74	28.19	22.76	12.02	23.44

Minimum Increase in Allowable VCG = 23.18
Maximum Allowable VCG = 50.26

P-36 STABILITY ANALYSIS REV C JAN 99 - Transit Intact Case T=11.0m
INTACT CASE HEEL AXIS = 0.0



NOBLE DENTON 23.FEB.1999 TIME 16.21.41

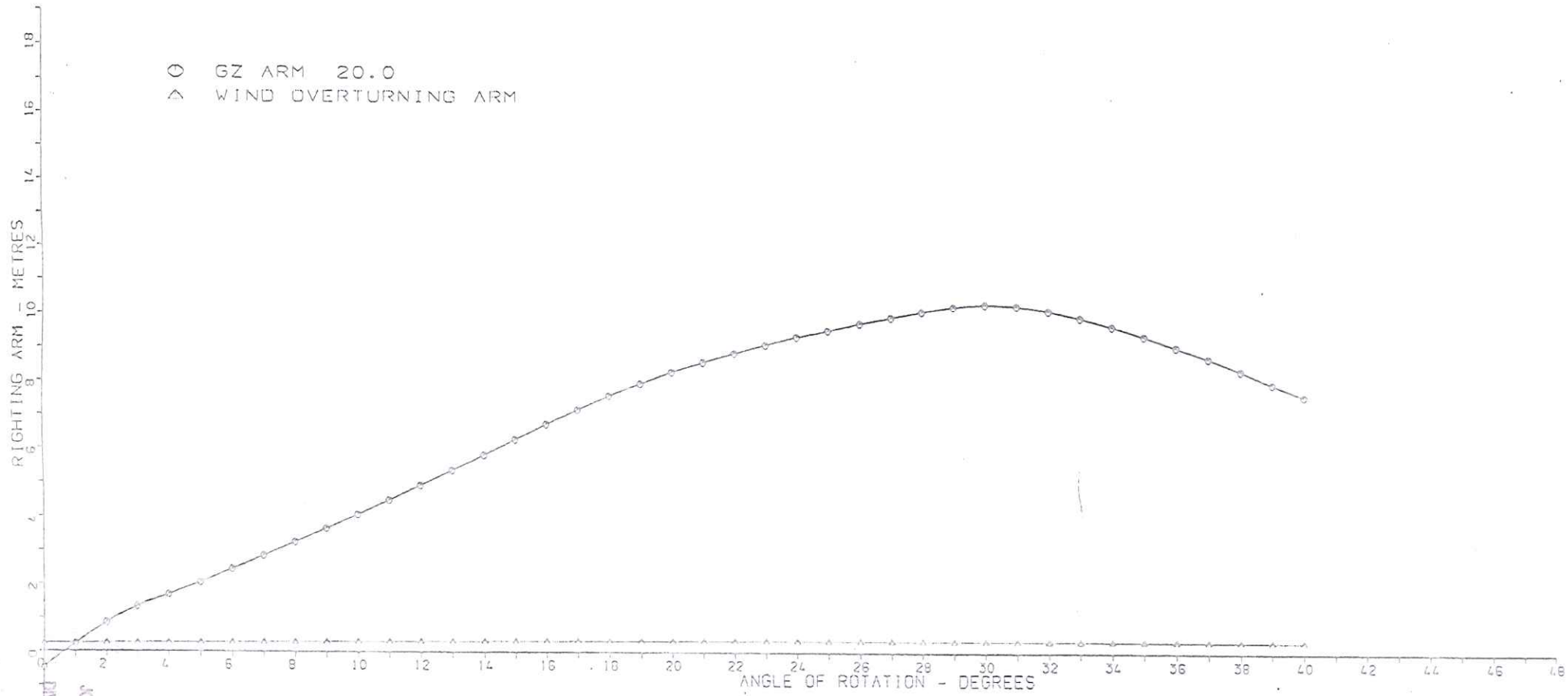
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d320		
Space Damaged	S.W. Bal Tk 1s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	1.14	1.54	99.99	28.81	27.27	22.41	2.00	21.20
10	80	0.00	1.30	99.99	29.40	28.10	22.41	2.00	21.36
20	70	0.00	1.04	99.99	27.79	26.75	22.41	2.00	20.36
30	60	0.00	0.75	99.99	26.80	26.06	22.41	2.00	23.44
40	50	0.00	0.44	99.99	26.19	25.75	22.42	1.00	27.47
50	40	0.00	0.12	99.99	25.94	25.82	22.43	1.00	32.52
60	30	0.00	99.99	99.99	25.69	99.99	99.99	99.99	*
70	20	0.00	99.99	99.99	25.26	99.99	99.99	99.99	*
80	10	0.00	99.99	99.99	25.08	99.99	99.99	99.99	*
90	0	0.00	99.99	99.99	26.30	99.99	99.99	99.99	*
270	180	1.15	1.36	99.99	25.48	24.12	22.47	2.00	30.82
280	170	1.32	1.56	99.99	24.60	23.04	22.46	2.00	29.14
290	160	1.46	1.77	99.99	24.95	23.18	22.45	3.00	27.25
300	150	1.56	1.95	99.99	25.52	23.57	22.44	3.00	25.40
310	140	1.61	2.08	99.99	26.08	24.00	22.42	3.00	23.87
320	130	1.61	2.13	99.99	26.46	24.33	22.41	3.00	22.70
330	120	1.56	2.08	99.99	26.69	24.61	22.41	3.00	21.64
340	110	1.46	1.95	99.99	27.01	25.06	22.41	3.00	21.09
350	100	1.32	1.76	99.99	27.64	25.88	22.41	3.00	21.02

Minimum Increase in Allowable VCG = 20.36
Maximum Allowable VCG = 47.441

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 1S T=11.0m
DAMAGED CASE HEEL AXIS = 20.0



NOBLE DENTON 23.FEB.1999 TIME 16.22.22

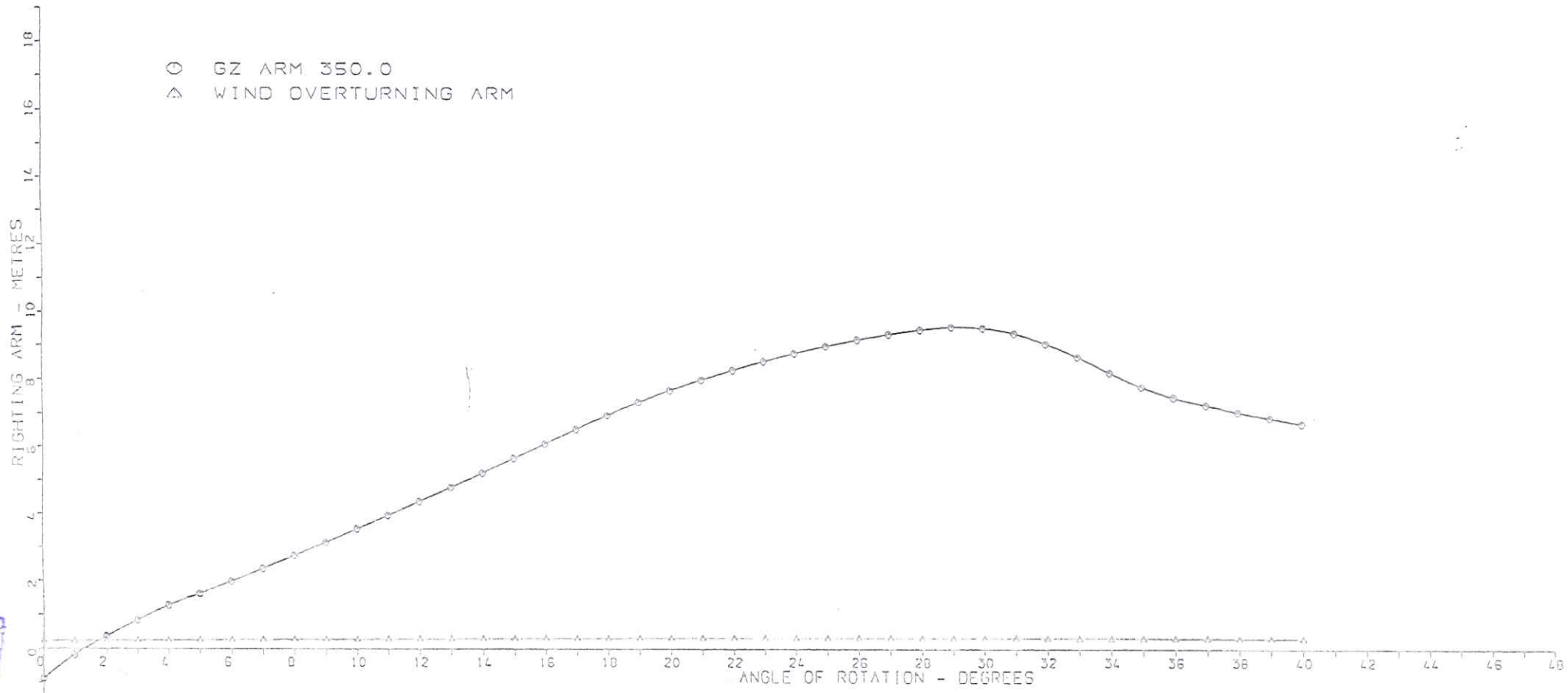
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d321		
Space Damaged	S.W. Bal Tk 4s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	1.21	1.61	99.99	29.32	27.70	22.45	3.00	21.11
10	80	1.05	1.44	99.99	29.16	27.72	22.45	2.00	21.40
20	70	0.00	1.24	99.99	27.75	26.52	22.44	2.00	22.20
30	60	0.00	0.98	99.99	26.93	25.95	22.45	2.00	23.61
40	50	0.00	0.71	99.99	26.39	25.68	22.46	2.00	24.70
50	40	0.00	0.43	99.99	25.97	25.54	22.46	1.00	30.36
60	30	0.00	0.14	99.99	25.30	25.16	22.47	1.00	36.25
70	20	0.00	99.99	99.99	24.60	99.99	99.99	99.99	*
80	10	0.00	99.99	99.99	24.35	99.99	99.99	99.99	*
90	0	0.00	99.99	99.99	25.86	99.99	99.99	99.99	*
270	180	0.00	0.99	99.99	25.07	24.08	22.51	2.00	32.65
280	170	0.00	1.23	99.99	24.41	23.18	22.50	2.00	31.20
290	160	1.16	1.47	99.99	24.84	23.37	22.49	2.00	29.05
300	150	1.31	1.69	99.99	25.51	23.81	22.47	3.00	26.75
310	140	1.41	1.87	99.99	26.13	24.27	22.46	3.00	24.79
320	130	1.47	1.96	99.99	26.57	24.61	22.45	3.00	23.19
330	120	1.47	1.97	99.99	26.84	24.86	22.44	3.00	21.87
340	110	1.42	1.90	99.99	27.23	25.32	22.44	3.00	21.17
350	100	1.34	1.77	99.99	27.96	26.18	22.45	3.00	20.98

Minimum Increase in Allowable VCG = 20.98
Maximum Allowable VCG = 48.061

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 4S T=11.0m
DAMAGED CASE HEEL AXIS = 350.0



NOBLE DENTON 23.FEB.1999 TIME 16.23.11

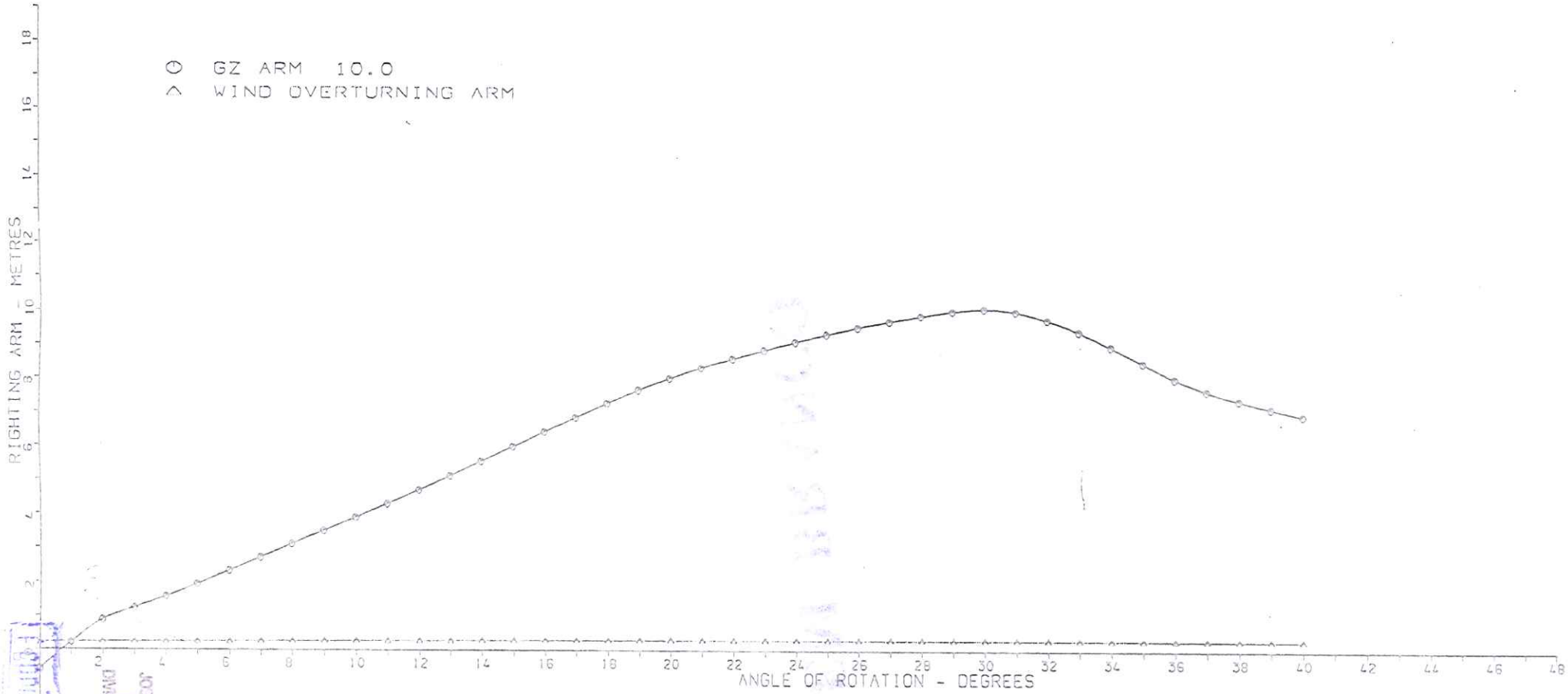
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d322		
Space Damaged	S.W. Bal Tk 13s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	1.02	99.99	29.99	28.97	22.50	2.00	19.11
10	80	0.00	1.03	99.99	28.34	27.32	22.50	2.00	19.08
20	70	0.00	1.01	99.99	27.50	26.49	22.49	2.00	22.28
30	60	0.00	0.96	99.99	27.06	26.10	22.49	2.00	23.53
40	50	0.00	0.88	99.99	26.77	25.89	22.49	2.00	25.61
50	40	0.00	0.76	99.99	26.34	25.57	22.49	2.00	28.08
60	30	0.00	0.63	99.99	25.71	25.08	22.49	1.00	31.36
70	20	0.00	0.49	99.99	25.01	24.53	22.49	1.00	35.44
80	10	0.00	0.34	99.99	24.50	24.16	22.50	1.00	38.68
90	0	0.00	0.19	99.99	24.94	24.75	22.51	1.00	40.93
270	180	0.00	0.09	99.99	25.52	25.43	22.54	1.00	41.65
280	170	0.00	0.24	99.99	24.44	24.20	22.54	1.00	39.89
290	160	0.00	0.40	99.99	24.79	24.38	22.53	1.00	37.30
300	150	0.00	0.55	99.99	25.46	24.91	22.53	1.00	33.79
310	140	0.00	0.69	99.99	26.13	25.44	22.53	1.00	29.94
320	130	0.00	0.82	99.99	26.59	25.77	22.52	2.00	26.84
330	120	0.00	0.92	99.99	26.96	26.04	22.51	2.00	24.38
340	110	0.00	0.98	99.99	27.57	26.60	22.51	2.00	20.70
350	100	0.00	1.01	99.99	28.77	27.76	22.50	2.00	19.61

Minimum Increase in Allowable VCG = 19.08
Maximum Allowable VCG = 46.161

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 13s T=11.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 16.23.48

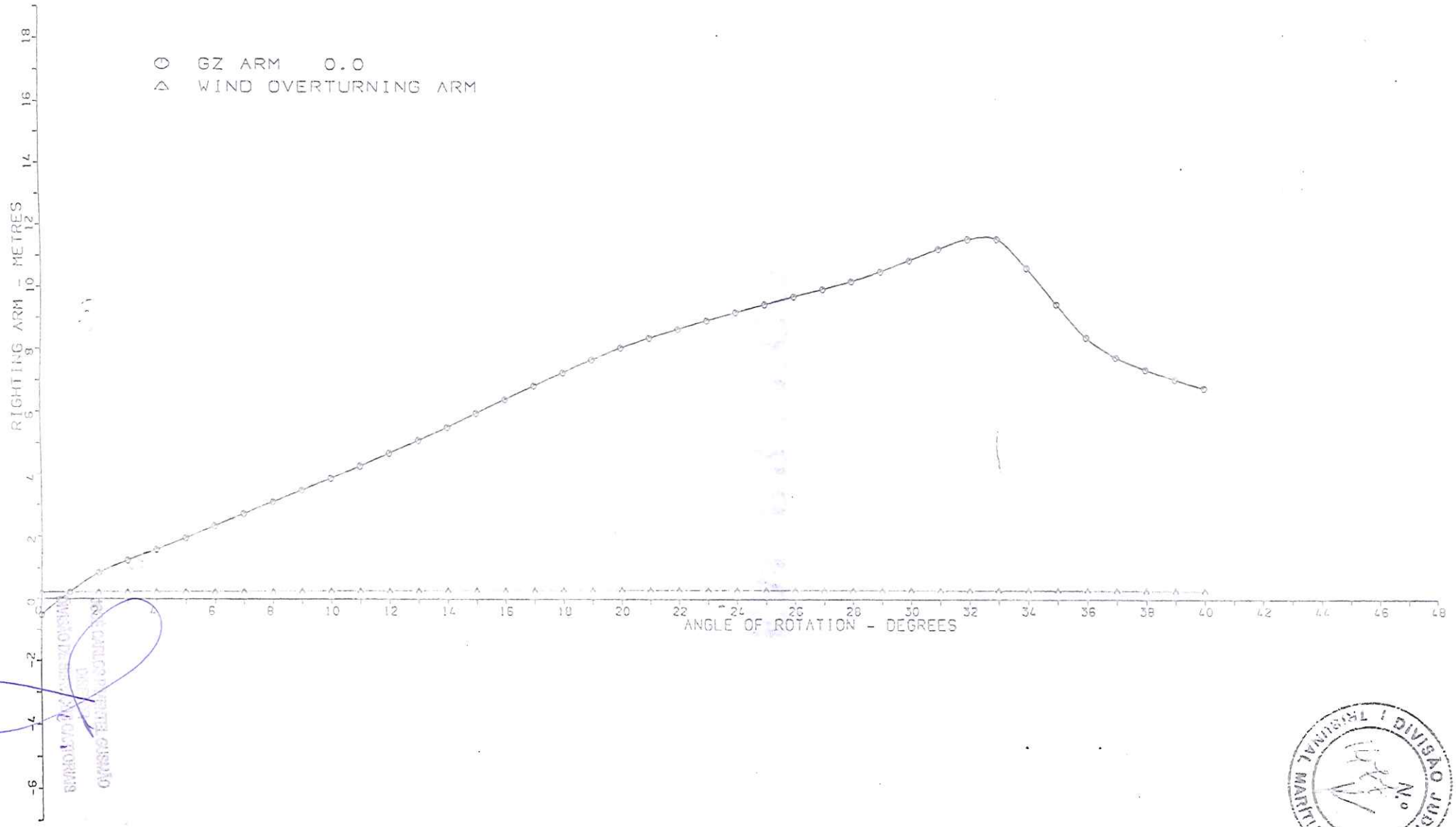
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d323		
Space Damaged	S.W. Bal Tk 18s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	1.00	99.99	29.47	28.47	22.50	2.00	19.32
10	80	0.00	1.06	99.99	28.09	27.02	22.50	2.00	21.64
20	70	0.00	1.11	99.99	27.42	26.32	22.49	2.00	22.02
30	60	0.00	1.11	99.99	27.10	25.99	22.48	2.00	23.08
40	50	0.00	1.05	99.99	26.85	25.79	22.48	2.00	24.98
50	40	0.00	0.95	99.99	26.44	25.49	22.49	2.00	27.05
60	30	0.00	0.84	99.99	25.83	24.99	22.50	2.00	29.70
70	20	0.00	0.72	99.99	25.15	24.43	22.50	1.00	32.58
80	10	0.00	0.59	99.99	24.62	24.03	22.50	1.00	35.85
90	0	0.00	0.45	99.99	25.01	24.56	22.51	1.00	37.85
270	180	0.00	99.99	99.99	26.03	99.99	99.99	99.99	*
280	170	0.00	99.99	99.99	24.39	99.99	99.99	99.99	*
290	160	0.00	0.14	99.99	24.73	24.58	22.54	1.00	40.52
300	150	0.00	0.31	99.99	25.43	25.12	22.54	1.00	36.38
310	140	0.00	0.48	99.99	26.12	25.64	22.53	1.00	31.87
320	130	0.00	0.64	99.99	26.58	25.94	22.52	1.00	27.62
330	120	0.00	0.77	99.99	26.99	26.22	22.51	2.00	24.15
340	110	0.00	0.87	99.99	27.71	26.84	22.51	2.00	21.70
350	100	0.00	0.94	99.99	29.11	28.17	22.51	2.00	20.19

Minimum Increase in Allowable VCG = 19.32
Maximum Allowable VCG = 46.401

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 18s T=11.0m
DAMAGED CASE HEEL AXIS = 0.0



NOBLE DENTON 23.FEB.1999 TIME 16.24.43

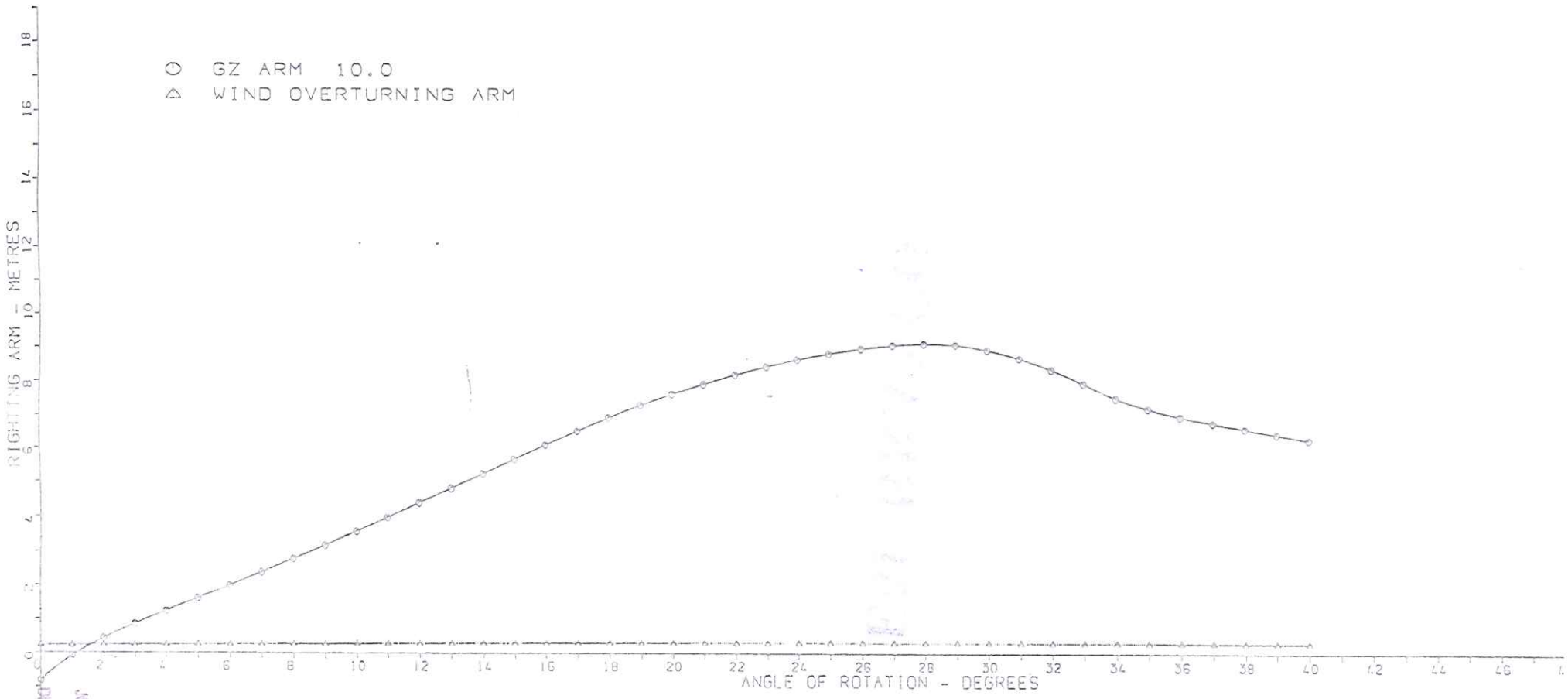
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d324		
Space Damaged	S.W. Bal Tk 20s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	1.06	1.48	99.99	28.88	27.39	22.29	2.00	21.03
10	80	1.17	1.62	99.99	27.77	26.15	22.27	3.00	20.92
20	70	1.25	1.73	99.99	27.24	25.51	22.26	3.00	20.99
30	60	1.28	1.78	99.99	26.96	25.17	22.25	3.00	21.59
40	50	1.27	1.76	99.99	26.74	24.97	22.24	3.00	22.81
50	40	1.20	1.67	99.99	26.35	24.68	22.24	3.00	24.33
60	30	1.09	1.49	99.99	25.75	24.27	22.26	2.00	26.35
70	20	0.00	1.25	99.99	25.05	23.30	22.29	2.00	29.00
80	10	0.00	1.01	99.99	24.46	23.45	22.33	2.00	31.91
90	0	0.00	0.83	99.99	24.63	23.79	22.32	1.00	33.76
270	180	0.00	99.99	99.99	30.27	99.99	99.99	99.99	*
280	170	0.00	99.99	99.99	24.41	99.99	99.99	99.99	*
290	160	0.00	99.99	99.99	24.48	99.99	99.99	99.99	*
300	150	0.00	0.21	99.99	25.17	24.96	22.38	1.00	37.25
310	140	0.00	0.46	99.99	25.86	25.41	22.37	1.00	31.57
320	130	0.00	0.70	99.99	26.27	25.57	22.35	2.00	25.78
330	120	0.00	0.93	99.99	26.85	25.92	22.34	2.00	24.27
340	110	0.00	1.15	99.99	27.81	26.66	22.32	2.00	22.40
350	100	0.00	1.32	99.99	29.50	28.17	22.30	2.00	21.74

Minimum Increase in Allowable VCG = 20.92
Maximum Allowable VCG = 48.001

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 20s T=11.0m
DAMAGED CASE HEEL AXIS = 10.0



NOBLE DENTON 23.FEB.1999 TIME 16.25.34

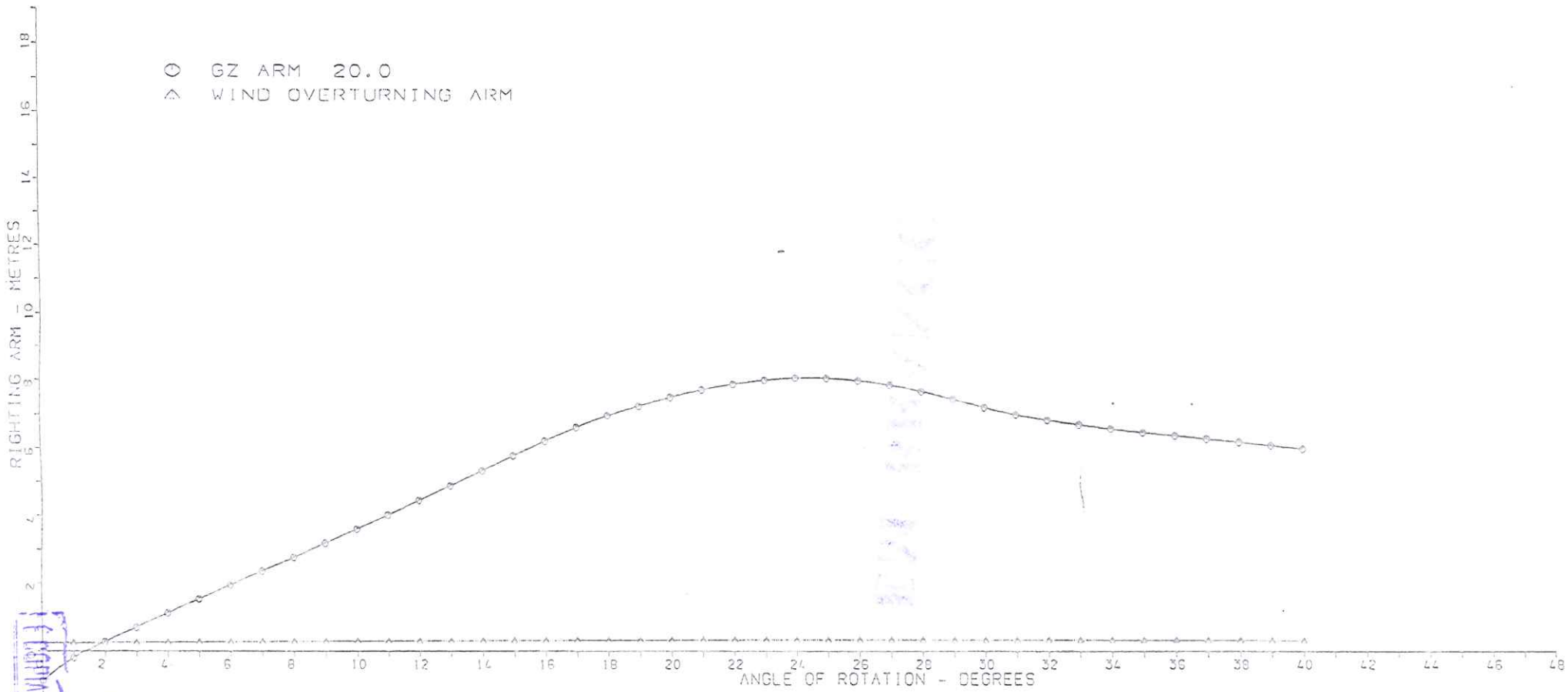
NOBLE DENTON

Title	Stability Analysis Results	W/S No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d325		
Space Damaged	S.W. Bal Tk 21s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	1.09	1.55	99.99	28.34	26.79	22.10	3.00	21.13
10	80	1.27	1.76	99.99	27.42	25.66	22.09	3.00	20.70
20	70	1.40	1.94	99.99	26.98	25.05	22.08	3.00	20.61
30	60	1.48	2.05	99.99	26.76	24.71	22.06	3.00	21.02
40	50	1.52	2.08	99.99	26.60	24.52	22.06	3.00	21.86
50	40	1.51	2.01	99.99	26.28	24.27	22.07	3.00	22.90
60	30	1.46	1.87	99.99	25.75	23.88	22.09	3.00	24.48
70	20	1.36	1.68	99.99	25.12	23.44	22.11	3.00	26.58
80	10	1.21	1.46	99.99	24.59	23.13	22.13	2.00	28.91
90	0	1.02	1.23	99.99	24.85	23.62	22.15	2.00	30.63
270	180	0.00	99.99	99.99	35.84	99.99	99.99	99.99	*
280	170	0.00	99.99	99.99	25.07	99.99	99.99	99.99	*
290	160	0.00	99.99	99.99	25.06	99.99	99.99	99.99	*
300	150	0.00	99.99	99.99	25.44	99.99	99.99	99.99	*
310	140	0.00	0.17	99.99	25.70	25.52	22.20	1.00	33.35
320	130	0.00	0.48	99.99	26.00	25.51	22.17	1.00	28.06
330	120	0.00	0.79	99.99	26.69	25.90	22.15	2.00	24.92
340	110	0.00	1.05	99.99	27.88	26.82	22.14	2.00	22.74
350	100	0.00	1.31	99.99	29.87	28.56	22.12	2.00	21.86

Minimum Increase in Allowable VCG = 20.61
Maximum Allowable VCG = 47.691

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 21s T=11.0m
DAMAGED CASE HEEL AXIS = 20.0



NOBLE DENTON 23.FEB.1999 TIME 16.27.07

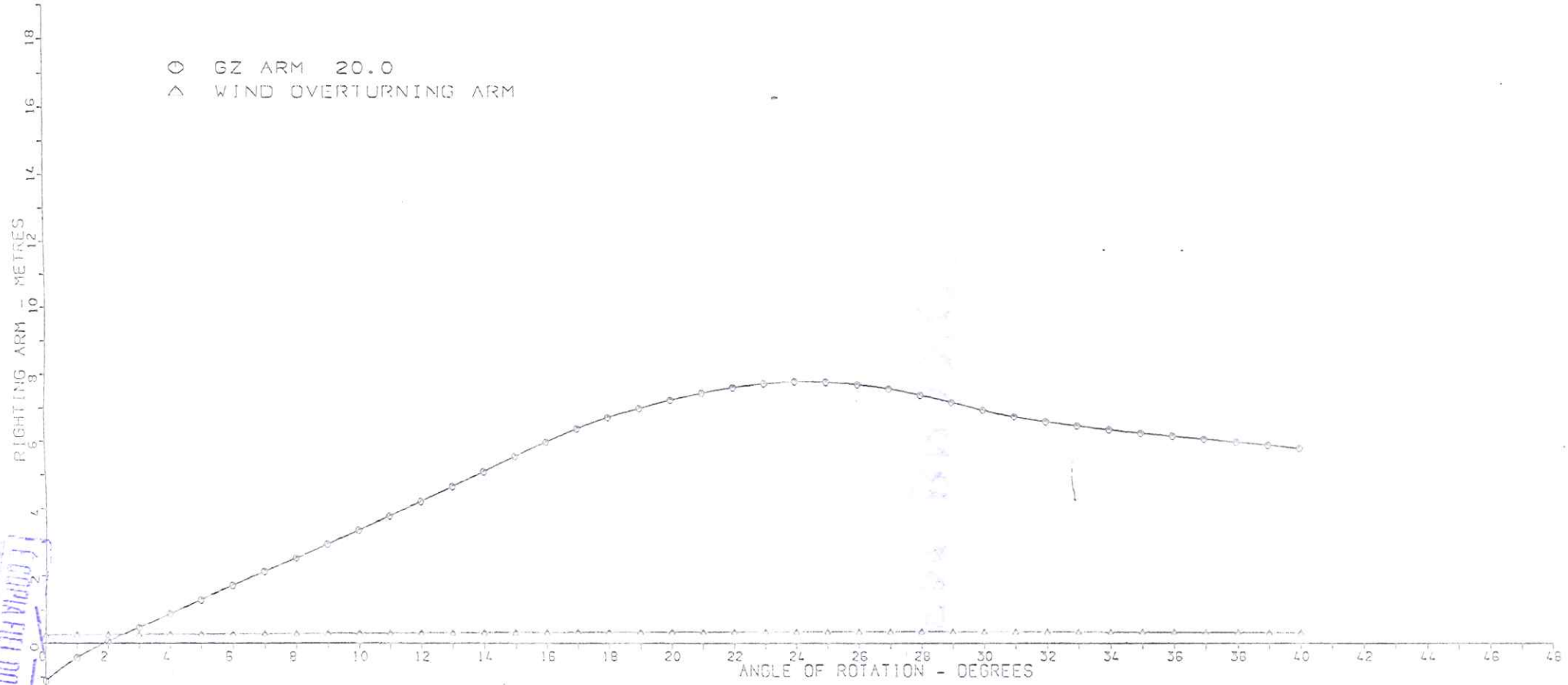
NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d326		
Space Damaged	S.W. Bal Tk 22s		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	1.57	2.04	99.99	28.21	26.17	21.96	3.00	20.56
10	80	1.76	2.29	99.99	27.36	25.07	21.94	3.00	20.03
20	70	1.90	2.49	99.99	26.96	24.47	21.92	4.00	19.85
30	60	1.97	2.62	99.99	26.76	24.14	21.90	4.00	20.14
40	50	1.99	2.63	99.99	26.59	23.97	21.90	4.00	20.85
50	40	1.96	2.52	99.99	26.26	23.74	21.91	4.00	21.83
60	30	1.87	2.32	99.99	25.71	23.39	21.93	3.00	23.34
70	20	1.72	2.06	99.99	25.03	22.97	21.97	3.00	25.46
80	10	1.50	1.76	99.99	24.42	22.66	21.99	3.00	27.93
90	0	1.25	1.45	99.99	24.48	23.02	22.02	2.00	30.01
270	180	0.00	99.99	99.99	35.91	99.99	99.99	99.99	*
280	170	0.00	99.99	99.99	24.92	99.99	99.99	99.99	*
290	160	0.00	99.99	99.99	24.71	99.99	99.99	99.99	*
300	150	0.00	99.99	99.99	25.05	99.99	99.99	99.99	*
310	140	0.00	0.32	99.99	25.46	25.14	22.06	1.00	32.33
320	130	0.00	0.71	99.99	25.90	25.18	22.02	2.00	27.30
330	120	0.00	1.10	99.99	26.66	25.56	22.00	2.00	24.12
340	110	1.03	1.46	99.99	27.94	26.48	21.98	2.00	22.56
350	100	1.32	1.77	99.99	29.95	28.18	21.97	3.00	21.36

Minimum Increase in Allowable VCG = 19.85
Maximum Allowable VCG = 46.931

P-36 STABILITY ANALYSIS REV C JAN 99 - Damage to SW Tk 22s T=11.0m
DAMAGED CASE HEEL AXIS = 20.0



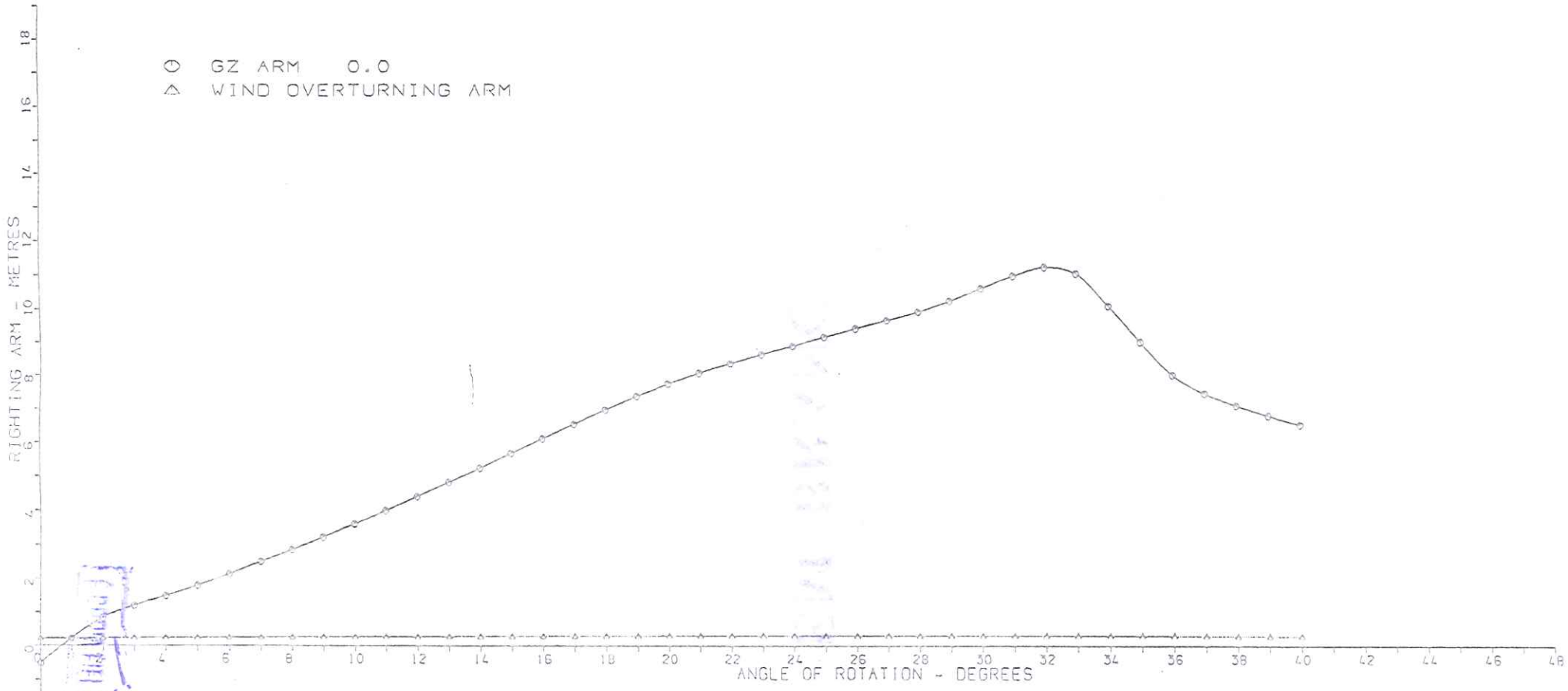
NOBLE DENTON 23.FEB.1999 TIME 16.27.52 NOBLE DENTON

Title	Stability Analysis Results	WS No	7/15/2177
Condition	Transit Condition - Damaged	Project	P36 Roncador
Draft	11.00 m	Client	Petromec
Displacement	37083 mT	Date	18-Jan-1999
LCG (from FP)	57.18 m	By	MSE
TCG (+ve stbd)	0.02 m	Checked	
VCG (abl)	27.08 m		
Genstab Run ID	d327		
Space Damaged	S.W. Bal Tk 18s & C/L 10S		

Heel Axis	Wind Heading	Angle of Loll	Angle of Static Wind Heel	Angle of 2nd Int	DF Angle	Range of Stability	Min DF Clearance	IMO Damaged Ratio	δ VCG
0	90	0.00	1.00	99.99	29.17	28.16	22.50	2.00	17.82
10	80	0.00	1.07	99.99	27.94	26.88	22.49	2.00	21.04
20	70	0.00	1.11	99.99	27.32	26.21	22.48	2.00	21.21
30	60	0.00	1.12	99.99	26.98	25.87	22.48	2.00	21.94
40	50	0.00	1.06	99.99	26.73	25.68	22.48	2.00	23.33
50	40	0.00	0.95	99.99	26.32	25.37	22.49	2.00	25.09
60	30	0.00	0.84	99.99	25.71	24.87	22.50	2.00	27.44
70	20	0.00	0.72	99.99	24.99	24.28	22.50	1.00	30.33
80	10	0.00	0.59	99.99	24.40	23.81	22.50	1.00	33.73
90	0	0.00	0.45	99.99	24.59	24.14	22.51	1.00	35.84
270	180	0.00	99.99	99.99	26.03	99.99	99.99	99.99	*
280	170	0.00	99.99	99.99	24.34	99.99	99.99	99.99	*
290	160	0.00	0.14	99.99	24.62	24.48	22.54	1.00	40.51
300	150	0.00	0.31	99.99	25.29	24.97	22.54	1.00	36.23
310	140	0.00	0.48	99.99	25.92	25.44	22.53	1.00	31.21
320	130	0.00	0.64	99.99	26.34	25.70	22.52	1.00	26.49
330	120	0.00	0.77	99.99	26.87	26.10	22.51	2.00	22.99
340	110	0.00	0.87	99.99	27.73	26.86	22.51	2.00	20.47
350	100	0.00	0.94	99.99	29.26	28.32	22.51	2.00	18.82

Minimum Increase in Allowable VCG = 17.82
Maximum Allowable VCG = 44.901

P-36 STABILITY ANALYSIS REV C SEP 98 - Damage SW Tk 18s & F/L Box
DAMAGED CASE HEEL AXIS = 0.0



NOBLE DENTON 23.FEB.1999 TIME 16.28.37

NOBLE DENTON

Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Loading Condition:

NOBLE DENTON

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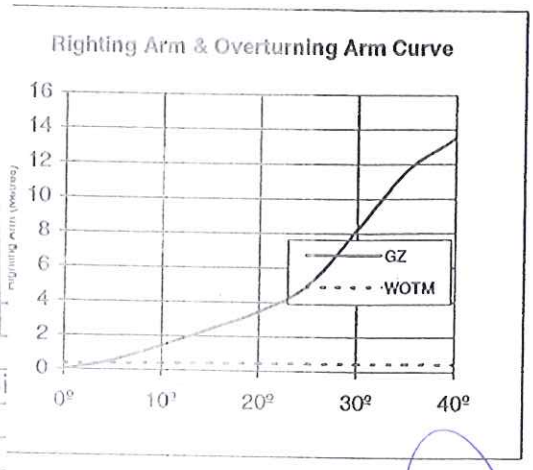
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	W to	TCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99%		-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99%		0.0	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	74%		0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	69%		1.7	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	80%		-3.6	39.1	0.001	0.000
SW Ballast 3S	728.7	1.025	85%		-1.6	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	99%		-6.1	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	99%		-9.0	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	1%		1.4	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1%		-0.6	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	99%		8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	99%		5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99%		0.0	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	99%		0.0	0.0	-	-
SW Ballast 11P	644.7	1.025	99%		0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99%		0.0	0.0	-	-
SW Ballast 13P	644.7	1.025	99%		0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99%		0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1%		0.47	5.19	0.036	0.146
SW Ballast 16S	249.7	1.025	1%		-0.02	21.21	0.039	0.147
SW Ballast 17P	523.9	1.025	96%					
SW Ballast 17S	523.9	1.025	99%					
SW Ballast 18P	555.2	1.025	99%					
SW Ballast 18S	555.2	1.025	99%					
SW Ballast 19P	728.8	1.025	99%					
SW Ballast 19S	728.8	1.025	99%					
SW Ballast 20P	768.2	1.025	99%					
SW Ballast 20S	768.2	1.025	99%					
SW Ballast 21P	963.7	1.025	13%					
SW Ballast 21S	963.7	1.025	44%					
SW Ballast 22P	1067.3	1.025	1%					
SW Ballast 22S	1067.3	1.025	1%					
SW Ballast 23P	665.6	1.025	1%					
SW Ballast 23S	665.6	1.025	1%					
SW Ballast 24P	980.8	1.025	1%					
SW Ballast 24S	980.8	1.025	1%					
SW Ballast 25P	665.6	1.025	1%					
SW Ballast 25S	665.6	1.025	1%					
SW Ballast 26P	980.8	1.025	1%					
SW Ballast 26S	980.8	1.025	1%					
SW Ballast Total								

atical Stability

rrected VCG =	21.25 m	21.36 m
IT / KML =	27.60 m	28.10 m
IT / GML =	6.35 m	6.74 m

ability Margin

owable VCG =	25.23 m
ability Margin =	3.87 m



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Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Loading Condition: Transiition from Transit Draft (11.0m) to M

NOBLE DENTON

r Tanks	ID	%	Density	Weight	LCG
D r Tanks	8p	0%	1.000	0.0	40.2
Drill Water Tanks	8S	0%	1.000	0.0	40.2
Drill Water Tanks	9P	0%	1.000	0.0	40.5
Drill Water Tanks	9S	0%	1.000	0.0	40.5
Drill Water Tanks	14P	0%	1.000	0.0	72.3
Drill Water Tanks	14S	0%	1.000	0.0	72.3
Drill Water Tanks	15P	0%	1.000	0.0	72.3
Drill Water Tanks	15S	0%	1.000	0.0	72.3
Drill Water Tanks (Process FW)	0			0.0	0.00

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.5
Pot Water Tk	1S	100%	1.000	193.8	84.5
Pot Water Day Tk	0	100%	1.000	15.2	78.8
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	0%	0.960	0.0	51.05
FO Tank	10S	0%	0.960	0.0	51.05
FO Tank	12P	0%	0.960	0.0	61.72
FO Tank	12S	0%	0.960	0.0	61.72
FO Overflow	P	50%	0.960	8.2	78.94
FO Overflow	S	50%	0.960	7.6	78.87
Fuel Oil	0			15.8	78.91

	ID	%	Density	Weight	LCG
	N1P	0%	0.870	0.0	67.61
G ge	N1S	0%	0.870	0.0	78.58
DO Settle	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DO Day Tk	N3S	100%	0.870	73.5	82.01
DOSettl	N4S	100%	0.870	73.5	79.15
DO Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			374.0	76.13

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	10%	1.000	1.9	80.72
Waste Oil	N1S	10%	1.000	1.9	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
WI Room LO Storage	T65110	100%	0.900	0.8	35.87
WI Room LO Storage	T65111	100%	0.900	0.8	35.87
Turbine Lube Oil Consule 'C'	UQ-122308	0%	0.900	0.0	89.67
Turbine Lube Oil Consule 'B'	UQ-122306	0%	0.900	0.0	89.68
Turbine Lube Oil Consule 'A'	UQ-122304	0%	0.900	0.0	89.71
Lub Oils	0			7.9	65.81

ellaneous Tanks	ID	%	Density	Weight	LCG
j Tank	P	10%	1.000	0.5	78.49
g Tank	S	10%	1.000	0.5	78.49
g Drain Tank	P	0%	1.000	0.0	77.13
ng Drain Tank	S	0%	1.000	0.0	77.13
Deaerator Tower (Port)	C-51001	0%	1.000	0.0	85.03
Deaerator Tower (Starb)	C-52001	0%	1.000	0.0	85.03
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Aft Column Separator Tank	N1P	0%	1.000	0.0	79.72
Aft Column Separator Tank	N1S	0%	1.000	0.0	79.72
Miscellaneous Tanks	0			2.1	66.77

Non Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00
Helifuel Refuel	A58001	100%	1.000	7.9	34.55
Helifuel Disp	A58002	100%	1.000	0.1	25.91
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Glycol Sump Tank	TQ-123301	0%	1.030	0.0	55.23
Tank Top Sump Tank	V-533605	0%	1.000	0.0	76.22
Non Structural Tanks	0			12.1	45.58

	ID	Chain	Weight	LCG	TCG	VCG
Port Aft (Winch 2)	1aP	450	85.3	87.52	-30.50	4.60
Port Aft (Winch 4)	1bP	450	85.3	91.65	-30.50	4.60
Port Aft (Winch 3)	5P	450	85.3	86.47	-31.12	16.19
Port Aft (Winch 1)	9P	450	85.3	91.05	-33.48	13.72
Port Fwd (Winch 5)	2aP	450	85.3	31.13	-30.50	4.60
Port Fwd (Winch 7)	2bP	450	85.3	25.26	-30.50	4.60
Port Fwd (Winch 6)	6P	450	85.3	26.31	-31.12	16.19
Port Fwd (Winch 8)	10P	450	85.3	21.73	-33.48	13.72
Stbd Aft (Winch 13)	4aS	450	85.3	81.65	30.50	4.60
Stbd Aft (Winch 15)	4bS	450	85.3	87.52	30.50	4.60
Stbd Aft (Winch 14)	8S	450	85.3	86.47	31.12	16.19
Stbd Aft (Winch 16)	12S	450	85.3	91.05	33.48	13.72
Stbd Fwd (Winch 10)	3aS	450	85.3	25.26	30.50	4.60
Stbd Fwd (Winch 12)	3bS	450	85.3	31.13	30.50	4.60
Stbd Fwd (Winch 11)	7S	450	85.3	26.31	31.12	16.19
Stbd Fwd (Winch 9)	11S	450	85.3	21.73	33.48	13.72
	0	7200	1364.6	56.39	0.00	9.78

q Forces	ID	Tension	Weight	LCG	TCG	VCG
/inch 9)	S1	0	0.0	24.63	38.00	18.29
/inch 10)	S2	0	0.0	28.19	38.00	18.29
/inch 11)	S3	0	0.0	31.75	38.00	18.29
/inch 12)	S4	0	0.0	35.31	38.00	18.29
/inch 13)	S5	0	0.0	81.02	38.00	18.29
/inch 14)	S6	0	0.0	84.58	38.00	18.29
/inch 15)	S7	0	0.0	88.14	38.00	18.29
/inch 16)	S8	0	0.0	91.70	38.00	18.29
/inch 8)	P1	0	0.0	24.63	-38.00	18.29
/inch 7)	P2	0	0.0	28.19	-38.00	18.29
/inch 6)	P3	0	0.0	31.75	-38.00	18.29
/inch 5)	P4	0	0.0	35.31	-38.00	18.29
/inch 4)	P5	0	0.0	81.02	-38.00	18.29
/inch 3)	P6	0	0.0	84.58	-38.00	18.29
/inch 2)	P7	0	0.0	88.14	-38.00	18.29
/inch 1)	P8	0	0.0	91.70	-38.00	18.29
Forces	0		0.0	0.00	0.00	0.00

@TT	ID	%	Weight	LCG	TCG	VCG
	TT-01	10%	0.8	63.51	9.85	37.88
d	TT-02	10%	0.8	49.26	9.85	37.88
	TT-03	10%	4.2	88.40	-31.10	37.88
	TT-04	10%	3.1	81.40	-32.18	37.88
)	TT-05	10%	10.0	85.97	-23.86	37.58
ehouse	TT-06	10%	5.1	88.61	24.15	37.58
ehouse	TT-07	10%	5.2	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
hop	TT-10	10%	3.3	75.27	-8.16	37.78
	TT-11	10%	4.4	75.27	-1.02	37.78
hop	TT-12	10%	3.1	75.37	4.83	37.68
Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
ard Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
Workshop	TT-15	10%	6.1	73.19	23.30	37.58
@TT	0		55.8	78.24	1.41	37.70

@ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	5%	1.4	65.89	8.51	43.87
	MD-02	5%	1.4	48.89	8.51	43.87
nt Storage	MD-03	10%	4.6	48.89	8.51	43.87
@ MD	0		7.4	52.10	8.51	43.87

ydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
own	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
Laydown	LD-04	50%	29.6	95.42	0.43	43.00
Laydown	LD-05	50%	28.3	95.44	15.43	43.00
Laydown	LD-06	50%	31.9	95.44	30.80	43.00
own	LD-07	0%	0.0	73.34	-5.46	43.00
own	LD-08	0%	0.0	73.34	9.54	43.00
own	LD-09	0%	0.0	73.34	24.54	43.00
ydown	LD-10	0%	0.0	106.05	-19.00	36.58
ort	LD-11	60%	127.2	30.37	1.29	43.00
/down Areas	0		298.7	52.07	5.21	43.00

Items	ID		Weight	LCG	TCG	VCG
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
			0.0	0.00	0.00	0.00

Units are as follows: Weight - metric tonnes, density - metric tonnes per cubic me

NOBLE DENTON

Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	VCG m	FSC$_T$ m	FSC$_L$ m
SW Ballast 1P	886.7	1.025	99	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	1	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	1	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	1	39.1	0.001	0.000
SW Ballast 3S	728.7	1.025	1	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	32	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	90	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	1	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	1	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	1	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	99	0.0	-	-
SW Ballast 11P	644.7	1.025	99	9.8	-	-
SW Ballast 11S	644.7	1.025	99	0.0	-	-
SW Ballast 13P	644.7	1.025	99	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99	0.0	-	-
SW Ballast 16P	249.7	1.025	1	5.08	0.009	0.108
SW Ballast 16S	249.7	1.025	1			
SW Ballast 17P	523.9	1.025	1	24.43	0.012	0.109
SW Ballast 17S	523.9	1.025	1			
SW Ballast 18P	555.2	1.025	99			
SW Ballast 18S	555.2	1.025	99			
SW Ballast 19P	728.8	1.025	1			
SW Ballast 19S	728.8	1.025	1			
SW Ballast 20P	768.2	1.025	33			
SW Ballast 20S	768.2	1.025	2			
SW Ballast 21P	963.7	1.025	1			
SW Ballast 21S	963.7	1.025	1			
SW Ballast 22P	1067.3	1.025	1			
SW Ballast 22S	1067.3	1.025	1			
SW Ballast 23P	665.6	1.025	1			
SW Ballast 23S	665.6	1.025	1			
SW Ballast 24P	980.8	1.025	1			
SW Ballast 24S	980.8	1.025	1			
SW Ballast 25P	665.6	1.025	1			
SW Ballast 25S	665.6	1.025	1			
SW Ballast 26P	980.8	1.025	1			
SW Ballast 26S	980.8	1.025	1			
SW Ballast Total						

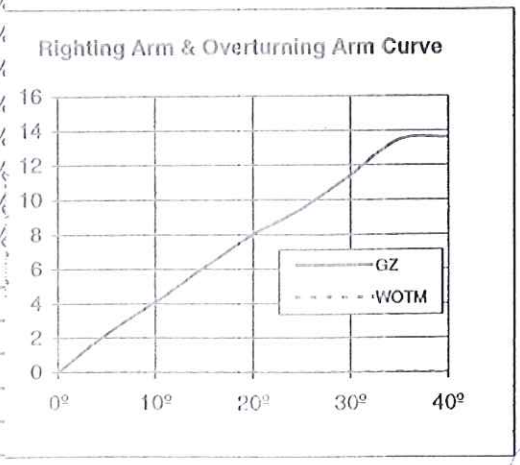
CG
rom CL

tical Stability

rected VCG =	24.44 m	24.54 m
T / KML =	28.80 m	34.30 m
T / GML =	4.36 m	9.76 m

bility Margin

wable VCG =	28.50 m
bility Margin =	3.96 m



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NOBLE DENTON

anks	ID	%	Density	Weight	LCG
D. ater Tanks	8p	0%	1.000	0.0	40.2Port Aft (Winch 2)
Drill Water Tanks	8S	0%	1.000	0.0	40.2Port Aft (Winch 4)
Drill Water Tanks	9P	0%	1.000	0.0	40.5Port Aft (Winch 3)
Drill Water Tanks	9S	0%	1.000	0.0	40.5Port Aft (Winch 1)
Drill Water Tanks	14P	0%	1.000	0.0	72.3Port Fwd (Winch 5)
Drill Water Tanks	14S	0%	1.000	0.0	72.3Port Fwd (Winch 7)
Drill Water Tanks	15P	0%	1.000	0.0	72.3Port Fwd (Winch 6)
Drill Water Tanks	15S	0%	1.000	0.0	72.3Port Fwd (Winch 8)
					Stbd Aft (Winch 13)
Drill Water Tanks (Process FW)	0			0.0	0.00Stbd Aft (Winch 15)
					Stbd Aft (Winch 14)
					Stbd Aft (Winch 16)
Potable Water	ID	%	Density	Weight	LCGStbd Fwd (Winch 10)
Pot Water Tk	1P	100%	1.000	193.8	84.58Stbd Fwd (Winch 12)
Pot Water Tk	1S	100%	1.000	193.8	84.58Stbd Fwd (Winch 11)
Pot Water Day Tk	0	100%	1.000	15.2	78.88Stbd Fwd (Winch 9)
Potable Water	0			402.7	84.36
Fuel Oil	ID	%	Density	Weight	LCGig Forces
FO Tank	10P	0%	0.960	0.0	51.05/inch 9)
FO Tank	10S	0%	0.960	0.0	51.05/inch 10)
FO Tank	12P	0%	0.960	0.0	61.72/inch 11)
FO Tank	12S	0%	0.960	0.0	61.72/inch 12)
FO Overflow	P	50%	0.960	8.2	78.94/inch 13)
FO Overflow	S	50%	0.960	7.6	78.87/inch 14)
					/inch 15)
Fuel Oil	0			15.8	78.91/inch 16)
					/inch 8)
	ID	%	Density	Weight	LCG/inch 7)
	N1P	0%	0.870	0.0	67.61/inch 6)
D. ..udge	N1S	0%	0.870	0.0	78.58/inch 5)
DO Settle	N1P	100%	0.870	105.3	74.52/inch 4)
DO Day Tk	N2P	100%	0.870	110.6	74.60/inch 3)
DO Day Tk	N3S	100%	0.870	73.5	82.01/inch 2)
DOSettl	N4S	100%	0.870	73.5	79.15/inch 1)
DO Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			374.0	76.13 Forces
Lub Oils	ID	%	Density	Weight	LCG @TT
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85d
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	10%	1.000	1.9	80.72
Waste Oil	N1S	10%	1.000	1.9	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47ehouse
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17ehouse
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04hop
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
WI Room LO Storage	T65110	100%	0.900	0.8	35.87hop
WI Room LO Storage	T65111	100%	0.900	0.8	35.87 Laydown Area
Turbine Lube Oil Consule 'C'	UQ-122308	0%	0.900	0.0	89.67ard Laydown Area
Turbine Lube Oil Consule 'B'	UQ-122306	0%	0.900	0.0	89.68 Workshop
Turbine Lube Oil Consule 'A'	UQ-122304	0%	0.900	0.0	89.71
Lub Oils	0			7.9	65.81 @TT
..lla s Tanks	ID	%	Density	Weight	LCG @ MD
..) fank	P	10%	1.000	0.5	78.49
B. ..oking Tank	S	10%	1.000	0.5	78.49
..ng Drain Tank	P	0%	1.000	0.0	77.13nt Storage
W... ring Drain Tank	S	0%	1.000	0.0	77.13
Deaerator Tower (Port)	C-51001	0%	1.000	0.0	85.08 @ MD
Deaerator Tower (Starb)	C-52001	0%	1.000	0.0	85.08
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39aydown Areas
Aft Column Separator Tank	N1P	0%	1.000	0.0	79.72
Aft Column Separator Tank	N1S	0%	1.000	0.0	79.72own
Miscellaneous Tanks	0			2.1	66.77
Non Structural Tanks	ID	%	Density	Weight	LCG Laydown
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00 Laydown
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15 Laydown
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15own
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00own
Helifuel Refuel	A58001	100%	1.000	7.9	34.55aydown
Helifuel Disp	A58002	100%	1.000	0.1	25.91ourt
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02ydown Areas
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77 Items
Glycol Sump Tank	TQ-123301	0%	1.080	0.0	55.23
Tank Top Sump Tank	V-533605	0%	1.000	0.0	76.22
Non Structural Tanks	0			12.1	45.58

ID	Chain	Weight	LCG	TCG	VCG
1aP	450	85.3	87.52	-30.50	4.60
1bP	450	85.3	81.65	-30.50	4.60
5P	450	85.3	86.47	-31.12	16.19
9P	450	85.3	91.05	-33.48	13.72
2aP	450	85.3	31.13	-30.50	4.60
2bP	450	85.3	25.26	-30.50	4.60
6P	450	85.3	26.31	-31.12	16.19
10P	450	85.3	21.73	-33.48	13.72
4aS	450	85.3	81.65	30.50	4.60
4bS	450	85.3	87.52	30.50	4.60
8S	450	85.3	86.47	31.12	16.19
12S	450	85.3	91.05	33.48	13.72
3aS	450	85.3	25.26	30.50	4.60
3bS	450	85.3	31.13	30.50	4.60
7S	450	85.3	26.31	31.12	16.19
11S	450	85.3	21.73	33.48	13.72
0	7200	1364.6	56.39	0.00	9.78

ID	Tension	Weight	LCG	TCG	VCG
S1	0	0.0	24.63	38.00	18.29
S2	0	0.0	28.19	38.00	18.29
S3	0	0.0	31.75	38.00	18.29
S4	0	0.0	35.31	38.00	18.29
S5	0	0.0	81.02	38.00	18.29
S6	0	0.0	84.58	38.00	18.29
S7	0	0.0	88.14	38.00	18.29
S8	0	0.0	91.70	38.00	18.29
P1	0	0.0	24.63	-38.00	18.29
P2	0	0.0	28.19	-38.00	18.29
P3	0	0.0	31.75	-38.00	18.29
P4	0	0.0	35.31	-38.00	18.29
P5	0	0.0	81.02	-38.00	18.29
P6	0	0.0	84.58	-38.00	18.29
P7	0	0.0	88.14	-38.00	18.29
P8	0	0.0	91.70	-38.00	18.29
	0	0.0	0.00	0.00	0.00

ID	%	Weight	LCG	TCG	VCG
TT-01	10%	0.8	63.51	9.85	37.88
TT-02	10%	0.8	49.26	9.85	37.88
TT-03	10%	4.2	88.40	-31.10	37.88
TT-04	10%	3.1	81.40	-32.18	37.88
TT-05	10%	10.0	85.97	-23.86	37.58
TT-06	10%	5.1	88.61	24.15	37.58
TT-07	10%	5.2	80.51	24.00	37.58
TT-08	5%	4.1	82.90	31.44	37.88
TT-09	5%	3.0	69.19	-5.33	37.88
TT-10	10%	3.3	75.27	-8.16	37.78
TT-11	10%	4.4	75.27	-1.02	37.78
TT-12	10%	3.1	75.37	4.83	37.68
TT-13	10%	0.6	61.89	-2.75	37.58
TT-14	10%	2.0	37.67	22.62	37.58
TT-15	10%	6.1	73.19	23.30	37.58
0		55.8	78.24	1.41	37.70

ID	%	Weight	LCG	TCG	VCG
MD-01	5%	1.4	65.89	8.51	43.87
MD-02	5%	1.4	48.89	8.51	43.87
MD-03	10%	4.6	48.89	8.51	43.87
0		7.4	52.10	8.51	43.87

ID	%	Weight	LCG	TCG	VCG
HD	0%	0.0	21.10	-35.80	48.90
LD-01	40%	30.4	37.14	10.07	43.00
LD-02	40%	30.0	38.55	-3.52	43.00
LD-03	40%	21.3	39.27	-11.28	43.00
LD-04	50%	29.6	95.42	0.43	43.00
LD-05	50%	28.3	95.44	15.43	43.00
LD-06	50%	31.9	95.44	30.80	43.00
LD-07	0%	0.0	73.34	-5.46	43.00
LD-08	0%	0.0	73.34	9.54	43.00
LD-09	0%	0.0	73.34	24.54	43.00
LD-10	0%	0.0	106.05	-19.00	36.58
LD-11	60%	127.2	30.37	1.29	43.00
0		298.7	52.07	5.21	43.00

ID	Weight	LCG	TCG	VCG
0	0.0	0.00	0.00	0.00
0	0.0	0.00	0.00	0.00
0	0.0	0.00	0.00	0.00
0	0.0	0.00	0.00	0.00
0	0.0	0.00	0.00	0.00
	0.0	0.00	0.00	0.00

Units are as follows: Weight - metric tonnes, density - metric tonnes per cubic me

NOBLE DENTON

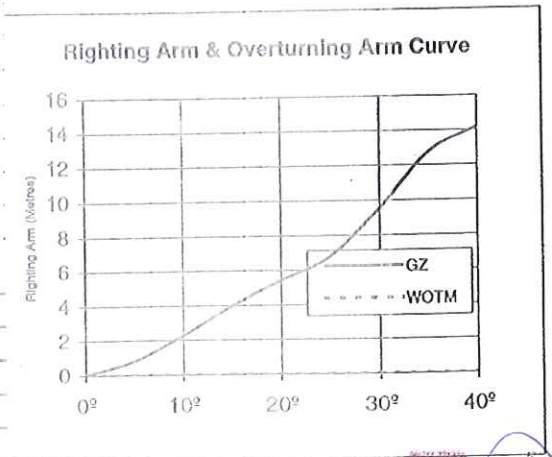
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	TCG m from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	0.0	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	1.7	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	-3.6	39.1	0.001	0.000
SW Ballast 3S	728.7	1.025	-1.6	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	-6.1	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	-9.0	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	1.4	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	-0.6	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	0.0	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	0.0	0.0	-	-
SW Ballast 11P	644.7	1.025	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	0.0	0.0	-	-
SW Ballast 13P	644.7	1.025	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	0.71	5.14	0.008	0.075
SW Ballast 16S	249.7	1.025				
SW Ballast 17P	523.9	1.025	-0.02	23.04	0.011	0.076
SW Ballast 17S	523.9	1.025				
SW Ballast 18P	555.2	1.025				
SW Ballast 18S	555.2	1.025				
SW Ballast 19P	728.8	1.025				
SW Ballast 19S	728.8	1.025				
SW Ballast 20P	768.2	1.025				
SW Ballast 20S	768.2	1.025				
SW Ballast 21P	963.7	1.025				
SW Ballast 21S	963.7	1.025				
SW Ballast 22P	1067.3	1.025				
SW Ballast 22S	1067.3	1.025				
SW Ballast 23P	665.6	1.025				
SW Ballast 23S	665.6	1.025				
SW Ballast 24P	980.8	1.025				
SW Ballast 24S	980.8	1.025				
SW Ballast 25P	665.6	1.025				
SW Ballast 25S	665.6	1.025				
SW Ballast 26P	980.8	1.025				
SW Ballast 26S	980.8	1.025				
SW Ballast Total						

tatical Stability

orrected VCG =	23.05 m	23.11 m
MT / KML =	27.00 m	27.90 m
MT / GML =	3.95 m	4.79 m

tability Margin

llowable VCG =	26.70 m
tability Margin =	3.59 m



	BY
Prepared	
Checked	

NOBLE DENTON

...anks	ID	%	Density	Weight	LCG
Dri...ater Tanks	8p	0%	1.000	0.0	40.25
Drill Water Tanks	8S	0%	1.000	0.0	40.25
Drill Water Tanks	9P	0%	1.000	0.0	40.55
Drill Water Tanks	9S	0%	1.000	0.0	40.55
Drill Water Tanks	14P	0%	1.000	0.0	72.35
Drill Water Tanks	14S	0%	1.000	0.0	72.35
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			0.0	0.00

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.58
Pot Water Tk	1S	100%	1.000	193.8	84.58
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	0%	0.960	0.0	51.05
FO Tank	10S	0%	0.960	0.0	51.05
FO Tank	12P	0%	0.960	0.0	61.72
FO Tank	12S	0%	0.960	0.0	61.72
FO Overflow	P	50%	0.960	8.2	78.94
FO Overflow	S	50%	0.960	7.6	78.87
Fuel Oil	0			15.8	78.91

...O	ID	%	Density	Weight	LCG
...ge	N1P	0%	0.870	0.0	67.61
DO...dge	N1S	0%	0.870	0.0	78.58
DO Settle	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DO Day Tk	N3S	100%	0.870	73.5	82.01
DOSetil	N4S	100%	0.870	73.5	79.15
DO Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			374.0	76.13

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	10%	1.000	1.9	80.72
Waste Oil	N1S	10%	1.000	1.9	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
M Room LO Storage	T65110	100%	0.900	0.8	35.87
M Room LO Storage	T65111	100%	0.900	0.8	35.87
Turbine Lube Oil Consule 'C'	UQ-122308	0%	0.900	0.0	89.67
Turbine Lube Oil Consule 'B'	UQ-122306	0%	0.900	0.0	89.68
Turbine Lube Oil Consule 'A'	UQ-122304	0%	0.900	0.0	89.71
Lub Oils	0			7.9	65.81

...lla... Tanks	ID	%	Density	Weight	LCG
...k ...ank	P	10%	1.000	0.5	78.49
...ding Tank	S	10%	1.000	0.5	78.49
...ng Drain Tank	P	0%	1.000	0.0	77.13
W.LL ...ing Drain Tank	S	0%	1.000	0.0	77.13
Deaerator Tower (Port)	C-51001	0%	1.000	0.0	85.08
Deaerator Tower (Starb)	C-52001	0%	1.000	0.0	85.08
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Aft Column Separator Tank	N1P	0%	1.000	0.0	79.72
Aft Column Separator Tank	N1S	0%	1.000	0.0	79.72
Miscellaneous Tanks	0			2.1	66.77

...ion Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00
Helifuel Refuel	A58001	100%	1.000	7.9	34.55
Helifuel Disp	A58002	100%	1.000	0.1	25.91
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Glycol Sump Tank	TQ-123301	0%	1.080	0.0	55.23
Tank Top Sump Tank	V-533605	0%	1.000	0.0	76.22
...ion Structural Tanks	0			12.1	45.58

	ID	Chala	Weight	LCG	TCG	VCG
...rt Aft (Winch 2)	1aP	450	85.3	87.52	-30.50	4.60
...rt Aft (Winch 4)	1bP	450	85.3	81.65	-30.50	4.60
...rt Aft (Winch 3)	5P	450	85.3	86.47	-31.12	16.19
...rt Aft (Winch 1)	9P	450	85.3	91.05	-33.48	13.72
...rt Fwd (Winch 5)	2aP	450	85.3	31.13	-30.50	4.60
...rt Fwd (Winch 7)	2bP	450	85.3	25.26	-30.50	4.60
...rt Fwd (Winch 6)	6P	450	85.3	26.31	-31.12	16.19
...rt Fwd (Winch 8)	10P	450	85.3	21.73	-33.48	13.72
...bd Aft (Winch 13)	4aS	450	85.3	81.65	30.50	4.60
...bd Aft (Winch 15)	4bS	450	85.3	87.52	30.50	4.60
...bd Aft (Winch 14)	8S	450	85.3	86.47	31.12	16.19
...bd Aft (Winch 16)	12S	450	85.3	91.05	33.48	13.72
...bd Fwd (Winch 10)	3aS	450	85.3	25.26	30.50	4.60
...bd Fwd (Winch 12)	3bS	450	85.3	31.13	30.50	4.60
...bd Fwd (Winch 11)	7S	450	85.3	26.31	31.12	16.19
...bd Fwd (Winch 9)	11S	450	85.3	21.73	33.48	13.72
	0	7200	1364.6	56.39	0.00	9.78

...3 Forces	ID	Tension	Weight	LCG	TCG	VCG
...nch 9)	S1	0	0.0	24.63	38.00	18.29
...nch 10)	S2	0	0.0	28.19	38.00	18.29
...nch 11)	S3	0	0.0	31.75	38.00	18.29
...nch 12)	S4	0	0.0	35.31	38.00	18.29
...nch 13)	S5	0	0.0	81.02	38.00	18.29
...nch 14)	S6	0	0.0	84.58	38.00	18.29
...inch 15)	S7	0	0.0	88.14	38.00	18.29
...inch 16)	S8	0	0.0	91.70	38.00	18.29
...inch 8)	P1	0	0.0	24.63	-38.00	18.29
...inch 7)	P2	0	0.0	28.19	-38.00	18.29
...inch 6)	P3	0	0.0	31.75	-38.00	18.29
...inch 5)	P4	0	0.0	35.31	-38.00	18.29
...inch 4)	P5	0	0.0	81.02	-38.00	18.29
...inch 3)	P6	0	0.0	84.58	-38.00	18.29
...inch 2)	P7	0	0.0	88.14	-38.00	18.29
...inch 1)	P8	0	0.0	91.70	-38.00	18.29
Forces	0		0.0	0.00	0.00	0.00

@TT	ID	%	Weight	LCG	TCG	VCG
	TT-01	10%	0.8	63.51	9.85	37.88
	TT-02	10%	0.8	49.26	9.85	37.88
	TT-03	10%	4.2	88.40	-31.10	37.88
	TT-04	10%	3.1	81.40	-32.18	37.88
	TT-05	10%	10.0	85.97	-23.86	37.58
...house	TT-06	10%	5.1	88.61	24.15	37.58
...house	TT-07	10%	5.2	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
...op	TT-10	10%	3.3	75.27	-8.16	37.78
	TT-11	10%	4.4	75.27	-1.02	37.78
...hop	TT-12	10%	3.1	75.37	4.83	37.68
...Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
...rd Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
...Workshop	TT-15	10%	6.1	73.19	23.30	37.58
...TT	0		55.8	78.24	1.41	37.70

@ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	5%	1.4	65.89	8.51	43.87
	MD-02	5%	1.4	48.89	8.51	43.87
...nt Storage	MD-03	10%	4.6	48.89	8.51	43.87
...MD	0		7.4	52.10	8.51	43.87

...ydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
...own	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
...Laydown	LD-04	50%	29.6	95.42	0.43	43.00
...Laydown	LD-05	50%	28.3	95.44	15.43	43.00
...Laydown	LD-06	50%	31.9	95.44	30.80	43.00
...wn	LD-07	0%	0.0	73.34	-5.46	43.00
...wn	LD-08	0%	0.0	73.34	9.54	43.00
...wn	LD-09	0%	0.0	73.34	24.54	43.00
...ydown	LD-10	0%	0.0	106.05	-19.00	36.58
...urt	LD-11	60%	127.2	30.37	1.29	43.00
...down Areas	0		298.7	52.07	5.21	43.00

Items	ID	Weight	LCG	TCG	VCG
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00

Units are as follows: Weight - metric tonnes, density - metric tonnes per cubic me...

Petrobras 36 - Roncador Field Develo
Operatons Manual - Volume 7
Loading Condition:

NOBLE DENTON

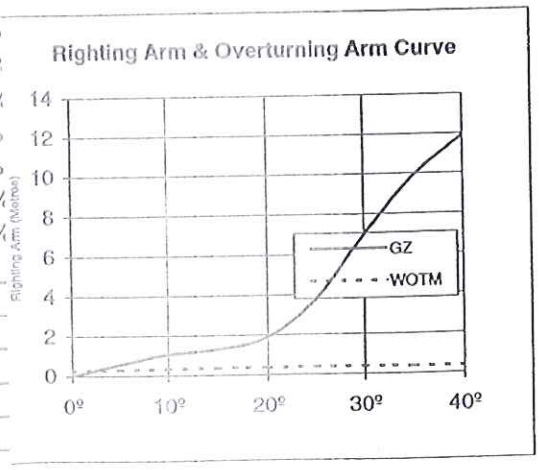
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	TCG n from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99	0.0	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	99	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99	1.7	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	99	-3.6	39.1	0.000	0.000
SW Ballast 3S	728.7	1.025	99	-1.6	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	99	-6.1	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	99	-9.0	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	99	1.4	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	99	-0.6	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	99	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	99	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99	0.0	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	99	1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99	0.0	0.0	-	-
SW Ballast 13P	644.7	1.025	99	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	99	0.23	5.67	0.088	0.167
SW Ballast 16S	249.7	1.025	99				
SW Ballast 17P	523.9	1.025	99	-0.02	20.03	0.090	0.168
SW Ballast 17S	523.9	1.025	99				
SW Ballast 18P	555.2	1.025	99				
SW Ballast 18S	555.2	1.025	99				
SW Ballast 19P	728.8	1.025	99				
SW Ballast 19S	728.8	1.025	99				
SW Ballast 20P	768.2	1.025	99				
SW Ballast 20S	768.2	1.025	99				
SW Ballast 21P	963.7	1.025	81				
SW Ballast 21S	963.7	1.025	99				
SW Ballast 22P	1067.3	1.025	1				
SW Ballast 22S	1067.3	1.025	1				
SW Ballast 23P	665.6	1.025	1				
SW Ballast 23S	665.6	1.025	1				
SW Ballast 24P	980.8	1.025	69				
SW Ballast 24S	980.8	1.025	64				
SW Ballast 25P	665.6	1.025	1				
SW Ballast 25S	665.6	1.025	1				
SW Ballast 26P	980.8	1.025	18				
SW Ballast 26S	980.8	1.025	25				
SW Ballast Total							

atical Stability

orrected VCG =	20.12 m	20.20 m
MT / KML =	26.80 m	27.20 m
MT / GML =	6.68 m	7.00 m

ability Margin

lowable VCG =	23.04 m
ability Margin =	2.84 m



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MA-3010.38-1320-915-NBD-909

NOBLE DENTON

...anks	ID	%	Density	Weight	LCG
Drill ... Tanks	8p	0%	1.000	0.0	40.25
Drill Water Tanks	8S	0%	1.000	0.0	40.25
Drill Water Tanks	9P	0%	1.000	0.0	40.53
Drill Water Tanks	9S	0%	1.000	0.0	40.53
Drill Water Tanks	14P	0%	1.000	0.0	72.39
Drill Water Tanks	14S	0%	1.000	0.0	72.39
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			0.0	0.00

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.58
Pot Water Tk	1S	100%	1.000	193.8	84.58
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	0%	0.960	0.0	51.05
FO Tank	10S	0%	0.960	0.0	51.05
FO Tank	12P	0%	0.960	0.0	61.72
FO Tank	12S	0%	0.960	0.0	61.72
FO Overflow	P	50%	0.960	8.2	78.94
FO Overflow	S	50%	0.960	7.6	78.87
Fuel Oil	0			15.8	78.91

	ID	%	Density	Weight	LCG
...	N1P	0%	0.870	0.0	67.61
DO ... ge	N1S	0%	0.870	0.0	78.58
DO Settle	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DO Day Tk	N3S	100%	0.870	73.5	82.01
DOSetl	N4S	100%	0.870	73.5	79.15
DO Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			374.0	76.13

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	10%	1.000	1.9	80.72
Waste Oil	N1S	10%	1.000	1.9	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
M Room LO Storage	T65110	100%	0.900	0.8	35.87
M Room LO Storage	T65111	100%	0.900	0.8	35.87
Turbine Lube Oil Consule 'C'	UQ-122308	0%	0.900	0.0	89.67
Turbine Lube Oil Consule 'B'	UQ-122306	0%	0.900	0.0	89.68
Turbine Lube Oil Consule 'A'	UQ-122304	0%	0.900	0.0	89.71
Lub Oils	0			7.9	65.81

...llan...s Tanks	ID	%	Density	Weight	LCG
... ...ank	P	10%	1.000	0.5	78.49
Bilg... ...g Tank	S	10%	1.000	0.5	78.49
W.I. ... Drain Tank	P	0%	1.000	0.0	77.13
W.I. ...ng Drain Tank	S	0%	1.000	0.0	77.13
Deaerator Tower (Port)	C-51001	0%	1.000	0.0	85.08
Deaerator Tower (Starb)	C-52001	0%	1.000	0.0	85.08
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Aft Column Separator Tank	N1P	0%	1.000	0.0	79.72
Aft Column Separator Tank	N1S	0%	1.000	0.0	79.72
Miscellaneous Tanks	0			2.1	66.77

Non Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00
Retifuel Refuel	A58001	100%	1.000	7.9	34.55
Retifuel Disp	A58002	100%	1.000	0.1	25.91
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Glycol Sump Tank	TQ-123301	0%	1.080	0.0	55.23
Tank Top Sump Tank	V-533605	0%	1.000	0.0	76.22
Non Structural Tanks	0			12.1	45.58

...d	ID	Chain	Weight	LCG	TCG	VCG
Port Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
Port Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
Port Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
Port Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
Port Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
Port Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
Port Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
Port Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
Stbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
Stbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
Stbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
Stbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
Stbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
Stbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
Stbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
Stbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0	5392	1021.9	56.39	0.00	9.78

...ng Forces	ID	Tension	Weight	LCG	TCG	VCG
(Winch 9)	S1	140	111.7	24.63	38.00	18.29
(Winch 10)	S2	140	112.1	28.19	38.00	18.29
(Winch 11)	S3	140	112.3	31.75	38.00	18.29
(Winch 12)	S4	140	112.4	35.31	38.00	18.29
(Winch 13)	S5	140	112.3	81.02	38.00	18.29
(Winch 14)	S6	140	112.6	84.58	38.00	18.29
(Winch 15)	S7	140	112.6	88.14	38.00	18.29
(Winch 16)	S8	140	112.5	91.70	38.00	18.29
(Winch 8)	P1	140	107.0	24.63	-38.00	18.29
(Winch 7)	P2	140	106.5	28.19	-38.00	18.29
(Winch 6)	P3	140	106.1	31.75	-38.00	18.29
(Winch 5)	P4	140	105.5	35.31	-38.00	18.29
(Winch 4)	P5	140	99.6	81.02	-38.00	18.29
(Winch 3)	P6	140	100.4	84.58	-38.00	18.29
(Winch 2)	P7	140	101.2	88.14	-38.00	18.29
(Winch 1)	P8	140	102.4	91.70	-38.00	18.29
Forces	0		1727.2	57.85	1.54	18.29

...GTT	ID	%	Weight	LCG	TCG	VCG
	TT-01	10%	0.8	63.51	9.85	37.88
...g	TT-02	10%	0.8	49.26	9.85	37.88
	TT-03	10%	4.2	88.40	-31.10	37.88
	TT-04	10%	3.1	81.40	-32.18	37.88
	TT-05	10%	10.0	85.97	-23.86	37.58
...house	TT-06	10%	5.1	88.61	24.15	37.58
...house	TT-07	10%	5.2	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
...hop	TT-10	10%	3.3	75.27	-8.16	37.78
	TT-11	10%	4.4	75.27	-1.02	37.78
...hop	TT-12	10%	3.1	75.37	4.83	37.68
... Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
...rd Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
... Workshop	TT-15	10%	6.1	73.19	23.30	37.58
GTT	0		55.8	78.24	1.41	37.70

...g MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	5%	1.4	65.89	8.51	43.87
	MD-02	5%	1.4	48.89	8.51	43.87
...nt Storage	MD-03	10%	4.6	48.89	8.51	43.87
...g MD	0		7.4	52.10	8.51	43.87

...ydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
...wn	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
...aydown	LD-04	50%	29.6	95.42	0.43	43.00
...aydown	LD-05	50%	28.3	95.44	15.43	43.00
...aydown	LD-06	50%	31.9	95.44	30.80	43.00
...wn	LD-07	0%	0.0	73.34	-5.46	43.00
...wn	LD-08	0%	0.0	73.34	9.54	43.00
...wn	LD-09	0%	0.0	73.34	24.54	43.00
...ydown	LD-10	0%	0.0	106.05	-19.00	36.58
...rt	LD-11	60%	127.2	30.37	1.29	43.00
...down Areas	0		298.7	52.07	5.21	43.00

...tems	ID		Weight	LCG	TCG	VCG
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
			0.0	0.00	0.00	0.00

Units are as follows: Weight - metric tonnes, density - metric tonnes per cubic metr

Petrobras 36 - Roncador Field Develc
Operatons Manual - Volume 7
Loading Condition:

NOBLE DENTON

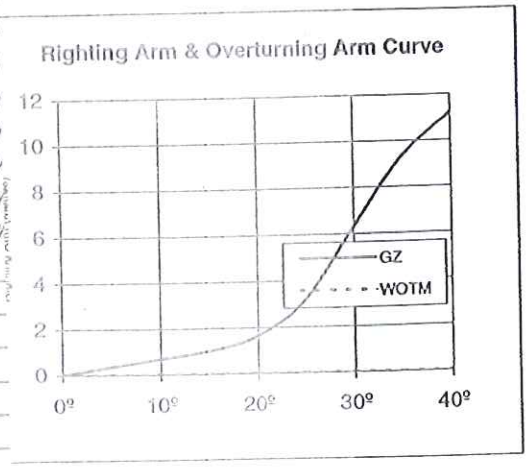
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	TCG m from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99	0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	99	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99	0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	1	-3.5	39.0	0.001	0.000
SW Ballast 3S	728.7	1.025	1	6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	1	-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	60	6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1	4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1	0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	1	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	98	-11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	1	1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99	2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	99	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1	1.13	5.06	0.005	0.061
SW Ballast 16S	249.7	1.025	1				
SW Ballast 17P	523.9	1.025	1	-0.02	23.01	0.011	0.075
SW Ballast 17S	523.9	1.025	1				
SW Ballast 18P	555.2	1.025	1				
SW Ballast 18S	555.2	1.025	1				
SW Ballast 19P	728.8	1.025	1				
SW Ballast 19S	728.8	1.025	1				
SW Ballast 20P	768.2	1.025	1				
SW Ballast 20S	768.2	1.025	39				
SW Ballast 21P	963.7	1.025	1				
SW Ballast 21S	963.7	1.025	1				
SW Ballast 22P	1067.3	1.025	1				
SW Ballast 22S	1067.3	1.025	1				
SW Ballast 23P	665.6	1.025	1				
SW Ballast 23S	665.6	1.025	1				
SW Ballast 24P	980.8	1.025	1				
SW Ballast 24S	980.8	1.025	1				
SW Ballast 25P	665.6	1.025	1				
SW Ballast 25S	665.6	1.025	1				
SW Ballast 26P	980.8	1.025	1				
SW Ballast 26S	980.8	1.025	1				
SW Ballast Total							

atical Stability

rrected VCG =	23.02 m	23.09 m
IT / KML =	27.10 m	27.60 m
IT / GML =	4.08 m	4.51 m

ability Margin

owable VCG =	26.80 m
ability Margin =	3.71 m



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MA-3010.38-1320-915-NBD-909

Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Loading Condition: Transition from operating Draft (22.0m) t

NOBLE DENTON

Tanks	ID	%	Density	Weight	LCG
anks	8p	100%	1.000	276.2	40.2
Water Tanks	8S	100%	1.000	276.2	40.2
Drill Water Tanks	9P	100%	1.000	248.5	40.5
Drill Water Tanks	9S	100%	1.000	248.5	40.5
Drill Water Tanks	14P	0%	1.000	0.0	72.3
Drill Water Tanks	14S	0%	1.000	0.0	72.3
Drill Water Tanks	15P	0%	1.000	0.0	72.3
Drill Water Tanks	15S	0%	1.000	0.0	72.3
Drill Water Tanks (Process FW)	0			1049.3	40.3

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.5
Pot Water Tk	1S	100%	1.000	193.8	84.5
Pot Water Day Tk	0	100%	1.000	15.2	78.8
Potable Water	0			402.7	84.3

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	100%	0.960	586.3	51.0
FO Tank	10S	100%	0.960	586.3	51.0
FO Tank	12P	100%	0.960	589.5	61.7
FO Tank	12S	100%	0.960	589.5	61.7
FO Overflow	P	100%	0.960	16.4	78.9
FO Overflow	S	100%	0.960	15.1	78.8
Fuel Oil	0			2383.0	58.7

	ID	%	Density	Weight	LCG
	N1P	100%	0.870	3.6	67.6
ogs	N1S	100%	0.870	3.6	78.5
DO Settle	N1P	100%	0.870	105.3	74.5
DO Day Tk	N2P	100%	0.870	110.6	74.6
DO Day Tk	N3S	100%	0.870	73.5	82.0
DOSettl	N4S	100%	0.870	73.5	79.1
DO Service	0	100%	0.870	11.2	48.0
Diesel Oil	0			381.2	76.0

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.6
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.8
Waste Oil	N1P	50%	1.000	9.6	80.7
Waste Oil	N1S	50%	1.000	9.6	80.7
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.4
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.1
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.6
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.3
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.0
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.6
WI Room LO Storage	T65110	100%	0.900	0.8	35.8
WI Room LO Storage	T65111	100%	0.900	0.8	35.8
Turbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.6
Turbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.6
Turbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.7
Lub Oils	0			68.2	84.9

ellaneous Tanks	ID	%	Density	Weight	LCG
Tank	P	50%	1.000	2.6	78.4
g Tank	S	50%	1.000	2.6	78.4
ing Drain Tank	P	50%	1.000	1.4	77.1
ring Drain Tank	S	50%	1.000	1.4	77.1
Deaerator Tower (Port)	C-51001	100%	1.000	37.9	85.0
Deaerator Tower (Starb)	C-52001	100%	1.000	37.9	85.0
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.3
Aft Column Separator Tank	N1P	100%	1.000	13.8	79.7
Aft Column Separator Tank	N1S	100%	1.000	13.8	79.7
Miscellaneous Tanks	0			112.5	82.9

Non Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00
Helifuel Refuel	A58001	100%	1.000	7.9	34.55
Helifuel Disp	A58002	100%	1.000	0.1	25.91
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Glycol Sump Tank	TQ-123301	60%	1.080	12.1	55.23
Tank Top Sump Tank	V-533605	50%	1.000	8.0	76.22
Non Structural Tanks	0			32.1	56.82

ard	ID	Chain	Weight	LCG	TCG	VCG
- Port Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
- Port Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
- Port Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
- Port Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
- Port Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
- Port Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
- Port Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
- Port Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
- Stbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
- Stbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
- Stbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
- Stbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
- Stbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
- Stbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
- Stbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
- Stbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
d	0	5392	1021.9	56.39	0.00	9.78

ring Forces	ID	Tension	Weight	LCG	TCG	VCG
(Winch 9)	S1	140	111.7	24.63	38.00	18.29
(Winch 10)	S2	140	112.1	28.19	38.00	18.29
(Winch 11)	S3	140	112.3	31.75	38.00	18.29
(Winch 12)	S4	140	112.4	35.31	38.00	18.29
(Winch 13)	S5	140	112.3	81.02	38.00	18.29
(Winch 14)	S6	140	112.6	84.58	38.00	18.29
(Winch 15)	S7	140	112.6	88.14	38.00	18.29
(Winch 16)	S8	140	112.5	91.70	38.00	18.29
(Winch 8)	P1	140	107.0	24.63	-38.00	18.29
(Winch 7)	P2	140	106.5	28.19	-38.00	18.29
(Winch 6)	P3	140	106.1	31.75	-38.00	18.29
(Winch 5)	P4	140	105.5	35.31	-38.00	18.29
(Winch 4)	P5	140	99.6	81.02	-38.00	18.29
(Winch 3)	P6	140	100.4	84.58	-38.00	18.29
(Winch 2)	P7	140	101.2	88.14	-38.00	18.29
(Winch 1)	P8	140	102.4	91.70	-38.00	18.29
g Forces	0		1727.2	57.85	1.54	18.29

s @TT	ID	%	Weight	LCG	TCG	VCG
il	TT-01	99%	8.0	63.51	9.85	37.88
wd	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
sp	TT-05	20%	19.9	85.97	-23.86	37.58
rehouse	TT-06	60%	30.9	88.61	24.15	37.58
rehouse	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
shop	TT-10	50%	16.3	75.27	-8.16	37.78
	TT-11	30%	13.1	75.27	-1.02	37.78
shop	TT-12	20%	6.2	75.37	4.83	37.68
n Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
ard Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
Workshop	TT-15	10%	6.1	73.19	23.30	37.58
@TT	0		169.3	78.84	4.33	37.69

@ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
ent Storage	MD-03	60%	27.6	48.89	8.51	43.87
@ MD	0		42.9	51.10	8.51	43.87

aydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
own	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
Laydown	LD-04	50%	29.6	95.42	0.43	43.00
Laydown	LD-05	50%	28.3	95.44	15.43	43.00
Laydown	LD-06	50%	31.9	95.44	30.80	43.00
own	LD-07	0%	0.0	73.34	-5.46	43.00
own	LD-08	0%	0.0	73.34	9.54	43.00
own	LD-09	0%	0.0	73.34	24.54	43.00
aydown	LD-10	0%	0.0	106.05	-19.00	36.58
ourt	LD-11	60%	127.2	30.37	1.29	43.00
ydown Areas	0		298.7	52.07	5.21	43.00

Items	ID	Weight	LCG	TCG	VCG
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
		0.0	0.00	0.00	0.00

its are as follows: Weight - metric tonnes, density - metric tonnes per cubic m

ADDENDUM 1

SUMMARY OF INTERNAL SUBDIVISION

OF

P36 TO MEET REQUIREMENTS OF IMO/RINA

(4 PAGES)

1 SUMMARY

As a result of the continuing increase in lightship weight, modifications to process content, and operational requirements for the unit to meet all the stability requirements of RINA, IMO and Brasoil additional subdivision of a number of compartments is required.

Upon completion of the subdivision work described below the unit should have an adequate stability margin for operations at the Roncador field provided that there is no further increase in lightship or operational loads.

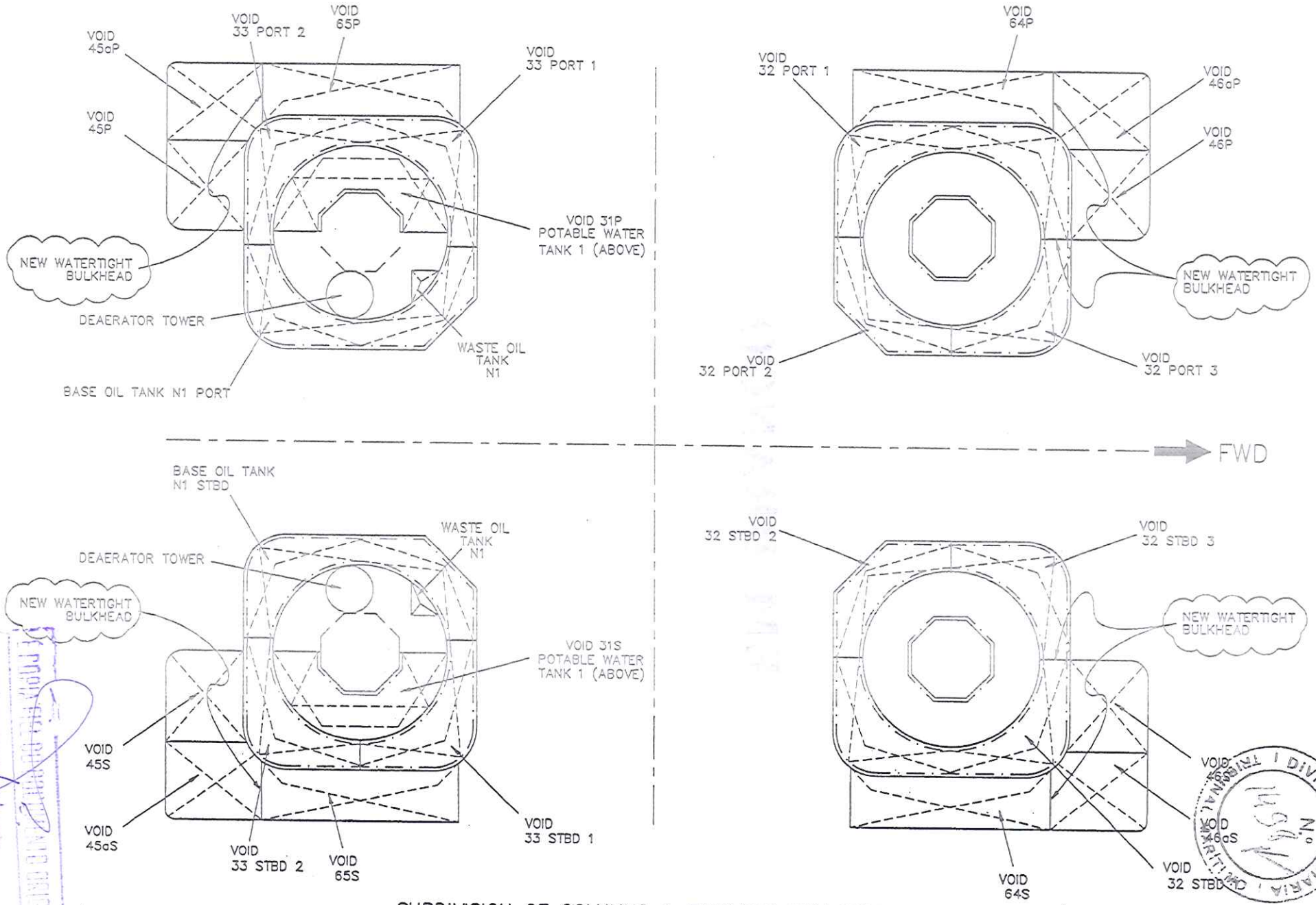
2 VOID SPACE 32 STBD 1 & PORT 1

This compartment is located on the forward columns from El. 19.812m up to 30.480m. The compartment requires to be split into two. This is best achieved by making the forward longitudinal bulkhead watertight, as shown on the attached drawing. Subject to survey and final engineering calculations this should be relatively straight forward to close and reinforce. Additional bilge drainage and vent pipes will be needed along with water detection sensors.

3 SUBDIVISION OF VS46A / VS45A PORT & STBD

This compartment is the part of the new fairlead box extension. On the capacity plans and as shown on the attached sketch the compartments have been designated as VS45a/VS46a and VS64/VS65, however, they are currently separated by a non-watertight bulkhead. To meet the stability requirements this watertight bulkhead must be closed as shown on the attached sketch.

The design of the bulkhead was such that it could become an watertight boundary if necessary. Therefore only the manway needs to be changed to a manhole and a small work platform added. Additional bilge drainage and vent pipes will be needed along with water detection sensors.



SUBDIVISION OF COLUMNS & FAIRLEAD BOX EXTENSIONS

ELEVATION BETWEEN 19812 & 30468 ABL

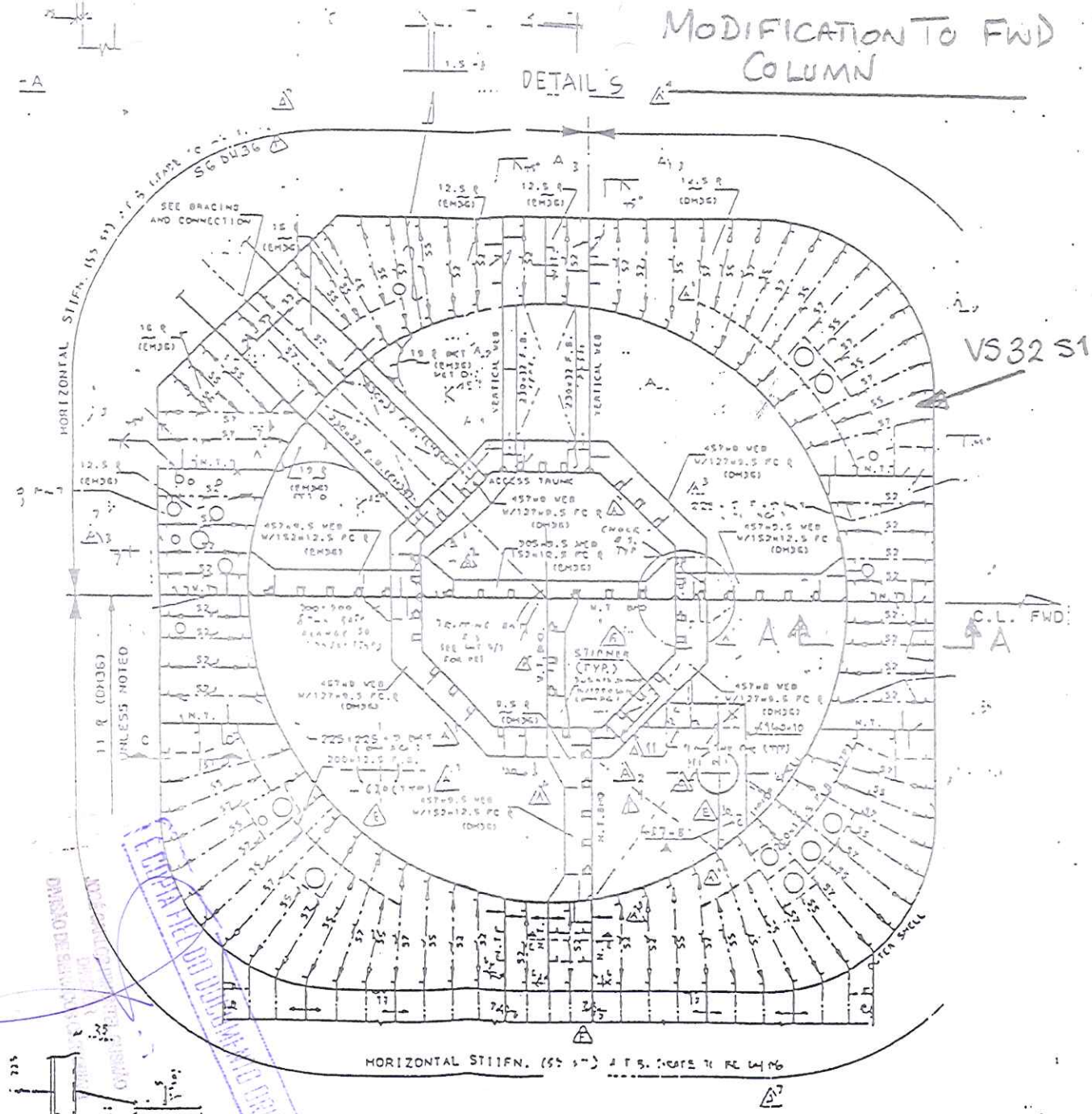
STABILITY ANALYSIS

RL-3010.38-1320-960-NBD-908 – REV B

L:\RONCADOR\CAD\DRAWINGS\STAB_REP\VS_MODS.DWG

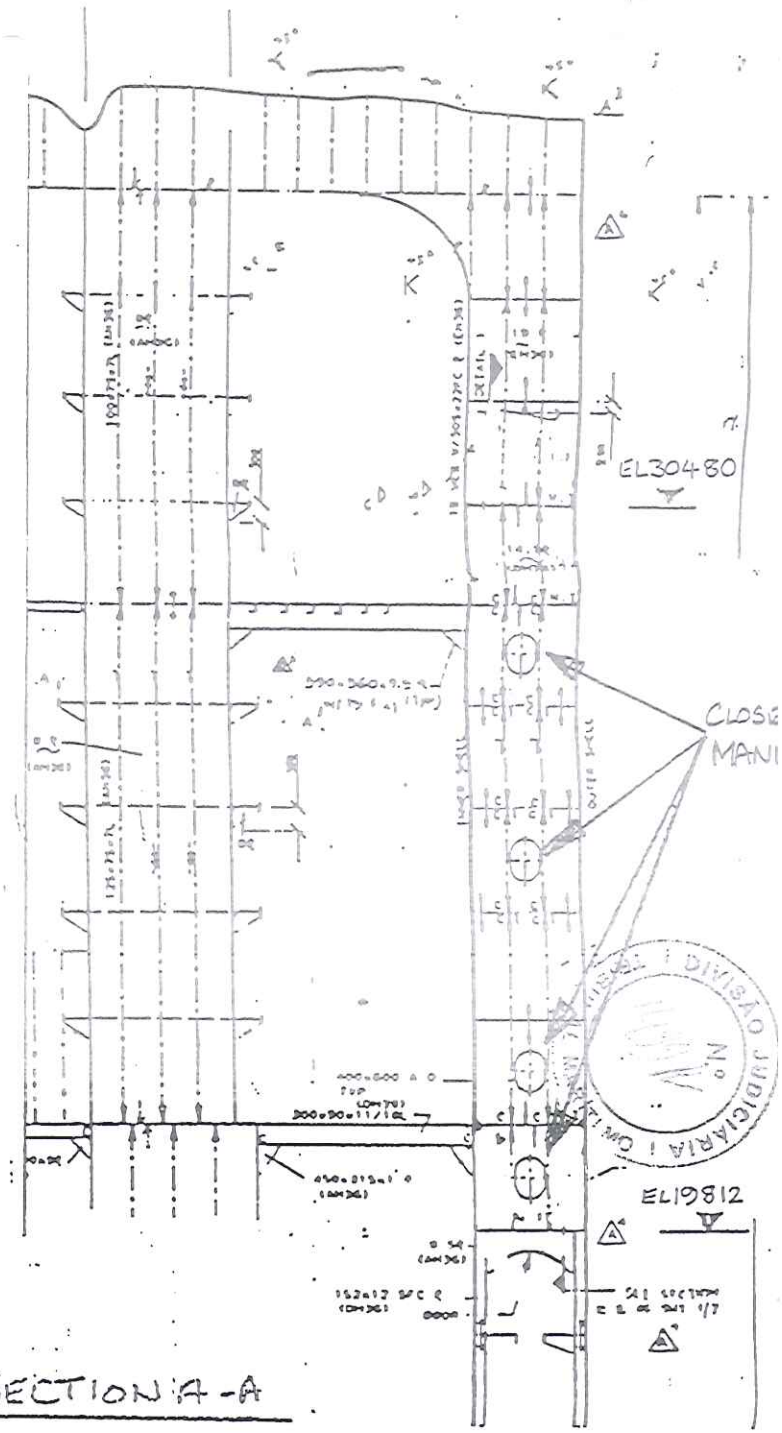
MODIFICATION TO FWD COLUMN

DETAIL S

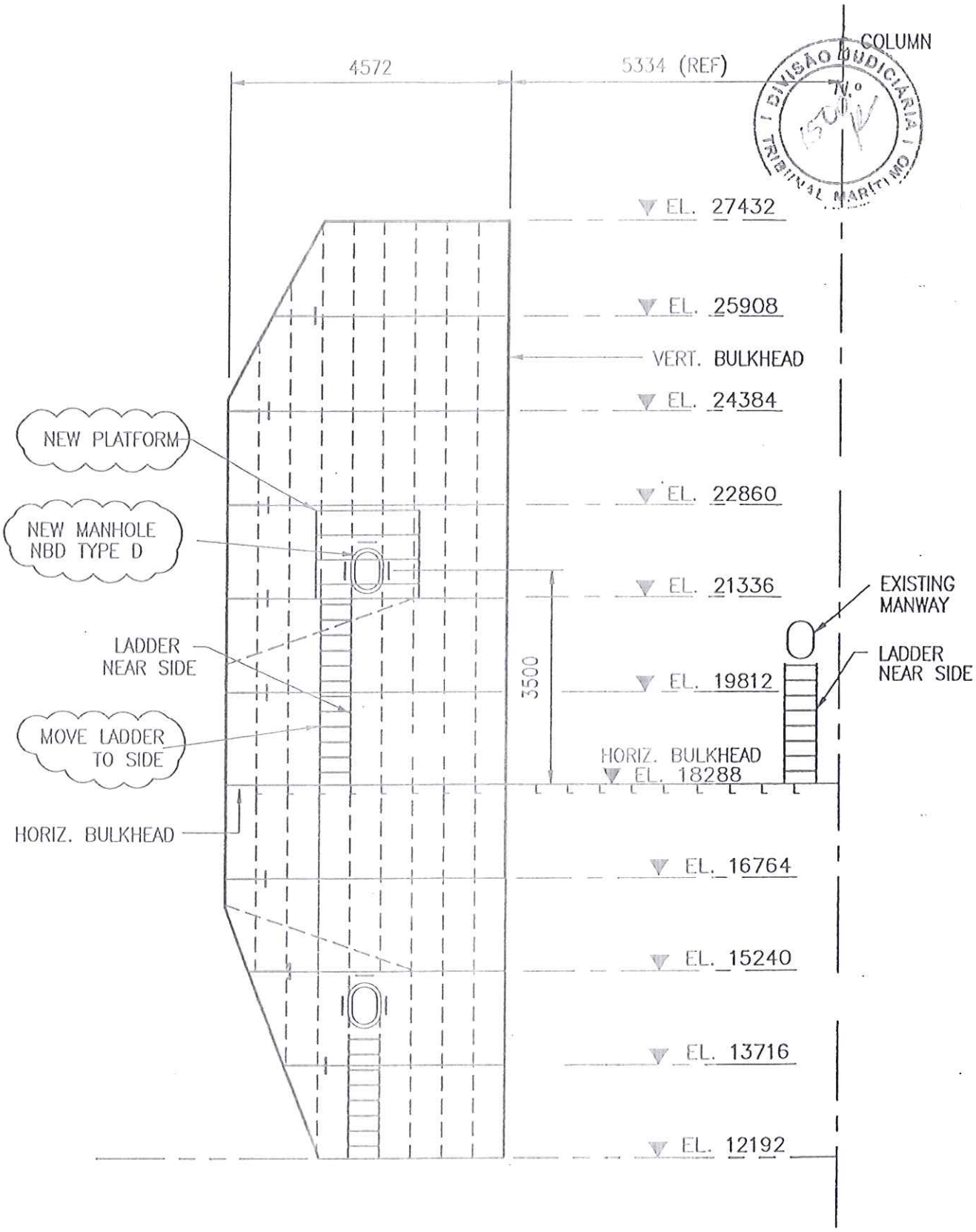


PLAN AT 19812 A.B.L.

STBD. FWD. COLUMN SHOWN-PORT SIMILAR



SECTION A-A



MODIFICATION TO BULKHEAD BETWEEN
VS 46a & 64 (PORT & STBD)
(VS 45a & 65 SIMILAR)

LOOKING AFT

(TYP. 4 LOCS.)

L:\RONCADOR\CAD\DRAWINGS\STAB_REP\VS46/2.DWG

ADDENDUM 2

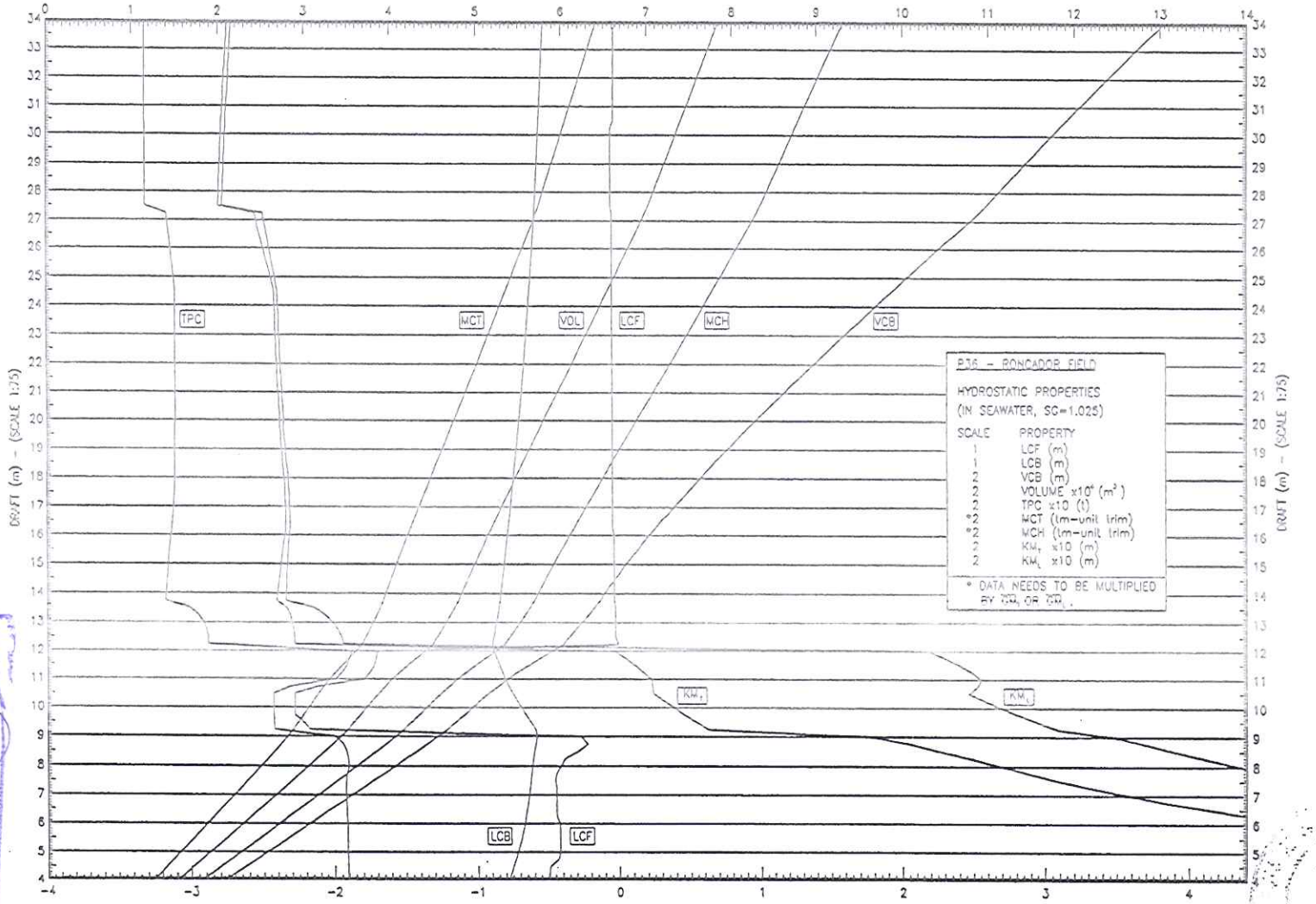
HYDROSTATIC & CROSS CURVES; WORST ANGLE INCLINATION

(FOR INFORMATION ONLY)

(5 PAGES)

SCALE 1 – VOLUME, TPC, MCT, MCH, KM_T, KM_L, VCB

SCALE 1:25



P36 – RONCADOR FIELD

HYDROSTATIC PROPERTIES
(IN SEAWATER, SG=1.025)

SCALE	PROPERTY
1	LCF (m)
1	LCB (m)
2	VCB (m)
2	VOLUME $x10^4$ (m^3)
2	TPC x10 (t)
*2	MCT (tm–unit trim)
*2	MCH (tm–unit trim)
2	KM_T x10 (m)
2	KM_L x10 (m)

* DATA NEEDS TO BE MULTIPLIED BY TCM_L OR TCM_T.

SCALE 1 – DISTANCE FROM AMIDSHIPS (m +VE FWD) LCB, LCF

SCALE 1:15

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
A	23.01.99	A.F.C.	SCE			
0	10/97	I.D.C	SCE	WSE	MSE	

BR BRASPETRO

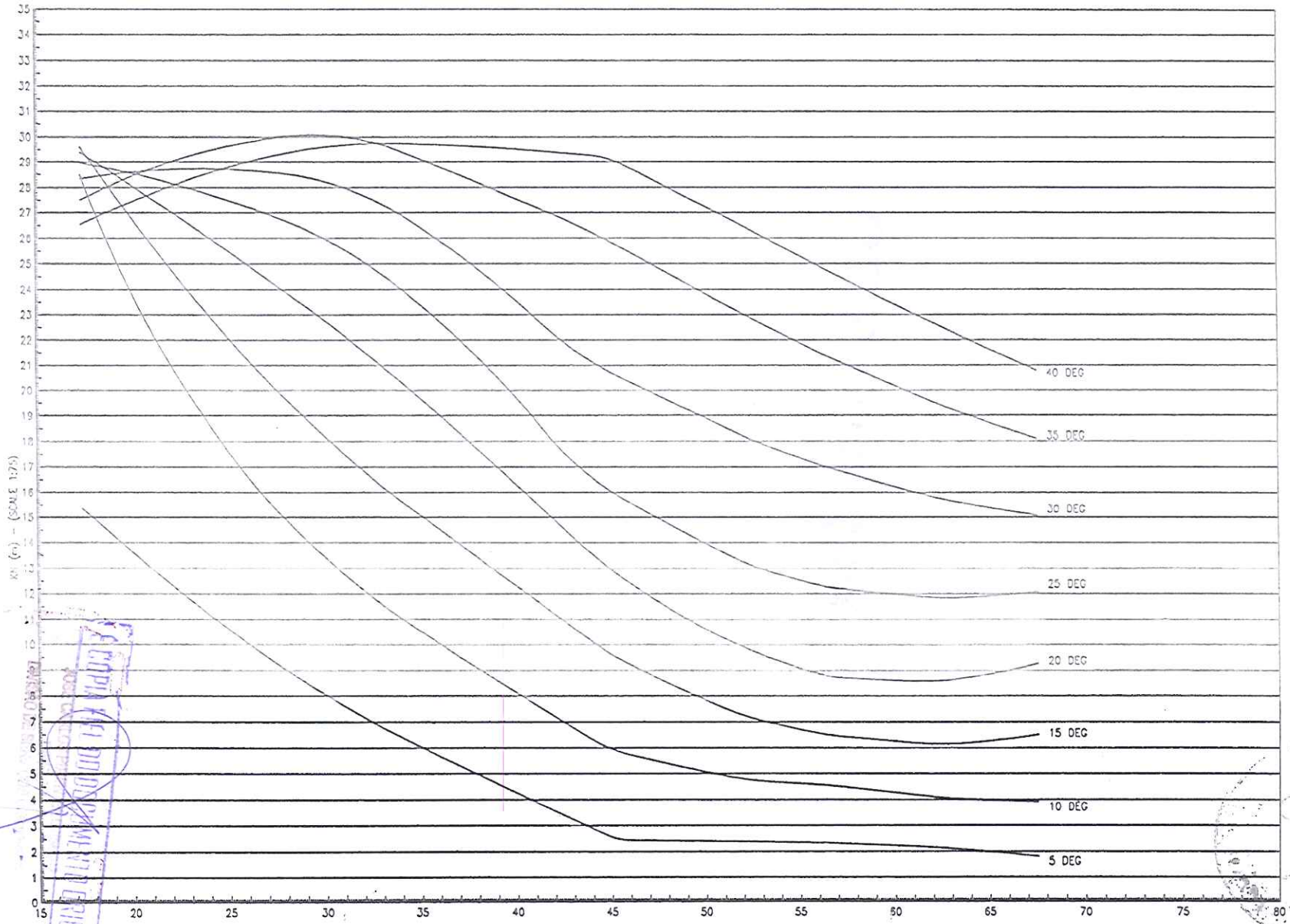
P36–RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

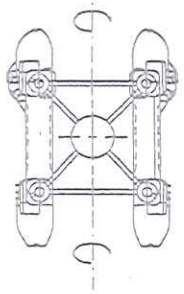
NOBLE DENTON | Petromec | AMEC

TITLE
HYDROSTATIC CURVES
FOR UNIT PETROBRAS 36

DRAWN/DATE SCE/OCT.97
CHECKED/DATE
APPROVED/DATE
SCALE AS NOTED (A1)

DRAWING NUMBER DE-3010.J8-1320-941-NBD-370-01 REV A





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0	10/97	I.O.C	SCE	MSE	MSE	

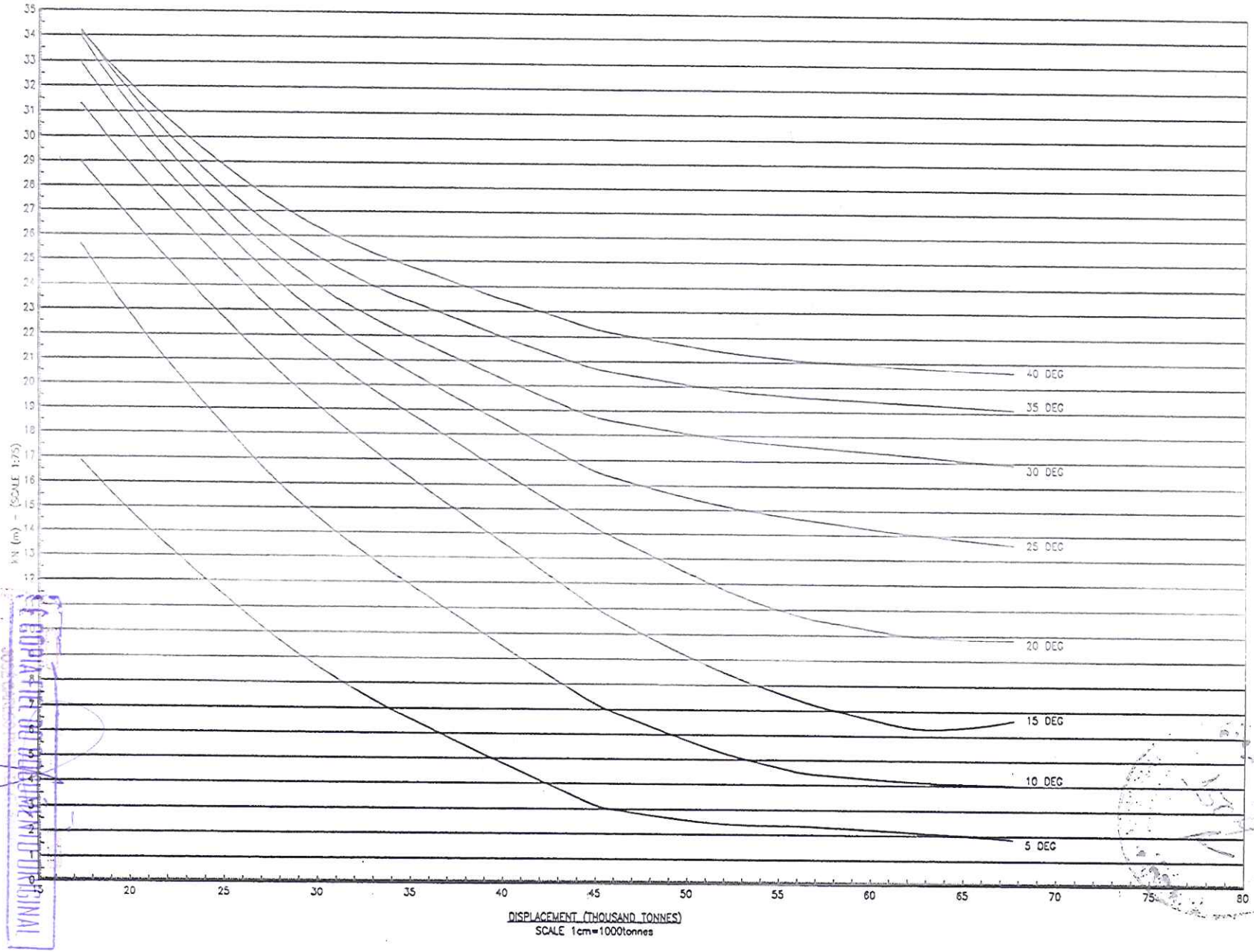
PJ6-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

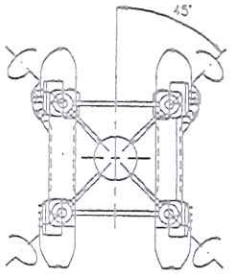
NOBLE DENTON | Petromec | AMEC

TITLE
CROSS CURVES OF STABILITY FOR 0 DEG-ROLL AXIS FOR UNIT PETROBRAS 36

DRAWN/DATE SCE/OCT.97
CHECKED/DATE
APPROVED/DATE
SCALE AS NOTED (A1)

DRAWING NUMBER DE-3010.38-1320-941-NBD-371-01 REV A





REFERENCE DRAWINGS	
DRAWING NUMBER	DRAWING TITLE

REV	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
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0	10/97	I.D.C	SCE	MSC	MSC	

BR BRASPETRO

PJ6-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

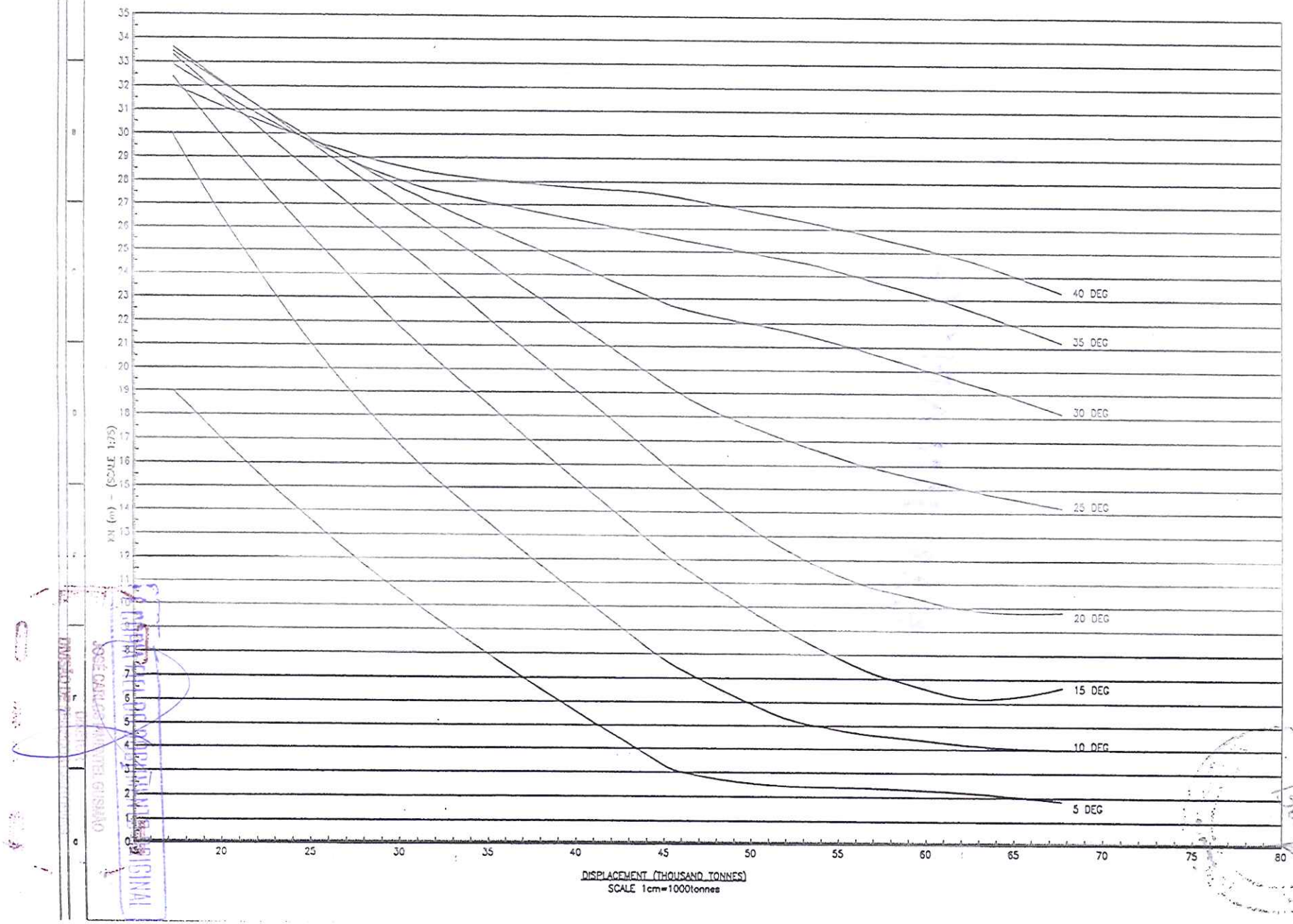
NOBLE DENTON | Petromec | AMCC

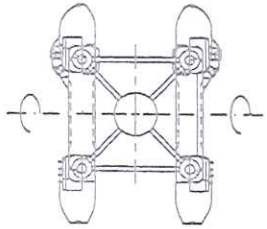
TITLE

CROSS CURVES OF STABILITY
FOR 45 DEG ROLL AXIS
FOR UNIT PETROBRAS 36

DRAWN/DATE: SCE/OCT.97
CHECKED/DATE:
APPROVED/DATE:
SCALE: AS NOTED (A1)

DRAWING NUMBER: DE-3010.36-1320-941-N90-371-02
REV: A





ROLL AXIS

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
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0	10/97	I.D.C	SCE	WSE	WSE	

PJ6-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

CROSS CURVES OF STABILITY FOR 90 DEG ROLL AXIS FOR UNIT PETROBRAS 36

DRAWN/DATE: SCE/OCT.97
CHECKED/DATE:
APPROVED/DATE:
SCALE: AS NOTED (A1)
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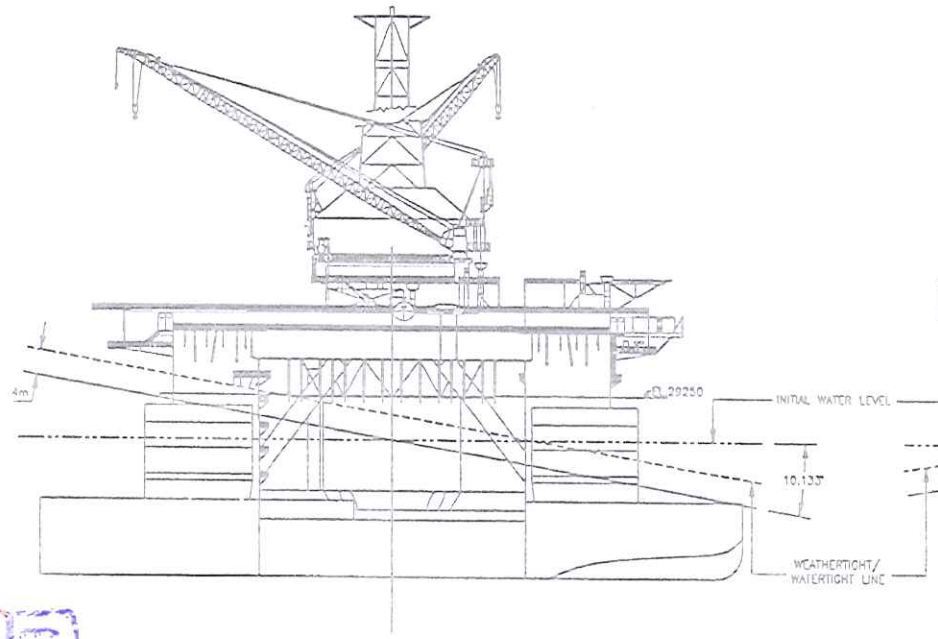
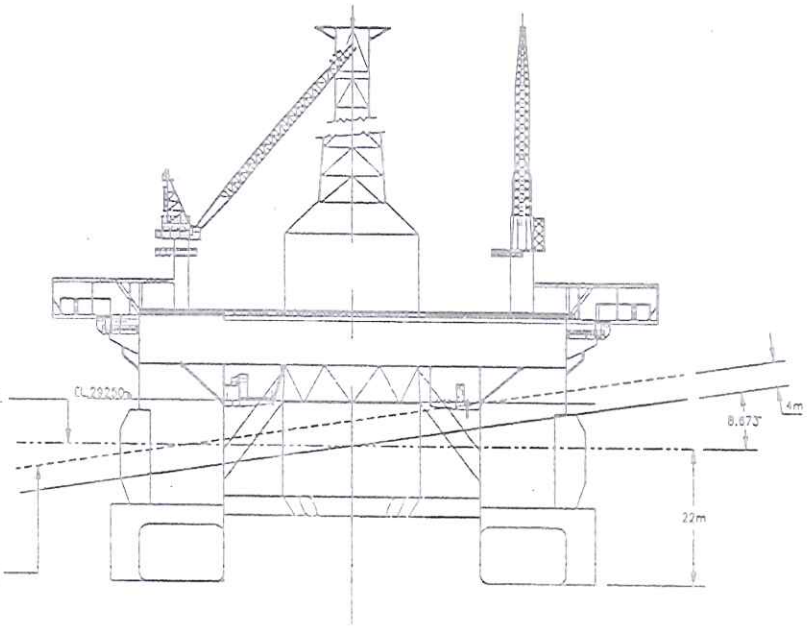
REV: A



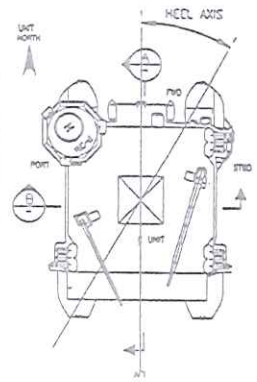
VIEW A

WORST CASE TRIM ANGLE
DAMAGE TO SW BALLAST TANK 22
T_{AMID} =22.78m (AFTER DAMAGE)



VIEW B

WORST CASE HEEL ANGLE
DAMAGE TO SW BALLAST TANK 22
T_{AMID} =22.78m (AFTER DAMAGE)



GENERAL NOTES

1. BASED ON RESULTS FROM STABILITY ANALYSIS (DOC. No. RL-3010.38-1320-960-N80-005) -REV B
2. DAMAGED CONDITIONS REPORTED ARE "ACCIDENTAL FLOODING CASES". THESE GIVE THE WORST ANGLE OF INCLINATION.

DRAWING NUMBER | DRAWING TITLE

REFERENCE DRAWINGS

REV	ISSUE DATE	DESCRIPTION OF REVISION	DRAWN BY	CHKD BY	APPD BY	APPD CLIENT
C	23.01.99	A/C	SCE			
B	3.12.97	REVISED A/B	SCE	WSE	AT	
A	26.11.97	A/D	SCE	WSE	AT	
0	17.6.97	I.D.C	PMS	AT	AT	

BRASPETRO — P36-RONCADOR FIELD DEVELOPMENT
CONTRACT No :- 7/15/2150

NOBLE DENTON | Petromec | AMEC

TITLE: INCLINATION OF UNIT WORST DAMAGE CONDITION

DRAWN/DATE: SCE/NOV.97
CHECKED/DATE:
APPROVED/DATE:
SCALE: N.T.S.

DRAWING NUMBER: DE-3010.38-1320-941-N80-368-01 | REV: C

ADDENDUM 3

CROSS FLOODING OF BASE OIL TANKS DURING ESD

(2 PAGES)

1 INTRODUCTION

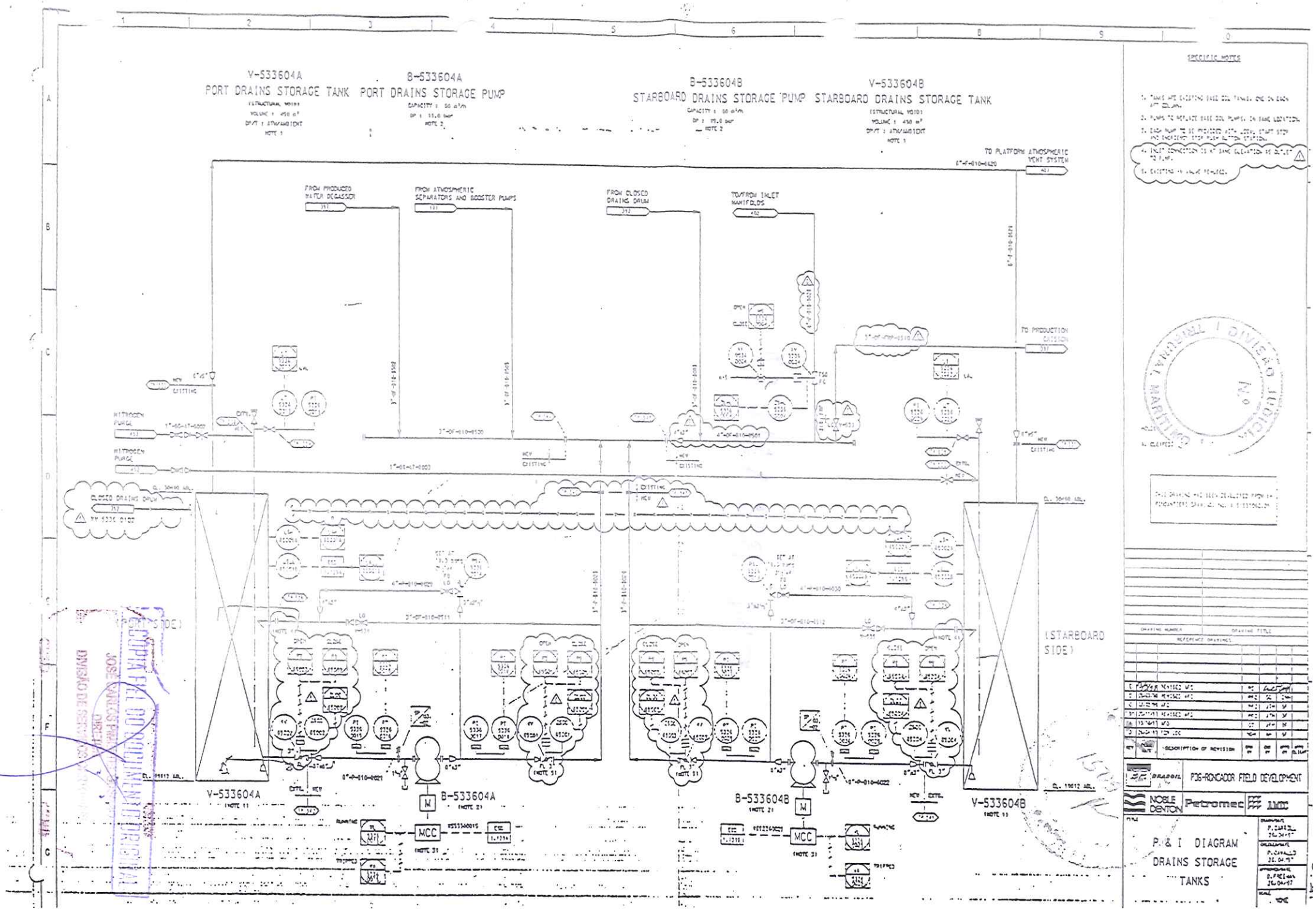
Following discussions with AMEC/Petromec it has been confirmed that the Base Oil tanks N1 Port & Stbd will be used as emergency dump for the separators (Ref P&ID AMK-398 Rev E). The valves XV65002 & XV65004, connecting these two tanks will be normally closed. Therefore it is correct to consider the tanks to be damaged singularly.

2 RESULTS

In the event of emergency dump the valves will be open which would mean a condition whereby if damage to the unit occurred both tanks should be considered flooded. Normally this would be classed as a temporary condition, however an analysis has been performed to demonstrate that there is no significant loss of stability in this condition. The results of the analysis for simultaneous flooding of are summarised below

Heel Axis (Deg)	Angle of Loll (Deg)	1st Intercept (Deg)	2nd Intercept (Deg)	Angle @ IMO Dam. Ratio >2 (Deg)	DF Angle (Deg)	DF Clear. (m)	Allow KG (m)
50	1.4	3.7	>40	11°	17.16	10.76	22.99

From the above results in can be seen that the allowable VCG will decrease by 5cm from that reported in the main body of the report, which is insignificant.


V-533604A
PORT DRAINS STORAGE TANK
B-533604A
PORT DRAINS STORAGE PUMP
B-533604B
STARBOARD DRAINS STORAGE PUMP
V-533604B
STARBOARD DRAINS STORAGE TANK
TO PLATFORM ATMOSPHERIC VENT SYSTEM
FROM PRODUCED WATER DEGASSER
FROM ATMOSPHERIC SEPARATORS AND BOOSTER PUMPS
FROM CLOSED DRAINS DRUM
TO/FROM INLET MANIFOLDS
TO PRODUCTION DIVISION
NITROGEN PURGE
CLOSED DRAINS DRUM
(STARBOARD SIDE)
MCC
SPECIFIC NOTES
P&I DIAGRAM
DRAINS STORAGE
TANKS
P36-RONCADOR FIELD DEVELOPMENT
NOBLE DENTON
Petromec
AMCC

ADDENDUM 4

INCLINED LIGHTSHIP RESULTS & REVISED LOADING CONDITIONS

(8 PAGES)

1 INTRODUCTION

This addendum summarises the results of the Inclining Test performed for the Petrobras-36 FPU. The Inclining Test was carried out in the Baie Des Sept Îles, Canada on the 17th October 1999. The unit was moored in a sheltered location and ballasted down to a draft of 18.94m where the displacement of the rig was calculated at 51820.4 metric tonnes. The deadweight survey was completed and the inclining test was then performed with environmental forces almost negligible.

The Inclination Test was performed using concrete weights moved longitudinally over the deck of the Unit. A total of eight shifts were made and the moment-tangent plots (appendix C) clearly showed that accurate results had been obtained.

The results were analysed both without and with a correction for the wind conditions recorded at the time. Statistical analysis indicates that when the inclining moments are corrected for wind effects a slightly better trend line is obtained. The GM_{fluid}, calculated from the gradient of the moment-tangent plot, is 6.87m. The resulting lightship weight and centre of gravity have been calculated as:

Lightship	31164.5	Tonnes
LCG (Fr. Fpp)	60.62	Metres
TCG (+ve stbd)	-0.30	Metres
VCG (Fr. USK)	29.67	Metres

2 REVISED LOADING CONDITIONS

A review of the operational stability of the Unit indicates all stability margins have increased positively to the following values:

Condition	Draft (m)	Δ (tonnes)	VCG (m)	Allow VCG (m)	Margin (m)
Operating	22.0	56503	22.18	23.04	0.86
Fairlead Inspection	18.0	50389	24.18	25.23	1.05
Transit	11.0	37083	27.06	44.90	17.84

Petrobras 36 - Roncador Field Develo
Operatons Manual - Volume 7
Loading Condition:

NOBLE DENTON

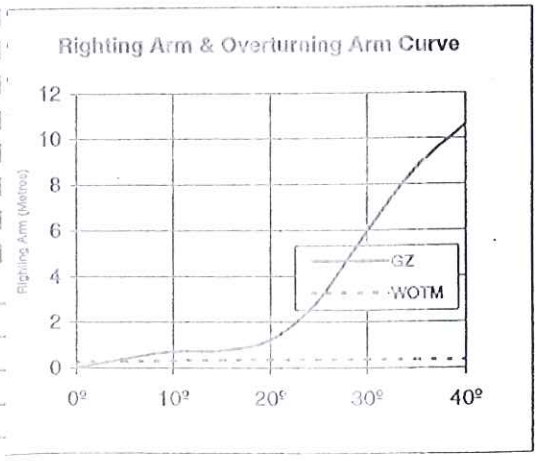
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	%	TCG from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	99	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	99	0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	99	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	99	0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	1	-3.5	39.0	0.000	0.000
SW Ballast 3S	728.7	1.025	1	6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	99	-0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	99	6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	1	4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	1	0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	1	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	47	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	99	-11.7	43.7	0.004	0.013
SW Ballast 7S	555.2	1.025	1	1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	99	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	99	2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	99	0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	99	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	1	0.80	5.42	0.007	0.055
SW Ballast 16S	249.7	1.025	1				
SW Ballast 17P	523.9	1.025	31	-0.02	22.11	0.012	0.069
SW Ballast 17S	523.9	1.025	1				
SW Ballast 18P	555.2	1.025	99				
SW Ballast 18S	555.2	1.025	99				
SW Ballast 19P	728.8	1.025	1				
SW Ballast 19S	728.8	1.025	1				
SW Ballast 20P	768.2	1.025	1				
SW Ballast 20S	768.2	1.025	92				
SW Ballast 21P	963.7	1.025	1				
SW Ballast 21S	963.7	1.025	1				
SW Ballast 22P	1067.3	1.025	1				
SW Ballast 22S	1067.3	1.025	1				
SW Ballast 23P	665.6	1.025	1				
SW Ballast 23S	665.6	1.025	1				
SW Ballast 24P	980.8	1.025	1				
SW Ballast 24S	980.8	1.025	1				
SW Ballast 25P	665.6	1.025	1				
SW Ballast 25S	665.6	1.025	1				
SW Ballast 26P	980.8	1.025	1				
SW Ballast 26S	980.8	1.025	1				
SW Ballast Total							

atical Stability

rrected VCG =	22.12 m	22.18 m
MT / KML =	26.80 m	27.20 m
MT / GML =	4.68 m	5.02 m

ability Margin

lowable VCG =	23.04 m
ability Margin =	0.86 m



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Loading Condition: Maximum Operating Condition

NOBLE DENTON

...ks Tanks	ID	%	Density	Weight	LCG
Drill Water Tanks	8p	100%	1.000	276.2	40.2
Drill Water Tanks	8S	100%	1.000	276.2	40.2
Drill Water Tanks	9P	100%	1.000	248.5	40.5
Drill Water Tanks	9S	100%	1.000	248.5	40.5
Drill Water Tanks	14P	0%	1.000	0.0	72.3
Drill Water Tanks	14S	0%	1.000	0.0	72.3
Drill Water Tanks	15P	0%	1.000	0.0	72.3
Drill Water Tanks	15S	0%	1.000	0.0	72.3
Drill Water Tanks (Process FW)	0			1049.3	40.3

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.5
Pot Water Tk	1S	100%	1.000	193.8	84.5
Pot Water Day Tk	0	100%	1.000	15.2	78.8
Potable Water	0			402.7	84.3

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	100%	0.960	586.3	51.0
FO Tank	10S	100%	0.960	586.3	51.0
FO Tank	12P	100%	0.960	589.5	61.7
FO Tank	12S	100%	0.960	589.5	61.7
FO Overflow	P	100%	0.960	16.4	78.9
FO Overflow	S	100%	0.960	15.1	78.8
Fuel Oil	0			2383.0	56.7

Oil	ID	%	Density	Weight	LCG
...dge	N1P	100%	0.870	3.6	67.6
O Sludge	N1S	100%	0.870	3.6	78.5
O Settle	N1P	100%	0.870	105.3	74.5
O Day Tk	N2P	100%	0.870	110.6	74.6
O Day Tk	N3S	100%	0.870	73.5	82.0
OSettl	N4S	100%	0.870	73.5	79.1
O Service	0	100%	0.870	11.2	48.0
Diesel Oil	0			381.2	76.0

...ub Oils	ID	%	Density	Weight	LCG
...ins Storage Tank Port	N1P	0%	0.900	0.0	84.8
...ins Storage Tank Stbd	N1S	0%	0.900	0.0	84.8
Waste Oil	N1P	50%	1.000	9.6	80.7
Waste Oil	N1S	50%	1.000	9.6	80.7
...r Compressors LO Storage	T65101	100%	0.900	0.8	78.4
...oring Winch LO Storage	T65105	100%	0.900	0.3	78.1
...oring Winch LO Storage	T65106	100%	0.900	0.3	34.6
...oring Winch LO Storage	T65107	100%	0.900	0.3	23.3
...oring Winch LO Storage	T65108	100%	0.900	0.3	91.0
...n. Gen. LO Storage	T65109	100%	0.900	0.5	48.9
...Room LO Storage	T65110	100%	0.900	0.8	35.8
...Room LO Storage	T65111	100%	0.900	0.8	35.8
...rbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.6
...rbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.6
...rbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.7
...b Oils	0			68.2	84.9

...ellaneous Tanks	ID	%	Density	Weight	LCG
...folding Tank	P	50%	1.000	2.6	78.4
...olding Tank	S	50%	1.000	2.6	78.4
...ing Drain Tank	P	50%	1.000	1.4	77.1
LL ...ing Drain Tank	S	50%	1.000	1.4	77.1
...aerator Tower (Port)	C-51001	100%	1.000	37.9	85.0
...aerator Tower (Starb)	C-52001	100%	1.000	37.9	85.0
...xiliary Generator DO	GE-514001	100%	0.870	1.0	54.3
...Column Separator Tank	N1P	100%	1.000	13.8	79.7
...Column Separator Tank	N1S	100%	1.000	13.8	79.7
Miscellaneous Tanks	0			112.5	82.9

...n Structural Tanks	ID	%	Density	Weight	LCG
...d clmn p-tk	T05001A	0%	1.316	0.0	25.0
...d clmn p-tk	T05001B	0%	1.316	0.0	28.1
...d clmn p-tk	T05001A	0%	1.316	0.0	28.1
...d clmn p-tk	T05001B	0%	1.316	0.0	25.0
Fuel Relief	A58001	100%	1.000	7.9	34.5
Fluid Disp	A58002	100%	1.000	0.1	25.9
...nerator DO Day Tank	T59305	100%	0.870	0.2	21.6
...Chem Dosing Tank	T55101	100%	1.000	2.0	63.0
...Cooling ExansionTank	T55102	100%	1.000	0.5	64.9
...Water Separators	V-66201/V-66202	100%	0.900	1.4	80.7
...ol Sump Tank	TQ-123301	60%	1.080	12.1	55.2
...k Top Sump Tank	V-533605	50%	1.000	8.0	76.2
...Structural Tanks	0			32.1	56.8

...ard	ID	Chain	Weight	LCG	TCG	VCG
...- Port Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
...- Port Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
...- Port Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
...- Port Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
...- Port Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
...- Port Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
...- Port Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
...- Port Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
...- Stbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
...- Stbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
...- Stbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
...- Stbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
...- Stbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
...- Stbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
...- Stbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
...- Stbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
...rd	0	5392	1021.9	56.39	0.00	9.78

...ring Forces	ID	Tension	Weight	LCG	TCG	VCG
(Winch 9)	S1	140	111.7	24.63	38.00	18.29
(Winch 10)	S2	140	112.1	28.19	38.00	18.29
(Winch 11)	S3	140	112.3	31.75	38.00	18.29
(Winch 12)	S4	140	112.4	35.31	38.00	18.29
(Winch 13)	S5	140	112.3	81.02	38.00	18.29
(Winch 14)	S6	140	112.6	84.58	38.00	18.29
(Winch 15)	S7	140	112.6	88.14	38.00	18.29
(Winch 16)	S8	140	112.5	91.70	38.00	18.29
(Winch 8)	P1	140	107.0	24.63	-38.00	18.29
(Winch 7)	P2	140	106.5	28.19	-38.00	18.29
(Winch 6)	P3	140	106.1	31.75	-38.00	18.29
(Winch 5)	P4	140	105.5	35.31	-38.00	18.29
(Winch 4)	P5	140	99.6	81.02	-38.00	18.29
(Winch 3)	P6	140	100.4	84.58	-38.00	18.29
(Winch 2)	P7	140	101.2	88.14	-38.00	18.29
(Winch 1)	P8	140	102.4	91.70	-38.00	18.29
...ing Forces	0		1727.2	57.85	1.54	18.29

...s @TT	ID	%	Weight	LCG	TCG	VCG
...ft	TT-01	99%	8.0	63.51	9.85	37.88
...wd	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
...ep	TT-05	20%	19.9	85.97	-23.86	37.58
...arehouse	TT-06	60%	30.9	88.61	24.15	37.58
...arehouse	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
...kshop	TT-10	50%	16.3	75.27	-8.16	37.78
...e	TT-11	30%	13.1	75.27	-1.02	37.78
...kshop	TT-12	20%	6.2	75.37	4.83	37.68
...on Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
...ward Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
...n Workshop	TT-15	10%	6.1	73.19	23.30	37.58
...s @TT	0		169.3	78.84	4.33	37.69

...s @ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
...nent Storage	MD-03	60%	27.6	48.89	8.51	43.87
...s @ MD	0		42.9	51.10	8.51	43.87

...Laydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
...ydown	LD-01	40%	30.4	37.14	10.07	43.00
...1	LD-02	40%	30.0	38.55	-3.52	43.00
...2	LD-03	40%	21.3	39.27	-11.28	43.00
...A Laydown	LD-04	50%	29.6	95.42	0.43	43.00
...B Laydown	LD-05	50%	28.3	95.44	15.43	43.00
...C Laydown	LD-06	50%	31.9	95.44	30.80	43.00
...down	LD-07	0%	0.0	73.34	-5.46	43.00
...down	LD-08	0%	0.0	73.34	9.54	43.00
...down	LD-09	0%	0.0	73.34	24.54	43.00
...aydown	LD-10	0%	0.0	106.05	-19.00	36.58
...ocun	LD-11	60%	127.2	30.37	1.29	43.00
...aydown Areas	0		298.7	52.07	5.21	43.00

...s Items	ID	Weight	LCG	TCG	VCG
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
		0.0	0.00	0.00	0.00

...ils are follows: Weight - metric tonnes, density - metric tonnes per cubic ...

NOBLE DENTON

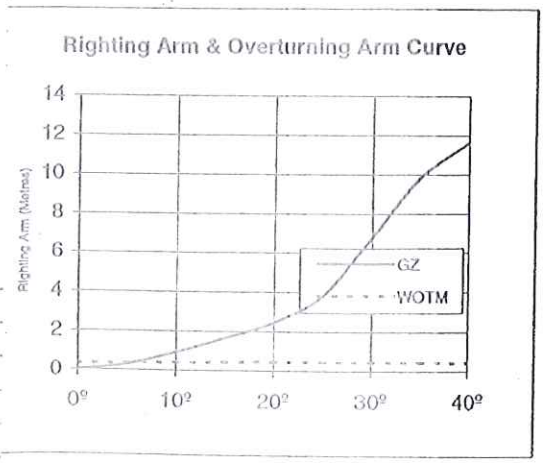
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	TCG m from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	9 -0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	9 0.0	4.4	0.000	0.000
SW Ballast 2P	877.6	1.025	· 0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	7 0.0	5.1	0.000	0.000
SW Ballast 3P	728.7	1.025	· -3.5	39.0	0.001	0.000
SW Ballast 3S	728.7	1.025	· 6.1	40.6	0.000	0.000
SW Ballast 4P	798.3	1.025	9 -0.1	27.7	0.000	0.001
SW Ballast 4S	798.3	1.025	9 6.3	42.1	0.000	0.000
SW Ballast 5P	256.6	1.025	· 4.3	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	· 0.2	41.0	0.000	0.000
SW Ballast 6P	523.9	1.025	· 8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	· 5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	6 -11.7	43.7	0.005	0.014
SW Ballast 7S	555.2	1.025	· 1.5	18.3	-	-
SW Ballast 11P	644.7	1.025	· 0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	· 2.8	15.1	-	-
SW Ballast 13P	644.7	1.025	· 0.0	0.0	0.000	0.000
SW Ballast 13S	644.7	1.025	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	· 1.88	5.33	0.012	0.041
SW Ballast 16S	249.7	1.025				
SW Ballast 17P	523.9	1.025	-0.02	24.12	0.017	0.056
SW Ballast 17S	523.9	1.025				
SW Ballast 18P	555.2	1.025				
SW Ballast 18S	555.2	1.025				
SW Ballast 19P	728.8	1.025				
SW Ballast 19S	728.8	1.025				
SW Ballast 20P	768.2	1.025				
SW Ballast 20S	768.2	1.025				
SW Ballast 21P	963.7	1.025				
SW Ballast 21S	963.7	1.025				
SW Ballast 22P	1067.3	1.025				
SW Ballast 22S	1067.3	1.025				
SW Ballast 23P	665.6	1.025				
SW Ballast 23S	665.6	1.025				
SW Ballast 24P	980.8	1.025				
SW Ballast 24S	980.8	1.025				
SW Ballast 25P	665.6	1.025				
SW Ballast 25S	665.6	1.025				
SW Ballast 26P	980.8	1.025				
SW Ballast 26S	980.8	1.025				
SW Ballast Total						

tatical Stability

orrected VCG =	24.14 m	24.18 m
MT / KML =	27.60 m	28.10 m
MT / GML =	3.46 m	3.92 m

tability Margin

llowable VCG =	25.23 m
tability Margin =	1.05 m



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Petrobras 36 - Roncador Field Development
Operatons Manual - Volume 7
Load[illegible] Condition: Fairlead Inspection Draft (18.0m)

NOBLE DENTON

[illegible] Tanks	ID	%	Density	Weight	LCG
Dri[illegible]er Tanks	8p	100%	1.000	276.2	40.25
Drill Water Tanks	8S	100%	1.000	276.2	40.25
Drill Water Tanks	9P	100%	1.000	248.5	40.53
Drill Water Tanks	9S	100%	1.000	248.5	40.53
Drill Water Tanks	14P	0%	1.000	0.0	72.39
Drill Water Tanks	14S	0%	1.000	0.0	72.39
Drill Water Tanks	15P	0%	1.000	0.0	72.34
Drill Water Tanks	15S	0%	1.000	0.0	72.34
Drill Water Tanks (Process FW)	0			1049.3	40.38

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.58
Pot Water Tk	1S	100%	1.000	193.8	84.58
Pot Water Day Tk	0	100%	1.000	15.2	78.87
Potable Water	0			402.7	84.36

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	100%	0.960	586.3	51.05
FO Tank	10S	100%	0.960	586.3	51.05
FO Tank	12P	100%	0.960	589.5	61.72
FO Tank	12S	100%	0.960	589.5	61.72
FO Overflow	P	100%	0.960	16.4	78.94
FO Overflow	S	100%	0.960	15.1	78.87
Fuel Oil	0			2383.0	56.70

[illegible]	ID	%	Density	Weight	LCG
[illegible]ge	N1P	100%	0.870	3.6	67.61
DO [illegible]ge	N1S	100%	0.870	3.6	78.58
DO Settle	N1P	100%	0.870	105.3	74.52
DO Day Tk	N2P	100%	0.870	110.6	74.60
DO Day Tk	N3S	100%	0.870	73.5	82.01
DOSettl	N4S	100%	0.870	73.5	79.15
DO Service	0	100%	0.870	11.2	48.01
Diesel Oil	0			381.2	76.08

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.85
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.85
Waste Oil	N1P	50%	1.000	9.6	80.72
Waste Oil	N1S	50%	1.000	9.6	80.72
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.47
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.17
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.65
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.33
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.04
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.60
WI Room LO Storage	T65110	100%	0.900	0.8	35.87
WI Room LO Storage	T65111	100%	0.900	0.8	35.87
Turbine Lube Oil Consule 'C'	UQ-122308	100%	0.900	15.0	89.67
Turbine Lube Oil Consule 'B'	UQ-122306	100%	0.900	15.0	89.68
Turbine Lube Oil Consule 'A'	UQ-122304	100%	0.900	15.0	89.71
Lub Oils	0			68.2	84.90

[illegible]s Tanks	ID	%	Density	Weight	LCG
[illegible]ing Tank	P	50%	1.000	2.6	78.49
b[illegible]ding Tank	S	50%	1.000	2.6	78.49
W[illegible]g Drain Tank	P	50%	1.000	1.4	77.13
W.D[illegible]ing Drain Tank	S	50%	1.000	1.4	77.13
Deaerator Tower (Port)	C-51001	100%	1.000	37.9	85.08
Deaerator Tower (Starb)	C-52001	100%	1.000	37.9	85.08
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.39
Aft Column Separator Tank	N1P	100%	1.000	13.8	79.72
Aft Column Separator Tank	N1S	100%	1.000	13.8	79.72
Miscellaneous Tanks	0			112.5	82.99

Non Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.00
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.15
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.00
Helifuel Refuel	A58001	100%	1.000	7.9	34.55
Helifuel Disp	A58002	100%	1.000	0.1	25.91
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.66
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.02
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.97
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	80.77
Glycol Sump Tank	TQ-123301	60%	1.080	12.1	55.23
Tank Top Sump Tank	V-533605	50%	1.000	8.0	76.22
Non Structural Tanks	0			32.1	56.82

[illegible]	ID	Chain	Weight	LCG	TCG	VCG
[illegible]ort Aft (Winch 2)	1aP	337	63.9	87.52	-30.50	4.60
[illegible]ort Aft (Winch 4)	1bP	337	63.9	81.65	-30.50	4.60
[illegible]ort Aft (Winch 3)	5P	337	63.9	86.47	-31.12	16.19
[illegible]ort Aft (Winch 1)	9P	337	63.9	91.05	-33.48	13.72
[illegible]ort Fwd (Winch 5)	2aP	337	63.9	31.13	-30.50	4.60
[illegible]ort Fwd (Winch 7)	2bP	337	63.9	25.26	-30.50	4.60
[illegible]ort Fwd (Winch 6)	6P	337	63.9	26.31	-31.12	16.19
[illegible]ort Fwd (Winch 8)	10P	337	63.9	21.73	-33.48	13.72
[illegible]tbd Aft (Winch 13)	4aS	337	63.9	81.65	30.50	4.60
[illegible]tbd Aft (Winch 15)	4bS	337	63.9	87.52	30.50	4.60
[illegible]tbd Aft (Winch 14)	8S	337	63.9	86.47	31.12	16.19
[illegible]tbd Aft (Winch 16)	12S	337	63.9	91.05	33.48	13.72
[illegible]tbd Fwd (Winch 10)	3aS	337	63.9	25.26	30.50	4.60
[illegible]tbd Fwd (Winch 12)	3bS	337	63.9	31.13	30.50	4.60
[illegible]tbd Fwd (Winch 11)	7S	337	63.9	26.31	31.12	16.19
[illegible]tbd Fwd (Winch 9)	11S	337	63.9	21.73	33.48	13.72
	0	5392	1021.9	56.39	0.00	9.78

[illegible]g Forces	ID	Tension	Weight	LCG	TCG	VCG
[illegible]inch 9)	S1	140	111.7	24.63	38.00	18.29
[illegible]inch 10)	S2	140	112.1	28.19	38.00	18.29
[illegible]inch 11)	S3	140	112.3	31.75	38.00	18.29
[illegible]inch 12)	S4	140	112.4	35.31	38.00	18.29
[illegible]inch 13)	S5	140	112.3	81.02	38.00	18.29
[illegible]inch 14)	S6	140	112.6	84.58	38.00	18.29
[illegible]inch 15)	S7	140	112.6	88.14	38.00	18.29
[illegible]inch 16)	S8	140	112.5	91.70	38.00	18.29
[illegible]inch 8)	P1	140	107.0	24.63	-38.00	18.29
[illegible]inch 7)	P2	140	106.5	28.19	-38.00	18.29
[illegible]inch 6)	P3	140	106.1	31.75	-38.00	18.29
[illegible]inch 5)	P4	140	105.5	35.31	-38.00	18.29
[illegible]inch 4)	P5	140	99.6	81.02	-38.00	18.29
[illegible]inch 3)	P6	140	100.4	84.58	-38.00	18.29
[illegible]inch 2)	P7	140	101.2	88.14	-38.00	18.29
[illegible]inch 1)	P8	140	102.4	91.70	-38.00	18.29
[illegible] Forces	0		1727.2	57.85	1.54	18.29

@ TT	ID	%	Weight	LCG	TCG	VCG
[illegible]d	TT-01	99%	8.0	63.51	9.85	37.88
	TT-02	99%	8.0	49.26	9.85	37.88
	TT-03	25%	10.6	88.40	-31.10	37.88
	TT-04	30%	9.3	81.40	-32.18	37.88
[illegible],	TT-05	20%	19.9	85.97	-23.86	37.58
[illegible]ehouse	TT-06	60%	30.9	88.61	24.15	37.58
[illegible]ehouse	TT-07	60%	31.4	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
[illegible]hop	TT-10	50%	16.3	75.27	-8.16	37.78
	TT-11	30%	13.1	75.27	-1.02	37.78
[illegible]hop	TT-12	20%	6.2	75.37	4.83	37.68
[illegible] Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
[illegible]ard Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
[illegible] Workshop	TT-15	10%	6.1	73.19	23.30	37.58
@ TT	0		169.3	78.84	4.33	37.69

@ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	20%	5.6	65.89	8.51	43.87
	MD-02	35%	9.7	48.89	8.51	43.87
[illegible]nt Storage	MD-03	60%	27.6	48.89	8.51	43.87
@ MD	0		42.9	51.10	8.51	43.87

[illegible]ydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
[illegible]own	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
[illegible] Laydown	LD-04	50%	29.6	95.42	0.43	43.00
[illegible] Laydown	LD-05	50%	28.3	95.44	15.43	43.00
[illegible] Laydown	LD-06	50%	31.9	95.44	30.80	43.00
[illegible]own	LD-07	0%	0.0	73.34	-5.46	43.00
[illegible]own	LD-08	0%	0.0	73.34	9.54	43.00
[illegible]own	LD-09	0%	0.0	73.34	24.54	43.00
[illegible]ydown	LD-10	0%	0.0	106.05	-19.00	36.58
[illegible]ourt	LD-11	60%	127.2	30.37	1.29	43.00
[illegible]ydown Areas	0		298.7	52.07	5.21	43.00

[illegible] Items	ID		Weight	LCG	TCG	VCG
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
	0		0.0	0.00	0.00	0.00
			0.0	0.00	0.00	0.00

Units [illegible]s follows: Weight - metric tonnes, density - metric tonnes per cubic m[illegible]

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MA-3010.38-1320-915-NBD-909

Petrobras 36 - Roncador Field Deve
Operatons Manual - Volume 7
Loading Condition:

NOBLE DENTON

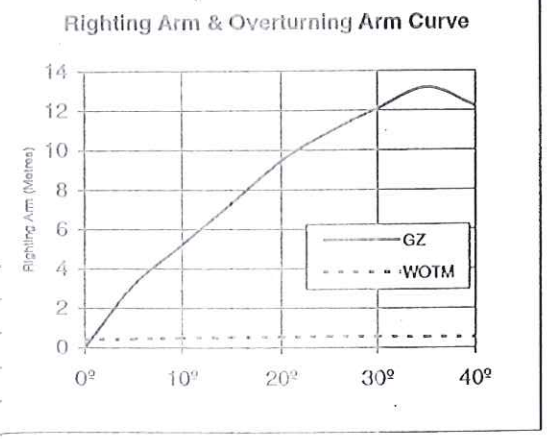
Sea Water Ballast Tanks	Max Vol. m³	Density t/m³	TCG m from CL	VCG m	FSC_T m	FSC_L m
SW Ballast 1P	886.7	1.025	-0.3	29.7	0.000	0.000
SW Ballast 1S	886.7	1.025	0.0	0.0	0.000	0.000
SW Ballast 2P	877.6	1.025	0.2	26.4	0.000	0.000
SW Ballast 2S	877.6	1.025	1.7	35.4	0.001	0.000
SW Ballast 3P	728.7	1.025	-3.6	39.1	0.001	0.000
SW Ballast 3S	728.7	1.025	-1.6	24.3	0.000	0.000
SW Ballast 4P	798.3	1.025	-6.1	25.8	0.000	0.001
SW Ballast 4S	798.3	1.025	-9.0	44.2	0.000	0.000
SW Ballast 5P	256.6	1.025	1.4	37.7	0.000	0.000
SW Ballast 5S	256.6	1.025	-0.6	41.1	0.000	0.000
SW Ballast 6P	523.9	1.025	8.5	43.9	0.000	0.000
SW Ballast 6S	523.9	1.025	5.2	43.0	0.000	0.000
SW Ballast 7P	555.2	1.025	0.0	0.0	0.001	0.000
SW Ballast 7S	555.2	1.025	0.0	0.0	-	-
SW Ballast 11P	644.7	1.025	0.0	9.8	-	-
SW Ballast 11S	644.7	1.025	0.0	0.0	-	-
SW Ballast 13P	644.7	1.025	0.0	12.2	0.000	0.000
SW Ballast 13S	644.7	1.025	0.0	0.0	-	-
SW Ballast 16P	249.7	1.025	2.53	5.39	0.007	0.071
SW Ballast 16S	249.7	1.025				
SW Ballast 17P	523.9	1.025	-0.02	26.99	0.010	0.072
SW Ballast 17S	523.9	1.025				
SW Ballast 18P	555.2	1.025				
SW Ballast 18S	555.2	1.025				
SW Ballast 19P	728.8	1.025				
SW Ballast 19S	728.8	1.025				
SW Ballast 20P	768.2	1.025				
SW Ballast 20S	768.2	1.025				
SW Ballast 21P	963.7	1.025				
SW Ballast 21S	963.7	1.025				
SW Ballast 22P	1067.3	1.025				
SW Ballast 22S	1067.3	1.025				
SW Ballast 23P	665.6	1.025				
SW Ballast 23S	665.6	1.025				
SW Ballast 24P	980.8	1.025				
SW Ballast 24S	980.8	1.025				
SW Ballast 25P	665.6	1.025				
SW Ballast 25S	665.6	1.025				
SW Ballast 26P	980.8	1.025				
SW Ballast 26S	980.8	1.025				
SW Ballast Total						

Statical Stability

Corrected VCG =	27.00 m	27.06 m
KMT / KML =	70.50 m	109.20 m
GMT / GML =	43.50 m	82.14 m

Stability Margin

Allowable VCG =	44.90 m
Stability Margin =	17.84 m



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MA-3010.38-1320-915-NBD-909

Loading Condition: Transit Draft 11.0m

NOBLE DENTON

Tanks	ID	%	Density	Weight	LCG
Drill Water Tanks	8p	0%	1.000	0.0	40.2
Drill Water Tanks	8S	0%	1.000	0.0	40.2
Drill Water Tanks	9P	0%	1.000	0.0	40.5
Drill Water Tanks	9S	0%	1.000	0.0	40.5
Drill Water Tanks	14P	0%	1.000	0.0	72.3
Drill Water Tanks	14S	0%	1.000	0.0	72.3
Drill Water Tanks	15P	0%	1.000	0.0	72.3
Drill Water Tanks	15S	0%	1.000	0.0	72.3
Drill Water Tanks (Process FW)	0			0.0	0.00

Potable Water	ID	%	Density	Weight	LCG
Pot Water Tk	1P	100%	1.000	193.8	84.5
Pot Water Tk	1S	100%	1.000	193.8	84.5
Pot Water Day Tk	0	100%	1.000	15.2	78.8
Potable Water	0			402.7	84.3

Fuel Oil	ID	%	Density	Weight	LCG
FO Tank	10P	0%	0.960	0.0	51.0
FO Tank	10S	0%	0.960	0.0	51.0
FO Tank	12P	0%	0.960	0.0	61.7
FO Tank	12S	0%	0.960	0.0	61.7
FO Overflow	P	50%	0.960	8.2	78.9
FO Overflow	S	50%	0.960	7.6	78.8
Fuel Oil	0			15.8	78.9

	ID	%	Density	Weight	LCG
Sludge	N1P	0%	0.870	0.0	67.6
DO Sludge	N1S	0%	0.870	0.0	78.5
DO Settle	N1P	100%	0.870	105.3	74.5
DO Day Tk	N2P	100%	0.870	110.6	74.0
DO Day Tk	N3S	100%	0.870	73.5	82.0
DOSetd	N4S	100%	0.870	73.5	79.1
DO Service	0	100%	0.870	11.2	48.0
Diesel Oil	0			374.0	76.1

Lub Oils	ID	%	Density	Weight	LCG
Drains Storage Tank Port	N1P	0%	0.900	0.0	84.8
Drains Storage Tank Stbd	N1S	0%	0.900	0.0	84.8
Waste Oil	N1P	10%	1.000	1.9	80.7
Waste Oil	N1S	10%	1.000	1.9	80.7
Air Compressors LO Storage	T65101	100%	0.900	0.8	78.4
Mooring Winch LO Storage	T65105	100%	0.900	0.3	78.1
Mooring Winch LO Storage	T65106	100%	0.900	0.3	34.6
Mooring Winch LO Storage	T65107	100%	0.900	0.3	23.3
Mooring Winch LO Storage	T65108	100%	0.900	0.3	91.0
Em. Gen. LO Storage	T65109	100%	0.900	0.5	48.6
WI Room LO Storage	T65110	100%	0.900	0.8	35.8
WI Room LO Storage	T65111	100%	0.900	0.8	35.8
Turbine Lube Oil Consule 'C'	UQ-122308	0%	0.900	0.0	89.6
Turbine Lube Oil Consule 'B'	UQ-122306	0%	0.900	0.0	89.6
Turbine Lube Oil Consule 'A'	UQ-122304	0%	0.900	0.0	89.7
Lub Oils	0			7.9	65.8

Tanks	ID	%	Density	Weight	LCG
Tank	P	10%	1.000	0.5	78.4
Holding Tank	S	10%	1.000	0.5	78.4
Drain Tank	P	0%	1.000	0.0	77.1
W.I.L ring Drain Tank	S	0%	1.000	0.0	77.1
Deaerator Tower (Port)	C-51001	0%	1.000	0.0	85.0
Deaerator Tower (Starb)	C-52001	0%	1.000	0.0	85.0
Auxiliary Generator DO	GE-514001	100%	0.870	1.0	54.3
Aft Column Separator Tank	N1P	0%	1.000	0.0	79.7
Aft Column Separator Tank	N1S	0%	1.000	0.0	79.7
Miscellaneous Tanks	0			2.1	66.7

Non Structural Tanks	ID	%	Density	Weight	LCG
Fwd clmn p-tk	T05001A	0%	1.316	0.0	25.0
Fwd clmn p-tk	T05001B	0%	1.316	0.0	28.1
Fwd clmn p-tk	T05001A	0%	1.316	0.0	28.1
Fwd clmn p-tk	T05001B	0%	1.316	0.0	25.0
Helifuel Refuel	A58001	100%	1.000	7.9	34.5
Helifuel Disp	A58002	100%	1.000	0.1	25.9
Incinerator DO Day Tank	T59305	100%	0.870	0.2	21.6
FW Chem Dosing Tank	T55101	100%	1.000	2.0	63.0
FW Cooling ExansionTank	T55102	100%	1.000	0.5	64.9
Oily Water Separators	V-66201/V-66202	100%	0.900	1.4	30.7
Glycol Sump Tank	TQ-123301	0%	1.080	0.0	55.2
Tank Top Sump Tank	V-533605	0%	1.000	0.0	76.2
Non Structural Tanks	0			12.1	45.9

	ID	Chain	Weight	LCG	TCG	VCG
Port Aft (Winch 2)	1aP	450	85.3	87.52	-30.50	4.60
Port Aft (Winch 4)	1bP	450	85.3	81.65	-30.50	4.60
Port Aft (Winch 3)	5P	450	85.3	86.47	-31.12	16.19
Port Aft (Winch 1)	9P	450	85.3	91.05	-33.48	13.72
Port Fwd (Winch 5)	2aP	450	85.3	31.13	-30.50	4.60
Port Fwd (Winch 7)	2bP	450	85.3	25.26	-30.50	4.60
Port Fwd (Winch 6)	6P	450	85.3	26.31	-31.12	16.19
Port Fwd (Winch 8)	10P	450	85.3	21.73	-33.48	13.72
Stbd Aft (Winch 13)	4aS	450	85.3	81.65	30.50	4.60
Stbd Aft (Winch 15)	4bS	450	85.3	87.52	30.50	4.60
Stbd Aft (Winch 14)	8S	450	85.3	86.47	31.12	16.19
Stbd Aft (Winch 16)	12S	450	85.3	91.05	33.48	13.72
Stbd Fwd (Winch 10)	3aS	450	85.3	25.26	30.50	4.60
Stbd Fwd (Winch 12)	3bS	450	85.3	31.13	30.50	4.60
Stbd Fwd (Winch 11)	7S	450	85.3	26.31	31.12	16.19
Stbd Fwd (Winch 9)	11S	450	85.3	21.73	33.48	13.72
	0	7200	1364.6	56.39	0.00	9.78

Mooring Forces	ID	Tension	Weight	LCG	TCG	VCG
Winch 9)	S1	0	0.0	24.63	38.00	18.29
Winch 10)	S2	0	0.0	28.19	38.00	18.29
Winch 11)	S3	0	0.0	31.75	38.00	18.29
Winch 12)	S4	0	0.0	35.31	38.00	18.29
Winch 13)	S5	0	0.0	81.02	38.00	18.29
Winch 14)	S6	0	0.0	84.58	38.00	18.29
Winch 15)	S7	0	0.0	88.14	38.00	18.29
Winch 16)	S8	0	0.0	91.70	38.00	18.29
Winch 8)	P1	0	0.0	24.63	-38.00	18.29
Winch 7)	P2	0	0.0	28.19	-38.00	18.29
Winch 6)	P3	0	0.0	31.75	-38.00	18.29
Winch 5)	P4	0	0.0	35.31	-38.00	18.29
Winch 4)	P5	0	0.0	81.02	-38.00	18.29
Winch 3)	P6	0	0.0	84.58	-38.00	18.29
Winch 2)	P7	0	0.0	88.14	-38.00	18.29
Winch 1)	P8	0	0.0	91.70	-38.00	18.29
Mooring Forces	0		0.0	0.00	0.00	0.00

@ TT	ID	%	Weight	LCG	TCG	VCG
	TT-01	10%	0.8	63.51	9.85	37.88
	TT-02	10%	0.8	49.26	9.85	37.88
	TT-03	10%	4.2	88.40	-31.10	37.88
	TT-04	10%	3.1	81.40	-32.18	37.88
	TT-05	10%	10.0	85.97	-23.86	37.58
Warehouse	TT-06	10%	5.1	88.61	24.15	37.58
Warehouse	TT-07	10%	5.2	80.51	24.00	37.58
	TT-08	5%	4.1	82.90	31.44	37.88
	TT-09	5%	3.0	69.19	-5.33	37.88
Workshop	TT-10	10%	3.3	75.27	-8.16	37.78
	TT-11	10%	4.4	75.27	-1.02	37.78
Workshop	TT-12	10%	3.1	75.37	4.83	37.68
Laydown Area	TT-13	10%	0.6	61.89	-2.75	37.58
Laydown Area	TT-14	10%	2.0	37.67	22.62	37.58
Workshop	TT-15	10%	6.1	73.19	23.30	37.58
@ TT	0		55.8	78.24	1.41	37.70

@ MD	ID	%	Weight	LCG	TCG	VCG
	MD-01	5%	1.4	65.89	8.51	43.87
	MD-02	5%	1.4	48.89	8.51	43.87
Cement Storage	MD-03	10%	4.6	48.89	8.51	43.87
@ MD	0		7.4	52.10	8.51	43.87

Laydown Areas	ID	%	Weight	LCG	TCG	VCG
	HD	0%	0.0	21.10	-35.80	48.90
Laydown	LD-01	40%	30.4	37.14	10.07	43.00
	LD-02	40%	30.0	38.55	-3.52	43.00
	LD-03	40%	21.3	39.27	-11.28	43.00
Laydown	LD-04	50%	29.6	95.42	0.43	43.00
Laydown	LD-05	50%	28.3	95.44	15.43	43.00
Laydown	LD-06	50%	31.9	95.44	30.80	43.00
Laydown	LD-07	0%	0.0	73.34	-5.46	43.00
Laydown	LD-08	0%	0.0	73.34	9.54	43.00
Laydown	LD-09	0%	0.0	73.34	24.54	43.00
Laydown	LD-10	0%	0.0	106.05	-19.00	36.58
Laydown Court	LD-11	60%	127.2	30.37	1.29	43.00
Laydown Areas	0		298.7	52.07	5.21	43.00

Other Items	ID	Weight	LCG	TCG	VCG
	0	36.0	35.31	0.00	12.20
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
	0	0.0	0.00	0.00	0.00
		36.0	35.31	0.00	12.20

Units are as follows: Weight - metric tonnes, density - metric tonnes per cubic m