

Prepared for:

Autoridad del Canal de Panamá

Salt Water Intrusion Analysis Panama Canal Locks

Existing situation

Report A: field data collection, development and validation of simulation model, analysis of salt water intrusion

Annex B: Salinity measurements dry season

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ANNEX B

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SALINITY MEASUREMENTS DRY SEASON (April 2002)

**Outline
of
salinity measurements
dry season (April 2002)**

Outline of salinity measurements in dry-season (April 2002)

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
10 April	low 08:15 high 14:30	installation of CT logger in tailbay-east, Miraflores Locks, edge wing wall, near bed					
		downlockage	forebay-east ML	c	long section	-	after passage of ship
			forebay-east ML	a	measurements near intake	-	salinity of inflow
			forebay-east ML	b	long section	-	before passage of ship
			lock B-east	3	measurements near u/s gates	low	vessel exits B
			lock B-east	4	long section	low	lock closed and empty
			lock B-east	5	long section	high	lock closed and empty
			lock B-east	2	measurements near d/s gates	high	vessel enters B
			lock A-east	2	measurements near d/s gates	high	vessel enters A
11 April	low 09:00 high: 15:15	uplockage low tide	tailbay-west ML	c	long section	-	after passage of ship
			tailbay-west ML	a	measurements near outlet	-	salinity of outflow
			tailbay-west ML	b	long section	-	before passage of ship
			lock A-west	3	measurements near d/s gates	high	vessel exits A
			lock A-west	4	long section	high	lock closed and empty
			lock A-west	5	long section	low	lock closed and empty
			lock A-west	2	measur. near u/s gates failed	low	vessel enters A
			lock B-west	2	measurements near u/s gates	low	vessel enters B
		Miraflores Lake: long sections near spillway long section in shipping lane from Miraflores Locks to Pedro Miguel Locks					

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
12 April	low 09:45 high 16:00	downlockage high tide	lock B-west lock A-west lock A-west lock A-west lock A-west tailbay-west ML tailbay-west ML tailbay-west ML tailbay-west ML	2 2 2! 3! 4 c c a c	measurements near d/s gates measurements near d/s gates measurements near u/s gates measurements near u/s gates long section long section long section measurements near outlet long section	high high high low low	vessel enters B vessel enters A after entry of vessel in A before exit of vessel lock closed and empty after passage of ship (1) after passage of ship (2) salinity of outflow after passage of ship
repositioning of CT logger in tailbay-east, Miraflores Locks, edge wing wall, from bed to 1 m below water surface low tide							
13 April	low 10:30 high 16:45	uplockage	lock B-east lock B-east lock B-east lock B-east lock B-east lock B-east forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML forebay-east ML	2! 3! 3 4 5 4! c c a b c c a b! c!	measurements near d/s gates measurements near d/s gates measurements near d/s gates long section long section long section long section long section measurements near intake long section long section long section measurements near intake long section long section	low high high high low high - - - - - - - - - -	after entry of vessel in B before exit of vessel vessel exits B lock closed and empty lock closed and empty after filling without ship after passage of ship (1) after passage of ship (2) inflow salinity before passage of ship after passage of ship (1) after passage of ship (2) salinity of inflow no passage of ship no passage of ship

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
14 April		uplockage	tailbay-west PML tailbay-west PML tailbay-west PML lock C-west lock C-west lock C-west lock C-west lock C-west lock C-west lock C-west lock C-west lock C-west lock C-west forebay-west PML forebay-west PML forebay-west PML forebay-west PML	a b c 3 4 5 2 2! 3! 3 4 c a b c	measurements near outlet long section long section measurements near d/s gates long section long section measurements near u/s gates measurements near d/s gates measurements near d/s gates measurements near d/s gates long section long section measurements near intake long section long section long section	- - - high high low low low high high high high -	salinity of outflow before passage of ship after passage of ship vessel exits C lock closed and empty lock closed and empty vessel enters C after entry of vessel in C before exit of vessel vessel exits C lock closed and empty after passage of ship salinity of inflow before passage of ship after passage of ship
Gaillard Cut: long section in shipping lane from Pedro Miguel Locks to Gamboa							
		downlockage	forebay-west PML forebay-east PML lock C-east lock C-east lock C-east lock C-east tailbay-east PML tailbay-east PML tailbay-east PML tailbay-east PML	c c 2! 3! 3 4 c a b c	long section long section measurements near u/s gates measurements near u/s gates measurements near u/s gates long section long section measurements near outlet long section long section	- - high low low low -	after passage of ships after passage of ships after entry of vessel in C before exit of vessel vessel exits C lock closed and empty after passage of ship salinity of outflow before passage of ship after passage of ship
15 April		removal of CT logger from tailbay-east, Miraflores Locks installation of CT logger in tailbay-east, Gatun Locks, edge wing wall, near bed					

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks	
16 April		Gatun Lake: long section west side of Gatun Locks, along spillway long section east side of Gatun Locks long section in shipping channel near Gatun Locks	downlockage	forebay-west GL forebay-west GL forebay-west GL forebay-west GL lock F-west lock F-west lock F-west lock F-west lock D-west lock D-west lock D-west lock D-west lock D-west tailbay-west GL tailbay-west GL tailbay-west GL tailbay-west GL	c a b c 3 4 5 2 2 2! 3! 3 4 c a b c	long section measurements near intake long section long section measurements near u/s gates long section long section measurements near d/s gates measurements near d/s gates measurements near u/s gates measurements near u/s gates long section long section measurements near outlet long section long section	- - - - low low high high high low low - - - -	after passage of ship salinity of inflow before passage of ship after passage of ship vessel exits F lock closed and empty lock closed and empty vessel enters F vessel enters D after entry of vessel in D before exit of vessel vessel exits D lock closed and empty after passage of ship salinity of outflow before passage of ship after passage of ship

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
17 April		uplockage	tailbay-west GL tailbay-west GL tailbay-west GL lock D-west lock D-west lock D-west lock F-west lock F-west lock F-west lock F-west forebay-west GL forebay-west GL forebay-west GL forebay-west GL	a b c 3 4 5 2! 3! 3 4 c a b c	measurements near outlet long section long section measurements near d/s gates long section long section measurements near d/s gates measurements near d/s gates measurements near d/s gates long section long section measurements near intake long section long section	- - - high high low low high high high high -	salinity of outflow before passage of ship after passage of ship vessel exits D lock closed and empty lock closed and empty after entry of vessel in F before exit of vessel vessel exits F lock closed and empty after passage of ship salinity of inflow before passage of ship after passage of ship
repositioning of CT logger in tailbay-east, Gatun Locks, edge wing wall, from bed to 1 m below water surface low tide							

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
19 April	high 08:30 low 14:45	uplockage high tide	lock A-east lock A-east lock A-east lock A-east lock B-east lock B-east lock B-east lock B-east lock B-east lock B-east lock B-east lock B-east lock B-east forebay-east ML forebay-east ML forebay-east ML forebay-east ML	2! 3! 3 4 3 4 5 2 2! 3! 3 4 c a b c	measurements near d/s gates measurements near d/s gates measurements near d/s gates long section measurements near d/s gates long section long section measurements near u/s gates measurements near d/s gates measurements near d/s gates long section long section measurements near intake long section long section	low high high high high high low low low high high -	after entry of vessel in A before exit of vessel vessel exits A lock closed and empty vessel exits B lock closed and empty lock closed and empty vessel enters B after entry of vessel in B before exit of vessel vessel exits B lock closed and empty after passage of ship salinity of inflow before passage of ship after passage of ship

date	tide	uplockage or downlockage	location of salinity measurements	phase	measurements	water level lock	remarks
19 April	high 08:30 low 14:45	downlockage low tide	lock B-east lock B-east lock B-east lock B-east lock A-east lock A-east lock A-east lock A-east lock A-east lock A-east lock A-east lock A-east lock A-east tailbay-east ML tailbay-east ML tailbay-east ML tailbay-east ML	2! 3! 3 4 2! 3! 3 4 3 4 5 2 c a b c	measurements near u/s gates measurements near u/s gates measurements near u/s gates long section measurements near u/s gates measurements near u/s gates measurements near u/s gates long section measurements near u/s gates long section long section measurements near d/s gates long section measurements near outlet long section long section	high low low low high low low low low low high -	after entry of vessel in B before exit of vessel vessel exits B lock closed and empty after entry of vessel in A before exit of vessel vessel exits A lock closed and empty vessel exits A lock closed and empty lock closed and empty vessel enters A after passage of ship salinity of outflow before passage of ship after passage of ship
20 April		removal of CT logger from tailbay-east, Gatun Locks					

Measurements

Miraflores Locks

Lock A - Lock B - Forebay Miraflores Locks
Uplockage Northbound vessels

Date: Saterday 13 April 2002

Time: 10:00 – 13:00 h

Lane: East lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Chios Harmony', 593.2 x 75.9 x 18.4

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Uplockage of launch 1 in west lane from Pacific Side to Miraflores Lake, astern of 'Saga Viking'. No measurements. Launch 1 waits for 'Chios Harmony' in east lane.									
Forebay-east Miraflores Locks			Waits beside wing wall		Lock A-east	Low -7.2	Vessel 1 and launch 2 enter A	Astern	
Forebay-east Miraflores Locks	+54.2		Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020413LN1007 020413LN1008 020413LN1010 020413LN1012 020413LN1014	Lock A-east	Low → High	Vessel 1	Astern	
Forebay-east Miraflores Locks	+54.2		Position in forebay:	c; Long section Files:	Lock A-east	High +19.3	Vessel 1 moves to B	Astern	

			near gates 1/3 2/3 knuckle wing edge	020413LN1017 020413LN1019 020413LN1020 020413LN1021 020413LN1023					
Forebay-east Miraflores Locks	+54.2		Takes position near intake		Lock B-east	Low +19.3	Launch 2 enters B	Near d/s gates	2!; Single position File: 020413j11037
Forebay-east Miraflores Locks	+54.2		Near intake, side wall east	a; Inflow File: 020413LN1031	Lock B-east	Low → High	Vessel 1	Astern	
Forebay-east Miraflores Locks	+54.2		Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020413LN1045 020413LN1047 020413LN1048 020413LN1050 020413LN1051	Lock B-east	High +54.2	Vessel 1	Near d/s gates	3!; Single position Files: 020413j11045 020413j11047 020413j11052
					Lock B-east	High +54.2	Vessel 1 exits B	Near d/s gates	3; Single position Files: 020413j11055 020413j11057 020413j11059 020413j11101
Forebay-east Miraflores Locks		Vessel 1 passes by	Waits beside						

			wing wall						
Forebay-east Miraflores Locks	+54.2		Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020413LN1103 020413LN1105 020413LN1106 020413LN1108 020413LN1109	Lock B-east (u/s gates are 50% opened and closed!)	High +54.2	-	Distance to u/s gates: 1000 800 600 400 200 0	4; Long section Files: 020413jl1104 020413jl1106 020413jl1108 020413jl1111 020413jl1113 020413jl1115
Forebay-east Miraflores Locks					Lock B-east	High → Low	-	Near u/s gates	
Forebay-east Miraflores Locks	+54.2		Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020413LN1135 020413LN1136 020413LN1139 020413LN1140 020413LN1141	Lock B-east	Low +22.3	-	Distance to u/s gates: 0 200 400 600 800 1000	5; Long section Files: 020413jl1133 020413jl1135 020413jl1137 020413jl1138 020413jl1140 020413jl1142
Forebay-east Miraflores Locks	+54.2	-	Near intake, side wall east	a; Inflow File: 020413LN1148	Lock B-east	Low → High	No next vessel!	Near d/s gates	
Forebay-east Miraflores Locks	+54.2	-	Position in forebay: near gates 1/3 2/3 knuckle	b!; Long section Files: 020413LN1210 020413LN1212 020413LN1213 020413LN1214	Lock B-east	High +54.2	No next vessel!	Distance to u/s gates: 1000 800 600 400	4!; Long section Files: 020413jl1207 020413jl1210 020413jl1212 020413jl1215

			wing edge	020413LN1216				0	020413jl1220
					Lock B-east	High	Launch 2 exits B		
Forebay-east Miraflores Locks		Launch 2 passes by							
Forebay-east Miraflores Locks	+54.2	No vessel; upstream gates of Lock B-east are opened prior to measurements!	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020413LN1234 020413LN1236 020413LN1239 020413LN1241 020413LN1242					

Lock A - Lock B - Forebay Miraflores Locks
Uplockage High Tide Northbound vessels

Date: Friday 19 April 2002

Time: 07:30 – 11:30 h

Lane: East lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Msc Chile', 662.8 x 100.5 x 37.2

Vessel 2, Tugboat + 'Christina', 330.1 x 60.1 x 6.0, + tugboat + sailing yacht

Vessel 3, 'Chios sky', 600.4 x 74.6 x 20.3, + tugboat

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock A-east	Low +4.2	Vessel 1 + launch 1 enter A	Astern						
Lock A-east	Low → High	Vessel 1	Astern						
Lock A-east	High +25.4	Vessel 1 moves to B	Astern						
Lock B-east	Low +25.4	Launch 1 enters B	Astern						
Lock B-east	Low → High	Vessel 1	Astern						
Lock B-east	High +54.3	Vessel 1 exits B	Near d/s gates	3; Single position Files: 020419LN0743	Lock A-east	Low +6.4	Vessel 2 + launch 2 enter A	Astern	

				020419LN0746 020419LN0748 020419LN0749 020419LN0751 020419LN0752 020419LN0754 020419LN0755 020419LN0757					
Lock B-east	High +54.3	-	Distance to u/s gates: 1000 800 600 400 200 0	4; Long section Files: 020419LN0800 020419LN0802 020419LN0803 020419LN0805 020419LN0807 020419LN0808	Lock A-east	Low +6.4	Vessel 2	Near d/s gates	2!; Single position File: 020419jl0827
Lock B-east	High → Low	-	Near d/s gates		Lock A-east	Low → High	Vessel 2	Astern	
Lock B-east	Low +27.6	-	Distance to u/s gates: 1000 800 600 400 200 0	5; Long section Files: 020419LN0838 020419LN0840 020419LN0841 020419LN0843 020419LN0844 020419LN0845	Lock A-east	High +24.6	Vessel 2	Near d/s gates	3!; Single position File: 020419jl0837
Lock B-east	Low +26.0	Vessel 2 enters B	Near u/s gates	2; Single position Files:	Lock A-east	High +26.0	Vessel 2 moves to B	Near d/s gates	3; Single position Files:

				020419LN0850 020419LN0851 020419LN0852 020419LN0853 020419LN0854 020419LN0855 020419LN0856 020419LN0858 020419LN0859 020419LN0900 020419LN0901					020419jl0852 020419jl0854 020419jl0857 020419jl0859 020419jl0901
					Lock A-east	High +26.0	-	Distance to u/s gates: 1000 800 600 400 200 0	4; Long section Files: 020419jl0905 020419jl0907 020419jl0910 020419jl0912 020419jl0915 020419jl0917
Lock B-east	Low → High	Vessel 2	Ahead		Lock A-east	High → Low	-	Near u/s gates	
Lock B-east	High +54.4	Launch 1 + vessel 2 exit B	Ahead		Lock A-east	Low +4.7	Launch 2 exits A (to tailbay Pac. side)		
Forebay-east Miraflores Locks	+54.4	-	Waits near wing wall		Lock A-east	Low +3.6	Vessel 3 + launch 2 enter A	Astern	
					Lock A-east	Low → High	Vessel 3	Astern	
Forebay-east	+54.5		Position in c; Long section		Lock A-east	High	Vessel 3	Astern	

Miraflores Locks			forebay: near gates 1/3 2/3 knuckle wing edge	Files: 020419LN1021 020419LN1023 020419LN1025 020419LN1026 020419LN1029		+26.0	moves to B		
					Lock B-east	Low +26.0	Launch 2 enters B	Astern	
Forebay-east Miraflores Locks			Takes position near intake		Lock B-east	Low +26.0	Vessel 3	Near d/s gates	2!; Single position File: 020419jl1039
Forebay-east Miraflores Locks	+54.5	-	Near intake, side wall east	a; Inflow File: 020419LN1034	Lock B-east	Low → High	Vessel 3	Astern	
Forebay-east Miraflores Locks	+54.5		Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020419LN1049 020419LN1051 020419LN1053 020419LN1054 020419LN1056	Lock B-east	High +54.5	Vessel 3	Near d/s gates	3!; Single position File: 020419jl1048
Forebay-east Miraflores Locks		Vessel 3 passes by	Waits beside wing wall		Lock B-east	High +54.5	Vessel 3 exits B	Near d/s gates	3; Single position Files: 020419jl1058 020419jl1100

									020419jl1102 020419jl1103 020419jl1106 020419jl1109
Forebay-east Miraflores Locks	+54.5		Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020419LN1111 020419LN1113 020419LN1115 020419LN1117 020419LN1119	Lock B-east	High +54.5	-	Distance to u/s gates: 1000 800 600 400 0	4; long section Files: 020419jl1112 020419jl1114 020419jl1117 020419jl1119 020419jl1124
Forebay-east Miraflores Locks					Lock B-east	High +54.5	Launch 2 exits B		

Tailbay Miraflores Locks - Lock A - Lock B
Uplockage Low Tide Northbound vessels

Date: Thursday 11 April 2002

Time: 08:00 – 10:30 h

Lane: West lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Stoja', 633.6 x 75.3 x 32.2, + tugboat

Vessel 2, 'Noblesse', 521.0 x 74.2 x 30.7, + tugboat + small tugboat

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock A-west	Low -3.5	Vessel 1 + launch 1 enter A	Astern						
Lock A-west	Low → High	Vessel 1	Astern						
Lock A-west	High +25.9	Vessel 1 moves to B	Near d/s gates	3; Single position Files: 020411ju0814 020411ju0816 020411ju0818 020411ju0819 020411ju0821 020411ju0822 020411ju0825	Tailbay-west Miraflores Locks			Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020411LN0817 020411LN0819 020411LN0820 020411LN0821 020411LN0822
Lock A-west	High	-	Distance to	4; Long section					

	+25.9		u/s gates: 1000 800 600 400 200 0	Files: 020411ju0827 020411ju0828 020411ju0829 020411ju0832 020411ju0835 020411ju0837					
Lock A-west	High → Low	-	Near d/s gates	Tailbay-west Miraflores Locks	Tide +	-	Near outlet, side wall west	a; Single position Files: 020411LN0843	
Lock A-west	Low -1.5	-	Distance to u/s gates: 1000 800 600 400 200 0	5; Long section Files: 020411ju0855 failed failed failed failed failed	Tailbay-west Miraflores Locks	Tide +	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020411LN0855 020411LN0856 020411LN0858 020411LN0859 020411LN0900	
Lock A-west	Low -1.6	Vessel 2 enters A	Near u/s gates	Measurements failed	Lock A-west	Low -1.6	Vessel 2 enters A	Near u/s gates	
Lock A-west	Low → High	Vessel 2	Ahead		Lock A-west	Low → High	Vessel 2	Ahead	
Lock A-west	High +26.8	Launch 1 moves to B	Ahead		Lock A-west	High +26.8	Launch 2 moves to B	Ahead	
Lock B-west	Low +26.8	Vessel 2 enters B	Near u/s gates	2; Single position Files:	Lock B-west	Low +26.8	Vessel 2 enters B	Near u/s gates	

				020411ju1001 020411ju1002 020411ju1003 020411ju1004 020411ju1005					
Lock B-west	Low → High	Vessel 2	Ahead		Lock B-west	Low → High	Vessel 2	Ahead	
Lock B-west	High +54.5	Launch 1 + Vessel 2 exit B	Ahead		Lock B-west	High +54.5	Launch 2 + Vessel 2 exit B	Ahead	

Date: Wednesday 10 April 2002

Time: 14:30 – 16:30 h

Lane: East lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessel (length, beam, draught (ft)):

Vessel 1, 'CCNI Arauco', 606.9 x 105.8 x 29.3

Vessel 2, 'Msc Nicole', 653.0 x 105.8 x 36.1

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock B-east	High +54.5	Vessel 1 + launch 1 enter B	Astern						
Lock B-east	High → Low	Vessel 1	Astern						
Lock B-east	Low +25.9	Vessel 1 moves to A	Near u/s gates	3; Single position Files: 020410ju1428 020410ju1430 020410ju1431 020410ju1432 020410ju1434 020410ju1435 020410ju1436 020410ju1437	Forebay-east Miraflores Locks	+54.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020410LO1431 020410LO1433 020410LO1434 020410LO1436 020410LO1438

Lock B-east	Low +25.9	-	Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020410ju1440 020410ju1442 020410ju1444 020410ju1447 020410ju1449 020410ju1452	Forebay-east Miraflores Locks	+54.5	-	Takes position near intake	
Lock B-east	Low → High	-	Near u/s gates		Forebay-east Miraflores Locks	+54.5	-	Near intake, side wall east	a; Inflow File: 020410LO1442
Lock B-east	High +54.5	-	Distance to u/s gates: 1000 800 600 400 200 0	5; Long section Files: 020410ju1507 020410ju1510 020410ju1512 020410ju1515 020410ju1517 020410ju1520	Forebay-east Miraflores Locks	+54.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020410LO1508 020410LO1509 020410LO1511 020410LO1512 020410LO1514
					Lock B-east	High +54.5	Launch 2 enters B	Ahead	
Lock B-east	High +54.5	Vessel 2 enters B	Near d/s gates	2; Single position Files: 020410ju1527 020410ju1529 020410ju1531 020410ju1533 020410ju1535	Lock B-east	High +54.5	Vessel 2 enters B	Near d/s gates	2; Single position Files: 020410LO1531 020410LO1533 020410LO1534 020410LO1536 020410LO1538

				020410ju1537 020410ju1539 020410ju1540					
Lock B-east	High → Low	Vessel 2	Ahead		Lock B-east	High → Low	Vessel 2	Ahead	
Lock B-east	Low +25.7	Launch 1 moves to A	Ahead		Lock B-east	Low +25.7	Launch 2 moves to A	Ahead	
Lock A-east	High +25.7	Vessel 2 enters A	Near d/s gates	2; Single position Files: 020410ju1558 020410ju1600 020410ju1601	Lock A-east	High +25.7	Vessel 2 enters A	Near d/s gates	-
Lock A-east	High → Low	Vessel 2	Ahead		Lock A-east	High → Low	Vessel 2	Ahead	
Lock A-east	Low +5.6	Launch 1 + vessel 2 exit A	Ahead		Lock A-east	Low +5.6	Launch 2 + vessel 2 exit A	Ahead	

Date: Friday 12 April 2002

Time: 13:30 – 16:45 h

Lane: West lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, Three yachts + 'J. Friend', 582.3 x 96.9 x 36.1

Vessel 2, 'Halki', 601.0 x 105.7 x 37.4

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock B-west	High +54.2	Launch 1 enters B	Ahead						
Lock B-west	High +54.2	Vessel 1 enters B	Near d/s side, u/s of yachts	2; Single position Files: 020412LN1353 020412LN1355 020412LN1357 020412LN1359 020412LN1400 020412LN1402 020412LN1404 020412LN1405 020412LN1407 020412LN1409					
Lock B-west	High → Low	Vessel 1	Ahead						

Lock B-west	Low +26.4	Launch 1 moves to A	Ahead						
Lock A-west	High +26.4	Vessel 1 enters A	Near d/s side, u/s of yachts	2; Single position Files: 020412LN1429 020412LN1431 020412LN1432					
Lock A-west	High → Low	Vessel 1	Ahead						
Lock A-west	Low +5.3	Launch 1 + Vessel 1 exit A	Ahead		Lock B-west	High +54.3	Vessel 2 + launch 2 enter B	Astern	
Tailbay-west Miraflores Locks	+6.8	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020412LN1527 020412LN1528 020412LN1530 020412LN1531 020412LN1533	Lock B-west	High → Low	Vessel 2	Astern	
Tailbay-west Miraflores Locks	+7.3	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020412LN1544 020412LN1546 020412LN1549 020412LN1550 020412LN1552	Lock B-west	Low +26.9	Vessel 2 moves to A	Astern	
Tailbay-west Miraflores Locks		-	Takes position		Lock A-west	High +26.9	Launch 2 enters A	Near u/s gates	2!; Single position

			near outlet						File: 020412ju1555
Tailbay-west Miraflores Locks	+7.5		Near outlet, side wall west	a; Outflow File: 020412LN1556	Lock A-west	High → Low	Vessel 2	Astern	
Tailbay-west Miraflores Locks	+7.6		Near wing wall	-	Lock A-west	Low +7.6	Vessel 2	Near u/s gates	3!; Single position File: 020412ju1604
					Lock A-west	Low +7.6	Vessel 2 exits A	Near u/s gates	-
Tailbay-west Miraflores Locks	+7.6	Vessel 2 passes by	Waits near wing wall						
Tailbay-west Miraflores Locks	+7.6		Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020412LN1629 020412LN1630 020412LN1632 020412LN1633 020412LN1634	Lock A-west (d/s gates closed)	Low +7.6		Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020412ju1614 020412ju1616 020412ju1618 020412ju1619 020412ju1621 020412ju1624
					Lock A-west		Launch 2 exits A		

Lock B - Lock A - Tailbay Miraflores Locks
Downlockage Low Tide **Southbound vessels**

Date: Friday 19 April 2002

Time: 13:30 – 18:30 h

Lane: East lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, Yacht + tugboat + 'Global Pioneer', 504.5 x 85.4 x 29.3

Vessel 2, Sailing yacht + tugboat + 'Sapphire Ace', 616.9 x 102.4 x 24.7

Vessel 3, Sailing yacht + 'Christoforo Colombo', 677.4 x 106.0 x 38.3

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock B-east	High +54.5	Vessel 1 + launch 1 enter B	Astern						
Lock B-east	High → Low	Vessel 1	Astern						
Lock B-east	Low +26.0	Vessel 1 moves to A	Astern						
Lock A-east	High +26.0	Launch 1 enters A	Astern						
Lock A-east	High → Low	Vessel 1	Astern						
Lock A-east	Low -3.4	Vessel 1 exits A	Near u/s gates	3; Single position Files: 020419LN1332	Lock B-east	High +54.4	Vessel 2 + launch 2 enter B	Astern	

				020419LN1334 020419LN1336 020419LN1337					
Lock A-east	Low -3.4	-	Distance to u/s gates:	4; Long section Files: 0 200 400 600 800 1000	Lock B-east	High +54.4	Vessel 2	Near u/s gates	2!; Single position File: 020419jl1407
Lock A-east	Low → High	-	Near u/s gates		Lock B-east	High → Low	Vessel 2	Astern	
Lock A-east	High +23.0	-	Distance to u/s gates:	5; Long section Files: 0 200 400 600 800 1000	Lock B-east	Low +27.3	Vessel 2	Near u/s gates	3!; Single position File: 020419jl1418
Lock A-east	High +25.1	Vessel 2 enters A	Near d/s gates	2; Single position Files: 020419LN1432 020419LN1434 020419LN1436 020419LN1437 020419LN1439 020419LN1440	Lock B-east	Low +25.1	Vessel 2 moves to A	Near u/s gates	3; Single position Files: 020419jl1432 020419jl1435 020419jl1436 020419jl1437 020419jl1439 020419jl1440

				020419LN1442 020419LN1443					020419jl1441 020419jl1443
					Lock B-east	Low +25.1	-	Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020419jl1447 020419jl1450 020419jl1451 020419jl1453 020419jl1455 020419jl1457
Lock A-east	High → Low	Vessel 2	Ahead		Lock B-east	Low → High	-	Near u/s gates	
Lock A-east	Low -4.2	Launch 1 + Vessel 2 exit A	Ahead		Lock B-east	High +54.4	Launch 2 exits B (to forebay Miraflores)		
Tailbay-east Miraflores Locks	Tide	-	Waits near wing wall		Lock B-east	High +54.4	Vessel 3 + launch 2 enter B	Astern	
					Lock B-east	High → Low	Vessel 3	Astern	
Tailbay-east Miraflores Locks	+1.6	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020419LN1658 020419LN1700 020419LN1702 020419LN1703 020419LN1705	Lock B-east	Low +26.3	Vessel 3 moves to A	Astern	
					Lock A-east	High	Launch 2	Astern	

Tailbay-east Miraflores Locks	+2.0	-	Takes position near outlet		Lock A-east	+26.3 High +26.3	Vessel 3	Near u/s gates	2!; Single position File: 020419jl1728
Tailbay-east Miraflores Locks	+2.1	-	Near outlet, side wall east	a; Outflow File: 020419LN1727	Lock A-east	High → Low	Vessel 3	Astern	
Tailbay-east Miraflores Locks	+2.4		Position in tailbay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020419LN1741 020419LN1743 020419LN1744 020419LN1745 020419LN1747	Lock A-east	Low +5.4	Vessel 3	Near u/s gates	3!; Single position File: 020419jl1741
					Lock A-east	Low +2.4	Vessel 3 exits A	Near u/s gates	3; Single position Files: 020419jl1748 020419jl1750 020419jl1754 020419jl1756 020419jl1758 020419jl1759 020419jl1801 020419jl1803 020419jl1804
Tailbay-east Miraflores Locks	+2.4	Vessel 3 passes by	Waits beside						

Tailbay-east Miraflores Locks	+2.5		wing wall	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020419LN1809 020419LN1810 020419LN1812 020419LN1814 020419LN1815	Lock A-east	Low +2.5	-	Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020419jl1809 020419jl1811 020419jl1813 020419jl1815 020419jl1817 020419jl1819
						Lock A-east	+2.6	Launch 2 exits A		

Measurements

Pedro Miguel Locks

Tailbay Pedro Miguel Locks - Lock C - Forebay Pedro Miguel Locks
Uplockage Northbound vessels

Date: Sunday 14 April 2002

Time: 07:15 – 11:00 h

Lane: West lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Melbourne Star', 712.7 x 95.2 x 35.3, + tugboat

Vessel 2, 'Sea Tiger', 683.4 x 98.5 x 32.7, + 2 tugboats

Vessel 3, 'Ville de Mars', 797.5 x 106.2 x 34.8

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock C-west	Low +54.6	Vessel 1 + launch 1 enter C	Astern						
Lock C-wests	Low → High	Vessel 1	Astern						
Lock C-west	High +85.6	Vessel 1 exits C	Near d/s gates	3; Single position Files: 020414LN0735 020414LN0737 020414LN0739 020414LN0740 020414LN0743					
Lock C-west	High +85.6	-	Distance to u/s gates:	4; Long section	Tailbay-west Pedro Miguel	+54.6	-	Takes position	

			0 200 400 600 800 1000	Files: 020414LN0748 020414LN0750 020414LN0753 020414LN0755 020414LN0757 020414LN0800	Locks			near outlet	
Lock C-west	High → Low	-	Near d/s gates		Tailbay-west Pedro Miguel Locks	+54.6	-	Near outlet, side wall west; launch floats away from outlet.	a; Outflow File: 020414jl0804
Lock C-west	Low +54.6	-	Distance to u/s gates: 1000 800 600 400 200 0	5; Long section Files: 020414LN0815 020414LN0816 020414LN0818 020414LN0819 020414LN0821 020414LN0822	Tailbay-west Pedro Miguel Locks	+54.6	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020414jl0816 020414jl0819 020414jl0821 020414jl0822 020414jl0824
					Tailbay-west Pedro Miguel Locks		Vessel 2 passes by	Near wing wall	
Lock C-west	Low +54.6	Vessel 2 enters C	Near u/s gates	2; Single position Files: 020414LN0838 020414LN0839 020414LN0840					

				020414LN0841 020414LN0843 020414LN0844 020414LN0845					
Lock C-west	Low → High	Vessel 2	Ahead		Tailbay-west Pedro Miguel Locks	+54.6	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414jl0846 020414jl0848 020414jl0850 020414jl0851 020414jl0853
Lock C-west	High +85.6	Launch 1 + Vessel 2 exit C	Ahead						
Forebay-west Pedro Miguel Locks		-	Waits near wing wall		Lock C-west	High → Low			
Forebay-west Pedro Miguel Locks	+85.6	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414LN0959 020414LN1001 020414LN1002 020414LN1004 020414LN1005	Lock C-west	Low +54.6	Vessel 3 + launch 2 enter C	Astern	
Forebay-west Pedro Miguel Locks		-	Takes position near intake		Lock C-west	Low +54.6	Vessel 3	Near d/s gates	2!; Single position File: 020414jl1013
Forebay-west	+85.6	-	Near	a; Inflow	Lock C-west	Low →		Astern	

Pedro Miguel Locks			intake, side wall west	File: 020414LN1012		High			
Forebay-west Pedro Miguel Locks	+85.6		Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020414LN1027 020414LN1028 020414LN1029 020414LN1031 020414LN1032	Lock C-west	High +85.6		Near d/s gates	3!; Single position Files: 020414jl1024 020414jl1030
					Lock C-west	High +85.6	Vessel 3 exits C	Near d/s gates	3; Single position Files: 020414jl1035 020414jl1038 020414jl1040 020414jl1042 020414jl1045
Forebay-west Pedro Miguel Locks		Vessel 3 passes by	Waits beside wing wall						
Forebay-west Pedro Miguel Locks	+85.6		Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414LN1047 020414LN1048 020414LN1050 020414LN1051 020414LN1053	Lock C-west (u/s gates are 50% opened and closed again, prior to measurements!)	High +85.6		Distance to u/s gates: 1000 800 600 400	4; Long section Files: 020414jl1048 020414jl1052 020414jl1053 020414jl1055
					Lock C-west		Launch 2 exits C		

Forebay Pedro Miguel Locks - Lock C - Tailbay Pedro Miguel Locks
Downlockage Southbound vessels

Date: Sunday 14 April 2002
 Time: 16:30 – 19:00 h
 Lane: East lane / west lane
 Water levels: in ft to PLD
 Dimensions: in ft
 Dimensions of vessel (length, beam, draught (ft)):
 Vessel 1, 'Lykes Falcon', 617.1 x 99.5 x 26.3

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock C-west									
					Forebay-west Pedro Miguel Locks	+85.6	-		After a series of uplocking ships: c; Long section Files: 020414j11646 020414j11649 020414j11650 020414j11652 020414j11653
					Forebay-east Pedro Miguel	+85.6	-		After a series of uplocking ships:

					Locks			Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414jl1702 020414jl1704 020414jl1706 020414jl1708 020414jl1709
Tailbay-east Pedro Miguel Locks	+54.6	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414LN1749 020414LN1751 020414LN1752 020414LN1753 020414LN1754	Lock C-east	High +85.6	Vessel 1 + launch 2 enter C	Astern	
Tailbay-east Pedro Miguel Locks	+54.6	-	Takes position near outlet		Lock C-east	High +85.6	Vessel 1	Near u/s gates	2!; Single position File: 020414jl1809
Tailbay-east Pedro Miguel Locks	+54.6	-	Near outlet, side wall east	a; Outflow File: 020414LN1810	Lock C-east	High → Low		Astern	
Tailbay-east Pedro Miguel Locks	+54.6		Position in tailbay: near gates 1/3 2/3	b; Long section Files: 020414LN1823 020414LN1824 020414LN1825	Lock C-east	Low +54.6		Near u/s gates	3!; Single position File: 020414jl1822

			knuckle wing edge	020414LN1826 020414LN1827						
					Lock C-east	Low +54.6	Vessel 1 exits C	Near u/s gates	3; Single position Files: 020414jl1830 020414jl1832 020414jl1834 020414jl1835 020414jl1837 020414jl1838	
Tailbay-east Pedro Miguel Locks		Vessel 1 passes by	Waits beside wing wall							
Tailbay-east Pedro Miguel Locks	+54.6		Position in tailbay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020414LN1840 020414LN1842 020414LN1843 020414LN1845 020414LN1846	Lock C-east (d/s gates closed!)	Low +54.6		Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020414jl1841 020414jl1843 020414jl1845 020414jl1846 020414jl1847 020414jl1849	
					Lock C-east		Launch 2 exits C			

Measurements

Gatun Locks

Tailbay Gatun Locks - Lock D – Lock E - Lock F - Forebay Gatun Locks
Uplockage Southbound vessels

Date: Wednesday 17 April 2002

Time: 08:30 – 14:30 h

Lane: West lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Veendam', 719.4 x 101.1 x 24.8

Vessel 2, 'Mol Ingenuity', 958.5 x 105.9 x 37.4

Vessel 3, 'Yong An 4', 623.3 x 100.2 x 36.8, + 2 tugboats

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock D-west	Low +1.0	Vessel 1 + launch 1 enter D	Astern						
Lock D-west	Low → High	Vessel 1	Astern						
Lock D-west	High +28.0	Vessel 1 moves to E	Near d/s gates	3; Single position Files: 020417LN0844 020417LN0848 020417LN0850 020417LN0852 020417LN0856 020417LN0858 020417LN0900	Tailbay-west Gatun Locks			Takes position near outlet	

Lock D-west	High +28.0	-	Distance to u/s gates: 1000 800 600 400 200 0	4; Long section Files: 020417LN0901 020417LN0904 020417LN0905 020417LN0907 020417LN0909 020417LN0910					
Lock D-west	High → Low	-	Near u/s gates	Tailbay-west Gatun Locks	+1.0	-	Near outlet, side wall west	a; Outflow File: 020417jl0915	
Lock D-west	Low +1.0	-	Distance to u/s gates: 0 200 400 600 800 1000	5; Long section Files: 020417LN0931 020417LN0933 020417LN0934 020417LN0936 020417LN0937 020417LN0938	Tailbay-west Gatun Locks	+1.0	-	Position in tailbay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020417jl0932 020417jl0937 020417jl0939 020417jl0941 020417jl0942
Lock D-west	Low +1.0	Launch 1 exits D							
				Tailbay-west Gatun Locks		Vessel 2 passes by	Near wing wall		
Lock D-west	Low +1.0	Vessel 2 enters D	-	Tailbay-west Gatun Locks	+1.0	-	Position in tailbay: near gates 1/3 2/3	c; Long section Files: 020417jl1031 020417jl1033 020417jl1035	

									knuckle wing edge	020417jl1037 020417jl1040
Uplockage of launch 1 in east lane from Atlantic Side to Gatun Lake astern Csav Callao. No measurements. Launch 1 waits for vessel 3 in Forebay-west, Gatun-north.										
					Lock D-west	Low +1.0	Vessel 3 + launch 2 enter D	Astern		
					Lock D-west	Low → High	Vessel 3	Astern		
					Lock D-west	High +28.0	Vessel 3 moves to E	Astern		
					Lock E-west	Low +28.0	Launch 2 enters E	Astern		
Forebay-west Gatun-north	+85.5	-	Waits near wing wall		Lock E-west	Low → High	Vessel 3	Astern		
Forebay-west Gatun Locks	+85.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020417LN1316 020417LN1318 020417LN1320 020417LN1321 020417LN1323	Lock E-west	High +57.0	Vessel 3 moves to E	Astern		
Forebay-west Gatun Locks	+85.5	-	Takes position near intake		Lock F-west	Low +57.0	Launch 2 enters F	Near d/s gates	2!: Single position File: 020417jl1334	
Forebay-west Gatun Locks	+85.5	-	Near intake, side	a; Inflow	Lock F-west	Low → High		Astern		

		wall west	File: 020417LN1334					
Forebay-west Gatun Locks	+85.5	Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020417LN1347 020417LN1349 020417LN1350 020417LN1351 020417LN1353	Lock F-west	High +85.5		Near d/s gates	3!; Single position Files: 020417jl1345
				Lock F-west	High +85.5	Vessel 3 exits F	Near d/s gates	3; Single position Files: 020417jl1354 020417jl1357 020417jl1359 020417jl1401 020417jl1403 020417jl1405
Forebay-west Gatun Locks	+85.5	Vessel 3 passes by	Waits near wing wall					
Forebay-west Gatun Locks	+85.5	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020417LN1407 020417LN1409 020417LN1411 020417LN1413 020417LN1415	Lock F-west	High +85.5		Distance to u/s gates: 1000 800 600 400 200 0	4; Long section Files: 020417jl1407 020417jl1412 020417jl1414 020417jl1416 020417jl1418 020417jl1420
				Lock F-west		Launch 2 exits F		

Forebay Gatun Locks - Lock F – Lock E - Lock D - Tailbay Gatun Locks
Downlockage Northbound vessels

Date: Tuesday 16 April 2002

Time: 16:00 – 22:00 h

Lane: West lane

Water levels: in ft to PLD

Dimensions: in ft

Dimensions of vessels (length, beam, draught (ft)):

Vessel 1, 'Hanjin Kaohsiung', 796.6 x 105.8 x 32.7

Vessel 2, Tugboat + 'Amerigo Vespucci', 677.4 x 106.0 x 31.5

Vessel 3, 'Pac Prince', 618.7 x 93.3 x 36.0

Location of measurements	Water level	Ship	Position launch 1	Phase / Files	Location of measurements	Water level	Ship	Position launch 2	Phase / Files
Lock F-west	High +85.5	Vessel 1 + launch 1 enter F	Astern						
Lock F-west	High → Low	Vessel 1	Astern						
Lock F-west	Low +57.0	Vessel 1 moves to E	Near u/s gates	3; Single position Files: 020416LN1652 020416LN1654 020416LN1655 020416LN1658 020416LN1659 020416LN1700 020416LN1701 020416LN1702	Forebay-west Gatun Locks	+85.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020416jl1636 020416jl1638 020416jl1640 020416jl1642 020416jl1644

Lock F-west	Low +57.0	-	Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020416LN1705 020416LN1707 020416LN1709 020416LN1710 020416LN1711 020416LN1712	Forebay-west Gatun Locks	+85.5	-	Takes position near intake	
Lock F-west	Low → High	-	Near u/s gates		Forebay-west Gatun Locks	+85.5	-	Near intake, side wall west	a; Inflow File: 020416jl1731
Lock F-west	High +85.5	-	Distance to u/s gates: 1000 800 600 400 200 0	5; Long section Files: 020416LN1743 020416LN1745 020416LN1746 020416LN1748 020416LN1749 020416LN1751	Forebay-west Gatun Locks	+85.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	b; Long section Files: 020416jl1746 020416jl1748 020416jl1750 020416jl1752 020416jl1756
					Forebay-west Gatun Locks	+85.5	Vessel 2 passes by	Near wing wall	
Lock F-west	High +85.5	Vessel 2 enters F	Near d/s gates	2; Single position Files: 020416LN1823 020416LN1824 020416LN1826 020416LN1827					

				020416LN1828 020416LN1829 020416LN1830 020416LN1831 020416LN1832 020416LN1833 020416LN1835					
Lock F-west	High → Low	Vessel 2	Ahead		Forebay-west Gatun Locks	+85.5	-	Position in forebay: near gates 1/3 2/3 knuckle wing edge	c; Long section Files: 020416jl1835 020416jl1837 020416jl1840 020416jl1842 020416jl1844
Lock F-west	Low +58.2	Launch 1 moves to E	Ahead		Forebay-west Gatun Locks	+85.5	-	Waits for vessel 3	
Lock E-west	High +58.2	Vessel 2 enters E	Near d/s gates	-					
Lock E-west	High → Low	Vessel 2	Ahead						
Lock E-west	Low +38.0	Launch 1 moves to D	Ahead						
Lock D-west	High +38.0	Vessel 2 enters D	Near d/s gates	2; Single position Files: 020416LN1915 020416LN1916 020416LN1918 020416LN1919 020416LN1920 020416LN1921	Lock F-west	High +85.5	Vessel 3 + launch 2 enter F	Astern	

				020416LN1923					
Lock D-west	High → Low	Vessel 2	Ahead		Lock F-west	High → Low	Vessel 3	Astern	
Lock D-west	Low +1.09	Launch 1 + Vessel 2 exit D	Ahead		Lock F-west	Low +58.2	Vessel 3 moves to E	Astern	
Tailbay-west Gatun Locks	Tide	-	Waits near wing wall		Lock E-west	High +58.2	Launch 2 enters E	Astern	
					Lock E-west	High → Low	Vessel 3	Astern	
					Lock E-west	Low +28.0	Vessel 3 moves to D	Astern	
Tailbay-west Gatun Locks	+1.0	-	Position in tailbay: near bridge 2/3 knuckle wing edge	c; Long section Files: 020416LN2059 020416LN2101 020416LN2102 020416LN2104	Lock D-west	High +28.0	Launch 2 enters D	Astern	
Tailbay-west Gatun Locks	+1.0	-	Takes position near outlet		Lock D-west	High +28.0	Vessel 3	Near u/s gates	2!; Single position File: 020416jl2117
Tailbay-west Gatun Locks	+1.0	-	Near outlet, side wall west	a; Outflow File: 020416LN2117	Lock D-west	High → Low		Astern	
Tailbay-west Gatun Locks	+0.9		Position in tailbay:	b; Long section	Lock D-west	Low +0.9		Near u/s gates	3!; Single position

			near bridge 2/3 knuckle wing edge	Files: 020416LN2135 020416LN2136 020416LN2138 020416LN2139					File: 020416jl2135
					Lock D-west	Low +0.9	Vessel 3 exits D	Near u/s gates	3; Single position Files: 020416jl2142 020416jl2143 020416jl2145 020416jl2146 020416jl2148 020416jl2150 020416jl2151
Tailbay-west Gatun Locks		Vessel 3 passes by	Waits beside wing wall						
Tailbay-west Gatun Locks	+0.9		Position in tailbay: near bridge 2/3 knuckle wing edge	c; Long section Files: 020416LN2154 020416LN2155 020416LN2156 020416LN2158	Lock D-west	Low +0.9		Distance to u/s gates: 0 200 400 600 800 1000	4; Long section Files: 020416jl2154 020416jl2156 020416jl2158 020416jl2200 020416jl2201 020416jl2203
					Lock D-west		Launch 2 exits D		

Measurements

Miraflores Lake

Profiling in Miraflores Lake		
Date / time:	11 April 2002, 12:00 h – 12:20 h	
Conditions:	Level Miraflores Lake (ft to PLD): +54.5	
Files		
identification	location	remarks
020411ju1206	in centre line of gate no 1 from west, 30 m away from spillway	long section parallel to Miraflores spillway
020411ju1207	in centre line of gate no 2 from west, 30 m away from spillway	
020411ju1208	in centre line of gate no 3 from west, 30 m away from spillway	
020411ju1209	in centre line of gate no 4 from west, 30 m away from spillway	
020411ju1211	in centre line of gate no 5 from west, 30 m away from spillway	
020411ju1212	in centre line of gate no 6 from west, 30 m away from spillway	
020411ju1214	in centre line of gate no 7 from west, 30 m away from spillway	
020411ju1215	in centre line of gate no 8 from west, 30 m away from spillway	

Profiling in Miraflores Lake			
Date / time:	11 April 2002, 12:20 h – 12:30 h		
Conditions:	Level Miraflores Lake (ft to PLD): +54.5		
Files			
Identification	location (GPS, UTM 17)	remarks	
	East (m)	North (m)	
020411ju1221	654483	995294	long section perpendicular to Miraflores spillway in centre line of gate no 3 from west
020411ju1223	654399	995349	
020411ju1227	654316	995398	

Profiling in Miraflores Lake			
Date / time:	11 April 2002, 12:30 h – 11:35 h		
Conditions:	Level Miraflores Lake (ft to PLD):		+54.7
Files			
Identification	location (GPS, UTM 17)		remarks
	East (m)	North (m)	
020411ju1232	lock B-west 6544540	lock B-west 995026	long section in shipping lane, from Miraflores Locks to Pedro Miguel Locks
020411ju1235	654467	995092	
020411ju1237	654393	995160	
020411ju1239	654323	995230	
020411ju1242	654256	995292	
020411ju1244	654181	995360	
020411ju1246	654118	995440	
020411ju1248	654055	995517	
020411ju1251	654001	995599	
020411ju1253	653942	995679	
020411ju1256	653878	995744	
020411ju1259	653819	995821	
020411ju1301	653751	995891	
020411ju1303	653679	995954	
020411ju1305	653605	996023	
020411ju1308	653550	996103	
020411ju1310	653495	996175	
020411ju1312	653416	996247	
020411ju1314	653339	996308	
020411ju1316	653226	996371	
020411ju1319	653197	996439	
020411ju1321	653122	996501	
020411ju1323	653047	996552	
020411ju1325	652976	996613	
020411ju1327	652905	996684	
020411ju1329	652831	996745	
020411ju1331	lock C-east 652758	lock C-east 996822	

Measurements

Gaillard Cut

Profiling in Gaillard Cut

Date / time:	14 April 2002, 11:30 - 13:00 h	
Conditions:	Level Gaillard Cut (ft to PLD):	+85.6
Files		
Identification	location (GPS, UTM 17)	remarks
	East (m)	North (m)
020414LN1144	lock C-west 652453	lock C-west 0997009
020414LN1149	652376	0997081
020414LN1151	652299	0997153
020414LN1152	652217	0997223
020414LN1154	652138	0997293
020414LN1155	652061	0997359
020414LN1158	651983	0997419
020414LN1159	651898	0997477
020414LN1201	651823	0997538
020414LN1203	651736	0997594
020414LN1204	651659	0997659
020414LN1206	651571	0997715
020414LN1208	651475	0997769
020414LN1209	651385	0997825
020414LN1211	651298	0997885
020414LN1213	651207	0997936
020414LN1214	651114	0997981
020414LN1216	651022	0998035
020414LN1217	650934	0998084
020414LN1219	650835	0998136
020414LN1221	650757	0998200
020414LN1223	650669	0998259
020414LN1225	650581	0998321
020414LN1226	650485	0998386
020414LN1228	650398	0998447
020414LN1230	650314	0998517
020414LN1231	650218	0998575
020414LN1233	650130	0998621
020414LN1235	650040	0998664
020414LN1237	649951	0998724
020414LN1239	649874	0998808
020414LN1241	649786	0998867
020414LN1244	649706	0998930
020414LN1246	649631	0999005
020414LN1247	649539	0999051
020414LN1249	649451	0999114
020414LN1251	649390	0999196
020414LN1253	649316	0999273
020414LN1255	649249	0999347
020414LN1257	649174	0999428

Profiling in Gaillard Cut			
Date / time:	14 April 2002, 11:30 - 13:00 h		
Conditions:	Level Gaillard Cut (ft to PLD):		+85.6
Files			
Identification	location (GPS, UTM 17)		remarks
	East (m)	North (m)	
020414jl1210	642595	1007944	Long section in shipping lane, from Gamboa to halfway Pedro Miguel Locks
020414jl1220	643098	1007591	
020414jl1226	643937	1007002	
020414jl1230	644445	1006102	
020414jl1233	644939	1005215	
020414jl1237	645429	1004291	
020414jl1241	645828	1003249	
020414jl1244	646407	1002414	
020414jl1247	647212	1001812	
020414jl1251	647916	1001112	
020414jl1254	648513	1000269	
020414jl1257	649154	999459	

Measurements

Gatun Lake

Profiling in Gatun Lake			
Date / time:	16 April 2002, 8:00 h – 11:00 h		
Conditions:	Level Gatun Lake (ft to PLD):		+85.5
Files			
identification	location (GPS, UTM 17)		remarks
	East (m)	North (m)	
020416LN0818	lock F-west 618216	lock F-west 1024788	long section from Gatun Locks to Gatun Spillway and back through shipping lane
020416LN0820	618199	1024672	
020416LN0822	618164	1024552	
020416LN0824	618108	1024443	
020416LN0828	618065	1024313	
020416LN0830	617996	1024233	
020416LN0833	617926	1024151	
020416LN0835	617855	1024079	
020416LN0838	617774	1023997	
020416LN0840	617684	1023932	
020416LN0843	617596	1023851	
020416LN0845	617538	1023754	
020416LN0847	617487	1023660	
020416LN0849	617432	1023563	
020416LN0851	617396	1023454	
020416LN0853	617357	1023347	
020416LN0855	617309	1023227	
020416LN0858	617222	1023169	
020416LN0900	617146	1023097	
020416LN0903	617058	1023010	
020416LN0907	617011	1022923	
020416LN0909	616959	1022824	
020416LN0912	616925	1022733	
020416LN0914	616920	1022623	
020416LN0916	616937	1022509	
020416LN0918	616988	1022412	
020416LN0920	617079	1022350	
020416LN0922	617175	1022294	
020416LN0924	617260	1022234	
020416LN0926	617343	1022163	
020416LN0929	617405	1022082	
020416LN0932	617489	1022026	
020416LN0934	617584	1021987	
020416LN0937	617681	1021945	
020416LN0939	617784	1021912	
020416LN0941	617893	1021915	
020416LN0944	617998	1021891	
020416LN0953	618089	1022059	
020416LN0956	618060	1022155	
020416LN0958	618095	1022250	
020416LN1000	618090	1022356	
020416LN1003	618076	1022456	

020416LN1006	618071	1022566	
020416LN1008	618075	1022680	
020416LN1010	618083	1022790	
020416LN1012	618064	1022900	
020416LN1015	618079	1023006	
020416LN1017	618082	1023114	
020416LN1019	618090	1023224	
020416LN1026	618098	1023331	
020416LN1029	618066	1023431	
020416LN1032	618049	1023535	
020416LN1036	618022	1023648	
020416LN1039	618007	1023763	
020416LN1041	617988	1023868	
020416LN1044	618022	1023975	
020416LN1047	618037	1024077	
020416LN1050	618054	1024176	
020416LN1054	618027	1024337	

Profiling in Gatun Lake			
Date / time:	16 April 2002, 10:00 h – 11:00 h		
Conditions:	Level Gatun Lake (ft to PLD):		+85.5
Files			
identification	location (GPS, UTM 17)		remarks
	East (m)	North (m)	
020416jl1001	621463	1023486	long section along north-east bank of Gatun Lake to Gatun Locks
020416jl1004	621337	1023390	
020416jl1007	621211	1023325	
020416jl1010	621045	1023232	
020416jl1012	620873	1023155	
020416jl1015	620728	1023116	
020416jl1018	620532	1023146	
020416jl1021	620396	1023188	
020416jl1024	620260	1023234	
020416jl1027	620128	1023274	
020416jl1031	620012	1023316	
020416jl1034	619874	1023382	
020416jl1037	619756	1023428	
020416jl1041	619626	1023472	
020416jl1044	619494	1023525	
020416jl1047	619366	1023571	
020416jl1050	619217	1023653	
020416jl1053	619086	1023741	
020416jl1055	618936	1023849	
020416jl1058	618770	1023929	
020416jl1100	618613	1023029	
020416jl1102	618444	1023125	
020416jl1105	618378	1023227	
020416jl1108	618281	1023394	
020416jl1110	618246	1023492	
020416jl1112	618240	1023572	
020416jl1114	618251	1023672	
020416jl1116	618265 lock F-east	1023777 lock F-east	

FIGURES

**SALINITY MEASUREMENTS
DRY SEASON
(April 2002)**

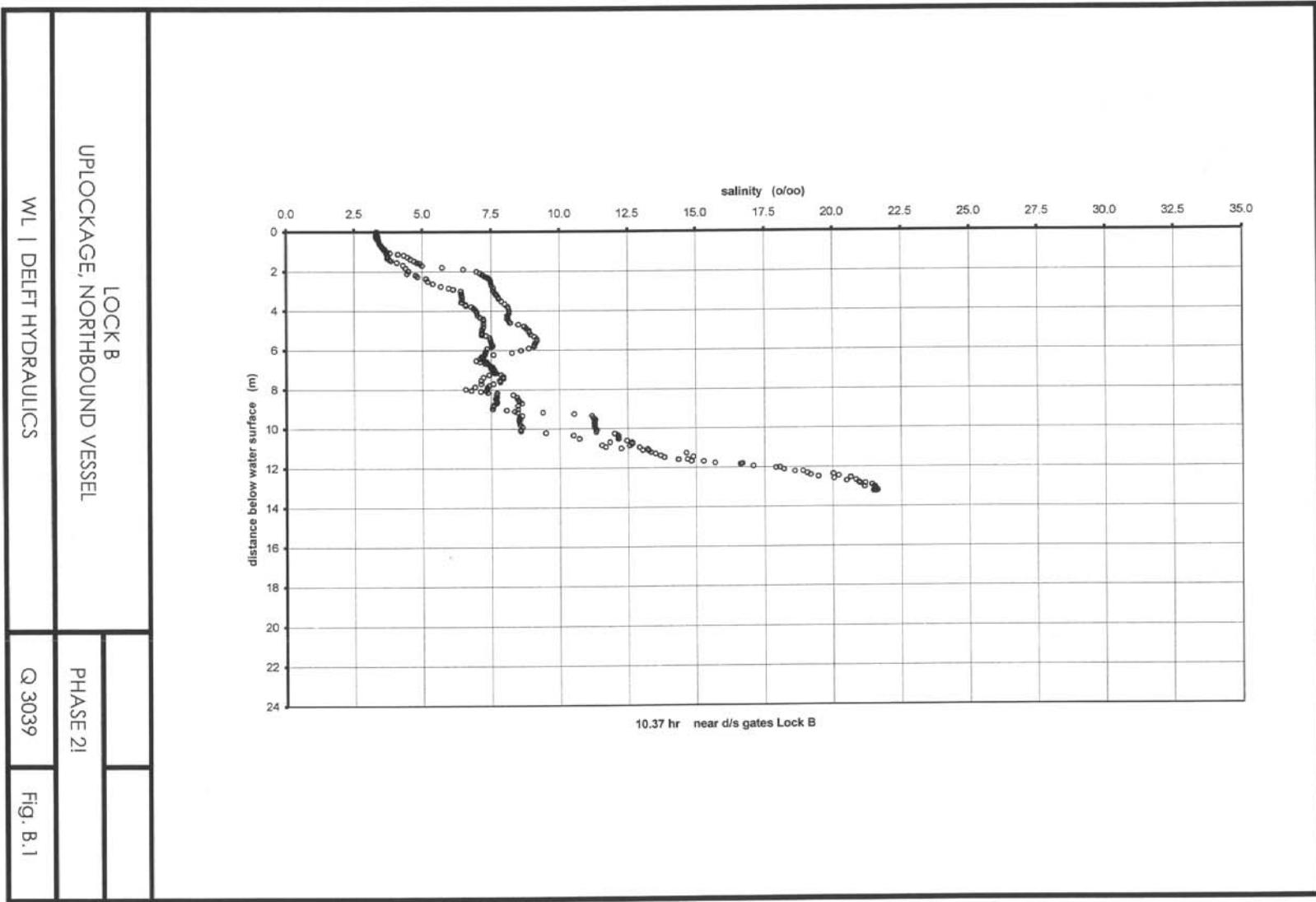
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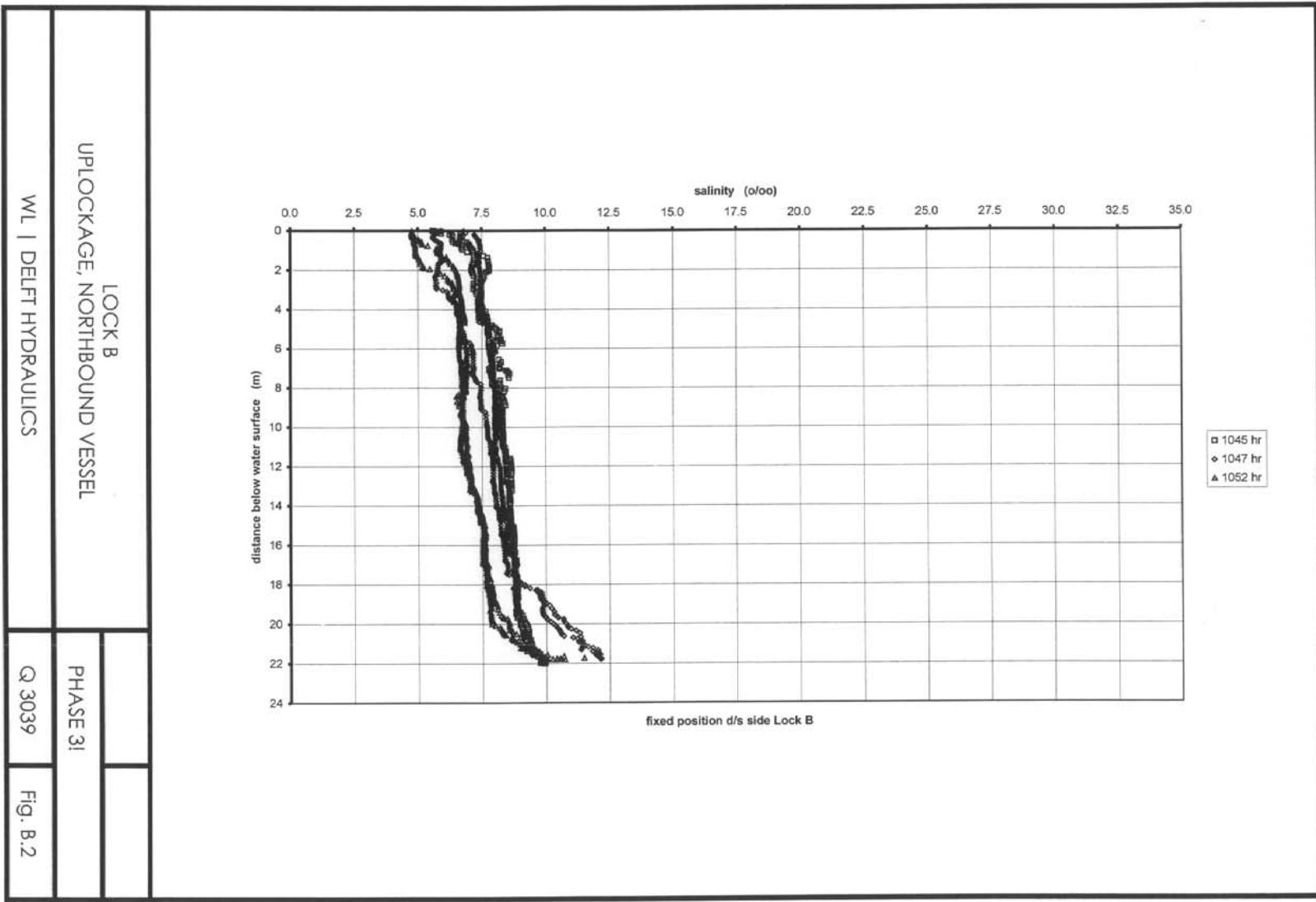
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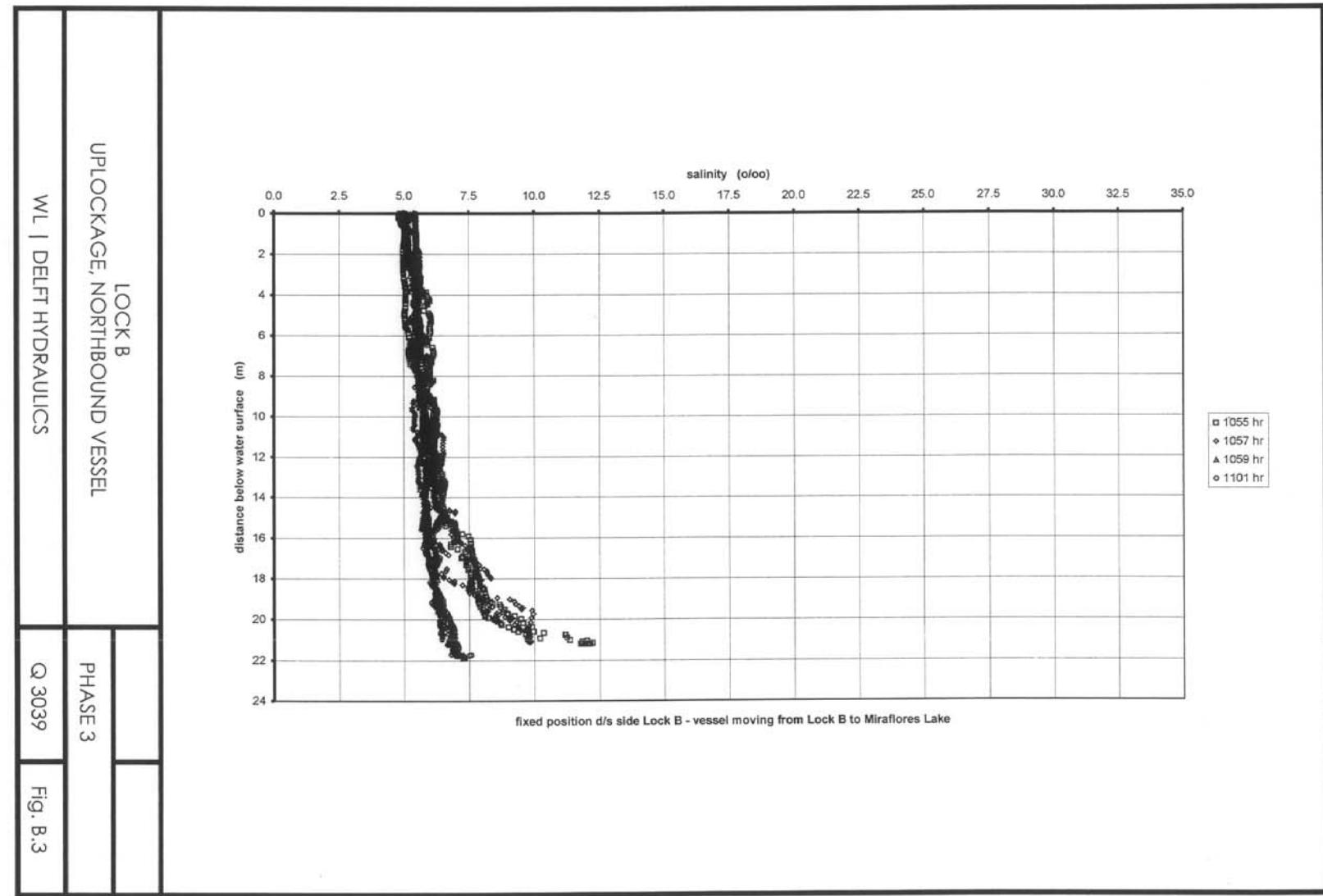
MIRAFLORES LOCKS

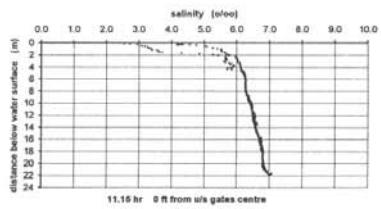
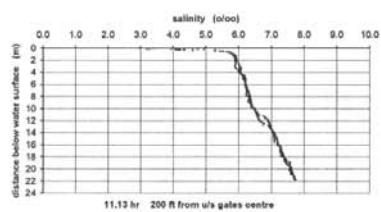
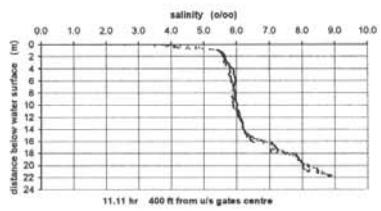
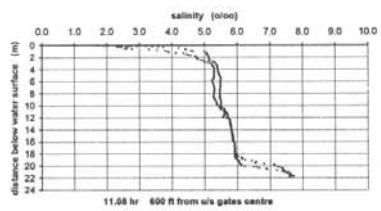
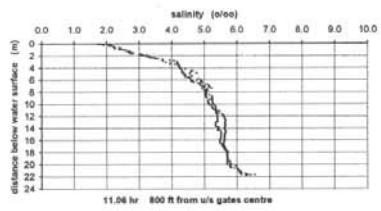
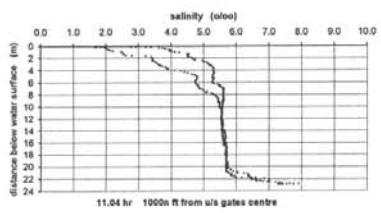
(Locks A and B)

UPLOCKAGE









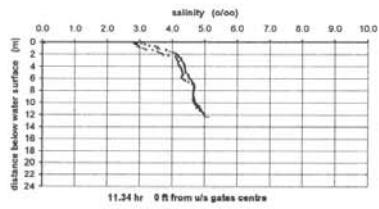
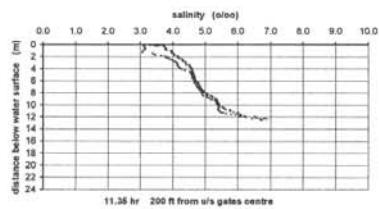
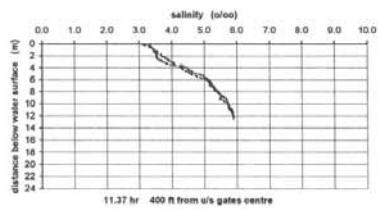
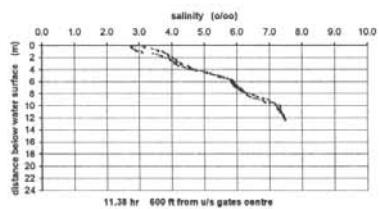
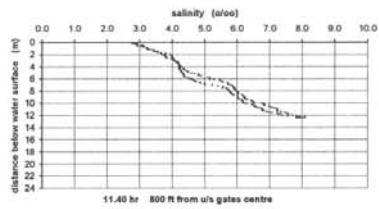
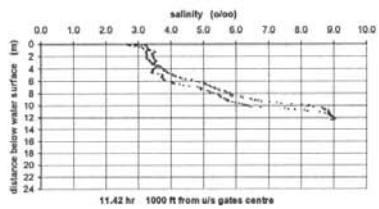
LOCK B
UPLOCKAGE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.4



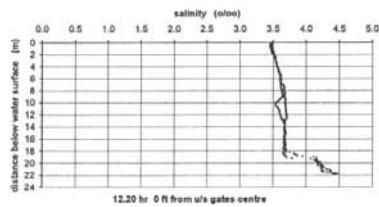
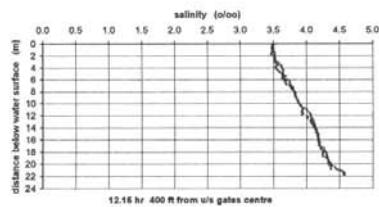
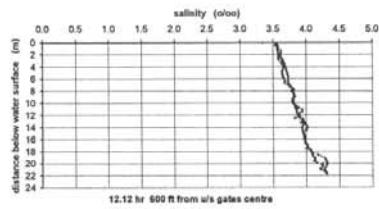
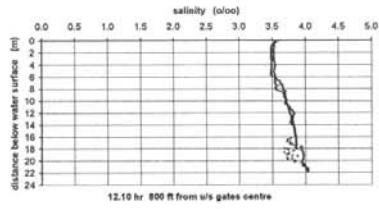
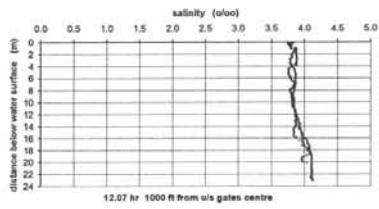
LOCK B
UPLOCKAGE, NORTHBOUND VESSEL

PHASE 5

WL | DELFT HYDRAULICS

Q 3039

Fig. B.5



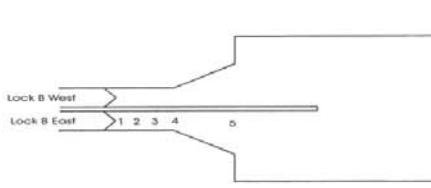
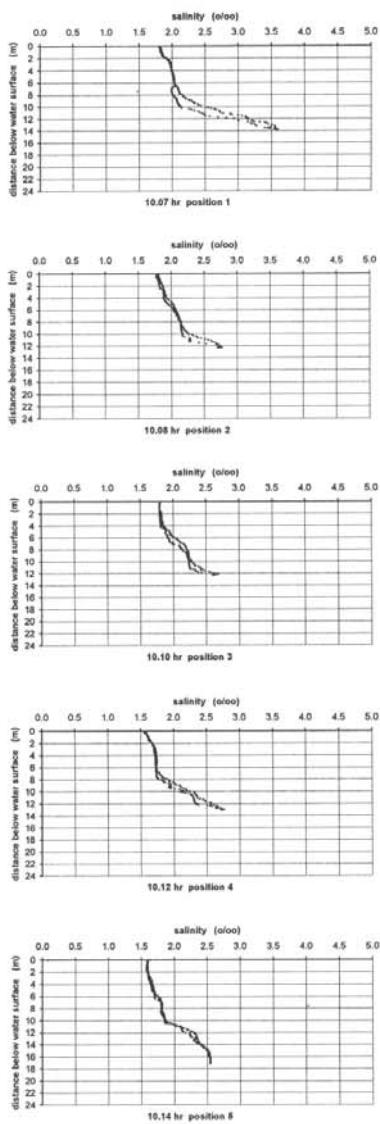
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UPLOCKAGE, NO VESSEL

PHASE 4!

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Q 3039

Fig. B.6



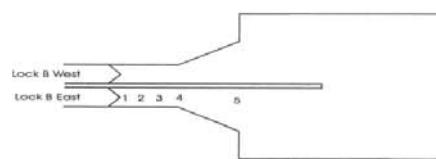
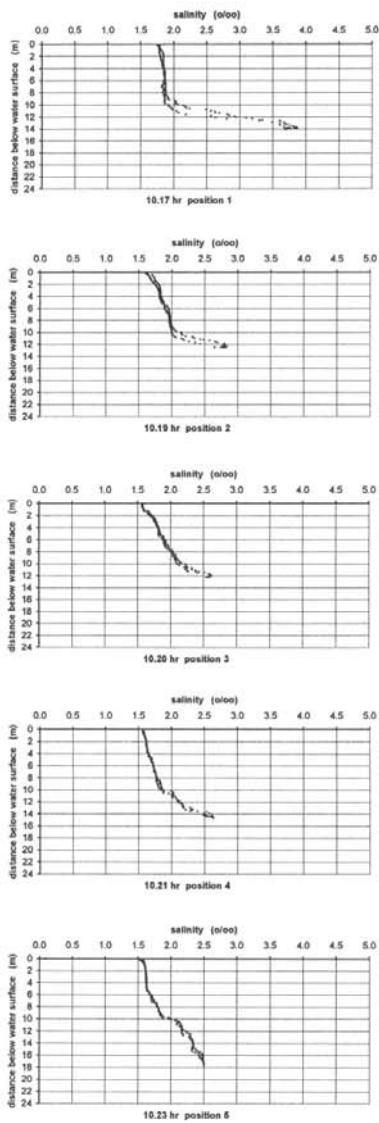
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.7



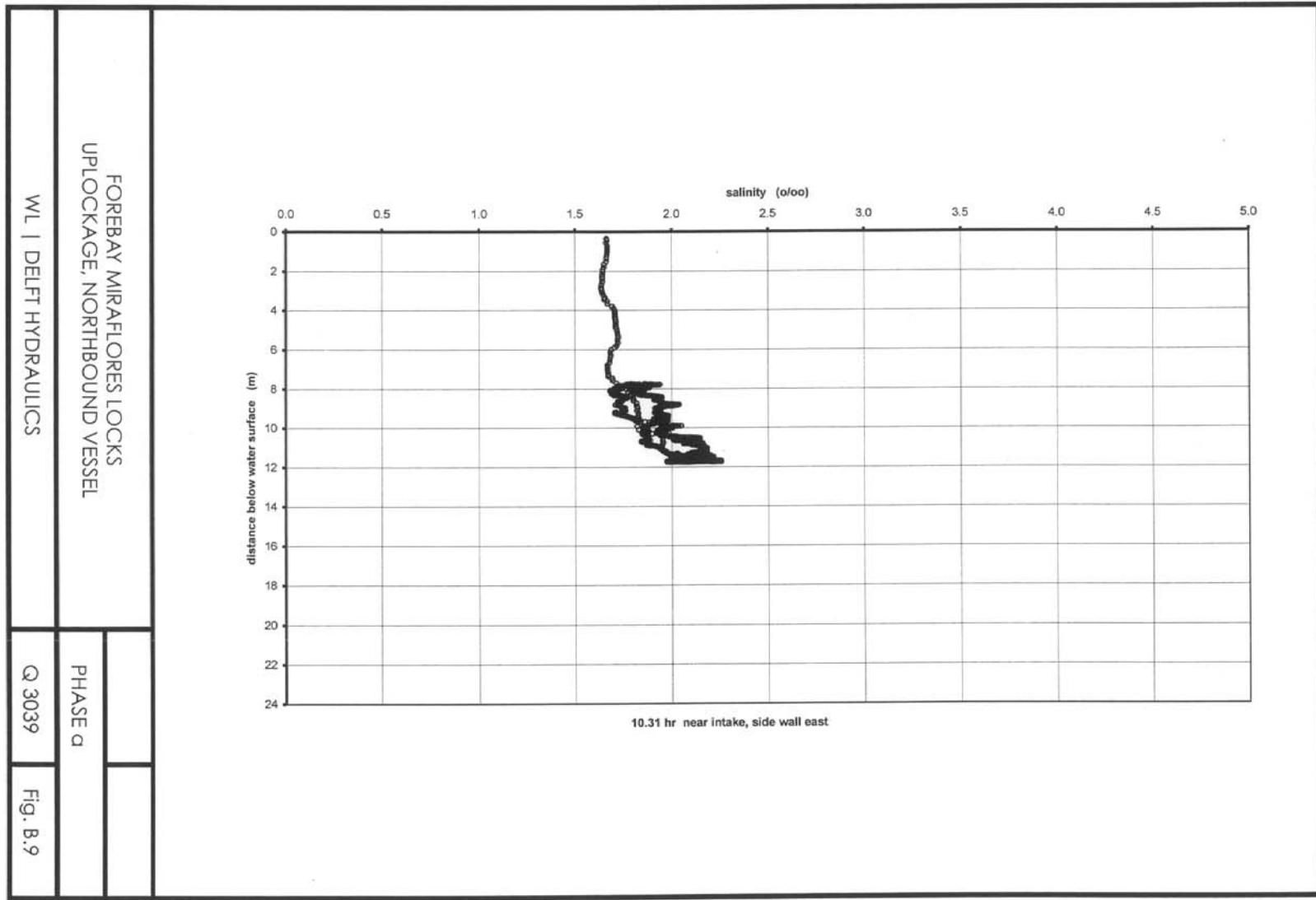
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

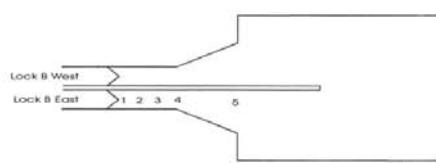
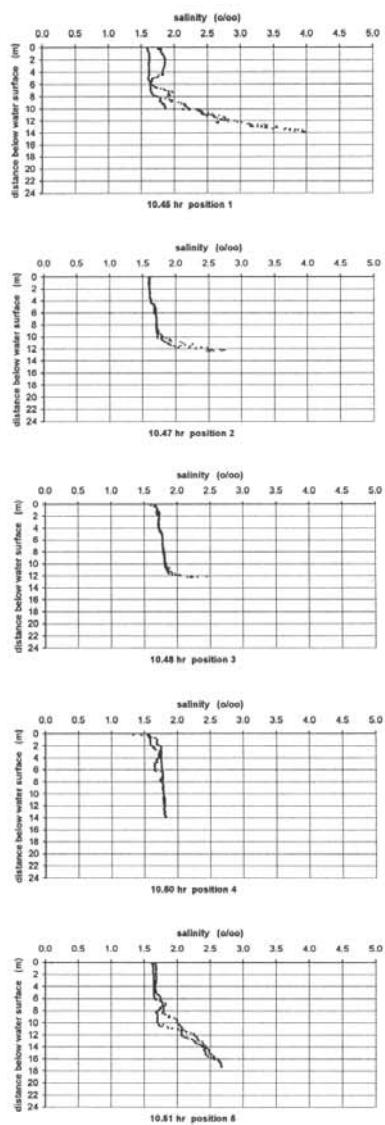
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.8





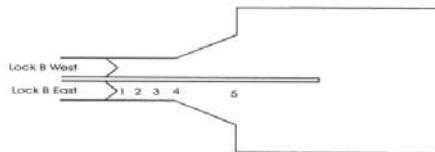
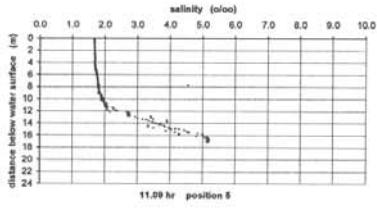
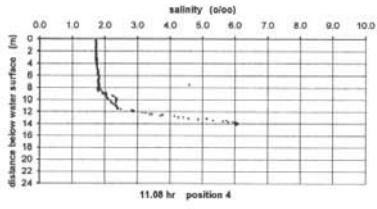
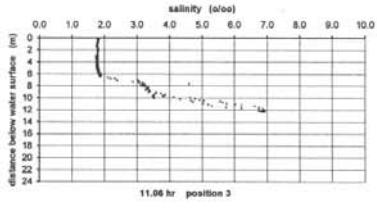
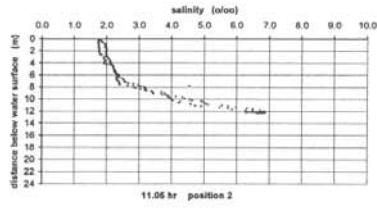
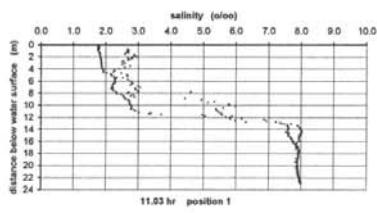
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.10



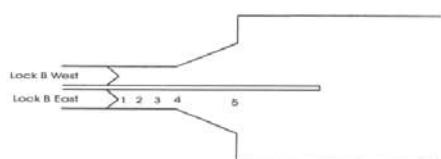
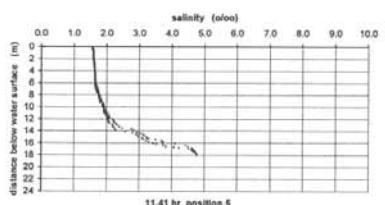
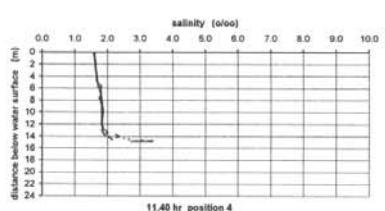
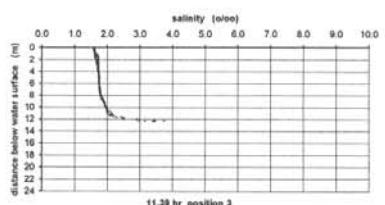
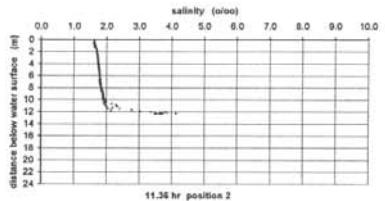
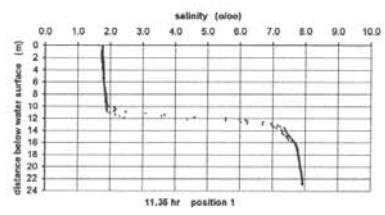
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.11



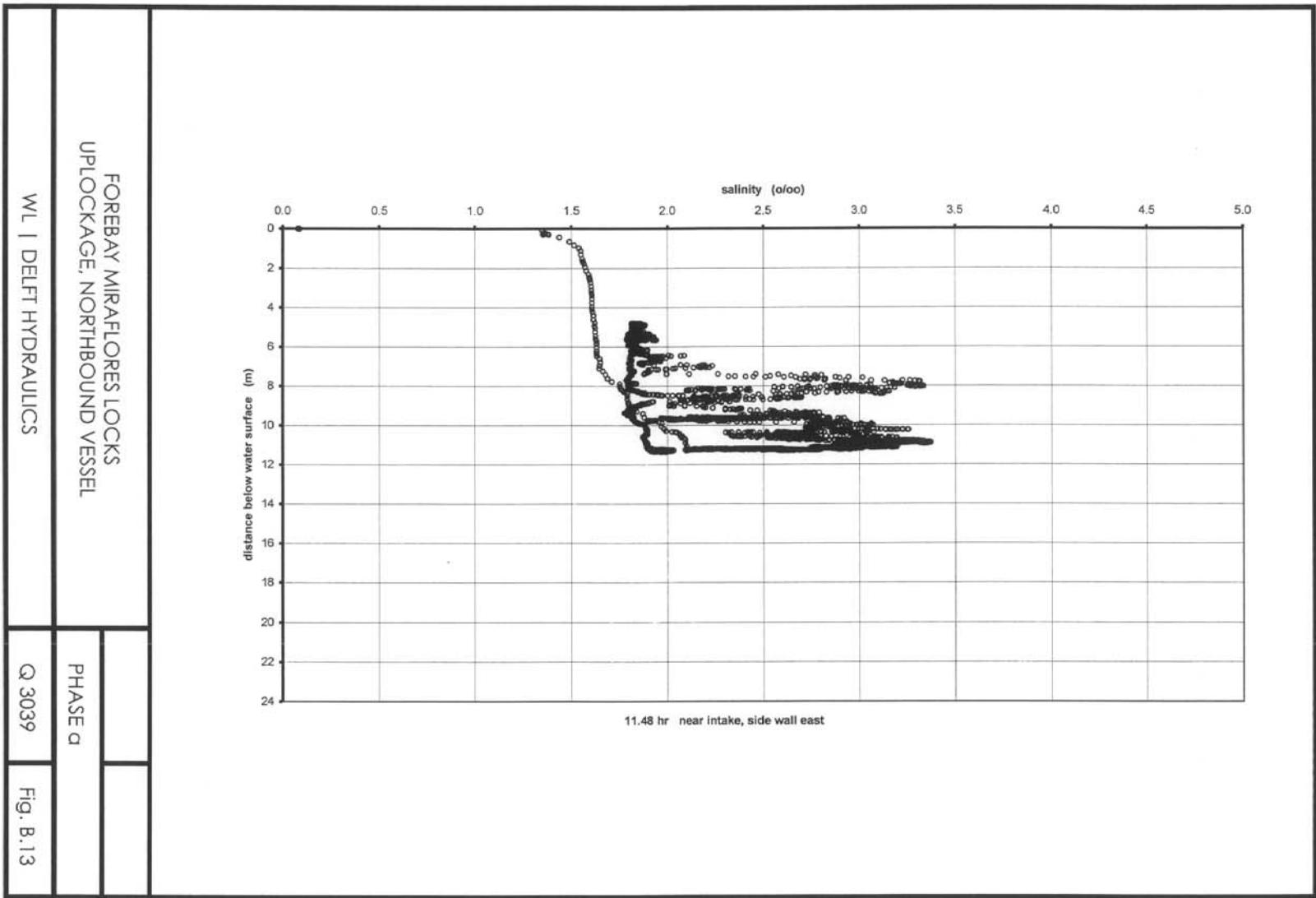
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

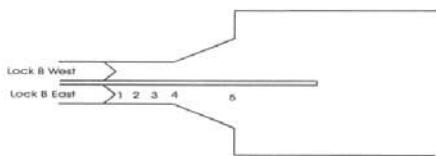
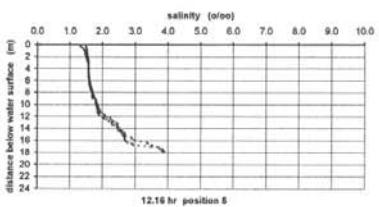
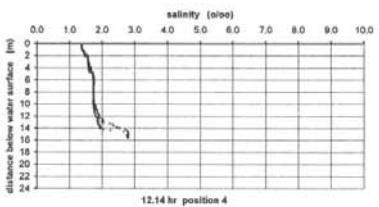
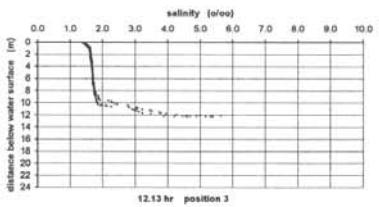
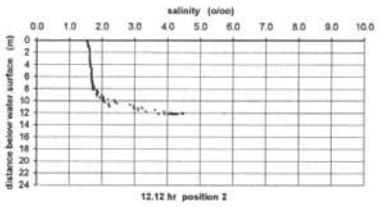
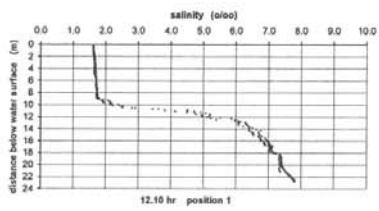
PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.12





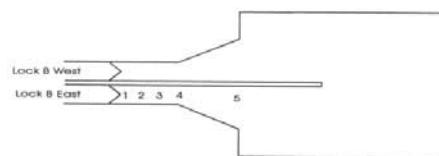
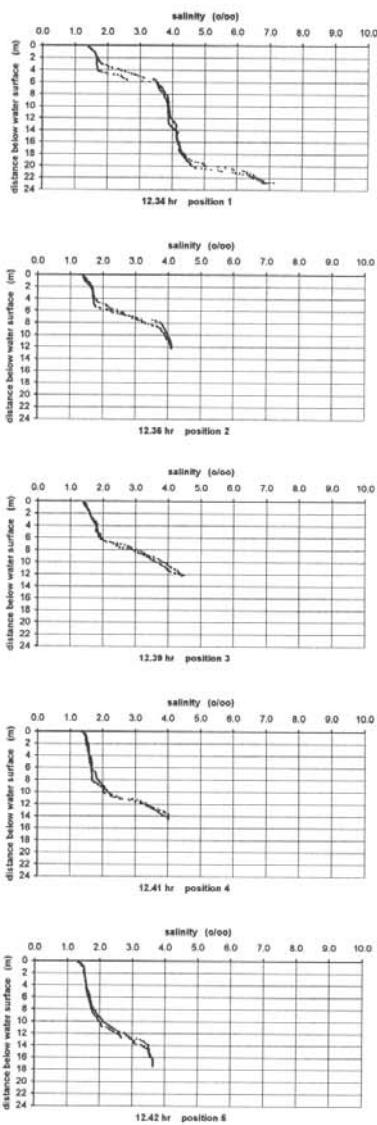
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE b!

WL | DELFT HYDRAULICS

Q 3039

Fig. B.14



FOREBAY MIRAFLORES LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE c!

WL | DELFT HYDRAULICS

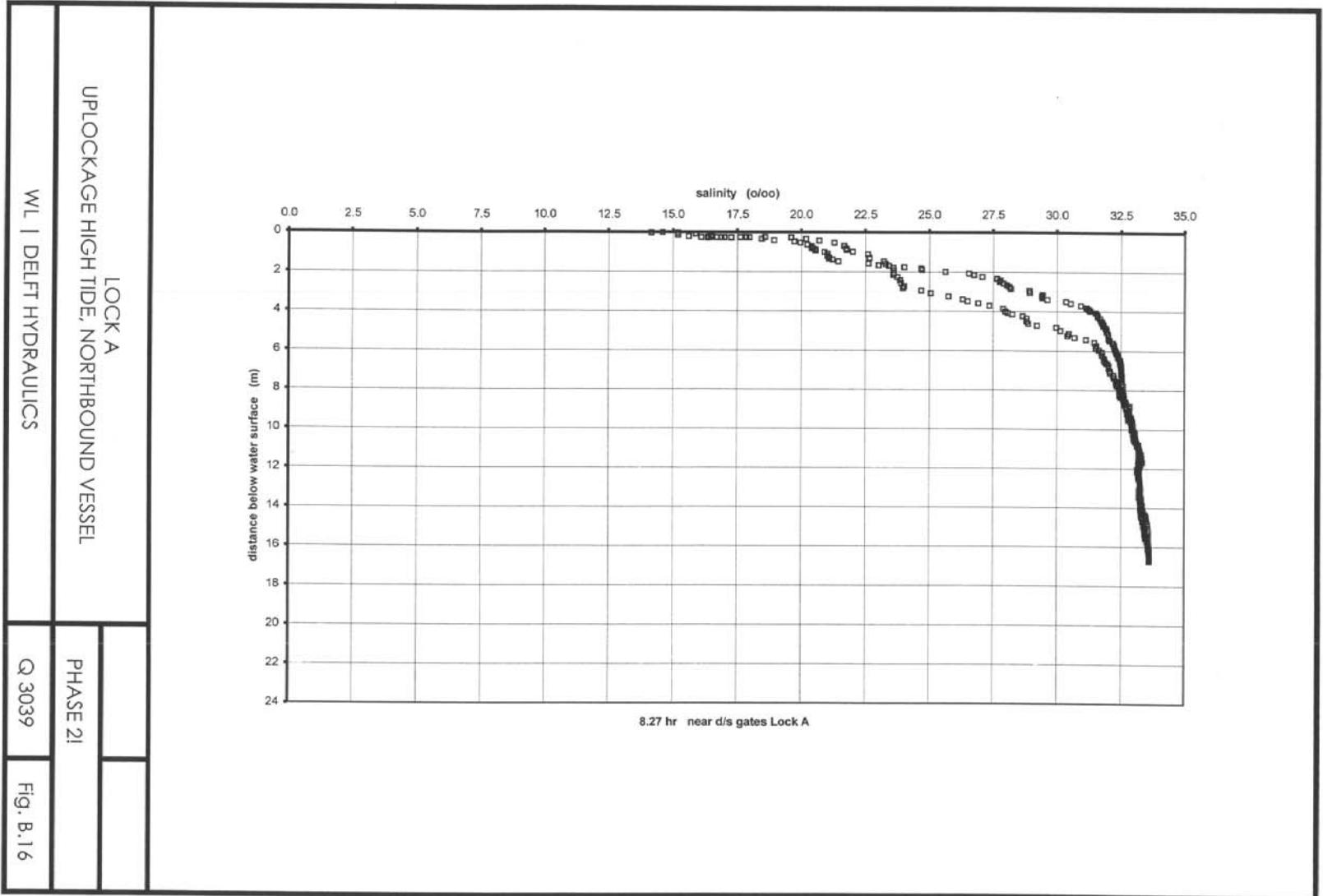
Q 3039

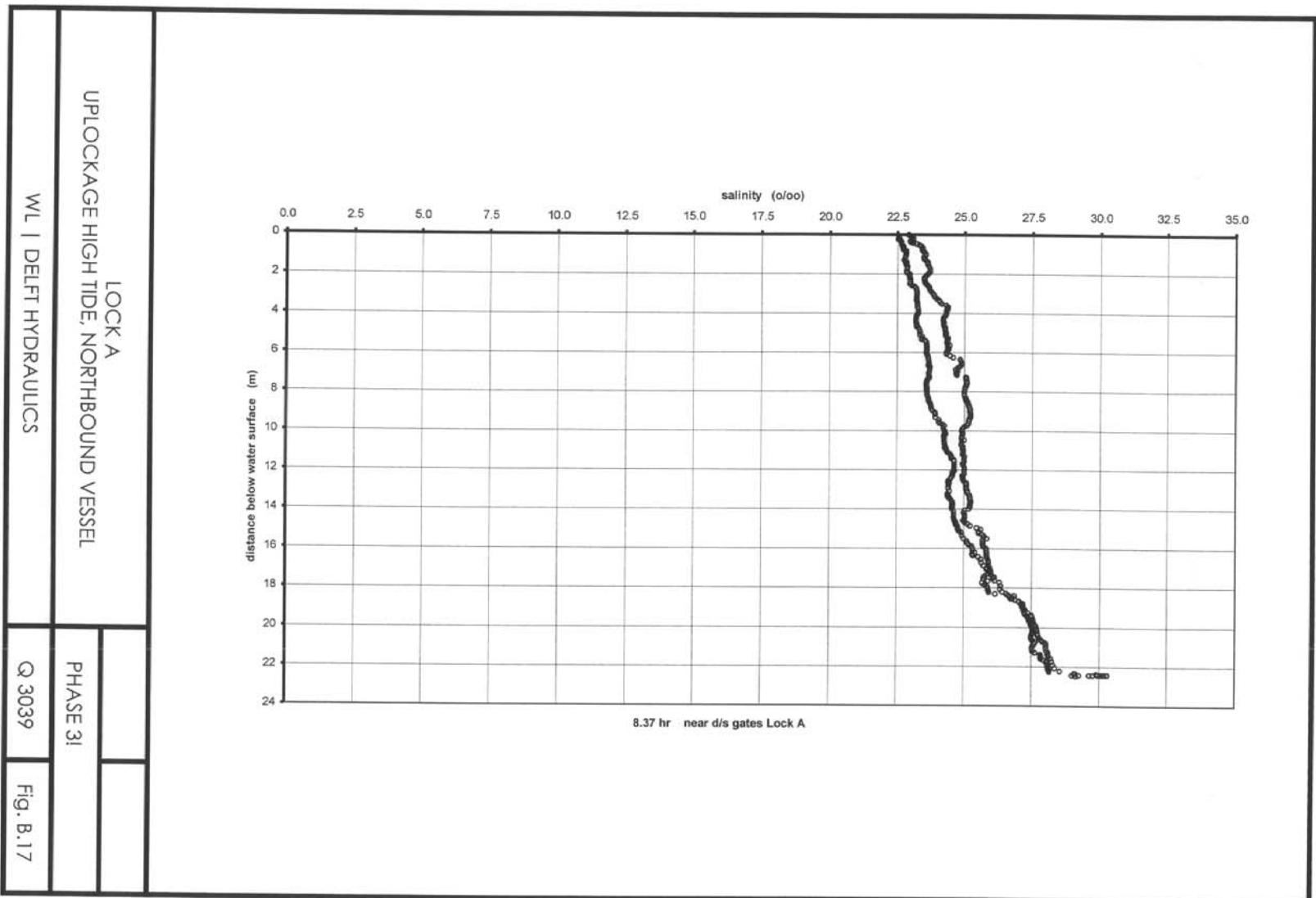
Fig. B.15

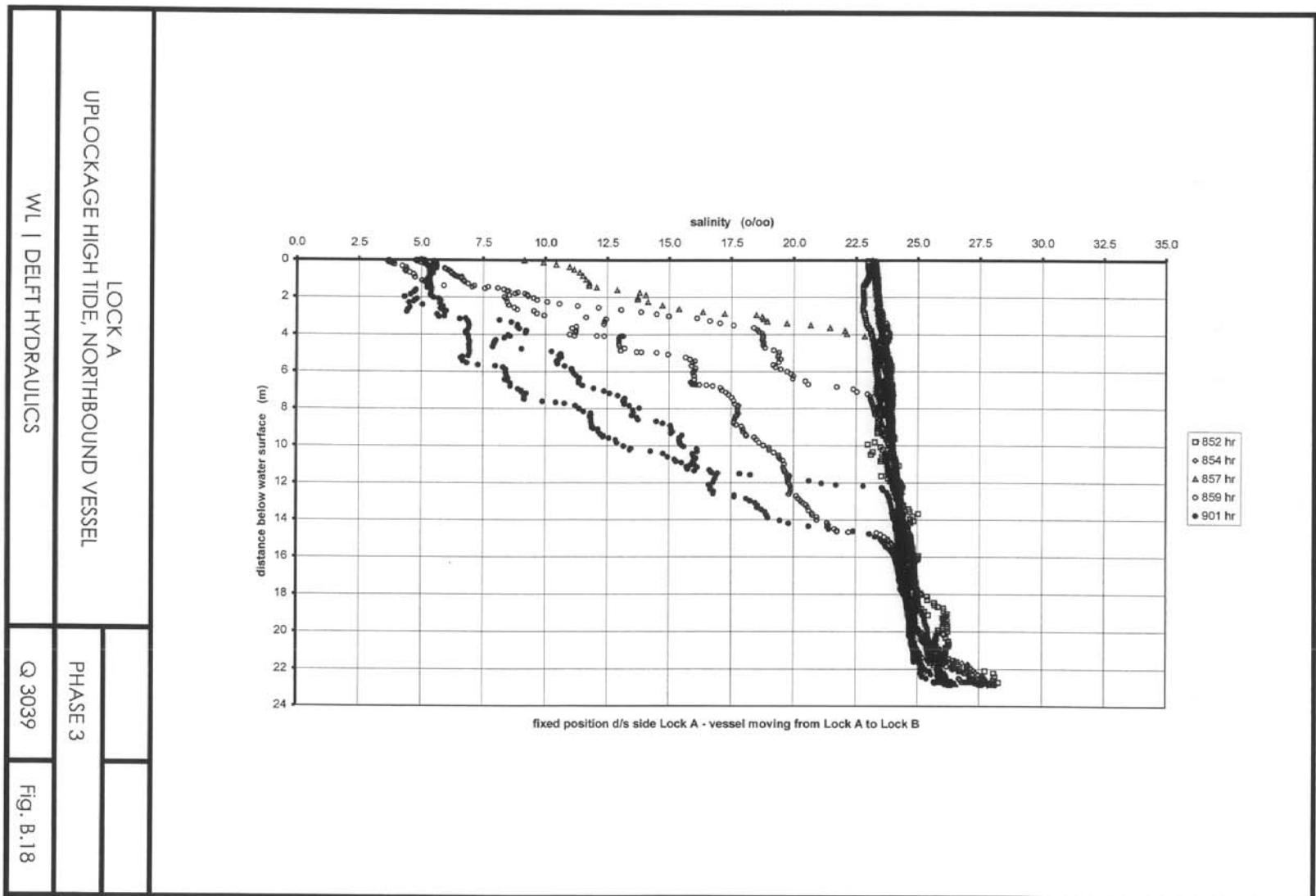
MIRAFLORES LOCKS

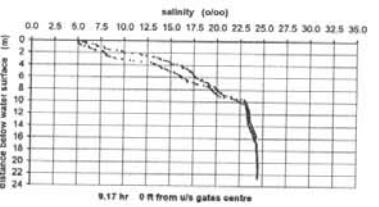
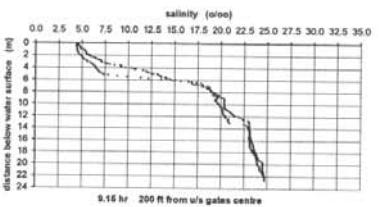
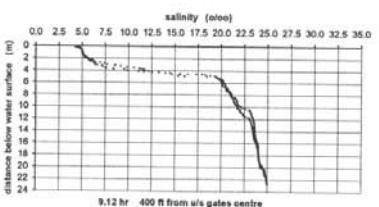
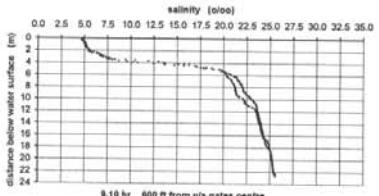
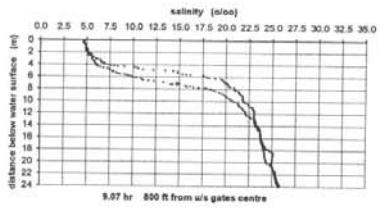
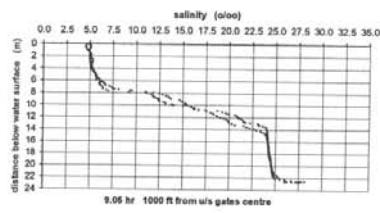
(Locks A and B)

UPLOCKAGE HIGH TIDE









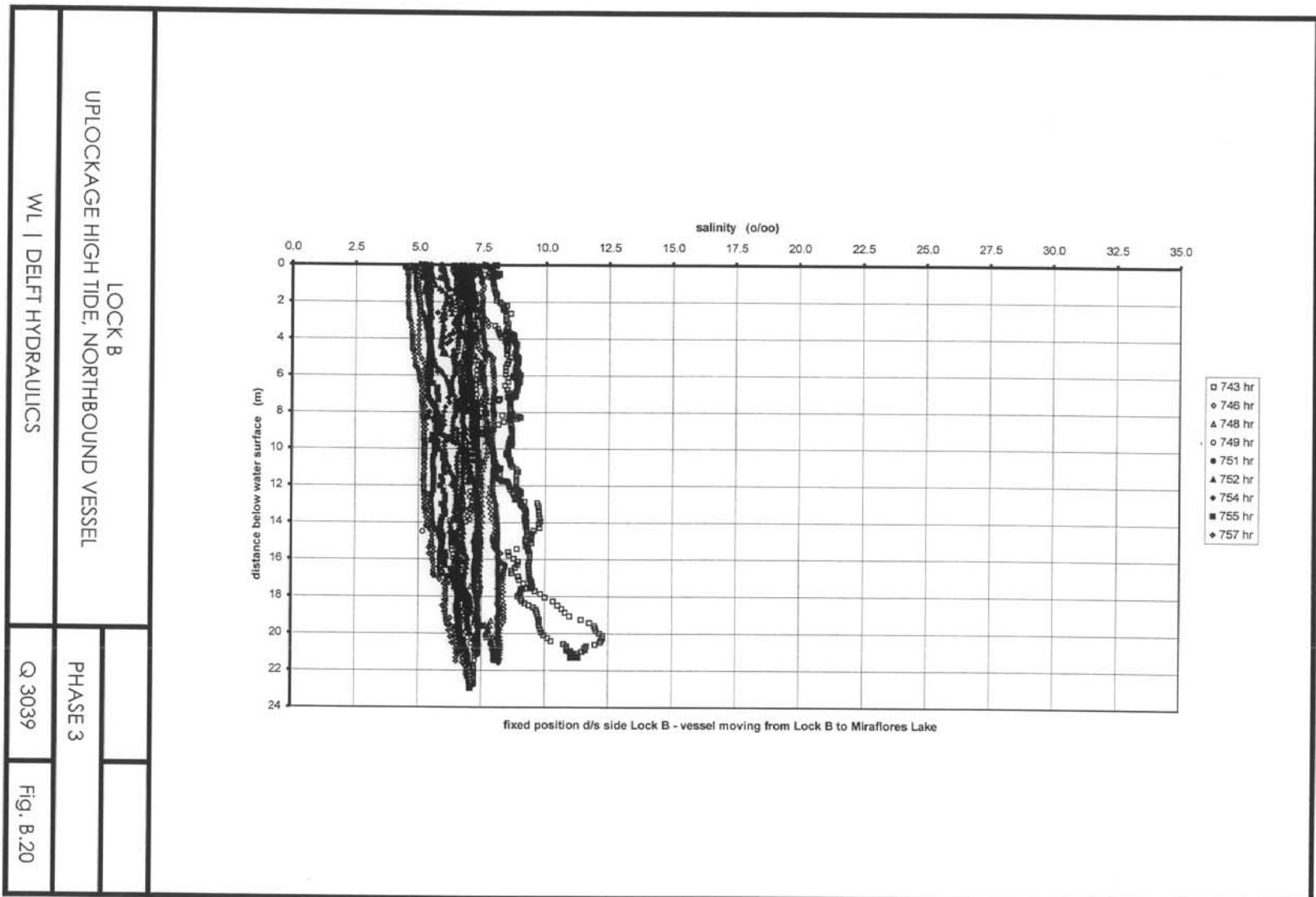
LOCK A
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

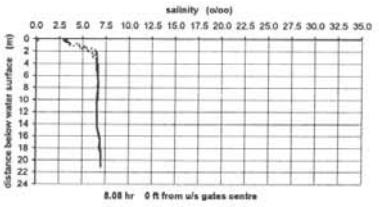
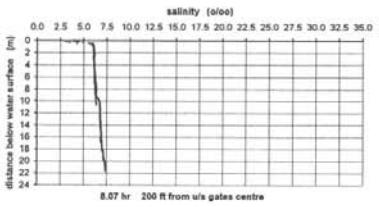
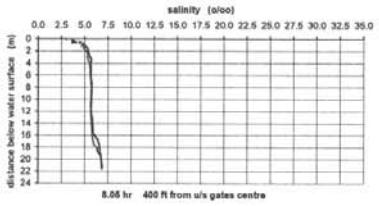
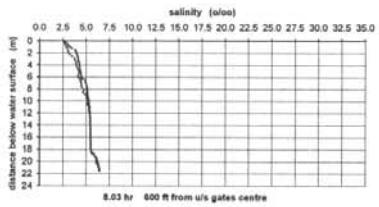
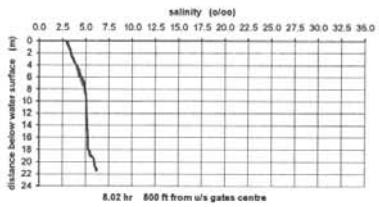
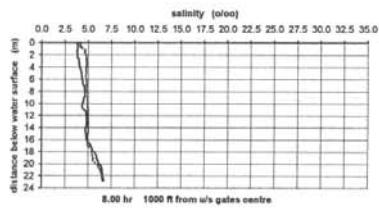
PHASE 4

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Fig. B.19





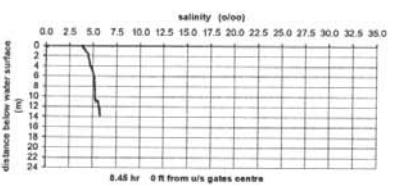
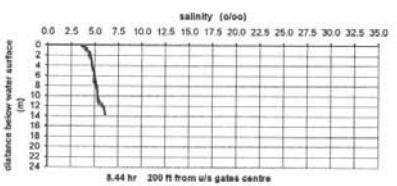
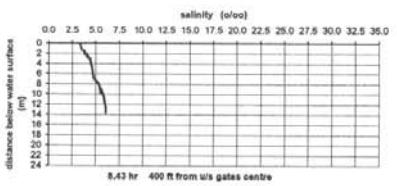
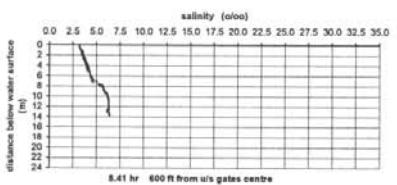
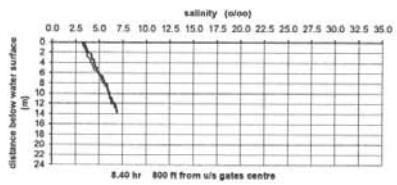
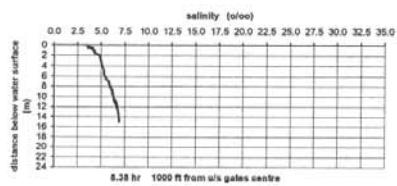
LOCK B
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.21



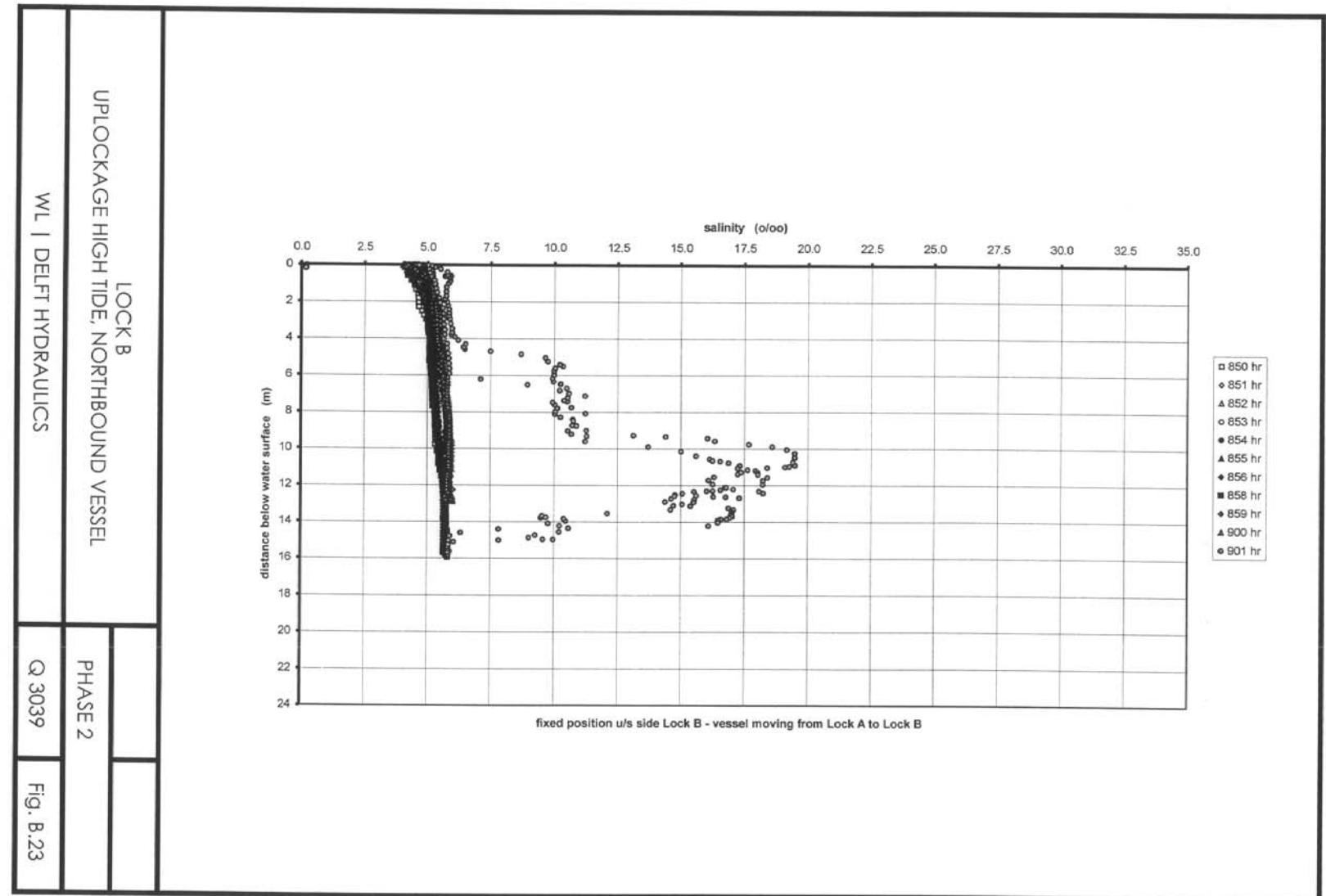
LOCK B
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

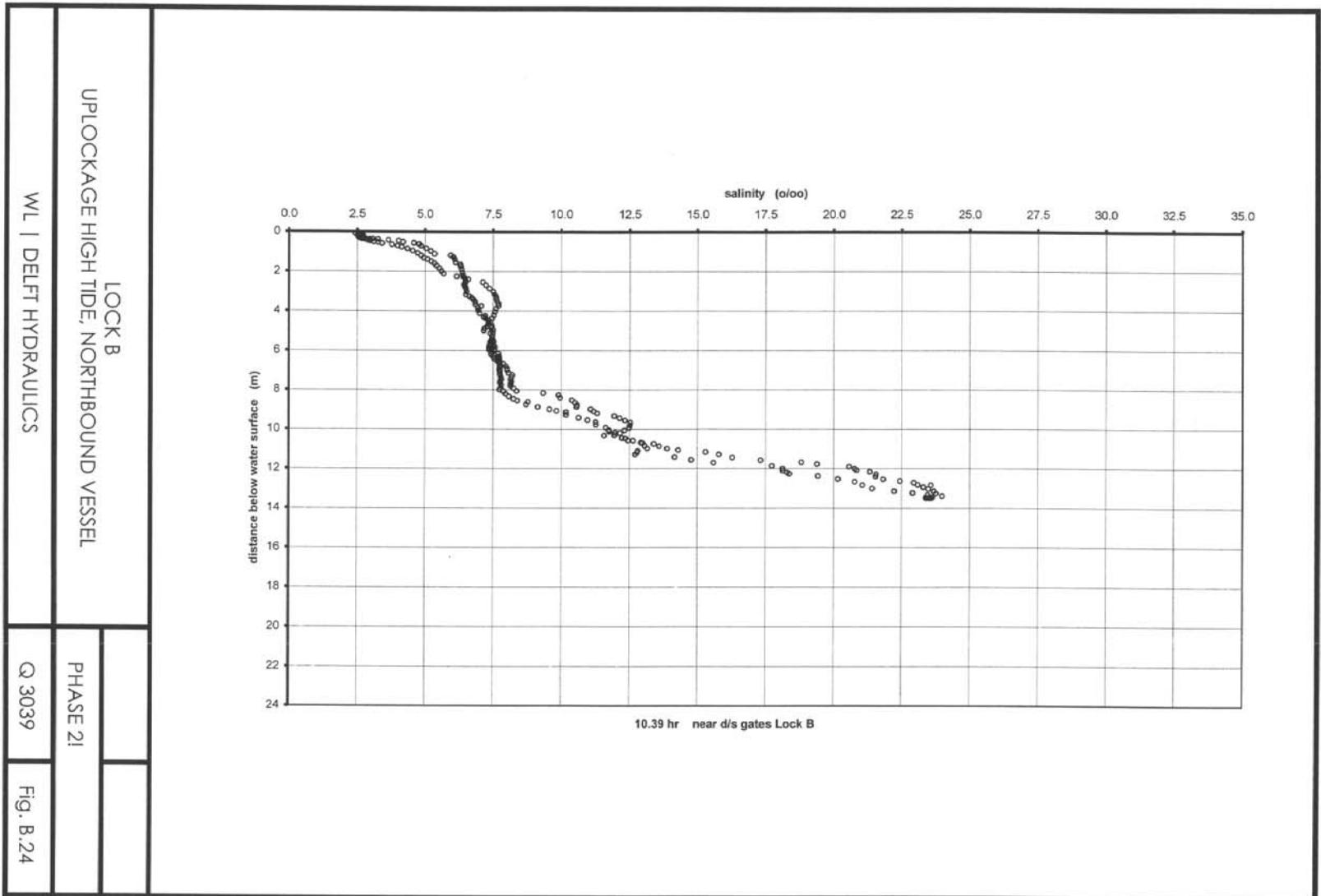
PHASE 5

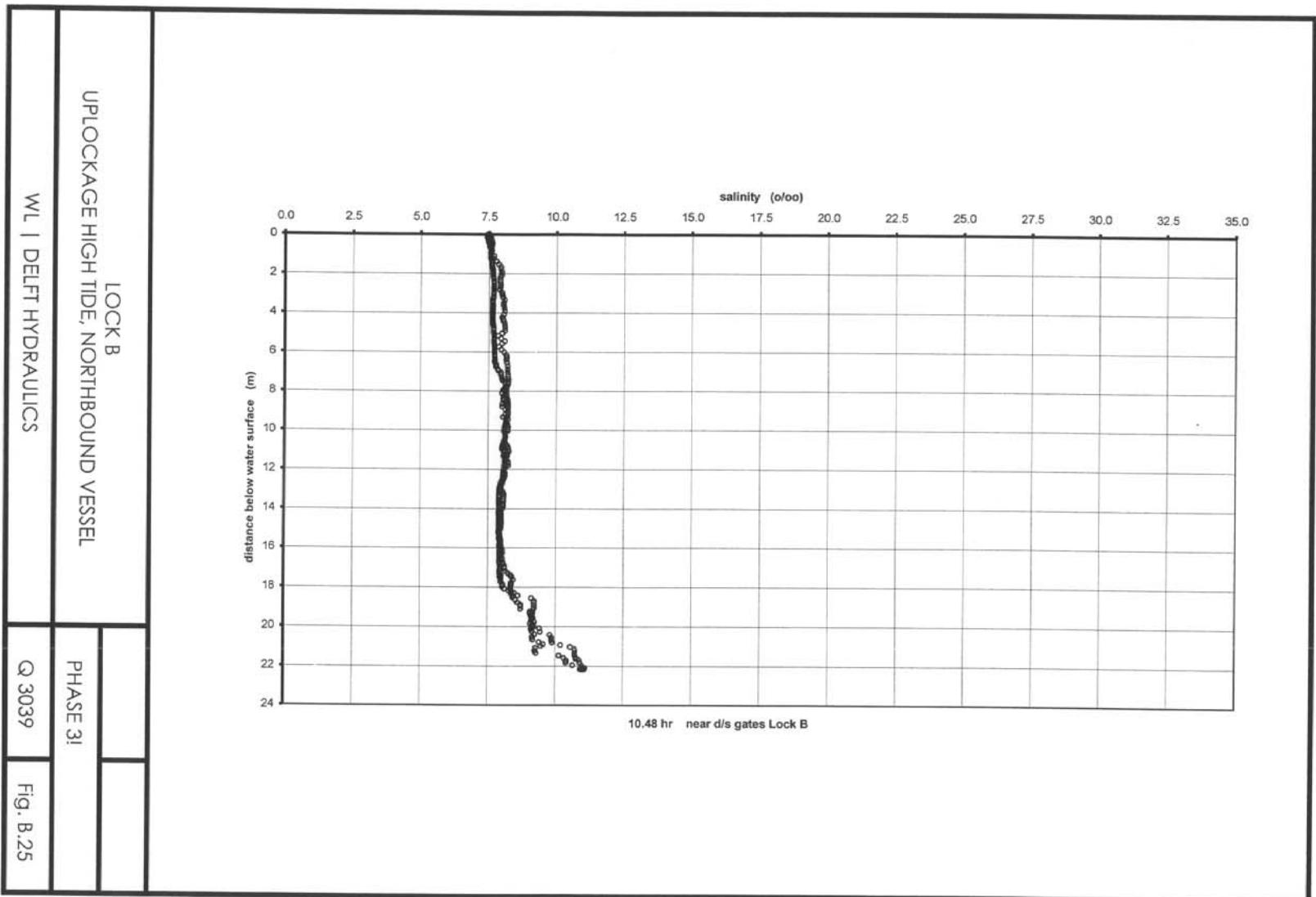
WL | DELFT HYDRAULICS

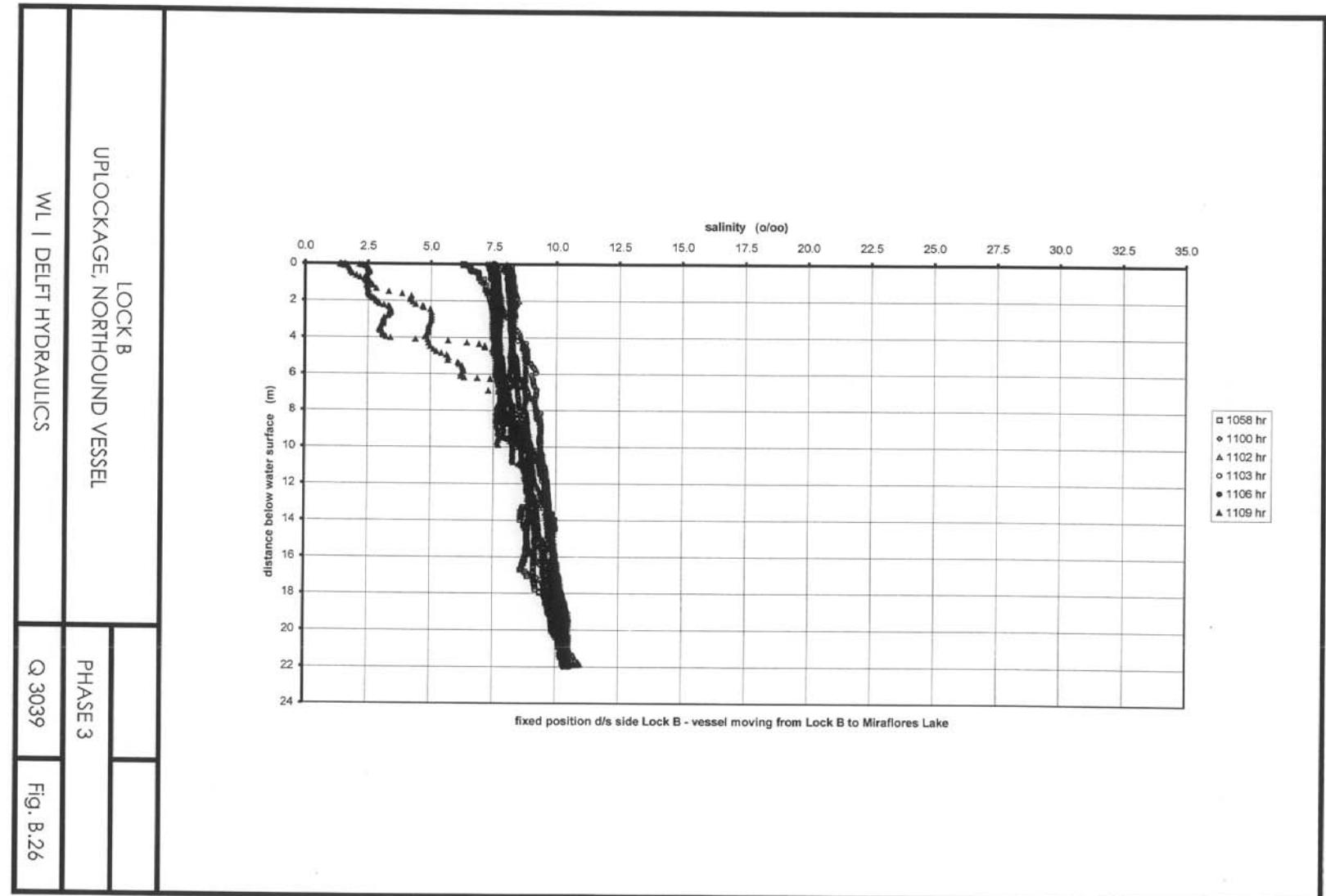
Q 3039

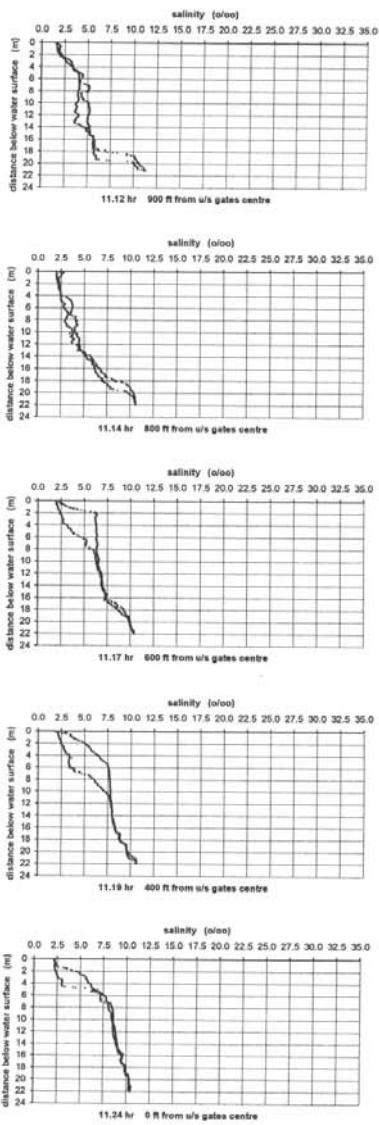
Fig. B.22











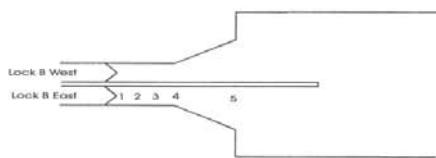
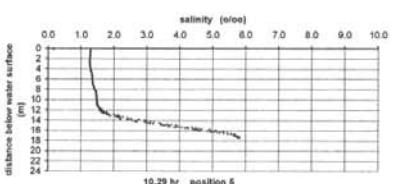
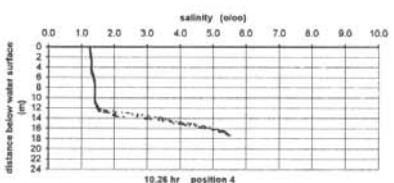
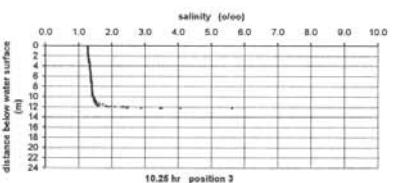
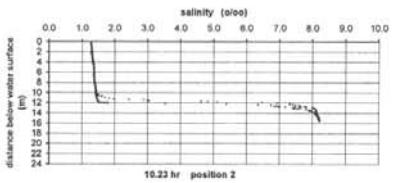
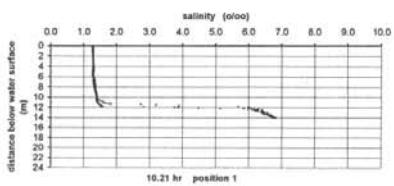
LOCK B
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.27



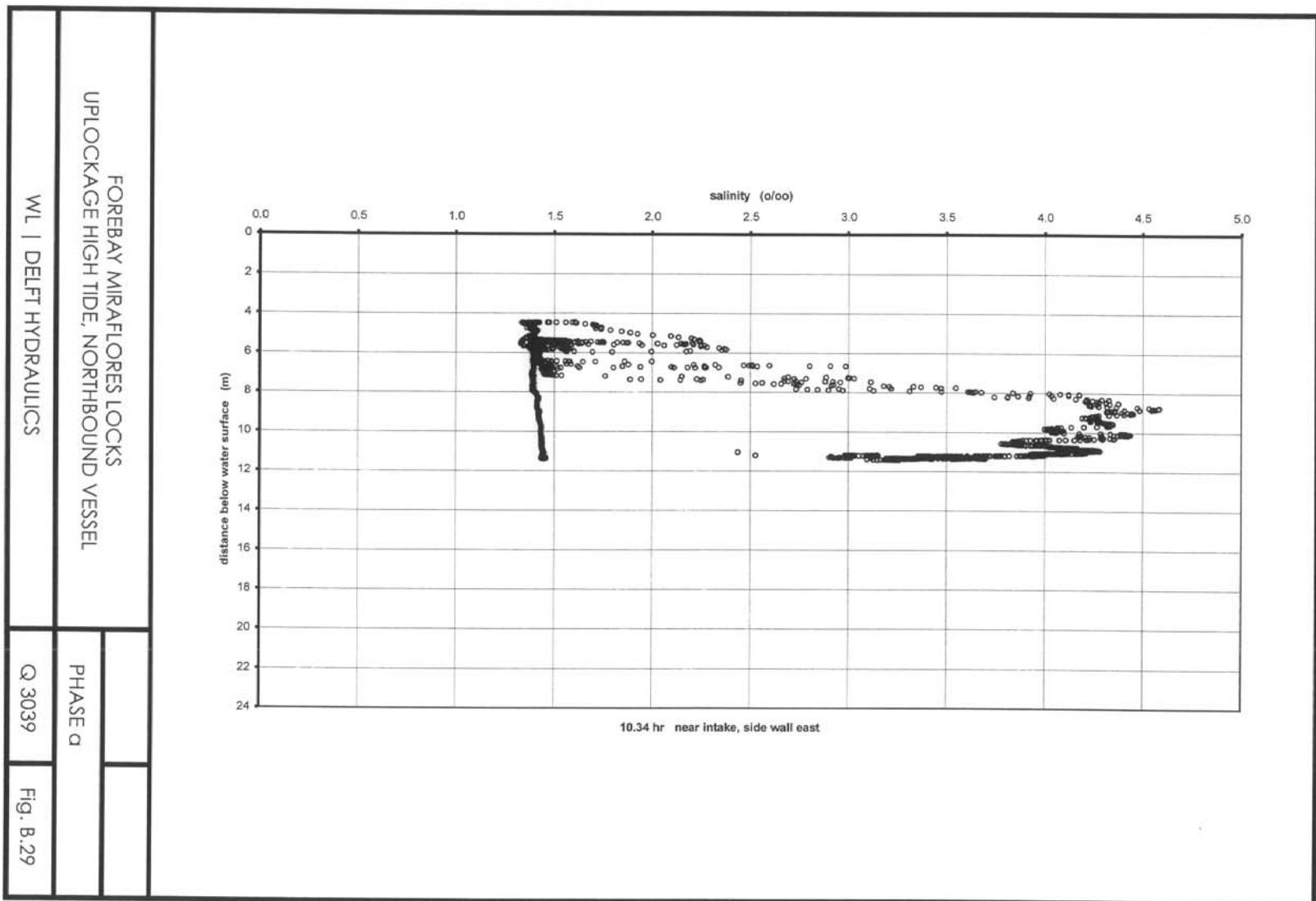
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.28

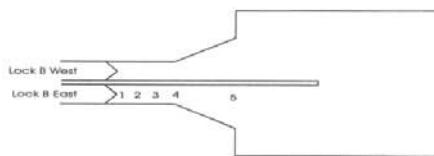
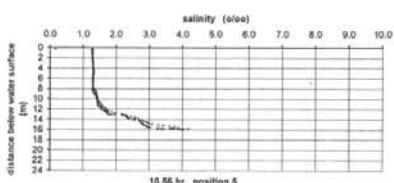
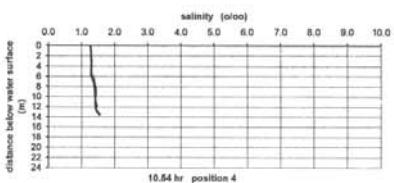
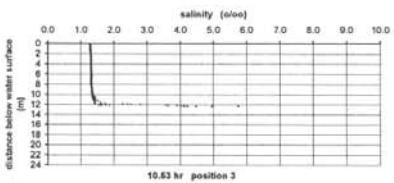
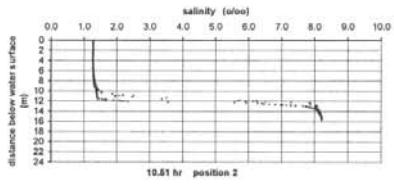
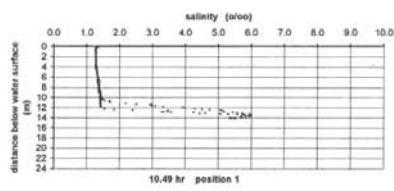


FOREBAY MIRAFLORES LOCKS
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE a

Q 3039

Fig. B.29



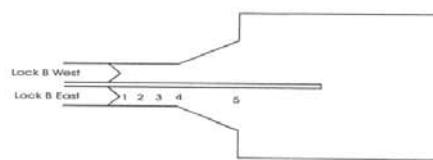
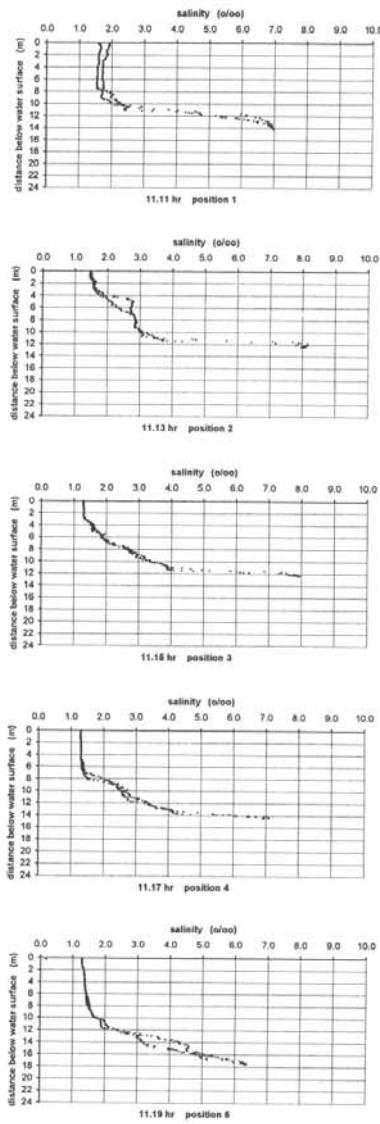
FOREBAY MIRAFLORES LOCKS
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.30



FOREBAY MIRAFLORES LOCKS
UPLOCKAGE HIGH TIDE, NORTHBOUND VESSEL

PHASE C

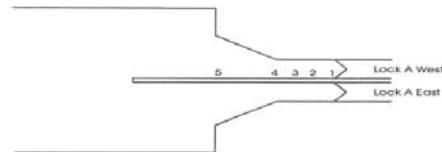
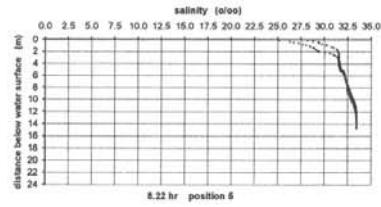
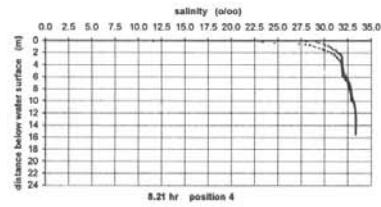
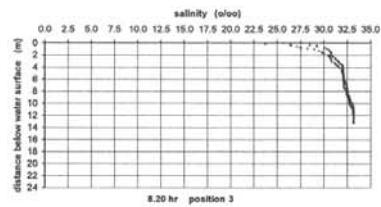
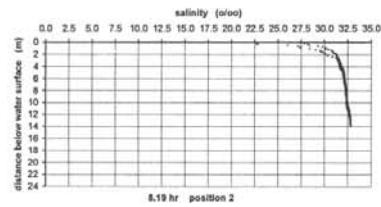
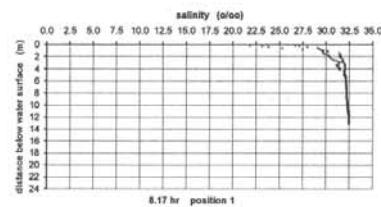
WL | DELFT HYDRAULICS

Q 3039

Fig. B.31

MIRAFLORES LOCKS
(Locks A and B)

UPLOCKAGE LOW TIDE



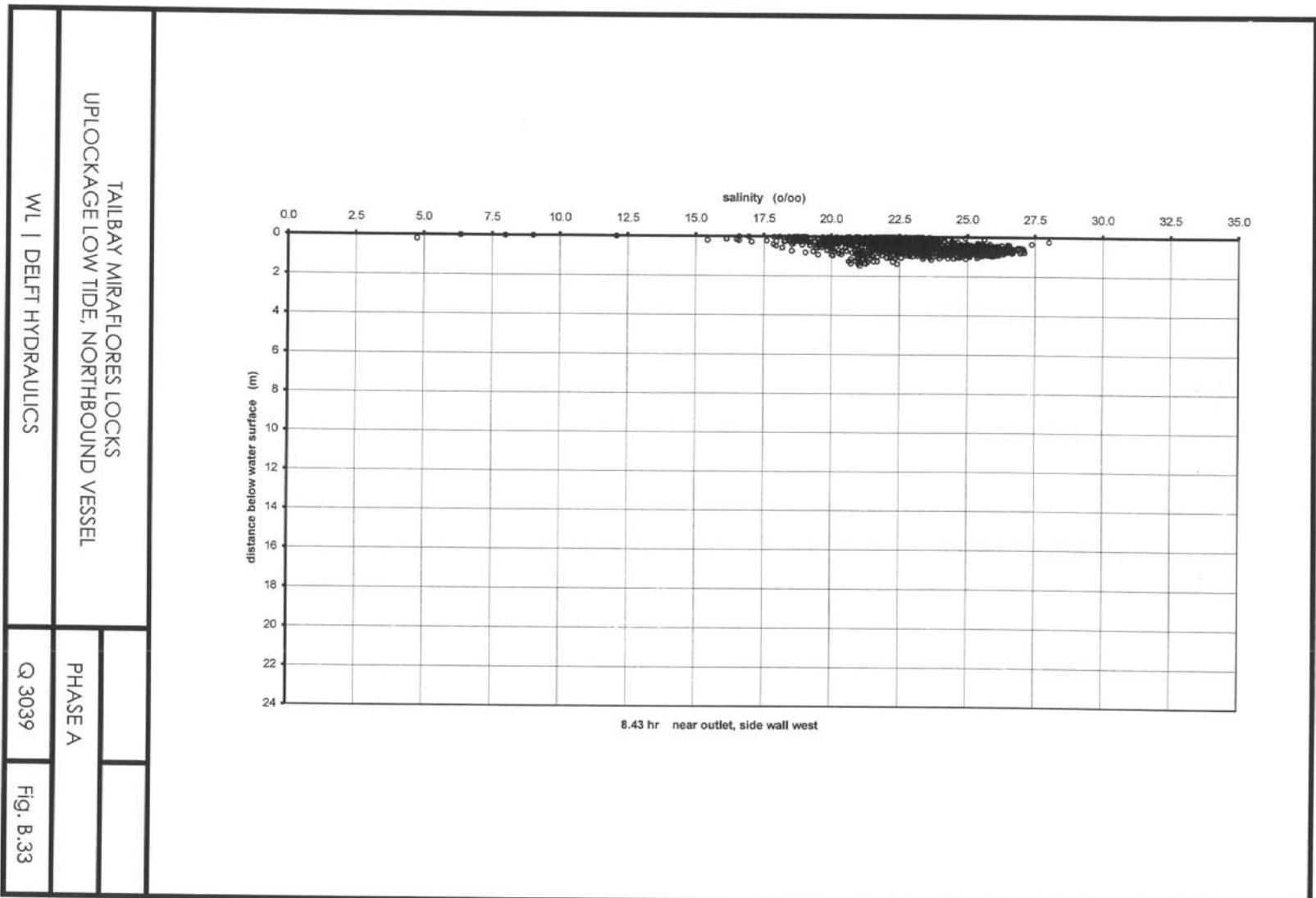
TAILBAY MIRAFLORES LOCKS
UPLOCKAGE LOW TIDE, NORTHBOUND VESSEL

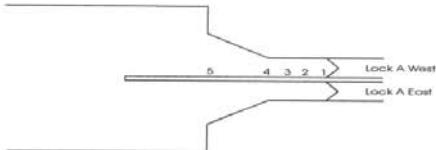
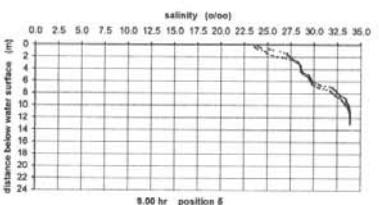
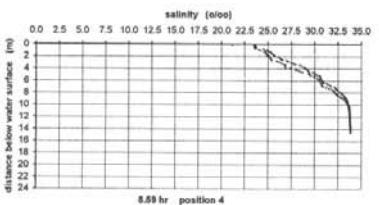
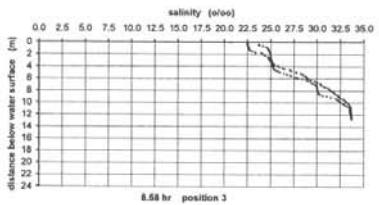
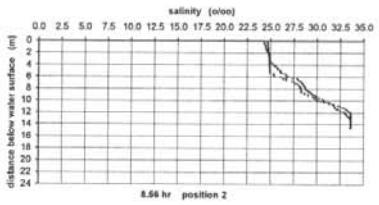
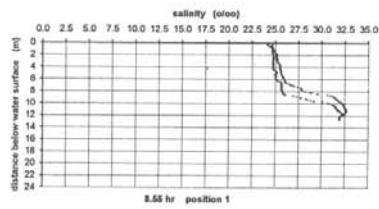
PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.32





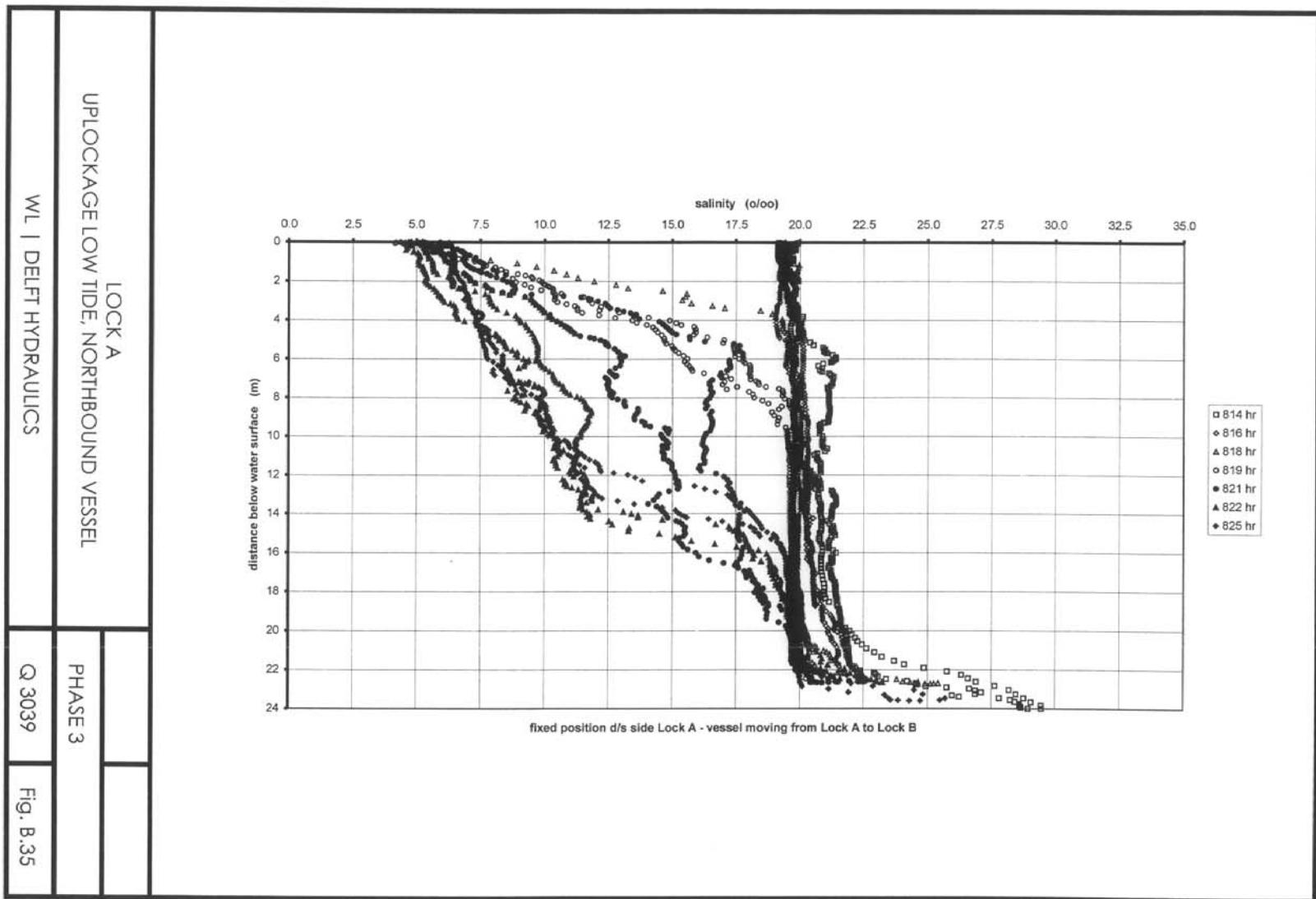
TAILBAY MIRAFLORES LOCKS
UPLOCKAGE LOW TIDE, NORTHBOUND VESSEL

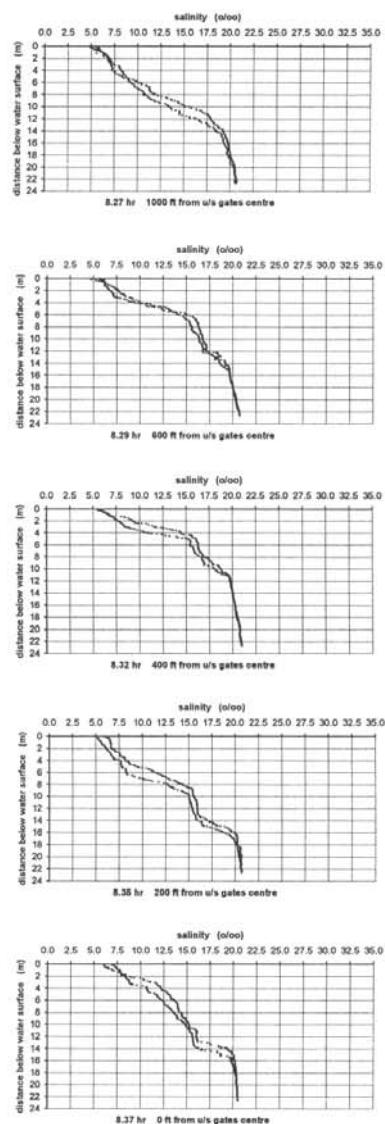
PHASE B

WL | DELFT HYDRAULICS

Q 3039

Fig. B.34





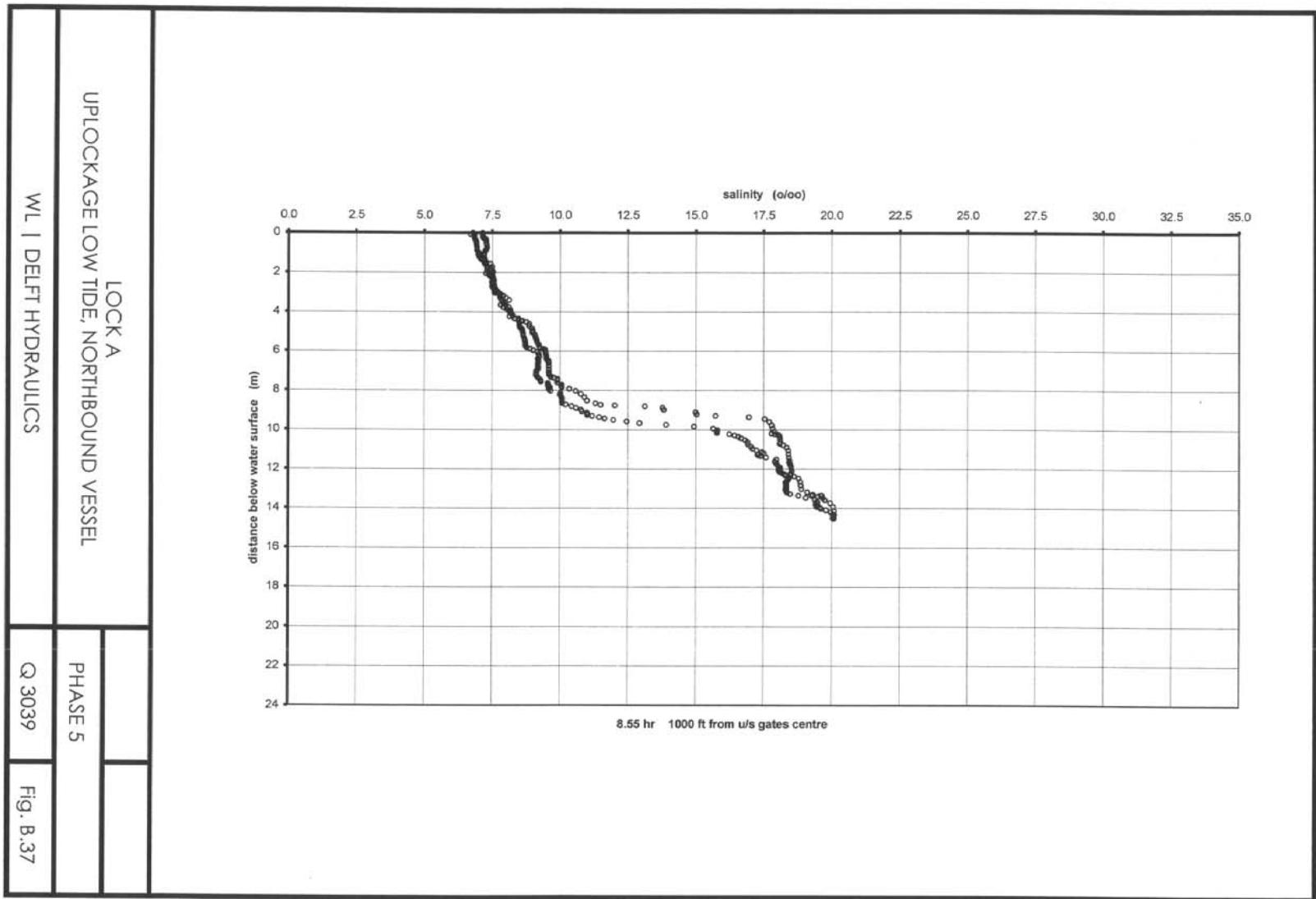
LOCK A
UPLOCKAGE LOW TIDE, NORTHBOUND VESSEL

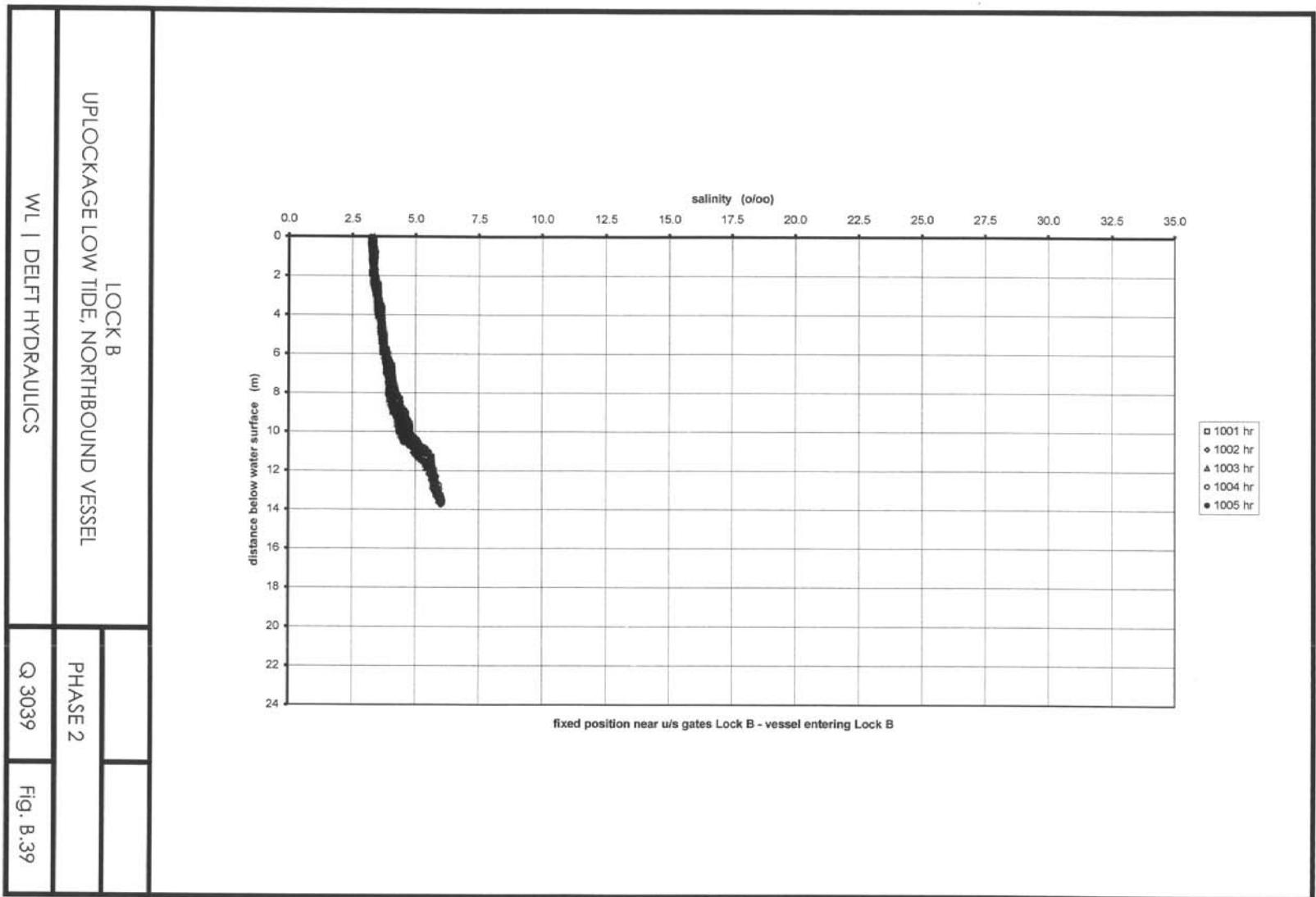
PHASE 4

WL | DELFT HYDRAULICS

Q 3039

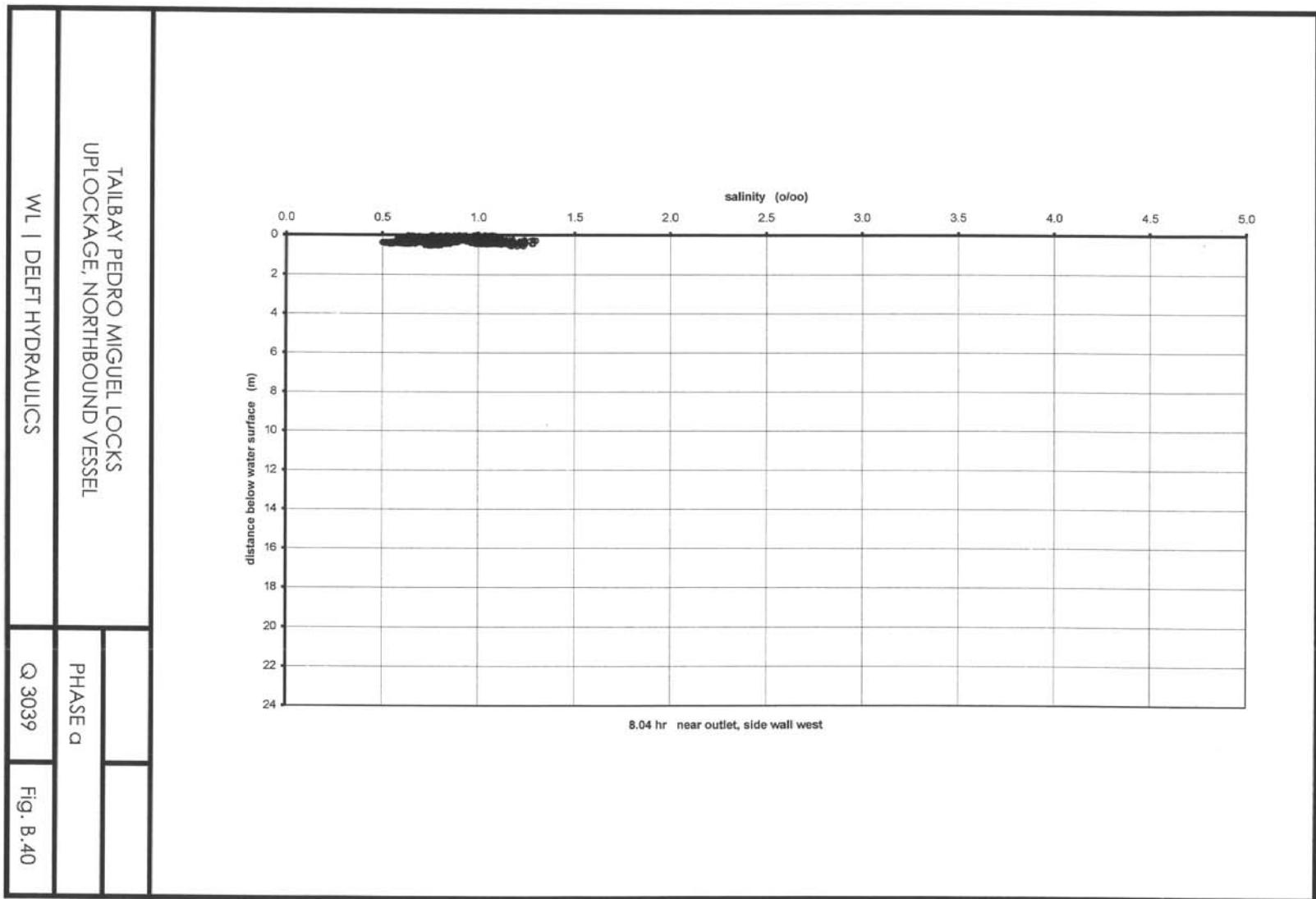
Fig. B.36

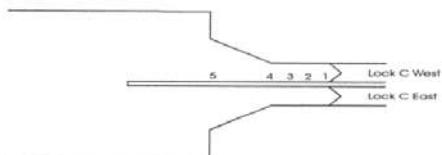
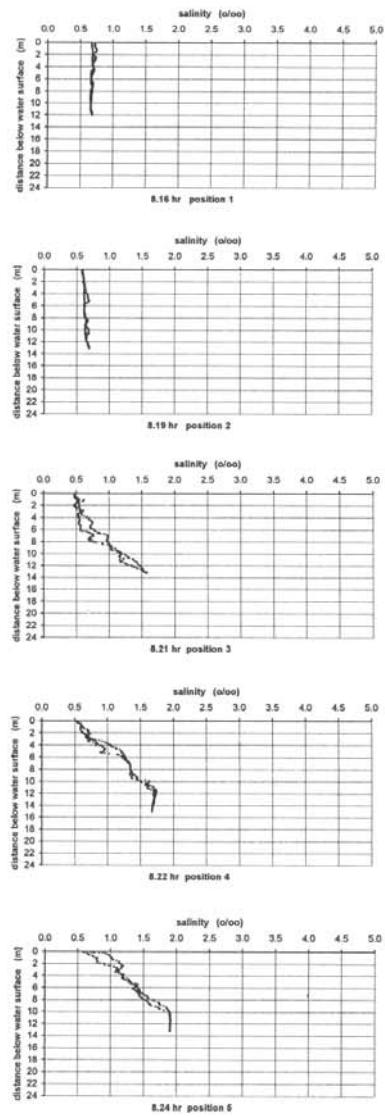




PEDRO MIGUEL LOCKS
(Locks C)

UPLOCKAGE





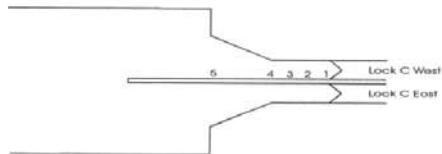
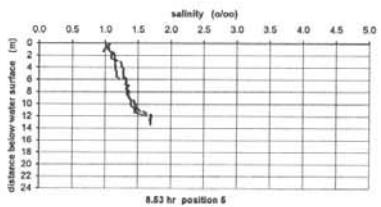
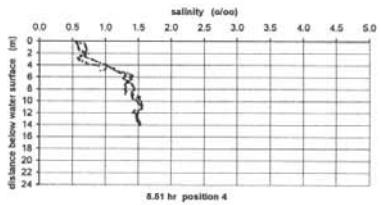
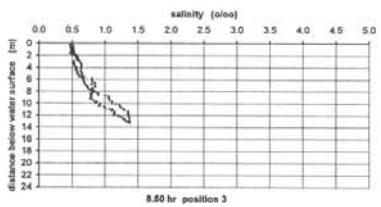
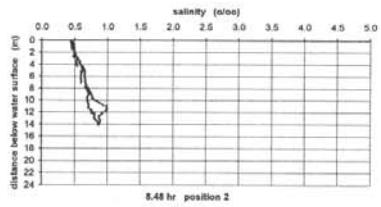
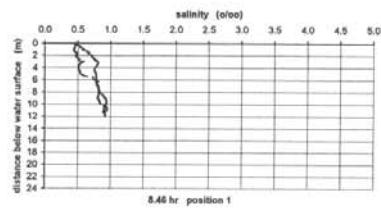
TAILBAY PEDRO MIGUEL LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.41



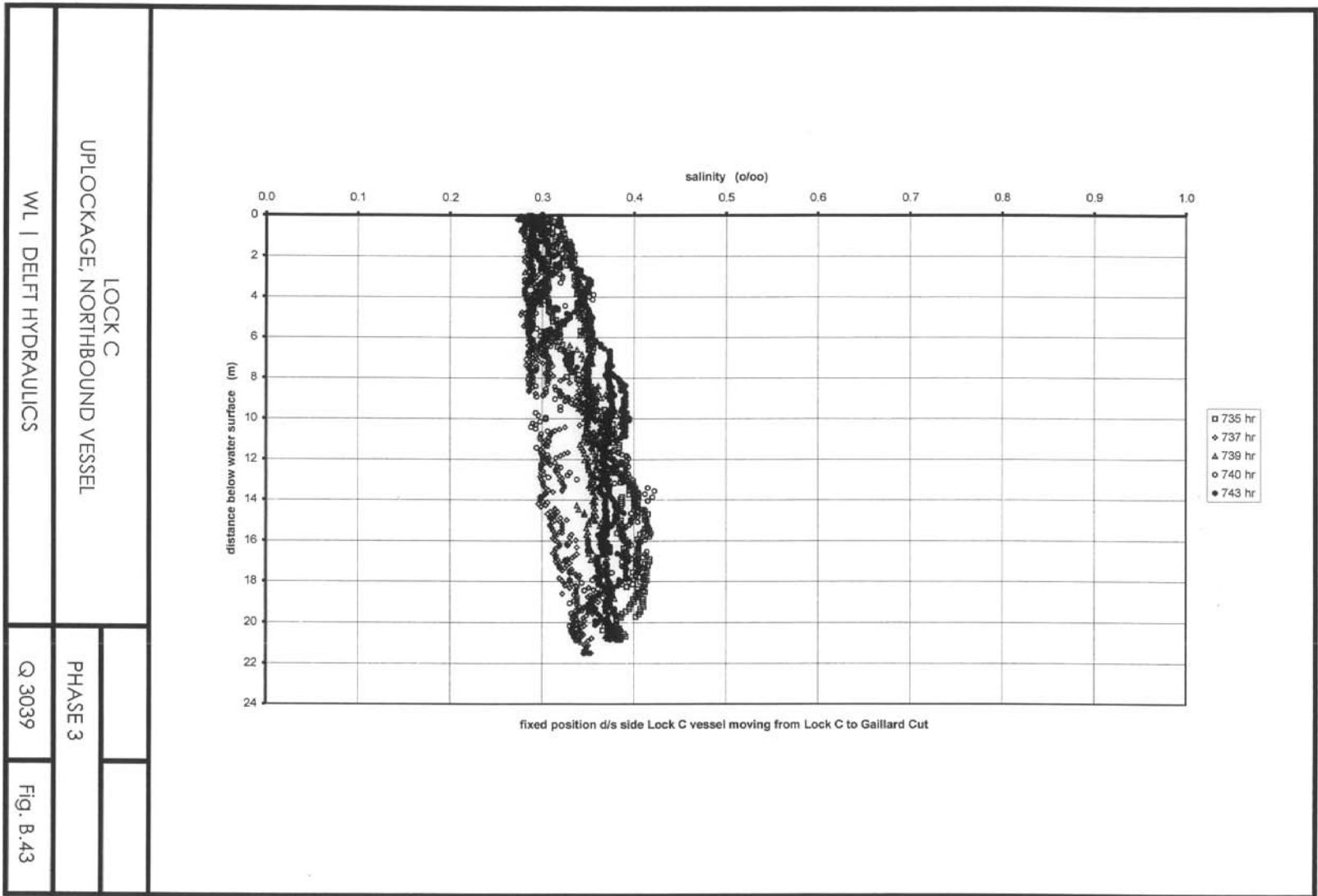
TAILBAY PEDRO MIGUEL LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

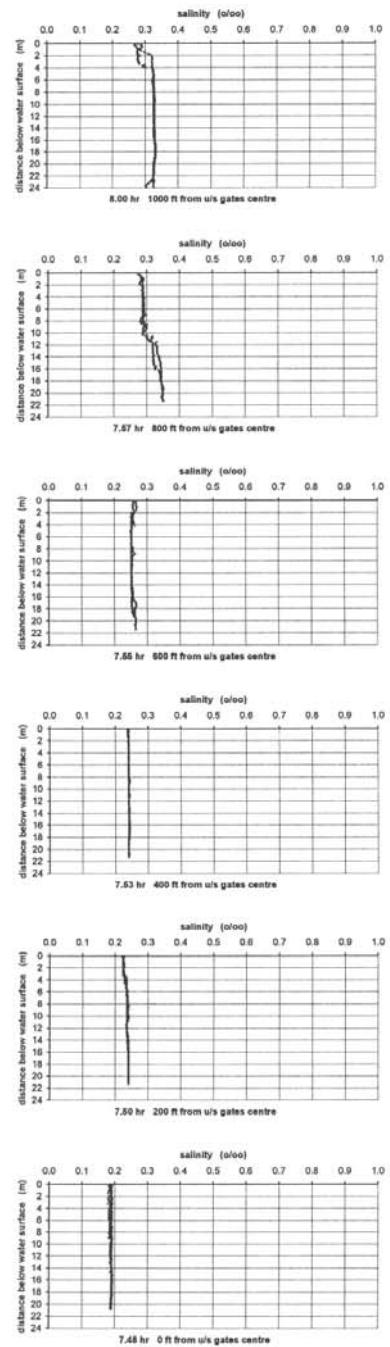
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.42





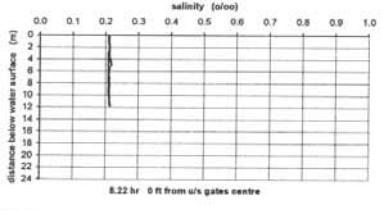
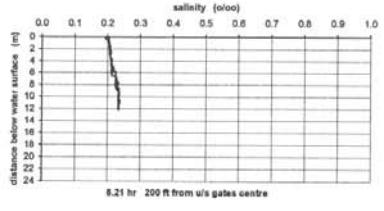
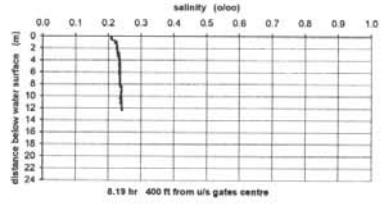
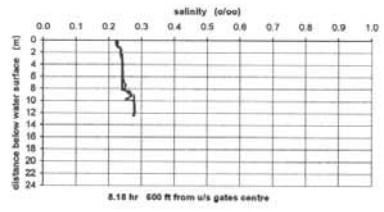
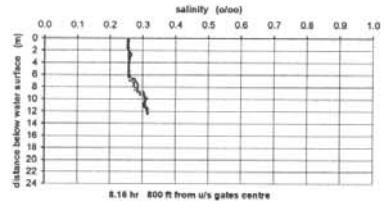
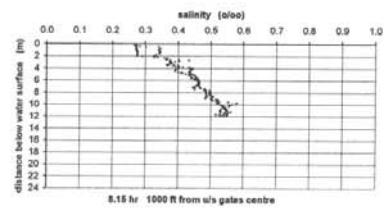
LOCK C
UPLOCKAGE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.44



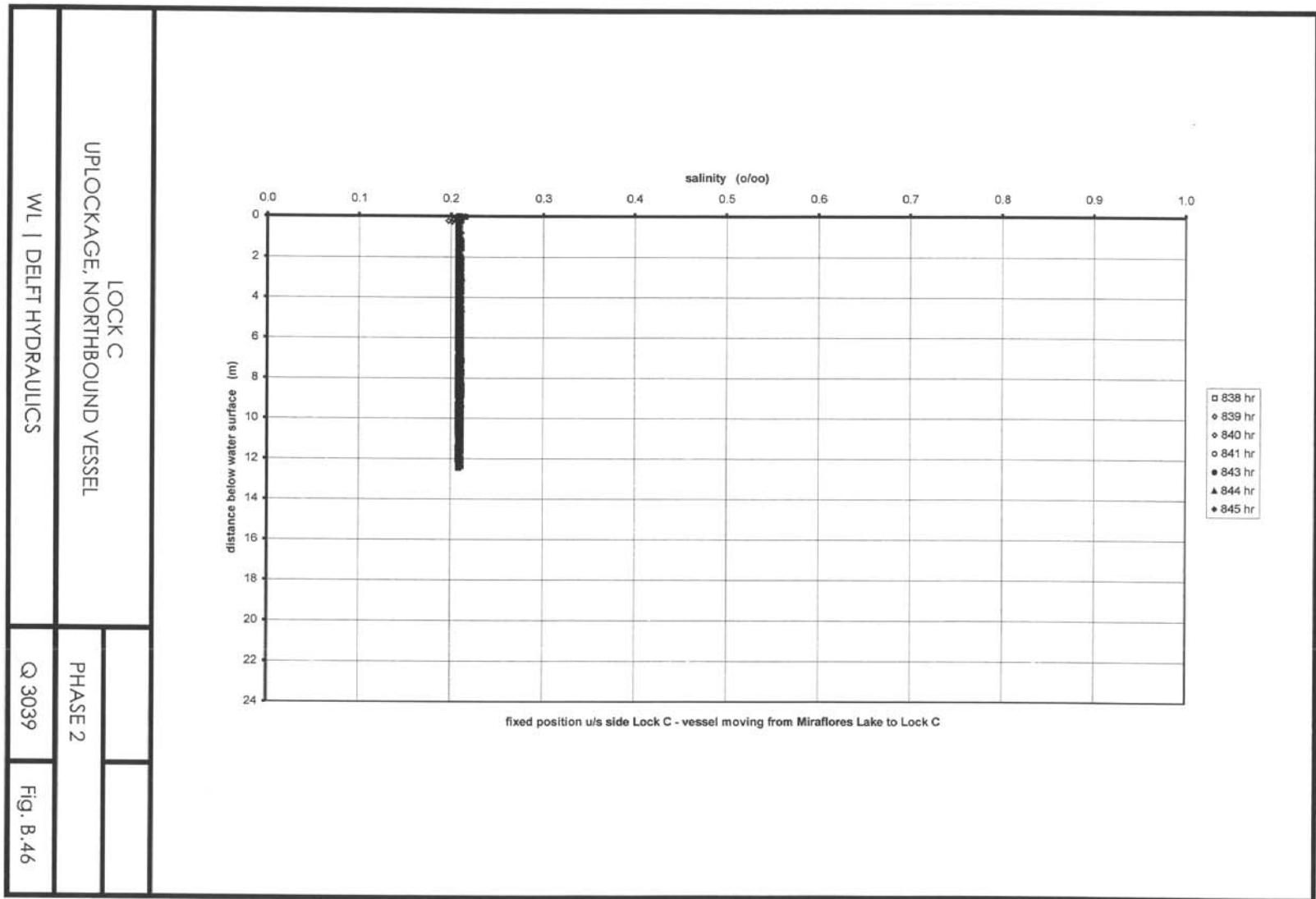
LOCK C
UPLOCKAGE, NORTHBOUND VESSEL

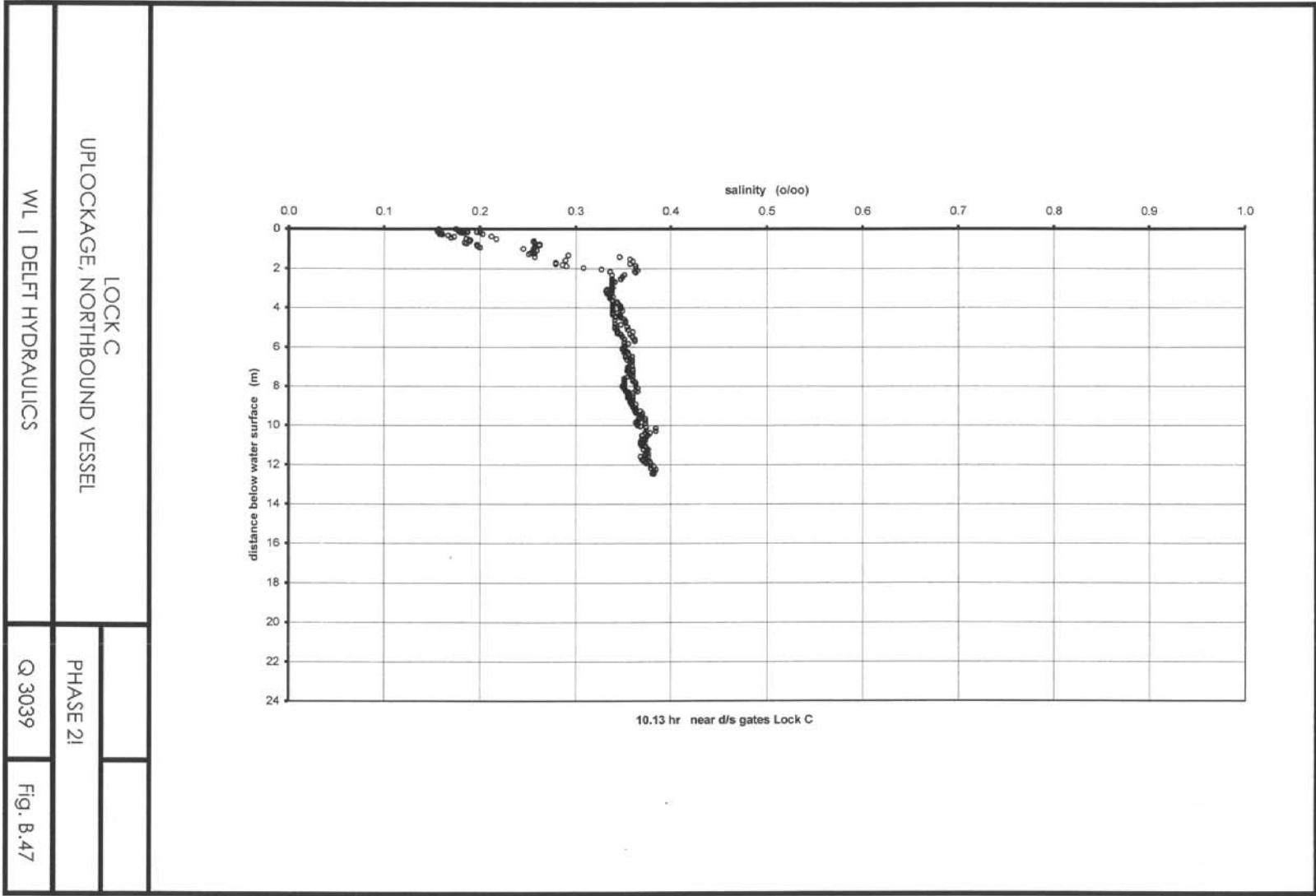
PHASE 5

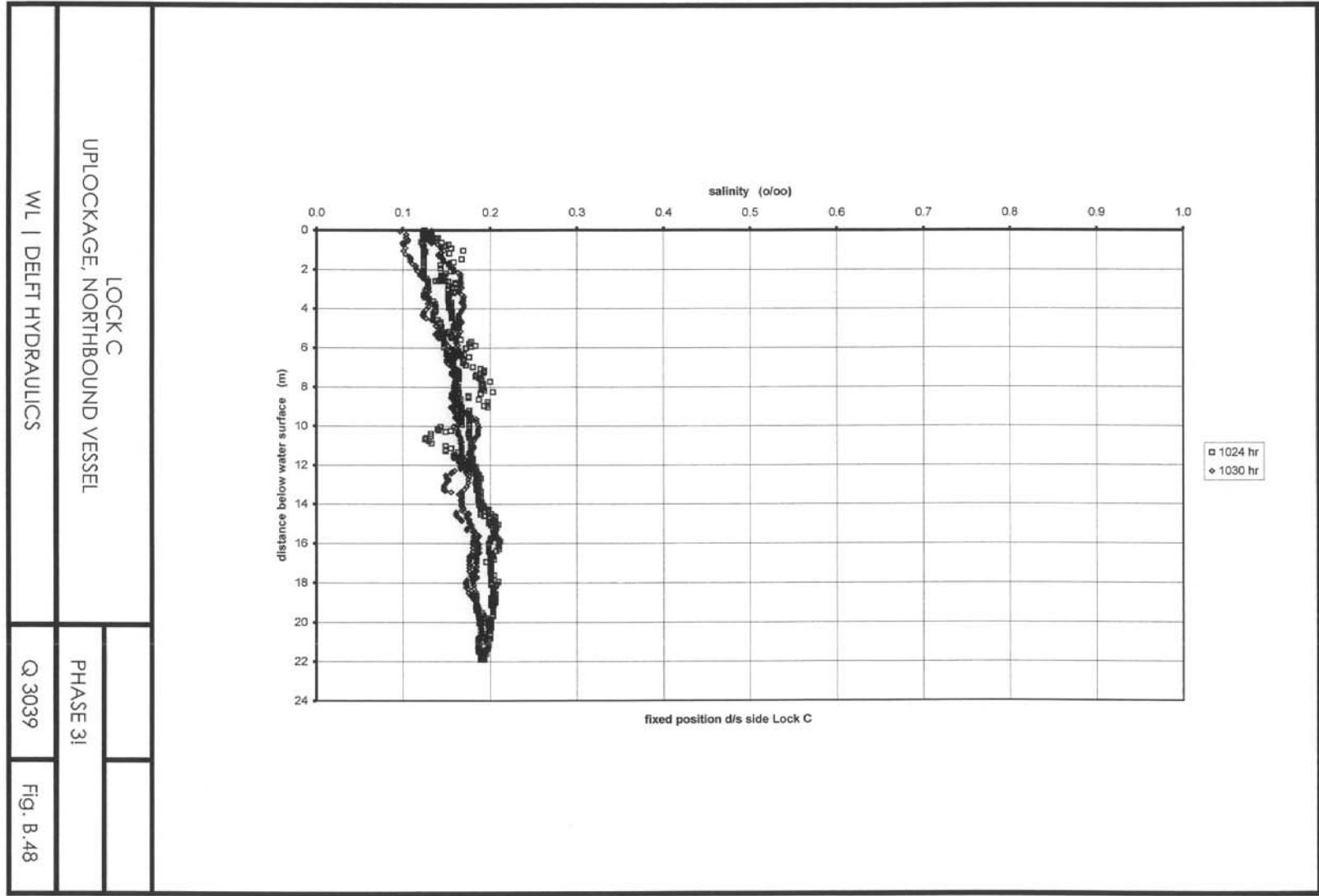
WL | DELFT HYDRAULICS

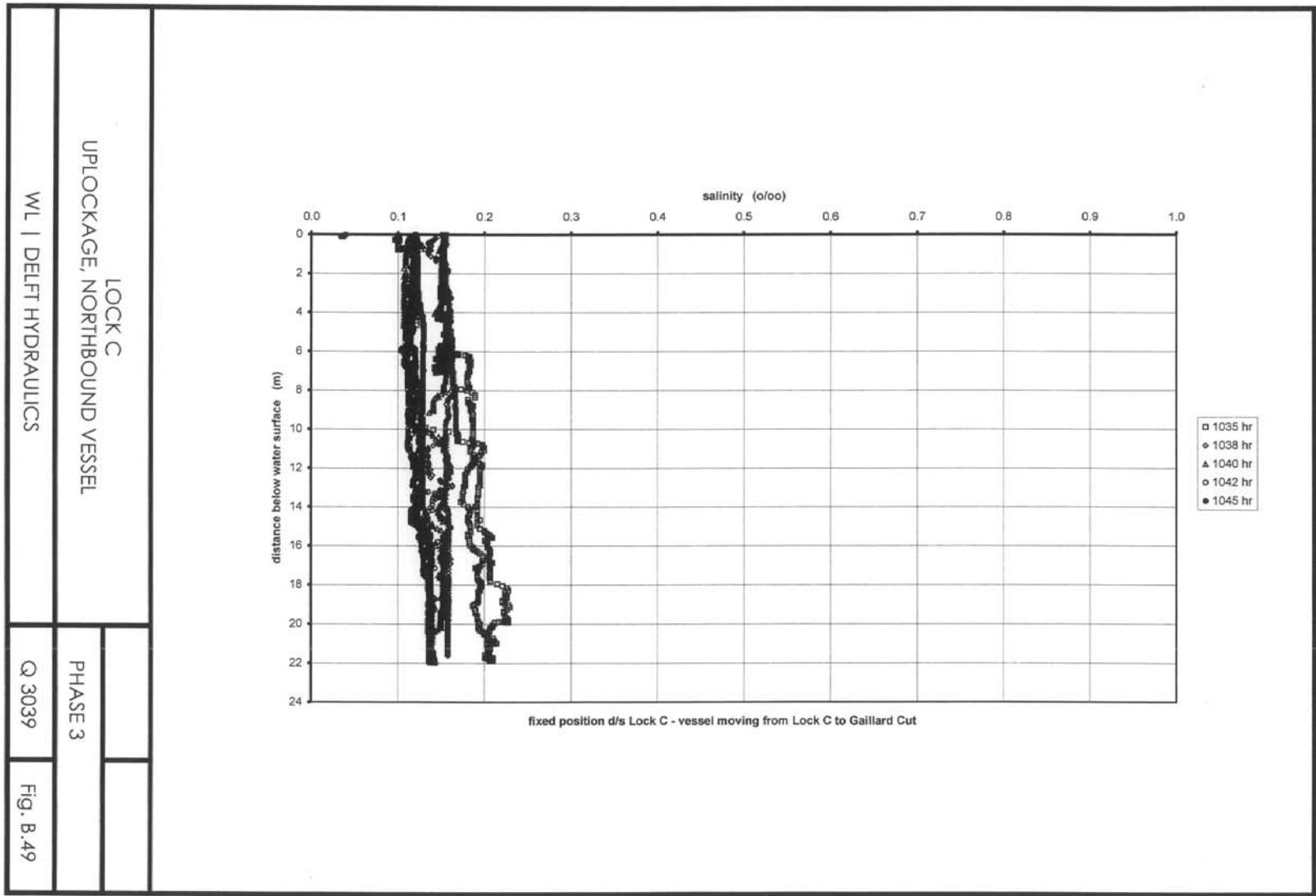
Q 3039

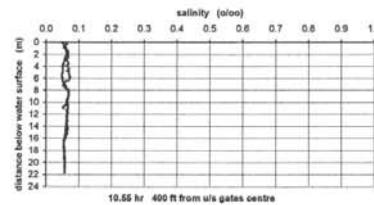
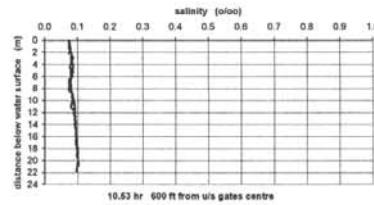
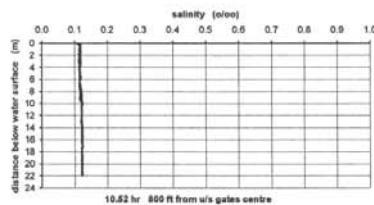
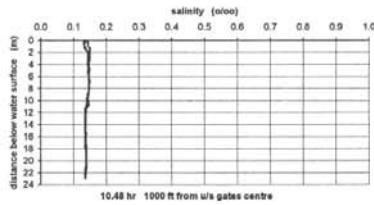
Fig. B.45











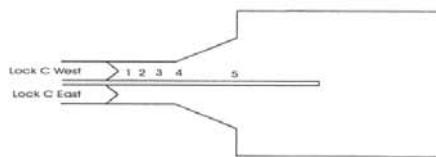
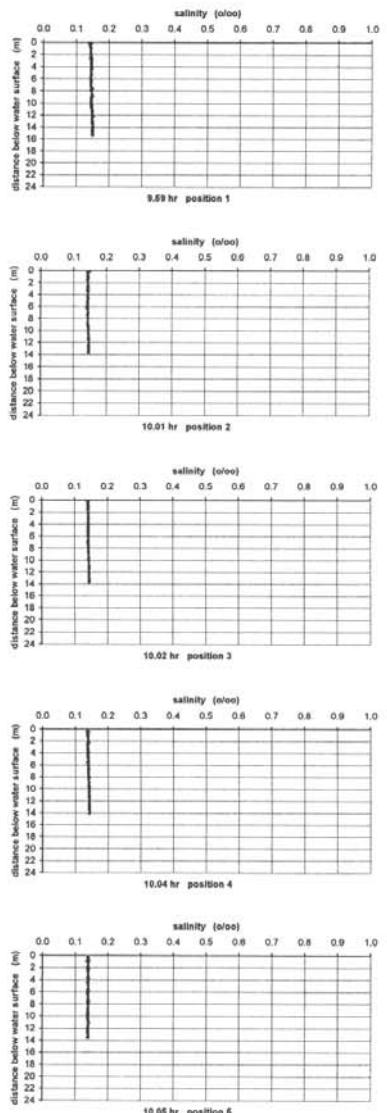
LOCK C
UPLOCKAGE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.50



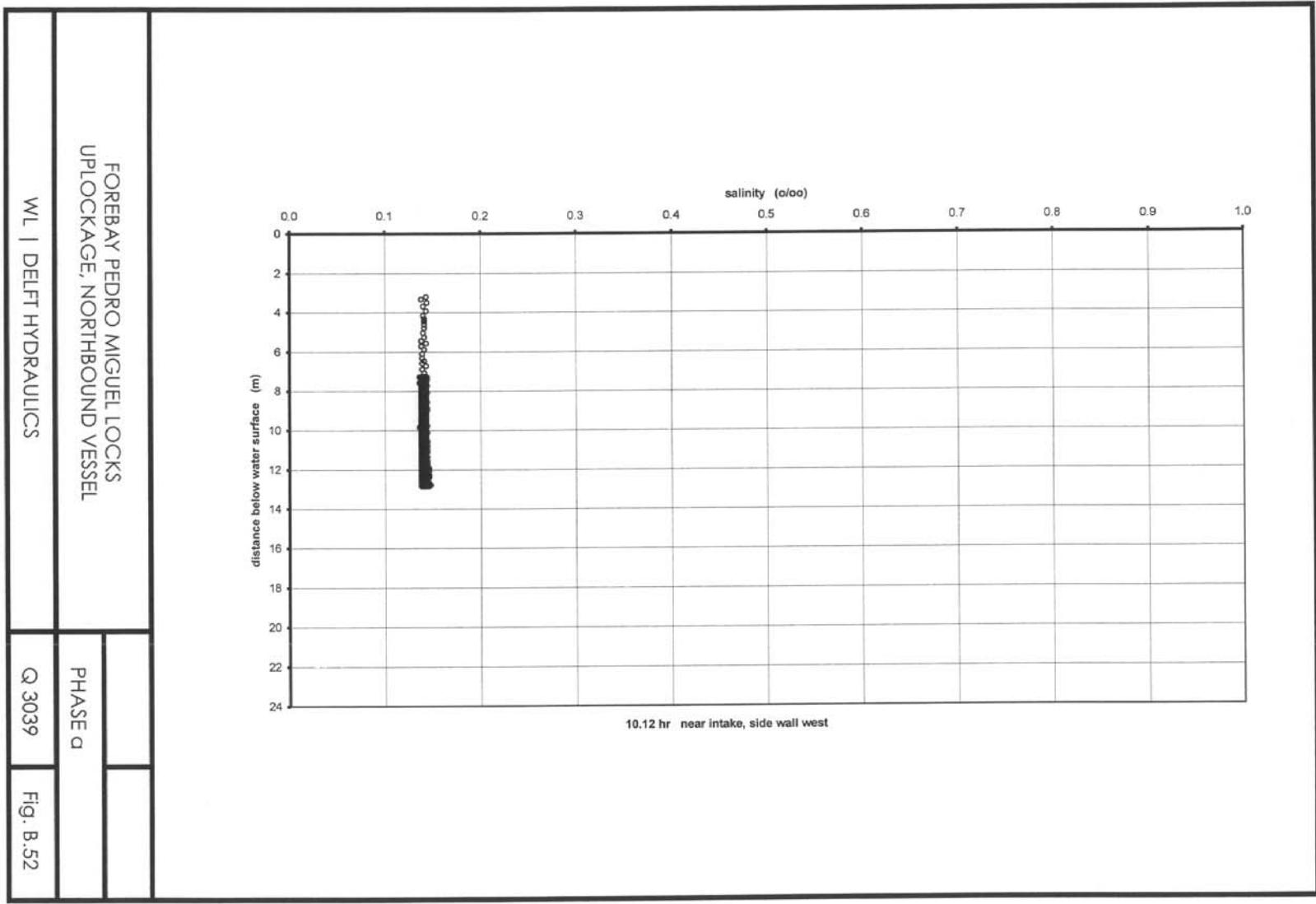
FOREBAY PEDRO MIGUEL LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

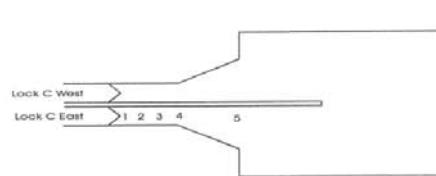
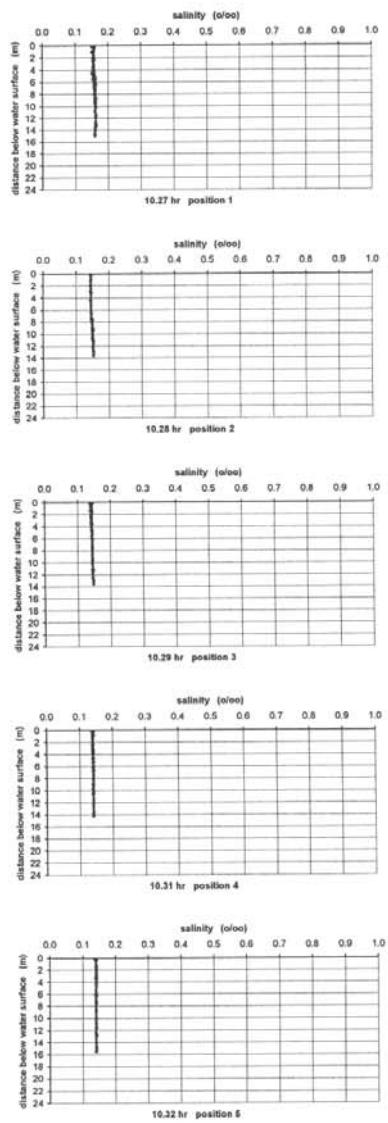
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.51





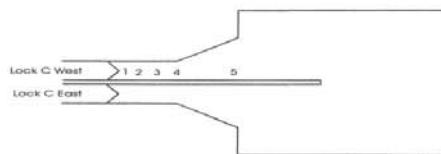
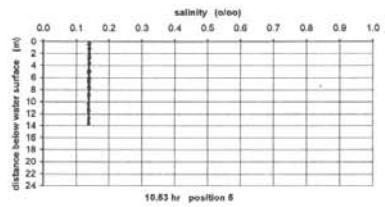
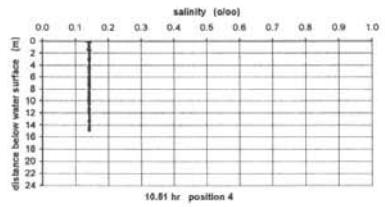
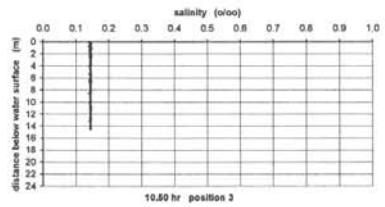
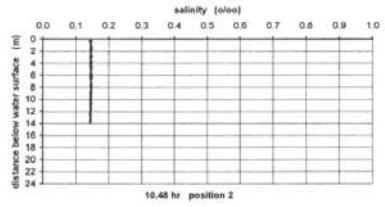
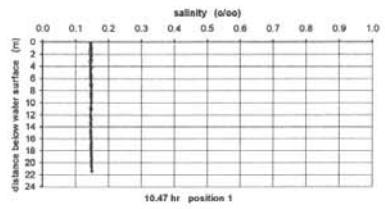
FOREBAY PEDRO MIGUEL LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.53



FOREBAY PEDRO MIGUEL LOCKS
UPLOCKAGE, NORTHBOUND VESSEL

PHASE C

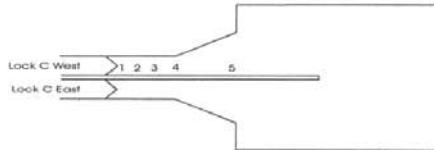
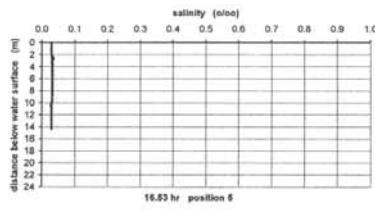
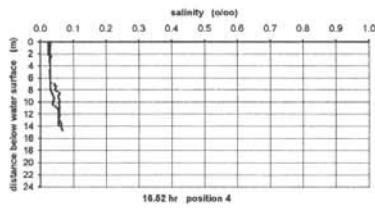
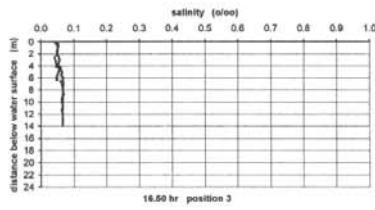
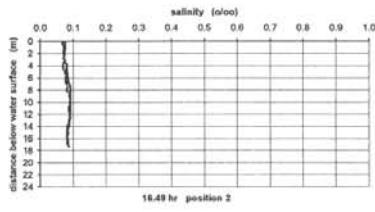
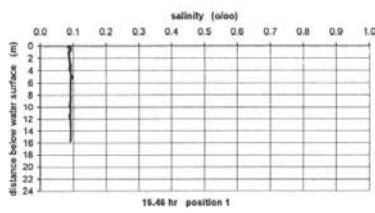
WL | DELFT HYDRAULICS

Q 3039

Fig. B.54

PEDRO MIGUEL LOCKS
(Locks C)

DOWNLOCKAGE



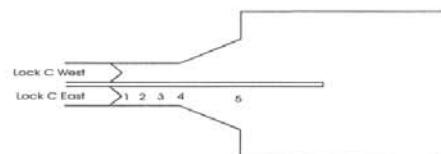
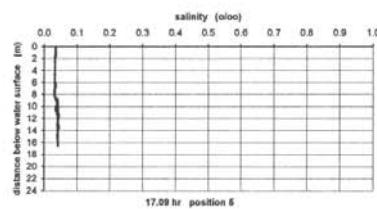
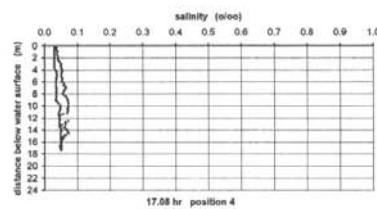
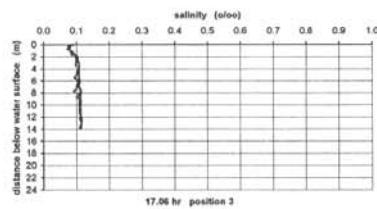
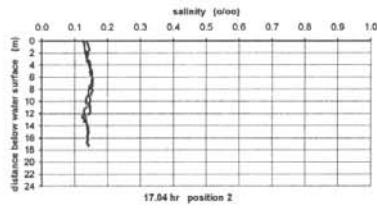
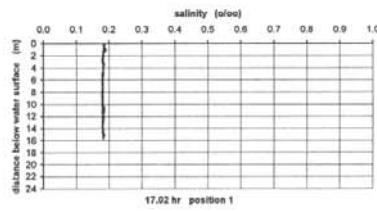
FOREBAY PEDRO MIGUEL LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.55



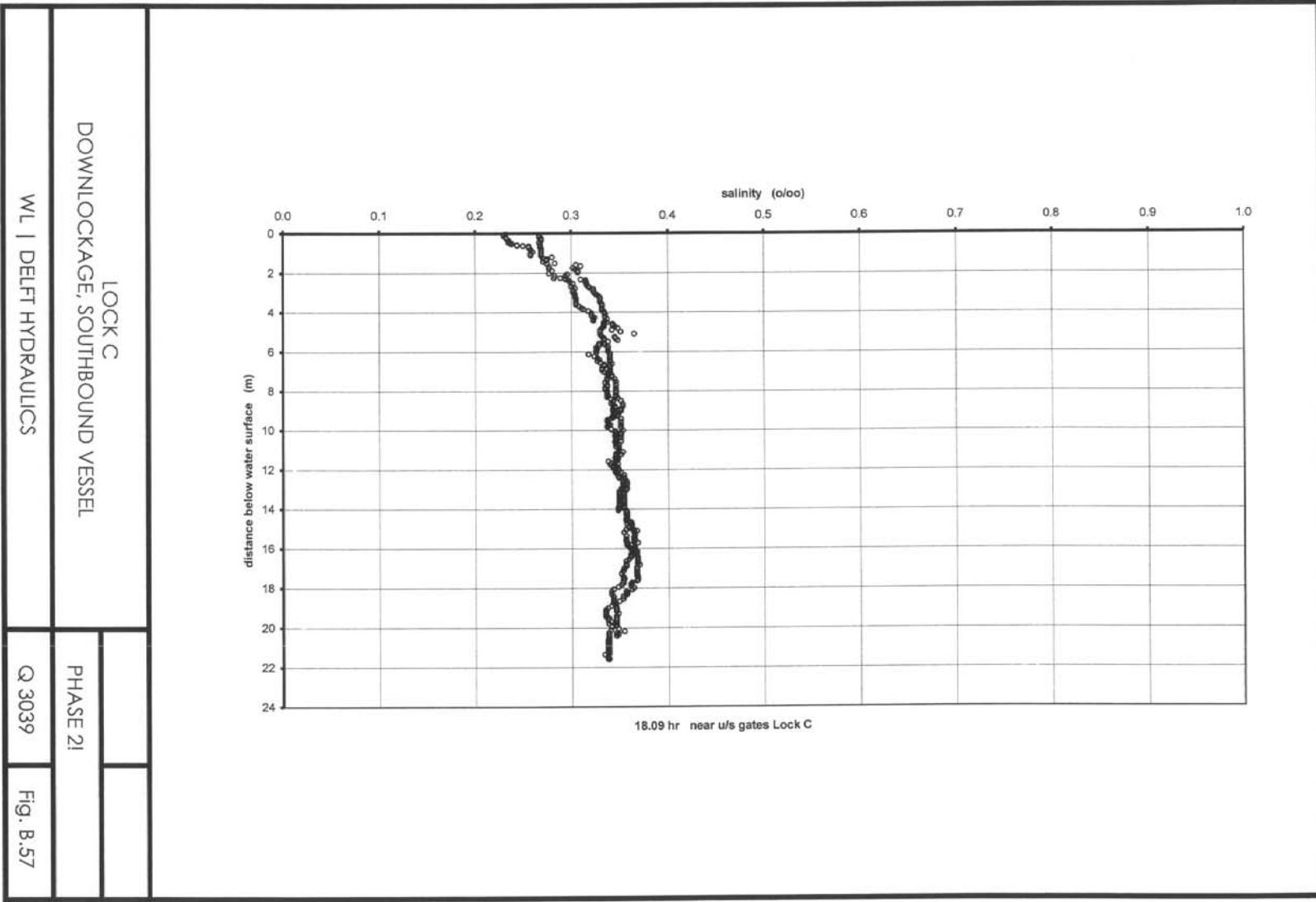
FOREBAY PEDRO MIGUEL LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

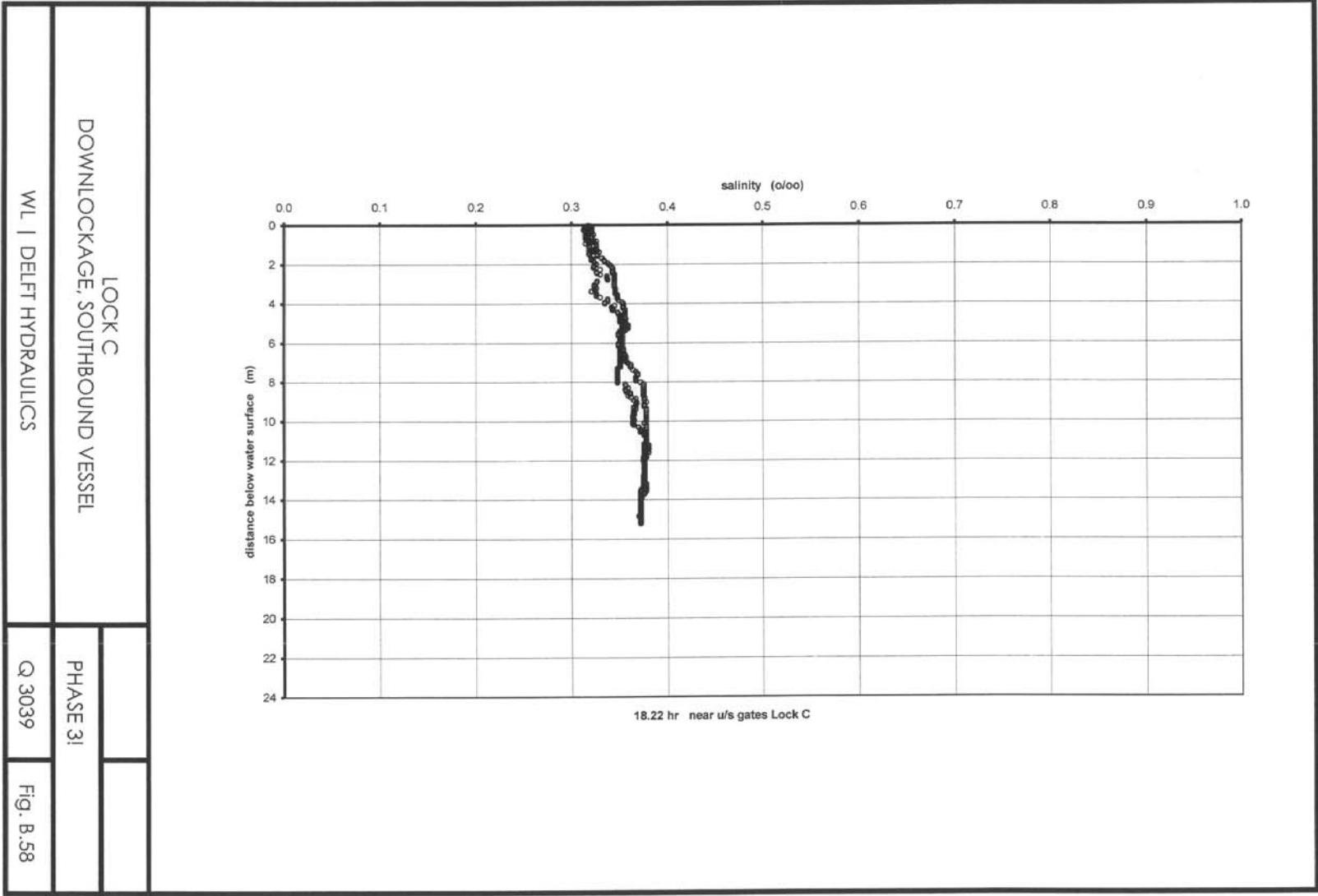
PHASE c

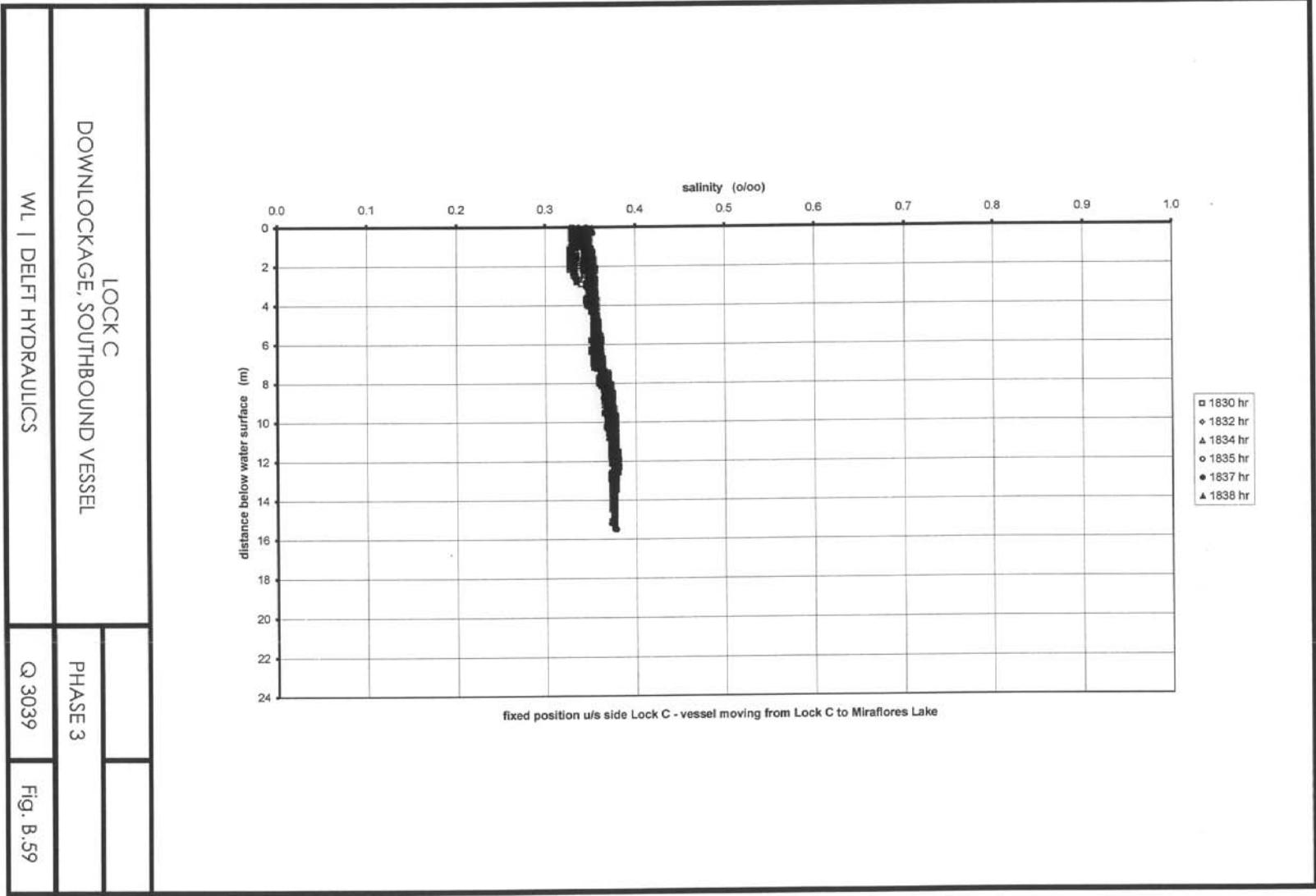
WL | DELFT HYDRAULICS

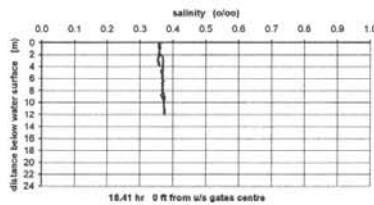
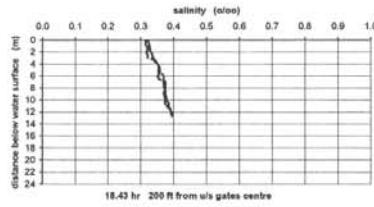
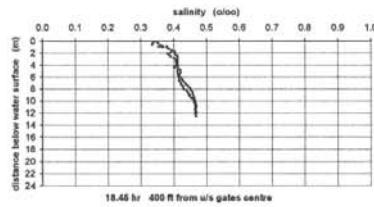
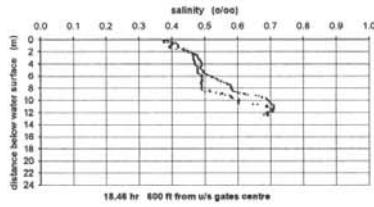
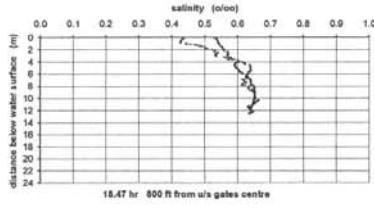
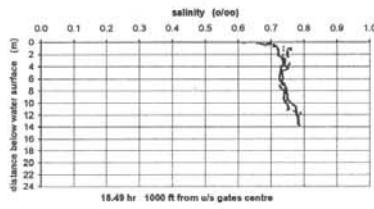
Q 3039

Fig. B.56









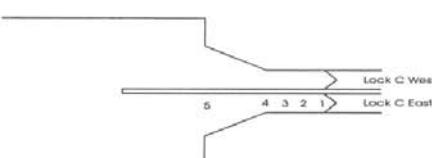
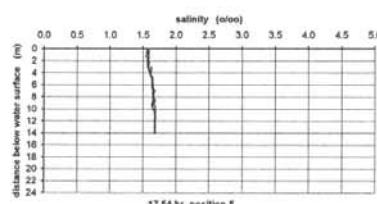
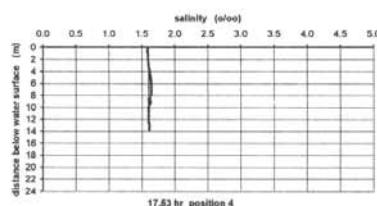
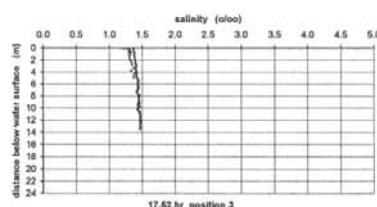
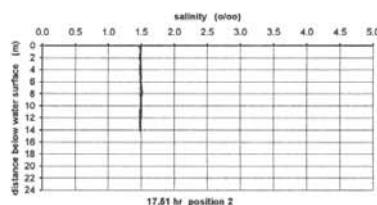
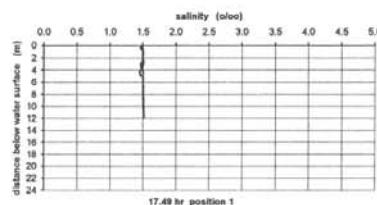
LOCK C
DOWNLOCKAGE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.60



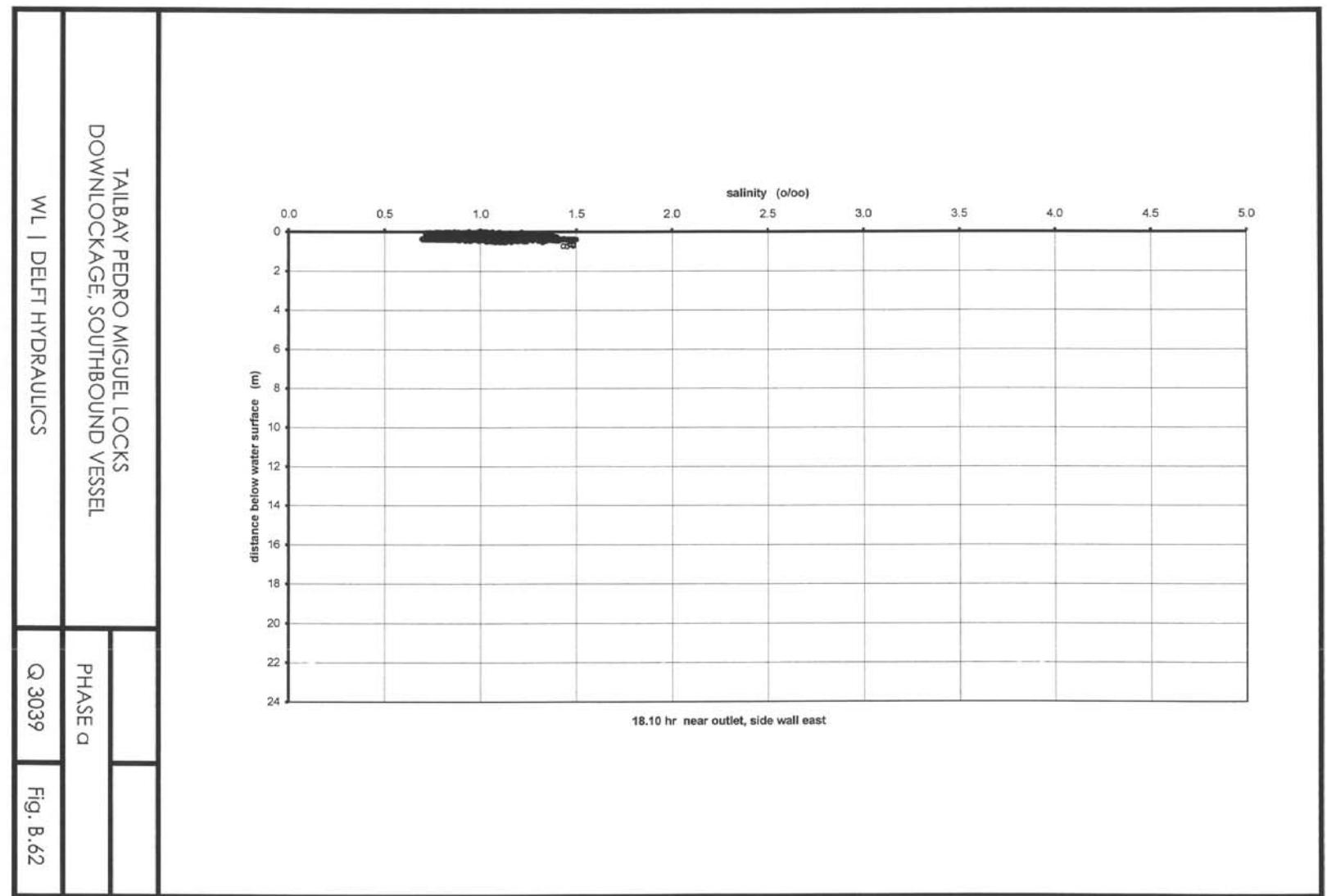
TAILBAY PEDRO MIGUEL LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

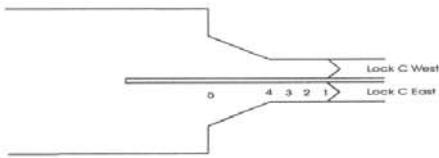
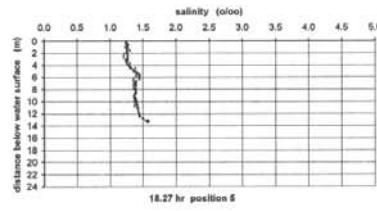
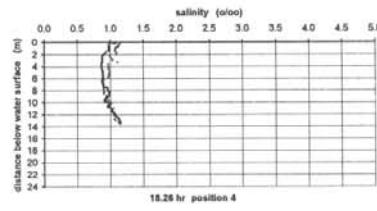
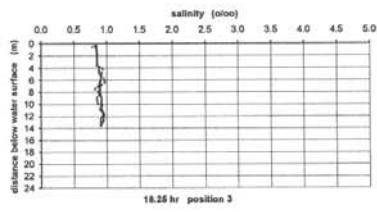
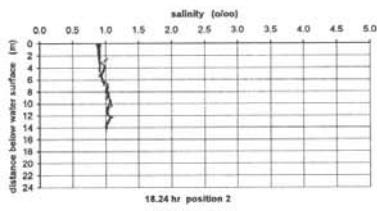
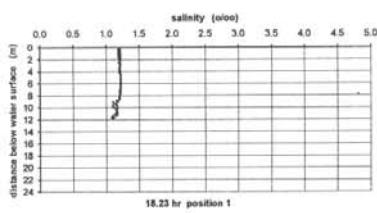
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.61





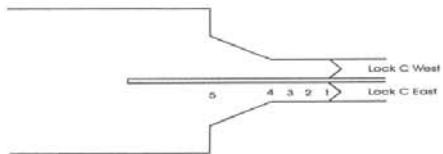
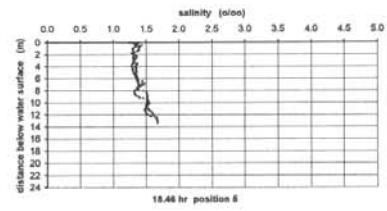
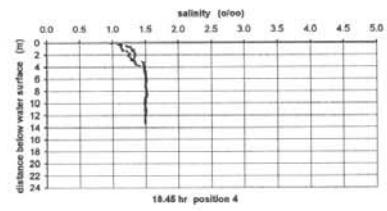
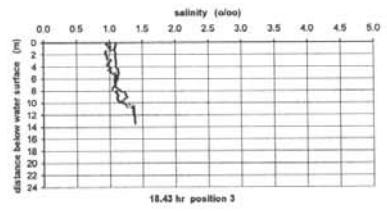
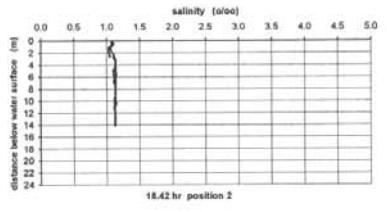
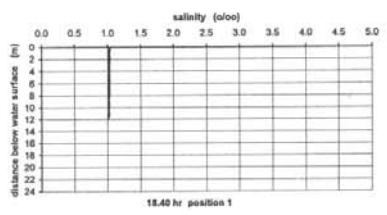
TAILBAY PEDRO MIGUEL LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.63



TAILBAY PEDRO MIGUEL LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

PHASE c

WL | DELFT HYDRAULICS

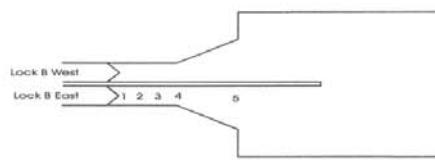
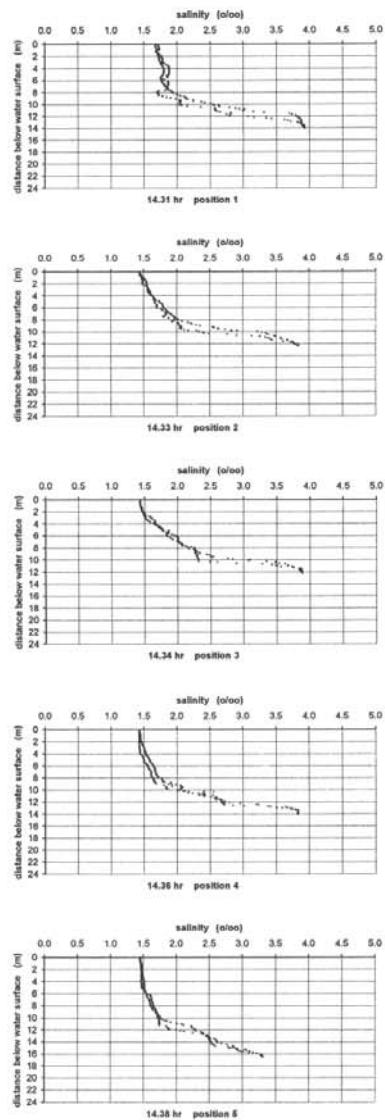
Q 3039

Fig. B.64

MIRAFLORES LOCKS

(Locks A and B)

DOWNLOCKAGE



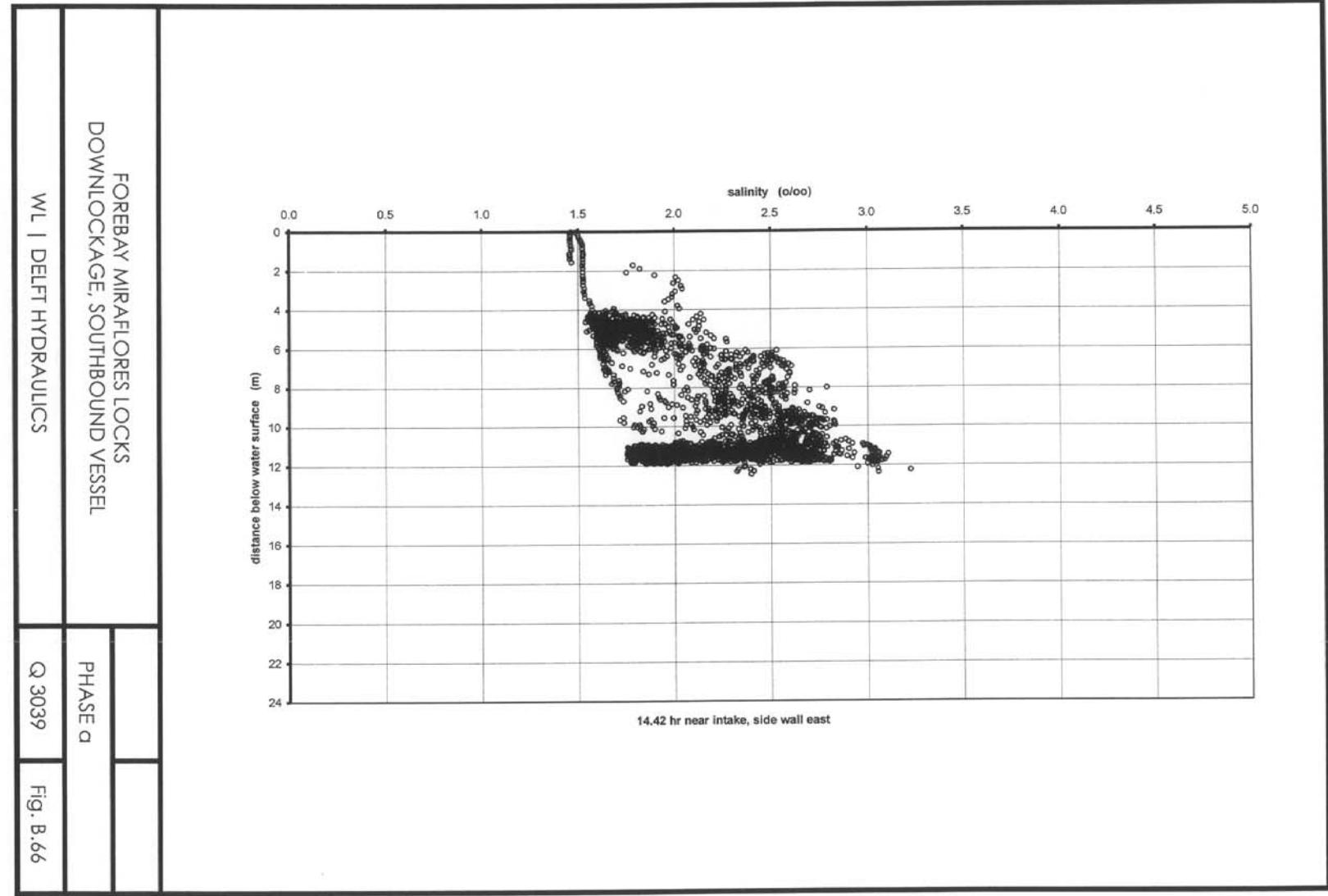
FOREBAY MIRAFLORES LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

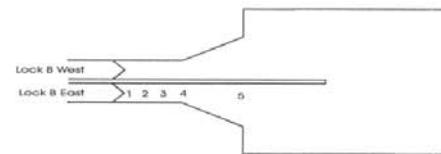
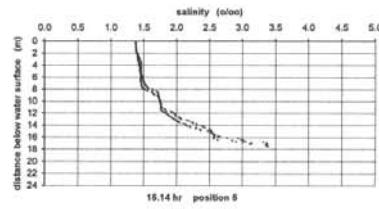
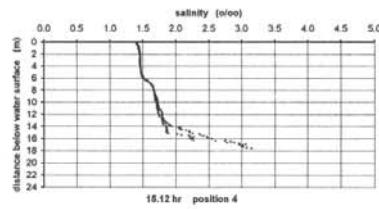
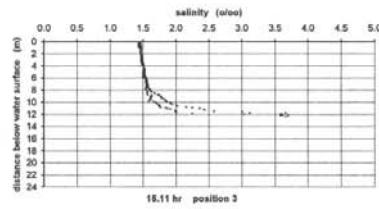
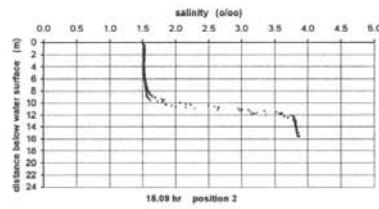
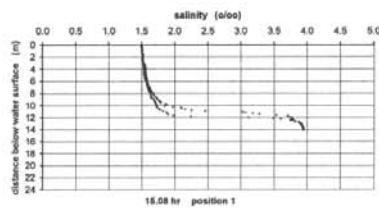
PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.65





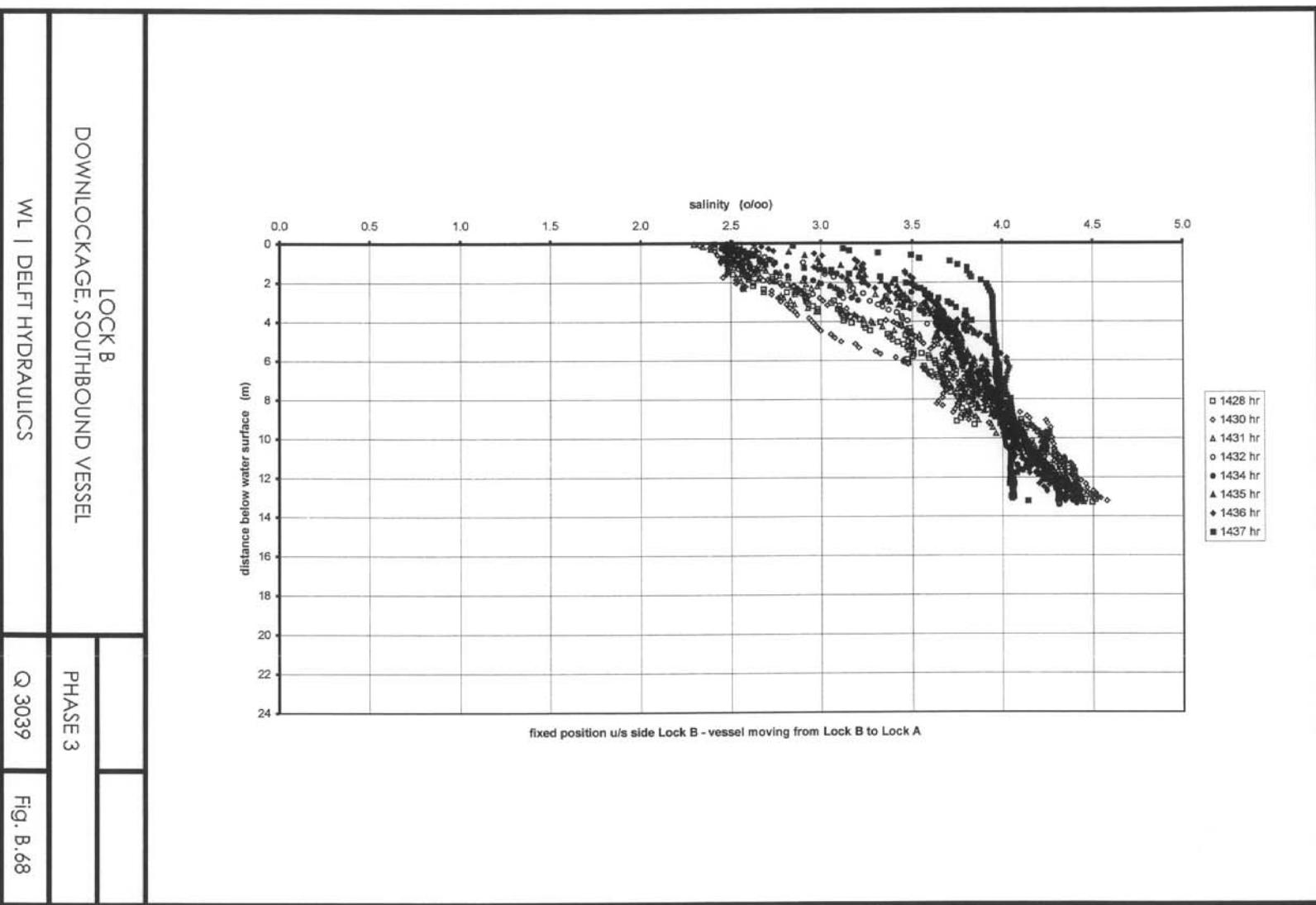
FOREBAY MIRAFLORES LOCKS
DOWNLOCKAGE, SOUTHBOUND VESSEL

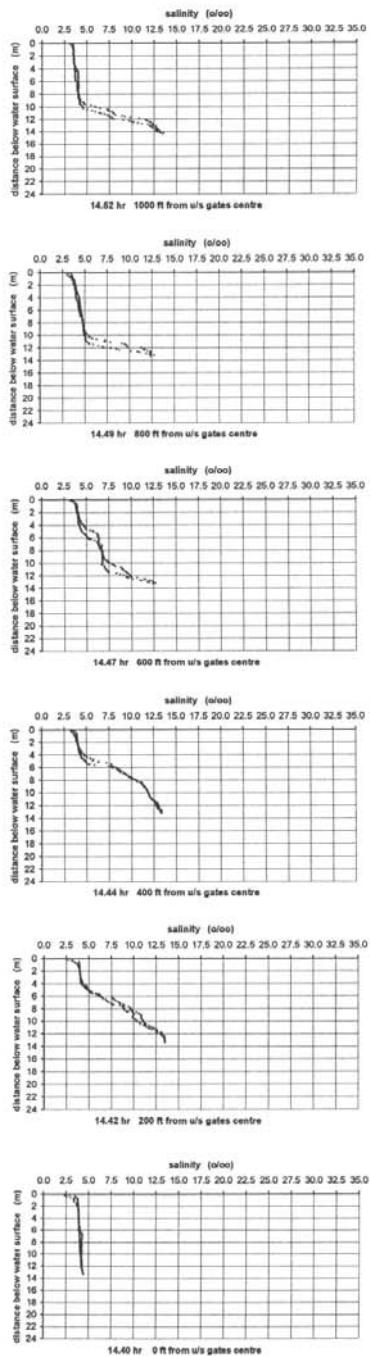
PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.67





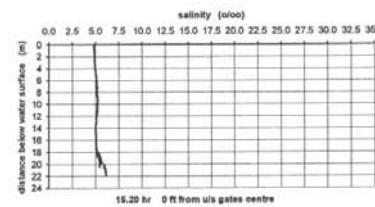
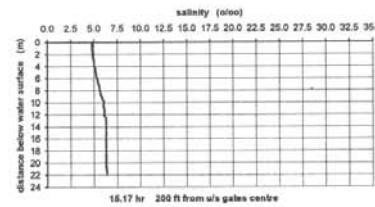
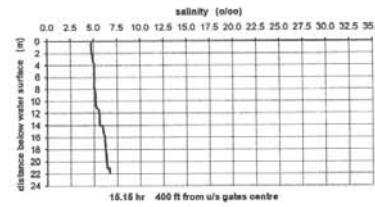
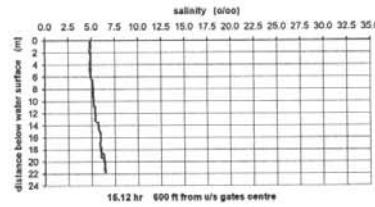
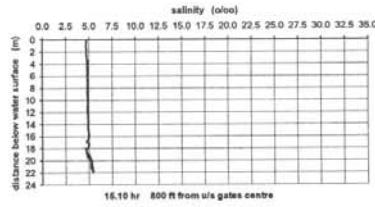
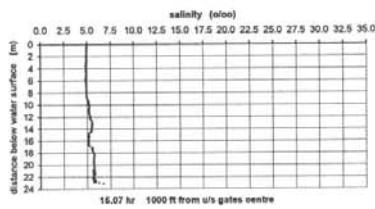
LOCK B
DOWNLOCKAGE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.69



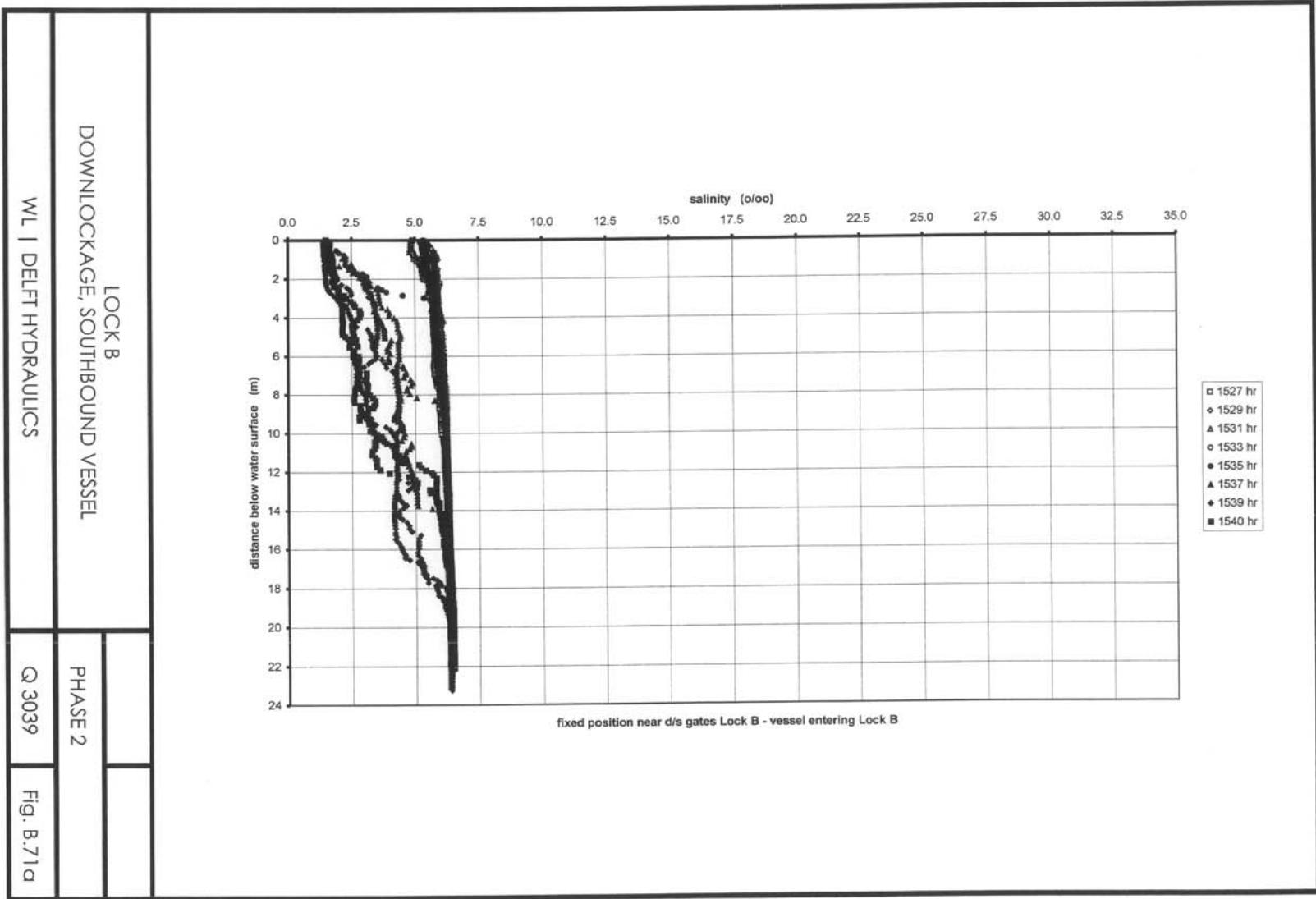
LOCK B
DOWNLOCKAGE, SOUTHBOUND VESSEL

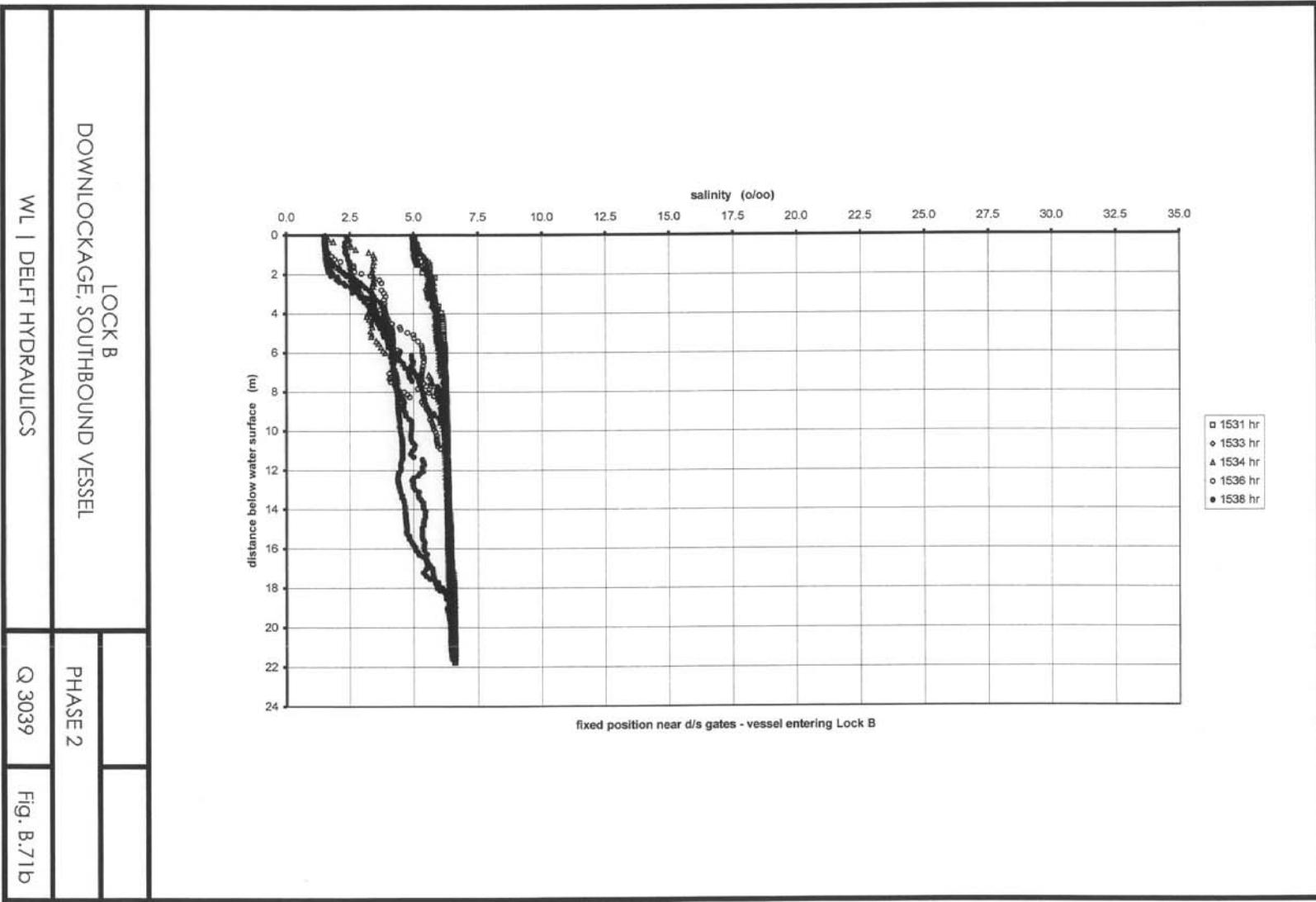
PHASE 5

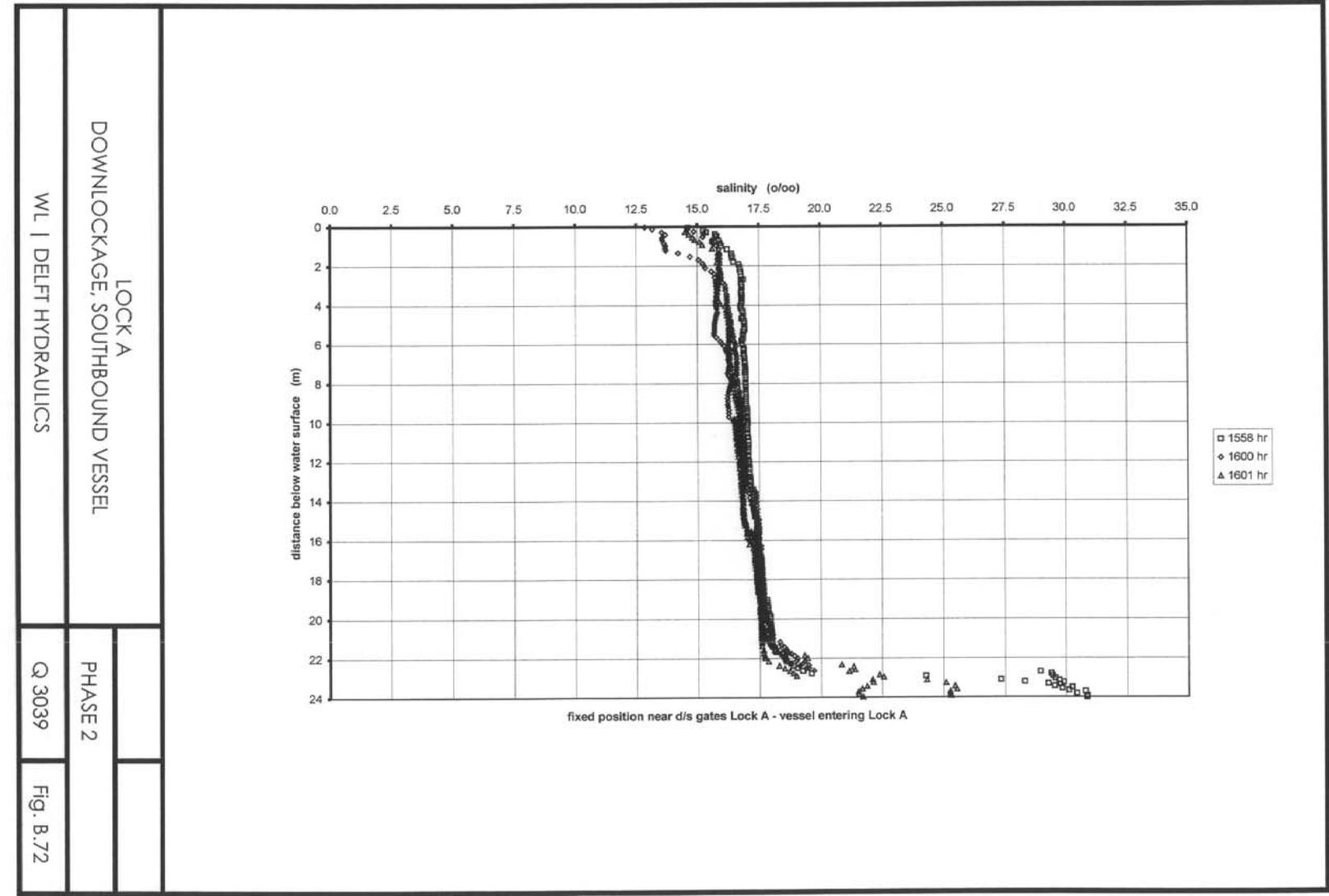
WL | DELFT HYDRAULICS

Q 3039

Fig. B.70



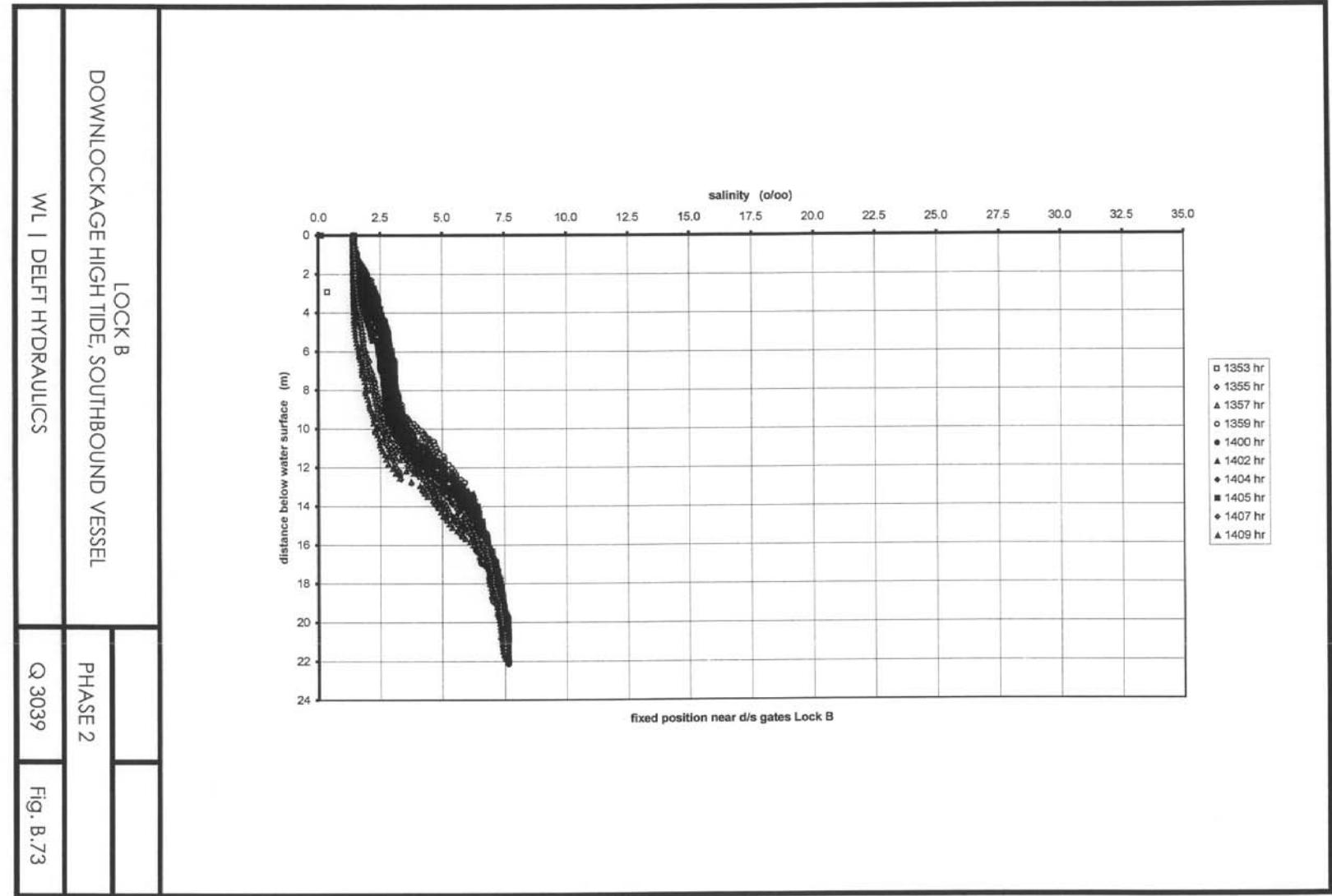


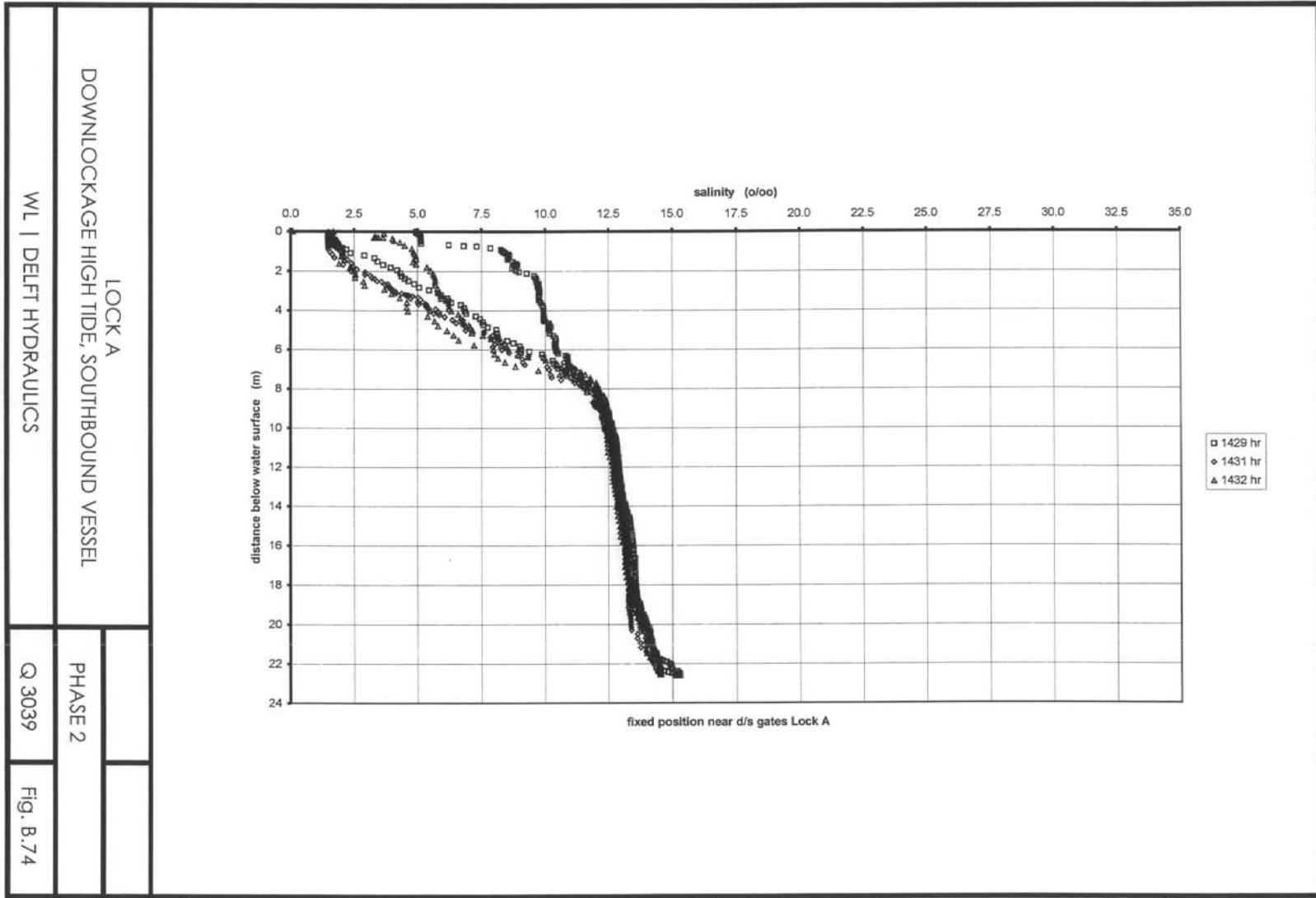


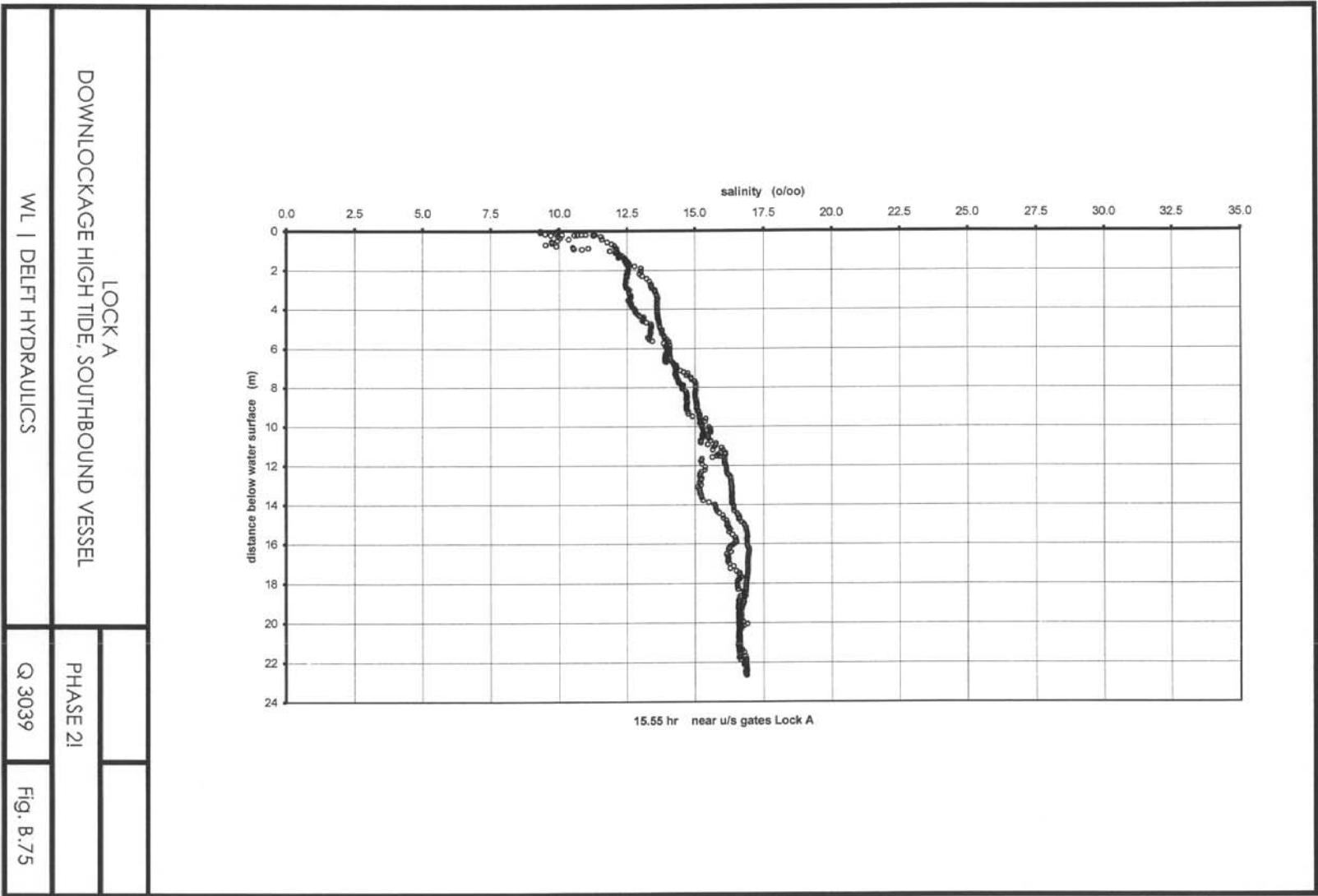
MIRAFLORES LOCKS

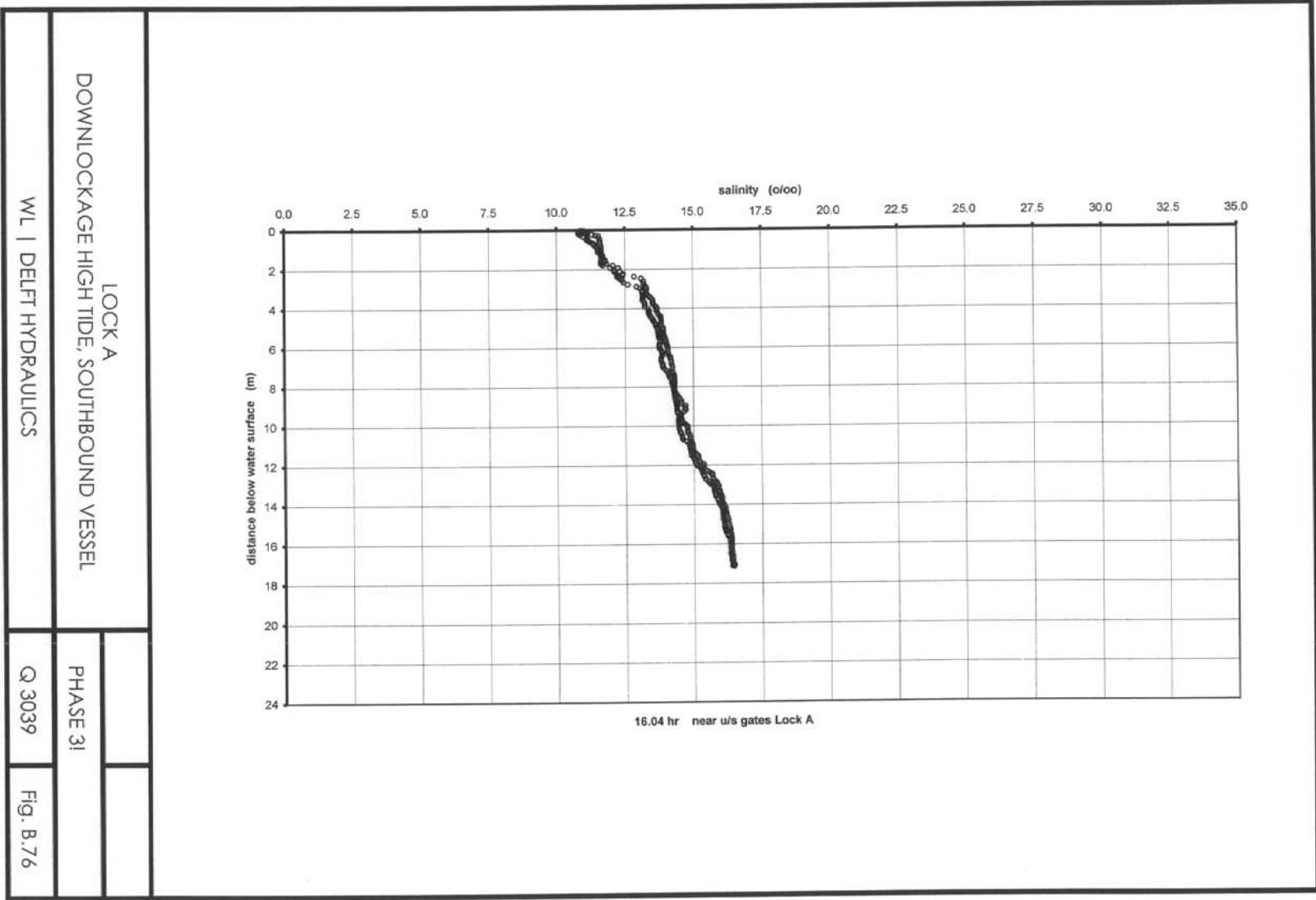
(Locks A and B)

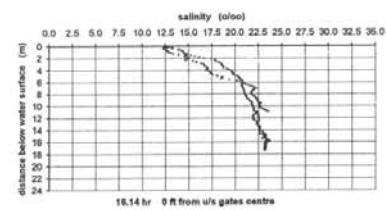
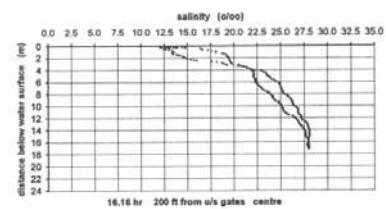
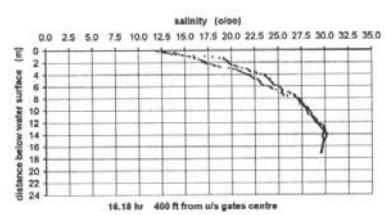
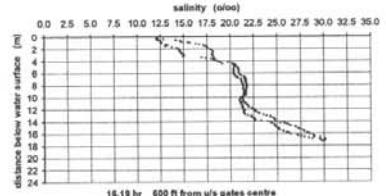
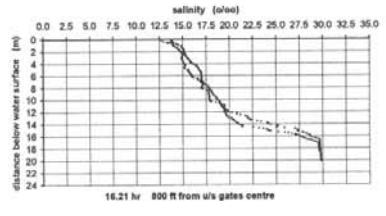
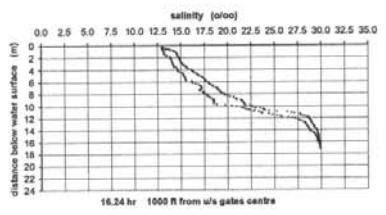
DOWNLOCKAGE HIGH TIDE











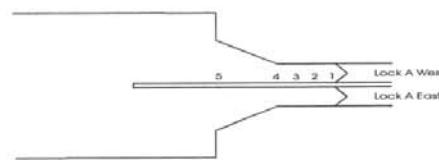
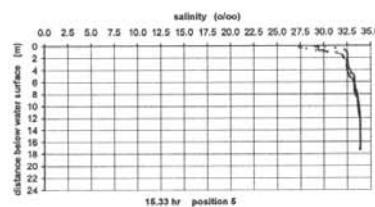
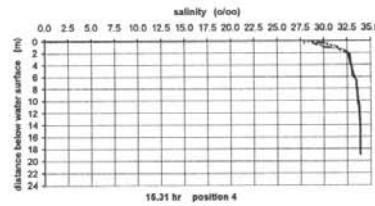
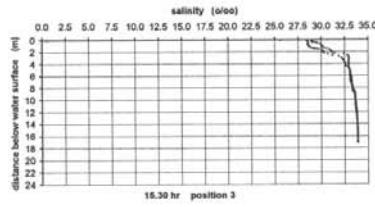
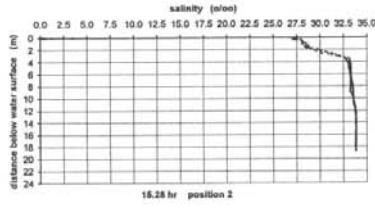
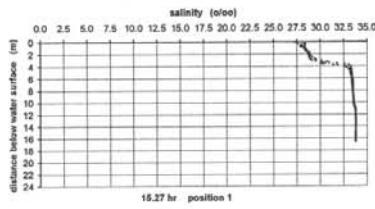
LOCK A
DOWNLOCKAGE HIGH TIDE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.77



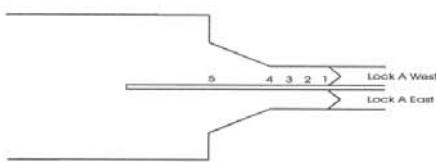
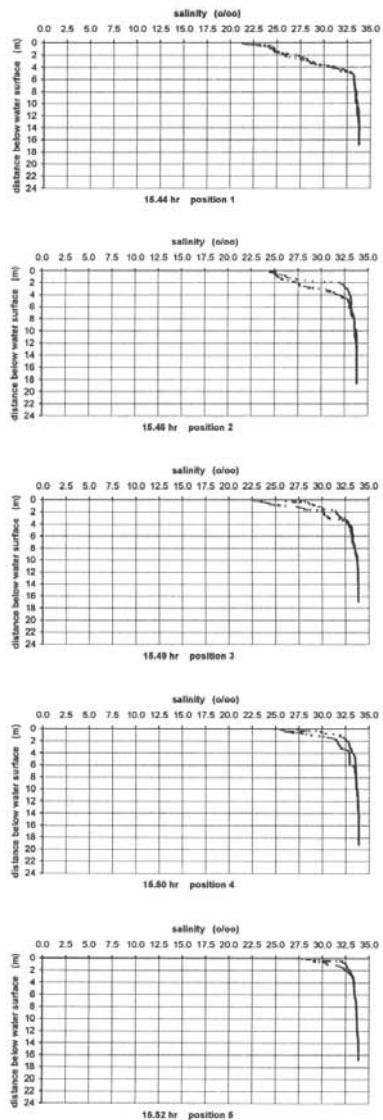
TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE HIGH TIDE, SOUTHBOUND VESSEL

PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.78



TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE HIGH TIDE, SOUTHBOUND VESSEL

PHASE C

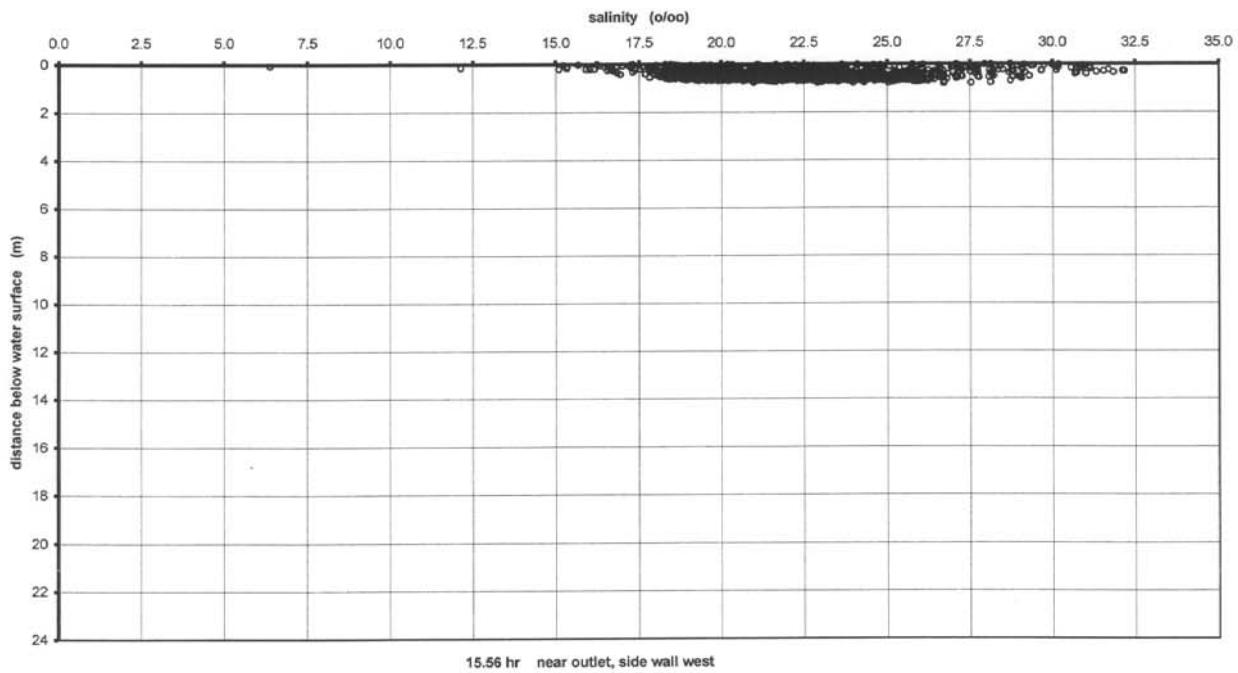
WL | DELFT HYDRAULICS

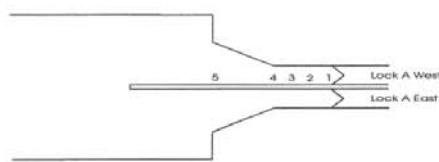
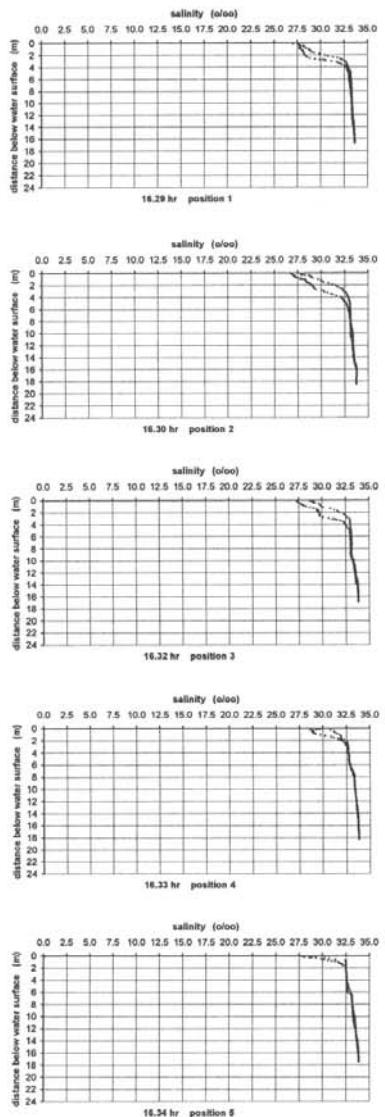
Q 3039

Fig. B.79

TAILBAY MIRAFLORES LOCKS	
DOWNLOCKAGE HIGH TIDE, SOUTHBOUND VESSEL	
WL DELFT HYDRAULICS	

PHASE a	
Q 3039	Fig. B.80





TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE HIGH TIDE, SOUTHBOUND VESSEL

PHASE C

WL | DELFT HYDRAULICS

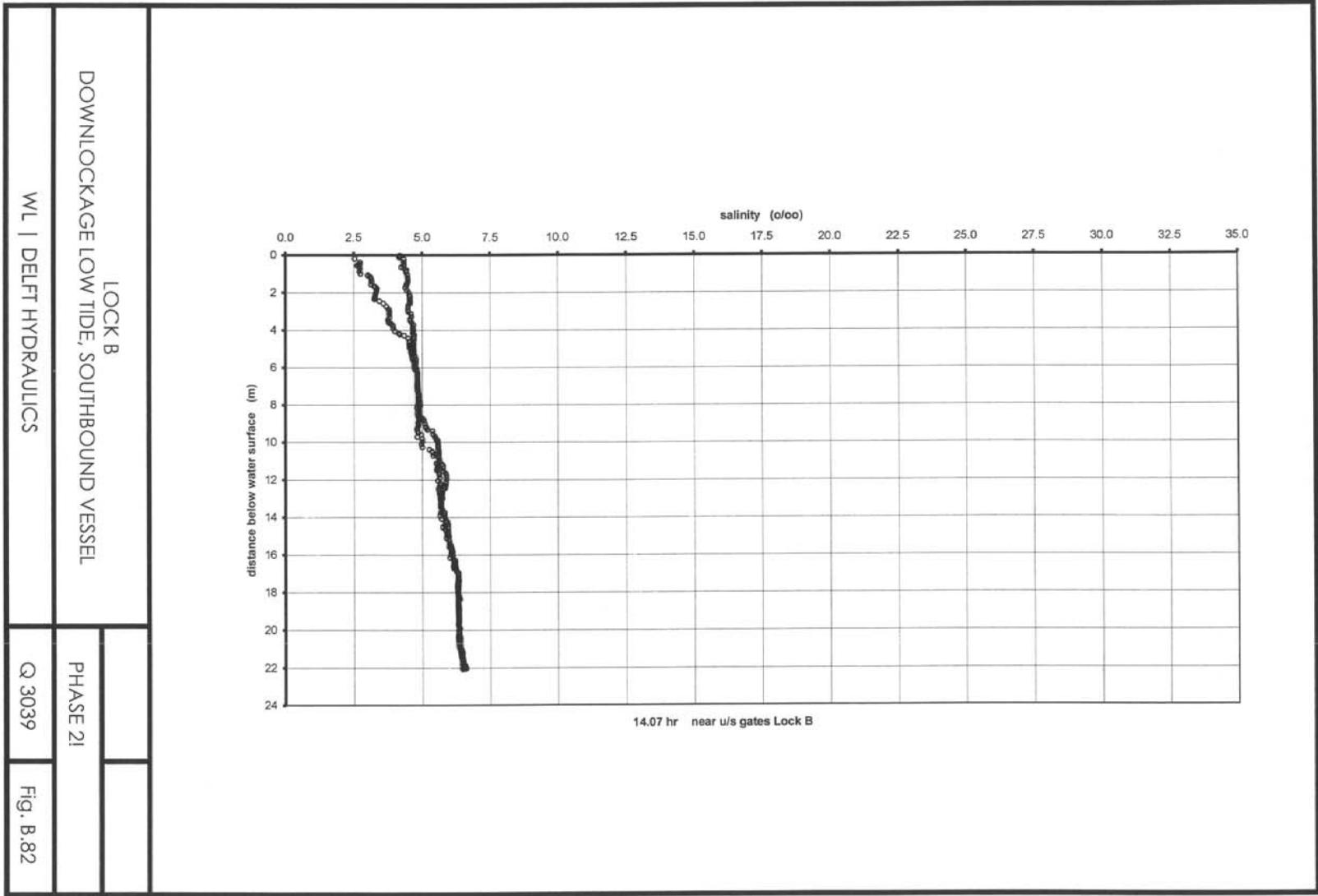
Q 3039

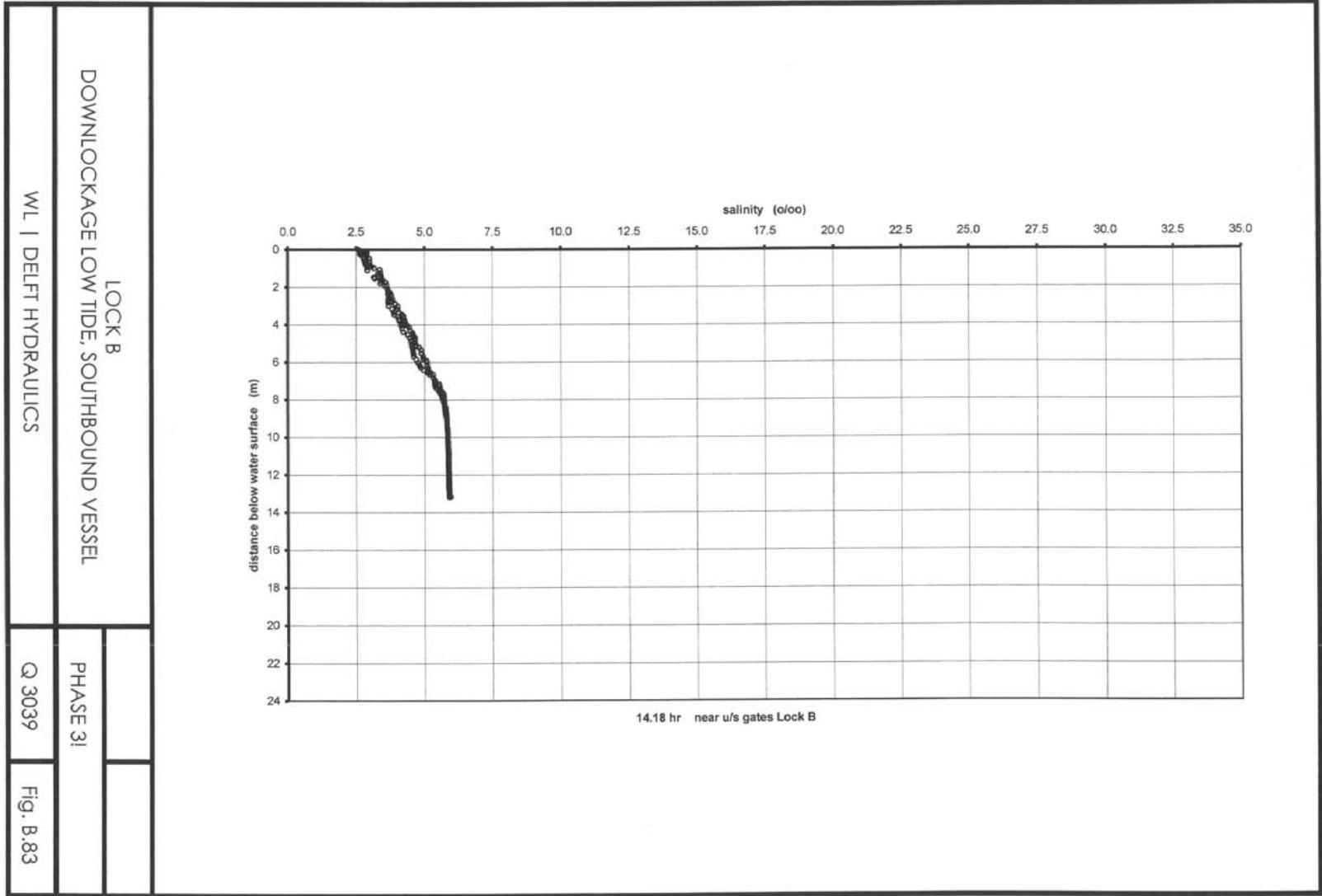
Fig. B.81

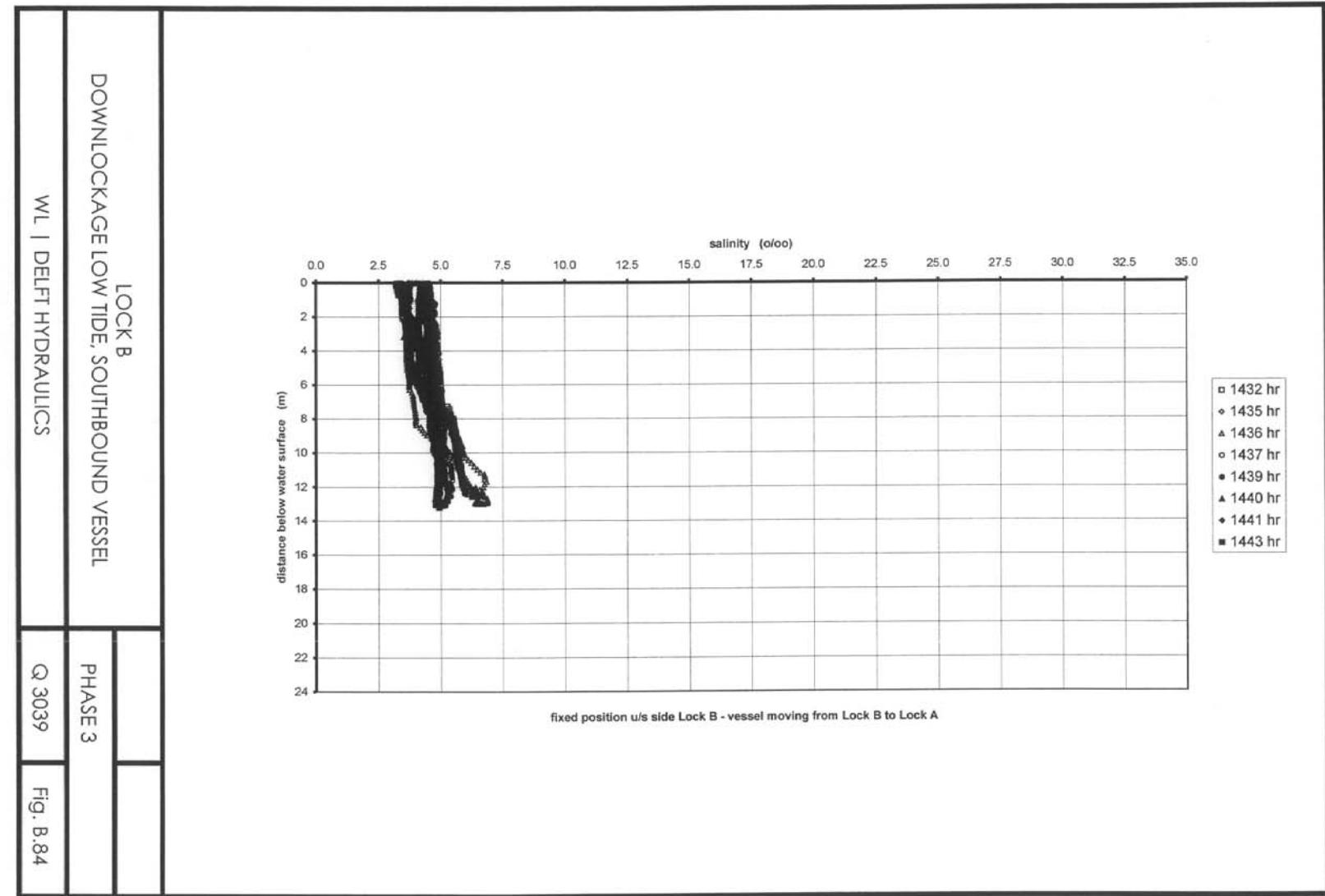
MIRAFLORES LOCKS

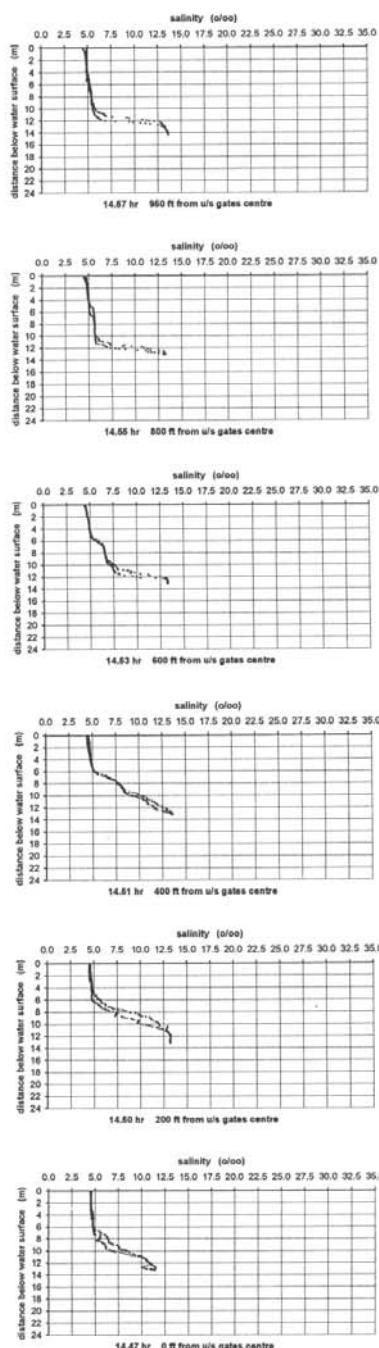
(Locks A and B)

DOWNLOCKAGE LOW TIDE







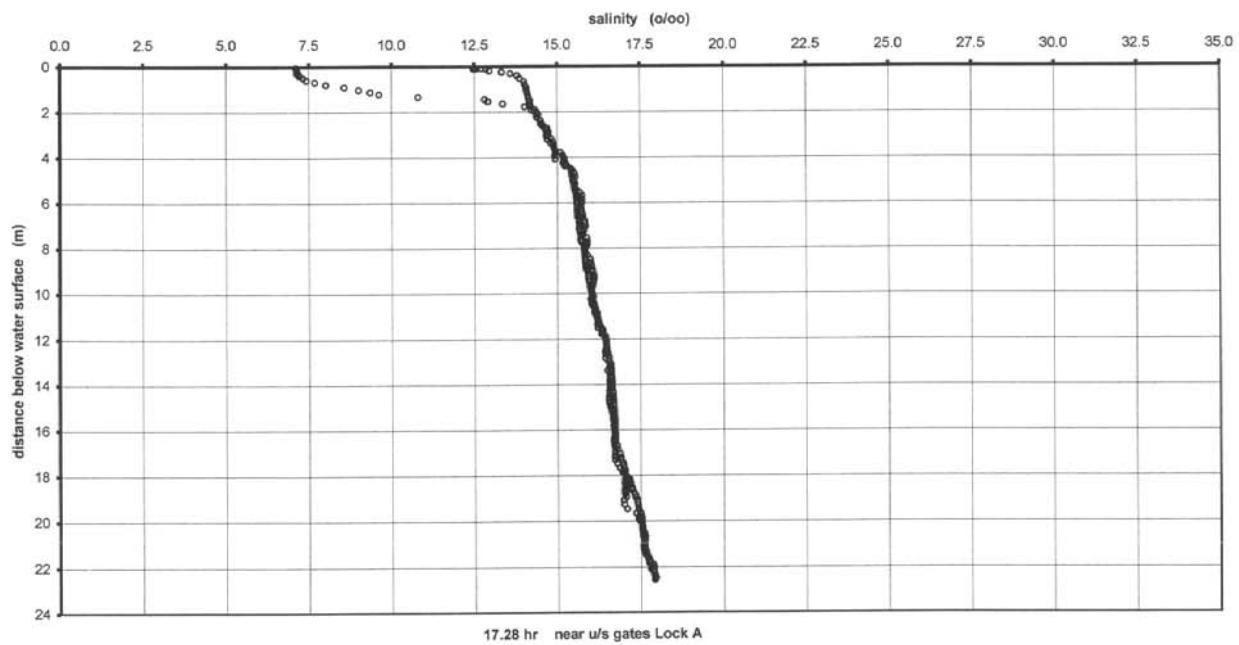


LOCK B
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE 4

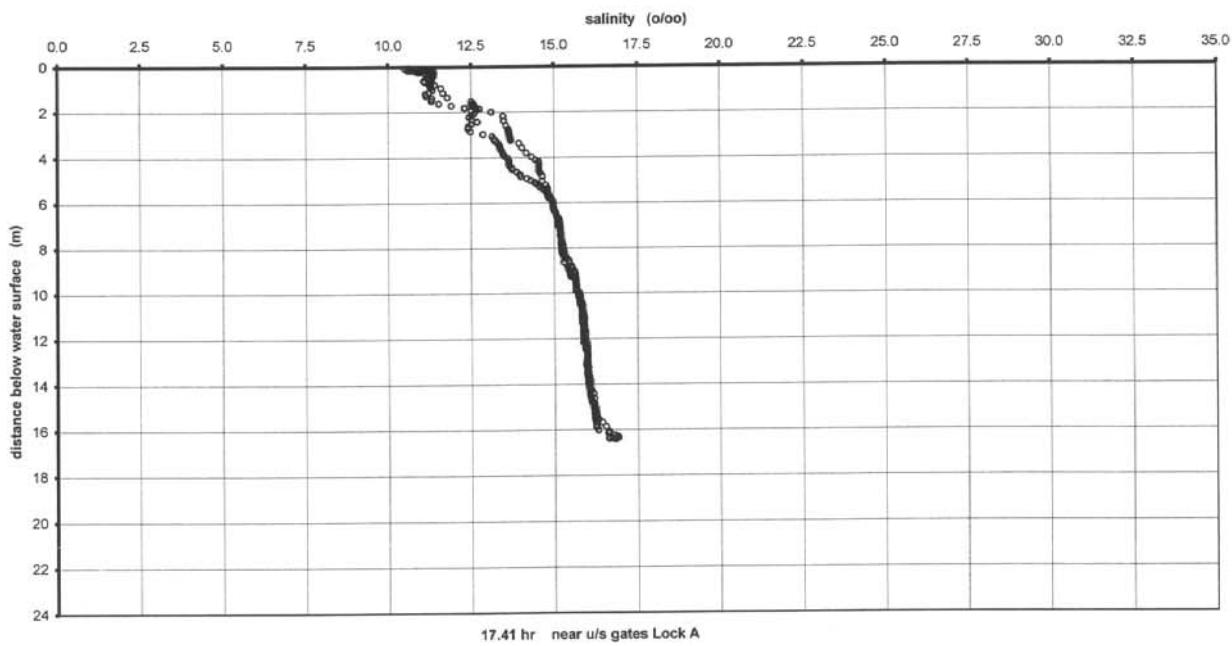
WL | DELFT HYDRAULICS

Q 3039 Fig. B.85



LOCK A
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL
PHASE 2!

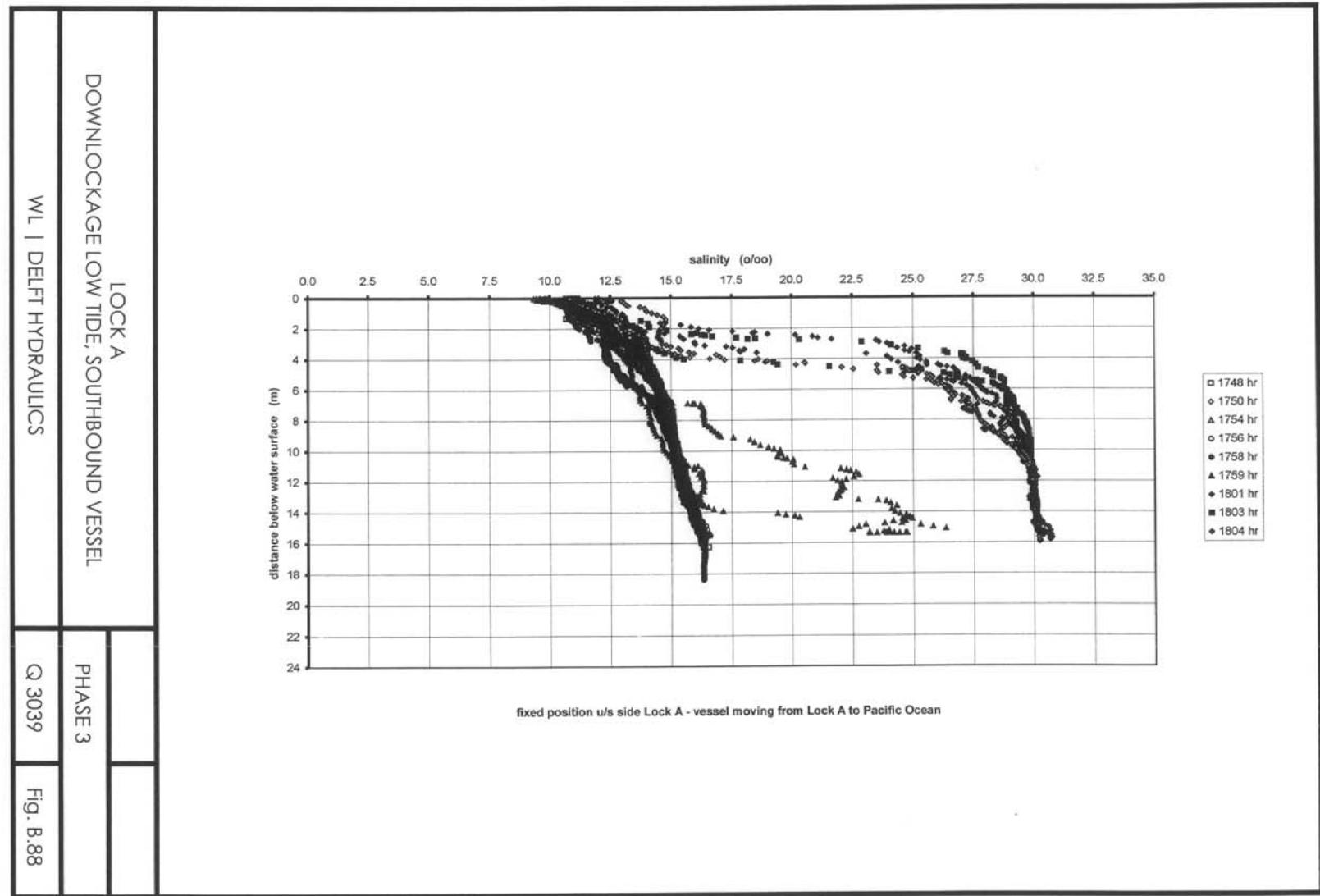
WL | DELFT HYDRAULICS
Q 3039 Fig. B.86

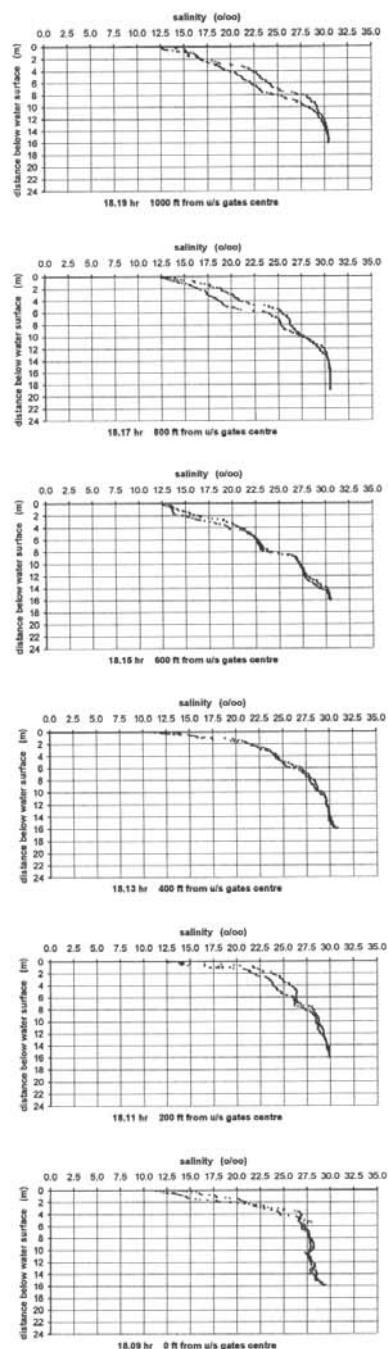


LOCK A
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL
PHASE 3!

Q 3039

Fig. B.87





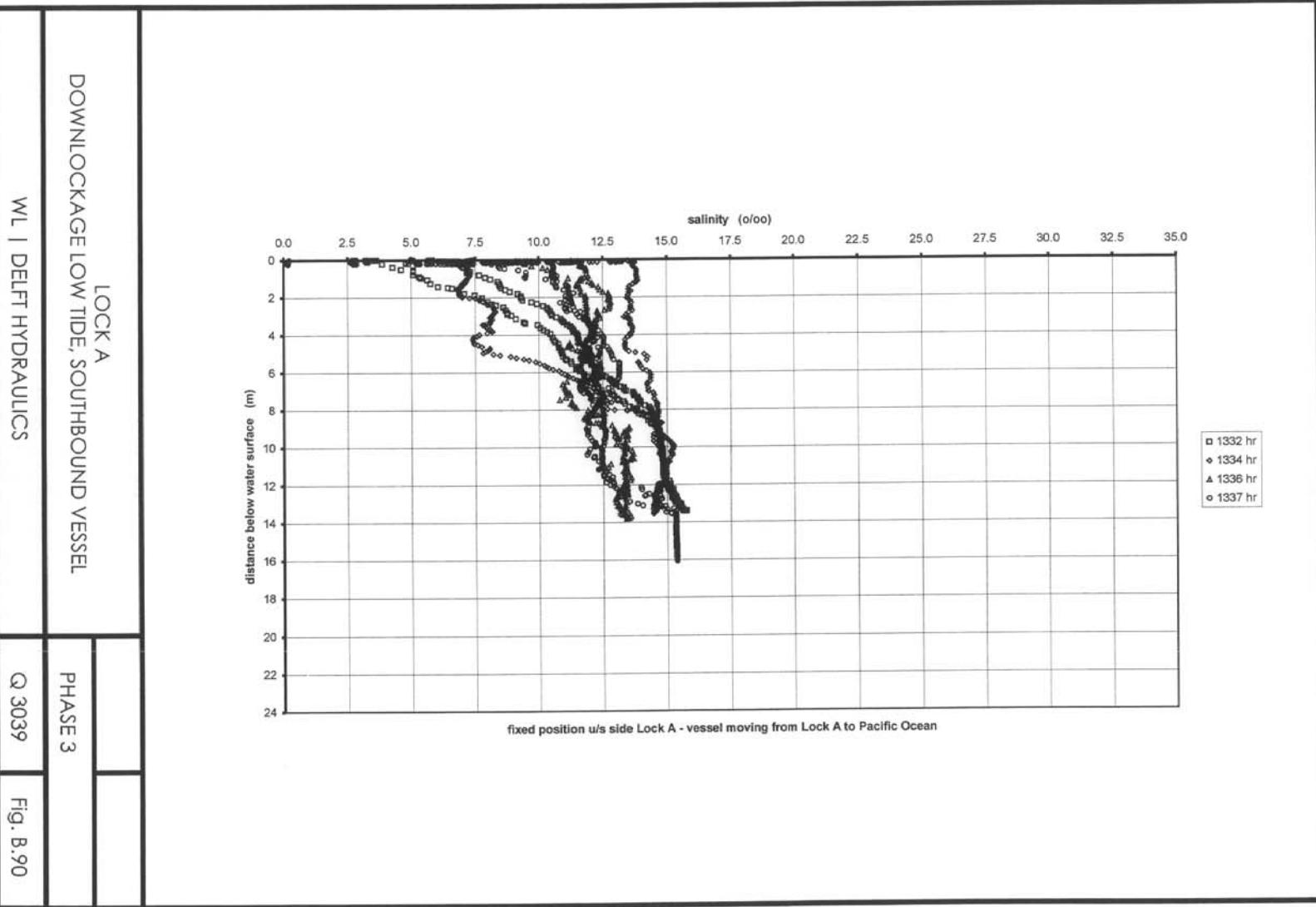
LOCK A
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

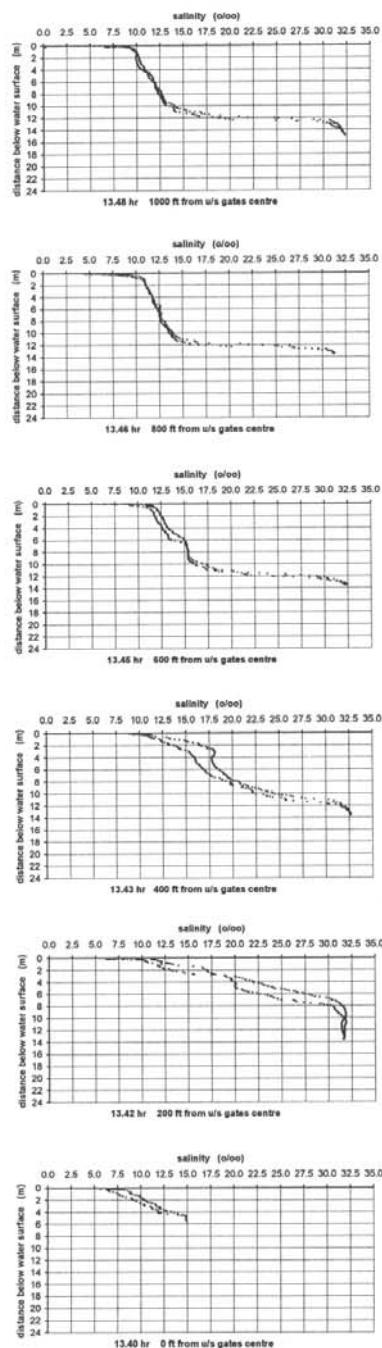
PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.89





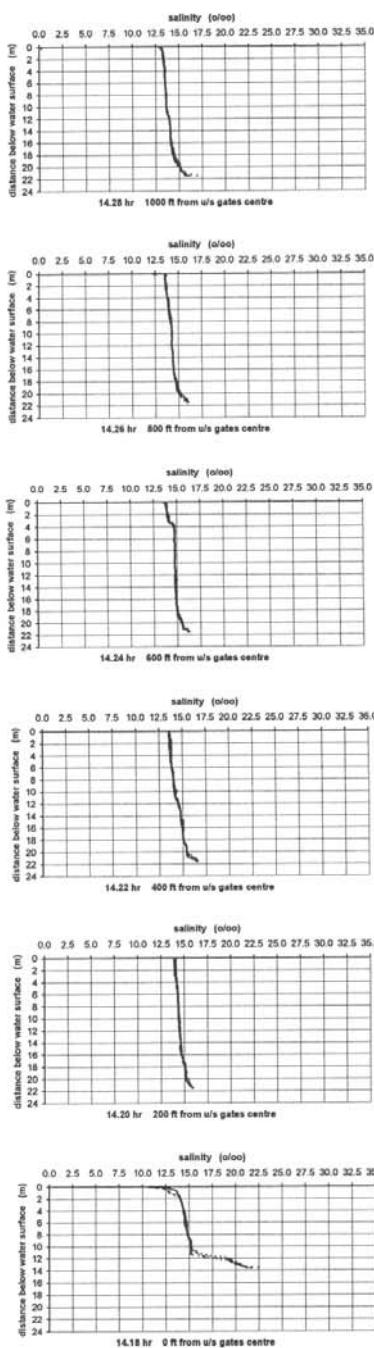
LOCK A
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.91



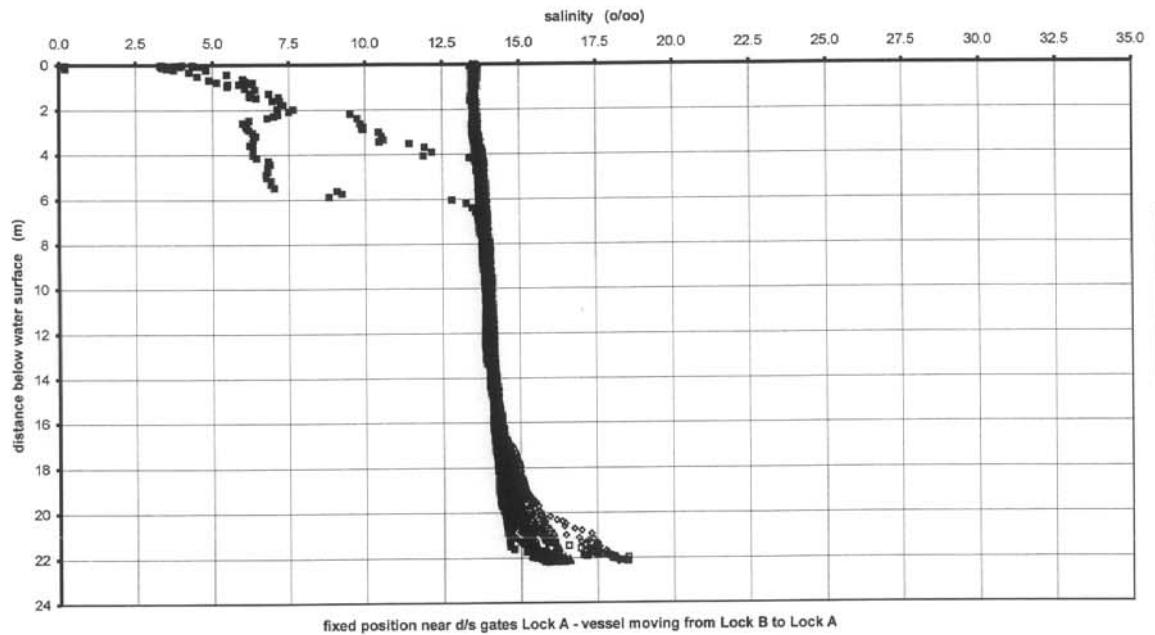
LOCK A
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE 5

WL | DELFT HYDRAULICS

Q 3039

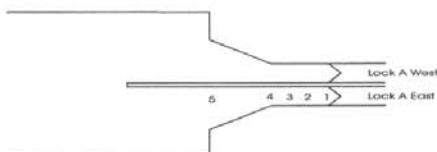
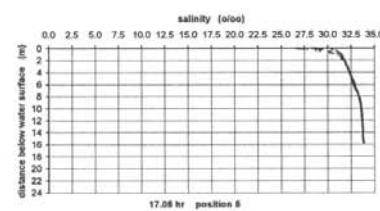
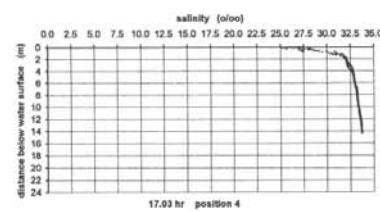
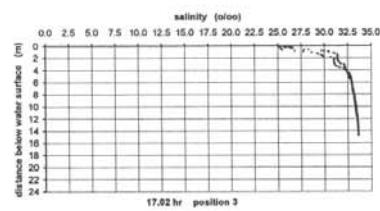
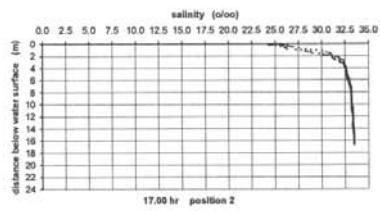
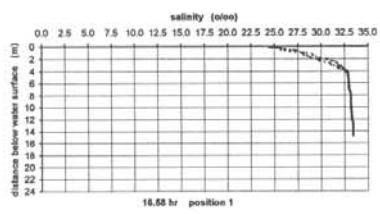
Fig. B.92



DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL
LOCK A

Q 3039

Fig. B.93



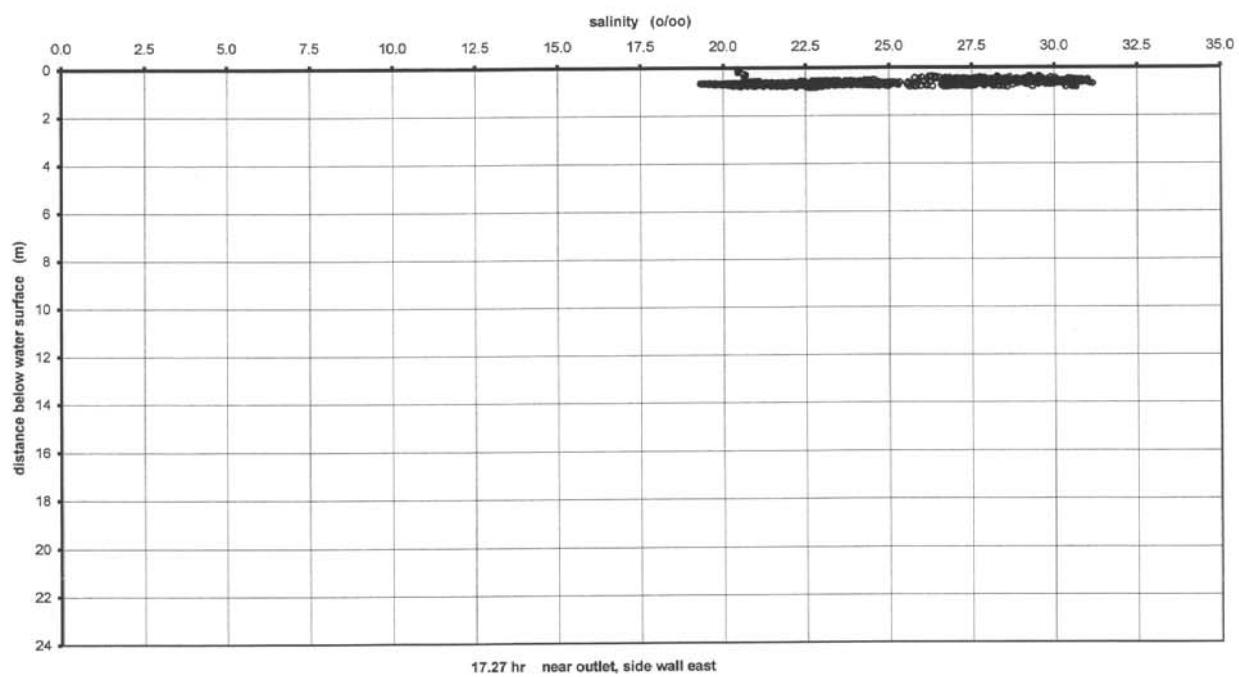
TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.94



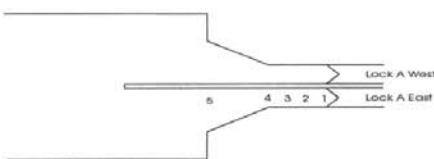
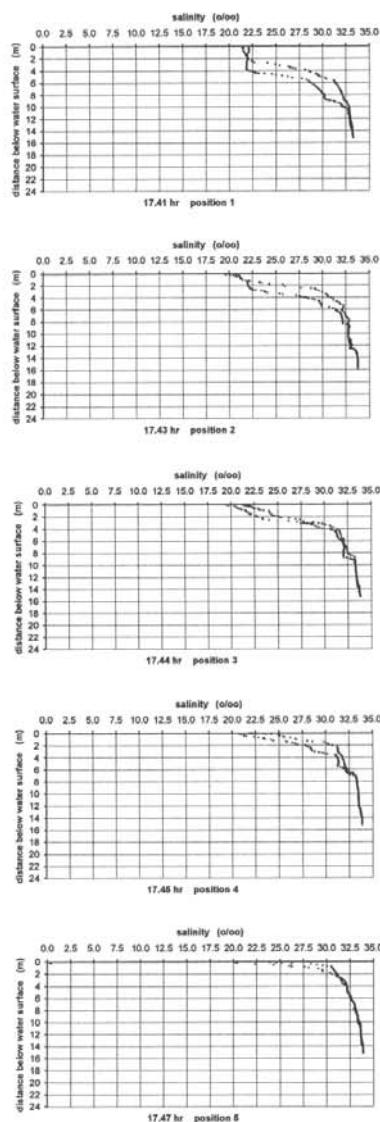
TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE α

Q 3039

Fig. B.95

WL | DELFT HYDRAULICS



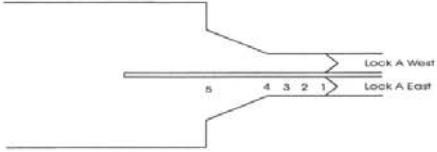
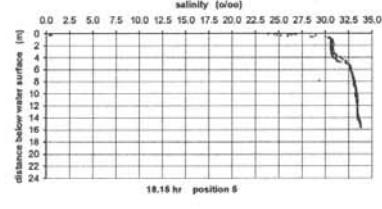
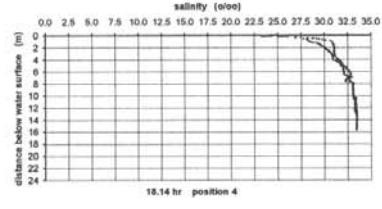
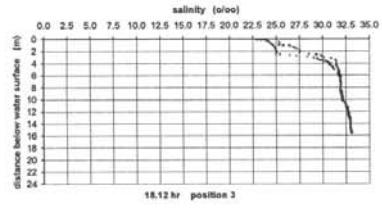
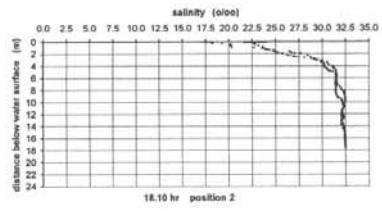
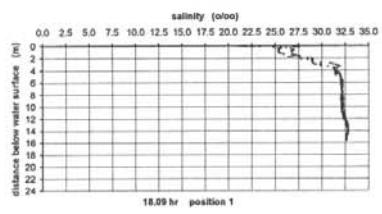
TAYLBAY MIRAFLORES LOCKS
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.96



TAILBAY MIRAFLORES LOCKS
DOWNLOCKAGE LOW TIDE, SOUTHBOUND VESSEL

PHASE c

WL | DELFT HYDRAULICS

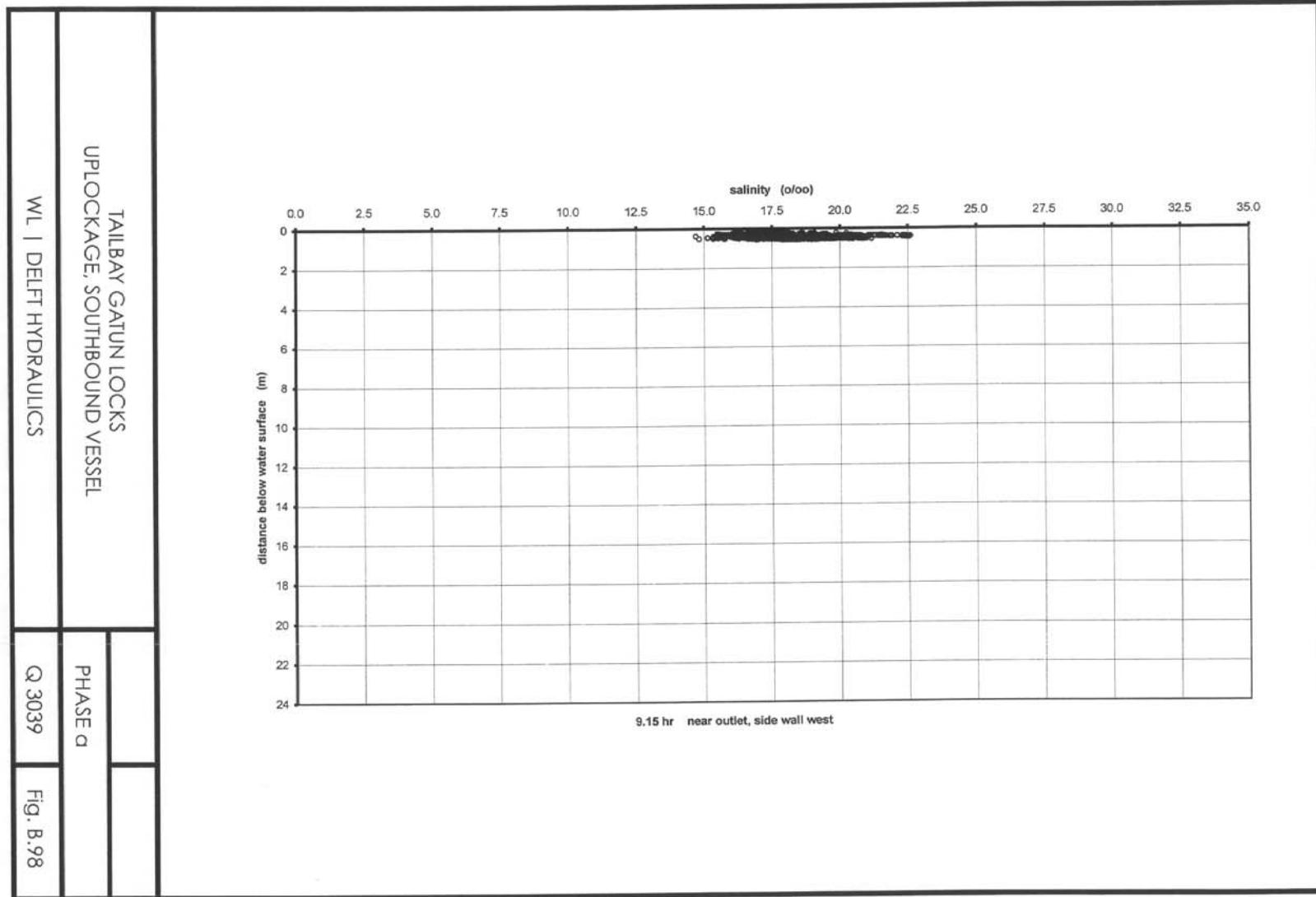
Q 3039

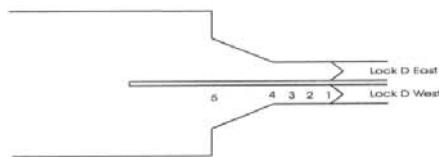
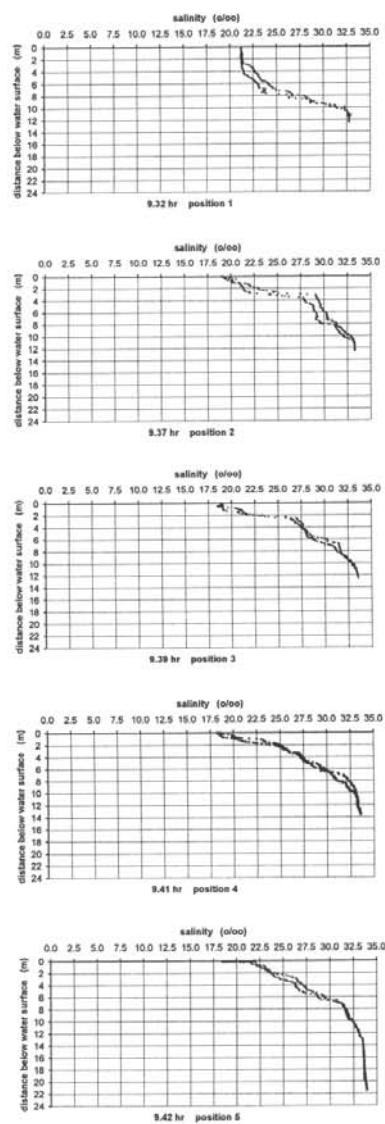
Fig. B.97

GATUN LOCKS

(Locks D, E and F)

UPLOCKAGE





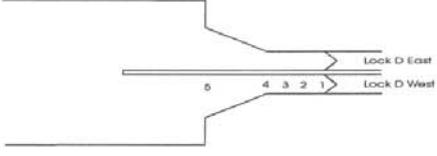
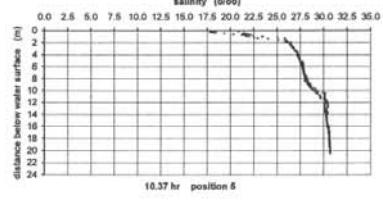
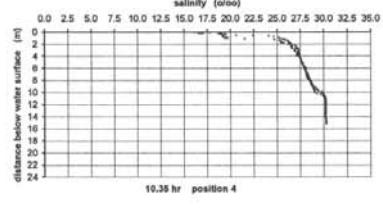
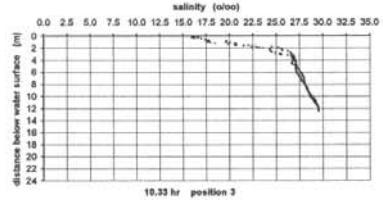
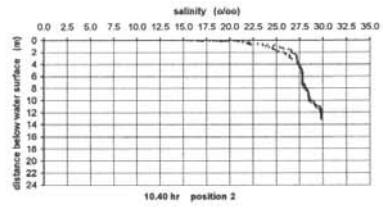
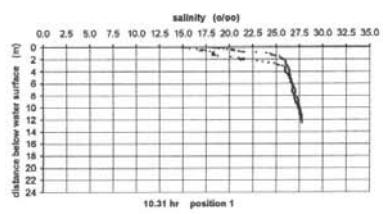
TAILBAY GATUN LOCKS
UPLOCKAGE, SOUTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.99



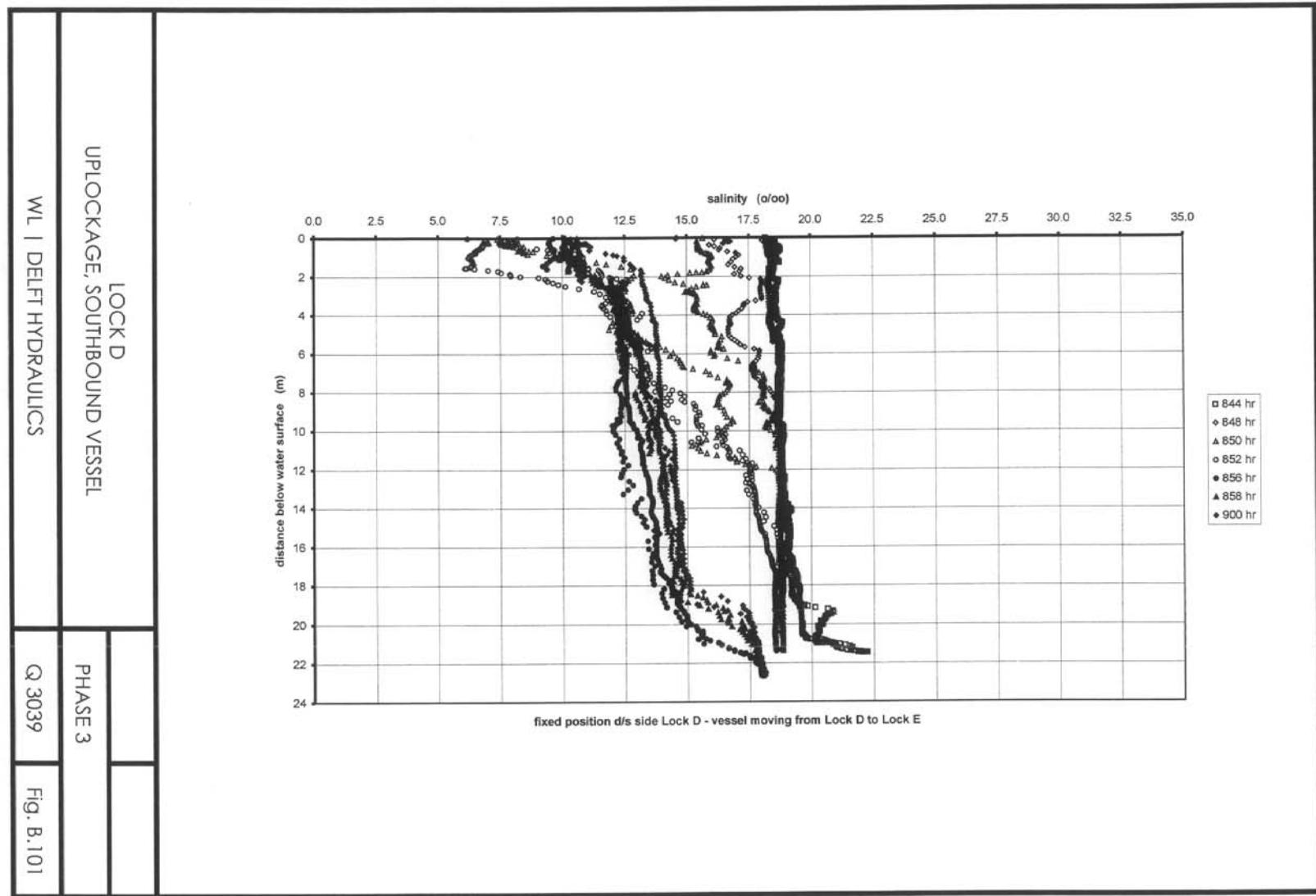
TAILBAY GATUN LOCKS
UPLOCKAGE, SOUTHBOUND VESSEL

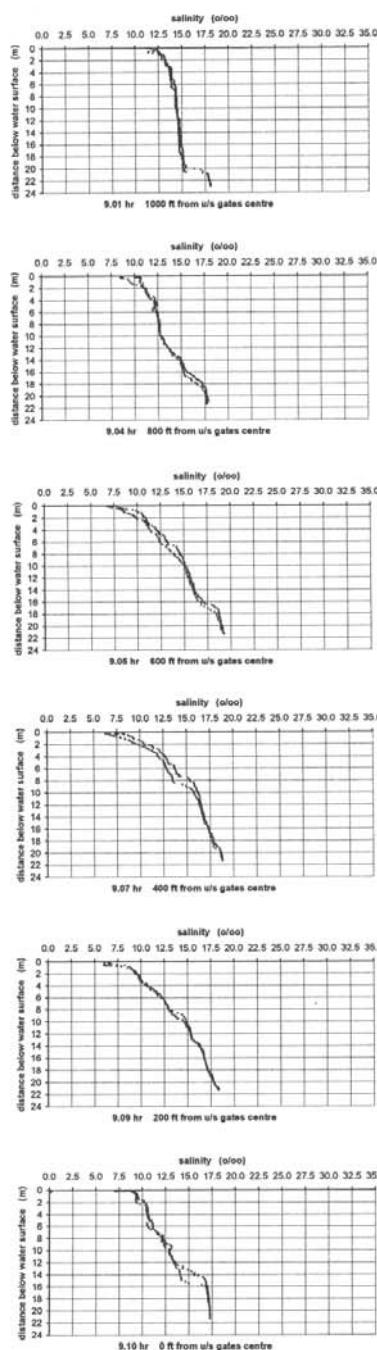
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.100





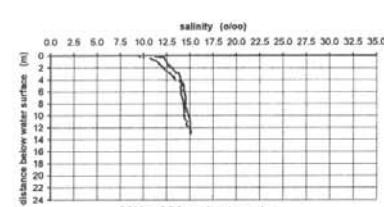
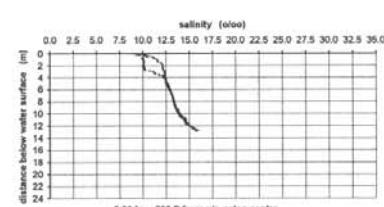
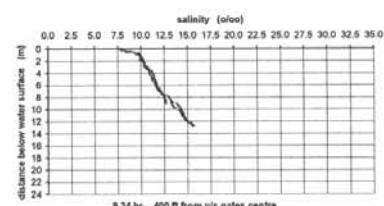
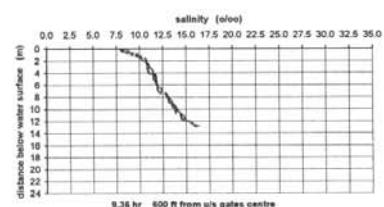
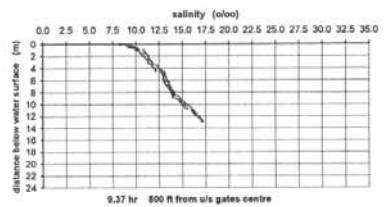
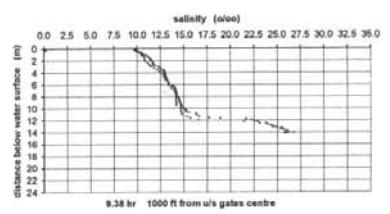
LOCK D
UPLOCKAGE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.102



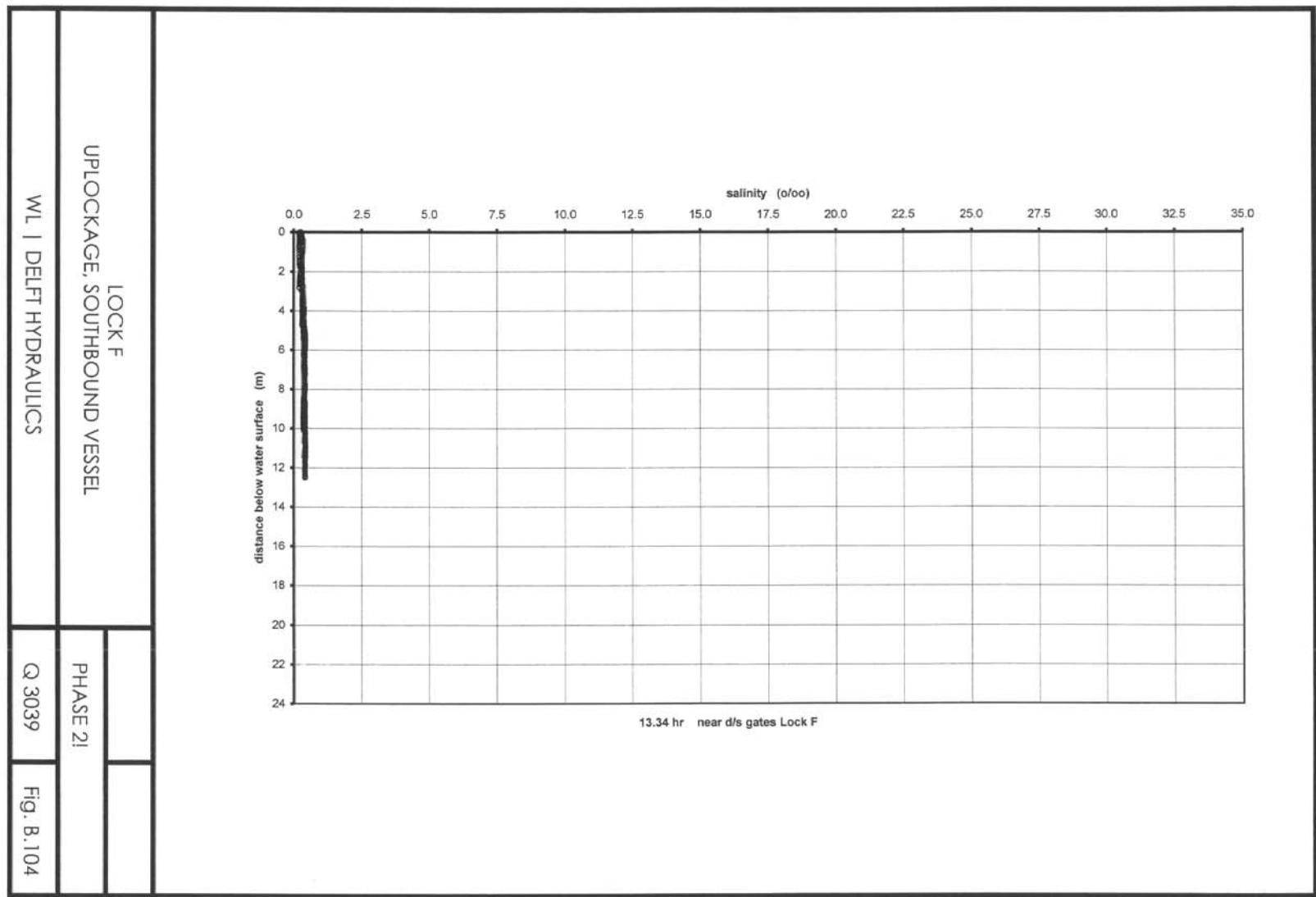
LOCK D
UPLOCKAGE, SOUTHBOUND VESSEL

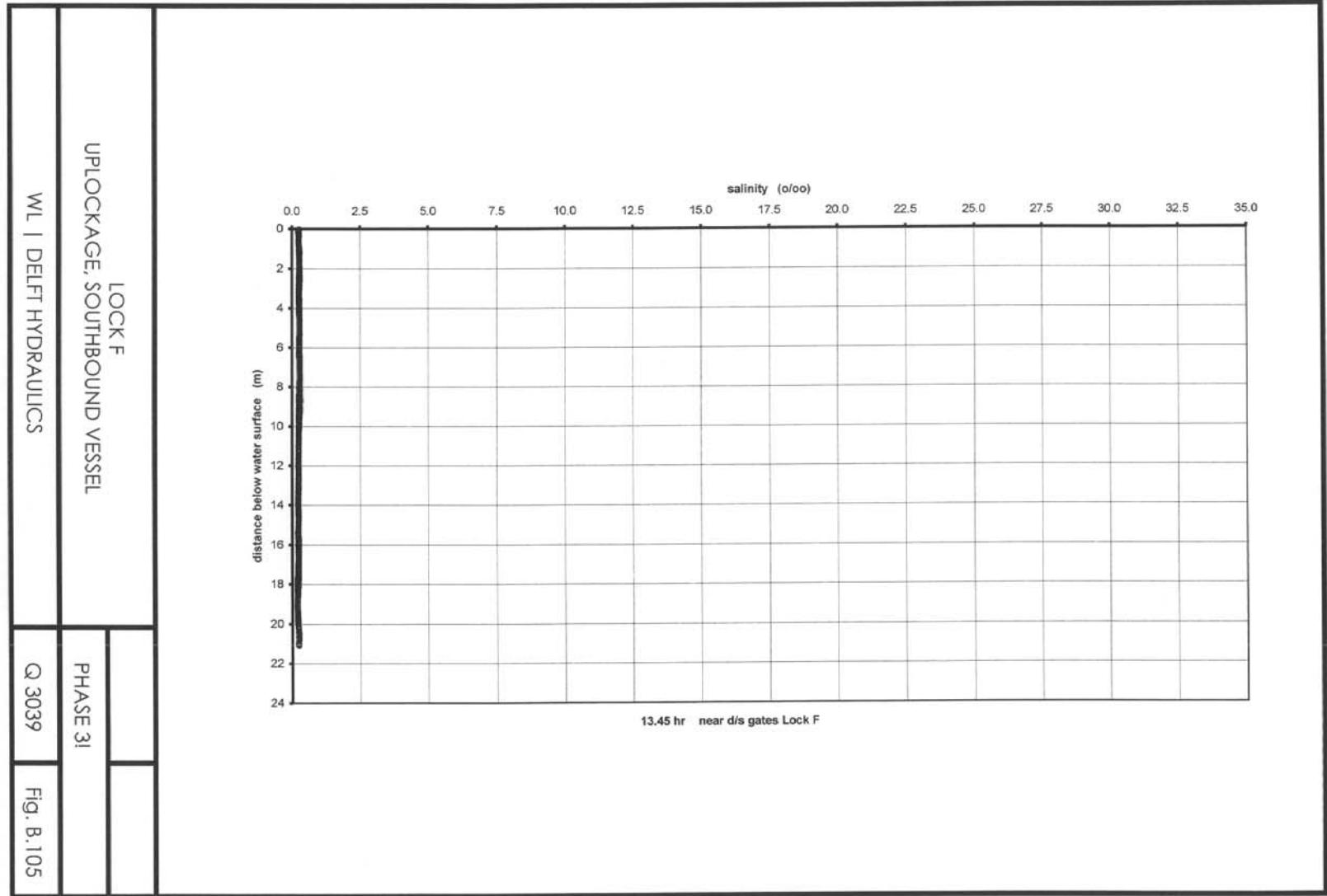
PHASE 5

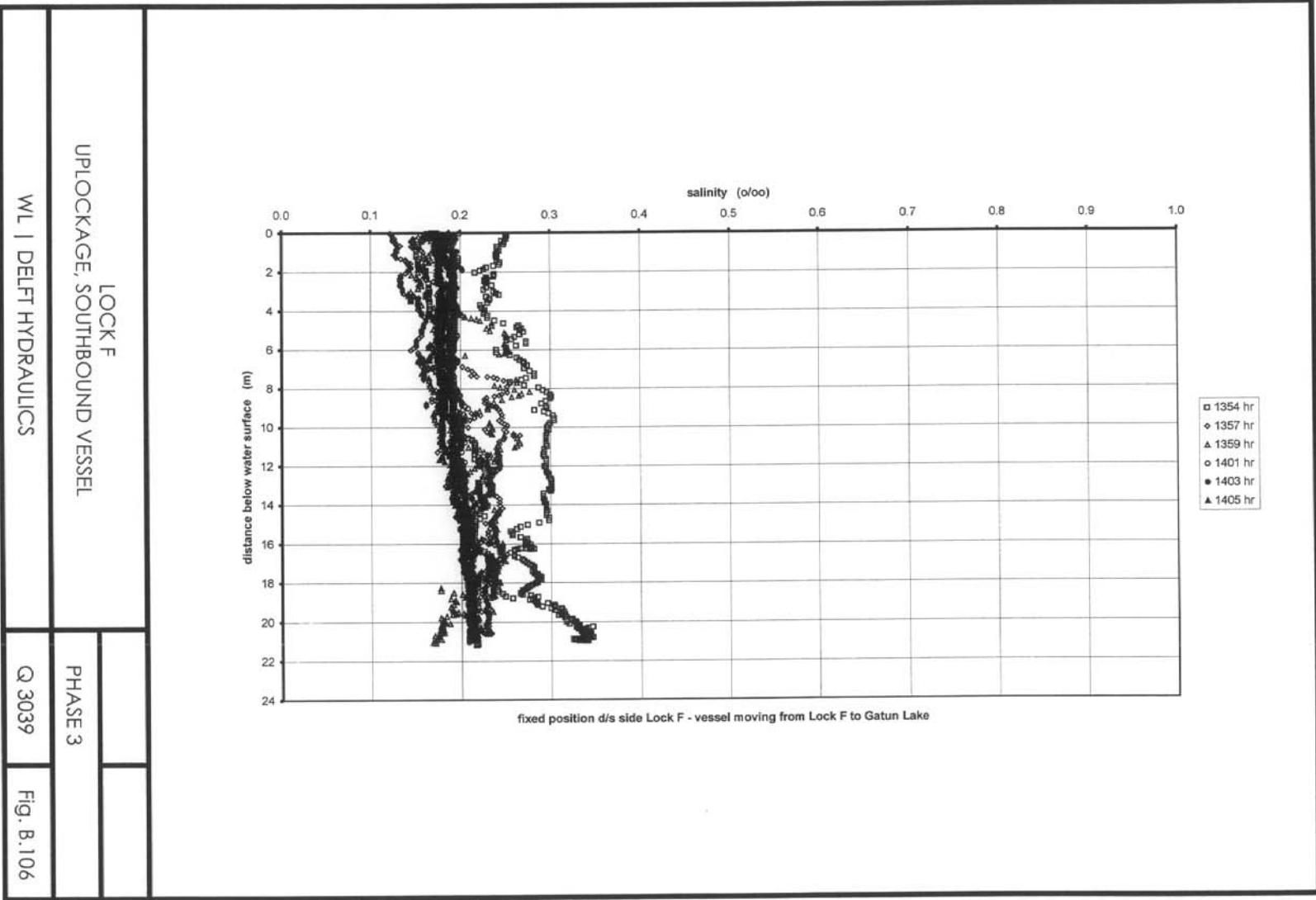
WL | DELFT HYDRAULICS

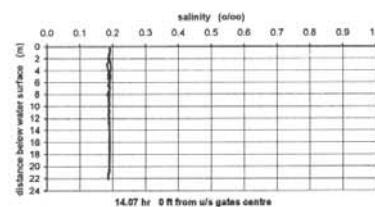
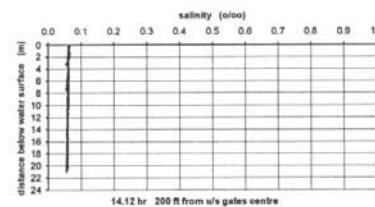
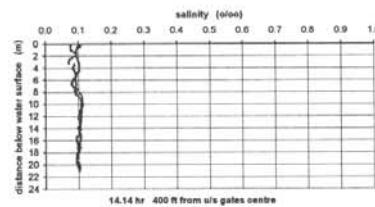
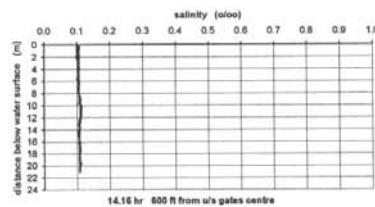
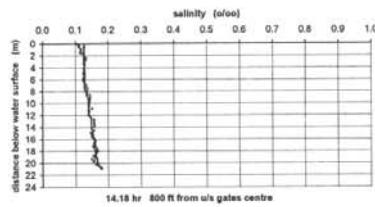
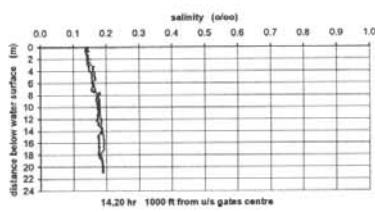
Q 3039

Fig. B.103









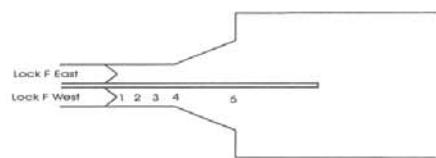
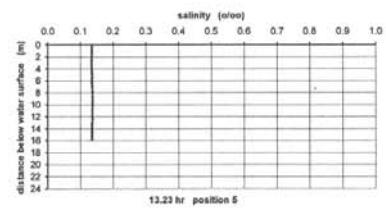
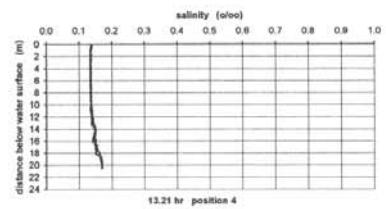
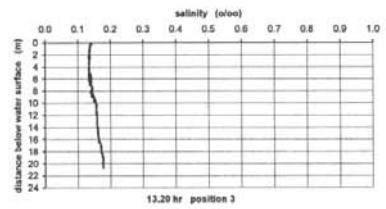
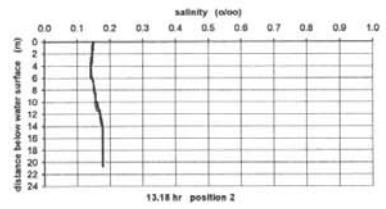
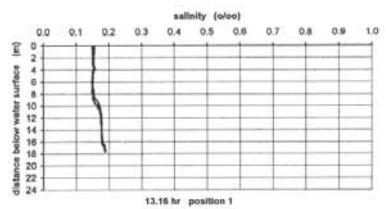
LOCK F
UPLOCKAGE, SOUTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.107



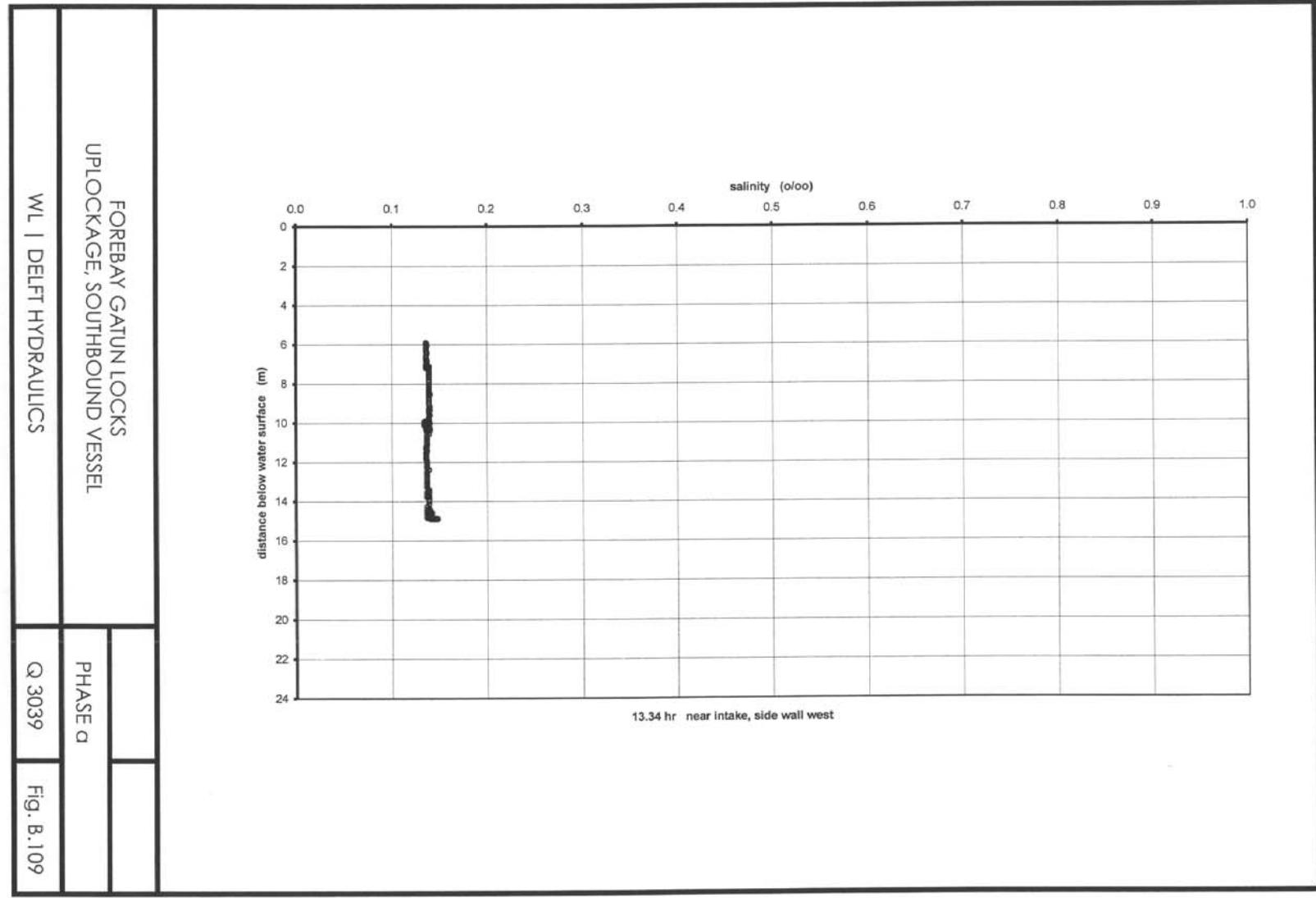
FOREBAY GATUN LOCKS
UPLOCKAGE, SOUTHBOUND VESSEL

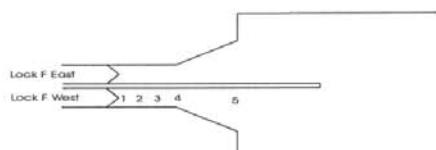
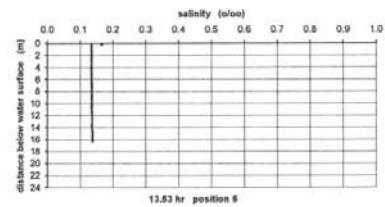
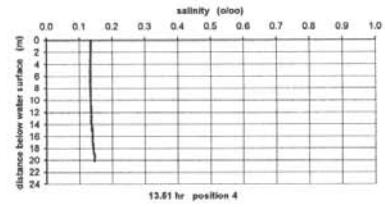
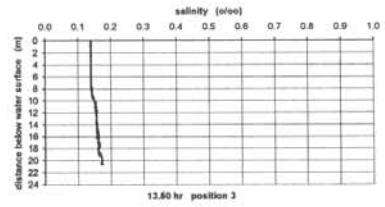
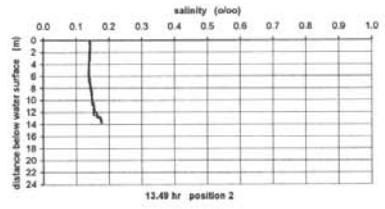
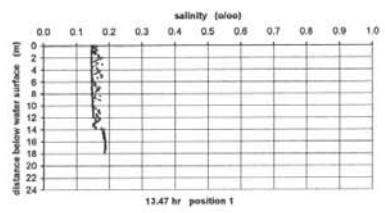
PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.108





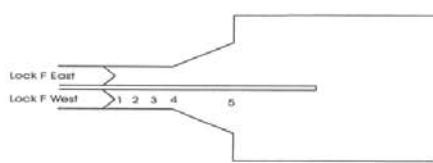
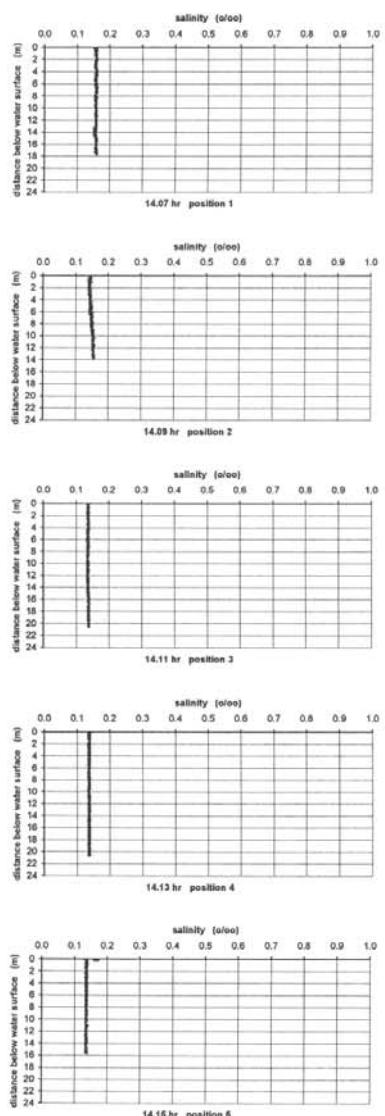
FOREBAY GATUN LOCKS
UPLOCKAGE, SOUTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.110



FOREBAY GATUN LOCKS
UPLOCKAGE, SOUTHBOUND VESSEL

PHASE c

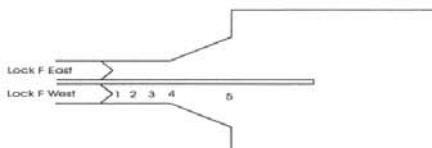
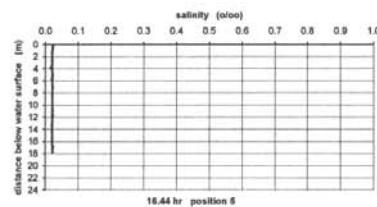
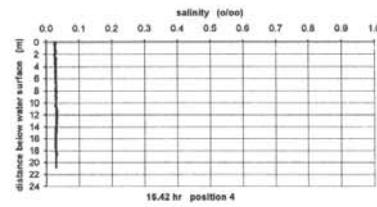
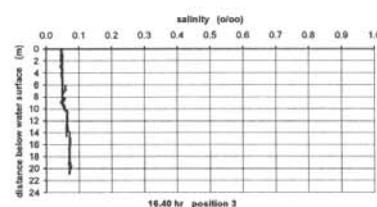
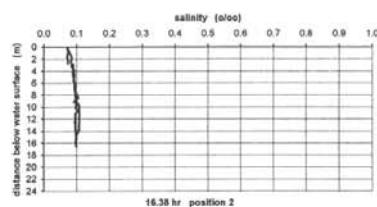
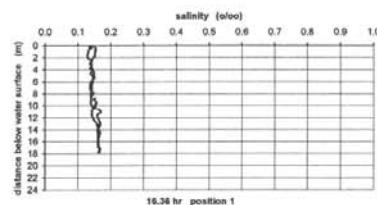
WL | DELFT HYDRAULICS

Q 3039

Fig. B.111

GATUN LOCKS
(Locks D, E and F)

DOWNLOCKAGE



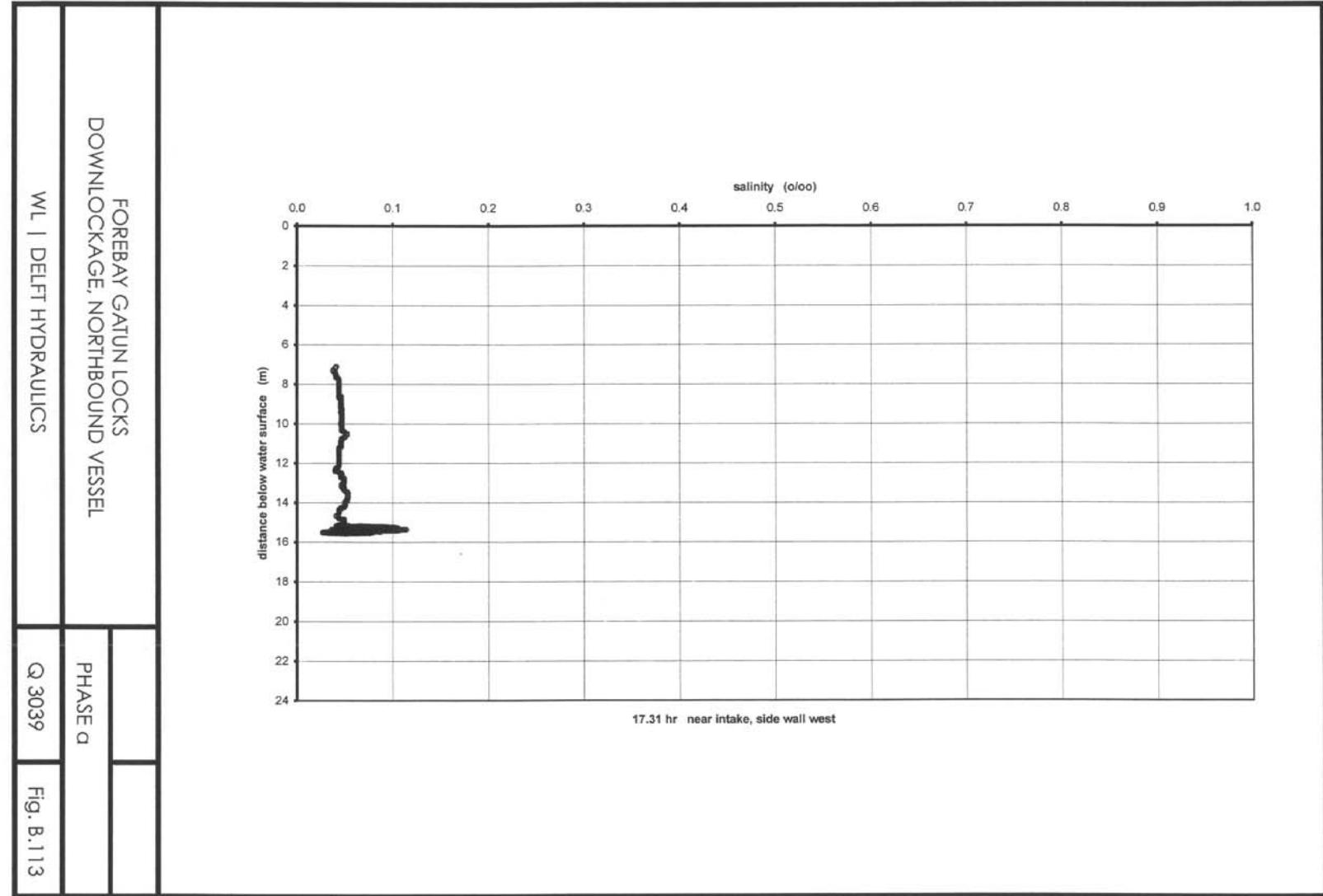
FOREBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

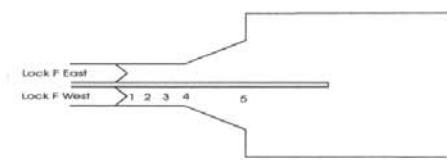
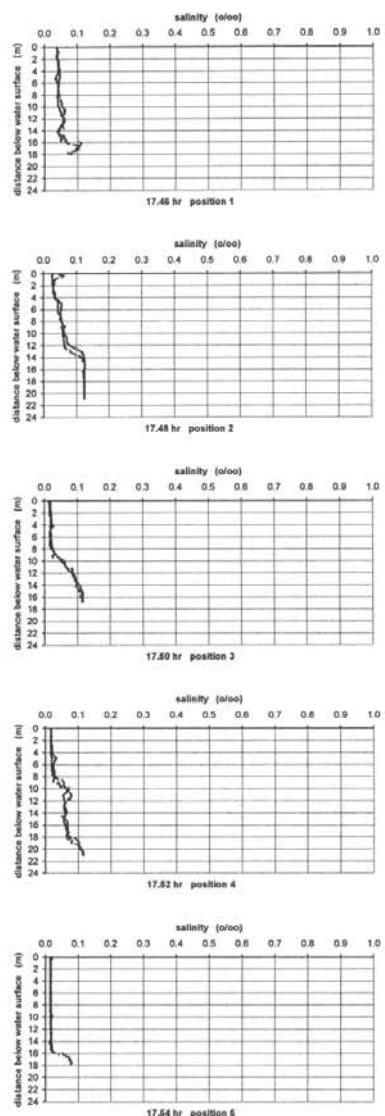
PHASE C

WL | DELFT HYDRAULICS

Q 3039

Fig. B.112





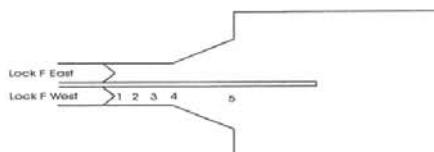
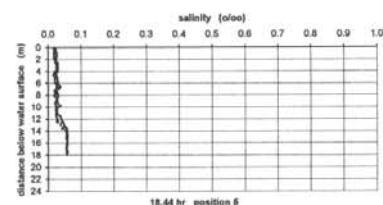
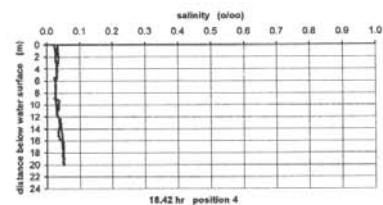
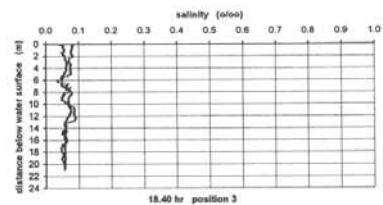
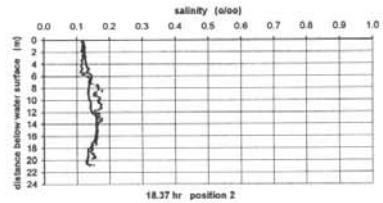
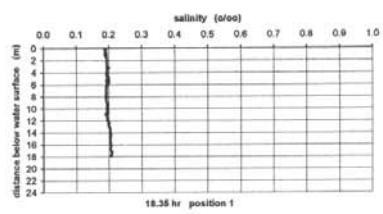
FOREBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.114



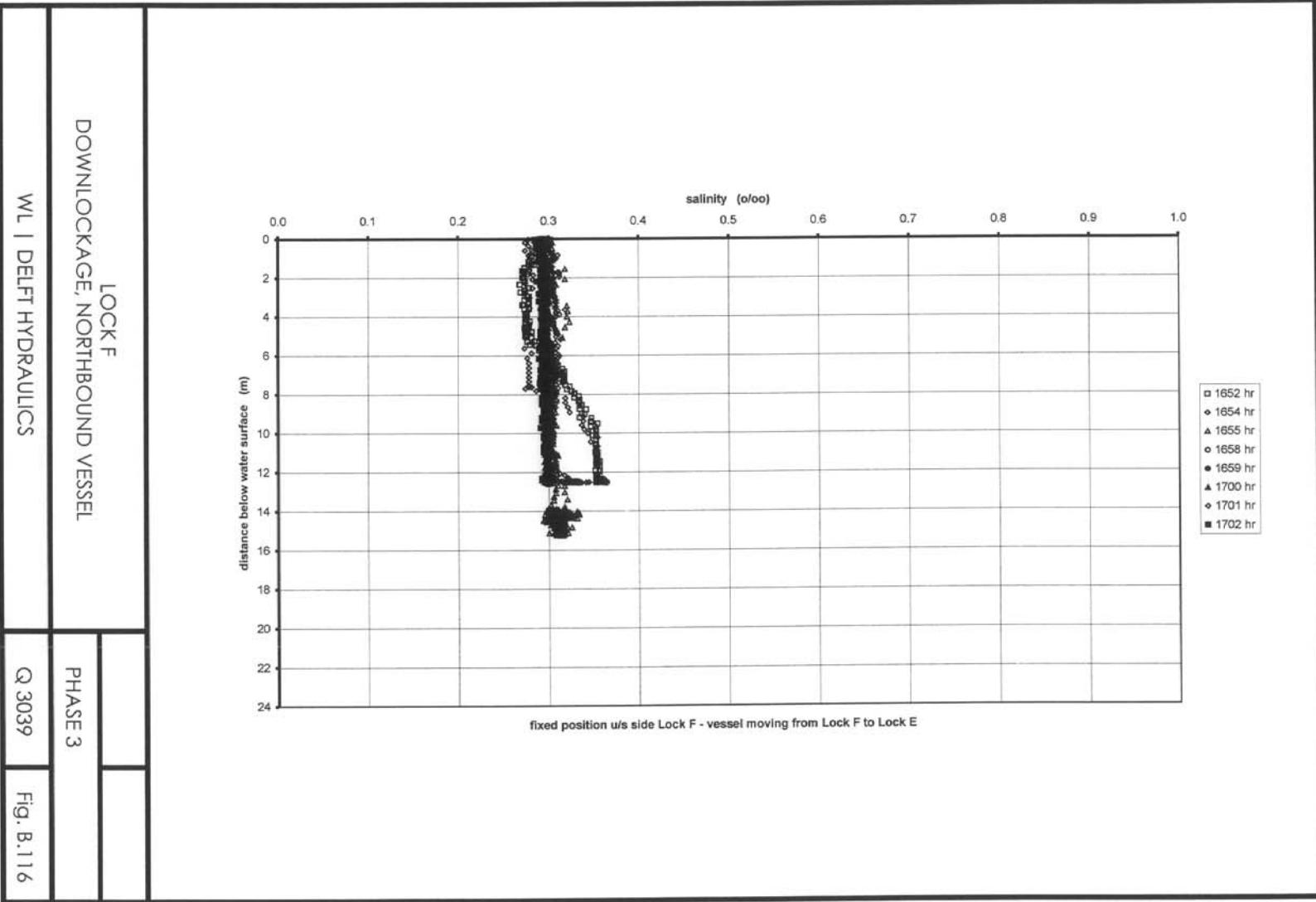
FOREBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

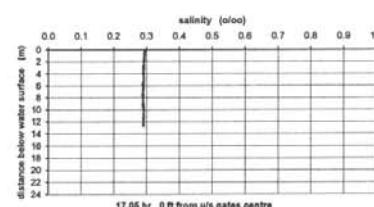
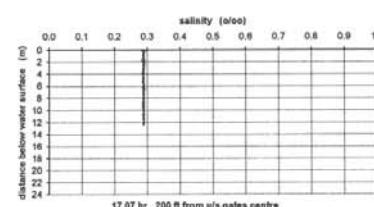
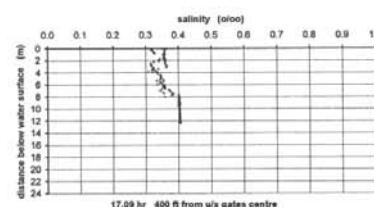
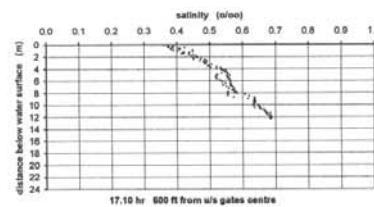
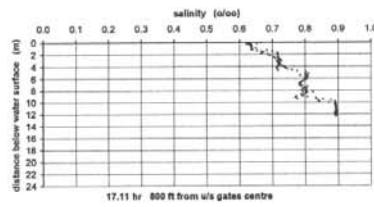
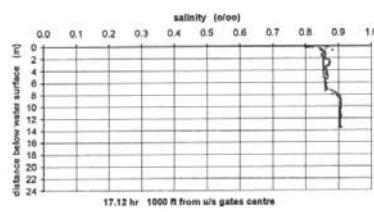
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.115





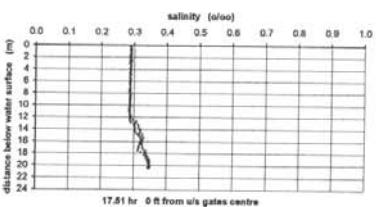
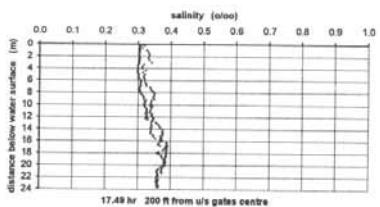
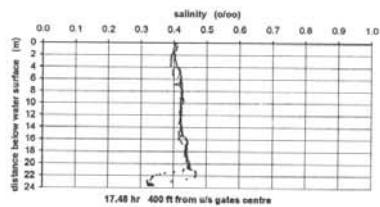
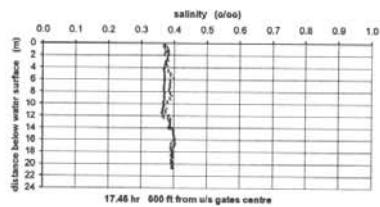
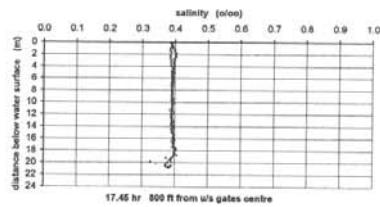
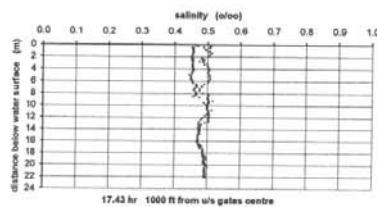
LOCK F
DOWNLOCKAGE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.117



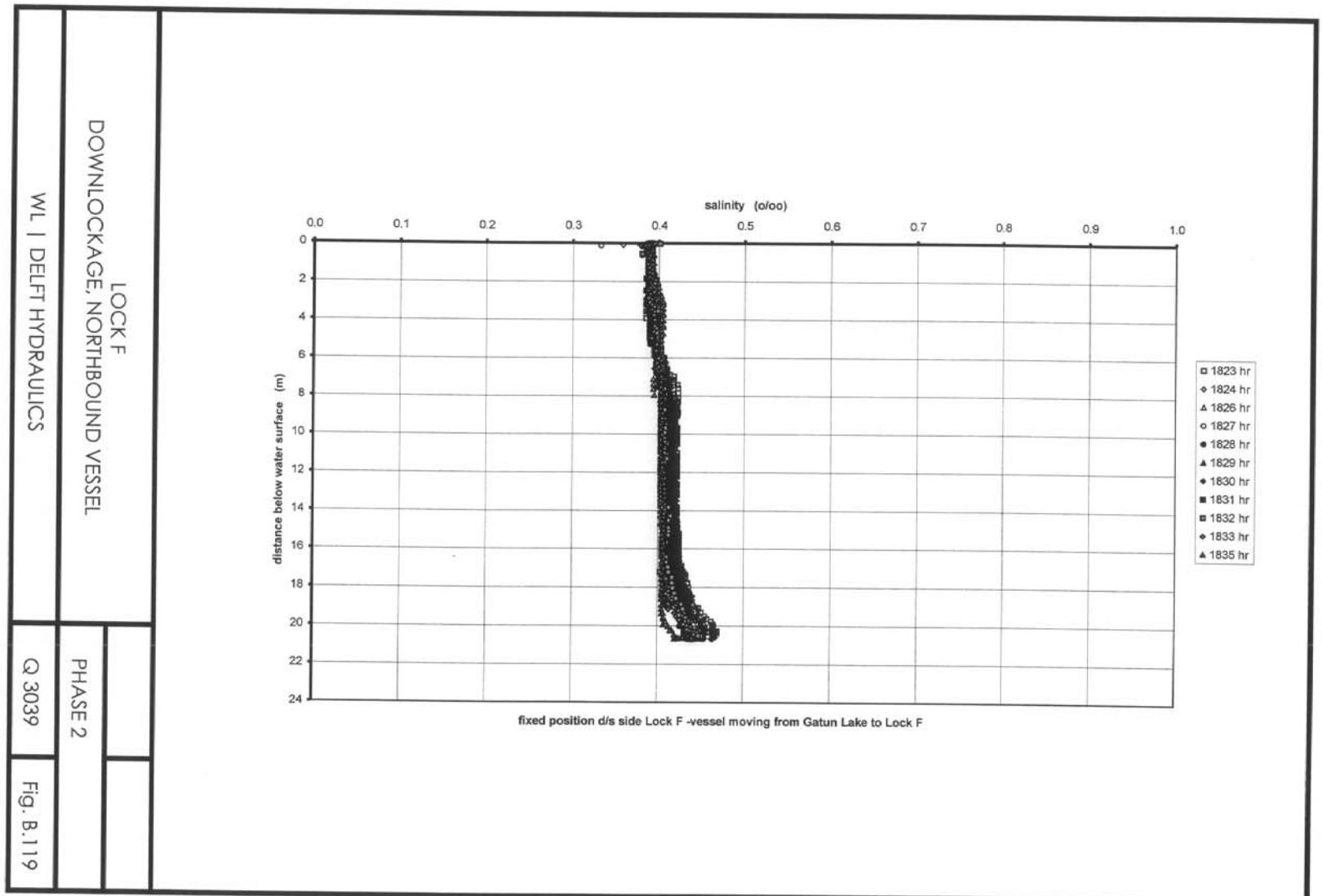
LOCK F
DOWNLOCKAGE, NORTHBOUND VESSEL

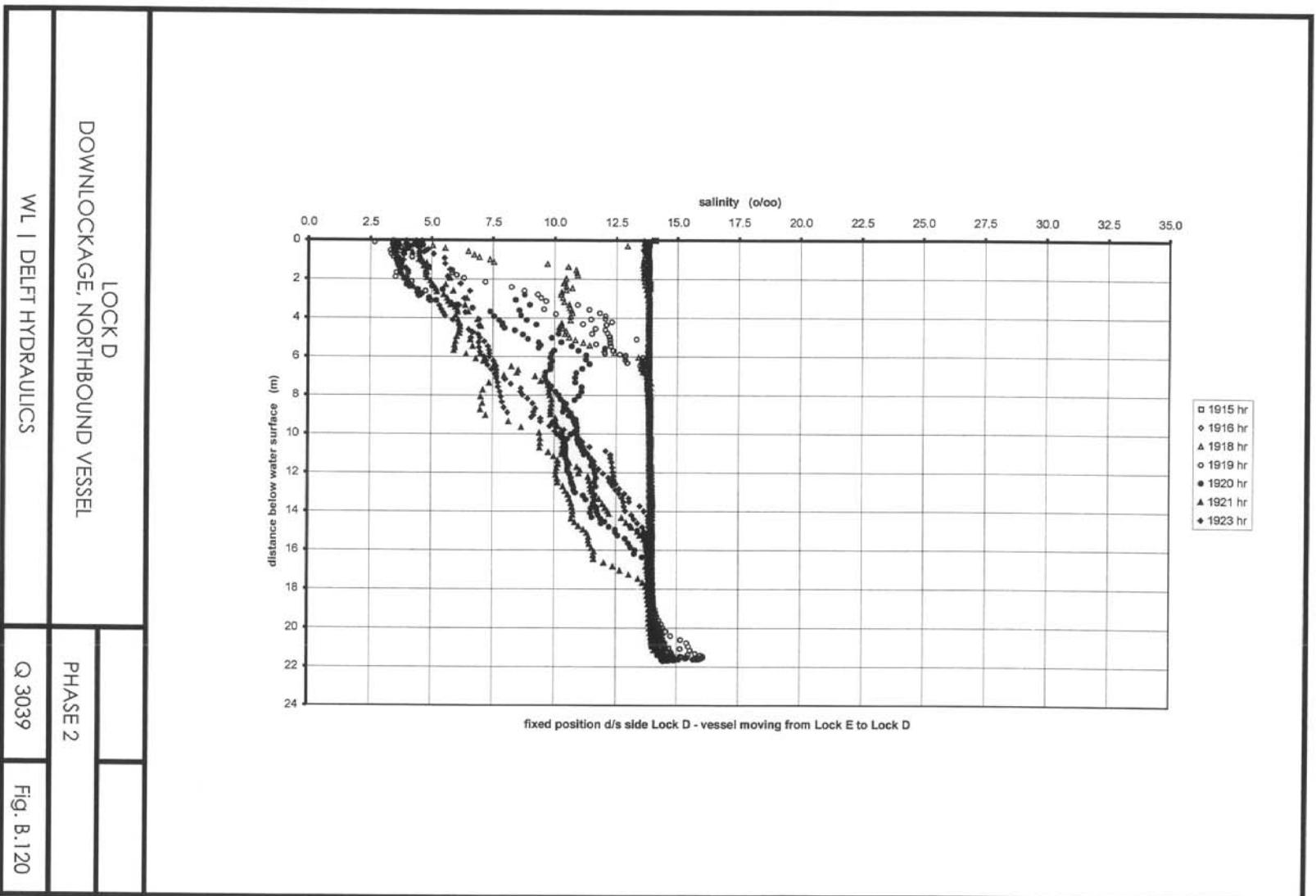
PHASE 5

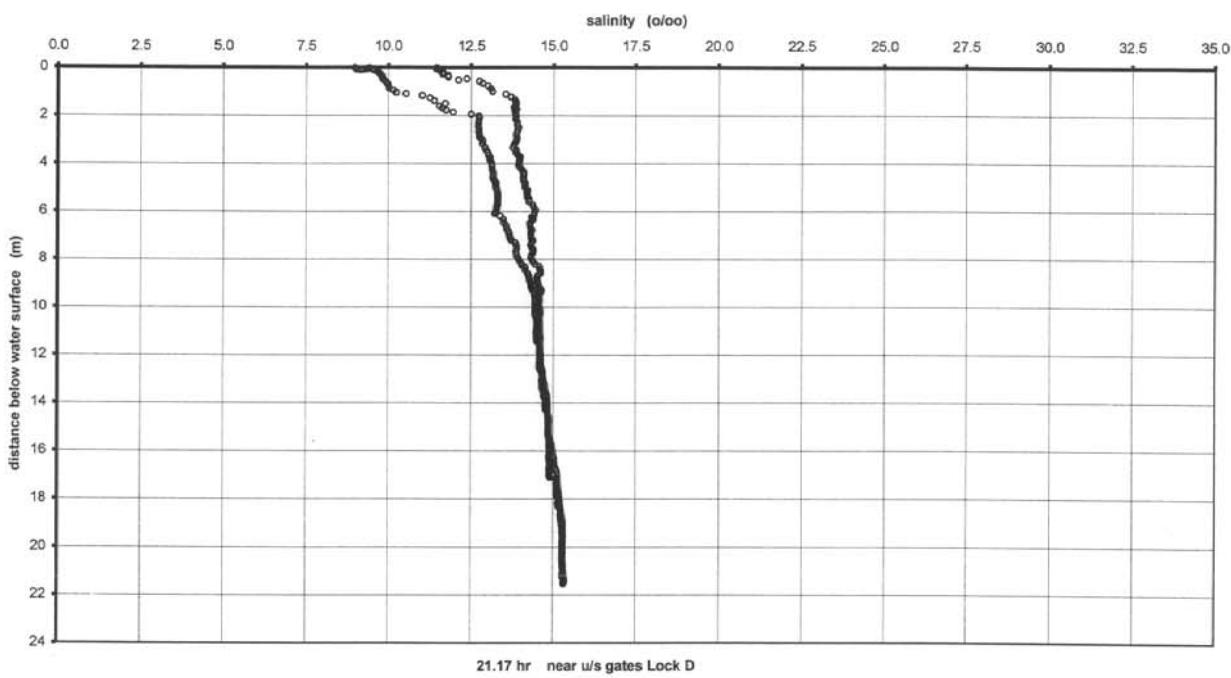
WL | DELFT HYDRAULICS

Q 3039

Fig. B.118





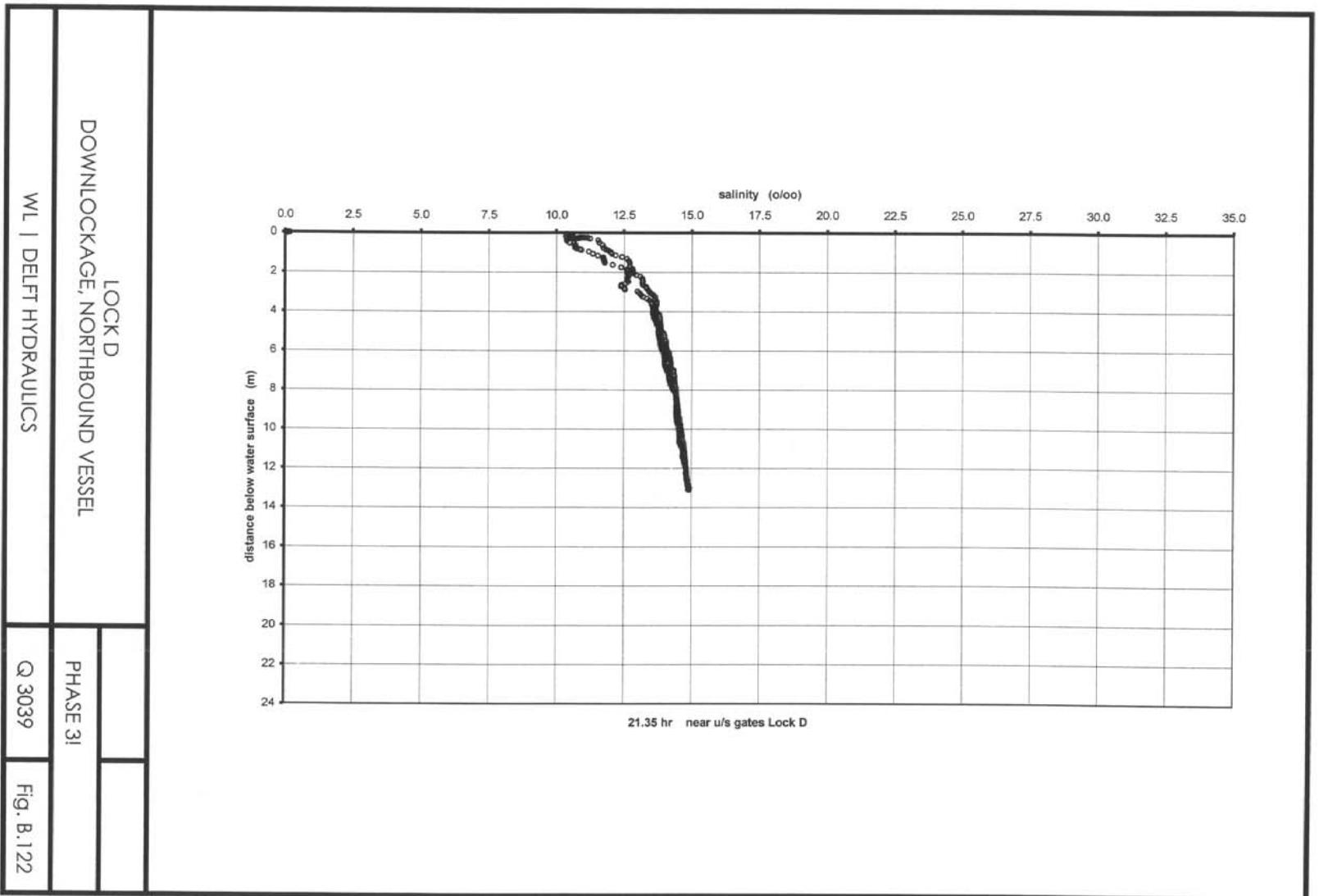


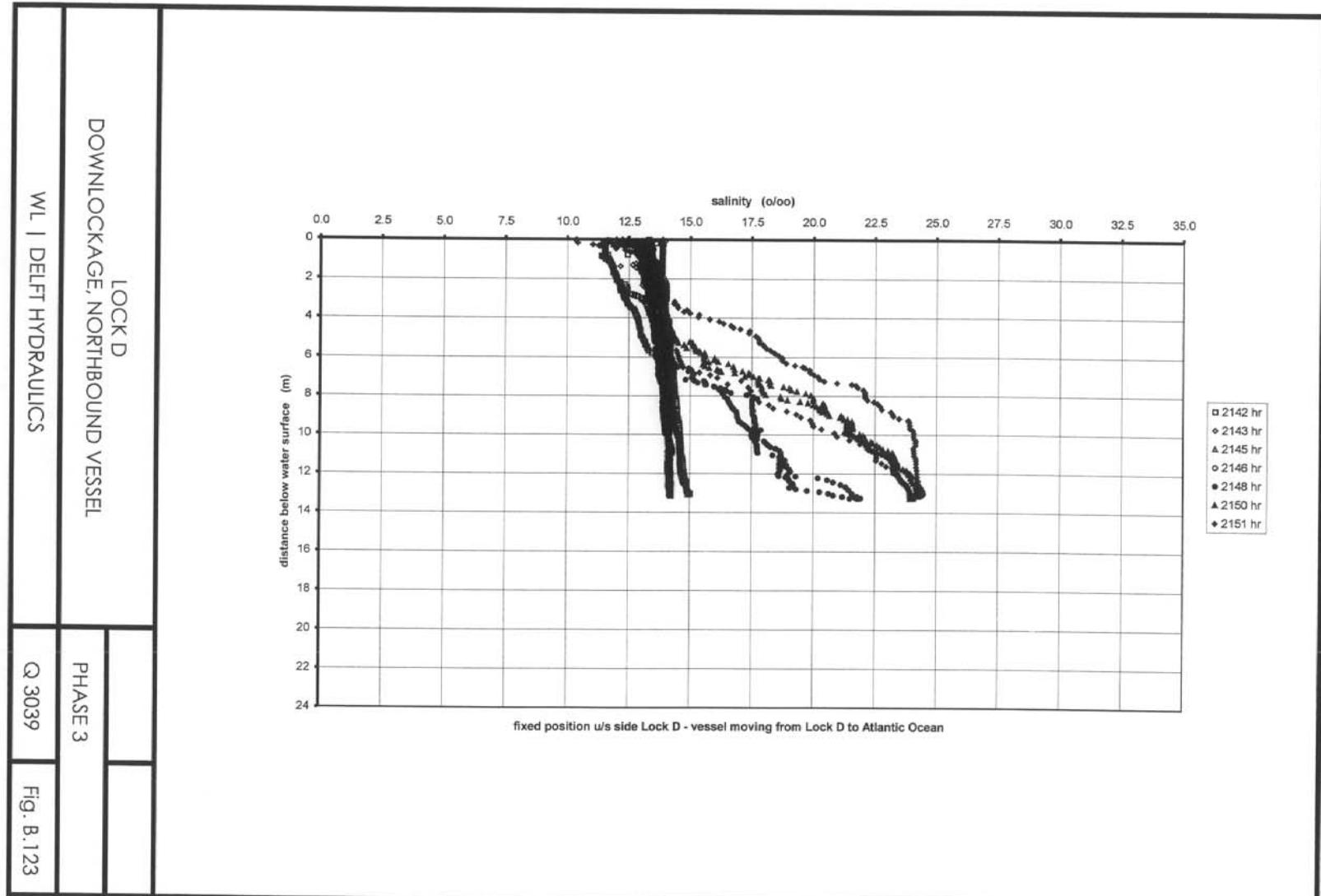
LOCK D
DOWNLOCKAGE, NORTHBOUND VESSEL

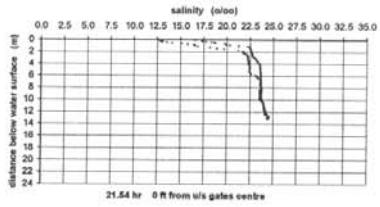
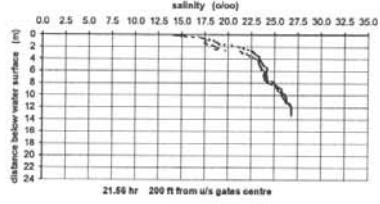
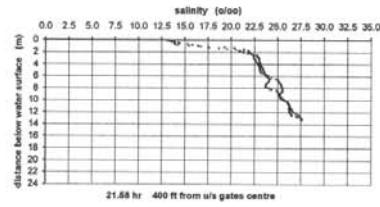
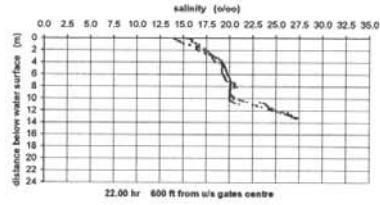
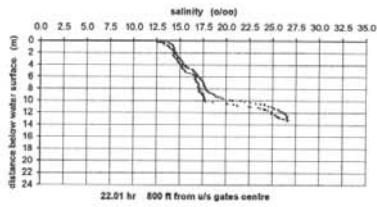
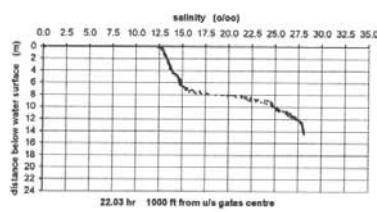
PHASE 2!

WL | DELFT HYDRAULICS

Q 3039 Fig. B.121







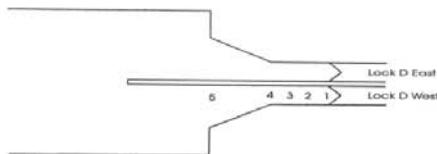
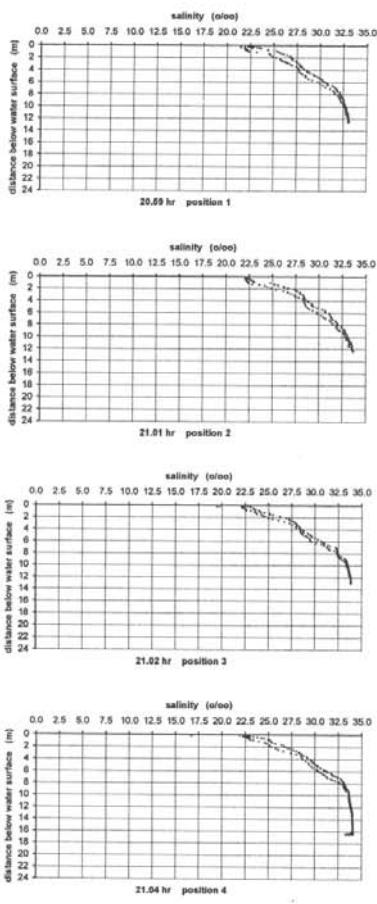
LOCK D
DOWNLOCKAGE, NORTHBOUND VESSEL

PHASE 4

WL | DELFT HYDRAULICS

Q 3039

Fig. B.124



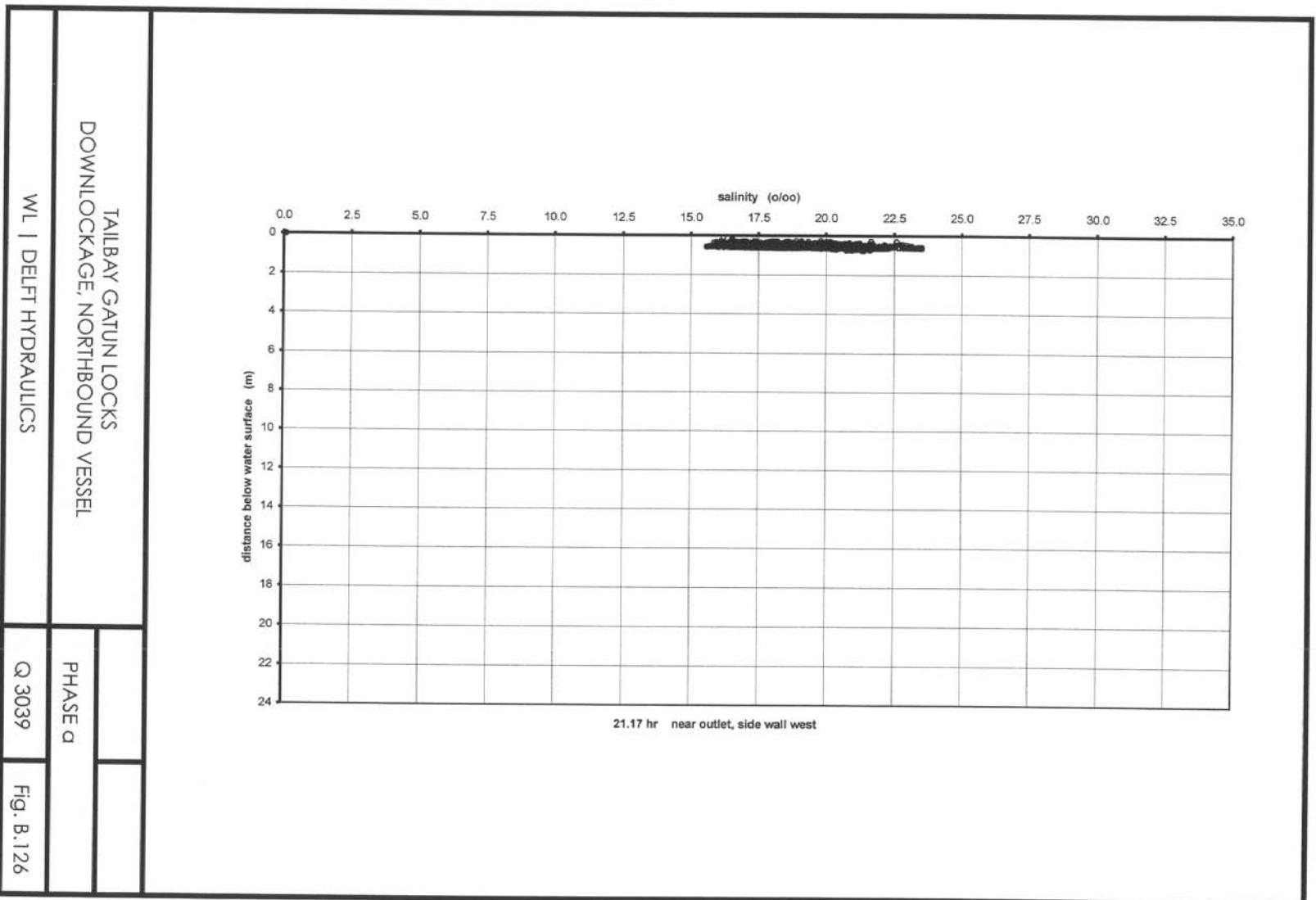
TAILBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

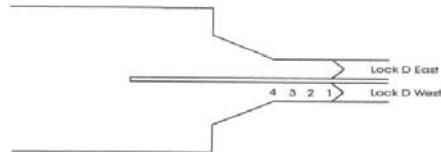
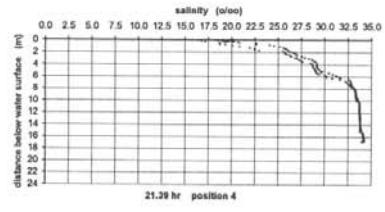
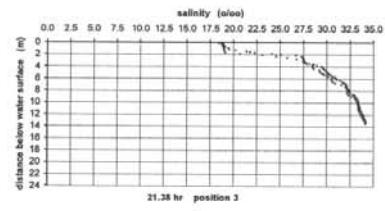
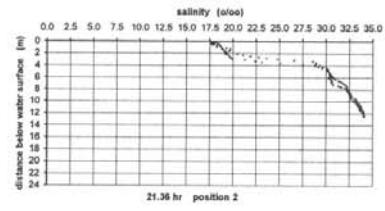
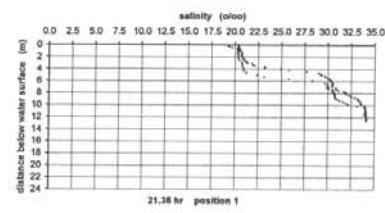
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.125





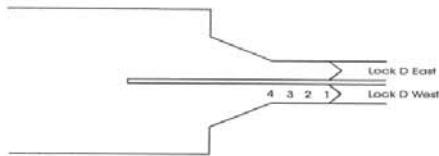
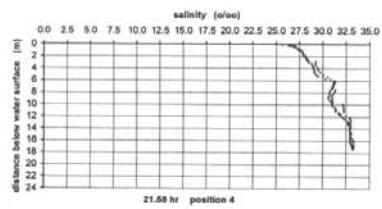
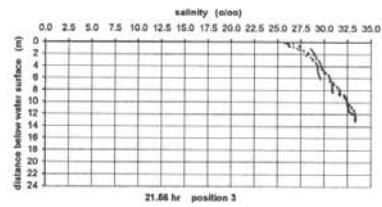
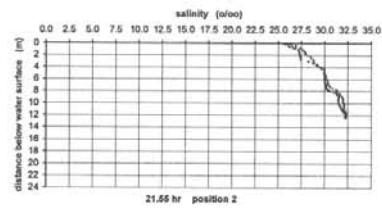
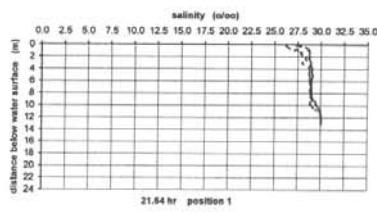
TAILBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

PHASE b

WL | DELFT HYDRAULICS

Q 3039

Fig. B.127



TAILBAY GATUN LOCKS
DOWNLOCKAGE, NORTHBOUND VESSEL

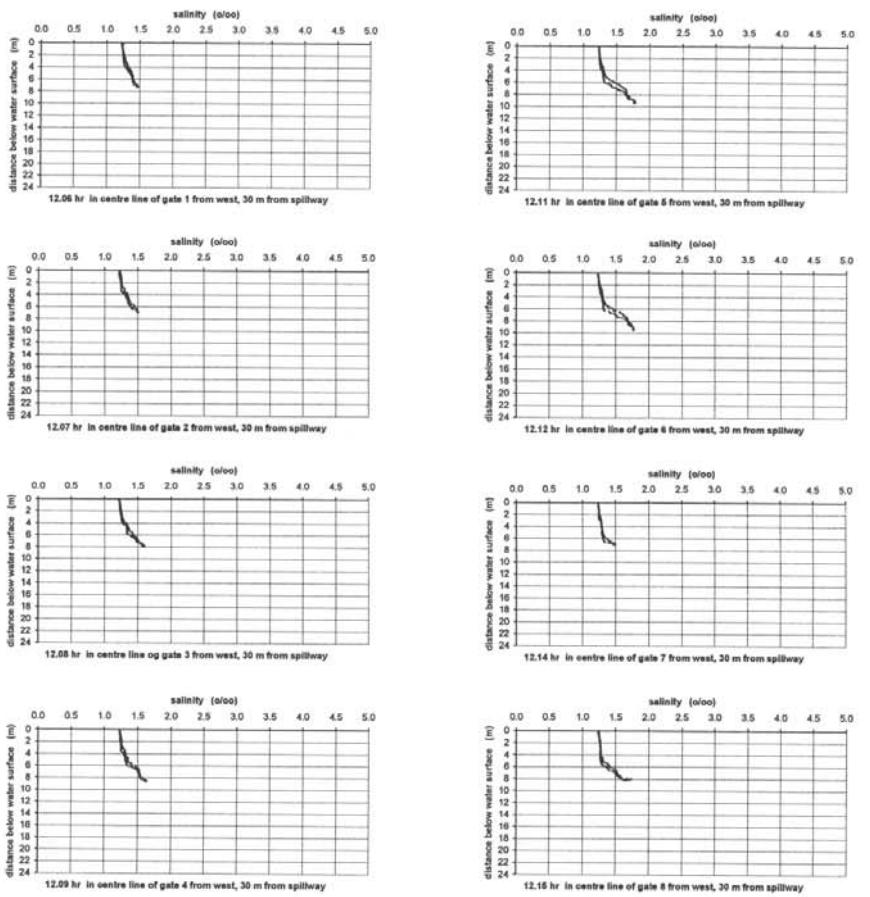
PHASE c

WL | DELFT HYDRAULICS

Q 3039

Fig. B.128

MIRAFLORES LAKE

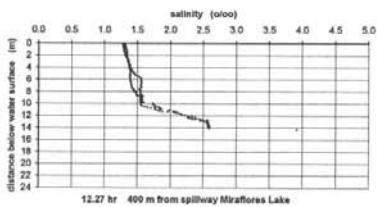
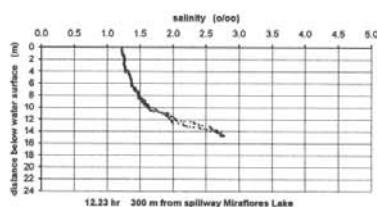
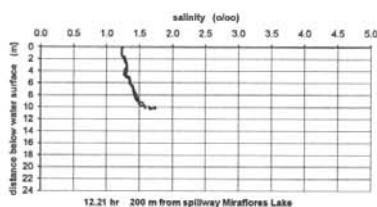


LONGITUDINAL SECTION
30 M DISTANCE TO MIRAFLORES SPILLWAY

WL | DELFT HYDRAULICS

Water Level +54.5 ft

Q 3039 Fig. B.129



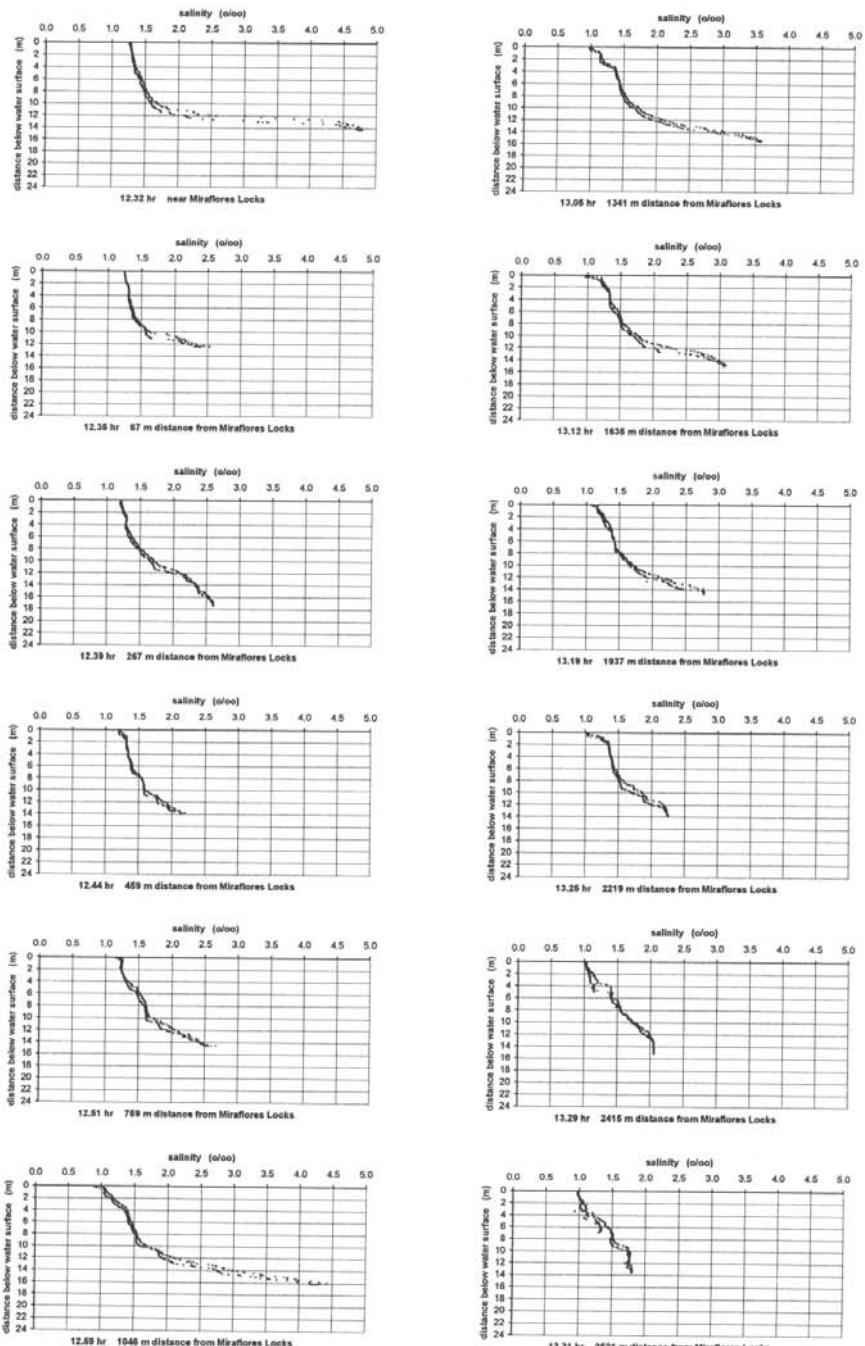
LONGITUDINAL SECTION PERPENDICULAR
TO MIRAFLORES SPILLWAY, CENTRE LINE GATE NO 3

Water Level +54.5 ft

WL | DELFT HYDRAULICS

Q 3039

Fig. B.130



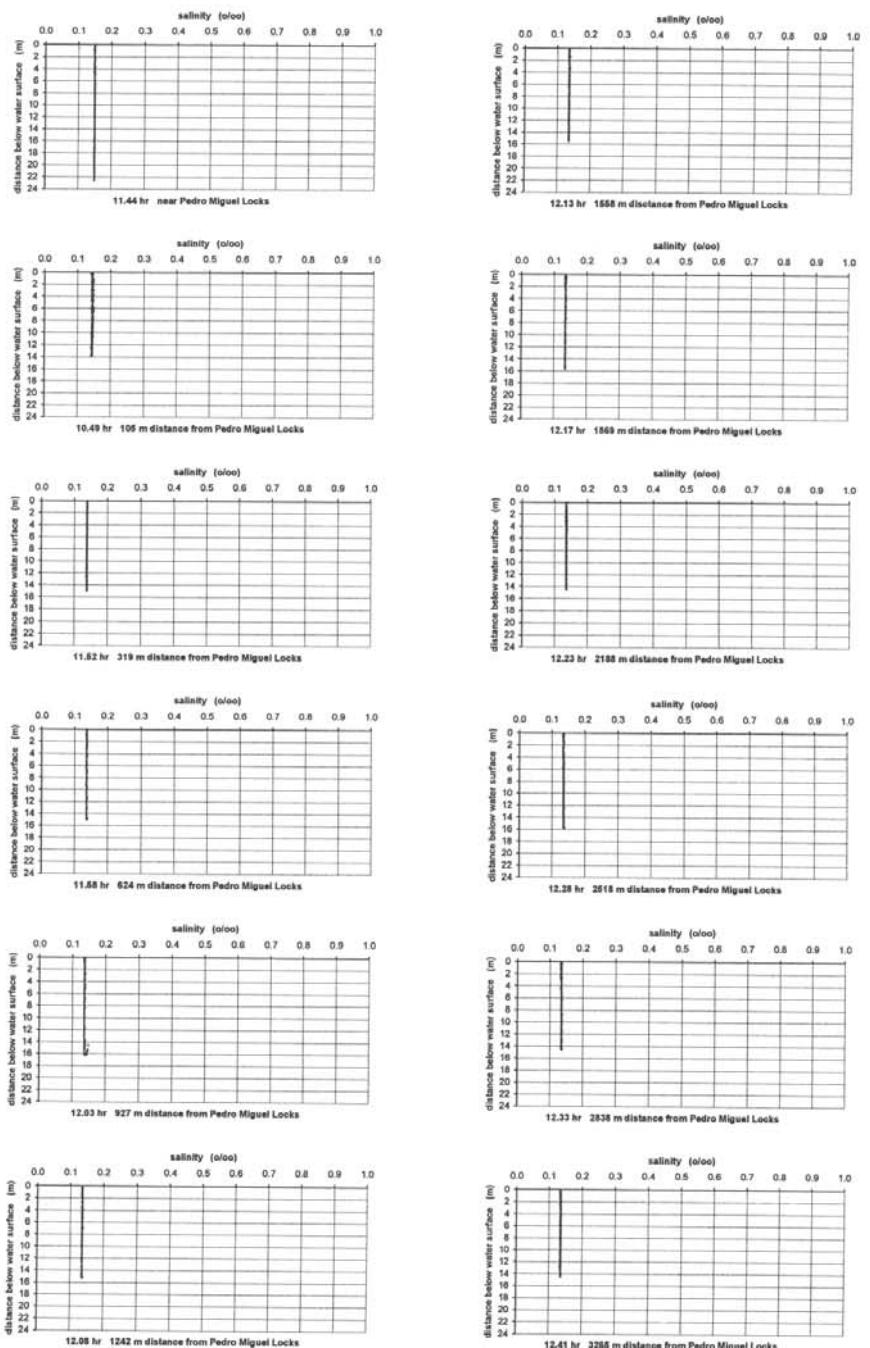
LONGITUDINAL SECTION MIRAFLORES LAKE
IN SHIPPING LANE

Lake Level +54.7

WL | DELFT HYDRAULICS

Q 3039 Fig. B.131

GAILLARD CUT

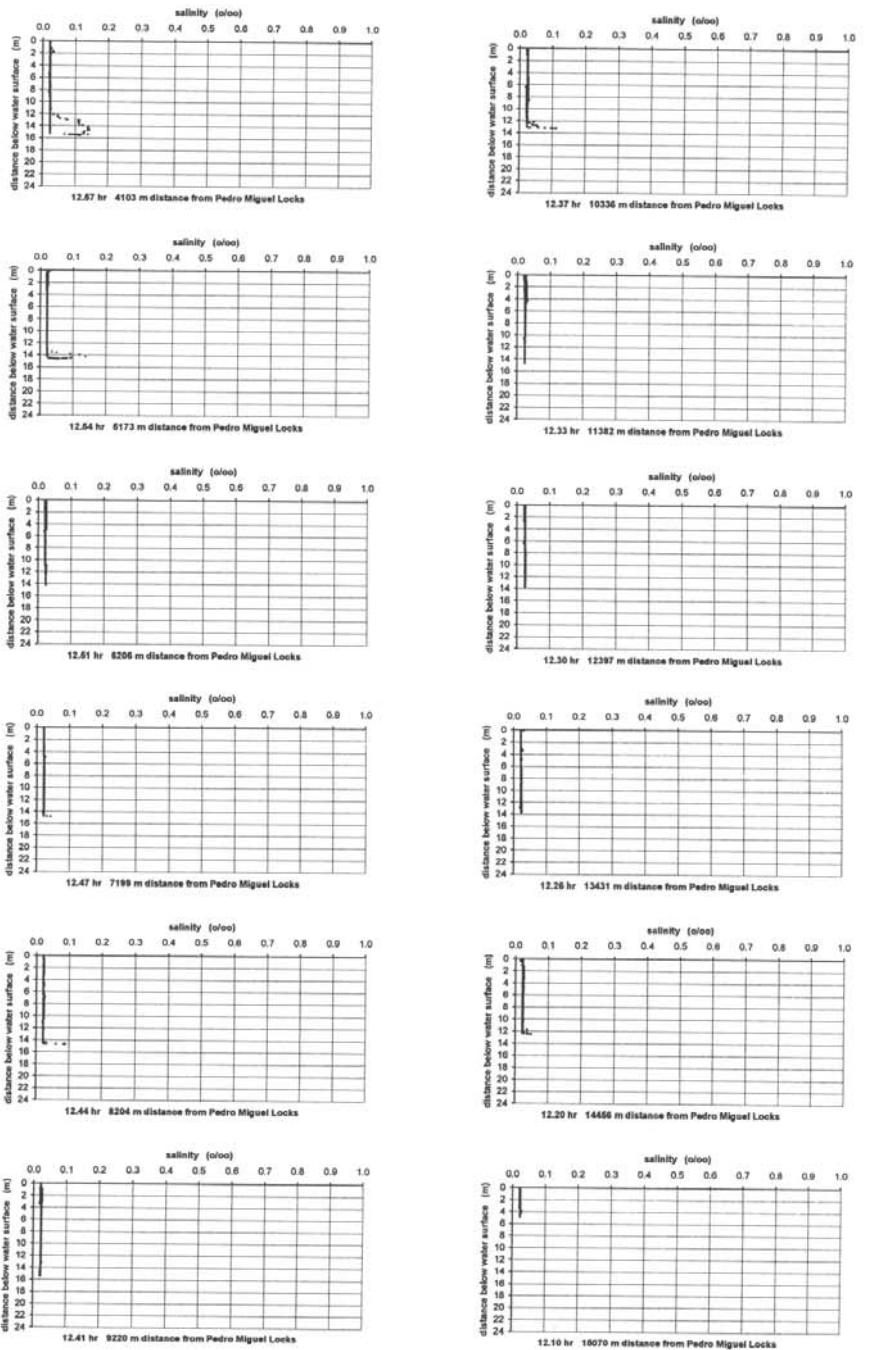


LONGITUDINAL SECTION
PEDRO MIGUEL LOCKS TO GAMBOA

WL | DELFT HYDRAULICS

Water Level +85.6

Q 3039 Fig. B.132



LONGITUDINAL SECTION
PEDRO MIGUEL LOCKS TO GAMBOA

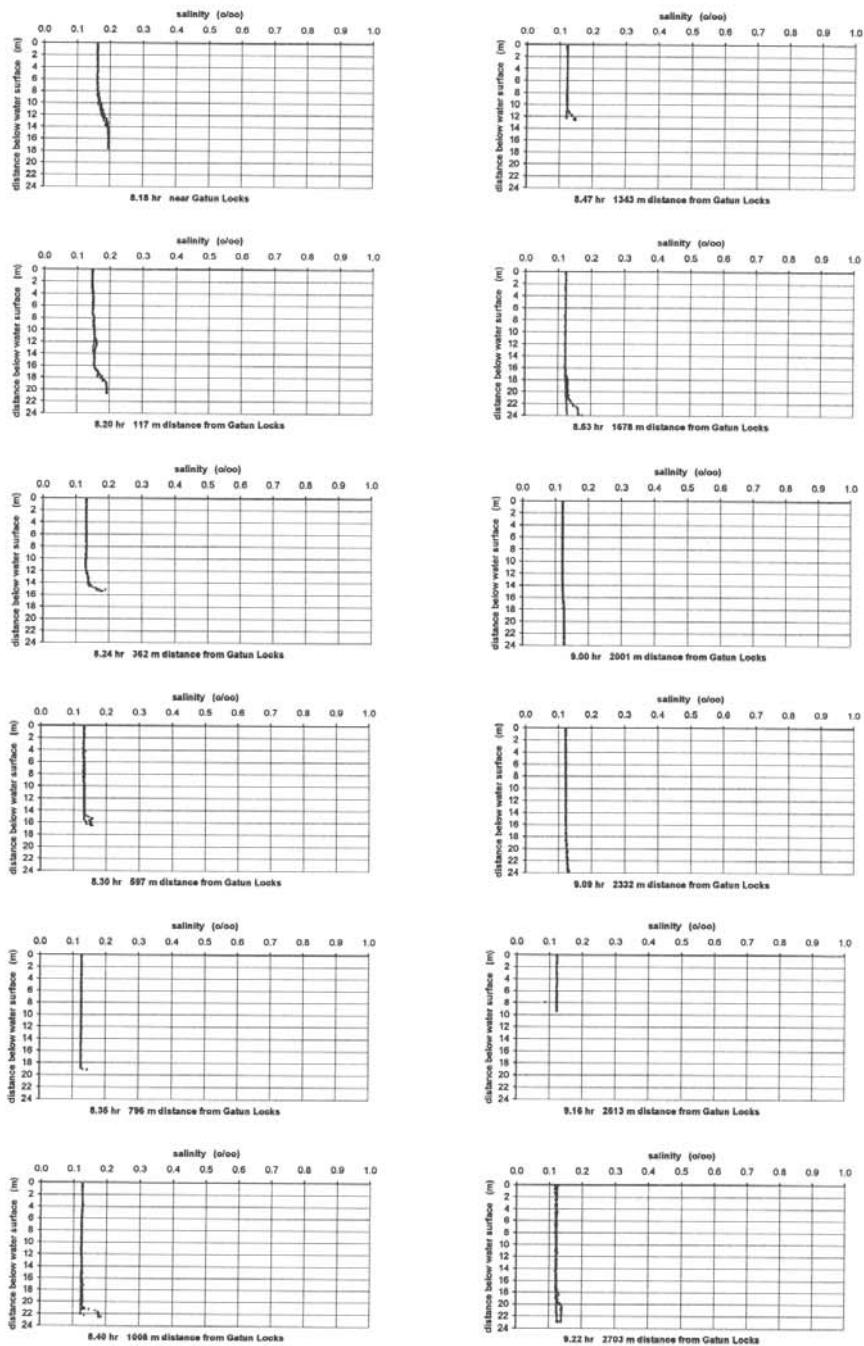
Water Level +85.6

WL | DELFT HYDRAULICS

Q 3039

Fig. B.133

GATUN LAKE



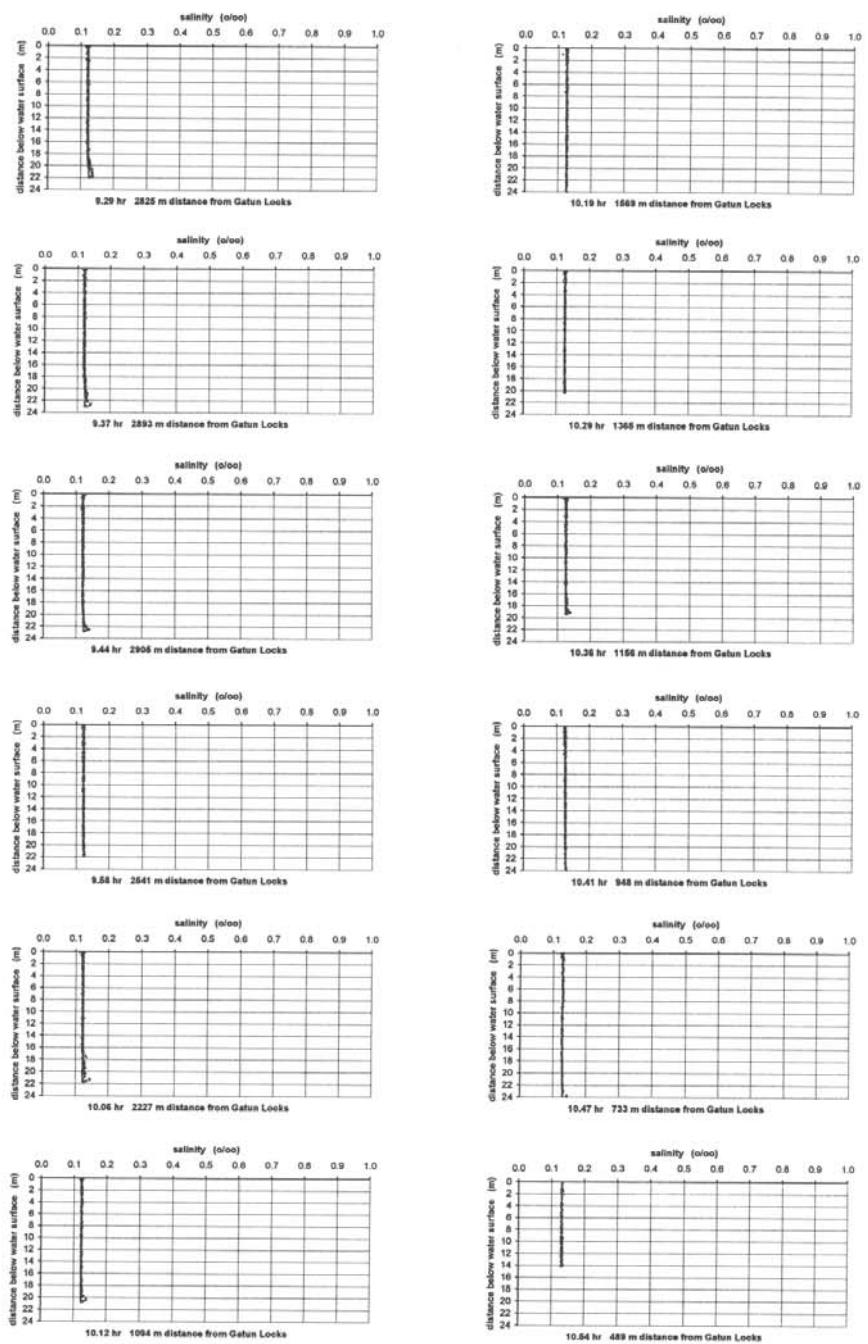
PROFILING GATUN LAKE FROM GATUN LOCKS
TO GATUN SPILLWAY AND BACK THROUGH SHIPPING LANE

Water Level +85.5

WL | DELFT HYDRAULICS

Q 3039

Fig. B.134

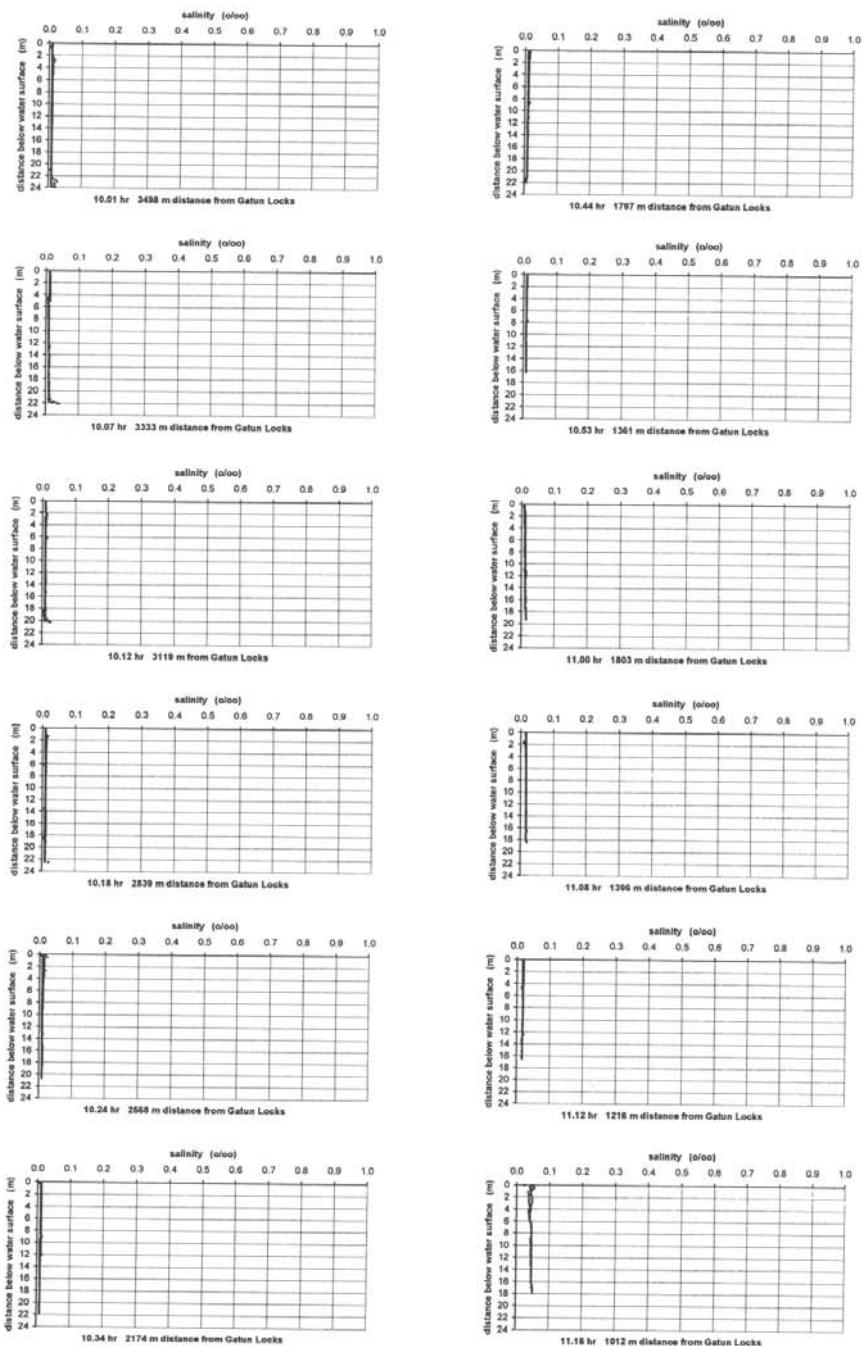


PROFILING GATUN LAKE FROM GATUN LOCKS
TO GATUN SPILLWAY AND BACK THROUGH SHIPPING LANE

Water Level +85.5

WL | DELFT HYDRAULICS

Q 3039 Fig. B.135



PROFILING GATUN LAKE FROM GATUN LOCKS
ALONG EAST BANK AND BACK

Lake Level +85.5

WL | DELFT HYDRAULICS

Q 3039

Fig. B.136

CT-LOGGER AT FIXED POSITION

