SYSTEM DESIGN DATA

SYSTEM	SERVICE	OPERATING TEMPERATURE		DESIGN TEMPERATURE		OPERATING PRESSURE		DESIGN PRESSURE		ABS CLASS	HYDRO TEST PRESSURE	
		(°F)	(°C)	(°F)	(°C)	(PSI)	(BAR)	(PSI)	(BAR)		(PSI)	(BAR)
BW01	BALLAST, SEAWATER, OUTSIDE OF TANKS	90	32	90	32	77	5.3	109	7.5	III	109	7.5
BW03	BALLAST, SEAWATER, INSIDE OF TANKS (GBP)	90	32	90	32	77	5.3	109	7.5	III	109	7.5
BW05	BALLAST, MUD TREATMENT SUPPLY (SST)	90	32	90	32	109	7.5	109	7.5	III	109	7.5
BW06	BALLAST, SEAWATER, INSIDE TANKS (STEEL)	90	32	90	32	77	5.3	109	7.5	III	109	7.5
BW07	BALLAST, AFT, SEAWATER, OUTSIDE OF TANKS	90	32	90	32	183	12.6	223	15.4	III	223	15.4

PUMP TABLE

QTY	SERVICE	TYPE	RATED CAPACITY	RATED TDH	SHUT-OFF HEAD	PURCHASE SPEC. NO.	REMARKS
2	BALLAST PUMP	VERTICAL CENTRIFUGAL	2800 M3/HR (12340 GPM)	33.0 M (108.4 FEET)	50 M (164 FEET)	484-342-7667	MOTOR DRIVEN
2	BALLAST STRIPPING EJECTOR	TRIENNIA ACTUATOR	200 M3/HR (1100 GPM)	33 M (94 FEET)	N/A	484-342-7612	C/O FIRE PUMP ACTUATION 7 KZ BWP (138 PSI), 7 M (23 FT) SUCTION LIFT
2	BALLAST AND CHEMICAL INJECTOR PUMPS	AIR MOTOR DRIVEN RECIPROCATING PUMPS	0.072 M3/HR (0.32 GPM)	5.5 BAR (80 PSI)	N/A	484-342-7361	AIR SUPPLIED AT 6.9 BAR (100 PSI) WITH 1.5 ARR
1	PORT FIRE & GENERAL SERVICE	VERTICAL CENTRIFUGAL	470 M3/HR (2069 GPM)	120 M (394 FEET)	137 M (449.5 FT)	484-342-7339	MOTOR DRIVEN SEE NOTE 3
1	AP SWITCH SNORKLER PUMP	HORIZONTAL CENTRIFUGAL	45 M3/HR (198 GPM)	12 M		UCS-165M	
2	PUMP ROOM BWTS SNORKLER PUMP	HORIZONTAL CENTRIFUGAL	181 M3/HR (797 GPM)	12 M			MOTOR DRIVEN GAS TIGHT BULKHEAD MOUNT
1	BWTS SUPPLY PUMP	HORIZONTAL CENTRIFUGAL	63 M3/HR (277 GPM)	12 M		UCS-165M	
1	MUD TREATMENT PUMP	VERTICAL CENTRIFUGAL	14 M3/HR (62 GPM)	105 M (345 FEET)			

SYSTEM SPECIFIC NOTES

S1. REFER TO THE BOOKLET OF SYSTEMS DIAGRAMS FOR DETAILS ON
HULL ARRANGEMENT
UNIFORM APPROACH
LIST OF ABBREVIATIONS
LIST OF EQUIPMENT
GENERAL NOTES
DRAWING SYMBOLS

S2. SYSTEM IS DESIGNED FOR EITHER FIRE FLOODING OR SIMULTANEOUS PUMPING OF TWO PAIR OF FOREBODY PORT AND STARBOARD BALLAST TANKS DURING BALLAST AND DEBALLAST OPERATIONS.

S3. FILL AND DISCHARGE OF THE AFT BALLAST TANKS IS ACCOMPLISHED BY THE PORT MACHINERY ROOM FIRE AND GENERAL SERVICE PUMP. MACHINERY ROOM BALLAST SYSTEM VALVES ARE ELECTRIC MOTOR OPERATED WITH ALL AFT BALLAST OPERATIONAL INCLUDING PUMP AND VALVE CONTROL AND MONITORING PROVIDED FROM THE ROOMS IN THE COX.

S4. THE INNER BALLAST TANK TEST HEADER ARE 2.4 M (7.87 FEET) ABOVAM ABOVE THE UPPER DECK.

S5. BALLAST WATER EXCHANGE IS NORMALLY PERFORMED BY THE "FLOW THROUGH" METHOD FOR THE FOREBODY BALLAST TANKS WITH THE USE OF THE BALLAST EXCHANGE OVERBOARD VALVES (SHOWN IN DETAIL B-A). THE EQUIVALENT OF THREE TIMES THE VOLUMES OF THE SEA BALLAST WILL BE PUMPED THROUGH TWO PAIRS OF FOREBODY PORT AND STARBOARD BALLAST TANKS SIMULTANEOUSLY. AFTER THE REQUIRED TIME HAS ELAPSED, THE OVERBOARD VALVES WILL BE CLOSED AND THE BALLAST PUMPS WILL BE SHUTDOWN. THE BALLAST WATER WILL THEN BE PUMPED OUT OF THE "DEADEYEDROP" BEHIND EACH AFT BALLAST TANK TO BE SUPPED AND THEN REPLUGGED BY THE FIRE & GENERAL SERVICE PUMP.

S6. THE FOREBODY BALLAST PUMPS ARE LOCATED IN THE CARGO PUMP ROOM WITH THE DRIVE MOTORS LOCATED IN THE ENGINE ROOM. PUMP OPERATION IS CONTROLLED FROM THE ROOMS IN THE CARGO CONTROL ROOM.

S7. A TEMPERATURE, IMPRESSION AND ALARM SYSTEM IS PROVIDED AS ACCEPTABLE WITH REGULATORY BODY RULES FOR PUMP BEARINGS, CASINGS AND STUFFING BOX SEALS, AND ARE INTERFACED INTO THE ROOM IN THE COX.

S8. EACH BALLAST TANK SHALL BE FITTED WITH A TANK LEVEL INDICATOR OF THE PRESSURE TRANSDUCER TYPE WITH A DISPLAY ON THE CARGO CONTROL AND ENGINE ROOM CONSOLES IN THE COX.

S9. BALLAST TANKS WILL BE PROVIDED WITH VENTS AND SOUNDING TUBES AS REQUIRED BY THE REGULATORY BODIES AND SHOWN ON REF. 22.

S10. FOREBODY BALLAST VALVES HAVE HYDRAULIC ACTUATORS MOUNTED DIRECTLY TO THE VALVES, REMOTELY OPERATED FROM THE CARGO CONTROL ROOM. THE ACTUATORS ARE SUPPLIED FROM THE HYDRAULIC POWER UNIT LOCATED IN THE ENGINE ROOM. THE ACTUATORS ARE FITTED WITH MEANS FOR MECHANICALLY LOCKING IN FINAL POSITION. PROVISION IS ALSO MADE FOR ALL TANK VALVES TO REMAIN IN THEIR LAST POSITION UPON LOSS OF POWER AND WE PROVIDED WITH LOCAL OVERRIDER OF THE VALVES FROM THE "VALVE DECK BONDS" LOCATED ON THE UPPER DECK ADJACENT TO THE TANKS SHELL. PORTABLE HYDRAULIC HAND PUMPS ARE ALSO PROVIDED FOR EMERGENCY VALVE OPERATION. SEE REFERENCE 22.

S11. ALL VENTS ARE REMOVABLE TO THE UPPER DECK THROUGH ACCESS HATCHES OR BOLTED EQUIPMENT REMOVAL PLATES SO THAT NO HOT WORK WILL BE REQUIRED TO BE PERFORMED.

S12. BALLAST TANK OVERFLOW IS PROVIDED AS SHOWN ON THE INERT GAS SYSTEM DIAGRAM REF 11 WA SYSTEM SHUT OFF VALVES AND A SPOOL PIECE, LABELLY MARKED AND NORMALLY SUBSTITUTED BY A BLANK, RIGID, DUMMY SPOOL.

S13. GAS FREEING OF BALLAST TANKS SHALL BE ACCOMPLISHED AS SHOWN ON THE INERT GAS SYSTEM DIAGRAM, REF 11.

S14. BALLAST TANKS ARE PROVIDED WITH TANK CLEANING OPENINGS FOR USE WITH PORTABLE TANK CLEANING MACHINES. TANK CLEANING OPENINGS ARE PROVIDED FOR AUTOMATIC SPRAYS SHOWN.

S15. FOREBODY BALLAST VALVEBOXES ARE LOCATED AT THE AFT END OF THE TANKS, AFT BALLAST TANK SHUTPIECE ARE LOCATED AT THE LOWEST PRACTICAL POINT IN THE TANK.

S16. WHERE PRACTICABLE EDUCTOR SUCTION HAVE A MINIMUM 10 TIMES THE PIPE DIA. OF STRAIGHT PIPE PRIOR TO THE SUCTION FLANGE. THE EDUCTOR DISCHARGE HAS A MINIMUM 3 TIMES THE PIPE DIA. OF STRAIGHT PIPE FROM THE DISCHARGE FLANGE.

S17. OVERBOARD DISCHARGE CONNECTIONS, EXCEPT FOR THE PUMP ROOM SUCTION/DISCHARGE SEA CHEST, ARE ABOVE THE WATERLINE AT THE STORM BALLAST CONDITION OF 12.21 METERS ABOVE BASELINE. ALL OVERBOARDS ARE LOCATED SO THAT INTERFERENCE WITH LIFEBOAT HANDLING AREAS AND DISCHARGE INTO FLOW STRUDING WHICH ARE LIKELY TO CAUSE SUCTION SCACHEETS ARE AVOIDED. ALL OVERBOARDS ARE PROVIDED WITH DOUBLE VALVES WITH THE OVERBOARD VALVE BEING ELECTRIC OR HYDRAULICLY OPERATED FROM ABOVE AND THE INBOARD VALVE BEING MANUALLY OPERATED WITH THE PUMP ROOM MANIFOLD VALVES BEING MANUALLY OPERATED FROM THE UPPER DECK.

S18. BALLAST SYSTEM PIPEWORK ARE EPOXY COATED STEEL IN THE MACHINERY ROOMS AND PUMP ROOM, AND FRP WITH EPOXY COATED EXTERNAL SURFACES IN THE COFFERDAMS AND VALVE BONFICKES BETWEEN THE FOREBODY BALLAST TANKS IN ACCORDANCE WITH MATERIAL SCHEDULE NASSCO DWG. 484-370-7766.

S19. TO PROVIDE A TOTALLY COATED PIPING SYSTEM THE PIPING SHALL BE DESIGNED AND ARRANGED TO PROVIDE ACCESS TO ENABLE REPAIR OF DAMAGED EPOXY SURFACES DUE TO WELDING, FABRICATION AND INSTALLATION.

S20. TANK DESIGN AND STRUCTURAL ARRANGEMENTS ALLOWS FOR EFFICIENT BALLAST DRAINAGE.

S21. A CROSS-CONNECTION IS PROVIDED FROM THE BALLAST SUCTION TO THE CARGO PUMP SUCTION MAIN FOR EMERGENCY DEBALLAST OF CONTAMINATED BALLAST TANKS TO SHORE FACILITY OR TO THE SLOP TANK FOR DECANTING. THE CROSS-CONNECTION IS FITTED WITH A PORTABLE SPOOL PIECE. THE SPOOL PIECE IS LABELLY MARKED AND NORMALLY SUBSTITUTED BY A BLANK, RIGID, DUMMY SPOOL.

S22. TANKS, PIPES AND THEIR SUPPORTS ARE TO BE DURABLY CONNECTED EITHER BY WELDING OR BOLTING DIRECTLY TO THE SHIPS STRUCTURE OR THROUGH THE USE OF DESIGNED FIXTURES IN ACCORDANCE WITH SPECIFICATION NO. 70-81-011. DRY PIPING CONTAINS INTERNALLY WOUND THERMOPLASTIC HOSE OVER FIBERS TO PROVIDE ELECTRICAL CONTINUITY AND ELECTRICAL CHANGES.

S23. PIPING WILL NOT BE SUPPORTED BY OUTER SHELL BOTTOM STRUCTURE.

S24. BALLAST SYSTEM TWOSIONS JOINT CONNECTIONS ARE FLANGED IN THE PUMP ROOM AND "DRESSON" TYPE COUPLINGS INSIDE THE TANKS.

S25. THE BALLAST MUD TREATMENT SYSTEM AS SHOWN ON DETAIL "F-C" IS PROVIDED TO CONTROL MUD ACCUMULATION IN THE FOREBODY BALLAST TANKS. THE SYSTEM IS DESIGNED TO TREAT THE MUD IN THE TANKS WITHOUT THE NEED TO DRY DOCK THE SHIP. THE SYSTEM CONSISTS OF THE MUD TREATMENT SUPPLY PUMP AND THE MUD TREATMENT UNIT LOCATED AT A BULKHEADED MUD BOX AT A BULKHEADED MUD BOX AT A BULKHEADED MUD BOX