

Title																	
WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE																	
REV C - INCORPORATES JBOYLSTON MEETING NOTES FROM 10NOV11 WSF																	
REV D- ADDS SUBK ENG, DNV, AND TRAINING BACK TO EST.																	
Owner: WSF																	
Date: 11-Nov-11																	
Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments	
073	0	0	Noise and Vibration Requirements	No work.									-	\$	-	\$	-
100	1	0	Introduction	Info only.									-	\$	-	\$	-
102	1	0	Welding	Info only.									-	\$	-	\$	-
103	1	0	Hull Structure Special Requirements	Info only.									-	\$	-	\$	-
104	1	0	Bulwarks	No work.									-	\$	-	\$	-
110	1	4	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Remove existing shell plate iwo new wet exhaust. Two (2) pc of 74"x84" plate.	Interferences - Pipe		Days	2	18.00	-		36	\$	-	\$	-
110	1	6	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Remove existing shell plate iwo new wet exhaust. Two (2) pc of 74"x84" plate.	Interferences - Cable		Days	2	18.00	-		36	\$	-	\$	-
110	1	2	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Remove existing shell plate iwo new wet exhaust. Two (2) pc of 74"x84" plate.	Cut, rig & scrap		Days	1	16.00	-		16	\$	-	\$	-
110	1	2	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Insert new two (2) 74"x84"x30.6" plate.			Lbs	2,644	0.08	0.85		212	\$	2,248	\$	-
110	1	2	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Add 20.4# pipe reinforce brcakets			Lbs	580	0.12	0.85		70	\$	493	\$	-
110	1	2	Shell Plate and Supporting Structure	Modify to accept wet exhaust.	Misc add'l foundations			Lbs	645	0.12	0.85		77	\$	548	\$	-
120	1	2	Hull Structural Bulkheads	Miscellaneous ER structure to support LNG and Nitrogen modifications	ER - Add two (2) long'l bhds for full length and depth plus one (1) tvs bhd for full length and depth for each engine room. 3/8" pl plus 30% stiffs.	Not required.		Lbs	0	-	-		-	\$	-	\$	-
120	1	2	Hull Structural Bulkheads	Miscellaneous ER structure to support LNG and Nitrogen modifications	Nitrogen Room - Add approx 28 Ln Ft of 3/8" bhd x 10' w/ 25% stiffs.			Lbs	5,783	0.09750	0.85		564	\$	4,916	\$	-
130	1	8	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Non-Skid remove		Sq Ft	400	0.03	-		11	\$	-	\$	-
130	1	4	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Interferences - Pipe		Days	2	32.00	-		64	\$	-	\$	-
130	1	6	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Interferences - Cable		Days	4	24.00	-		96	\$	-	\$	-
130	1	9	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Interferences - HVAC		Days	3	24.00	-	-	72	\$	-	\$	-
130	1	8	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Interferences - Insulation		Days	1	24.00	-		24	\$	-	\$	-
130	1	2	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Remove plate iwo engine. Two (2) pc of 20' x 10' plate.	Cut, rig & relocate		Days	2	16.00	-		32	\$	-	\$	-
130	1	2	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Reinstall plate iwo engine. Two (2) pc of 20' x 10' plate.			Lbs	11,016	0.08	0.15		881	\$	1,652	\$	-
130	1	8	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Clean and Paint	Non-Skid repair iwo access cuts.		Sq Ft	600	-	-	12.50	-	\$	-	\$	7,500.00
130	1	4	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Reinstall Interferences	Interferences - Pipe		Days	3	32.00	-		96	\$	-	\$	-
130	1	6	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Reinstall Interferences	Interferences - Cable		Days	5	24.00	-		120	\$	-	\$	-
130	1	9	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Reinstall Interferences	Interferences - HVAC		Days	4	24.00	-	-	96	\$	-	\$	-
130	1	8	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Reinstall Interferences	Interferences - Insulation		Days	2	24.00	-		48	\$	-	\$	-
130	1	2	Hull Decks	Access cut for R/R main engines and local support of overhead to facilitate rigging out / in of engine.	Install additional structure in overhead, trusses, pillars, etc for support of lifting arrangements.			ST	7.5	120.00	1,800.00		900	\$	13,500	\$	-
140	1	2	Hull Platforms and Flats	No work.				N/A	0	-	-		-	\$	-	\$	-
150	1	4	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Pipe		Days	1.0	20.00	-		20	\$	-	\$	-
150	1	6	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Cable		Days	2.0	24.00	-		48	\$	-	\$	-
150	1	9	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - HVAC		Days	2.0	32.00	-		64	\$	-	\$	-
150	1	8	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Insulation		Days	1.0	16.00	-		16	\$	-	\$	-
150	1	8	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Ceilings		Days	1.0	24.00	-		24	\$	-	\$	-
150	1	6	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Lighting		Days	1.0	12.00	-		12	\$	-	\$	-
150	1	6	Superstructure	Modify for LNG tank foundations / local strengthening.	Removals iwo 20' x 30' area at each end.	Interferences - Speakers, etc		Days	1.0	12.00	-		12	\$	-	\$	-
150	1	2	Superstructure	Modify for LNG tank foundations / local strengthening.	Install additional structure in overhead, trusses, pillars, etc for support of LNG Tank Skids at each end.	Steel work		Lbs	36,000	0.15	0.85		5,220	\$	30,600	\$	-
151	1	2	Heat Exchanger / Pump Room	Fabricate structure for heat exchanger on Nav Bridge Deck	Fabricate & install	Allow 10 ST each side		Lbs	40,000	0.0525	0.85		2,100	\$	34,000	\$	-
160	1	2	Special Structures	Install LNG tank skids and cryogenic drips trays.	Provide drip tray with approx footprint of 675 Sq Ft of 3/8" stainless material at each end with required support.			Lbs	27,884	0.12	4.00		3,346	\$	111,537	\$	-
160	1	4	Special Structures	Install LNG tank skids and cryogenic drips trays.	Drain line included in drains.			NSP	0	-	-		-	\$	-	\$	-
160	1	2	Special Structures	Install LNG tank skids and cryogenic drips trays.	Install foundations for LNG skids on house top.			ST	5	120.00	1,700.00		600	\$	8,500	\$	-
170	1	2	Masts, Kingposts, and Service Platforms	Add Mast Vent	30' plus weight for supports, foundations, etc			LBS	538	0.12	0.85		65	\$	457	\$	-
180	1	2	Foundations	Modify for RRM Bergen engines.	Remove existing foundations iwo EMD.	Layout area for removal		Days	1	40.00	-		40	\$	-	\$	-
180	1	2	Foundations	Modify for RRM Bergen engines.	Remove existing foundations iwo EMD.	Interferences - Pipe		Days	3	32.00	-		96	\$	-	\$	-
180	1	2	Foundations	Modify for RRM Bergen engines.	Remove existing foundations iwo EMD.	Interferences - Cable		Days	2	24.00	-		48	\$	-	\$	-
180	1	2	Foundations	Modify for RRM Bergen engines.	Remove existing foundations iwo EMD.	Interferences - Lighting		Days	2	24.00	-		48	\$	-	\$	-
180	1	2	Foundations	Modify for RRM Bergen engines.	Remove existing foundations iwo EMD.	Interferences - Grating		Days	1	30.00	-		30	\$	-	\$	-

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180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Fabricate and install in-place two (2) new foundation assuming 12ST per foundation and inner bottom support.		LBS	48,000	0.0925	0.85		4,440	\$ 40,800	\$ -	
180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Accuracy control for S/Y AC and consultant.		Days	40	16.00	-	750.00	640	\$ -	\$ 30,000.00	
180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Interferences - Pipe		Days	3	32.00			96	\$ -	\$ -	
180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Interferences - Cable		Days	2	24.00			48	\$ -	\$ -	
180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Interferences - Lighting		Days	1	24.00			24	\$ -	\$ -	
180	1	2	Foundations	Modify for RRM Bergen engines.	Install new foundation for RRM engine.	Interferences - Grating		Days	3	20.00			60	\$ -	\$ -	
200	2	5	Propulsion Systems, Equipment	Purchase LNG Diesel and Skids				Lot	1	-	7,740,000.00	-	-	\$ 7,740,000	\$ -	
230	2	5	Propulsion Engines	Remove existing & replace with RRM.	Remove existing EMD.	Remove two (2) engines, rig, and dispose. Lifting fixture included in I-160.		Days	5	80.00	1,500.00	-	400	\$ 7,500	\$ -	
230	2	5	Propulsion Engines	Remove existing & replace with RRM.	Install new RRM engine.	Install two (2) RRM engines, including setting and installing.		Days	10	80.00			800	\$ -	\$ -	
230	2	5	Propulsion Engines	Remove existing & replace with RRM.	Install new RRM engine.	Install loose items as quoted by RRM. Associated distributive systems included in the specific systems.		Ea	35	24.00			840	\$ -	\$ -	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Align new RRM engines to existing shaft	Align includes S/Y personnel for ME/Red Gr interface. Does not include alignment of the existing shafting.		Days	10	50.00	-	-	500	\$ -	\$ -	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Align new RRM engines to existing shaft	Includes outside engineering / consultant for alignment procedure and tech oversight during alignment of ME/Red Gr		Lot	1	-	-	25,000.00	-	\$ -	\$ 25,000.00	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Shaft alignment	Check alignment of existing shafting system due to new innerbottom structure, hull loading, etc.		Days	4	40.00	-	-	160	\$ -	\$ -	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Shaft alignment	Analyze alignment due to incorporation of RRM engines and new hull loading.		Lot	1	-	-	25,000.00	-	\$ -	\$ 25,000.00	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Shaft alignment	Allow for adjustments based on alignment checks and analysis.		Days	15	40.00		1,750.00	600	\$ -	\$ 26,250.00	
242	2	5	Propulsion Shafting	Re-align with RRM engines.	Shaft alignment	Chockfast		Lot	1	-	7,500.00	-	-	\$ 7,500	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Remove existing inclusive of exhaust & dispose.	90' of 24" pipe and fittings		In Ft	2,160	0.20	-	-	432	\$ -	\$ -	
259	2	8	Exhaust System	Remove existing & replace with wet exhaust.	Remove existing inclusive of exhaust & dispose.	Insulation		Sq Ft	13,565	0.02	-	-	271	\$ -	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Remove existing inclusive of exhaust & dispose.	Hangers		Ea	20	12.00	-	-	240	\$ -	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	20", A-53, Sch 10, Pipe		In Ft	2,000	0.25	167.45		500	\$ 334,900	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	20", Valve, Butterfly, Lug		Ea	2	16.00	2,000.00		32	\$ 4,000	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	20", Flange, SO, A-105		Ea	12	16.00	47.00		192	\$ 564	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	20", Expansion Joint		Ea	2	16.00	5,000.00		32	\$ 10,000	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	Muffler, supplied by RRM		Ea	2	120.00	100.00		240	\$ 200	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	Hangers		Ea	6	24.00	150.00		144	\$ 900	\$ -	
259	2	8	Exhaust System	Remove existing & replace with wet exhaust.	Install new wet exhaust system with new pipe.	Insulation		Sq Ft	523	0.20	6.00		105	\$ 3,140	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	6" Air Vent to Main Deck	6", A-53, Sch 40 plus fittings		In Ft	210	0.65	2.25		137	\$ 473	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	0.75" Water Supply to Muffler	0.75", A-53, Sch 40 plus fittings		In Ft	75	1.00	1.50		75	\$ 113	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	2" Drain Line & Valve	0.5", A-53, Sch 40 plus fittings		In Ft	200	0.65	1.20		130	\$ 240	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	6" Air Vent to Main Deck	Valves		Ea	2	6.00	450.00		12	\$ 900	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	0.75" Water Supply to Muffler	Valves		Ea	6	1.00	50.00		6	\$ 300	\$ -	
259	2	4	Exhaust System	Remove existing & replace with wet exhaust.	2" Drain Line & Valve	Valves		Ea	6	1.00	250.00		6	\$ 1,500	\$ -	
301	3	6	Electrical, General	Info only.	No work on existing systems except as defined herein.			N/A					-	\$ -	\$ -	
302	3	6	Electric Motors and Equipment	Info only.	No work on existing systems except as defined herein.			N/A					-	\$ -	\$ -	
303	3	6	Protective Devices for Electrical Circuits	Info only.	No work on existing systems except as defined herein.			N/A					-	\$ -	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-route on deckhouse top / superstructure area due to lng skids.			LF	2,500	0.12	3.00		300	\$ 7,500	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-route on deckhouse top / superstructure area due to lng skids.	Allowance for explosion proof junction boxes, etc		Lot	1	100.00	5,000.00		100	\$ 5,000	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-route existing cable trays in exhaust trunks to alternate location.	Allow thirty (30) cable runs of 150' each from MCC to Elec Room, Fan Rooms, and Em Swbd.		LF	4,500	0.30	6.00		1,350	\$ 27,000	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-locate lighting in exhaust trunks.			Ea	15	8.00	20.00		120	\$ 300	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-locate in engine room due to machinery re-arrangements	Allow fifteen (15) circuits on seven (7) panels with 65' per run.		LF	6,825	0.25	5.00		1,706	\$ 34,125	\$ -	
304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Add electrical service to LNG tank room power panel.			LF	500	0.30	2.00		150	\$ 1,000	\$ -	

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304	3	6	Electric Cable & Cableways	Allowance to re-route depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Add electrical service to four (4) gas trunk blowers / fans.			LF	600	0.30	2.00		180	\$ 1,200	\$ -	
311	3	6	Ship Service Power Generation	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
313	3	6	Batteries and Charging	Add UPS for RRM Automation & Gas Control system.		Includes power cable, install, and racks.		Lot	1	200.00	17,500.00		200	\$ 17,500	\$ -	
314	3	6	General Power Conversion	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
320	3	6	Power Distribution	Add for additional circuits associated with LNG & HVAC systems.	See I-304			NSP	0	-	-	-	-	\$ -	\$ -	
324	3	6	Power Distribution Switchboards	Allow for additional MCC Section required for LNG & HVAC systems.	Add, extend or modify existing MMC for LNG fuel related modifications in ER#1 and ER#2.	Includes foundation & mounting. Electrical terminations included in electrical rates. Material cost includes breakers.		Ea	2	120.00	10,000.00		240	\$ 20,000	\$ -	
325	3	6	Heat Tracing	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
331	3	6	Lighting System Distribution	Allowance to re-locate depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-locate lighting in exhaust trunks.			Ea	20	16.00	20.00		320	\$ 400	\$ -	
331	3	6	Lighting System Distribution	Allowance to re-locate depending on routing of new pipe systems as well as removals in superstructure iwo LNG tank skids.	Re-locate lighting in machinery space due to exhaust routing, bilge lighting, etc			Ea	30	16.00	20.00		480	\$ 600	\$ -	
332	3	6	Lighting Systems Fixtures	Allow for "explosion proof" floods on house top iwo LNG tank installation.	Replace existing fixtures on topside superstructure with explosion proof fixtures.			Ea	14	12.00	850.00		168	\$ 11,900	\$ -	
410	4	6	Vessel Control and Maneuvering	Allow for additional alarm and monitoring points related to gas detection & gas monitoring.	Install additional alarm panels to existing alarm system.			Ea	2	60.00	7,500.00		120	\$ 15,000	\$ -	
410	4	6	Vessel Control and Maneuvering	Allow for additional alarm and monitoring points related to gas detection & gas monitoring.	Add additional addressable sensors in tank room, tanks, vent duct, ER & GSU enclosure			Ea	34	12.00	125.00		408	\$ 4,250	\$ -	
410	4	6	Vessel Control and Maneuvering	Allow for additional alarm and monitoring points related to gas detection & gas monitoring.	Add cable from sensors to central panel.	Allow 125' per circuit.		LF	4,250	0.12	2.00		510	\$ 8,500	\$ -	
410	4	6	Vessel Control and Maneuvering	Allow for additional alarm and monitoring points related to gas detection & gas monitoring.	Modify alarm mimic panel in ECR and 2 x bridge.	By subcontractor		Lot	1	-	-	15,000.00	-	\$ -	\$ 15,000.00	
422	4	6	Navigation Lights, Signal Lights, Searchlights and Night Flight Electronic and Acoustic	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
424	4	6	Navigation Systems	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
426	4	6	Electrical Navigation Systems	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
427	4	6	Gyrocompasses	No work.	No work on existing systems except as defined herein.			N/A	0	-	-	-	-	\$ -	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Basis of estimate is a complete new MAMS and Engine Controls.			N/A	0	-	-	-	-	\$ -	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Provide Consoles - included in RRM quote.			Lot	1	-	-	-	-	\$ -	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Install EOS Consoles for control & maneuvering. Four (4) total panels.			Days	10	60.00	-	-	600	\$ -	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Install P/H Consoles for maneuvering. Four (4) total panels.			Days	10	24.00	-	-	240	\$ -	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Install cable associated with monitoring point	Basis is 200 points.		LF	13,000	0.08	2.00		1,040	\$ 26,000	\$ -	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Purchase & install A&M system for Gas Systems.	Basis is 48 points.		Lot	1	80.00	-	35,000.00	80	\$ -	\$ 35,000.00	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Purchase & install A&M system for Gas Systems.	Console for LNG systems.		Lot	1	-	-	50,000.00	-	\$ -	\$ 50,000.00	
431	4	6	Centralized Machinery Control and Monitoring System	Modify existing controls to integrate RRM controls and LNG monitoring functions.	Purchase & install A&M system for Gas Systems.	Basis is 48 points.		LF	6000	0.08	2.00		480	\$ 12,000	\$ -	
432	4	6	Interior Communications Telephone Systems	Extend interior comm to LNG storage tanks and bunkering stations.	Expand existing sound powered phone system.	Central Switch		Lot	1	16.00	5,000.00	-	16	\$ 5,000	\$ -	
432	4	6	Interior Communications Telephone Systems	Extend interior comm to LNG storage tanks and bunkering stations.	Expand existing sound powered phone system.	Console / booth		Ea	3	12.00	1,800.00	-	36	\$ 5,400	\$ -	
432	4	6	Interior Communications Telephone Systems	Extend interior comm to LNG storage tanks and bunkering stations.	Expand existing sound powered phone system.	Headsets		Ea	3	6.00	650.00	-	18	\$ 1,950	\$ -	
432	4	6	Interior Communications Telephone Systems	Extend interior comm to LNG storage tanks and bunkering stations.	Expand existing sound powered phone system.	Speakers		Ea	3	8.00	650.00	-	24	\$ 1,950	\$ -	
432	4	6	Interior Communications Telephone Systems	Extend interior comm to LNG storage tanks and bunkering stations.	Expand existing sound powered phone system.	Cable		LF	2000	0.20	3.00		400	\$ 6,000	\$ -	
439	4	6	Interior Communications Recording and TV	Extend CCTV to LNG storage tanks and bunkering stations.	Expand CCTV system.	Camera		Ea	4	24.00	800.00		96	\$ 3,200	\$ -	
439	4	6	Interior Communications Recording and TV	Extend CCTV to LNG storage tanks and bunkering stations.	Expand CCTV system.	Cable		LF	600	0.15	4.00		90	\$ 2,400	\$ -	
441	4	6	Radio Communication Systems	No work.				N/A	0	-	-	-	-	\$ -	\$ -	
503	5	5	Pumps	See specific systems.				NSP	0	-	-	-	-	\$ -	\$ -	
504	5	5	Instruments and Instrument Boards, Mechanical	Provide additional gauges, thermometers, etc.	Repair / replace those dmaged in modifications.			Lot	1	200.00	5,000.00	-	200	\$ 5,000	\$ -	
505	5	4	General Requirements for Hull and Machinery Piping Systems	Special hangers for cryogenic piping.	Assign to cryogenic sub.								-	\$ -	\$ -	
506	5	4	Overflows, Vents, and Soundings Machinery and Piping Designation and Marking	Install Bleed Vent System	See I-570			NSP	0	-	-	-	-	\$ -	\$ -	
507	5	1	Insulation and Lagging for Piping, Equipment and Machinery	Mark as required.	Mark / paint added and modified systems.			Ea	8	32.00	750.00		256	\$ 6,000	\$ -	
508	5	8	Insulation and Lagging for Piping, Equipment and Machinery	Exhaust, LNG Fill, & LNG Service.	Included in specific systems.								-	\$ -	\$ -	

Title																
WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE																
Owner: WSF																
Date: 11-Nov-11																
REV C - INCORPORATES JBOYLSTON MEETING NOTES FROM 10NOV11 WSF																
REV D- ADDS SUBK ENG, DNV, AND TRAINING BACK TO EST.																
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Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments
509	5	8	Thermal Insulation and Acoustic Absorptive Treatment for Ducts and Trunks	See specific systems.	Insulate A-60 the gas line trunks from intake to exhaust, ie two (2) trunks, each approximately 100'x4'x6'.			Sq Ft	4,000	0.15	6.00		600	\$ 24,000	\$ -	
512	5	9	Deckhouse HVAC	Relocate iwo structural mods for LNG foundations.	Remove / relocate ducts, vents, etc in superstructure and deckhouse tops.			Days	15	48.00	2,000.00		720	\$ 30,000	\$ -	
513	5	9	Machinery Spaces Ventilation	Add fans for gas-free pipe ducts in former exhaust uptakes, gas trunk structural support, & HVAC for nitrogen rack room.	Assume 3,000CFM with a low SP.	Estimate addresses controller, foundations, etc		Ea	4	64.00	6,500.00		256	\$ 26,000	\$ -	
513	5	2	Machinery Spaces Ventilation	Add fans for gas-free pipe ducts in former exhaust uptakes, gas trunk structural support, & HVAC for nitrogen rack room.	Provide additional structure to existing exhaust trunk for ~110psi requirement.	Assume a support system of spilt tees using a WT12x34		Lbs	57,800	0.0825	0.85		4,769	\$ 49,130	\$ -	
513	5	9	Machinery Spaces Ventilation	Add fans for gas-free pipe ducts in former exhaust uptakes, gas trunk structural support, & HVAC for nitrogen rack room.	Provide segregated HVAC to Nitrogen Room.	SWAG		Lot	1	200.00	7,500.00		200	\$ 7,500	\$ -	
514	5	9	Air Conditioning System	No work.	No work on existing systems except as defined herein.			N/A	0	-	-		-	\$ -	\$ -	
516	5	9	Refrigeration Machinery, Equipment and Piping	No work.	No work on existing systems except as defined herein.			N/A	0	-	-		-	\$ -	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	0.50 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	150	0.58	8.00		86	\$ 1,200	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	0.75 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	100	0.86	10.00		86	\$ 1,000	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	1.00 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	100	1.15	12.00		115	\$ 1,200	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	1.50 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	50	1.73	15.00		86	\$ 750	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	2.00 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	50	2.30	20.00		115	\$ 1,000	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	2.50 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312 & FITTINGS		1.15 LD	50	2.88	30.00		144	\$ 1,500	\$ -	
521	5	4	Firemain Systems	Extend sprinkler system to deckhouse top with distribution from existing sprinkler pump.	Nozzles			Ea	20	2.00	115.00		40	\$ 2,300	\$ -	
523	5	4	Seawater Cooling Systems	Extend to accommodate the added Heat Recovery Unit	4.00 In	CU-FL-SW-FF-CU-NI_04.00_150		1.75 LD	10	7.00	368.41		70	\$ 3,684	\$ -	
523	5	4	Seawater Cooling Systems	Extend to accommodate the added Heat Recovery Unit	4.00 In	P-SM-CU-NI_04.00_CL200_90-10 - TUBE-CL200 SMLS, CU-NI		1.75 LD	100	7.00	59.69		700	\$ 5,969	\$ -	
523	5	4	Seawater Cooling Systems	Extend to accommodate the added Heat Recovery Unit	4.00 In	Valves		1.75 LD	6	7.00	750.00		42	\$ 4,500	\$ -	
526	5	4	Interior & Deck Drain System	Relocate iwo deckhouse structural mods for LNG foundations.	2.50 In	45° ELBOW,SCH 40,CS,ASTM A234		1.50 LD	8	3.75	9.00		30	\$ 72	\$ -	
526	5	4	Interior & Deck Drain System	Relocate iwo deckhouse structural mods for LNG foundations.	2.50 In	LATERAL,SCH 40,CS,ASTM A234		1.50 LD	8	3.75	9.00		30	\$ 72	\$ -	
526	5	4	Interior & Deck Drain System	Relocate iwo deckhouse structural mods for LNG foundations.	2.50 In	PIPE, SMLS,SCH 40,CS,ASTM A53		1.50 LD	100	3.75	25.00		375	\$ 2,500	\$ -	
528	5	4	Sanitary Flushing System	Relocate vertical header outside of gas line trunks.	2.50 In	45° ELBOW,CL200,CuNi,90-10		1.75 LD	12	4.38	25.00		53	\$ 300	\$ -	
528	5	4	Sanitary Flushing System	Relocate vertical header outside of gas line trunks.	2.50 In	PIPE CAP-CLEAN OUT,CL200,CuNi,90-10		1.75 LD	6	4.38	22.00		26	\$ 132	\$ -	
528	5	4	Sanitary Flushing System	Relocate vertical header outside of gas line trunks.	2.50 In	SEAMLESS PIPE,CL200,CuNi,90-10		1.75 LD	200	4.38	32.00		875	\$ 6,400	\$ -	
530	5	4	Fresh Water Systems	No work.				N/A	0	-	-		-	\$ -	\$ -	
531	5	4	Watermakers	No work.				N/A	0	-	-		-	\$ -	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	5.00 In	ELBOW-45 DEG LR-05.00°-STD-CS-BW		1.75 LD	6	8.75	14.98		53	\$ 90	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	5.00 In	ELBOW-90 DEG LR-05.00°-STD-CS-BW		1.75 LD	6	8.75	23.78		53	\$ 143	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	5.00 In	FL-SW-RF-CS_05.00_150LB-A105		1.75 LD	12	8.75	26.15		105	\$ 314	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	5.00 In	P-ERW-CS_05.00_40_A53-B		1.75 LD	100	8.75	15.00		875	\$ 1,500	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	3.00 In	ELBOW-90 DEG LR-03.00°-STD-CS-BW		1.75 LD	5	5.25	5.48		26	\$ 27	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	3.00 In	FL-SW-RF-CS_03.00_150LB-A105		1.75 LD	12	5.25	6.69		63	\$ 80	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	3.00 In	V-BFY-LUG-DI_03.00_200 PSI-LEVER_(STAINLESS STEM, BRONZE DISC, EPDM SEAL)		1.75 LD	6	5.25	924.00		32	\$ 5,544	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	3.00 In	V-BFY-WAF-DI_03.00_200 PSI-LEVER_(STAINLESS STEM, BRONZE DISC, EPDM SEAL)		1.75 LD	6	5.25	176.24		32	\$ 1,057	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	UNION-02.00"-3000 LB-FS-THD		1.75 LD	10	3.50	20.26		35	\$ 203	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	ELBOW-90 DEG-02.00"-3000 LB-FS-SW		1.75 LD	10	3.50	12.36		35	\$ 124	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	FL-SW-FF-CS_02.00_150LB-A105		1.75 LD	12	3.50	8.60		42	\$ 103	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	P-ERW-CS_02.00_40_A53-B - PIPE-SCH 40 ERW		1.75 LD	100	3.50	5.00		350	\$ 500	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	TEE-02.00"-3000 LB-FS-SW		1.75 LD	10	3.50	15.21		35	\$ 152	\$ -	
532.1	5	4	Fresh Water Cooling System - Main Engine	Allow to modify pipe connection; however no new coolers.	2.00 In	VALVE-3 WAY TEMPERATURE CONTROL-AMOT-2" GEFDJB021-DI		1.75 LD	2	3.50	8,500.00		7	\$ 17,000	\$ -	
532.2	5	5	Fresh Water Cooling System - LNG Systems	Add ppq and cooler as required.	HRU in ER #1 & ER#2			Ea	2	64.00	200.00		128	\$ 400	\$ -	
532.2	5	5	Fresh Water Cooling System - LNG Systems	Add ppq and cooler as required.	Heat Exchanger in Pump Room on Deckhouse								-	\$ -	\$ -	

Title																
WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE																
REV C - INCORPORATES JBOYLSTON MEETING NOTES FROM 10NOV11 WSF																
REV D- ADDS SUBK ENG, DNV, AND TRAINING BACK TO EST.																
Owner: WSF																
Date: 11-Nov-11																
Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments
532.2	5	5	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	Pump - ER	Includes foundation, controller, pump & motor.		Ea	2	40.00	15,000.00		80	\$ 30,000	\$ -	
532.2	5	5	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	Pump - Pump Room	Includes foundation, controller, pump & motor.		Ea	2	40.00	7,500.00		80	\$ 15,000	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	4.00 In	PIPE, SMLS,SCH 40,CS,ASTM A53		1.25 LD	400	5.00	12.00		2,000	\$ 4,800	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	4.00 In	ELBOW-90 DEG LR-04.00"-STD-CS-BW		1.25 LD	20	5.00	11.03		100	\$ 221	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	4.00 In	FL-SW-RF-CS_04.00_150LB-A105		1.25 LD	8	5.00	18.67		40	\$ 149	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	4.00 In	Valves		1.25 LD	4	5.00	350.00		20	\$ 1,400	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	6.00 In	ELBOW-90 DEG LR-06.00"-STD-CS-BW		1.25 LD	12	7.50	24.32		90	\$ 292	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	6.00 In	FLANGE SPECIAL - PLATE FLANGE - 6"		1.25 LD	8	7.50	45.00		60	\$ 360	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	6.00 In	P-ERW-CS_06.00_40_A53-B - PIPE-SCH 40 ERW		1.25 LD	160	7.50	18.00		1,200	\$ 2,880	\$ -	
532.2	5	4	Fresh Water Cooling System - LNG Systems	Add ppg and cooler as required.	6.00 In	Valves		1.25 LD	4	7.50	425.00		30	\$ 1,700	\$ -	
533	5	4	Potable Water Service System	Relocate vertical header outside of gas line trunks.	2.00 In	PIPE, SMLS,40S,STAINLESS STEEL,ASTM A312		1.50 LD	200	3.00	27.00		600	\$ 5,400	\$ -	
536	5	4	Hot Water Heating Systems	Relocate vertical header outside of gas line trunks.	2.00 In	Copper Pipe, B-88, Typ K		1.00 LD	200	2.00	17.00		400	\$ 3,400	\$ -	
536	5	4	Hot Water Heating Systems	Relocate vertical header outside of gas line trunks.	2.00 In	Flange, 150# Brz SJ		1.00 LD	15	2.00	85.00		30	\$ 1,275	\$ -	
536	5	4	Hot Water Heating Systems	Relocate vertical header outside of gas line trunks.	2.00 In	Copper El, 90, B-75		1.00 LD	20	2.00	30.00		40	\$ 600	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Pipe, CS, Smls, A106, Sch 40, WO 771040	Remove	0.75 LD	75	0.75	-		56	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Elbow, FS, SW, 3000#, WO 622107	Remove	0.75 LD	5	0.75	-		4	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Tee, FS, SW, 3000#, WO 622121	Remove	0.75 LD	3	0.75	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Union, FS, SCRD, 3000#, WO 621150	Remove	0.75 LD	6	0.75	-		5	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Gate, ST/ST, SW, 300#, WO 214131	Remove	0.75 LD	2	0.75	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Ball, ST/ST, SW, 300#, WO 376331	Remove	0.75 LD	2	0.75	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Filter, Racor, Estimate	Remove	0.75 LD	2	0.75	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Check, Thd, 300#, WO 214521	Remove	0.75 LD	4	0.75	-		3	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Pipe, CS, Smls, A106, Sch 40, WO 771040	Remove	0.75 LD	50	0.56	-		28	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Elbow, FS, SW, 3000#, WO 622107	Remove	0.75 LD	4	0.56	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Tee, FS, SW, 3000#, WO 622121	Remove	0.75 LD	6	0.56	-		3	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Union, FS, SCRD, 3000#, WO 621150	Remove	0.75 LD	10	0.56	-		6	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Valve, Gate, ST/ST, SW, 300#, WO 214131	Remove	0.75 LD	4	0.56	-		2	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Valve, Check, Thd, 300#, WO 214521	Remove	0.75 LD	2	0.56	-		1	\$ -	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	0.75 In	Hose, FO, Connections, Estimate	Remove	0.75 LD	2	0.56	-		1	\$ -	\$ -	

Title	WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE															
Owner:	WSF				REV C - INCORPORATES JBOYLSTON MEETING NOTES FROM 10NOV11 WSF MTG. DN COMMENTS ARE ADDED IN COMMENTS COLUMN.				REV D- ADDS SUBK ENG, DNV, AND TRAINING BACK TO EST.							
Date:	11-Nov-11															
Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Pipe, CS, Smls, A106, Sch 40, WO 771040	Relocate	1.50 LD	50	1.50	2.40		75	\$ 120	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Elbow, FS, SW, 3000#, WO 622107	Relocate	1.50 LD	6	1.50	5.00		9	\$ 30	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Tee, FS, SW, 3000#, WO 622121	Relocate	1.50 LD	4	1.50	5.00		6	\$ 20	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Union, FS, SCRD, 3000#, WO 621150	Relocate	1.50 LD	8	1.50	7.00		12	\$ 56	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Gate, ST/ST, SW, 300#, WO 214131	Relocate	1.50 LD	2	1.50	60.00		3	\$ 120	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Ball, ST/ST, SW, 300#, WO 376331	Relocate	1.50 LD	2	1.50	90.00		3	\$ 180	\$ -	
541.1	5	4	Fuel Oil System - Diesel	Remove existing FO service system piping, pumps, etc associated with diesel engines. Re-route DO lines to Emergency Generator outside of gas trunk.	1.00 In	Valve, Check, Thd, 300#, WO 214521	Relocate	1.50 LD	2	1.50	115.00		3	\$ 230	\$ -	
541.2	5	5	Fuel Oil System - LNG Supply	Install LNG service lines from storage tanks to GSU & diesels.	Install Gas Supply Unit in ER#1 & ER#2		Includes foundations, setting, etc.	Ea	2	120.00	2,000.00		240	\$ 4,000	\$ -	
541.2	5	4	Fuel Oil System - LNG Supply	Install LNG service lines from storage tanks to GSU & diesels.	2.50 In	Pipe & fittings.		4.00 LD	50	10.00	85.00		500	\$ 4,250	\$ -	Pending guidance from Chart Industries
541.2	5	4	Fuel Oil System - LNG Supply	Install LNG service lines from storage tanks to GSU & diesels.	2.50 In	Valves - supplied by Hamworthy		4.00 LD	6	10.00	20.00		60	\$ 120	\$ -	Pending guidance from Chart Industries
541.2	5	4	Fuel Oil System - LNG Supply	Install LNG service lines from storage tanks to GSU & diesels.	2.00 In	Pipe & fittings.		4.00 LD	275	8.00	100.00		2,200	\$ 27,500	\$ -	Pending guidance from Chart Industries
541.2	5	4	Fuel Oil System - LNG Supply	Install LNG service lines from storage tanks to GSU & diesels.	2.00 In	Valves - supplied by Hamworthy		4.00 LD	6	8.00	20.00		48	\$ 120	\$ -	Pending guidance from Chart Industries
541.3	5	4	Fuel Oil System - LNG Bunker Line	Install LNG bunker lines from bunker station to storage tanks.	3.00 In	Pipe & fittings.		4.00 LD	300	12.00	120.00		3,600	\$ 36,000	\$ -	Pending guidance from Chart Industries
541.3	5	4	Fuel Oil System - LNG Bunker Line	Install LNG bunker lines from bunker station to storage tanks.	3.00 In	Valves - supplied by Hamworthy		4.00 LD	15	12.00	20.00		180	\$ 300	\$ -	Pending guidance from Chart Industries
542.0	5	4	Lubricating Oil Systems	Allow modified engine connections. Addition of LO purifier or backflush filter is not included.	2.00 In	ELBOW-45 DEG LR-02.00"-STD-CS-BW		1.50 LD	3	3.00	4.42		9	\$ 13	\$ -	
542.0	5	4	Lubricating Oil Systems	Allow modified engine connections. Addition of LO purifier or backflush filter is not included.	2.00 In	ELBOW-90 DEG LR-02.00"-STD-CS-BW		1.50 LD	7	3.00	4.53		21	\$ 32	\$ -	
542.0	5	4	Lubricating Oil Systems	Allow modified engine connections. Addition of LO purifier or backflush filter is not included.	2.00 In	FL-SW-FF-CS_02.00_150LB-A105		1.50 LD	2	3.00	8.60		6	\$ 17	\$ -	
542.0	5	4	Lubricating Oil Systems	Allow modified engine connections. Addition of LO purifier or backflush filter is not included.	2.00 In	P-SM-CS_02.0_40_A106-B		1.50 LD	150	3.00	4.77		450	\$ 716	\$ -	
542.0	5	4	Lubricating Oil Systems	Allow modified engine connections. Addition of LO purifier or backflush filter is not included.	2.00 In	Valves		1.50 LD	10	3.00	325.00		30	\$ 3,250	\$ -	
543	5	4	Waste Oil Transfer System	Allow modified engine connections.	1.25 In	CPLG-01.25"-3000 LB-SS-SW		1.50 LD	6	1.88	15.68		11	\$ 94	\$ -	
543	5	4	Waste Oil Transfer System	Allow modified engine connections.	1.25 In	ELBOW-45 DEG-01.25"-3000 LB-FS-SW		1.50 LD	4	1.88	7.82		8	\$ 31	\$ -	
543	5	4	Waste Oil Transfer System	Allow modified engine connections.	1.25 In	ELBOW-90 DEG LR-01.25"-STD-CS-BW		1.50 LD	2	1.88	3.24		4	\$ 6	\$ -	
543	5	4	Waste Oil Transfer System	Allow modified engine connections.	1.25 In	ELBOW-90 DEG-01.25"-3000 LB-FS-SW		1.50 LD	20	1.88	7.23		38	\$ 145	\$ -	
543	5	4	Waste Oil Transfer System	Allow modified engine connections.	1.25 In	P-SM-CS_01.25_40_A106 GR-B - PIPE-SCH 40 SMLS		1.50 LD	150	1.88	3.74		281	\$ 561	\$ -	
551	5	4	Compressed Air System	Allow modified engine connections. Addition, if required, of increased capacity air compressor is not included.	1.50 In	ELBOW-45 DEG-01.50"-3000 LB-FS-SW		1.50 LD	8	2.25	10.00		18	\$ 80	\$ -	
551	5	4	Compressed Air System	Allow modified engine connections. Addition, if required, of increased capacity air compressor is not included.	1.50 In	ELBOW-90 DEG-01.50"-3000 LB-FS-SW		1.50 LD	53	2.25	8.46		119	\$ 448	\$ -	
551	5	4	Compressed Air System	Allow modified engine connections. Addition, if required, of increased capacity air compressor is not included.	1.50 In	HOSE-01.50"-AEROQUIP 2651-12-SINGLE WIRE-SAE 100R5		1.50 LD	2	2.25	260.00		5	\$ 520	\$ -	
551	5	4	Compressed Air System	Allow modified engine connections. Addition, if required, of increased capacity air compressor is not included.	1.50 In	HOSE-01.50"-AEROQUIP 2651-12-SINGLE WIRE-SAE 100R5 - HOSE-1 1/2"-AEROQUIP 2651-12-SINGLE WIRE-SAE 100R5		1.50 LD	4	2.25	260.00		9	\$ 1,040	\$ -	
551	5	4	Compressed Air System	Allow modified engine connections. Addition, if required, of increased capacity air compressor is not included.	1.50 In	P-SM-CS_01.50_40_A106-B - PIPE-SCH 40 SMLS		1.50 LD	479	2.25	4.24		1,078	\$ 2,031	\$ -	
553	5	2	Nitrogen Systems	Install bottles and distributive systems.	Install bottle racks / foundations.			ST	1	120.00	1,700.00		120	\$ 1,700	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	Install bottle racks / foundations.			Days	2	16.00	1,000.00		32	\$ 2,000	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	1.50 In	ELBOW-45 DEG-01.50"-3000 LB-FS-SW		1.50 LD	8	2.25	10.00		18	\$ 80	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	1.50 In	ELBOW-90 DEG-01.50"-3000 LB-FS-SW		1.50 LD	53	2.25	8.46		119	\$ 448	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	1.50 In	HOSE-01.50"-AEROQUIP 2651-12-SINGLE WIRE-SAE 100R5		1.50 LD	2	2.25	260.00		5	\$ 520	\$ -	

Title																
WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE																
REV C - INCORPORATES JBOYLSTON MEETING NOTES FROM 10NOV11 WSF																
MTG. DN COMMENTS ARE ADDED IN COMMENTS COLUMN.																
REV D- ADDS SUBK ENG, DNV, AND TRAINING BACK TO EST.																
Date: 11-Nov-11																
Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	1.50 In	P-SM-CS_01.50_40_A106-B - PIPE-SCH 40 SMLS		1.50 LD	255	2.25	4.24		574	\$ 1,081	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	0.75 In	ELBOW-90 DEG-00.75"-3000 LB-FS-SW		2.00 LD	20	1.50	5.00		30	\$ 100	\$ -	
553	5	4	Nitrogen Systems	Install bottles and distributive systems.	0.75 In	P-SM-CS_0.75_40_A106-B - PIPE-SCH 40 SMLS		2.00 LD	125	1.50	3.00		188	\$ 375	\$ -	
555	5	4	Firefighting	Add CO2 iwo bunker stations.	Subcontract scope			Lot	1	80.00	-	20,000.00	80	\$ -	\$ 20,000.00	
561	5	9	Combustion Air Systems	Increase existing blower & duct systems to address larger engine HP rating.		SWAG		Lot	1	300.00	-	45,000.00	300	\$ -	\$ 45,000.00	
570	5	4	Vents, Fills and Sounds	Extend LNG vents to Mast in I-170.	3.00 In	Pipe & fittings.		4.00 LD	280	12.00	85.00		3,360	\$ 23,800	\$ -	Pending guidance from Chart Industries
570	5	4	Vents, Fills and Sounds	Extend LNG vents to Mast in I-170.	3.00 In	Valves - supplied by Hamworthy		4.00 LD	20	12.00	20.00		240	\$ 400	\$ -	Pending guidance from Chart Industries
581	5	2	Anchor Systems	No work.				N/A	0	-	-		-	\$ -	\$ -	
583	5	2	Boats, Boat Handling and Storage	No work.				N/A	0	-	-		-	\$ -	\$ -	
585	5	2	Life Rafts	No work.				N/A	0	-	-		-	\$ -	\$ -	
586	5	5	Lift Machinery	No work.				N/A	0	-	-		-	\$ -	\$ -	
590	5	5	Incinerator	No work.				N/A	0	-	-		-	\$ -	\$ -	
593	5	5	Oily Water Systems	No work.				N/A	0	-	-		-	\$ -	\$ -	
594	5	5	MSD Plant	No work.				N/A	0	-	-		-	\$ -	\$ -	
602	6	2	Hull Designations and Markings	No work.				N/A	0	-	-		-	\$ -	\$ -	
603	6	1	Hull Markings	Add for LNG storage and bunker stations.				Lot	1	100.00	5,000.00		100	\$ 5,000	\$ -	
604	6	8	Locks, Keys, and Tags	No work.	See I-624			NSP	0	-	-		-	\$ -	\$ -	
611	6	2	Mooring Fittings	No work.				N/A	0	-	-		-	\$ -	\$ -	
612	6	2	Handrails, Lifelines and Bulwarks	Remove & replace handrails on Nav / Bridge Deck iwo LNG Tank installation.				LF	200	1.75	22.00		350	\$ 4,400	\$ -	
613	6	2	Rigging and Lines	Provide tensioning lines for vent mast.				Lot	1	60.00	1,000.00		60	\$ 1,000	\$ -	
621	6	8	Joiner Bulkheads	Allow for removal / replacement iwo deckhouse structural modifications.	Heads on Passenger Deck	Ripout and replace with new in kind.		LF	200	0.50	65.00		100	\$ 13,000	\$ -	
621	6	8	Joiner Bulkheads	Allow for removal / replacement iwo deckhouse structural modifications.	Office on Passenger Deck	Ripout and replace with new in kind.		LF	37	0.50	65.00		19	\$ 2,405	\$ -	
621	6	8	Joiner Bulkheads	Allow for removal / replacement iwo deckhouse structural modifications.	Gas Line Duct Areas iwo structural reinforcement	Ripout and replace with new in kind.		Sq Ft	1,680	0.1250	12.00		210	\$ 20,160	\$ -	
622	6	2	Floorplates and Gratings	Allowance for revised machinery arrangement.				Sq Ft	700	1.75	35.00		1,225	\$ 24,500	\$ -	
623	6	2	Ladders and Stairways	Allowance for revised machinery arrangement.				LF	30	4.00	65.00		120	\$ 1,950	\$ -	
624	6	2	Doors and Hatches	Allowance for revised machinery arrangement, bridge doors, and heat exchanger / pump room house.	ER#1 (6), Pump Rm (2), & Bridge (4).			Ea	12	24.00	3,000.00		288	\$ 36,000	\$ -	
625	6	5	Windows and Portlights	Remove one (1) as means to accomplish material flow				Lot	1	24.00	2,000.00		24	\$ 2,000	\$ -	
626	6	8	Joiner Ceilings	Allow for removal / replacement iwo deckhouse structural modifications.	Heads, seating area, and office	Ripout and replace with new in kind.		Sq Ft	1,200	0.25	2.50		300	\$ 3,000	\$ -	
631	6	1	Surface Preparation & Coating	Allow for clean & paint of new and disturbed surfaces.	Area based on structural mods with an assumed average 3/8" plate thickness.			Sq Ft	33,987	0.090	1.30		3,048	\$ 44,183	\$ -	
632	6	2	Anodes	Add in wet exhaust.				Ea	4	6.00	85.00		24	\$ 340	\$ -	
633	6	6	Cathodic Protection	No work.				N/A	0	-	-		-	\$ -	\$ -	
634	6	8	Deck Covering	Allow for repair of damaged areas during modifications.	Heads & passenger seating on Passenger Deck	Assume 50% damaged.		Sq Ft	600	-	-	17.50	-	\$ -	\$ 10,500.00	
634	6	8	Deck Covering	Allow for repair of damaged areas during modifications.	Office on Passenger Deck	Assume 100% damaged.		Sq Ft	100	-	-	17.50	-	\$ -	\$ 1,750.00	
635	6	8	Insulation	Allow for removal / replacement iwo deckhouse structural modifications & main deck access cuts, addition of A-60 in overhead of passenger deck in entirety, and A-60 in gas line ducts.	Heads, seating area, and office	Ripout existing and replace with A-60.		Sq Ft	12,750	0.175	2.00		2,231	\$ 25,500	\$ -	
635	6	8	Insulation	Allow for removal / replacement iwo deckhouse structural modifications & main deck access cuts, addition of A-60 in overhead of passenger deck in entirety, and A-60 in gas line ducts.	Gas Line Duct Areas iwo structural reinforcement	Ripout existing and replace with A-60.		Sq Ft	1,680	0.175	2.00		294	\$ 3,360	\$ -	
637	6	8	Sheet Metal Sheathings and Linings	Allow for removal / replacement iwo ER #1 & #2 structural modifications.	ER Overheads	Ripout & replace		Sq Ft	800	-	-	9.00	-	\$ -	\$ 7,200.00	
638	6	4	Refrigeration Spaces	No work.				N/A	0	-	-		-	\$ -	\$ -	
641	6	8	Furniture	Allow for removal / replacement iwo deckhouse structural modifications.	Passenger Seating Areas	Remove, retain, and replace.		Chairs	30	8.00	-		240	\$ -	\$ -	
641	6	8	Furniture	Allow for removal / replacement iwo deckhouse structural modifications.	Heads	Remove, retain, and replace.		Pcs	45	6.00	30.00		270	\$ 1,350	\$ -	
641	6	8	Furniture	Allow for removal / replacement iwo deckhouse structural modifications.	Office on Passenger Deck	Remove, retain, and replace.		Lot	1	24.00	200.00		24	\$ 200	\$ -	
645	6	8	Plumbing Fixtures	Remove and replace sanitary fixtures iwo each head under LNG storage tank installation.	Included in I-641.			NSP	0	-	-		-	\$ -	\$ -	
651	6	8	Galley Space and Equipment	No work.				N/A	0	-	-		-	\$ -	\$ -	
662	6	8	Engineers Control Room Furnishings	Extend console for additional MAMS.	Included in I-436.			NSP	0	-	-		-	\$ -	\$ -	
663	6	8	Wheelhouse and Chartroom Furnishings	No work.									-	\$ -	\$ -	
665	6	8	Shop Equipment	No work.									-	\$ -	\$ -	
671	6	8	Lockers and Special Stowage	No work.									-	\$ -	\$ -	
672	6	8	Storerooms	No work.									-	\$ -	\$ -	
802	8	10	Contract Drawings	Duration / manning based estimate.				Lot	1	-	-	750,000.00	-	\$ -	\$ 750,000.00	
802	8	10	Contract Drawings	Owner provide Contract Drawings and DNV Documentation. Allow cost to expand Design for turnover to Production Engineering.	Material ordering, class coordination, etc			Months	2	172.00	-		344	\$ -	\$ -	Assume 1) crafts will order material from dwg BOM and 2) WSF will coordinate design issues with USCG. Balance of hours are for Vigor / WSF interface.

Title																
WSF - ISSAQUAH LNG FUEL CONVERSION ROM ESTIMATE																
Owner: WSF																
Date: 11-Nov-11																
Spec Item	SWBS GROUP	Craft	SWBS Title	Brief Scope	Notes 1	Notes 2	Notes 3	Unit	Qty	Unit Labor	U. Material	U. Subcontract	Total Labor	Total Material	Total Subcontract	Comments
813	8	0	Planning and Production Control	Duration / manning based estimate.	Planning / Scheduling			Months	6	43.00	-	-	258	\$ -	\$ -	Assume 1) Craft will plan their own work. 2) Remaining hours are for update of master schedule by planning department.
831	8	10	Prod Engineering / Construction Drawings	Duration / manning based estimate.				Months	2	258.00	-	-	516	\$ -	\$ -	Assume 1) Craft will develop their own production sketches, etc. 2) Interferences will be dealt with through field coordination by supervision. 3) Remaining hours are for structural packages, ie lofting.
835	8	10	Engineering Calculations / Naval Architecture	Duration / manning based estimate.	Lift & turn, docking, inclining, etc			Months	1	172.00	-	-	172	\$ -	\$ -	No change
837	8	0	Photographs	Duration / manning based estimate.				Months	6	4.00	100.00	-	24	\$ 600	\$ -	
838	8	10	Design/Engineering Liaison	Duration / manning based estimate.	Field Engineer			Months	6	86.00	-	-	516	\$ -	\$ -	Assume 1) craft will handle field engineering. 2) Remaining hours are for production / engineering coordination.
840	8	0	Quality Assurance		Oversight			Months	6	40.00	-	-	240	\$ -	\$ -	
840	8	0	Quality Assurance	Quality Assurance / Accuracy Control	Quality Control / Accuracy Control			Months	6	51.60	-	-	310	\$ -	\$ -	Assume 1) craft will accomplish their own AC/QC work. 2) Remaining hours are for QC audit of crafts.
843	8	7	Inclining Experiment	Accomplish inclining.				Lot	1	80.00	5,000.00	6,500.00	80	\$ 5,000	\$ 6,500.00	
845	8	0	Certification Standards - DNV Fees	Weld Procedures & Weld Certification	Develop new weld procedures - None			NSP	0	-	-	-	-	\$ -	\$ -	
845	8	0	Certification Standards - DNV Fees	Weld Procedures & Weld Certification	NDT / Xray			Shots	15	2.00	-	-	30	\$ -	\$ -	
845	8	0	Certification Standards - DNV Fees	Duration / manning based estimate.									-	\$ -	\$ -	
845	8	10	Certification Standards - DNV Fees	DNV				Lot	1	-	-	300,000.00	-	\$ -	\$ 300,000.00	
854	8	0	Transportation	Duration / manning based estimate.				Months	6	172.00	-	-	1,032	\$ -	\$ -	Reduce by 2 men / month.
856	8	0	Technical Manuals and Other Data	Vendor pass-through.	Catalog & coordinate			Months	0.5	172.00	-	-	86	\$ -	\$ -	WSF accomplishes major effort.
857	8	0	Facilities	No upgrades expected.	Security			Months	0	-	-	-	-	\$ -	\$ -	Assume to be an overhead function.
858	8	0	Personnel and Training	Allow for video training of LNG systems.				Lot	1	-	-	35,000.00	-	\$ -	\$ 35,000.00	
859	8	0	Training Equipment	No work.									-	\$ -	\$ -	
891	8	0	Safety	Duration / manning based estimate.	Safety			Months	6	80.00	-	-	480	\$ -	\$ -	
897	8	0	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Project Manager			Months	8	172.00	-	-	1,376	\$ -	\$ -	
897	8	1	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Paint		Hrs	10%	3,915.59	-	-	392	\$ -	\$ -	
897	8	2	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Steel		Hrs	10%	29,896.54	-	-	2,990	\$ -	\$ -	
897	8	4	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Pipe		Hrs	10%	32,685.91	-	-	3,269	\$ -	\$ -	
897	8	5	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	OSM		Hrs	10%	5,312.94	-	-	531	\$ -	\$ -	
897	8	6	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Elec		Hrs	10%	11,390.99	-	-	1,139	\$ -	\$ -	
897	8	7	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Rigging		Hrs	10%	5,720.00	-	-	572	\$ -	\$ -	
897	8	8	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	Carpenter / Scaffold / Joiner		Hrs	10%	8,185.71	-	-	819	\$ -	\$ -	
897	8	9	Project Management	Work Mgmt, Fire Guard, Supv. Watch	Front Line Supervision	HVAC		Hrs	10%	2,135.00	-	-	214	\$ -	\$ -	
897	8	0	Project Management	Production Support	Clerical			Months	6	80.00	-	-	480	\$ -	\$ -	
897	8	0	Project Management	Production Support	Yard Superintendent			Months	6	80.00	-	-	480	\$ -	\$ -	
981	9	0	Insurance	Taxes, Insurance, and Warranty.				NSP	0	-	-	-	-	\$ -	\$ -	
981	9	0	Insurance	Noted - no warranty cost included.				NSP	0	-	-	-	-	\$ -	\$ -	
982	9	5	Trials	Dock Trials				Days	4.00	80.00	1,000.00	-	320	\$ 4,000	\$ -	
982	9	0	Trials	Sea Trials - Fueling	??????			Gallons	0.00	-	-	-	-	\$ -	\$ -	
982	9	0	Trials	Sea Trials - Tugs				Lot	1.00	-	-	5,000.00	-	\$ -	\$ 5,000.00	
982	9	0	Trials	Sea Trials - Pilot				Lot	1.00	-	-	2,000.00	-	\$ -	\$ 2,000.00	
982	9	0	Trials	Sea Trials - Crew	WSF Provide.			Days	0.00	-	-	-	-	\$ -	\$ -	
982	9	0	Trials	Sea Trials - Catering				Lot	1.00	-	-	1,500.00	-	\$ -	\$ 1,500.00	
982	9	5	Trials	Sea Trials - Production & Supervision				Days	2.00	72.00	-	-	144	\$ -	\$ -	
983	9	1	Delivery	Clean and wash down vessel				Lot	1	-	-	5,000.00	-	\$ -	\$ 5,000.00	
985	9	0	Fire and Flooding Protection	Schedule based estimate.	Firewatch			Months	6	688.00	-	-	4,128	\$ -	\$ -	
986	9	2	Tests and Inspection	Percentage by craft.	Steel	Air tests, hose test, and hydros.		Hours	1.0%	29,896.54	-	-	299	\$ -	\$ -	
986	9	4	Tests and Inspection	Percentage by craft.	Pipe			Hours	7.5%	32,685.91	-	-	2,451	\$ -	\$ -	
986	9	4	Tests and Inspection	Percentage by craft.	Pipe flush of modified systems, ie LO, FO, etc & purge of Nitrogen.			Days	30	60.00	750.00	-	1,800	\$ 22,500	\$ -	
986	9	5	Tests and Inspection	Percentage by craft.	Machinist			Hours	5.0%	5,312.94	-	-	266	\$ -	\$ -	
986	9	6	Tests and Inspection	Percentage by craft.	Electrical			Hours	4.0%	11,390.99	-	-	456	\$ -	\$ -	
986	9	9	Tests and Inspection	Percentage by craft.	HVAC			Hours	10.0%	2,135.00	-	-	214	\$ -	\$ -	
990	9	7	Rigging & Transportation	Provisional Lifting & Transport Equipment	Rigging & Crane			Months	6	688.00	-	-	4,128	\$ -	\$ -	
991	9	8	Staging, Scaffolding, and Cribbing	Schedule based estimate.				Months	6	430.00	-	2,000.00	2,580	\$ -	\$ 12,000.00	
992	9	0	Temporary Utilities and Services					Hours	111,950	-	0.75	-	-	\$ 83,963	\$ -	
993	9	0	Material Handling and Removal	Production Support	Warehouse			Months	7	172.00	-	-	1,204	\$ -	\$ -	Reduce by 1 man / month.
993	9	0	Material Handling and Removal	Production Support	Toolroom			Months	6	172.00	-	-	1,032	\$ -	\$ -	
994	9	1	Cleaning Services	Clearing & Cleaning				Week	1	120.00	-	-	120	\$ -	\$ -	Assume crafts will accomplish their own cleaning. Remaining hours are for cleaning of dock.
995	9	2	Consumables	Tools, Jigs	Dogs, clips, etc			Lot	1	-	20,000.00	-	-	\$ 20,000	\$ -	
995	9	0	Consumables	Consumables				Hours	111,950	-	3.00	-	-	\$ 335,851	\$ -	
997	9	7	Drydocking	Include based on duration required for wet exhaust install.	Haul Day			Lot	1	240.00	5,000.00	5,000.00	240	\$ 5,000	\$ 5,000.00	
997	9	7	Drydocking	Keel Blocks, Pillars, Cushions	Keel Blocks			LF	350	2.00	-	-	700	\$ -	\$ -	
997	9	0	Drydocking	Lay days	Dock rental at \$0.35 per GT / Day			Days	30	-	866.25	-	-	\$ 25,988	\$ -	
													111,950	\$ 9,658,363	\$ 1,420,200.00	

Rate Price \$ 70.00 0% 0% 18,915,062.83