L2/L3 Top Level Cost Summary Review

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
1	Project admin - principal investigator	1.1.1.1	KE	Labor - LoE	Hanson	$38,282.2	$39,105.24	$39,946.00	$27,203.23	$144,536.65	C1
2	Project admin - Doug Cowen	1.1.1.1	KE	Labor - LoE	Cowen	$16,274.0	$16,623.86	$16,981.27	$11,564.24	$61,443.34	C1
3	Project admin - Greg Sullivan	1.1.1.1	KE	Labor - LoE	Sullivan	$19,422.5	$19,840.08	$20,266.64	$13,801.58	$73,330.78	C1
4	Project manager-Feyzi	1.1.1.1	KE	Labor - LoE	Feyzi	$372,187.8	$200,655.76	$156,424.36	$93,668.53	$822,936.46	C1
5	Project Office M&S	1.1.1.1		M & S		$23,715.0	$23,715.00	$23,715.00	$11,934.00	$83,079.00	C1
6	Project Advisory Panel Reviews - Panel Members Compensation	1.1.1.1		Travel	Domestic	$21,114.0	$21,114.00	$21,114.00	$0.00	$63,342.00	C1
7	PO-Travel	1.1.1.1		Travel	Domestic	$22,032.0	$22,032.00	$22,032.00	$2,754.00	$68,850.00	C1
8	PO-Travel	1.1.1.1		Travel	Foreign	$14,688.0	$14,688.00	$14,688.00	$0.00	$44,064.00	C1
9	Finance -	1.1.2.1	MA	Labor - LoE	Finance	$68,361.0	$69,830.79	$71,332.15	$48,577.20	$258,101.16	C1
10	Project Controls -	1.1.2.1	MA	Labor - LoE	Controls	$235,845.5	$120,458.11	$123,047.96	$83,795.66	$563,147.28	C1
11	Q&A / Safety - Zernick	1.1.3.1	MA	Labor - LoE	Zernick	$174,523.2	$140,280.14	$143,296.16	$31,003.94	$489,103.42	C1
12	Logistics-Tosi	1.1.4.1	SC	Labor - LoE	Tosi	$35,699.6	$18,233.60	$14,383.12	$2,853.91	$71,170.27	C1
13	System Engineering-Sandstrom	1.1.5.1	SE	Labor - LoE	Sandstrom	$123,429.6	$126,083.37	$85,862.77	$0.00	$335,375.78	C1
14	Technical Coordination-DuVernois	1.1.5.1	SS	Labor - LoE	DuVernois	$140,519.9	$143,541.07	$146,627.20	$24,963.28	$455,651.44	C1
15	EHWD Project Management and Controls (WIPAC_Implementation_Manager)	1.2.1.1	SE	Labor - LoE	McEwen	$231,668	$236,649	$241,737	$144,045	$854,098	C1
16	2022-23 Systems Engineering (Terry Benson)	1.2.1.2.5.1	EN-ME	Labor - Task	Benson	$105,725	$0	$0	$0	$105,725	C1
17	2022-23 Management	1.2.1.2.5.1	EN	Labor - Task	Gibson	$169,160	$0	$0	$0	$169,160	C1
18	2022-23 Systems Engineering Support	1.2.1.2.5.1	EN	Labor - Task		$53,990	$0	$0	$0	$53,990	C1
19	Drill Procedure Review	1.2.1.2.5.2	EN	Labor - Task		$32,892	$0	$0	$0	$32,892	C2
20	Drill Hole Modeling	1.2.1.2.5.3	EN-ME	Labor - Task		$9,398	$0	$0	$0	$9,398	C2
21	2023-24 Management & Systems	1.2.1.2.6.1	EN-ME	Labor - Task	Benson	$0	$71,927	$0	$0	$71,927	C1
22	2023-24 Management	1.2.1.2.6.1	EN	Labor - Task	Gibson	$0	$115,126	$0	$0	$115,126	C1
23	2023-24 Systems Engineering Support	1.2.1.2.6.1	EN	Labor - Task		$0	$44,159	$0	$0	$44,159	C1
24	PY6 Season Debrief	1.2.1.2.6.2	EN	Labor - Task		$0	$14,400	$0	$0	$14,400	C2
25	Drill Procedure Review	1.2.1.2.6.3	EN	Labor - Task		$0	$26,880	$0	$0	$26,880	C2
26	Drill Hole Modeling	1.2.1.2.6.5	EN-ME	Labor - Task		$0	$9,600	$0	$0	$9,600	C2
27	2024-25 Management & Systems	1.2.1.2.7.1	EN-ME	Labor - Task	Benson	$0	$0	$73,473	$0	$73,473	C1
28	2024-25 Management	1.2.1.2.7.1	EN	Labor - Task	Gibson	$0	$0	$117,601	$0	$117,601	C1
29	2024-25 Systems Engineering Support	1.2.1.2.7.1	EN	Labor - Task		$0	$0	$45,109	$0	$45,109	C1
30	PY7 Season Debrief	1.2.1.2.7.2	EN	Labor - Task		$0	$0	$14,709	$0	$14,709	C2
31	Drill Procedure Review	1.2.1.2.7.3	EN	Labor - Task		$0	$0	$27,457	$0	$27,457	C2
32	Drill Hole Modeling	1.2.1.2.7.5	EN	Labor - Task		$0	$0	$9,806	$0	$9,806	C2
33	Drill Readiness Review (PSL)	1.2.1.2.7.6	EN	Labor - Task		$0	$0	$23,535	$0	$23,535	C2
34	2025-26 Systems Engineering	1.2.1.2.8.1	EN-ME	Labor - Task	Benson	$0	$0	$0	$33,808	$33,808	C1
35	2025-26 Management	1.2.1.2.8.1	EN	Labor - Task	Gibson	$0	$0	$0	$45,077	$45,077	C1
36	2025-26 Systems Engineering	1.2.1.2.8.1	EN	Labor - Task		$0	$0	$0	$30,051	$30,051	C1
37	PY8 Season Debrief	1.2.1.2.8.2	EN	Labor - Task		$0	$0	$0	$15,026	$15,026	C2
38	String Management and Controls (2022-2023)	1.2.1.3.2.1	SC	Labor - LoE	Tosi	$26,775	$0	$0	$0	$26,775	C1
39	Installation Engineering (2022-2023)	1.2.1.3.2.2	SC	Labor - LoE	Tosi	$44,625	$0	$0	$0	$44,625	C1
40	Installation Engineering Support (2022-2023)	1.2.1.3.2.3	EN	Labor - LoE		$5,639	$0	$0	$0	$5,639	C2
41	String Management and Controls (2023-2024)	1.2.1.3.3.1	SC	Labor - LoE	Tosi	$0	$18,234	$0	$0	$18,234	C1
42	Installation Engineering (2023-2024)	1.2.1.3.3.2	SC	Labor - LoE	Tosi	$0	$54,701	$0	$0	$54,701	C1
43	Installation Engineering Support (2023-2024)	1.2.1.3.3.3	EN	Labor - LoE		$0	$5,760	$0	$0	$5,760	C2
44	String Management and Controls (2024-2025)	1.2.1.3.4.1	SC	Labor - LoE	Tosi	$0	$0	$9,313	$0	$9,313	C1
45	Installation Engineering (2024-2025)	1.2.1.3.4.2	SC	Labor - LoE	Tosi	$0	$0	$46,564	$0	$46,564	C1
46	Installation Engineering Support (2024-2025)	1.2.1.3.4.3	EN	Labor - LoE		$0	$0	$5,393	$0	$5,393	C2
47	String Management and Controls (2025-2026)	1.2.1.3.5.1	SC	Labor - LoE	Tosi	$0	$0	$0	$1,903	$1,903	C1
48	Installation Engineering (2025-2026)	1.2.1.3.5.2	SC	Labor - LoE	Tosi	$0	$0	$0	$8,139	$8,139	C1
49	2022-23 Quality & Safety HA Review	1.2.1.4.5	EN	Labor - Task		$16,916	$0	$0	$0	$16,916	C2
50	2023-24 Quality & Safety HA Review	1.2.1.4.6	EN	Labor - Task		$0	$17,280	$0	$0	$17,280	C2

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
51	2025-25 Quality & Safety HA Review	1.2.1.4.7	EN	Labor - Task		$0	$0	$17,651	$0	$17,651	C2
52	2025-26 Quality & Safety HA Review	1.2.1.4.8	EN	Labor - Task		$0	$0	$0	$3,005	$3,005	C2
53	2022-23 Travel (non-deployment)	1.2.1.5.5		Travel	Domestic	$19,278	$0	$0	$0	$19,278	C1
54	2023-24 Travel (non-deployment)	1.2.1.5.6		Travel	Domestic	$0	$19,278	$0	$0	$19,278	C1
55	2024-25 Travel (non-deployment)	1.2.1.5.7		Travel		$0	$0	$19,278	$0	$19,278	C1
56	Crate Control Systems Components Shipment 1 - DNF (Vessel)	1.2.1.6.2.11	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C2
57	Crate Control Systems Components Shipment 1 - DNF (Vessel)	1.2.1.6.2.11		M & S		$1,282	$0	$0	$0	$1,282	C2
58	Load Container C (Main/Combo	1.2.1.6.2.20	TE	Labor - Task		$2,360	$0	$0	$0	$2,360	C2
59	Load Container C (Main/Combo	1.2.1.6.2.20		M & S		$9,180	$0	$0	$0	$9,180	C2
60	Crate Control Systems Components	1.2.1.6.2.22	TE	Labor - Task		$1,888	$0	$0	$0	$1,888	C2
61	Crate Control Systems Components	1.2.1.6.2.22		M & S		$2,564	$0	$0	$0	$2,564	C2
62	Crate Elect. Distribution System Components (ComSur)	1.2.1.6.2.23	EN	Labor - Task		$940	$0	$0	$0	$940	C2
63	Crate MDS Internal Hoses & Spares	1.2.1.6.2.24	TE	Labor - Task		$0	$643	$0	$0	$643	C2
64	Crate Drill Filtration Resupply (FS2	1.2.1.6.2.25	TE	Labor - Task		$0	$643	$0	$0	$643	C2
65	Crate FS2 SES Interconnect	1.2.1.6.2.26	TE	Labor - Task		$0	$643	$0	$0	$643	C2
66	Load FS2 Resupply Container	1.2.1.6.2.28	TE	Labor - Task		$0	$1,286	$0	$0	$1,286	C2
67	Crate Repair/Replacement	1.2.1.6.2.29	TE	Labor - Task		$0	$643	$0	$0	$643	C2
68	Crate Control Systems Components	1.2.1.6.2.30	TE	Labor - Task		$0	$0	$1,313	$0	$1,313	C2
69	FS0 - Ship Control Systems	1.2.1.6.3.1		M & S		$6,120	$0	$0	$0	$6,120	C2
70	FS0 - Ship Control Systems	1.2.1.6.3.1		M & S		$1,530	$0	$0	$0	$1,530	C2
71	FS1 - Ship Control Systems	1.2.1.6.3.2		M & S		$5,355	$0	$0	$0	$5,355	C2
72	FS2 - Ship Control Systems	1.2.1.6.3.3		M & S		$0	$3,825	$0	$0	$3,825	C2
73	FS3 - Ship Resupply Container	1.2.1.6.3.4		M & S		$0	$0	$3,825	$0	$3,825	C2
74	Crate (Installation): Sensor Handling Structure (Vessel)	1.2.1.6.4.1		M & S		$4,590	$0	$0	$0	$4,590	C2
75	Crate (Installation): Installation Kits (Vessel)	1.2.1.6.4.2	TE	Labor - Task		$2,517	$0	$0	$0	$2,517	C2
76	Crate (Installation): Installation Kits (Vessel)	1.2.1.6.4.2		M & S		$7,488	$0	$0	$0	$7,488	C2
77	Crate (Installation): String Weights (Vessel)	1.2.1.6.4.3	TE	Labor - Task		$629	$0	$0	$0	$629	C2
78	Crate (Installation): String Weights (Vessel)	1.2.1.6.4.3		M & S		$1,582	$0	$0	$0	$1,582	C2
79	Crate (Installation): Science Equipment FS2 (SPAT, IME, Laser Rangers, Pressure Sensors)(Comsur)	1.2.1.6.4.4		M & S		$0	$1,135	$0	$0	$1,135	C2
80	Crate (Installation): Science Equipment FS3 (Comsur)	1.2.1.6.4.5		M & S		$0	$0	$1,135	$0	$1,135	C2
81	Ship (Installation): Sensor Handling Structure (Vessel)	1.2.1.6.5.1		M & S		$4,590	$0	$0	$0	$4,590	C2
82	Ship (Installation): Installation Kits (Vessel)	1.2.1.6.5.2		M & S		$0	$3,140	$0	$0	$3,140	C2
83	Ship (Installation): String Weights (Vessel)	1.2.1.6.5.3		M & S		$0	$796	$0	$0	$796	C2
84	Ship (Installation): Science Equipment FS2 (SPAT, IME, Laser Rangers, Pressure Sensors) (Comsur)	1.2.1.6.5.4		M & S		$0	$1,530	$0	$0	$1,530	C2
85	Ship (Installation): Science Equipment FS3 (Comsur)	1.2.1.6.5.5		M & S		$0	$0	$1,530	$0	$1,530	C2
86	Install FS3: FS3 Off-Ice Installation Training: Drillers	1.2.10.1.3	TE	Labor - Task	PSL Driller	$0	$0	$23,637	$0	$23,637	C1
87	Install FS2: Install Team FS2 PQ Costs (Headcount 1)	1.2.10.4.2		M & S		$0	$1,071	$0	$0	$1,071	C1
88	Install FS2: Install Team FS2 ECW Costs (Headcount 1)	1.2.10.4.2		M & S		$0	$383	$0	$0	$383	C1
89	Install FS2: Install Team FS2 Deployment Travel Costs (Headcount 1)	1.2.10.4.2		Travel	Foreign	$0	$0	$2,754	$0	$2,754	C1
90	Installation: On-Ice Labor (FS2) (Installation Lead)	1.2.10.4.10	SC	Labor - LoE	Tosi	$0	$0	$29,061	$0	$29,061	C1
91	Install FS3: Install Team FS3 PQ Costs (Headcount 1)	1.2.10.5.2		M & S		$0	$0	$1,071	$0	$1,071	C1
92	Install FS3: Install Team FS3 ECW Costs (Headcount 1)	1.2.10.5.2		M & S		$0	$0	$383	$0	$383	C1
93	Install FS3: Install Team FS3 Deployment Costs (Headcount 1 + 9 in-kind)	1.2.10.5.2		Travel	Foreign	$0	$0	$0	$2,754	$2,754	C1

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
94	Installation: On-Ice Labor (FS3) (Installation Lead)	1.2.10.5.8	SC	Labor - Task	Tosi	$0	$0	$0	$37,808	$37,808	C1
95	MHP: Procure MHP Upgrade, Sub-Components, Spares (PY5)	1.2.2.1.6	EN-ME	Labor - Task	Gibson	$2,819	$0	$0	$0	$2,819	C3
96	MHP: Procure MHP Upgrade, Sub-Components, Spares (PY5)	1.2.2.1.6		CapEx		$5,000	$0	$0	$0	$5,000	C3
97	MHP: Develop HPU2 Integrate Plan	1.2.2.1.7	EN	Labor - Task		$0	$6,000	$0	$0	$6,000	C4
98	MHP: Procure and Assemble HPU2 Integration Components	1.2.2.1.8	EN-ME	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
99	MHP: Procure and Assemble HPU2 Integration Components	1.2.2.1.8	TE	Labor - Task		$0	$3,214	$0	$0	$3,214	C3
100	MHP: Procure and Assemble HPU2 Integration Components	1.2.2.1.8		CapEx		$0	$10,000	$0	$0	$10,000	C3
101	MHP: Procure Upgrade, Sub-Components, Spares (PY6)	1.2.2.1.10	EN-ME	Labor - Task		$0	$2,880	$0	$0	$2,880	C3
102	MHP: Procure Upgrade, Sub-Components, Spares (PY6)	1.2.2.1.10		CapEx		$0	$5,000	$0	$0	$5,000	C3
103	PHS: Procure and Upgrade Control	1.2.2.2.4	EN-EE	Labor - Task		$0	$9,600	$0	$0	$9,600	C3
104	PHS: Procure and Upgrade Control	1.2.2.2.4	TE	Labor - Task		$0	$6,428	$0	$0	$6,428	C3
105	PHS: Procure and Upgrade Control	1.2.2.2.4		CapEx		$0	$4,000	$0	$0	$4,000	C3
106	PHS: Procure Upgrade, Sub-Components, Spares (PY6)	1.2.2.2.5	EN-ME	Labor Hours		$0	$2,880	$0	$0	$2,880	C3
107	PHS: Procure Upgrade, Sub-Components, Spares (PY6)	1.2.2.2.5		CapEx		$0	$5,000	$0	$0	$5,000	C3
108	Fuel Tower: Procure ARA Fueling Hose & Nozzle (PY5)	1.2.2.3.8	EN-ME	Labor - Task		$940	$0	$0	$0	$940	C3
109	Fuel Tower: Procure ARA Fueling Hose & Nozzle (PY5)	1.2.2.3.8		CapEx		$4,442	$0	$0	$0	$4,442	C3
110	Fuel Tower: Procure Racor Fuel Filter Elements and Gauges Replacements (PY5)	1.2.2.3.9	EN-ME	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
111	Fuel Tower: Procure Racor Fuel Filter Elements and Gauges Replacements (PY5)	1.2.2.3.9	TE	Labor - Task		$1,258	$0	$0	$0	$1,258	C3
112	Fuel Tower: Procure Racor Fuel Filter Elements and Gauges Replacements (PY5)	1.2.2.3.9		CapEx		$1,500	$0	$0	$0	$1,500	C3
113	Fuel Tower: Procure Fuel system Upgrade/Maintenance Subcomponents (PY6)	1.2.2.3.10	EN-ME	Labor - Task		$0	$2,880	$0	$0	$2,880	C3
114	Fuel Tower: Procure Fuel system Upgrade/Maintenance Subcomponents (PY6)	1.2.2.3.10		CapEx		$0	$2,400	$0	$0	$2,400	C3
115	Fuel Tower: Procure MHP Fuel Heat Exchangers Replacements (PY6)	1.2.2.3.11	EN-ME	Labor - Task		$0	$1,920	$0	$0	$1,920	C3
116	Fuel Tower: Procure MHP Fuel Heat Exchangers Replacements (PY6)	1.2.2.3.11		CapEx		$0	$10,283	$0	$0	$10,283	C3
117	Tower Ops: Crescent Emergency Repair Kit Assembly	1.2.3.1.5	EN-ME	Labor - Task	Lemery	$0	$4,800	$0	$0	$4,800	C3
118	Tower Ops: Crescent Emergency Repair Kit Assembly	1.2.3.1.5		CapEx	Lemry	$0	$2,500	$0	$0	$2,500	C3
119	Tower Ops: Examine Interface between Dust Logger and Tower & Address as Needed	1.2.3.1.6	EN-ME	Labor - Task		$4,699	$0	$0	$0	$4,699	C4
120	Tower Ops: Examine Interface between Dust Logger and Tower & Address as Needed	1.2.3.1.6		CapEx		$2,400	$0	$0	$0	$2,400	C4
121	Tower Ops: Load Cell Calibration	1.2.3.1.7.2	EN-ME	Labor - Task		$940	$0	$0	$0	$940	C2
122	Tower Ops: Load Cell Calibration	1.2.3.1.7.2		CapEx		$1,789	$0	$0	$0	$1,789	C2
123	Tower Ops: Identify/Procure: Load Cell Rigging Calibration	1.2.3.1.7.3	EN-ME	Labor - Task		$940	$0	$0	$0	$940	C2
124	Tower Ops: Identify/Procure: Load Cell Rigging Calibration	1.2.3.1.7.3		CapEx		$1,220	$0	$0	$0	$1,220	C2
125	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY5)	1.2.3.1.8	EN-ME	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
126	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY5)	1.2.3.1.8	EN-ME	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
127	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY5)	1.2.3.1.8		CapEx		$10,232	$0	$0	$0	$10,232	C3
128	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY6)	1.2.3.1.9	EN-ME	Labor - Task		$0	$1,920	$0	$0	$1,920	C3
129	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY6)	1.2.3.1.9	EN-ME	Labor Hours		$0	$1,920	$0	$0	$1,920	C3
130	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY6)	1.2.3.1.9		CapEx		$0	$9,232	$0	$0	$9,232	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
131	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY7)	1.2.3.1.10	EN-ME	Labor - Task		$0	$0	$1,961	$0	$1,961	C3
132	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY7)	1.2.3.1.10	EN-ME	Labor - Task		$0	$0	$1,961	$0	$1,961	C3
133	Tower Ops: Identify/Procure: TOS & Tower Hardware, Repair Parts (PY7)	1.2.3.1.10		CapEx		$0	$0	$22,992	$0	$22,992	C3
134	Drillheads: Prepare Crates, Spares,	1.2.3.2.10	EN-ME	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
135	Drillheads: Prepare Crates, Spares,	1.2.3.2.10	TE	Labor - Task		$1,888	$0	$0	$0	$1,888	C3
136	Reels & Winches: Drill Reels Sliprings - final testing and prep	1.2.3.3.9	EN-EE	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
137	Reels & Winches: TU20 Sliprings - spec, procure, test	1.2.3.3.10	EN-EE	Labor - Task		$18,796	$0	$0	$0	$18,796	C3
138	Reels & Winches: TU20 Sliprings - spec, procure, test	1.2.3.3.10		CapEx		$8,413	$0	$0	$0	$8,413	C3
139	Reels & Winches: Reel Components & Spares (PY6). TU20 brakes)	1.2.3.3.11	EN-ME	Labor - Task		$0	$9,600	$0	$0	$9,600	C3
140	Reels & Winches: Reel Components & Spares (PY6). TU20 brakes)	1.2.3.3.11	TE	Labor - Task		$0	$3,214	$0	$0	$3,214	C3
141	Reels & Winches: Reel Components & Spares (PY6). TU20 brakes)	1.2.3.3.11		CapEx		$0	$8,770	$0	$0	$8,770	C3
142	Architecture: Coordination with USAP IT (PY5) (station connectivity, internet, phone)	1.2.4.1.8	EN-EE	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
143	Architecture: CS Drawings & Documentation (PY5)	1.2.4.1.9	EN-EE	Labor - Task		$3,759	$0	$0	$0	$3,759	C3
144	Architecture: CS Drawings & Documentation (PY6)	1.2.4.1.10	EN-EE	Labor - Task		$0	$3,840	$0	$0	$3,840	C3
145	Architecture: CS Drawings & Documentation (PY7)	1.2.4.1.11	EN-EE	Labor - Task		$0	$0	$3,922	$0	$3,922	C3
146	Architecture: CS Drawings & Documentation (PY8)	1.2.4.1.12	EN-EE	Labor - Task		$0	$0	$0	$4,007	$4,007	C3
147	Controls Hardware: Procure System Sensors (PY5)	1.2.4.2.2.5	EN-EE	Labor Hours		$3,759	$0	$0	$0	$3,759	C3
148	Controls Hardware: Procure System Sensors (PY5)	1.2.4.2.2.5		CapEx		$27,776	$0	$0	$0	$27,776	C2
149	Network Controllers: CS HW Production Ignition Servers (3x: DCC, TOS1, TOS2)	1.2.4.2.11.1	EN-EE	Labor - Task		$1,175	$0	$0	$0	$1,175	C3
150	Network Controllers: CS HW Production Ignition Servers (3x: DCC, TOS1, TOS2)	1.2.4.2.11.1		CapEx		$4,671	$0	$0	$0	$4,671	C2
151	Network Controllers: CS HW Production Database Server (1x: DCC)	1.2.4.2.11.2	EN-EE	Labor - Task		$1,175	$0	$0	$0	$1,175	C3
152	Network Controllers: CS HW Production Database Server (1x: DCC)	1.2.4.2.11.2		CapEx		$2,906	$0	$0	$0	$2,906	C2
153	Network Controllers: CS HW Production Peripherals (3x sets: DCC, TOS1, TOS2)	1.2.4.2.11.3	EN-EE	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
154	Network Controllers: CS HW Production Peripherals (3x sets: DCC, TOS1, TOS2)	1.2.4.2.11.3		CapEx		$17,520	$0	$0	$0	$17,520	C2
155	Network Controllers: CS HW DCC Core Switch & Security Appliance	1.2.4.2.11.4	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
156	Network Controllers: CS HW DCC Core Switch & Security Appliance	1.2.4.2.11.4		CapEx		$19,803	$0	$0	$0	$19,803	C2
157	Network Controllers: CS HW Production Main PLC - PLC (redundant), I/O, network, UPS, in a box (3x: DCC, TOS1, TOS2)	1.2.4.2.11.5	EN-EE	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
158	Network Controllers: CS HW Production Main PLC - PLC (redundant), I/O, network, UPS, in a box (3x: DCC, TOS1, TOS2)	1.2.4.2.11.5		CapEx		$29,867	$0	$0	$0	$29,867	C2
159	Network Controllers: CS HW PY6 Resupply	1.2.4.2.13	EN-EE	Labor - Task		$0	$9,600	$0	$0	$9,600	C4
160	Network Controllers: CS HW PY6 Resupply	1.2.4.2.13		CapEx		$0	$4,000	$0	$0	$4,000	C4
161	Network Controllers: CS HW PY7 Resupply	1.2.4.2.14	EN-EE	Labor - Task		$0	$0	$9,806	$0	$9,806	C4
162	Network Controllers: CS HW PY7 Resupply	1.2.4.2.14		CapEx		$0	$0	$4,000	$0	$4,000	C4
163	Controls Software: PLC & Software Development (w/sub-tasks)	1.2.4.3.4	EN-EE	Labor - Task		$7,048	$7,200	$0	$0	$14,248	C3
164	Controls Software: SCADA Monitoring Software Procurement - Server	1.2.4.3.5	EN-EE	Labor - Task		$2,349	$0	$0	$0	$2,349	C2

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
165	Controls Software: SCADA Monitoring Software - Server	1.2.4.3.5		CapEx		$2,297	$0	$0	$0	$2,297	C2
166	Operator Screen MHP: Local-Panel MDS-specific HMI (PY5)	1.2.4.3.9.1.1	EN-EE	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
167	Operator Screen MHP: Local-Panel MDS-specific HMI (PY6)	1.2.4.3.9.1.2	EN-EE	Labor - Task		$0	$2,400	$0	$0	$2,400	C3
168	Operator Screen MHP: DCC-based SCADA UI (PY5)	1.2.4.3.9.1.3	EN-EE	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
169	Operator Screen MHP: DCC-based SCADA UI (PY6)	1.2.4.3.9.1.4	EN-EE	Labor - Task		$0	$9,600	$0	$0	$9,600	C3
170	Operator Screen Fuel System: Local-Panel MDS-specific HMI (PY5)	1.2.4.3.9.2.1	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
171	Operator Screen Fuel System: Local-Panel MDS-specific HMI (PY6)	1.2.4.3.9.2.2	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
172	Operator Screen Fuel System: DCC-based SCADA (PY5)	1.2.4.3.9.2.3	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
173	Operator Screen Fuel System: DCC-based SCADA (PY6)	1.2.4.3.9.2.4	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
174	Operator Screen Gensets: Local-Panel MDS-specific HMI (PY5)	1.2.4.3.9.3.1	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
175	Operator Screen Gensets: Local-Panel MDS-specific HMI (PY6)	1.2.4.3.9.3.2	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
176	Operator Screen Gensets: DCC-based SCADA (PY5)	1.2.4.3.9.3.3	EN-EE	Labor - Task		$1,410	$0	$0	$0	$1,410	C3
177	Operator Screen Gensets: DCC-based SCADA (PY6)	1.2.4.3.9.3.4	EN-EE	Labor - Task		$0	$1,440	$0	$0	$1,440	C3
178	Operator Screen Rodwell: DCC-based SCADA (PY5)	1.2.4.3.9.4.3	EN-EE	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
179	Operator Screen Rodwell: DCC-based SCADA (PY6)	1.2.4.3.9.4.4	EN-EE	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
180	Operator Screen HPP: Local-Panel MDS-specific HMI (PY5)	1.2.4.3.9.5.1	EN-EE	Labor - Task		$2,115	$0	$0	$0	$2,115	C3
181	Operator Screen HPP: Local-Panel MDS-specific HMI (PY6)	1.2.4.3.9.5.2	EN-EE	Labor - Task		$0	$2,160	$0	$0	$2,160	C3
182	Operator Screen HPP: DCC-based SCADA (PY5)	1.2.4.3.9.5.3	EN-EE	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
183	Operator Screen HPP: DCC-based SCADA (PY6)	1.2.4.3.9.5.4	EN-EE	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
184	Operator Screen PHS: Local-Panel MDS-specific HMI (PY5)	1.2.4.3.9.6.1	EN-EE	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
185	Operator Screen PHS: Local-Panel MDS-specific HMI (PY6)	1.2.4.3.9.6.2	EN-EE	Labor - Task		$0	$1,920	$0	$0	$1,920	C3
186	Operator Screen PHS: DCC-based SCADA (PY5)	1.2.4.3.9.6.3	EN-EE	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
187	Operator Screen PHS: DCC-based SCADA (PY6)	1.2.4.3.9.6.4	EN-EE	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
188	TOS Operator Screen: SCADA - DrillHead (PY5)	1.2.4.3.10.1	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
189	TOS Operator Screen: SCADA - DrillHead (PY6)	1.2.4.3.10.2	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
190	TOS Operator Screen: SCADA - Drill_Settings (PY5)	1.2.4.3.10.3	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
191	TOS Operator Screen: SCADA - Drill_Settings (PY6)	1.2.4.3.10.4	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
192	TOS Operator Screen: SCADA - SCADA - Drilling_Drill Control (PY5)	1.2.4.3.10.5	EN-EE	Labor - Task		$1,410	$0	$0	$0	$1,410	C3
193	TOS Operator Screen: SCADA - Drilling_Drill Control (PY6)	1.2.4.3.10.6	EN-EE	Labor - Task		$0	$1,440	$0	$0	$1,440	C3
194	TOS Operator Screen: SCADA - SCADA - Drilling_Cable Level Wind (PY5)	1.2.4.3.10.7	EN-EE	Labor - Task		$1,410	$0	$0	$0	$1,410	C3
195	TOS Operator Screen: SCADA - Drilling_Cable Level Wind (PY6)	1.2.4.3.10.8	EN-EE	Labor - Task		$0	$1,440	$0	$0	$1,440	C3
196	TOS Operator Screen: SCADA - Drilling_Hose Level Wind (PY5)	1.2.4.3.10.9	EN-EE	Labor - Task		$1,410	$0	$0	$0	$1,410	C3
197	TOS Operator Screen: SCADA - Drilling_Hose Level Wind (PY6)	1.2.4.3.10.10	EN-EE	Labor - Task		$0	$1,440	$0	$0	$1,440	C3
198	TOS Operator Screen: SCADA - Return Water Pump (PY5)	1.2.4.3.10.11	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
199	TOS Operator Screen: SCADA - Return Water Pump (PY6)	1.2.4.3.10.12	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3
200	TOS Operator Screen: SCADA - Deployment - Cable (PY5)	1.2.4.3.10.13	EN-EE	Labor - Task		$940	$0	$0	$0	$940	C3
201	TOS Operator Screen: SCADA - Deployment - Cable (PY6)	1.2.4.3.10.14	EN-EE	Labor - Task		$0	$960	$0	$0	$960	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
202	TOS Operator Screen: SCADA - Deployment Settings (PY5)	1.2.4.3.10.15	EN-EE	Labor - Task		$1,175	$0	$0	$0	$1,175	C3
203	TOS Operator Screen: SCADA - Deployment Settings (PY6)	1.2.4.3.10.16	EN-EE	Labor - Task		$0	$1,200	$0	$0	$1,200	C3
204	TOS Operator Screen: Build DCC dB schema (PY5)	1.2.4.3.11.1	EN-EE	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
205	TOS Operator Screen: Build DCC dB schema (PY6)	1.2.4.3.11.2	EN-EE	Labor - Task		$0	$9,600	$0	$0	$9,600	C3
206	TOS Operator Screen: Build Drill dB schema (PY5)	1.2.4.3.11.3	EN-EE	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
207	TOS Operator Screen: Build Drill dB schema (PY6)	1.2.4.3.11.4	EN-EE	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
208	TOS Operator Screen: Build Deploy dB schema (PY5)	1.2.4.3.11.5	EN-EE	Labor - Task		$3,524	$0	$0	$0	$3,524	C3
209	TOS Operator Screen: Build Deploy dB schema (PY6)	1.2.4.3.11.6	EN-EE	Labor - Task		$0	$3,600	$0	$0	$3,600	C3
210	Controls Software: CS SW Standup Production Computing Hardware, Configure, Verify before Shipment (3x systems) (PY6)	1.2.4.3.12	EN-EE	Labor - Task		$0	$16,800	$0	$0	$16,800	C4
211	Controls Software: CS SW MDS-specific HMI Refinement (PY7)	1.2.4.3.13	EN-EE	Labor - Task		$0	$0	$9,806	$0	$9,806	C4
212	Controls Software: CS SW DCC-based SCADA Refinement (PY7)	1.2.4.3.14	EN-EE	Labor - Task		$0	$0	$14,709	$0	$14,709	C4
213	Controls Software: CS SW TOS-based SCADA Refinement (PY7)	1.2.4.3.15	EN-EE	Labor - Task		$0	$0	$14,709	$0	$14,709	C4
214	Controls Software: CS SW dB Refinement (PY7)	1.2.4.3.16	EN-EE	Labor - Task		$0	$0	$14,709	$0	$14,709	C4
215	Motor Drives: Programming and Testing at PSL (PSL_Engineer)	1.2.4.4.4	EN-EE	Labor - Task		$15,859	$0	$0	$0	$15,859	C3
216	E-stop: Estop PY6 Resupply	1.2.4.5.6	EN-EE	Labor - Task		$0	$2,880	$0	$0	$2,880	C4
217	E-stop: Estop PY6 Resupply	1.2.4.5.6	TE	Labor - Task		$0	$1,928	$0	$0	$1,928	C4
218	E-stop: Estop PY6 Resupply	1.2.4.5.6		CapEx		$0	$5,000	$0	$0	$5,000	C4
219	E-stop: Estop PY7 Resupply	1.2.4.5.7	EN-EE	Labor - Task		$0	$0	$2,942	$0	$2,942	C4
220	E-stop: Estop PY7 Resupply	1.2.4.5.7	TE	Labor - Task		$0	$0	$1,970	$0	$1,970	C4
221	E-stop: Estop PY7 Resupply	1.2.4.5.7		CapEx		$0	$0	$5,000	$0	$5,000	C4
222	DCC: Update Workspace (desk, chairs), Procure Printer & Accessories	1.2.4.6.3	EN-EE	Labor Hours		$3,759	$0	$0	$0	$3,759	C3
223	DCC: Update Workspace (desk, chairs), Procure Printer & Accessories	1.2.4.6.3		CapEx		$10,770	$0	$0	$0	$10,770	C2
224	Outdoor Cables: Fabricate and Test SES & SES to TOS Cables - Signal	1.2.4.7.3	EN-EE	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
225	Outdoor Cables: CS Cabling Resupply (PY6)	1.2.4.7.4	EN-EE	Labor - Task		$0	$2,880	$0	$0	$2,880	C4
226	Outdoor Cables: CS Cabling Resupply (PY6)	1.2.4.7.4		CapEx		$0	$5,000	$0	$0	$5,000	C4
227	Outdoor Cables: CS Cabling Resupply (PY7)	1.2.4.7.5	EN-EE	Labor - Task		$0	$0	$2,942	$0	$2,942	C4
228	Outdoor Cables: CS Cabling Resupply (PY7)	1.2.4.7.5		CapEx		$0	$0	$5,000	$0	$5,000	C4
229	CS: Procure sample temperature display and digital thermostat, install in test bed heater, test	1.2.4.8.1.2.1	EN	Labor - Task		$940	$0	$0	$0	$940	C3
230	CS: Procure sample temperature display and digital thermostat, install in test bed heater, test	1.2.4.8.1.2.1		CapEx		$300	$0	$0	$0	$300	C2
231	CS: Select and procure temperature display units for heater controls, conversion hardware	1.2.4.8.1.2.2	EN	Labor - Task		$940	$0	$0	$0	$940	C3
232	CS: Select and procure temperature display units for heater controls, conversion hardware	1.2.4.8.1.2.2		CapEx		$4,500	$0	$0	$0	$4,500	C2
233	CS: Replace temperature display units, remove RTD DGHs, transfer net connections, test	1.2.4.8.1.2.3	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
234	CS: Replace temperature display units, remove RTD DGHs, transfer net connections, test	1.2.4.8.1.2.3	TE	Labor - Task		$7,866	$0	$0	$0	$7,866	C3
235	CS: Select and procure digital thermostats for heater controls, conversion hardware	1.2.4.8.1.2.4	EN	Labor - Task		$940	$0	$0	$0	$940	C3
236	CS: Select and procure digital thermostats for heater controls, conversion hardware	1.2.4.8.1.2.4		CapEx		$4,962	$0	$0	$0	$4,962	C2

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
237	CS: Write thermostat field replacement procedure	1.2.4.8.1.2.5	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
238	CS: Write rewiring and test instructions for MHP E-stop boxes (fixes switch contact selections made in Gen 1)	1.2.4.8.1.3.1	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
239	CS: Write test procedures for dry heater tests	1.2.4.8.1.3.2	EN	Labor - Task		$3,759	$0	$0	$0	$3,759	C3
240	CS: Assemble equipment to test flow meters (excitation coil and portable pulse generator)	1.2.4.8.1.3.3	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
241	CS: Assemble equipment to test flow meters (excitation coil and portable pulse generator)	1.2.4.8.1.3.3		CapEx		$759	$0	$0	$0	$759	C3
242	CS: Write flow meter test procedure and assemble test kit	1.2.4.8.1.3.4	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
243	CS: Develop heater-based sensor readout; (heater temp/flow manifold pressures	1.2.4.8.1.5.1	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
244	CS: Develop environmental sensor readout; (bldg temps, smoke, e-stop)	1.2.4.8.1.5.2	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
245	CS: Develop heater control; (ON/OFF, Thermostat setpoint)	1.2.4.8.1.5.3	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
246	CS: Implement interlocks	1.2.4.8.1.5.7	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
247	CS: Document Subsystem	1.2.4.8.1.5.8	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C1
248	CS: Develop VFD installation strategy & document, procure materials	1.2.4.8.2.1.3	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
249	CS: Develop VFD installation strategy & document, procure materials	1.2.4.8.2.1.3	TE	Labor - Task		$1,258	$0	$0	$0	$1,258	C3
250	CS: Select and procure new power supplies for the network box, procure one RS-485 gateway	1.2.4.8.2.3.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
251	CS: Select and procure new power supplies for the network box, procure one RS-485 gateway	1.2.4.8.2.3.2		CapEx		$925	$0	$0	$0	$925	C2
252	CS: Redesign and rebuild PHS network box with new I/O, document as-built configuration	1.2.4.8.2.3.3	EN	Labor - Task		$16,916	$0	$0	$0	$16,916	C3
253	CS: Redesign and rebuild PHS network box with new I/O, document as-built configuration	1.2.4.8.2.3.3	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
254	CS: Redesign and rebuild PHS network box with new I/O, document as-built configuration	1.2.4.8.2.3.3		CapEx		$3,850	$0	$0	$0	$3,850	C3
255	CS: Indicate where approximately 20 sensor and network cables terminate in PHS and document config. plans	1.2.4.8.2.3.4	EN	Labor - Task		$12,687	$0	$0	$0	$12,687	C3
256	CS: Configure heater-mounted DGH modules, develop and document DGH installation and test plans	1.2.4.8.2.3.5	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
257	CS: Configure heater-mounted DGH modules, develop and document DGH installation and test plans	1.2.4.8.2.3.5	TE	Labor - Task		$1,258	$0	$0	$0	$1,258	C3
258	CS PHS HW4: New estop slap switch and box for outdoor location	1.2.4.8.2.4	EN	Labor - Task		$940	$0	$0	$0	$940	C3
259	CS PHS HW4: New estop slap switch and box for outdoor location	1.2.4.8.2.4		CapEx		$200	$0	$0	$0	$200	C3
260	CS PHS HW5: Develop heater test procedures, configure test tools, document test plans	1.2.4.8.2.5	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
261	CS: Develop and document test plans for all PHS system components	1.2.4.8.2.7.1	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
262	CS: Develop and document test plans for all PHS system components	1.2.4.8.2.7.2	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
263	CS: Develop heater-based sensor readout; (heater temp/flow manifold pressures)	1.2.4.8.2.8.1	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
264	CS: Develop environmental sensor readout; (bldg temps, smoke, e-stop)	1.2.4.8.2.8.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
265	CS: Develop water tank sensors readout	1.2.4.8.2.8.3	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
266	CS: Develop heater control; (ON/OFF, Thermostat setpoint)	1.2.4.8.2.8.4	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
267	CS: Develop AB drive/pump control; (variable speed velocity drives)	1.2.4.8.2.8.5	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
268	CS: Implement interlocks	1.2.4.8.2.8.10	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
269	CS: Implement interlocks	1.2.4.8.2.8.11	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
270	CS: Configure VFDs with accessories, connection pigtails, document	1.2.4.8.3.1.3	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
271	CS: Configure VFDs with accessories, connection pigtails, document	1.2.4.8.3.1.3	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
272	CS: Configure VFDs with accessories, connection pigtails, document	1.2.4.8.3.1.3		CapEx		$5,000	$0	$0	$0	$5,000	C3
273	CS: Develop VFD mechanical and electrical installation strategies & document, procure materials	1.2.4.8.3.1.4	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
274	CS: Develop VFD mechanical and electrical installation strategies & document, procure materials	1.2.4.8.3.1.4	TE	Labor - Task		$6,292	$0	$0	$0	$6,292	C3
275	CS: Develop VFD mechanical and electrical installation strategies & document, procure materials	1.2.4.8.3.1.4		CapEx		$2,000	$0	$0	$0	$2,000	C3
276	CS: SW configuration and autotuning, make plan - MDCR/LW, DSHR/LW, RWHR, RWCR, Tower Hoist	1.2.4.8.3.1.5	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
277	CS: Document changes to E-stop and Reel stop interfaces to motor drives, procure materials, implement	1.2.4.8.3.2.2	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
278	CS: Document changes to E-stop and Reel stop interfaces to motor drives, procure materials, implement	1.2.4.8.3.2.2	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
279	CS: Document changes to E-stop and Reel stop interfaces to motor drives, procure materials, implement	1.2.4.8.3.2.2		CapEx		$4,000	$0	$0	$0	$4,000	C3
280	CS: Test refurbished E-stop panels with reel safety junction boxes, I/O boxes, network boxes, drives	1.2.4.8.3.2.3	EN	Labor - Task		$23,495	$0	$0	$0	$23,495	C3
281	CS: Test refurbished E-stop panels with reel safety junction boxes, I/O boxes, network boxes, drives	1.2.4.8.3.2.3	TE	Labor - Task		$6,292	$0	$0	$0	$6,292	C3
282	CS: Test refurbished E-stop panels with reel safety junction boxes, I/O boxes, network boxes, drives	1.2.4.8.3.2.3		CapEx		$250	$0	$0	$0	$250	C3
283	CS: Design new E-stop controllers for TOS, build and test boxes	1.2.4.8.3.2.6	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
284	CS: Design new E-stop controllers for TOS, build and test boxes	1.2.4.8.3.2.6	TE	Labor - Task		$6,292	$0	$0	$0	$6,292	C3
285	CS: Design new E-stop controllers for TOS, build and test boxes	1.2.4.8.3.2.6		CapEx		$3,000	$0	$0	$0	$3,000	C3
286	CS: Spec and procure new power supplies for TOS network boxes, procure DGH gateway, document changes	1.2.4.8.3.3.1	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
287	CS: Spec and procure new power supplies for TOS network boxes, procure DGH gateway, document changes	1.2.4.8.3.3.1		CapEx		$1,650	$0	$0	$0	$1,650	C2
288	CS: Document plans for TOS network box upgrades, specify and procure tools and materials	1.2.4.8.3.3.2	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
289	CS: Document plans for TOS network box upgrades, specify and procure tools and materials	1.2.4.8.3.3.2	TE	Labor - Task		$1,258	$0	$0	$0	$1,258	C3
290	CS: Document plans for TOS network box upgrades, specify and procure tools and materials	1.2.4.8.3.3.2		CapEx		$400	$0	$0	$0	$400	C3
291	CS: Spec TOS nework switch location, spec cables to drives, I/O boxes, network box, DCC modem, PC, PLC, e-stop controller	1.2.4.8.3.3.3	EN	Labor - Task		$7,048	$0	$0	$0	$7,048	C3
292	CS: Spec TOS nework switch location, spec cables to drives, I/O boxes, network box, DCC modem, PC, PLC, e-stop controller	1.2.4.8.3.3.3	TE	Labor - Task		$2,517	$0	$0	$0	$2,517	C3
293	CS: Spec TOS nework switch location, spec cables to drives, I/O boxes, network box, DCC modem, PC, PLC, e-stop controller	1.2.4.8.3.3.3		CapEx		$1,000	$0	$0	$0	$1,000	C3
294	CS: Design enclosures for TOS PLCs and attached I/O used for payout encoders, load cells; procure parts	1.2.4.8.3.3.4	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
295	CS: Design enclosures for TOS PLCs and attached I/O used for payout encoders, load cells; procure parts	1.2.4.8.3.3.4		CapEx		$2,000	$0	$0	$0	$2,000	C3
296	CS: Construct enclosures for TOS PLCs and attached I/O , test	1.2.4.8.3.3.5	EN	Labor - Task		$7,048	$0	$0	$0	$7,048	C3
297	CS: Construct enclosures for TOS PLCs and attached I/O , test	1.2.4.8.3.3.5	TE	Labor - Task		$5,663	$0	$0	$0	$5,663	C3
298	CS: Construct enclosures for TOS PLCs and attached I/O , test	1.2.4.8.3.3.5		CapEx		$200	$0	$0	$0	$200	C3
299	CS: Develop and document on-ice test plans for E-stop, Reel-Stop, and Fault Detection hardware	1.2.4.8.3.5.1	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
300	CS: Develop and document on-ice test plans for integrated hardware	1.2.4.8.3.5.2	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
301	CS: Test load cells and payout encoders with PLC, verify functionality required for payout control, load sharing	1.2.4.8.3.6.2	EN	Labor - Task		$23,495	$0	$0	$0	$23,495	C3
302	CS TOS HW9: Tower hoist	1.2.4.8.3.8	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
303	CS TOS HW9: Tower hoist	1.2.4.8.3.8		CapEx		$1,000	$0	$0	$0	$1,000	C3
304	CS TOS HW10: Review deployment	1.2.4.8.3.9	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
305	CS: Develop general control/monitoring software	1.2.4.8.3.10.1	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
306	CS: Develop reel control software(MCR/LW, DSHR/LW, RWHR, RWCR, Tower Winch)	1.2.4.8.3.10.2	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
307	CS: Develop tension-sharing algorithm software (MCR/LW, DSHR/LW)	1.2.4.8.3.10.3	EN	Labor - Task		$14,097	$0	$0	$0	$14,097	C3
308	CS: Develop drillhead data monitoring interface)	1.2.4.8.3.10.4	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
309	CS: Implement interlocks	1.2.4.8.3.10.8	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
310	CS: Document Subsystem	1.2.4.8.3.10.9	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
311	CS HW Drillhead sofware/hardware production version	1.2.4.8.4.1	EN	Labor - Task		$7,048	$0	$0	$0	$7,048	C3
312	CS HW Drillhead sofware/hardware production version	1.2.4.8.4.1		CapEx		$2,510	$0	$0	$0	$2,510	C2
313	CS: Port C-Lang ingest process to rPI platform & test	1.2.4.8.4.2.1	EN	Labor - Task		$3,759	$0	$0	$0	$3,759	C3
314	CS: Integrate rPI platform into PLC infrastructure	1.2.4.8.4.2.2	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
315	CS: Document Subsystem	1.2.4.8.4.2.3	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
316	CS: Design, construct and test master E-stop controller, produce documentation and user instructions	1.2.4.8.5.1	EN	Labor - Task		$18,796	$0	$0	$0	$18,796	C3
317	CS: Design, construct and test master E-stop controller, produce documentation and user instructions	1.2.4.8.5.1	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
318	CS: Design, construct and test master E-stop controller, produce documentation and user instructions	1.2.4.8.5.1		CapEx		$3,000	$0	$0	$0	$3,000	C3
319	CS: Design and construct general-purpose I/O box for fuel sled, gather required component stock to install	1.2.4.8.5.2	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
320	CS: Design and construct general-purpose I/O box for fuel sled, gather required component stock to install	1.2.4.8.5.2		CapEx		$3,850	$0	$0	$0	$3,850	C3
321	CS: Procure 20 kW three-phase heater for DCC and 208V breakers	1.2.4.8.5.3	TE	Labor - Task		$1,258	$0	$0	$0	$1,258	C3
322	Procure 20 kW three-phase heater	1.2.4.8.5.3		CapEx		$3,152	$0	$0	$0	$3,152	C2
323	CS: WT1 VT pump drives: procure, configure, rewire plan	1.2.4.8.5.4	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
324	CS: WT1 VT pump drives: procure, configure, rewire plan	1.2.4.8.5.4		CapEx		$5,083	$0	$0	$0	$5,083	C2
325	CS: WT1 VT pump drives: final configure	1.2.4.8.5.5	EN	Labor - Task		$7,048	$0	$0	$0	$7,048	C3
326	CS: WT1 VT pump drives: install plan and kit	1.2.4.8.5.6	EN	Labor - Task		$7,048	$0	$0	$0	$7,048	C3
327	CS: WT1 VT pump drives: install plan and kit	1.2.4.8.5.6		CapEx		$1,500	$0	$0	$0	$1,500	C3
328	CS: Develop fuel system sensor readout ; (multi-level tank status, control relay status)	1.2.4.8.5.7.1	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
329	CS: Configure/document Point I/O Block	1.2.4.8.5.7.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
330	CS: Document Subsystem	1.2.4.8.5.7.3	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
331	CS: Implement interlocks	1.2.4.8.5.7.4	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
332	CS: CS Gensets HW - identify, procure, assemble	1.2.4.8.6.1	EN	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
333	CS: CS Gensets HW - identify, procure, assemble	1.2.4.8.6.1	TE	Labor - Task		$0	$3,214	$0	$0	$3,214	C3
334	CS: CS Gensets HW - identify, procure, assemble	1.2.4.8.6.1		CapEx		$0	$3,850	$0	$0	$3,850	C3
335	CS: Develop sensor readout; (bldg temps, fuel temps, supply/return water temps)	1.2.4.8.6.2.1	EN	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
336	CS: Develop sensor readout; (engine jacket temps, exhaust temps, drip pan status)	1.2.4.8.6.2.2	EN	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
337	CS: Configure/document network switch	1.2.4.8.6.2.3	EN	Labor - Task		$0	$960	$0	$0	$960	C3
338	CS: Configure/document RTA gateway to M-DGH interface	1.2.4.8.6.2.4	EN	Labor - Task		$0	$1,200	$0	$0	$1,200	C3
339	CS: Configure/document M-DGHs	1.2.4.8.6.2.5	EN	Labor - Task		$0	$2,400	$0	$0	$2,400	C3
340	CS: Document Subsystem	1.2.4.8.6.2.6	EN	Labor - Task		$0	$4,800	$0	$0	$4,800	C3
341	CS: Develop VFD mechanical and electrical installation strategies & document, procure materials	1.2.4.8.7.1.3	EN	Labor - Task		$8,458	$0	$0	$0	$8,458	C3
342	CS: Develop VFD mechanical and electrical installation strategies & document, procure materials	1.2.4.8.7.1.3		CapEx		$1,000	$0	$0	$0	$1,000	C3
343	CS: Define requirements and procedures for reading signals applied to HPP motor drives	1.2.4.8.7.2.1	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
344	CS: Define method of verifying sensor readout accuracy (reading vs stimulus)	1.2.4.8.7.2.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
345	CS: Develop and document test procedures for on-ice personnel	1.2.4.8.7.2.3	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
346	CS: Define core HPP PLC functions and requirements, define needed I/O connections	1.2.4.8.7.3.1	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
347	CS: Select PLC, Enclosure, Power supplies, I/O expansion cards, power distribution, connectors and cables	1.2.4.8.7.3.2	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
348	CS: Design and Construct PLC enclosure	1.2.4.8.7.3.3	EN	Labor - Task		$3,759	$0	$0	$0	$3,759	C3
349	CS: Design and Construct PLC enclosure	1.2.4.8.7.3.3	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
350	CS: Design and Construct PLC enclosure	1.2.4.8.7.3.3		CapEx		$7,050	$0	$0	$0	$7,050	C3
351	CS: Test HPP PLC enclosure with HPP Network box	1.2.4.8.7.3.4	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
352	CS: Procure additional drives for charge pumps (4), AC and network pigtail materials	1.2.4.8.7.4.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
353	CS: Procure additional drives for charge pumps (4), AC and network pigtail materials	1.2.4.8.7.4.2		CapEx		$14,505	$0	$0	$0	$14,505	C2
354	CS: Connectorize four drives with power and network pigtails, test each in test bed	1.2.4.8.7.4.3	EN	Labor - Task		$2,819	$0	$0	$0	$2,819	C3
355	CS: Connectorize four drives with power and network pigtails, test each in test bed	1.2.4.8.7.4.3	TE	Labor - Task		$3,146	$0	$0	$0	$3,146	C3
356	CS: Connectorize four drives with power and network pigtails, test each in test bed	1.2.4.8.7.4.3		CapEx		$1,000	$0	$0	$0	$1,000	C3
357	CS: Select and procure E-stop relays for pump VFD Enable signals	1.2.4.8.7.7.1	EN	Labor - Task		$940	$0	$0	$0	$940	C3
358	CS: Select and procure E-stop relays for pump VFD Enable signals	1.2.4.8.7.7.1		CapEx		$200	$0	$0	$0	$200	C3
359	CS: Develop and document rewiring instructions for HPP E-stop box	1.2.4.8.7.7.2	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
360	CS: Develop and document test plans for all HPP system components	1.2.4.8.7.9.1	EN	Labor - Task		$4,229	$0	$0	$0	$4,229	C3
361	CS: Review Gen-1 docs, identify where sensor connections terminated, plan for field integration and test	1.2.4.8.7.9.2	EN	Labor - Task		$3,759	$0	$0	$0	$3,759	C3
362	CS: Develop water path sensor readout; (pressure, temp, flow)	1.2.4.8.7.10.1	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
363	CS: Develop environmental sensor readout; (bldg temps, smoke, e-stop)	1.2.4.8.7.10.2	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
364	CS: Implement interlocks	1.2.4.8.7.10.9	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
365	CS: Document Subsystem	1.2.4.8.7.10.10	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
366	CS: Develop ARA-drill sensor readout; (heater flows, head press, tank level)	1.2.4.8.8.2.1	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C3
367	CS: Develop AB drive/pump control; (variable speed velocity drives)	1.2.4.8.8.2.2	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
368	CS: Configure/document Point I/O Block	1.2.4.8.8.2.3	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
369	CS: Configure/document network switch	1.2.4.8.8.2.4	EN	Labor - Task		$940	$0	$0	$0	$940	C3
370	CS: Configure/document RTA gateway to M-DGH interface	1.2.4.8.8.2.5	EN	Labor - Task		$1,880	$0	$0	$0	$1,880	C3
371	CS: Configure/document M-DGHs	1.2.4.8.8.2.6	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
372	CS: Implement interlocks	1.2.4.8.8.2.7	EN	Labor - Task		$2,349	$0	$0	$0	$2,349	C3
373	CS: Document Subsystem	1.2.4.8.8.2.8	EN	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
374	GEN-2, 3, PDM - Procure Batteries	1.2.5.2.6	EN-ME	Labor Hours		$940	$0	$0	$0	$940	C2
375	GEN-2, 3, PDM - Procure Batteries	1.2.5.2.6		CapEx		$2,000	$0	$0	$0	$2,000	C2
376	GEN-2, 3, PDM - Generator 2 Subcontract Repairs in New Zealand	1.2.5.2.7		CapEx		$14,804	$0	$0	$0	$14,804	C2
377	PDM - Procure Batteries	1.2.5.2.8		CapEx		$600	$0	$0	$0	$600	C2
378	GEN-2, 3, PDM - Develop SOW for South Pole Power Generation Technical Support Subcontract & Communicate with Vendor	1.2.5.2.9	EN-ME	Labor Hours		$0	$4,800	$0	$0	$4,800	C3
379	GEN-2, 3, PDM - Predeployment Coordination with Power Generation Technical Support Subcontract Vendor (PY6)	1.2.5.2.10	EN-ME	Labor Hours		$4,699	$4,800	$0	$0	$9,499	C4
380	Elec Dist. System: Design & Procure	1.2.5.4.3	EN-EE	Labor - Task		$2,349	$0	$0	$0	$2,349	C4
381	Elec Dist. System: Design & Procure	1.2.5.4.3		CapEx		$5,460	$0	$0	$0	$5,460	C4
382	Elec Dist. System: Build and Test Subcomponents	1.2.5.4.5	EN-EE	Labor - Task		$4,229	$0	$0	$0	$4,229	C4
383	Elec Dist. System: System Electrical Resupply (PY6)	1.2.5.4.8	EN-EE	Labor - Task		$0	$2,880	$0	$0	$2,880	C4
384	Elec Dist. System: System Electrical Resupply (PY6)	1.2.5.4.8	TE	Labor - Task		$0	$1,928	$0	$0	$1,928	C4
385	Elec Dist. System: System Electrical Resupply (PY6)	1.2.5.4.8		CapEx		$0	$5,000	$0	$0	$5,000	C4
386	Elec Dist. System: System Electrical Resupply (PY7)	1.2.5.4.10	EN	Labor - Task		$0	$0	$2,942	$0	$2,942	C4
387	Elec Dist. System: System Electrical Resupply (PY7)	1.2.5.4.10	TE	Labor - Task		$0	$0	$1,970	$0	$1,970	C4
388	Elec Dist. System: System Electrical Resupply (PY7)	1.2.5.4.10		CapEx		$0	$0	$5,000	$0	$5,000	C4
389	Water Tanks: Procure Repair Parts, Replacements (PY6)	1.2.6.1.3	EN-ME	Labor - Task		$0	$2,880	$0	$0	$2,880	C4
390	Water Tanks: Procure Repair Parts, Replacements (PY6)	1.2.6.1.3		CapEx		$0	$5,000	$0	$0	$5,000	C4
391	Pumps: Procure Repair/Replacement Components (PY5)	1.2.6.2.5	EN-ME	Labor - Task		$4,699	$0	$0	$0	$4,699	C4
392	Pumps: Procure Repair/Replacement Components (PY5))	1.2.6.2.5		CapEx		$6,600	$0	$0	$0	$6,600	C4
393	Pumps: Procure Repair/Replacement Components (PY6)	1.2.6.2.6	EN-ME	Labor - Task		$0	$2,880	$0	$0	$2,880	C4
394	Pumps: Procure Repair/Replacement Components (PY6)	1.2.6.2.6		CapEx		$0	$5,000	$0	$0	$5,000	C4
395	Interconnect: Procure External Interconnect materials (PY6)	1.2.6.4.9	EN-ME	Labor - Task		$0	$4,800	$0	$0	$4,800	C4
396	Interconnect: Procure External Interconnect materials (PY6)	1.2.6.4.9		CapEx		$0	$10,551	$0	$0	$10,551	C4
397	MDS: Evaluate Water Hoses (1-1/2", 3/4", and 1/2" Hose)	1.2.6.5.1	EN-ME	Labor - Task		$0	$960	$0	$0	$960	C4
398	MDS: Evaluate Fuel Hoses	1.2.6.5.2	EN-ME	Labor - Task		$0	$960	$0	$0	$960	C4
399	MDS: Procure Replacements Internal Hoses and Spares	1.2.6.5.3	EN-ME	Labor - Task		$0	$1,920	$0	$0	$1,920	C4
400	MDS: Procure Replacements Internal Hoses and Spares	1.2.6.5.3		CapEx		$0	$11,365	$0	$0	$11,365	C4
401	Support Equipment: IFD Follow-up Tasks (PY5)	1.2.7.1.7	EN-ME	Labor - Task		$4,699	$0	$0	$0	$4,699	C3
402	Support Equipment: IFD Follow-up Tasks (PY5)	1.2.7.1.7	TE	Labor - Task		$1,888	$0	$0	$0	$1,888	C3
403	Support Equipment: IFD Follow-up Tasks (PY5)	1.2.7.1.7		CapEx		$2,000	$0	$0	$0	$2,000	C3

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
404	Support Equipment: Identify Spares and Replacements	1.2.7.2.1	EN-ME	Labor - Task		$2,819	$0	$0	$0	$2,819	C4
405	Support Equipment: Procure Spares and Replacements	1.2.7.2.2	EN-ME	Labor - Task		$2,349	$2,400	$0	$0	$4,749	C4
406	Support Equipment: Procure Spares and Replacements	1.2.7.2.2		CapEx		$4,000	$4,000	$0	$0	$8,000	C4
407	Support Equipment: Procure Hose Stock and Fittings	1.2.7.2.4	EN-ME	Labor - Task		$2,819	$0	$0	$0	$2,819	C4
408	Support Equipment: Procure Hose Stock and Fittings	1.2.7.2.4		CapEx		$5,000	$0	$0	$0	$5,000	C4
409	Support Equipment: Spare Parts Inventory and Catalog - Electrical/Controls	1.2.7.2.5	EN-ME	Labor - Task		$1,880	$0	$0	$0	$1,880	C4
410	Shops: Identify Upgrade-Replacements, Spares	1.2.7.3.1	EN-ME	Labor - Task		$1,880	$0	$0	$0	$1,880	C4
411	Shops: Procure Upgrade-Replacements, Spares	1.2.7.3.2	EN-ME	Labor - Task		$3,759	$0	$0	$0	$3,759	C4
412	Shops: Procure Upgrade-Replacements, Spares	1.2.7.3.2		CapEx		$3,500	$0	$0	$0	$3,500	C4
413	Testbed: Commission/Maintenance/Decommission (PY5)	1.2.7.4.7	TE	Labor - Task		$6,292	$0	$0	$0	$6,292	C4
414	Testbed: Commission/Maintenance/Decommission (PY5)	1.2.7.4.7	EN	Labor - Task		$9,398	$0	$0	$0	$9,398	C4
415	Testbed: Commission/Maintenance/Decommission (PY5)	1.2.7.4.7		CapEx		$10,000	$0	$0	$0	$10,000	C4
416	Testbed: Commission/Maintenance/Decommission (PY6)	1.2.7.4.8	TE	Labor - Task		$0	$6,428	$0	$0	$6,428	C4
417	Testbed: Commission/Maintenance/Decommission (PY6)	1.2.7.4.8	EN	Labor - Task		$0	$9,600	$0	$0	$9,600	C4
418	Testbed: Commission/Maintenance/Decommission (PY6)	1.2.7.4.8		CapEx		$0	$10,000	$0	$0	$10,000	C4
419	Testbed: Commission/Maintenance/Decommission (PY7)	1.2.7.4.9	TE	Labor - Task		$0	$0	$6,566	$0	$6,566	C4
420	Testbed: Commission/Maintenance/Decommission (PY7)	1.2.7.4.9	EN	Labor - Task		$0	$0	$9,806	$0	$9,806	C4
421	Testbed: Commission/Maintenance/Decommission (PY7)	1.2.7.4.9		CapEx		$0	$0	$10,000	$0	$10,000	C4
422	Testbed: Commission/Maintenance/Decommission (PY8)	1.2.7.4.10	TE	Labor - Task		$0	$0	$0	$3,354	$3,354	C4
423	Testbed: Commission/Maintenance/Decommission (PY8)	1.2.7.4.10	EN	Labor - Task		$0	$0	$0	$5,009	$5,009	C4
424	Testbed: Commission/Maintenance/Decommission (PY8)	1.2.7.4.10		CapEx		$0	$0	$0	$2,000	$2,000	C4
425	Tools & Equipment: Procure Tools & Consumables	1.2.7.5.5	EN	Labor - Task		$2,819	$2,880	$2,942	$0	$8,641	C4
426	Tools & Equipment: Procure Tools & Consumables	1.2.7.5.5		M & S		$7,650	$7,650	$7,650	$0	$22,950	C4
427	FS1 - Off-Ice EHWD & Safety Training - 5 Drillers (w/ 2 alternates) (Driller_PSL_DirectHire)	1.2.8.1.2	TE	Labor - Task		$22,024	$0	$0	$0	$22,024	C1
428	FS1 - Off-Ice EHWD & Safety Training - 10 PSL (Driller Lead/Engineers)	1.2.8.1.2	EN	Labor - Task		$35,242	$0	$0	$0	$35,242	C1
429	FS1 - Off-Ice EHWD & Safety Training - Safety Training Materials/Vendors	1.2.8.1.2		M & S		$7,650	$0	$0	$0	$7,650	C1
430	FS1 - Off-Ice EHWD & Safety Training - Safety Equipment/Consumables	1.2.8.1.2		M & S		$3,366	$0	$0	$0	$3,366	C1
431	FS1 - Off-Ice EHWD & Safety Training - 5 DH Drillers (w/ 2 alternates) - (Direct Hire Travel -1 Domestic, 2 International, 2 Local)	1.2.8.1.2		Travel	Foreign	$9,792	$0	$0	$0	$9,792	C1
432	FS1 - Off-Ice EHWD & Safety Training - 5 DH Drillers (w/ 2 alternates) - (Direct Hire Travel -1 Domestic, 2 International, 2 Local)	1.2.8.1.2		Travel	Domestic	$2,754	$0	$0	$0	$2,754	C1

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
433	FS2 - Off-Ice EHWD & Safety Training - 8 Drillers (2 alternates) (Driller_PSL_DirectHire)	1.2.8.1.3	TE	Labor - Task		$0	$35,995	$0	$0	$35,995	C1
434	FS2 - 10 PSL (Driller_Lead/Engineer)	1.2.8.1.3	EN	Labor - Task		$0	$35,999	$0	$0	$35,999	C1
435	FS2 - Off-Ice EHWD & Safety Training - Safety Training Materials/Vendors	1.2.8.1.3		M & S		$0	$3,825	$0	$0	$3,825	C1
436	FS2 - Off-Ice EHWD & Safety Training - Safety Equipment/Consumables	1.2.8.1.3		M & S		$0	$3,825	$0	$0	$3,825	C1
437	FS2 - Off-Ice EHWD & Safety Training - 8 DH Drillers w/ 2 alternates - (Direct Hire Travel -1 Domestic 2 International)	1.2.8.1.3		Travel	Foreign	$0	$14,688	$0	$0	$14,688	C1
438	FS2 - Off-Ice EHWD & Safety Training - 6 DH Drillers w/ 2 alternates - (Direct Hire Travel -1 Domestic 2 International)	1.2.8.1.3		Travel	Domestic	$0	$8,262	$0	$0	$8,262	C1
439	FS3 - Off-Ice EHWD & Safety Training - 22 Drillers (w/ 4 alternates) (Driller_PSL_DirectHire)	1.2.8.1.4	TE	Labor - Task		$0	$0	$220,615	$0	$220,615	C1
440	FS3 - Off-Ice EHWD & Safety Training - 10 PSL Staff - 2 Rotators (Engineer/Driller PSL_Lead)	1.2.8.1.4	EN	Labor - Task		$0	$0	$73,547	$0	$73,547	C1
441	FS3 - Off-Ice EHWD & Safety Training - Safety Training Materials/Vendors	1.2.8.1.4		M & S		$0	$0	$7,650	$0	$7,650	C1
442	FS3 - Off-Ice EHWD & Safety Training - Safety Equipment/Consumables	1.2.8.1.4		M & S		$0	$0	$6,885	$0	$6,885	C1
443	FS3 - Off-Ice EHWD & Safety Training - 24 Drillers (Direct Hire Travel)	1.2.8.1.4		Travel	Foreign	$0	$0	$29,376	$0	$29,376	C1
444	FS3 - Off-Ice EHWD & Safety Training - 24 Drillers (Direct Hire Travel)	1.2.8.1.4		Travel	Domestic	$0	$0	$33,048	$0	$33,048	C1
445	FS3 - Off-Ice Logging Winch Training - 3 Drillers 1 day	1.2.8.1.5	EN	Labor - Task		$0	$0	$2,942	$0	$2,942	C1
446	Deployment Travel & PQ Costs (FS1) (Driller_PSL_Manager)	1.2.8.5.2	EN	Labor - Task		$0	$7,680	$7,845	$0	$15,525	C1
447	Deployment Travel & PQ Costs (FS1) (Safety Engineer)	1.2.8.5.2	EN-S	Labor - Task	Zernick	$0	$8,566	$0	$0	$8,566	C1
448	Deployment Travel & PQ Costs (FS1) (Driller_PSL_DirectHire) x 3	1.2.8.5.2	TE	Labor - Task		$0	$15,427	$0	$0	$15,427	C1
449	Deployment Travel & PQ Costs (FS1) (PSL_Engineer) x 9	1.2.8.5.2	EN	Labor - Task		$0	$69,119	$0	$0	$69,119	C1
450	Deployment Travel & PQ Costs (FS1) (Drill Team)	1.2.8.5.2		M & S		$23,256	$0	$0	$0	$23,256	C1
451	Deployment Travel & PQ Costs (FS1) (Drill Team)	1.2.8.5.2		Travel	Foreign	$38,556	$0	$0	$0	$38,556	C1
452	On-Ice Labor (FS1) (PSL Engineers)	1.2.8.5.11	EN	Labor - Task		$0	$407,994	$0	$0	$407,994	C2
453	On-Ice Labor (FS1) (PSL Contract Drillers)	1.2.8.5.11	TE	Labor - Task		$0	$87,846	$0	$0	$87,846	C2
454	On-Ice Labor (FS1) (Safety Engineer)	1.2.8.5.11	EN-S	Labor - Task	Zernick	$0	$21,811	$0	$0	$21,811	C1
455	Deployment Travel & PQ Costs (FS2) (Driller_PSL_Manager)	1.2.8.6.2	EN	Labor - Task		$0	$0	$7,845	$0	$7,845	C1
456	Deployment Travel & PQ Costs (FS2) (Safety_Engineer)	1.2.8.6.2	EN-S	Labor - Task	Zernick	$0	$0	$8,750	$0	$8,750	C1
457	Deployment Travel & PQ Costs (FS2) (PSL_Direct_Hire)	1.2.8.6.2	TE	Labor - Task		$0	$0	$31,516	$0	$31,516	C1
458	Deployment Travel & PQ Costs (FS2) (PSL_Engineer)	1.2.8.6.2	EN	Labor - Task		$0	$0	$70,605	$0	$70,605	C1
459	Deployment Travel & PQ Costs (FS2) (Drill Team)	1.2.8.6.2		M & S		$0	$27,617	$0	$0	$27,617	C1
460	Deployment Travel & PQ Costs (FS2) (Drill Team)	1.2.8.6.2		Travel	Foreign	$0	$46,818	$0	$0	$46,818	C1
461	Generators/PDM: Parallel Gens through PDM Bays (Contract Gen Tech)	1.2.8.6.6.9		CapEx		$0	$0	$13,900	$0	$13,900	C3
462	Generators/PDM: Load Test using Resistance Heaters (Contract Gen Tech)	1.2.8.6.6.10		CapEx		$0	$0	$13,900	$0	$13,900	C3
463	Generators/PDM: Test Safety Shut-downs (Contract Gen Tech)	1.2.8.6.6.11		CapEx		$0	$0	$13,900	$0	$13,900	C3
464	On-Ice Labor (FS2) (PSL Engineers)	1.2.8.6.15	EN	Labor - Task		$0	$0	$404,508	$0	$404,508	C2
465	On-Ice Labor (FS2) (PSL Drillers)	1.2.8.6.15	TE	Labor - Task		$0	$0	$205,185	$0	$205,185	C2

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
466	On-Ice Labor (FS2) (Safety Engineer)	1.2.8.6.15	EN-S	Labor - Task	Zernick	$0	$0	$28,582	$0	$28,582	C2
467	Deployment Travel & PQ Costs (FS3) (Driller_Manager)	1.2.8.7.2	EN	Labor - Task		$0	$0	$0	$8,014	$8,014	C1
468	Deployment Travel & PQ Costs (FS3) (Safety_Engineer)	1.2.8.7.2	EN-S	Labor - Task	Zernick	$0	$0	$0	$8,938	$8,938	C1
469	Deployment Travel & PQ Costs (FS3) (Driller_PSL_Direct_Hire)	1.2.8.7.2	EN	Labor - Task		$0	$0	$0	$160,273	$160,273	C1
470	Deployment Travel & PQ Costs (FS3) (Engineer_PSL)	1.2.8.7.2	EN	Labor - Task		$0	$0	$0	$64,109	$64,109	C1
471	PQ Costs (FS3) (Drill Team)	1.2.8.7.2		M & S		$0	$0	$47,966	$0	$47,966	C1
472	Travel (FS3) (Drill Team)	1.2.8.7.2		Travel	Foreign	$0	$0	$79,866	$0	$79,866	C1
473	On-Ice Labor (FS3) (PSL Engineers)	1.2.8.7.13	EN	Labor - Task		$0	$0	$0	$374,806	$374,806	C2
474	On-Ice Labor (FS3) (PSL Contract Drillers)	1.2.8.7.13	TE	Labor - Task		$0	$0	$0	$645,558	$645,558	C2
475	On-Ice Labor (FS3) (Safety Engineer)	1.2.8.7.13	EN-S	Labor - Task	Zernick	$0	$0	$0	$46,898	$46,898	C2
476	Off-Ice Install: Procure Sensor Handling Equipment	1.2.9.1.3.2		CapEx		$8,453	$0	$0	$0	$8,453	C3
477	Off-Ice Install: Procure ESD Sensor Handling Equipment	1.2.9.1.3.3		CapEx		$5,549	$0	$0	$0	$5,549	C4
478	Off-Ice Install: Procure Installation Hardware	1.2.9.2.8		CapEx		$108,000	$0	$0	$0	$108,000	C3
479	Off-Ice Install: Procure Installation Weights	1.2.9.2.9		CapEx		$9,900	$0	$0	$0	$9,900	C4
480	Off-ice Install: IME ICL Quad Connectivity Tester Design, Prototype & Production (2023-24)	1.2.9.3.2.1		CapEx		$0	$4,800	$0	$0	$4,800	C4
481	Off-ice Install: IME ICL Quad Connectivity Tester Design, Prototype & Production (2023-24)	1.2.9.3.2.1		Travel	Domestic	$0	$2,754	$0	$0	$2,754	C1
482	Off-ice Install: IME Depth Readout Development and System Integration (2022-23)	1.2.9.3.3.2	EN-EE	Labor - Task	Wisniewski	$7,048	$0	$0	$0	$7,048	C3
483	Off-ice Install: IME Depth Readout Development and System Integration (2022-23)	1.2.9.3.3.2		Travel	Domestic	$2,754	$0	$0	$0	$2,754	C1
484	Off-ice Install: IME Depth Readout Development and System Integration (2022-23)	1.2.9.3.3.2		CapEx		$3,400	$0	$0	$0	$3,400	C4
485	Off-Ice Install: IME Depth Readout System Final Integration (2023-24)	1.2.9.3.3.3	EN-EE	Labor - Task	Wisniewski	$0	$4,800	$0	$0	$4,800	C3
486	Off-Ice Install: Procure Pressure Sensors	1.2.9.3.3.7		CapEx		$0	$104,796	$0	$0	$104,796	C2
487	Off-Ice Install: Procure Tablets for Logbook	1.2.9.4.2.3		CapEx		$0	$5,967	$0	$0	$5,967	C4
488	Off-Ice Install: Procure Laser Rangers & various Installation Supplies	1.2.9.4.2.5		CapEx		$0	$5,355	$0	$0	$5,355	C3
489	Domestic trip to PCA manufacturer	1.3.3.1.2.5		Travel	Domestic	$2,754.0	$0.00	$0.00	$0.00	$2,754.00	C1
490	27 Rev3 PDOM Mainboards	1.3.3.1.2.5		CapEx		$42,795.0	$0.00	$0.00	$0.00	$42,795.00	C2
491	27 PDOM Calibration Boards	1.3.3.1.2.5		CapEx		$17,550.0	$0.00	$0.00	$0.00	$17,550.00	C3
492	27 PDOM HV subsystems (HV supply PCA)	1.3.3.2.2.5		CapEx		$9,450.0	$0.00	$0.00	$0.00	$9,450.00	C3
493	35 Penetrator Cable Assemblies and attachment hardware	1.3.3.4.1		CapEx		$21,350.0	$0.00	$0.00	$0.00	$21,350.00	C1
494	Refurbishment Batch #1 (Qty. 20)	1.3.3.4.5.1	TE	Labor - Task	N.N.	$21,819.2	$0.00	$0.00	$0.00	$21,819.24	C3
495	Refurbishment Batch #1 (Qty. 20)	1.3.3.4.5.1		M & S		$9,180.0	$0.00	$0.00	$0.00	$9,180.00	C3
496	FAT Batch #1	1.3.3.4.5.2	SC	Labor - Task	Scientist	$12,617.3	$0.00	$0.00	$0.00	$12,617.25	C3
497	FAT Batch #1	1.3.3.4.5.2		M & S		$7,650.0	$0.00	$0.00	$0.00	$7,650.00	C3
498	Packing Batch #1	1.3.3.4.5.3	TE	Labor - Task	N.N.	$1,879.6	$0.00	$0.00	$0.00	$1,879.56	C3
499	Packing Batch #1	1.3.3.4.5.3		M & S		$1,530.0	$0.00	$0.00	$0.00	$1,530.00	C3
500	Ship to Pt. Hueneme	1.3.3.4.6		M & S		$765.0	$0.00	$0.00	$0.00	$765.00	C3
501	Ship to Pt. Hueneme	1.3.3.4.7		M & S		$0.0	$1,530.00	$0.00	$0.00	$1,530.00	C3
502	Firmware support during D-Egg FAT	1.3.4.2.3.3	EN	Labor - LoE	S. Griffin	$17,453.2	$0.00	$0.00	$0.00	$17,453.16	C1
503	Firmware support during mDOM FAT	1.3.4.2.3.5	EN	Labor - LoE	S. Griffin	$19,634.8	$0.00	$0.00	$0.00	$19,634.81	C1
504	Firmware support during development of Calibration Devices, Special Devices, system integration, and commissioning	1.3.4.2.3.6	EN	Labor - LoE	S. Griffin	$8,329.9	$8,509.01	$8,691.95	$5,179.32	$30,710.20	C1
505	First article cable fabrication	1.4.1.1.1.3.2.1	EN-ME	Labor - LoE	Ng	$4,712.0	$0.00	$0.00	$0.00	$4,711.98	C1
506	First article acceptance testing	1.4.1.1.1.3.2.2	EN-ME	Labor - Task	Ng	$3,141.3	$0.00	$0.00	$0.00	$3,141.32	C4
507	First article acceptance testing	1.4.1.1.1.3.2.2	TE	Labor - Task	Wilkins	$2,364.6	$0.00	$0.00	$0.00	$2,364.60	C4

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
508	First article shipping to breakout installation facility	1.4.1.1.1.3.2.4	EN-ME	Labor - Task	Ng	$3,141.3	$0.00	$0.00	$0.00	$3,141.32	C3
509	Production readiness review	1.4.1.1.1.3.3	EN-ME	Labor - Task	Ng	$5,497.3	$0.00	$0.00	$0.00	$5,497.30	C2
510	Production readiness review	1.4.1.1.1.3.3	TE	Labor - Task	Wilkins	$4,138.1	$0.00	$0.00	$0.00	$4,138.05	C2
511	Production of final six main cables	1.4.1.1.1.3.4	EN-ME	Labor - LoE	Ng	$4,712.0	$0.00	$0.00	$0.00	$4,711.98	C1
512	Production cable shipping to breakout installation facility	1.4.1.1.1.3.6	EN-ME	Labor - Task	Ng	$3,141.3	$0.00	$0.00	$0.00	$3,141.32	C3
513	Breakout final design	1.4.1.1.2.2.1	TE	Labor - Task	Wilkins	$591.2	$0.00	$0.00	$0.00	$591.15	C5
514	Breakout final design	1.4.1.1.2.2.1	EN-ME	Labor - Task	Ng	$3,926.6	$0.00	$0.00	$0.00	$3,926.65	C5
515	Breakout prototype production	1.4.1.1.2.2.2	EN-ME	Labor - LoE	Ng	$3,141.3	$0.00	$0.00	$0.00	$3,141.32	C1
516	Breakout prototype testing	1.4.1.1.2.2.3	EN-ME	Labor - Task	Ng	$3,926.6	$0.00	$0.00	$0.00	$3,926.65	C2
517	Breakout prototype testing	1.4.1.1.2.2.3	TE	Labor - Task	Wilkins	$2,955.8	$0.00	$0.00	$0.00	$2,955.75	C2
518	Breakout prototype testing	1.4.1.1.2.2.3		Travel	Foreign	$14,880.0	$0.00	$0.00	$0.00	$14,880.00	C1
519	Breakout final design review	1.4.1.1.2.2.4	TE	Labor - Task	Wilkins	$7,093.8	$0.00	$0.00	$0.00	$7,093.80	C3
520	Breakout final design review	1.4.1.1.2.2.4	EN-ME	Labor - Task	Ng	$9,424.0	$0.00	$0.00	$0.00	$9,423.95	C3
521	Breakout final design review	1.4.1.1.2.2.4		Travel	Domestic	$8,370.0	$0.00	$0.00	$0.00	$8,370.00	C1
522	MCA production	1.4.1.1.3.2		Travel	Foreign	$9,920.0	$0.00	$0.00	$0.00	$9,920.00	C1
523	MCA production	1.4.1.1.3.2	EN-ME	Labor - LoE	Ng	$5,497.3	$0.00	$0.00	$0.00	$5,497.30	C1
524	Pre-ship review	1.4.1.1.3.3	TE	Labor - Task	Wilkins	$4,138.1	$0.00	$0.00	$0.00	$4,138.05	C3
525	Pre-ship review	1.4.1.1.3.3	EN-ME	Labor - Task	Ng	$5,497.3	$0.00	$0.00	$0.00	$5,497.30	C3
526	Main Cable Assembly shipping to PTH	1.4.1.1.3.4	EN-ME	Labor - Task	Ng	$1,570.7	$1,604.43	$0.00	$0.00	$3,175.09	C3
527	BCA prototype evaluation	1.4.1.2.1.5	EN-ME	Labor - Task	Ng	$2,945.0	$0.00	$0.00	$0.00	$2,944.98	C4
528	BCA prototype evaluation	1.4.1.2.1.5	TE	Labor - Task	Wilkins	$2,216.8	$0.00	$0.00	$0.00	$2,216.81	C4
529	BCA prototype evaluation	1.4.1.2.1.5		Travel	Foreign	$14,880.0	$0.00	$0.00	$0.00	$14,880.00	C1
530	BCA final design	1.4.1.2.2.1	EN-ME	Labor - Task	Ng	$13,743.3	$0.00	$0.00	$0.00	$13,743.26	C4
531	BCA final design	1.4.1.2.2.1	TE	Labor - Task	Wilkins	$5,911.5	$0.00	$0.00	$0.00	$5,911.50	C4
532	BCA final design review	1.4.1.2.2.2	EN-ME	Labor - Task	Ng	$9,424.0	$0.00	$0.00	$0.00	$9,423.95	C2
533	BCA final design review	1.4.1.2.2.2	TE	Labor - Task	Wilkins	$7,093.8	$0.00	$0.00	$0.00	$7,093.80	C2
534	BCA final design review	1.4.1.2.2.2		Travel	Domestic	$8,370.0	$0.00	$0.00	$0.00	$8,370.00	C1
535	BCA procurement	1.4.1.2.2.4	EN-ME	Labor - Task	Ng	$7,853.3	$0.00	$0.00	$0.00	$7,853.29	C4
536	BCA manufacturing - first two strings	1.4.1.2.3.1	EN-ME	Labor - LoE	Ng	$7,853.3	$0.00	$0.00	$0.00	$7,853.29	C1
537	BCA manufacturing - first two strings	1.4.1.2.3.1		Travel	Foreign	$9,920.0	$0.00	$0.00	$0.00	$9,920.00	C1
538	BCA connectors - first two strings, MCA side (62 connectors)	1.4.1.2.3.1		CapEx		$21,700.0	$0.00	$0.00	$0.00	$21,700.00	C3
539	BCA cable - first two strings (2,000 m)	1.4.1.2.3.1		CapEx		$30,000.0	$0.00	$0.00	$0.00	$30,000.00	C4
540	BCA fabrication costs - first two strings	1.4.1.2.3.1		CapEx		$25,000.0	$0.00	$0.00	$0.00	$25,000.00	C4
541	BCA pre-ship review	1.4.1.2.3.2	EN-ME	Labor - Task	Ng	$5,497.3	$0.00	$0.00	$0.00	$5,497.30	C3
542	Shipping to PTH	1.4.1.2.3.3	EN-ME	Labor - Task	Ng	$3,141.3	$0.00	$0.00	$0.00	$3,141.32	C3
543	BCA shipping costs to PTH (1st two strings)	1.4.1.2.3.3		M & S		$2,325.0	$0.00	$0.00	$0.00	$2,325.00	C4
544	BCA manufacturing	1.4.1.2.4.1	EN-ME	Labor - LoE	Ng	$4,712.0	$1,604.43	$0.00	$0.00	$6,316.40	C1
545	BCA manufacturing	1.4.1.2.4.1		Travel	Foreign	$9,920.0	$0.00	$0.00	$0.00	$9,920.00	C1
546	BCA connectors - last five strings, MCA side (110 connectors)	1.4.1.2.4.1		CapEx		$38,500.0	$0.00	$0.00	$0.00	$38,500.00	C3
547	BCA cable - last five strings (4,556 m)	1.4.1.2.4.1		CapEx		$68,340.0	$0.00	$0.00	$0.00	$68,340.00	C4
548	BCA fabrication costs - last five strings	1.4.1.2.4.1		CapEx		$0.0	$45,000.00	$0.00	$0.00	$45,000.00	C4
549	Shipping to PTH	1.4.1.2.4.2	EN-ME	Labor - Task	Ng	$0.0	$3,208.86	$0.00	$0.00	$3,208.86	C2
550	BCA shipping costs to PTH (remaining strings)	1.4.1.2.4.2		M & S		$0.0	$3,100.00	$0.00	$0.00	$3,100.00	C4
551	Breakout Cable Assembly miscellaneous supplies	1.4.1.2.5		M & S		$775.0	$193.75	$0.00	$0.00	$968.75	C1
552	SPAT cable materials	1.4.1.3.4.2		M & S		$1,488.0	$0.00	$0.00	$0.00	$1,488.00	C2
553	SPAT cable production	1.4.1.3.4.3	TE	Labor - Task	Wilkins	$2,955.8	$0.00	$0.00	$0.00	$2,955.75	C3
554	SPAT cable shipping	1.4.1.3.4.4	TE	Labor - Task	Wilkins	$591.2	$0.00	$0.00	$0.00	$591.15	C2
555	Penetrator Cable Assembly Miscellaneous supplies	1.4.1.3.5		M & S		$193.8	$0.00	$0.00	$0.00	$193.75	C1
556	String hardware final design review	1.4.1.4.1.5		Travel	Domestic	$5,580.0	$0.00	$0.00	$0.00	$5,580.00	C1
557	String hardware shipping to MCA production facility	1.4.1.4.1.7	EN-ME	Labor - Task	Ng	$1,570.7	$0.00	$0.00	$0.00	$1,570.66	C3
558	String hardware miscellaneous supplies	1.4.1.4.2		M & S		$387.5	$0.00	$0.00	$0.00	$387.50	C1

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
559	Off-Ice Safety Training FS3 Cable SMEs (Headcount 2)	1.4.1.6.1		Travel	Domestic	$0.0	$0.00	$5,580.00	$0.00	$5,580.00	C1
560	Cable SME FS3 PQ costs (Headcount 2)	1.4.1.6.3		M & S		$0.0	$0.00	$2,170.00	$0.00	$2,170.00	C2
561	Cable SME FS3 ECW costs (Headcount 2)	1.4.1.6.3		M & S		$0.0	$0.00	$775.00	$0.00	$775.00	C2
562	Cable SME FS3 Deployment travel (Headcount 2)	1.4.1.6.3		Travel	Foreign	$0.0	$0.00	$0.00	$5,580.00	$5,580.00	C1
563	On-Ice Cable SME support for FS3 activities (slot 1)	1.4.1.6.4	EN-ME	Labor - LoE	Ng	$0.0	$0.00	$0.00	$31,390.49	$31,390.49	C1
564	On-Ice Cable SME support for FS3 activities (slot 2)	1.4.1.6.5	EN-ME	Labor - LoE	TBD	$0.0	$0.00	$0.00	$19,880.65	$19,880.65	C1
565	Fabrication	1.4.2.2.4	EN-ME	Labor - Task	Ng	$785.3	$0.00	$0.00	$0.00	$785.33	C4
566	SJBs	1.4.2.2.4		CapEx		$14,000.0	$0.00	$0.00	$0.00	$14,000.00	C4
567	Pre-ship review	1.4.2.2.6	TE	Labor - Task	Wilkins	$1,773.5	$0.00	$0.00	$0.00	$1,773.45	C2
568	Pre-ship review	1.4.2.2.6	EN-ME	Labor - Task	Ng	$2,356.0	$0.00	$0.00	$0.00	$2,355.99	C2
569	Pre-ship review	1.4.2.2.6	SS	Labor - Task	Kelley	$4,511.8	$0.00	$0.00	$0.00	$4,511.83	C2
570	Shipping to PTH	1.4.2.2.6	EN-ME	Labor - Task	Ng	$2,356.0	$0.00	$0.00	$0.00	$2,355.99	C3
571	Shipping costs to PTH	1.4.2.2.6		M & S		$2,325.0	$0.00	$0.00	$0.00	$2,325.00	C4
572	Surface Junction Box miscellaneous supplies	1.4.2.2.8		M & S		$193.8	$0.00	$0.00	$0.00	$193.75	C1
573	Fabrication	1.4.2.3.2.3	SS	Labor - Task	Kelley	$3,759.9	$0.00	$0.00	$0.00	$3,759.86	C4
574	Pre-ship review	1.4.2.3.2.4	SS	Labor - Task	Kelley	$1,503.9	$0.00	$0.00	$0.00	$1,503.94	C2
575	Shipping to PTH (NB: small)	1.4.2.3.2.5	SS	Labor - Task	Kelley	$3,007.9	$0.00	$0.00	$0.00	$3,007.89	C3
576	Shipping costs	1.4.2.3.2.5		M & S		$1,530.0	$0.00	$0.00	$0.00	$1,530.00	C4
577	Final design	1.4.2.3.3.1	SS	Labor - Task	Kelley	$4,511.8	$0.00	$0.00	$0.00	$4,511.83	C4
578	Final design review	1.4.2.3.3.3	SS	Labor - Task	Kelley	$10,527.6	$0.00	$0.00	$0.00	$10,527.60	C2
579	Procurement	1.4.2.3.3.4	SS	Labor - Task	Kelley	$3,007.9	$0.00	$0.00	$0.00	$3,007.89	C3
580	Procurement	1.4.2.3.3.4	TE	Labor - LoE	Wilkins	$2,955.8	$0.00	$0.00	$0.00	$2,955.75	C1
581	Patch cables (169)	1.4.2.3.3.4		M & S		$45,249.8	$0.00	$0.00	$0.00	$45,249.75	C2
582	Production	1.4.2.3.3.5	TE	Labor - Task	Wilkins	$11,084.1	$2,264.47	$0.00	$0.00	$13,348.54	C3
583	Pre-ship review	1.4.2.3.3.6	SS	Labor - Task	Kelley	$0.0	$4,608.83	$0.00	$0.00	$4,608.83	C2
584	Shipping to PTH	1.4.2.3.3.7	TE	Labor - Task	Wilkins	$0.0	$2,415.44	$0.00	$0.00	$2,415.44	C3
585	Patch cable shipping costs	1.4.2.3.3.7		M & S		$0.0	$1,836.00	$0.00	$0.00	$1,836.00	C4
586	ICL Upgrade Support miscellaneous supplies	1.4.2.3.4		M & S		$765.0	$765.00	$765.00	$382.50	$2,677.50	C1
587	Cable SME FS2 PQ costs (Headcount 2)	1.4.2.4.4		M & S		$0.0	$2,170.00	$0.00	$0.00	$2,170.00	C2
588	Cable SME FS2 ECW costs (Headcount 2)	1.4.2.4.4		M & S		$0.0	$775.00	$0.00	$0.00	$775.00	C2
589	Cable SME FS2 Deployment travel (Headcount 2)	1.4.2.4.4		Travel	Foreign	$0.0	$0.00	$5,580.00	$0.00	$5,580.00	C1
590	Cable SME support for FS2 activities (slot 1)	1.4.2.4.5	EN-ME	Labor - LoE	Ng	$0.0	$0.00	$11,779.76	$0.00	$11,779.76	C1
591	Cable SME support for FS2 activities (slot 2)	1.4.2.4.6	EN-EE	Labor - LoE	Shoolz	$0.0	$0.00	$17,843.11	$0.00	$17,843.11	C1
592	Procurement	1.4.4.1.1.1	SS	Labor - LoE	Kelley	$7,519.7	$0.00	$0.00	$0.00	$7,519.71	C1
593	White Rabbit OEM nodes for NTS and SPTS (10 total, 6 to be purchased)	1.4.4.1.1.1		CapEx		$6,475.0	$0.00	$0.00	$0.00	$6,475.00	C2
594	White Rabbit OEM nodes for ICL (10)	1.4.4.1.1.1		CapEx		$10,791.0	$0.00	$0.00	$0.00	$10,791.00	C2
595	Fiber patch cables for ICL (10)	1.4.4.1.1.1		M & S		$306.0	$0.00	$0.00	$0.00	$306.00	C2
596	Shipping to PTH	1.4.4.1.1.5	SS	Labor - Task	Kelley	$4,511.8	$0.00	$0.00	$0.00	$4,511.83	C3
597	Shipping costs	1.4.4.1.1.5		M & S		$459.0	$0.00	$0.00	$0.00	$459.00	C4
598	Final design	1.4.4.1.2.1	SS	Labor - Task	Kelley	$0.0	$26,884.85	$0.00	$0.00	$26,884.85	C4
599	Prototype production	1.4.4.1.2.2	SS	Labor - Task	Kelley	$0.0	$15,362.77	$0.00	$0.00	$15,362.77	C3
600	Timing monitoring prototype	1.4.4.1.2.2		CapEx		$0.0	$3,000.00	$0.00	$0.00	$3,000.00	C3
601	Installation and testing at NTS/SPTS	1.4.4.1.2.3	SS	Labor - Task	Kelley	$0.0	$11,522.08	$0.00	$0.00	$11,522.08	C3
602	Installation and testing at NTS/SPTS	1.4.4.1.2.3		Travel	Domestic	$0.0	$2,754.00	$0.00	$0.00	$2,754.00	C1
603	Production of ICL system	1.4.4.1.2.4	SS	Labor - Task	Kelley	$0.0	$15,362.77	$0.00	$0.00	$15,362.77	C3
604	Timing monitoring system for ICL	1.4.4.1.2.4		CapEx		$0.0	$6,000.00	$0.00	$0.00	$6,000.00	C3
605	Shipping to PTH	1.4.4.1.2.6	SS	Labor - Task	Kelley	$0.0	$4,608.83	$0.00	$0.00	$4,608.83	C3
606	Shipping costs	1.4.4.1.2.6		M & S		$0.0	$459.00	$0.00	$0.00	$459.00	C4
607	Timing systems miscellaneous supplies	1.4.4.1.3		M & S		$765.0	$765.00	$191.25	$0.00	$1,721.25	C1
608	Procurement	1.4.4.2.1.5	SS	Labor - LoE	Kelley	$10,527.6	$0.00	$0.00	$0.00	$10,527.60	C1

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
609	DC power supply chassis for ICL (3)	1.4.4.2.1.5		CapEx		$1,995.0	$0.00	$0.00	$0.00	$1,995.00	C2
610	48V DC power supply modules for ICL (15)	1.4.4.2.1.5		CapEx		$7,230.0	$0.00	$0.00	$0.00	$7,230.00	C2
611	Final design	1.4.4.2.2.1	SS	Labor - Task	Kelley	$3,007.9	$0.00	$0.00	$0.00	$3,007.89	C4
612	Production	1.4.4.2.2.4	SS	Labor - LoE	Kelley	$11,279.6	$0.00	$0.00	$0.00	$11,279.57	C1
613	Custom power fanout unit for NTS	1.4.4.2.2.4		CapEx		$1,275.0	$0.00	$0.00	$0.00	$1,275.00	C3
614	Power fanout cables for NTS (5)	1.4.4.2.2.4		CapEx		$800.0	$0.00	$0.00	$0.00	$800.00	C2
615	Custom power fanout units for ICL (2)	1.4.4.2.2.4		CapEx		$2,550.0	$0.00	$0.00	$0.00	$2,550.00	C3
616	Power fanout cables for ICL (10)	1.4.4.2.2.4		CapEx		$1,600.0	$0.00	$0.00	$0.00	$1,600.00	C2
617	Production	1.4.4.2.3.4	SS	Labor - LoE	Kelley	$22,559.1	$0.00	$0.00	$0.00	$22,559.14	C1
618	Power control unit for NTS	1.4.4.2.3.4		CapEx		$750.0	$0.00	$0.00	$0.00	$750.00	C3
619	Power control units for ICL (2)	1.4.4.2.3.4		CapEx		$1,500.0	$0.00	$0.00	$0.00	$1,500.00	C3
620	Installation and testing at NTS	1.4.4.2.4.1	SS	Labor - Task	Kelley	$7,519.7	$0.00	$0.00	$0.00	$7,519.71	C3
621	Installation and testing at NTS	1.4.4.2.4.1		Travel	Domestic	$2,754.0	$0.00	$0.00	$0.00	$2,754.00	C1
622	Power system final design review	1.4.4.2.4.2	SS	Labor - Task	Kelley	$18,047.3	$0.00	$0.00	$0.00	$18,047.31	C3
623	Pre-ship review	1.4.4.2.4.3	SS	Labor - Task	Kelley	$7,519.7	$0.00	$0.00	$0.00	$7,519.71	C3
624	Shipping to PTH	1.4.4.2.4.4	SS	Labor - Task	Kelley	$4,511.8	$0.00	$0.00	$0.00	$4,511.83	C2
625	Shipping costs	1.4.4.2.4.4		M & S		$765.0	$0.00	$0.00	$0.00	$765.00	C4
626	Power systems miscellaneous supplies	1.4.4.2.5		M & S		$765.0	$765.00	$765.00	$382.50	$2,677.50	C1
627	Electronics SME FS2 PQ costs (slot 1)	1.4.4.3.2		M & S		$0.0	$1,085.00	$0.00	$0.00	$1,085.00	C2
628	Electronics SME FS2 ECW costs (slot 1)	1.4.4.3.2		M & S		$0.0	$387.50	$0.00	$0.00	$387.50	C2
629	Electronics SME FS2 Deployment travel (slot 1)	1.4.4.3.2		Travel	Foreign	$0.0	$0.00	$2,790.00	$0.00	$2,790.00	C1
630	Electronics SME FS2 PQ costs (slot 2)	1.4.4.3.2		M & S		$0.0	$1,085.00	$0.00	$0.00	$1,085.00	C2
631	Electronics SME FS2 ECW costs (slot 2)	1.4.4.3.2		M & S		$0.0	$387.50	$0.00	$0.00	$387.50	C2
632	Electronics SME FS2 Deployment travel (slot 2)	1.4.4.3.2		Travel	Foreign	$0.0	$0.00	$2,790.00	$0.00	$2,790.00	C1
633	Electronics SME support for FS2 activities	1.4.4.3.3	PO	Labor - LoE	Halliday	$0.0	$0.00	$13,183.85	$0.00	$13,183.85	C1
634	Electronics SME support for FS3 activities (slot 1)	1.4.4.3.8	SS	Labor - LoE	Kelley	$0.0	$0.00	$0.00	$30,057.14	$30,057.14	C1
635	Off-ice safety training FS3 Electronics SMEs	1.4.4.3.5		Travel	Domestic	$0.0	$0.00	$2,790.00	$0.00	$2,790.00	C1
636	Electronics SME FS3 PQ costs (slot 1)	1.4.4.3.7		M & S		$0.0	$0.00	$1,071.00	$0.00	$1,071.00	C2
637	Electronics SME FS3 ECW costs (slot 1)	1.4.4.3.7		M & S		$0.0	$0.00	$382.50	$0.00	$382.50	C2
638	Electronics SME FS3 Deployment travel (slot 1)	1.4.4.3.7		Travel	Foreign	$0.0	$0.00	$0.00	$2,754.00	$2,754.00	C1
639	Electronics SME FS3 PQ costs (slot 2)	1.4.4.3.7		M & S		$0.0	$0.00	$1,085.00	$0.00	$1,085.00	C2
640	Electronics SME FS3 ECW costs (slot 2)	1.4.4.3.7		M & S		$0.0	$0.00	$387.50	$0.00	$387.50	C2
641	Electronics SME FS3 Deployment travel (slot 2)	1.4.4.3.7		Travel	Foreign	$0.0	$0.00	$0.00	$2,790.00	$2,790.00	C1
642	CPT Management - Ty DeYoung	1.4.6	KE	Labor - LoE	DeYoung	$40,306.2	$41,172.78	$42,058.00	$0.00	$123,536.97	C1
643	CPT Management miscellaneous Supplies	1.4.6		M & S		$775.0	$775.00	$775.00	$387.50	$2,712.50	C1
644	Reviews and Project Planning Meetings	1.4.6		Travel	Domestic	$5,580.0	$5,580.00	$5,580.00	$2,790.00	$19,530.00	C1
645	Overall coordination for Pencil Beam	1.5.2.2.2.0	SS	Labor - LoE	Wendt	$61,714.8	$57,788.21	$0.00	$0.00	$119,503.03	C1
646	Simulation Studies	1.5.3.1.1	PO	Labor - Task		$0.0	$33,738.97	$68,928.71	$0.00	$102,667.68	C1
647	Create Database Structure for Timing Calibration Data	1.5.3.2.4	PO	Labor - Task		$0.0	$33,738.97	$68,928.71	$17,602.67	$120,270.35	C1
648	Analyze Timing Calibration Data from Deployed Modules	1.5.3.2.5	PO	Labor - Task		$0.0	$0.00	$0.00	$17,602.67	$17,602.67	C1
649	Create Database Structure for Geometry Calibration Data	1.5.3.3.2	PO	Labor - Task		$0.0	$33,738.97	$68,928.71	$17,602.67	$120,270.35	C1
650	Analyze Geometry Calibration Data from Deployed Modules	1.5.3.3.3	PO	Labor - Task		$0.0	$0.00	$0.00	$17,602.67	$17,602.67	C1
651	Software Development	1.5.3.4.2	PO	Labor - Task		$0.0	$33,738.97	$68,928.71	$35,205.34	$137,873.01	C1
652	Execution	1.5.3.4.3	PO	Labor - Task		$0.0	$0.00	$0.00	$35,205.34	$35,205.34	C1
653	Dust logger shipping UCB to UW/PSL	1.5.3.5.1		M & S		$0.0	$1,000.00	$0.00	$0.00	$1,000.00	C1

	Primary	WBS	Resource ID	Subtype	Resource Name	Complete Total PY5	Complete Total PY6	Complete Total PY7	Complete Total PY8	Complete Total PY5-PY8	Contingency
654	PSL Engineering support for summer 2024 testing	1.5.3.5.1	TE	Labor - Task		$0.0	$3,856.64	$0.00	$0.00	$3,856.64	C1
655	Research Scientist to test dust logger	1.5.3.5.1	SS	Labor - Task	Senior Scientist	$0.0	$30,725.55	$0.00	$0.00	$30,725.55	C1
656	Travel to test dust logger	1.5.3.5.1		Travel	Domestic	$0.0	$2,754.00	$0.00	$0.00	$2,754.00	C1
657	Shipping of logger and winch to PTH	1.5.3.5.3		M & S		$0.0	$0.00	$4,000.00	$0.00	$4,000.00	C1
658	Calibration Management	1.5.4.1	KE	Labor - LoE	Williams	$11,733.1	$11,985.32	$12,243.01	$0.00	$35,961.40	C1
659	Miscellaneous supplies for calibration and outreach activities	1.5.4.1		M & S		$4,470.0	$0.00	$0.00	$0.00	$4,470.00	C1
660	Travel to reviews and working meetings - Domestic	1.5.4.2		Travel	Domestic	$5,364.0	$5,364.00	$5,364.00	$2,682.00	$18,774.00	C1
661	Travel to reviews and working meetings - International	1.5.4.2		Travel	Foreign	$9,536.0	$9,536.00	$9,536.00	$0.00	$28,608.00	C1
662	L2 Task management - Erik Blaufuss	1.6.0	SS	Labor - LoE	Blaufuss	$42,460.7	$43,373.65	$44,306.18	$22,629.38	$152,769.95	C1
663	Travel to annual project reviews	1.6.0		Travel	Domestic	$5,562.0	$5,562.00	$2,781.00	$0.00	$13,905.00	C1
664	Travel to project planning workshops and meetings	1.6.0		Travel	Domestic	$2,781.0	$0.00	$0.00	$0.00	$2,781.00	C1
665	PQ process - all L3 areas	1.6.0		M & S		$0.0	$1,453.50	$1,453.50	$0.00	$2,907.00	C1
666	Deployment to Pole - all L3 areas	1.6.0		Travel	Foreign	$0.0	$2,754.00	$2,754.00	$0.00	$5,508.00	C1
667	PQ process - all L3 areas	1.6.0		M & S		$0.0	$0.00	$1,467.75	$0.00	$1,467.75	C1
668	Deployment to Pole - all L3 areas	1.6.0		Travel	Foreign	$0.0	$0.00	$2,781.00	$0.00	$2,781.00	C1
669	L3 Task Management - Jim Braun	1.6.1.0	SC	Labor Hours	Braun	$10,937.8	$11,172.93	$11,413.14	$5,829.26	$39,353.10	C1
670	Travel to project planning workshops and meetings	1.6.1.0		Travel	Domestic	$2,754.0	$2,754.00	$2,754.00	$0.00	$8,262.00	C1
671	Travel to NTS for new OM integration work	1.6.1.0		Travel	Domestic	$2,754.0	$0.00	$0.00	$0.00	$2,754.00	C1
672	Travel to NTS for new calibration device integration work	1.6.1.0		Travel	Domestic	$0.0	$2,754.00	$2,754.00	$0.00	$5,508.00	C1
673	Travel to NTS for OM integration work	1.6.1.0		Travel	Domestic	$0.0	$2,754.00	$2,754.00	$0.00	$5,508.00	C1
674	Support OM testing app thru FAT testing cycles	1.6.1.4.3.8	SE	Labor - Task	Weber	$84,596.8	$0.00	$0.00	$0.00	$84,596.77	C1
675	Extend OM testing app to include support for MMB based special devices	1.6.1.4.3.9.1	SE	Labor - Task	Weber	$68,930.7	$0.00	$0.00	$0.00	$68,930.70	C4
676	Support OM testing app thru calibration device DVT and FAT testing	1.6.1.4.3.9.2	SE	Labor - Task	Weber	$43,865.0	$72,013.00	$0.00	$0.00	$115,877.99	C2
677	Prototype and test SPAT testing software at NTS	1.6.1.4.3.10	SE	Labor - Task	Weber	$0.0	$38,406.93	$0.00	$0.00	$38,406.93	C3
678	Prepare and ship SPAT toolset to Pole	1.6.1.4.3.11	SE	Labor - Task	Weber	$0.0	$21,603.90	$0.00	$0.00	$21,603.90	C2
679	Prepare and ship SPAT toolset to Pole	1.6.1.4.3.11		M & S		$0.0	$11,475.00	$0.00	$0.00	$11,475.00	C2
680	SPAT testing preparation and execution at Pole FS2	1.6.1.4.3.13	SE	Labor - Task	Weber	$0.0	$0.00	$73,561.28	$0.00	$73,561.28	C2
681	SPAT testing preparation and execution at Pole FS3	1.6.1.4.3.15	SE	Labor - Task	Weber	$0.0	$0.00	$0.00	$75,142.85	$75,142.85	C2
682	Extend xDOMapp to include support for calibration devices in operations	1.6.1.4.5.4.3	SE	Labor - Task	Weber	$14,099.5	$53,609.68	$0.00	$0.00	$67,709.14	C4
683	Support full DAQ testing with xDOMapp at NTS/SPTS with Calibration devices	1.6.1.4.5.6	SE	Labor - Task	Weber	$0.0	$0.00	$17,981.65	$10,853.97	$28,835.61	C2
684	Support xDOMapp through SPAT testing and deployment	1.6.1.4.5.8	SE	Labor - Task	Weber	$0.0	$0.00	$49,040.85	$10,019.05	$59,059.90	C2
685	Support MMB-xDOMapp software for calibration devices	1.6.1.4.6.5	SE	Labor - Task	Weber	$28,198.9	$86,415.60	$14,712.26	$0.00	$129,326.78	C2
686	Firmware device maintenance and support for all OM devices during DAQ Development	1.6.1.6.6	SE	Labor - Task	Anderson	$22,376.7	$12,190.83	$12,452.93	$6,360.33	$53,380.80	C3
687	L3 Task management - Ralf Auer	1.6.4.0	EN	Labor - LoE	Auer	$0.0	$0.00	$6,340.64	$4,317.97	$10,658.61	C1
688	Miscellaneous supplies	1.6.4.0		M & S		$765.0	$765.00	$0.00	$0.00	$1,530.00	C1
689	Trip to MSU to install NTS equipment	1.6.4.0		Travel	Domestic	$0.0	$0.00	$2,754.00	$0.00	$2,754.00	C1
690	NTS computing system purchase	1.6.4.0		CapEx		$0.0	$0.00	$2,500.00	$0.00	$2,500.00	C3
691	Miscellaneous supplies	1.6.4.0		M & S		$0.0	$0.00	$765.00	$0.00	$765.00	C1
692	SPS computing system additions	1.6.4.0		CapEx		$0.0	$0.00	$12,000.00	$0.00	$12,000.00	C3
693	L3 Task Management	1.6.5.0	SC	Labor - Task		$0.0	$0.00	$10,260.27	$6,987.24	$17,247.52	C1