Attachment F

Monte Carlo Simulation Reports

ESTIMATE WORKSHEET

FEATURE:

REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[JC Boyle - Full Removal Crystal Ball - with Escalation - 2011-04.xls]Copco 2 - Full - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	1	Removal of Diversion Conduit Bulkheads.	8130	14	14	14	CY	$725.00	$850.00	$950.00	$10,150.00	$11,900.00	$13,300.00
	2	Remove Water from behind Tailrace Cofferdam.	8130	500,000	500,000	500,000	GAL	$0.01	$0.01	$0.01	$5,000.00	$5,000.00	$5,000.00
	3	Provide Dewatering behind Tailrace Cofferdam	8130	1	1	1	LS	$28,000.00	$30,000.00	$160,000.00	$28,000.00	$30,000.00	$160,000.00
	4	Construct Embankment Cofferdam in Tailrace around Powerhouse	8130	2,000	2,000	2,000	CY	$50.00	$60.00	$100.00	$100,000.00	$120,000.00	$200,000.00
	5	Remove Spillway Concrete	8130	2,500	2,500	2,500	CY	$130.00	$260.00	$390.00	$325,000.00	$650,000.00	$975,000.00
	6	Remove Monorail Structural Steel Components	8130	15,000	15,000	15,000	LBS	$0.45	$0.65	$0.75	$6,750.00	$9,750.00	$11,250.00
	7	Remove Fish Ladder Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	8	Remove Gravity Dam Section Concrete	8130	600	600	600	CY	$130.00	$260.00	$390.00	$78,000.00	$156,000.00	$234,000.00
	9	Remove Timber Equipment Ramp on left side of Dam	8130	10,500	10,500	10,500	LBS	$0.50	$0.55	$0.70	$5,250.00	$5,775.00	$7,350.00
	10	Remove Pressure-Treated Lumber from Footbridge around Intake Structure	8130	3,600	3,600	3,600	LBS	$0.50	$0.55	$0.70	$1,800.00	$1,980.00	$2,520.00
	11	Remove Storage Shed located on access road	8130	1,728	1,728	1,728	SF	$38.00	$40.00	$42.00	$65,664.00	$69,120.00	$72,576.00
	12	Remove Warehouse located on access road	8130	1,920	1,920	1,920	SF	$38.00	$40.00	$42.00	$72,960.00	$76,800.00	$80,640.00
	13	Remove Fire System Control Bldg. on left abutment.	8130	385	385	385	SF	$38.00	$40.00	$42.00	$14,630.00	$15,400.00	$16,170.00
	14	Remove Dam Communication Bldg. on left abutment.	8130	331	331	331	SF	$38.00	$40.00	$42.00	$12,578.00	$13,240.00	$13,902.00
	15	Remove Concrete Slab on left abutment for former Control House	8130	6	6	6	CY	$130.00	$260.00	$390.00	$780.00	$1,560.00	$2,340.00
	16	Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment.	8130	1	1	1	CY	$130.00	$260.00	$390.00	$130.00	$260.00	$390.00
	17	Remove Reservoir Level Gauge House on Dam Crest	8130	24	24	24	SF	$38.00	$40.00	$42.00	$912.00	$960.00	$1,008.00
	18	Upstream Riprap	8313	2,220	2,220	2,220	CY	$8.00	$9.00	$12.00	$17,760.00	$19,980.00	$26,640.00
	19	Downstream Riprap	8313	1,850	1,850	1,850	CY	$8.00	$9.00	$12.00	$14,800.00	$16,650.00	$22,200.00
	20	Miscellaneous Excavation	8313	132,500	132,500	132,500	CY	$8.00	$9.00	$12.00	$1,060,000.00	$1,192,500.00	$1,590,000.00
	21	Cutoff Wall Concrete Demolition	8313	70	70	70	CY	$130.00	$260.00	$390.00	$9,100.00	$18,200.00	$27,300.00
	22	Cutoff Wall Anchors	8313	285	285	285	EA	$9.00	$10.00	$12.00	$2,565.00	$2,850.00	$3,420.00
	23	Remove & Dispose Hand Rails and Light Poles	8420	5,000	5,000	5,000	LBS	$0.45	$0.65	$0.75	$2,250.00	$3,250.00	$3,750.00
	24	Remove & Dispose Spillway Radial Gates and Hoists	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	25	Remove & Dispose Stop Logs and Slots (steel)	8420	92,000	92,000	92,000	LBS	$0.45	$0.65	$0.75	$41,400.00	$59,800.00	$69,000.00
	26	Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure	8420	4,200	4,200	4,200	LBS	$0.45	$0.65	$0.75	$1,890.00	$2,730.00	$3,150.00
	27	Remove & Dispose of Spillway gate motor & control panel	8430	1	1	1	EA	$500.00	$600.00	$700.00	$500.00	$600.00	$700.00
	28	Remove & Dispose of Distribution equipment , panelboards	8430	1	1	1	EA	$5,500.00	$6,000.00	$6,500.00	$5,500.00	$6,000.00	$6,500.00
	29	Remove Powerhouse Concrete down to Elevation 3324.0	8130	1,500	1,500	1,500	CY	$300.00	$370.00	$800.00	$450,000.00	$555,000.00	$1,200,000.00
	30	Remove Structural Steel Items associated with Powerhouse	8130	94,000	94,000	94,000	LBS	$0.45	$0.65	$0.75	$42,300.00	$61,100.00	$70,500.00
	31	Remove Warehouse near Powerhouse	8130	5,200	5,200	5,200	SF	$38.00	$40.00	$42.00	$197,600.00	$208,000.00	$218,400.00
	32	Remove & Dispose of 2 - Governor oil systems	8420	52,500	52,500	52,500	LBS	$0.45	$0.65	$0.75	$23,625.00	$34,125.00	$39,375.00
	33	Remove & Dispose of Cooling water and bearing oil systems	8420	6,500	6,500	6,500	LBS	$0.45	$0.65	$0.75	$2,925.00	$4,225.00	$4,875.00
	34	Remove & Dispose of 2 - Francis Turbines	8420	560,000	560,000	560,000	LBS	$0.45	$0.65	$0.75	$252,000.00	$364,000.00	$420,000.00
	35	Remove & Dispose of 150 Ton crane	8420	240,000	240,000	240,000	LBS	$0.45	$0.65	$0.75	$108,000.00	$156,000.00	$180,000.00
	36	Remove & Dispose of Compressed Air systems	8420	1,100	1,100	1,100	LBS	$0.45	$0.65	$0.75	$495.00	$715.00	$825.00
	37	Remove & Dispose of 2 - CO2 systems	8420	6,600	6,600	6,600	LBS	$0.45	$0.65	$0.75	$2,970.00	$4,290.00	$4,950.00
	38	Remove & Dispose of Plant Water and Fire Protection	8420	3,100	3,100	3,100	LBS	$0.45	$0.65	$0.75	$1,395.00	$2,015.00	$2,325.00
	39	Remove & Dispose of Transformer Oil Fire protection	8420	6,500	6,500	6,500	LBS	$0.45	$0.65	$0.75	$2,925.00	$4,225.00	$4,875.00
	40	Remove & Dispose of Unwatering Piping	8420	33,000	33,000	33,000	LBS	$0.45	$0.65	$0.75	$14,850.00	$21,450.00	$24,750.00
	41	Remove & Dispose of Drainage Piping	8420	10,000	10,000	10,000	LBS	$0.45	$0.65	$0.75	$4,500.00	$6,500.00	$7,500.00
	42	Remove & Dispose of 2-Oil Sump pumps	8420	2,000	2,000	2,000	LBS	$0.45	$0.65	$0.75	$900.00	$1,300.00	$1,500.00
	43	Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Powerhouse	8420	65,000	65,000	65,000	LBS	$0.45	$0.65	$0.75	$29,250.00	$42,250.00	$48,750.00
	44	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA	8430	2	2	2	EA	$150,000.00	$200,000.00	$250,000.00	$300,000.00	$400,000.00	$500,000.00
	45	Remove & Dispose of Excitation equipment for 53/50 MVA Generator	8430	2	2	2	EA	$12,000.00	$12,500.00	$13,000.00	$24,000.00	$25,000.00	$26,000.00
	46	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator	8430	2	2	2	EA	$6,000.00	$7,000.00	$8,000.00	$12,000.00	$14,000.00	$16,000.00
	47	Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator	8430	2	2	2	EA	$2,000.00	$3,000.00	$4,000.00	$4,000.00	$6,000.00	$8,000.00

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	48	Remove & Dispose of Generator Switchgear, 15kV - (6 sections)	8430	1	1	1	EA	$19,000.00	$20,000.00	$21,000.00	$19,000.00	$20,000.00	$21,000.00
	49	Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections)	8430	1	1	1	EA	$8,000.00	$9,000.00	$10,000.00	$8,000.00	$9,000.00	$10,000.00
	50	Remove & Dispose of Unit and plant control switchboard	8430	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	51	Remove & Dispose of Battery system	8430	1	1	1	EA	$7,000.00	$8,000.00	$9,000.00	$7,000.00	$8,000.00	$9,000.00
	52	Remove & Dispose of Raceways, Conduit and Cable	8430	1	1	1	EA	$10,000.00	$11,000.00	$12,000.00	$10,000.00	$11,000.00	$12,000.00
	53	Remove & Dispose of Misc. power & control boards	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	54	Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	55	Remove & Dispose of Gantry Crane control equipment (3 cubicles)	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	56	Remove & Dispose of Conduit and Cable	8430	1	1	1	EA	$9,000.00	$10,000.00	$11,000.00	$9,000.00	$10,000.00	$11,000.00
	57	Remove & Dispose of Exterior Lighting	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	58	Remove & Dispose of Transmission Line No. 59	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	59	Remove & Dispose of Transmission Line No. 98	8430	0.24	0.24	0.24	MILE	$20,000.00	$25,000.00	$30,000.00	$4,800.00	$6,000.00	$7,200.00
	60	Remove & Dispose of Transmission Line No. 58	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	61	Remove Intake Structure Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	62	Remove Fish Screen Building	8130	1,300	1,300	1,300	SF	$38.00	$40.00	$42.00	$49,400.00	$52,000.00	$54,600.00
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	8130	22,000	22,000	22,000	LBS	$0.45	$0.65	$0.75	$9,900.00	$14,300.00	$16,500.00
	64	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	8130	1,100	1,100	1,100	CY	$130.00	$260.00	$390.00	$143,000.00	$286,000.00	$429,000.00
	65	Remove Open Concrete Flume.	8130	26,000	26,000	26,000	CY	$220.00	$260.00	$390.00	$5,720,000.00	$6,760,000.00	$10,140,000.00
	66	Remove Structural Steel Items associated with the Forebay Trashrack Piers	8130	11,500	11,500	11,500	LBS	$0.45	$0.65	$0.75	$5,175.00	$7,475.00	$8,625.00
	67	Remove Forebay Concrete	8130	2,500	2,500	2,500	CY	$220.00	$260.00	$390.00	$550,000.00	$650,000.00	$975,000.00
	68	Place Concrete Plugs at Tunnel Portals	8130	30	30	30	CY	$900.00	$1,000.00	$1,100.00	$27,000.00	$30,000.00	$33,000.00
	69	Remove Concrete Items associated with Penstocks D/S from Tunnel	8130	1,800	1,800	1,800	CY	$220.00	$260.00	$390.00	$396,000.00	$468,000.00	$702,000.00
	70	Remove Headgate Control Building at Flume Entrance	8130	330	330	330	SF	$38.00	$40.00	$42.00	$12,540.00	$13,200.00	$13,860.00
	71	Remove Forebay Spillway Gate House	8130	570	570	570	SF	$38.00	$40.00	$42.00	$21,660.00	$22,800.00	$23,940.00
	72	Remove Forebay Control Building.	8130	470	470	470	SF	$38.00	$40.00	$42.00	$17,860.00	$18,800.00	$19,740.00
	73	Remove Communication Tower next to Forebay Control Building	8130	7,100	7,100	7,100	LBS	$0.45	$0.65	$0.75	$3,195.00	$4,615.00	$5,325.00
	74	Remove Insulated Generator Building next to Forebay Control Building	8130	72	72	72	SF	$38.00	$40.00	$42.00	$2,736.00	$2,880.00	$3,024.00
	75	Remove Fixed Wheel Gate (gate, Frame and Hoist)	8420	55,000	55,000	55,000	LBS	$0.45	$0.65	$0.75	$24,750.00	$35,750.00	$41,250.00
	76	Remove Trash rack and trash rake (steel)	8420	75,000	75,000	75,000	LBS	$0.45	$0.50	$0.70	$33,750.00	$37,500.00	$52,500.00
	77	Remove stop Logs and slots (steel)	8420	136,000	136,000	136,000	LBS	$0.45	$0.65	$0.75	$61,200.00	$88,400.00	$102,000.00
	78	Remove Traveling Water Screen	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	79	Remove Fish By-Pass and Supports (steel)	8420	610,000	610,000	610,000	LBS	$0.45	$0.65	$0.75	$274,500.00	$396,500.00	$457,500.00
	80	Remove Radial Gates and Hoists	8420	16,500	16,500	16,500	LBS	$0.45	$0.65	$0.75	$7,425.00	$10,725.00	$12,375.00
	81	Remove Trash rack and trash rake (steel)	8420	43,500	43,500	43,500	LBS	$0.45	$0.50	$0.70	$19,575.00	$21,750.00	$30,450.00
	82	Remove Stop Logs and slots (steel)	8420	14,500	14,500	14,500	LBS	$0.45	$0.65	$0.75	$6,525.00	$9,425.00	$10,875.00
	83	Remove & Dispose Penstocks and bifurcation (steel)	8420	1,600,000	1,600,000	1,600,000	LBS	$0.45	$0.65	$0.75	$720,000.00	$1,040,000.00	$1,200,000.00
	84	Remove & Dispose Surge Tank (steel)	8420	79,000	79,000	79,000	LBS	$0.45	$0.65	$0.75	$35,550.00	$51,350.00	$59,250.00
	85	Remove & Dispose 2 - 108" Butterfly valves	8420	148,000	148,000	148,000	LBS	$0.45	$0.65	$0.75	$66,600.00	$96,200.00	$111,000.00
	86	Remove & Dispose Gate, Stem and Frame	8420	28,000	28,000	28,000	LBS	$0.45	$0.65	$0.75	$12,600.00	$18,200.00	$21,000.00
	87	Remove & Dispose of Steel Transition Manifolds on Upstream and Downstream	8420	250,000	250,000	250,000	LBS	$0.45	$0.50	$0.70	$112,500.00	$125,000.00	$175,000.00
	88	Temporary Access Roads	8140	2	2	2	MILE	$85,000.00	$150,000.00	$100,000.00	$170,000.00	$300,000.00	$200,000.00
	89	Spring Ground Seeding	8220	247	247	0	ACRES	$3,000.00	$3,500.00	$4,000.00	$741,000.00	$864,500.00	$0.00
	90	Spring Barge Seeding	8220	0	0	0	ACRES				$0.00	$0.00	$0.00
	91	Spring Aerial Seeding	8220	0	0	247	ACRES	$6,500.00	$7,500.00	$15,000.00	$0.00	$0.00	$3,705,000.00
	92	Fall Ground Seeding	8220	62	124	185	ACRES	$3,000.00	$3,500.00	$4,000.00	$186,000.00	$434,000.00	$740,000.00
	93	Riparian Pole Planting	8220	54	54	54	ACRES	$4,000.00	$8,500.00	$10,000.00	$216,000.00	$459,000.00	$540,000.00
	94	Weed Management	8220	62	124	185	ACRES	$1,000.00	$1,500.00	$2,000.00	$62,000.00	$186,000.00	$370,000.00
	95	Fall Ground Seeding	8220	99	99	99	ACRES	$3,000.00	$3,500.00	$4,000.00	$297,000.00	$346,500.00	$396,000.00

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	96	Weed Management	8220	99	99	99	ACRES	$1,000.00	$1,500.00	$2,000.00	$99,000.00	$148,500.00	$198,000.00
	97	Clear and Grub Disposal Area (Embankment)	8313	10	10	7	ACRES	$4,000.00	$5,000.00	$6,000.00	$40,000.00	$50,000.00	$42,000.00
	98	Clear and Grub, 40' width	8313	2.4	2.4	2.4	ACRES	$4,000.00	$5,000.00	$6,000.00	$9,600.00	$12,000.00	$14,400.00
	99	4" thick gravel surfacing	8313	0	2,150	2,150	TON	$20.00	$30.00	$40.00	$0.00	$64,500.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	8313	4	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$16,000.00	$0.00	$0.00
	101	Clear and grub, 20' width	8313	1	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$0.00	$0.00
	102	4" thick gravel surfacing	8313	0	0	0	TON				$0.00	$0.00	$0.00
	103	Soil Cover over Concrete Rubble	8313	13,000	13,000	0	CY	$25.00	$140.00	$150.00	$325,000.00	$1,820,000.00	$0.00
	104	Dispose of Concrete Rubble from Dam	8313	0	0	0	CY				$0.00	$0.00	$0.00
	105	Dispose of Concrete Rubble from Flume/Forebay	8313	0	0	0	CY				$0.00	$0.00	$0.00
	106	Dispose of Concrete Rubble from Power House	8313	0	0	0	CY				$0.00	$0.00	$0.00
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	8313	0	0	41,000	CY	$25.00	$140.00	$150.00	$0.00	$0.00	$6,150,000.00
	108	Topsy Recreation Area - Concrete total	BLM	68	68	68	CY	$175.00	$220.00	$320.00	$11,900.00	$14,960.00	$21,760.00
	109	Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite decking	BLM	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	110	Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platform	BLM	200	200	200	SF	$12.00	$13.00	$14.00	$2,400.00	$2,600.00	$2,800.00
	111	Topsy Recreation Area - Regrade to natural contour and reseed	BLM	300	300	300	SF	$3.00	$4.00	$5.00	$900.00	$1,200.00	$1,500.00
	112	Pioneer Park - Picnic tables to be removed and hauled away	BLM	12	12	12	EA	$55.00	$60.00	$65.00	$660.00	$720.00	$780.00
	113	Pioneer Park - 12 Concrete fire rings	BLM	5	5	5	CY	$175.00	$220.00	$320.00	$875.00	$1,100.00	$1,600.00
	114	Pioneer Park - Portable toilets to be removed and hauled away	BLM	2	2	2	EA	$900.00	$1,000.00	$1,200.00	$1,800.00	$2,000.00	$2,400.00
	115	Pioneer Park - Signs to be removed and hauled away	BLM	6	6	6	EA	$135.00	$150.00	$160.00	$810.00	$900.00	$960.00
	116	Pioneer Park - Dumpster to be removed and hauled away	BLM	1	1	1	EA	$900.00	$1,000.00	$1,200.00	$900.00	$1,000.00	$1,200.00
	117	Pioneer Park - Remove paved access road	BLM	200	200	200	LF	$230.00	$250.00	$270.00	$46,000.00	$50,000.00	$54,000.00
	118	Pioneer Park - Regrage to natural contour, rip, plant and seed parking and recreation site	BLM	1	1	1	ACRES	$19,000.00	$20,000.00	$22,000.00	$9,500.00	$10,000.00	$11,000.00
		Subtotal 1									$14,604,690.00	$20,597,050.00	$35,199,745.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$730,000.00	$1,050,000.00	$1,750,000.00	$730,000.00	$1,050,000.00	$1,750,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)		1	1	1	ls	$2,461,844.00	$7,444,775.00	$19,749,377.00	$2,461,844.00	$7,444,775.00	$19,749,377.00
		from Unit Price Level (July 2010) to NTP (Jan. 2020)											
		MPL - 1.5% / year for 10 yr.; MP - 3.0% /year for 10 yr.; MPH - 4.375% / year for 10 yr.											
		Design Contingencies (MPL ~ 8%; MP ~ 10%; MPH ~ 15%)		1	1	1	ls	$1,203,466.00	$2,908,175.00	$8,996,798.00	$1,203,466.00	$2,908,175.00	$8,996,798.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$1,304,080.00	$0.00	$0.00	$1,304,080.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$19,000,000.00**	**$32,000,000.00**	**$67,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$4,000,000.00	$6,000,000.00	$16,000,000.00	$4,000,000.00	$6,000,000.00	$16,000,000.00
		FIELD COST									**$23,000,000.00**	**$38,000,000.00**	**$83,000,000.00**
		Non-Contract Cost (MPL ~ 52%; MP ~ 55%; MPH ~ 61%)		1	1	1	ls	$12,000,000.00	$21,000,000.00	$52,000,000.00	$12,000,000.00	$21,000,000.00	$52,000,000.00
		CONSTRUCTION COST									**$35,000,000.00**	**$59,000,000.00**	**$135,000,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES		
BY	See Group Worksheets	CHECKED: See Group Worksheets	BY	Craig Grush, P.E.	CHECKED 05-25-11
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	05/25/11	PEER REVIEW ACD 6/3/11

Crystal Ball Report - Full
Simulation started on 6/8/2011 at 6:51:29
Simulation stopped on 6/8/2011 at 6:52:37

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	67.59
Trials/second (average)	148
Random numbers per sec	35,211
Crystal Ball data:	
Assumptions	238
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP
UNIT PRICES BY Craig L. Grosh
DATE 6/8/2011

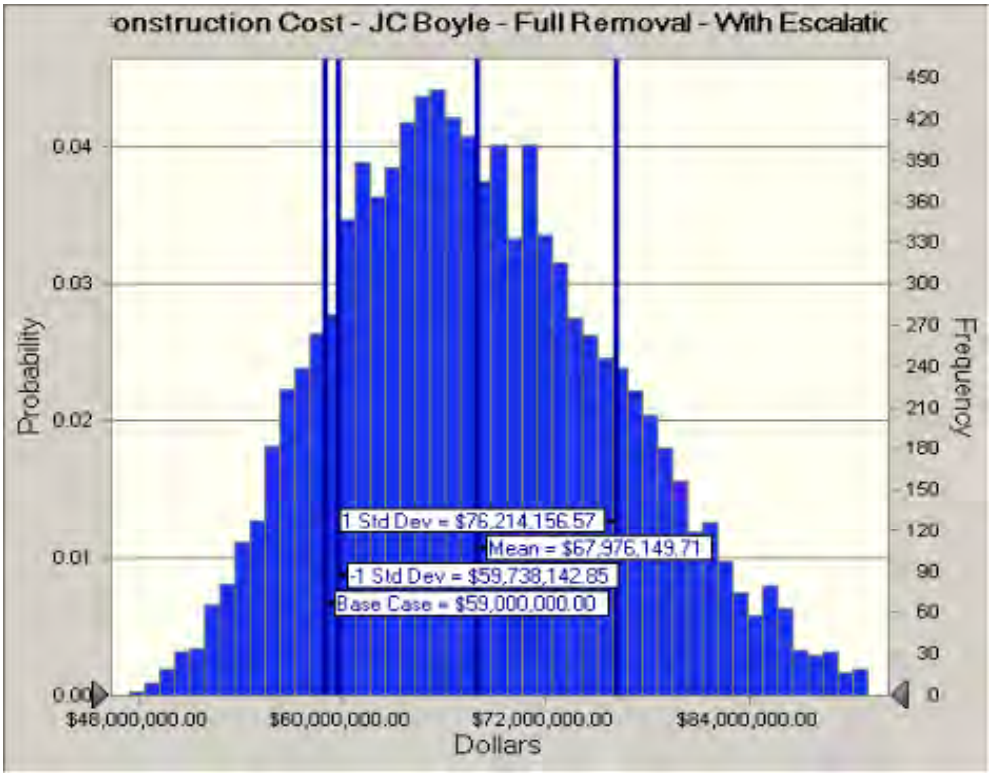
DATE	PEER REVIEWER(S)	CODE
6/8/11	Signature DAN MARCH Printed Name	8,24
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [JC Boyle - Full Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - Ful

Forecast: Construction Cost - JC Boyle - Full Removal - With Escalation **Cell: U146**

Summary:
Entire range is from $47,412,732.61 to $98,309,455.64
Base case is $59,000,000.00
After 10,000 trials, the std. error of the mean is $82,380.07



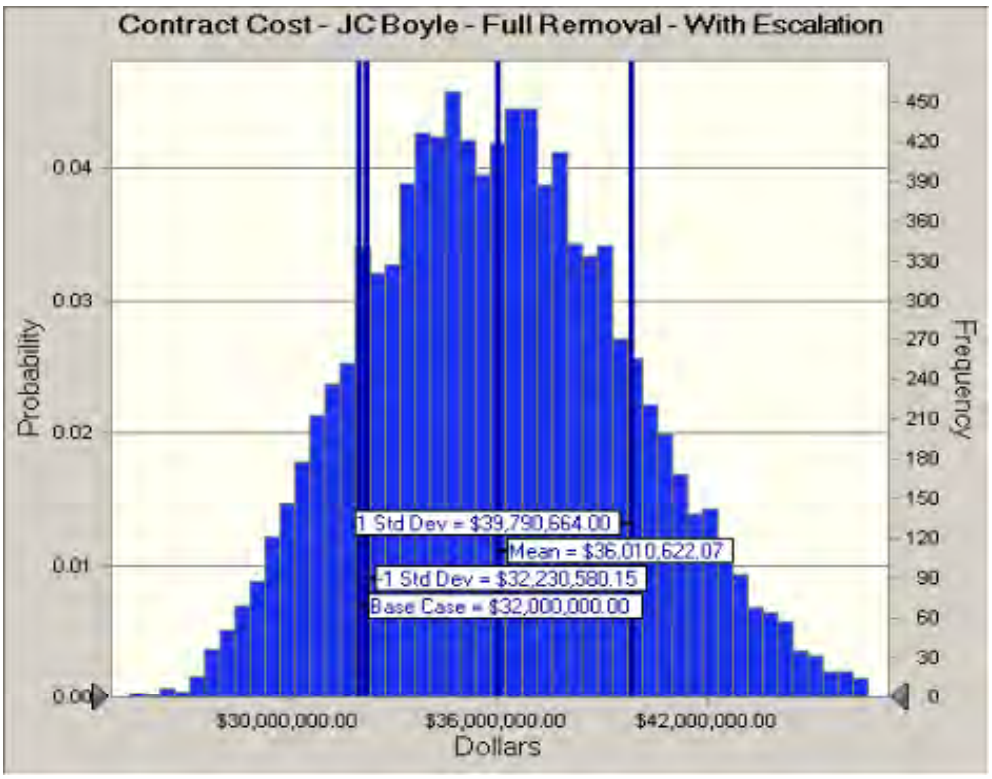
Forecast: Construction Cost - JC Boyle - Full Removal - With Escalation (cont'd) **Cell: U146**

Statistics:	Forecast values
Trials	10,000
Mean	$67,976,149.71
Median	$67,291,572.36
Mode	$60,532,044.08
Standard Deviation	$8,238,006.86
Variance	$67,864,757,095,121.70
Skewness	0.3457
Kurtosis	2.77
Coeff. of Variability	0.1212
Minimum	$47,412,732.61
Maximum	$98,309,455.64
Range Width	$50,896,723.04
Mean Std. Error	$82,380.07

Percentiles:	Forecast values
0%	$47,412,732.61
10%	$57,697,844.30
20%	$60,740,227.88
30%	$63,093,663.62
40%	$65,217,366.50
50%	$67,291,551.45
60%	$69,570,804.95
70%	$72,038,631.40
80%	$75,092,359.27
90%	$79,203,569.30
100%	$98,309,455.64

Forecast: Contract Cost - JC Boyle - Full Removal - With Escalation **Cell: U142**

Summary:
Entire range is from $25,388,769.20 to $51,824,200.87
Base case is $32,000,000.00
After 10,000 trials, the std. error of the mean is $37,800.42



Forecast: Contract Cost - JC Boyle - Full Removal - With Escalation (cont'd) **Cell: U142**

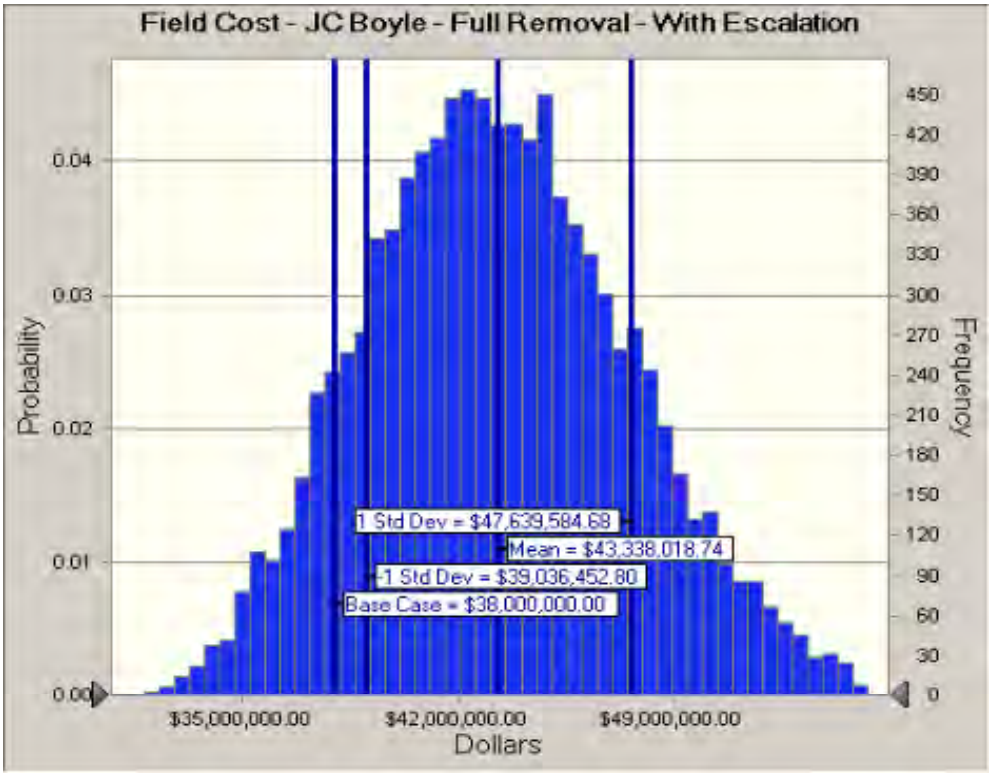
Statistics:	Forecast values
Trials	10,000
Mean	$36,010,622.07
Median	$35,883,202.31
Mode	$30,700,759.15
Standard Deviation	$3,780,041.92
Variance	$14,288,716,945,925.10
Skewness	0.2556
Kurtosis	2.84
Coeff. of Variability	0.1050
Minimum	$25,388,769.20
Maximum	$51,824,200.87
Range Width	$26,435,431.68
Mean Std. Error	$37,800.42

Percentiles:	Forecast values
0%	$25,388,769.20
10%	$31,180,506.06
20%	$32,660,172.52
30%	$33,842,578.82
40%	$34,831,563.72
50%	$35,882,562.07
60%	$36,871,717.69
70%	$37,927,741.87
80%	$39,189,733.19
90%	$40,997,606.84
100%	$51,824,200.87

Forecast: Field Cost - JC Boyle - Full Removal - With Escalation **Cell: U144**

Summary:

Entire range is from $30,860,482.29 to $63,881,896.37
Base case is $38,000,000.00
After 10,000 trials, the std. error of the mean is $43,015.66



Forecast: Field Cost - JC Boyle - Full Removal - With Escalation (cont'd) **Cell: U144**

Statistics:	Forecast values
Trials	10,000
Mean	$43,338,018.74
Median	$43,145,684.12
Mode	$40,145,266.91
Standard Deviation	$4,301,565.94
Variance	$18,503,469,554,630.10
Skewness	0.2367
Kurtosis	2.87
Coeff. of Variability	0.0993
Minimum	$30,860,482.29
Maximum	$63,881,896.37
Range Width	$33,021,414.08
Mean Std. Error	$43,015.66

Percentiles:	Forecast values
0%	$30,860,482.29
10%	$37,815,541.82
20%	$39,584,983.23
30%	$40,919,040.43
40%	$42,055,804.59
50%	$43,143,231.93
60%	$44,332,483.57
70%	$45,492,458.18
80%	$46,980,596.34
90%	$48,980,267.51
100%	$63,881,896.37

End of Forecasts

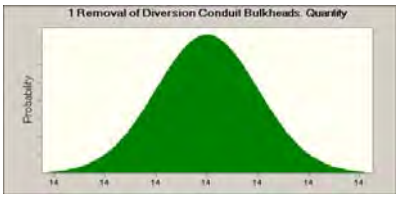
Assumptions

Worksheet: [JC Boyle - Full Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - Ful

Assumption: 1 Removal of Diversion Conduit Bulkheads. Quantity **Cell: L14**

Normal distribution with parameters:

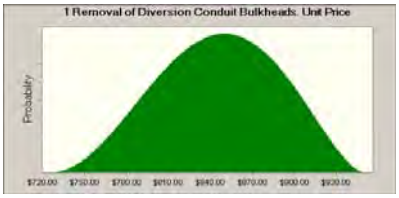
Mean	14	(=L14)
Std. Dev.	0	(=0.000001)



Assumption: 1 Removal of Diversion Conduit Bulkheads. Unit Price **Cell: R14**

BetaPERT distribution with parameters:

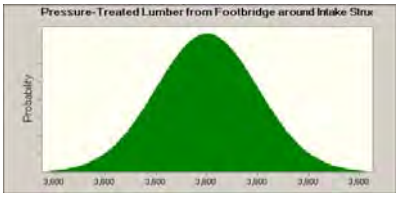
Minimum	$725.00	(=Q14)
Likeliest	$850.00	(=R14)
Maximum	$950.00	(=S14)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structu **Cell: L23**

Normal distribution with parameters:

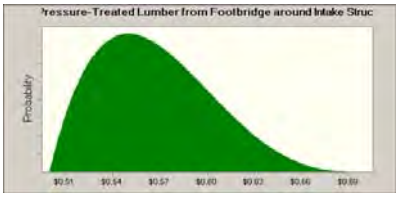
Mean	3,600	(=L23)
Std. Dev.	0	(=0.000001)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structure **Cell: R23**

BetaPERT distribution with parameters:

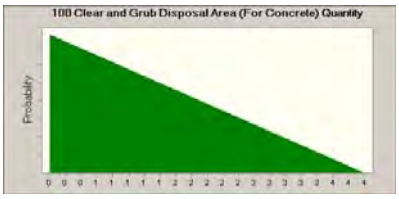
Minimum	$0.50	(=Q23)
Likeliest	$0.55	(=R23)
Maximum	$0.70	(=S23)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Quantity **Cell: L113**

Triangular distribution with parameters:

Minimum	0	(=M113)
Likeliest	0	(=L113)
Maximum	4	(=K113)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Unit Price **Cell: R113**

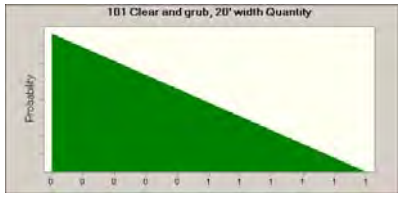
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q113)
Likeliest	$5,000.00	(=R113)
Maximum	$6,000.00	(=S113)

Assumption: 101 Clear and grub, 20' width Quantity **Cell: L114**

Triangular distribution with parameters:

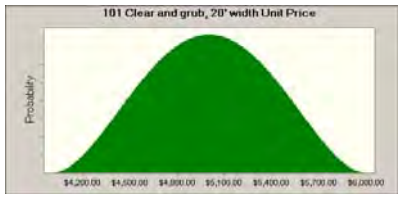
Minimum	0	(=M114)
Likeliest	0	(=L114)
Maximum	1	(=K114)



Assumption: 101 Clear and grub, 20' width Unit Price **Cell: R114**

BetaPERT distribution with parameters:

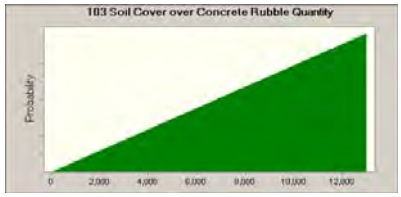
Minimum	$4,000.00	(=Q114)
Likeliest	$5,000.00	(=R114)
Maximum	$6,000.00	(=S114)



Assumption: 103 Soil Cover over Concrete Rubble Quantity **Cell: L116**

Triangular distribution with parameters:

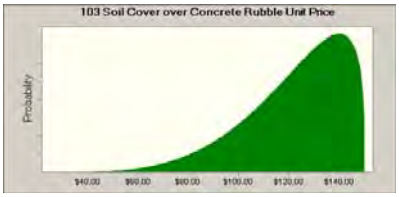
Minimum	0	(=M116)
Likeliest	13,000	(=L116)
Maximum	13,000	(=K116)



Assumption: 103 Soil Cover over Concrete Rubble Unit Price **Cell: R116**

BetaPERT distribution with parameters:

Minimum	$25.00	(=Q116)
Likeliest	$140.00	(=R116)
Maximum	$150.00	(=S116)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Quantity **Cell: L120**

Triangular distribution with parameters:

Minimum	0	(=K120)
Likeliest	0	(=L120)
Maximum	41,000	(=M120)

Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Unit Price **Cell: R120**

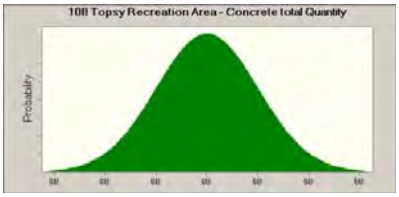
BetaPERT distribution with parameters:

Minimum	$25.00	(=Q120)
Likeliest	$140.00	(=R120)
Maximum	$150.00	(=S120)

Assumption: 108 Topsy Recreation Area - Concrete total Quantity **Cell: L121**

Normal distribution with parameters:

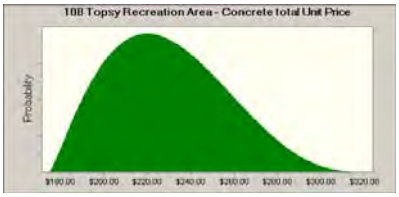
Mean	68	(=L121)
Std. Dev.	0	(=0.000001)



Assumption: 108 Topsy Recreation Area - Concrete total Unit Price **Cell: R121**

BetaPERT distribution with parameters:

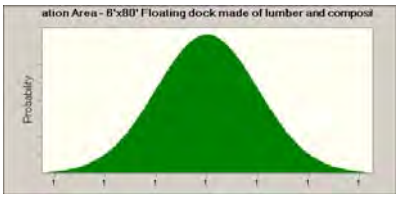
Minimum	$175.00	(=Q121)
Likeliest	$220.00	(=R121)
Maximum	$320.00	(=S121)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composi **Cell: L122**

Normal distribution with parameters:

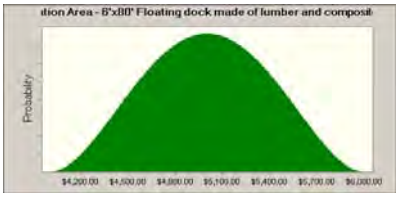
Mean	1	(=L122)
Std. Dev.	0	(=0.000001)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and Cell: R122

BetaPERT distribution with parameters:

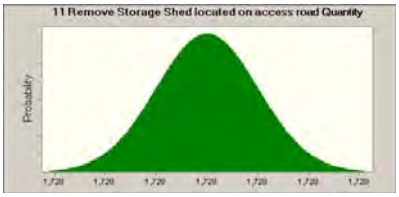
Minimum	$4,000.00	(=Q122)
Likeliest	$5,000.00	(=R122)
Maximum	$6,000.00	(=S122)



Assumption: 11 Remove Storage Shed located on access road Quantity **Cell: L24**

Normal distribution with parameters:

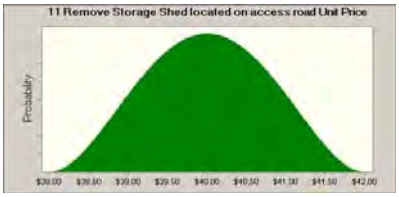
Mean	1,728	(=L24)
Std. Dev.	0	(=0.000001)



Assumption: 11 Remove Storage Shed located on access road Unit Price **Cell: R24**

BetaPERT distribution with parameters:

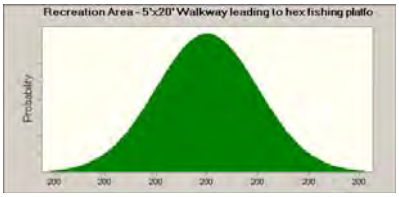
Minimum	$38.00	(=Q24)
Likeliest	$40.00	(=R24)
Maximum	$42.00	(=S24)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo **Cell: L123**

Normal distribution with parameters:

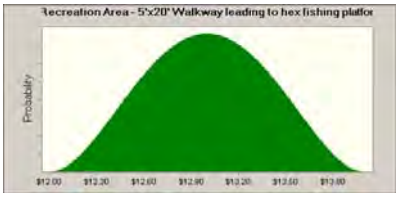
Mean	200	(=L123)
Std. Dev.	0	(=0.000001)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo **Cell: R123**

BetaPERT distribution with parameters:

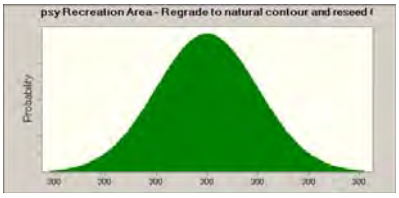
Minimum	$12.00	(=Q123)
Likeliest	$13.00	(=R123)
Maximum	$14.00	(=S123)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Quantity **Cell: L124**

Normal distribution with parameters:

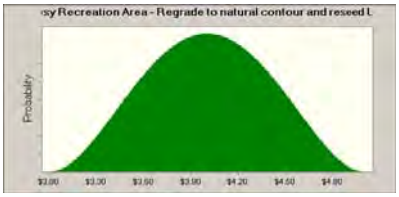
Mean	300	(=L124)
Std. Dev.	0	(=0.000001)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Unit Price: R124

BetaPERT distribution with parameters:

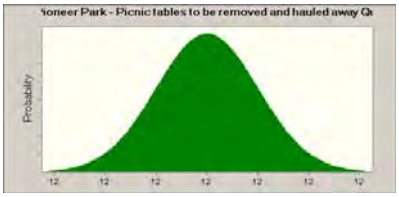
Minimum	$3.00	(=Q124)
Likeliest	$4.00	(=R124)
Maximum	$5.00	(=S124)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Quantity: L125

Normal distribution with parameters:

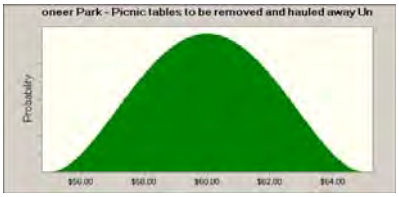
Mean	12	(=L125)
Std. Dev.	0	(=0.000001)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Unit Price: R125

BetaPERT distribution with parameters:

Minimum	$55.00	(=Q125)
Likeliest	$60.00	(=R125)
Maximum	$65.00	(=S125)



Assumption: 113 Pioneer Park - 12 Concrete fire rings Quantity **Cell: L126**

Normal distribution with parameters:

Mean	5	(=L126)
Std. Dev.	0	(=0.000001)

Assumption: 113 Pioneer Park - 12 Concrete fire rings Unit Price **Cell: R126**

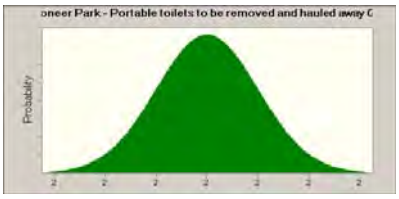
BetaPERT distribution with parameters:

Minimum	$175.00	(=Q126)
Likeliest	$220.00	(=R126)
Maximum	$320.00	(=S126)

Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Quantity **Cell: L127**

Normal distribution with parameters:

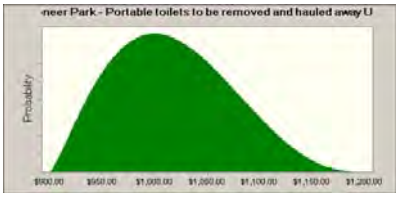
Mean	2	(=L127)
Std. Dev.	0	(=0.000001)



Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Unit Price **Cell: R127**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q127)
Likeliest	$1,000.00	(=R127)
Maximum	$1,200.00	(=S127)



Assumption: 115 Pioneer Park - Signs to be removed and hauled away Quantity **Cell: L128**

Normal distribution with parameters:

Mean	6	(=L128)
Std. Dev.	0	(=0.000001)

Assumption: 115 Pioneer Park - Signs to be removed and hauled away Unit Price **Cell: R128**

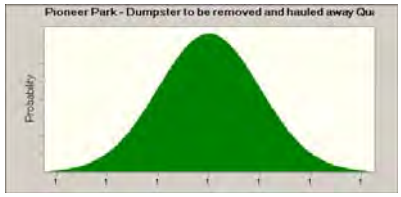
BetaPERT distribution with parameters:

Minimum	$135.00	(=Q128)
Likeliest	$150.00	(=R128)
Maximum	$160.00	(=S128)

Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Quantity **Cell: L129**

Normal distribution with parameters:

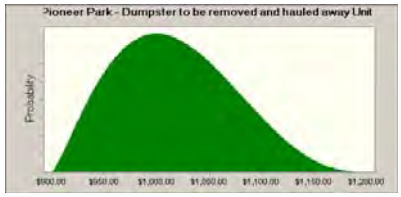
Mean	1	(=L129)
Std. Dev.	0	(=0.000001)



Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Unit Price **Cell: R129**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q129)
Likeliest	$1,000.00	(=R129)
Maximum	$1,200.00	(=S129)



Assumption: 117 Pioneer Park - Remove paved access road Quantity **Cell: L130**

Normal distribution with parameters:

Mean	200	(=L130)
Std. Dev.	0	(=0.000001)

Assumption: 117 Pioneer Park - Remove paved access road Unit Price **Cell: R130**

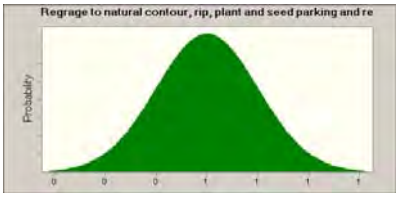
BetaPERT distribution with parameters:

Minimum	$230.00	(=Q130)
Likeliest	$250.00	(=R130)
Maximum	$270.00	(=S130)

Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: L131**

Normal distribution with parameters:

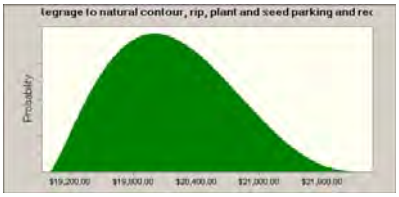
Mean	1	(=L131)
Std. Dev.	0	(=0.000001)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: R131**

BetaPERT distribution with parameters:

Minimum	$19,000.00	(=Q131)
Likeliest	$20,000.00	(=R131)
Maximum	$22,000.00	(=S131)



Assumption: 12 Remove Warehouse located on access road Quantity **Cell: L25**

Normal distribution with parameters:

Mean	1,920	(=L25)
Std. Dev.	0	(=0.000001)

Assumption: 12 Remove Warehouse located on access road Unit Price **Cell: R25**

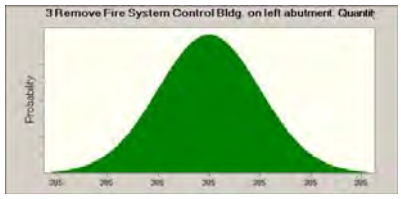
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q25)
Likeliest	$40.00	(=R25)
Maximum	$42.00	(=S25)

Assumption: 13 Remove Fire System Control Bldg. on left abutment. Quantity **Cell: L26**

Normal distribution with parameters:

Mean	385	(=L26)
Std. Dev.	0	(=0.000001)



Assumption: 13 Remove Fire System Control Bldg. on left abutment. Unit Price **Cell: R26**

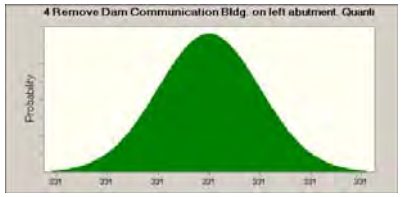
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q26)
Likeliest	$40.00	(=R26)
Maximum	$42.00	(=S26)

Assumption: 14 Remove Dam Communication Bldg. on left abutment. Quantity **Cell: L27**

Normal distribution with parameters:

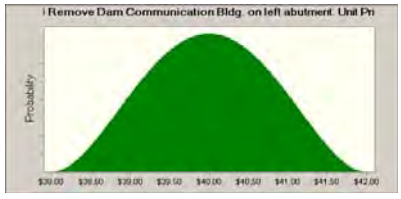
Mean	331	(=L27)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove Dam Communication Bldg. on left abutment. Unit Price **Cell: R27**

BetaPERT distribution with parameters:

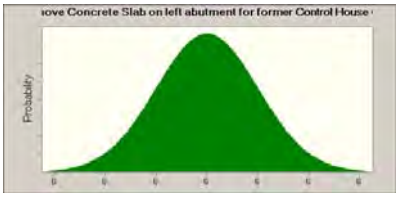
Minimum	$38.00	(=Q27)
Likeliest	$40.00	(=R27)
Maximum	$42.00	(=S27)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Quantity **Cell: L28**

Normal distribution with parameters:

Mean	6	(=L28)
Std. Dev.	0	(=0.000001)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Unit Price **Cell: R28**

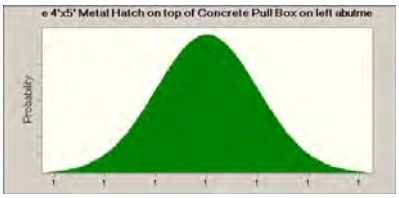
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q28)
Likeliest	$260.00	(=R28)
Maximum	$390.00	(=S28)

Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment Qty **Cell: L29**

Normal distribution with parameters:

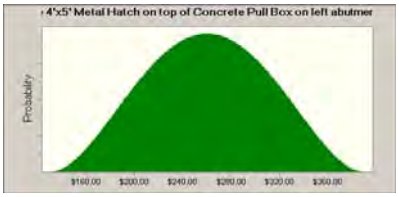
Mean	1	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutmen Cell: R29

BetaPERT distribution with parameters:

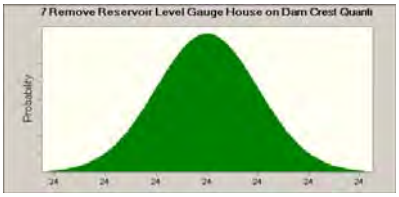
Minimum	$130.00	(=Q29)
Likeliest	$260.00	(=R29)
Maximum	$390.00	(=S29)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Quantity Cell: L30

Normal distribution with parameters:

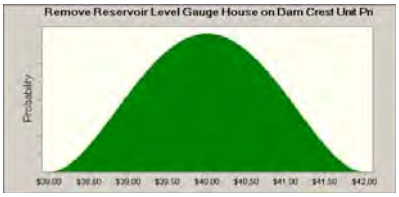
Mean	24	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Unit Price Cell: R30

BetaPERT distribution with parameters:

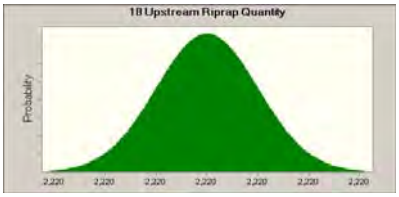
Minimum	$38.00	(=Q30)
Likeliest	$40.00	(=R30)
Maximum	$42.00	(=S30)



Assumption: 18 Upstream Riprap Quantity **Cell: L31**

Normal distribution with parameters:

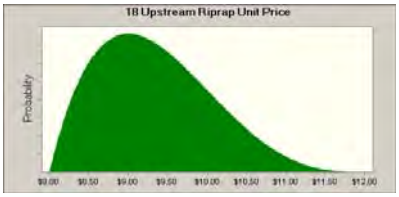
Mean	2,220	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 18 Upstream Riprap Unit Price **Cell: R31**

BetaPERT distribution with parameters:

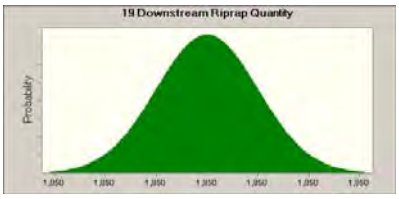
Minimum	$8.00	(=Q31)
Likeliest	$9.00	(=R31)
Maximum	$12.00	(=S31)



Assumption: 19 Downstream Riprap Quantity **Cell: L32**

Normal distribution with parameters:

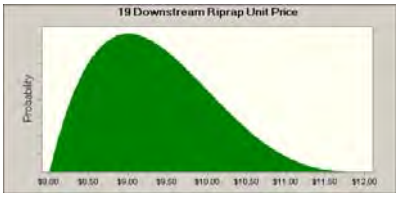
Mean	1,850	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 19 Downstream Riprap Unit Price **Cell: R32**

BetaPERT distribution with parameters:

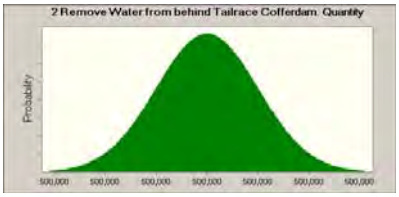
Minimum	$8.00	(=Q32)
Likeliest	$9.00	(=R32)
Maximum	$12.00	(=S32)



Assumption: 2 Remove Water from behind Tailrace Cofferdam. Quantity **Cell: L15**

Normal distribution with parameters:

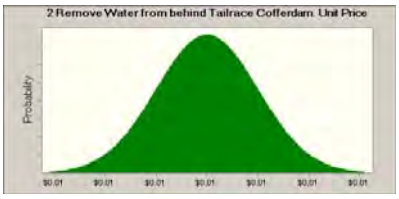
Mean	500,000	(=L15)
Std. Dev.	0	(=0.000001)



Assumption: 2 Remove Water from behind Tailrace Cofferdam. Unit Price **Cell: R15**

Normal distribution with parameters:

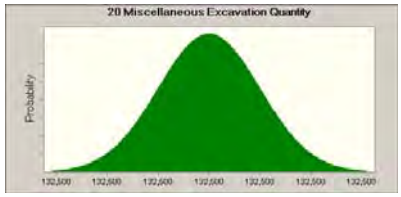
Mean	$0.01	(=R15)
Std. Dev.	$0.00	(=0.000001)



Assumption: 20 Miscellaneous Excavation Quantity **Cell: L33**

Normal distribution with parameters:

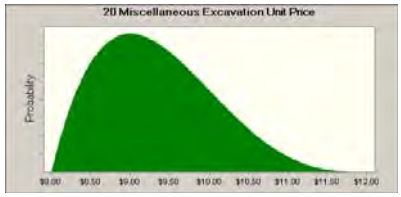
Mean	132,500	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 20 Miscellaneous Excavation Unit Price **Cell: R33**

BetaPERT distribution with parameters:

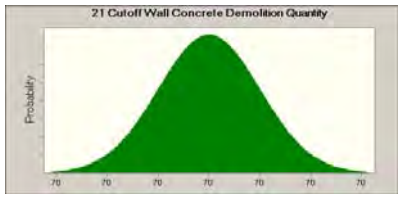
Minimum	$8.00	(=Q33)
Likeliest	$9.00	(=R33)
Maximum	$12.00	(=S33)



Assumption: 21 Cutoff Wall Concrete Demolition Quantity **Cell: L34**

Normal distribution with parameters:

Mean	70	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 21 Cutoff Wall Concrete Demolition Unit Price **Cell: R34**

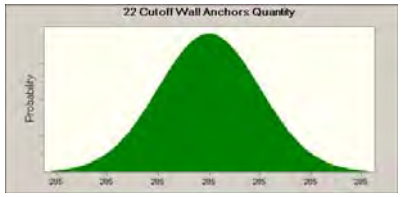
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q34)
Likeliest	$260.00	(=R34)
Maximum	$390.00	(=S34)

Assumption: 22 Cutoff Wall Anchors Quantity **Cell: L35**

Normal distribution with parameters:

Mean	285	(=L35)
Std. Dev.	0	(=0.000001)



Assumption: 22 Cutoff Wall Anchors Unit Price **Cell: R35**

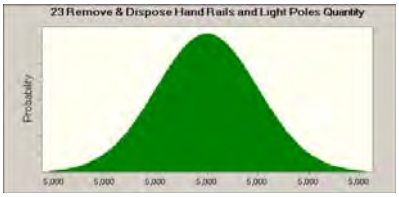
BetaPERT distribution with parameters:

Minimum	$9.00	(=Q35)
Likeliest	$10.00	(=R35)
Maximum	$12.00	(=S35)

Assumption: 23 Remove & Dispose Hand Rails and Light Poles Quantity **Cell: L36**

Normal distribution with parameters:

Mean	5,000	(=L36)
Std. Dev.	0	(=0.000001)



Assumption: 23 Remove & Dispose Hand Rails and Light Poles Unit Price **Cell: R36**

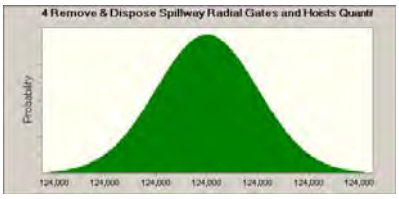
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q36)
Likeliest	$0.65	(=R36)
Maximum	$0.75	(=S36)

Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Quantity **Cell: L37**

Normal distribution with parameters:

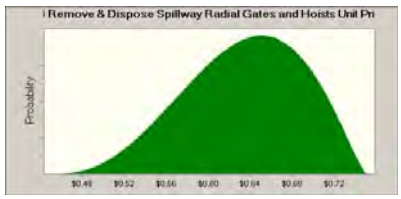
Mean	124,000	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Unit Price **Cell: R37**

BetaPERT distribution with parameters:

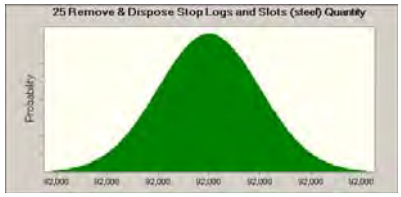
Minimum	$0.45	(=Q37)
Likeliest	$0.65	(=R37)
Maximum	$0.75	(=S37)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Quantity **Cell: L38**

Normal distribution with parameters:

Mean	92,000	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Unit Price **Cell: R38**

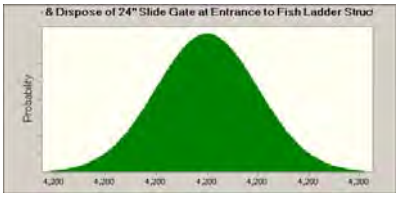
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q38)
Likeliest	$0.65	(=R38)
Maximum	$0.75	(=S38)

Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure Cell: L39

Normal distribution with parameters:

Mean	4,200	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure Cell: R39

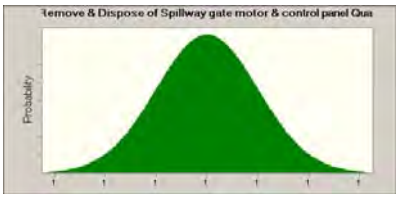
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q39)
Likeliest	$0.65	(=R39)
Maximum	$0.75	(=S39)

Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Quantity Cell: L40

Normal distribution with parameters:

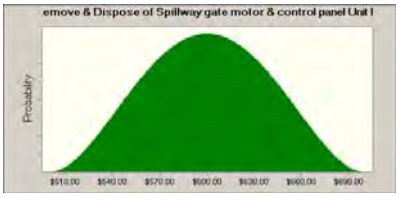
Mean	1	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Unit Price **Cell: R40**

BetaPERT distribution with parameters:

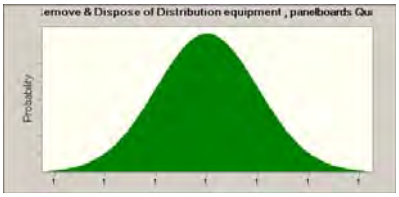
Minimum	$500.00	(=Q40)
Likeliest	$600.00	(=R40)
Maximum	$700.00	(=S40)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Quantity **Cell: L41**

Normal distribution with parameters:

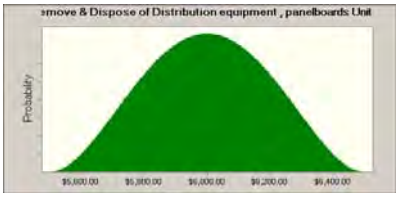
Mean	1	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Unit Price **Cell: R41**

BetaPERT distribution with parameters:

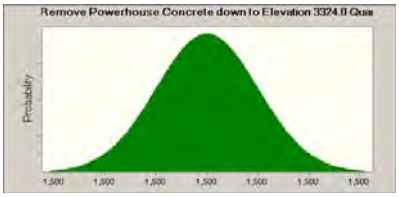
Minimum	$5,500.00	(=Q41)
Likeliest	$6,000.00	(=R41)
Maximum	$6,500.00	(=S41)



Assumption: 29 Remove Powerhouse Concrete down to Elevation 3324.0 Quantity **Cell: L42**

Normal distribution with parameters:

Mean	1,500	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 29 Remove Powerhouse Concrete down to Elevation 3324.0 Unit Price **Cell: R42**

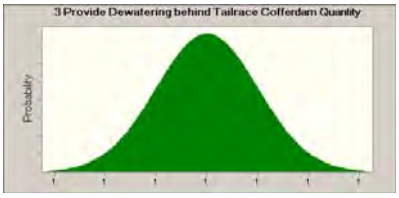
BetaPERT distribution with parameters:

Minimum	$300.00	(=Q42)
Likeliest	$370.00	(=R42)
Maximum	$800.00	(=S42)

Assumption: 3 Provide Dewatering behind Tailrace Cofferdam Quantity **Cell: L16**

Normal distribution with parameters:

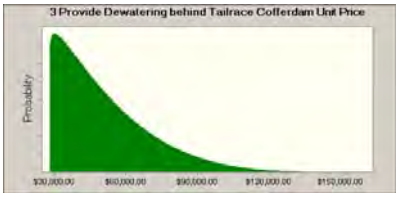
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



Assumption: 3 Provide Dewatering behind Tailrace Cofferdam Unit Price **Cell: R16**

BetaPERT distribution with parameters:

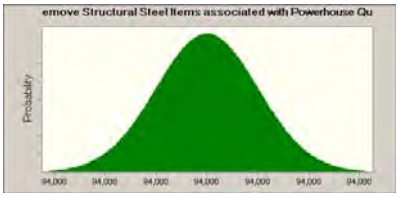
Minimum	$28,000.00	(=Q16)
Likeliest	$30,000.00	(=R16)
Maximum	$160,000.00	(=S16)



Assumption: 30 Remove Structural Steel Items associated with Powerhouse Quantity **Cell: L43**

Normal distribution with parameters:

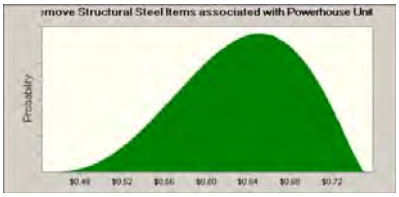
Mean	94,000	(=L43)
Std. Dev.	0	(=0.000001)



Assumption: 30 Remove Structural Steel Items associated with Powerhouse Unit Price **Cell: R43**

BetaPERT distribution with parameters:

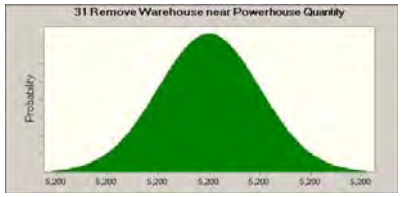
Minimum	$0.45	(=Q43)
Likeliest	$0.65	(=R43)
Maximum	$0.75	(=S43)



Assumption: 31 Remove Warehouse near Powerhouse Quantity **Cell: L44**

Normal distribution with parameters:

Mean	5,200	(=L44)
Std. Dev.	0	(=0.000001)



Assumption: 31 Remove Warehouse near Powerhouse Unit Price **Cell: R44**

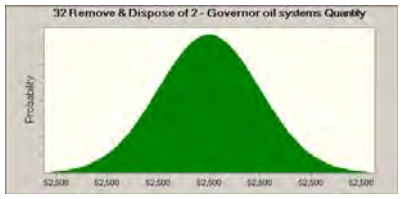
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q44)
Likeliest	$40.00	(=R44)
Maximum	$42.00	(=S44)

Assumption: 32 Remove & Dispose of 2 - Governor oil systems Quantity **Cell: L45**

Normal distribution with parameters:

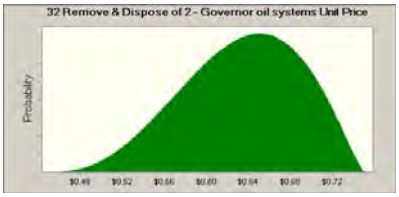
Mean	52,500	(=L45)
Std. Dev.	0	(=0.000001)



Assumption: 32 Remove & Dispose of 2 - Governor oil systems Unit Price **Cell: R45**

BetaPERT distribution with parameters:

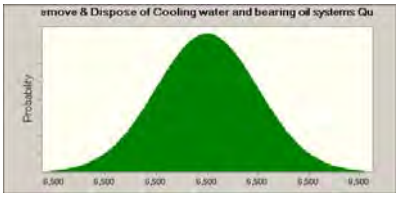
Minimum	$0.45	(=Q45)
Likeliest	$0.65	(=R45)
Maximum	$0.75	(=S45)



Assumption: 33 Remove & Dispose of Cooling water and bearing oil systems Quantity **Cell: L46**

Normal distribution with parameters:

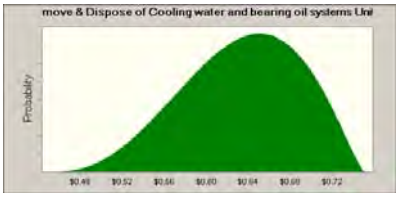
Mean	6,500	(=L46)
Std. Dev.	0	(=0.000001)



Assumption: 33 Remove & Dispose of Cooling water and bearing oil systems Unit Price **Cell: R46**

BetaPERT distribution with parameters:

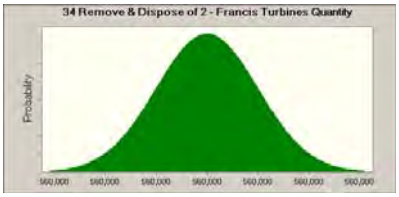
Minimum	$0.45	(=Q46)
Likeliest	$0.65	(=R46)
Maximum	$0.75	(=S46)



Assumption: 34 Remove & Dispose of 2 - Francis Turbines Quantity **Cell: L47**

Normal distribution with parameters:

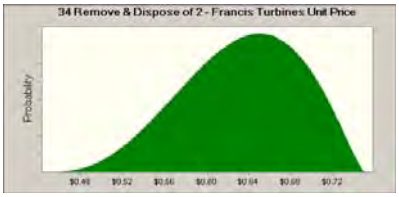
Mean	560,000	(=L47)
Std. Dev.	0	(=0.000001)



Assumption: 34 Remove & Dispose of 2 - Francis Turbines Unit Price **Cell: R47**

BetaPERT distribution with parameters:

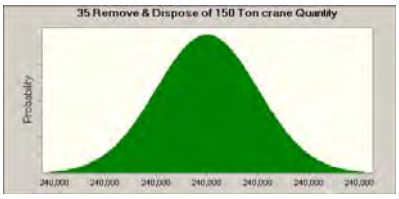
Minimum	$0.45	(=Q47)
Likeliest	$0.65	(=R47)
Maximum	$0.75	(=S47)



Assumption: 35 Remove & Dispose of 150 Ton crane Quantity **Cell: L48**

Normal distribution with parameters:

Mean	240,000	(=L48)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose of 150 Ton crane Unit Price **Cell: R48**

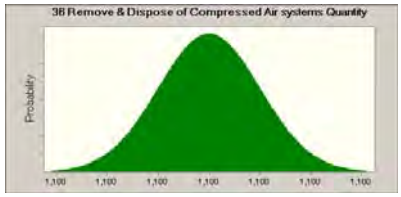
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q48)
Likeliest	$0.65	(=R48)
Maximum	$0.75	(=S48)

Assumption: 36 Remove & Dispose of Compressed Air systems Quantity **Cell: L49**

Normal distribution with parameters:

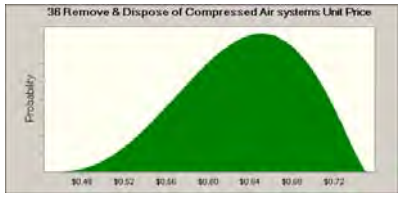
Mean	1,100	(=L49)
Std. Dev.	0	(=0.000001)



Assumption: 36 Remove & Dispose of Compressed Air systems Unit Price **Cell: R49**

BetaPERT distribution with parameters:

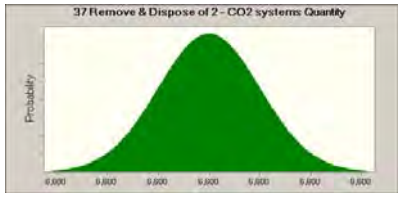
Minimum	$0.45	(=Q49)
Likeliest	$0.65	(=R49)
Maximum	$0.75	(=S49)



Assumption: 37 Remove & Dispose of 2 - CO2 systems Quantity **Cell: L50**

Normal distribution with parameters:

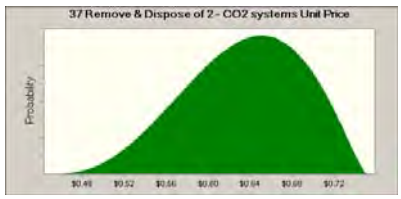
Mean	6,600	(=L50)
Std. Dev.	0	(=0.000001)



Assumption: 37 Remove & Dispose of 2 - CO2 systems Unit Price **Cell: R50**

BetaPERT distribution with parameters:

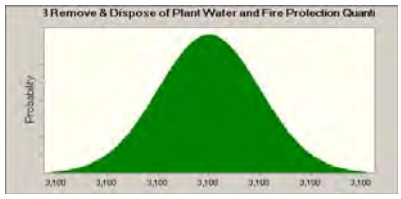
Minimum	$0.45	(=Q50)
Likeliest	$0.65	(=R50)
Maximum	$0.75	(=S50)



Assumption: 38 Remove & Dispose of Plant Water and Fire Protection Quantity **Cell: L51**

Normal distribution with parameters:

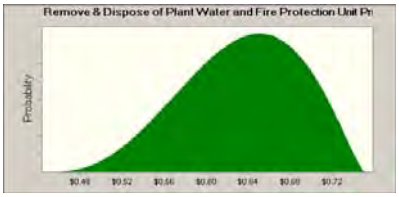
Mean	3,100	(=L51)
Std. Dev.	0	(=0.000001)



Assumption: 38 Remove & Dispose of Plant Water and Fire Protection Unit Price **Cell: R51**

BetaPERT distribution with parameters:

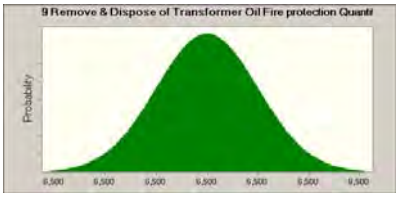
Minimum	$0.45	(=Q51)
Likeliest	$0.65	(=R51)
Maximum	$0.75	(=S51)



Assumption: 39 Remove & Dispose of Transformer Oil Fire protection Quantity **Cell: L52**

Normal distribution with parameters:

Mean	6,500	(=L52)
Std. Dev.	0	(=0.000001)



Assumption: 39 Remove & Dispose of Transformer Oil Fire protection Unit Price **Cell: R52**

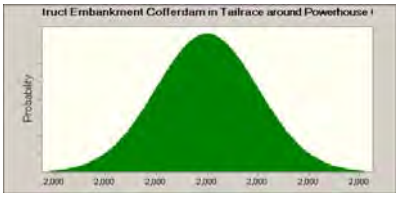
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q52)
Likeliest	$0.65	(=R52)
Maximum	$0.75	(=S52)

Assumption: 4 Construct Embankment Cofferdam in Tailrace around Powerhouse Quantity **Cell: L17**

Normal distribution with parameters:

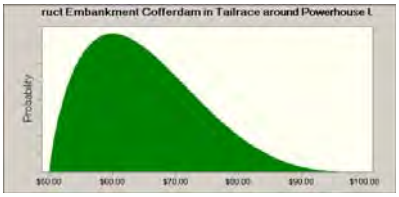
Mean	2,000	(=L17)
Std. Dev.	0	(=0.000001)



Assumption: 4 Construct Embankment Cofferdam in Tailrace around Powerhouse Unit Price **Cell: R17**

BetaPERT distribution with parameters:

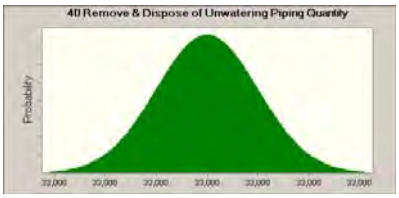
Minimum	$50.00	(=Q17)
Likeliest	$60.00	(=R17)
Maximum	$100.00	(=S17)



Assumption: 40 Remove & Dispose of Unwatering Piping Quantity **Cell: L53**

Normal distribution with parameters:

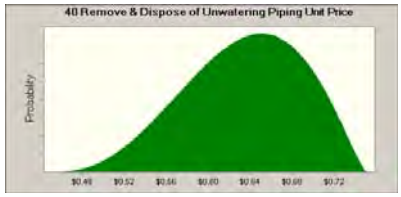
Mean	33,000	(=L53)
Std. Dev.	0	(=0.000001)



Assumption: 40 Remove & Dispose of Unwatering Piping Unit Price **Cell: R53**

BetaPERT distribution with parameters:

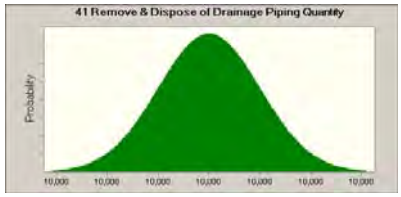
Minimum	$0.45	(=Q53)
Likeliest	$0.65	(=R53)
Maximum	$0.75	(=S53)



Assumption: 41 Remove & Dispose of Drainage Piping Quantity **Cell: L54**

Normal distribution with parameters:

Mean	10,000	(=L54)
Std. Dev.	0	(=0.000001)



Assumption: 41 Remove & Dispose of Drainage Piping Unit Price **Cell: R54**

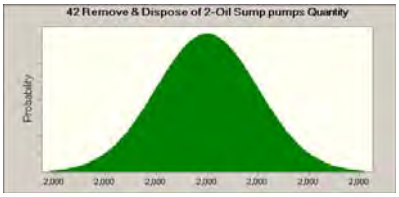
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q54)
Likeliest	$0.65	(=R54)
Maximum	$0.75	(=S54)

Assumption: 42 Remove & Dispose of 2-Oil Sump pumps Quantity **Cell: L55**

Normal distribution with parameters:

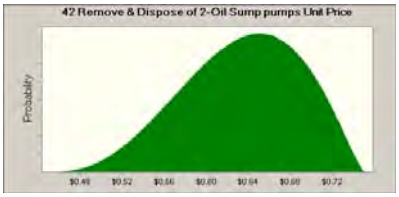
Mean	2,000	(=L55)
Std. Dev.	0	(=0.000001)



Assumption: 42 Remove & Dispose of 2-Oil Sump pumps Unit Price **Cell: R55**

BetaPERT distribution with parameters:

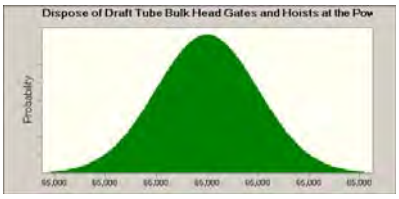
Minimum	$0.45	(=Q55)
Likeliest	$0.65	(=R55)
Maximum	$0.75	(=S55)



Assumption: 43 Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Pow **Cell: L56**

Normal distribution with parameters:

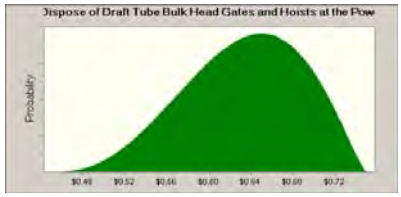
Mean	65,000	(=L56)
Std. Dev.	0	(=0.000001)



Assumption: 43 Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Pow **Cell: R56**

BetaPERT distribution with parameters:

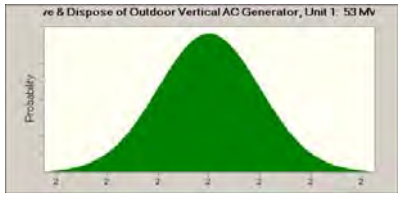
Minimum	$0.45	(=Q56)
Likeliest	$0.65	(=R56)
Maximum	$0.75	(=S56)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA, Qua **Cell: L57**

Normal distribution with parameters:

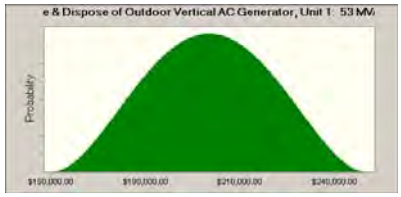
Mean	2	(=L57)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA, Unit **Cell: R57**

BetaPERT distribution with parameters:

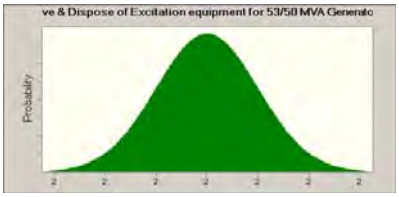
Minimum	$150,000.00	(=Q57)
Likeliest	$200,000.00	(=R57)
Maximum	$250,000.00	(=S57)



Assumption: 45 Remove & Dispose of Excitation equipment for 53/50 MVA Generator Qty **Cell: L58**

Normal distribution with parameters:

Mean	2	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 45 Remove & Dispose of Excitation equipment for 53/50 MVA Generator Unit **Cell: R58**

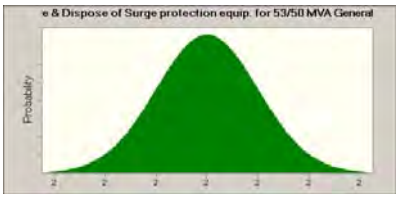
BetaPERT distribution with parameters:

Minimum	$12,000.00	(=Q58)
Likeliest	$12,500.00	(=R58)
Maximum	$13,000.00	(=S58)

Assumption: 46 Remove & Dispose of Surge protection equip. for 53/50 MVA Generator Qty **Cell: L59**

Normal distribution with parameters:

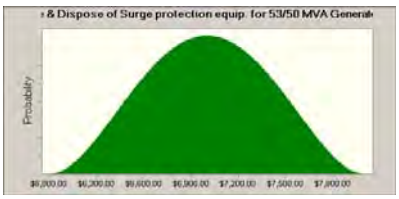
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 46 Remove & Dispose of Surge protection equip. for 53/50 MVA Generator **Cell: R59**

BetaPERT distribution with parameters:

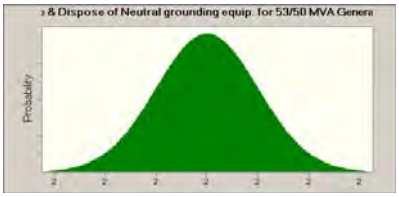
Minimum	$6,000.00	(=Q59)
Likeliest	$7,000.00	(=R59)
Maximum	$8,000.00	(=S59)



Assumption: 47 Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator **Cell: L60**

Normal distribution with parameters:

Mean	2	(=L60)
Std. Dev.	0	(=0.000001)



Assumption: 47 Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator **Cell: R60**

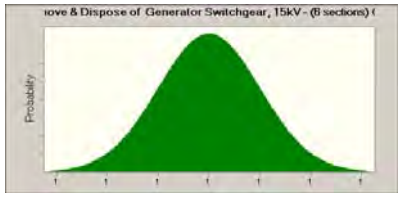
BetaPERT distribution with parameters:

Minimum	$2,000.00	(=Q60)
Likeliest	$3,000.00	(=R60)
Maximum	$4,000.00	(=S60)

Assumption: 48 Remove & Dispose of Generator Switchgear, 15kV - (6 sections) Quantity **Cell: L61**

Normal distribution with parameters:

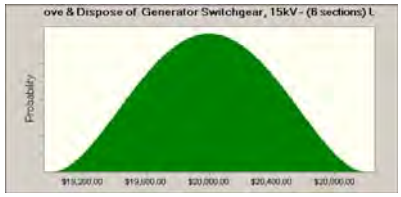
Mean	1	(=L61)
Std. Dev.	0	(=0.000001)



Assumption: 48 Remove & Dispose of Generator Switchgear, 15kV - (6 sections) Unit Price **Cell: R61**

BetaPERT distribution with parameters:

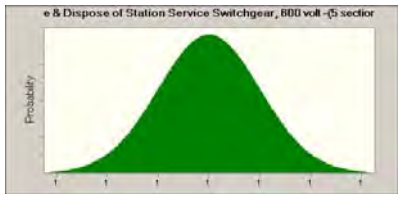
Minimum	$19,000.00	(=Q61)
Likeliest	$20,000.00	(=R61)
Maximum	$21,000.00	(=S61)



Assumption: 49 Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections) Qty **Cell: L62**

Normal distribution with parameters:

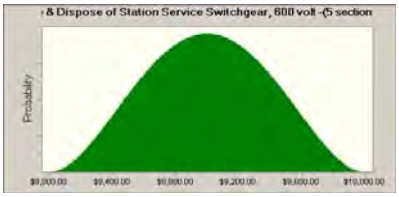
Mean	1	(=L62)
Std. Dev.	0	(=0.000001)



Assumption: 49 Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections) **Cell: R62**

BetaPERT distribution with parameters:

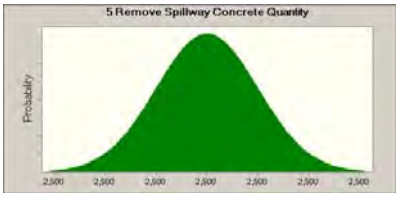
Minimum	$8,000.00	(=Q62)
Likeliest	$9,000.00	(=R62)
Maximum	$10,000.00	(=S62)



Assumption: 5 Remove Spillway Concrete Quantity **Cell: L18**

Normal distribution with parameters:

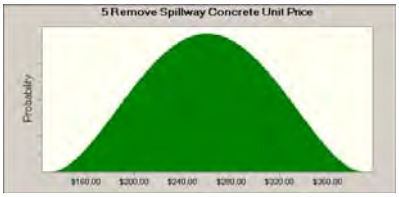
Mean	2,500	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove Spillway Concrete Unit Price **Cell: R18**

BetaPERT distribution with parameters:

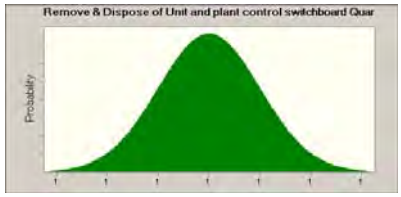
Minimum	$130.00	(=Q18)
Likeliest	$260.00	(=R18)
Maximum	$390.00	(=S18)



Assumption: 50 Remove & Dispose of Unit and plant control switchboard Quantity Cell: L63

Normal distribution with parameters:

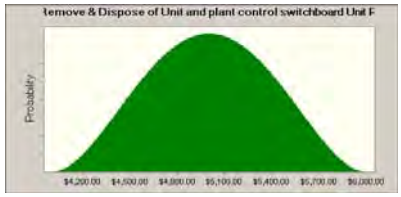
Mean	1	(=L63)
Std. Dev.	0	(=0.000001)



Assumption: 50 Remove & Dispose of Unit and plant control switchboard Unit Price Cell: R63

BetaPERT distribution with parameters:

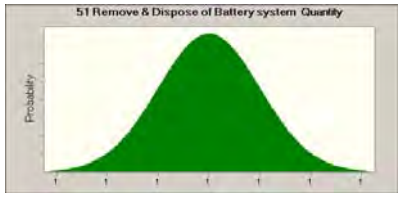
Minimum	$4,000.00	(=Q63)
Likeliest	$5,000.00	(=R63)
Maximum	$6,000.00	(=S63)



Assumption: 51 Remove & Dispose of Battery system Quantity Cell: L64

Normal distribution with parameters:

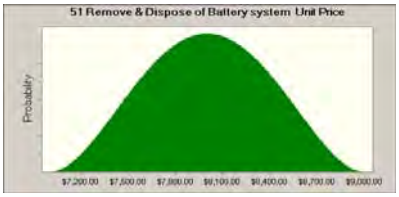
Mean	1	(=L64)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose of Battery system Unit Price **Cell: R64**

BetaPERT distribution with parameters:

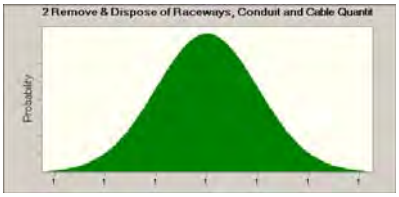
Minimum	$7,000.00	(=Q64)
Likeliest	$8,000.00	(=R64)
Maximum	$9,000.00	(=S64)



Assumption: 52 Remove & Dispose of Raceways, Conduit and Cable Quantity **Cell: L65**

Normal distribution with parameters:

Mean	1	(=L65)
Std. Dev.	0	(=0.000001)



Assumption: 52 Remove & Dispose of Raceways, Conduit and Cable Unit Price **Cell: R65**

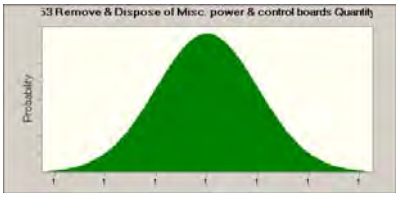
BetaPERT distribution with parameters:

Minimum	$10,000.00	(=Q65)
Likeliest	$11,000.00	(=R65)
Maximum	$12,000.00	(=S65)

Assumption: 53 Remove & Dispose of Misc. power & control boards Quantity **Cell: L66**

Normal distribution with parameters:

Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 53 Remove & Dispose of Misc. power & control boards Unit Price **Cell: R66**

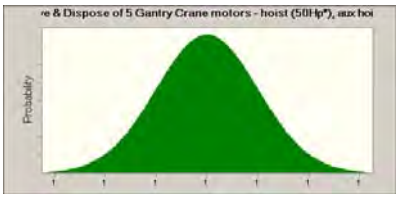
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q66)
Likeliest	$6,000.00	(=R66)
Maximum	$7,000.00	(=S66)

Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Qu **Cell: L67**

Normal distribution with parameters:

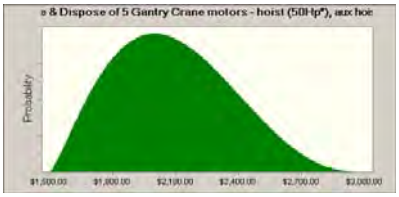
Mean	1	(=L67)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Cell: R67

BetaPERT distribution with parameters:

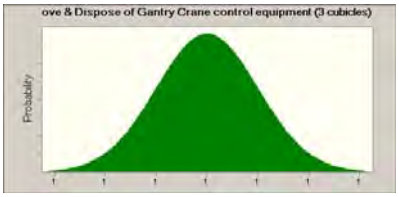
Minimum	$1,500.00	(=Q67)
Likeliest	$2,000.00	(=R67)
Maximum	$3,000.00	(=S67)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Quantity Cell: L68

Normal distribution with parameters:

Mean	1	(=L68)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Unit Price Cell: R68

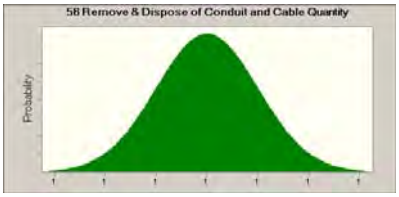
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q68)
Likeliest	$6,000.00	(=R68)
Maximum	$7,000.00	(=S68)

Assumption: 56 Remove & Dispose of Conduit and Cable Quantity **Cell: L69**

Normal distribution with parameters:

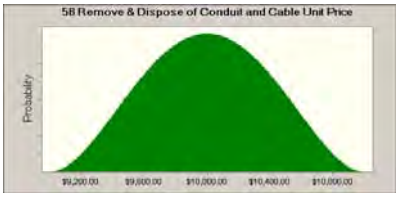
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose of Conduit and Cable Unit Price **Cell: R69**

BetaPERT distribution with parameters:

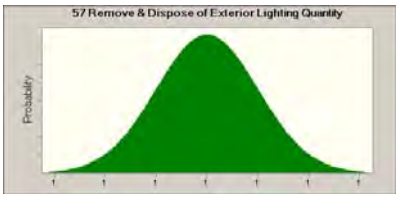
Minimum	$9,000.00	(=Q69)
Likeliest	$10,000.00	(=R69)
Maximum	$11,000.00	(=S69)



Assumption: 57 Remove & Dispose of Exterior Lighting Quantity **Cell: L70**

Normal distribution with parameters:

Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose of Exterior Lighting Unit Price **Cell: R70**

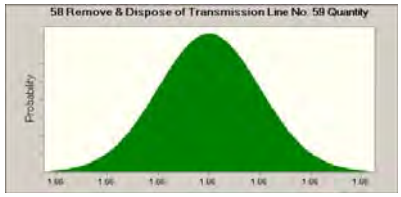
BetaPERT distribution with parameters:

Minimum	$1,500.00	(=Q70)
Likeliest	$2,000.00	(=R70)
Maximum	$3,000.00	(=S70)

Assumption: 58 Remove & Dispose of Transmission Line No. 59 Quantity **Cell: L71**

Normal distribution with parameters:

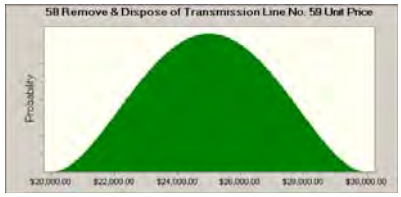
Mean	1.66	(=L71)
Std. Dev.	0.00	(=0.000001)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Unit Price **Cell: R71**

BetaPERT distribution with parameters:

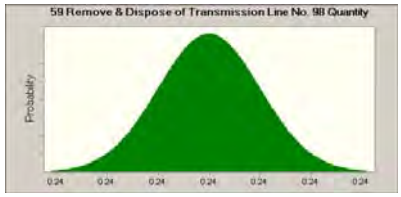
Minimum	$20,000.00	(=Q71)
Likeliest	$25,000.00	(=R71)
Maximum	$30,000.00	(=S71)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Quantity **Cell: L72**

Normal distribution with parameters:

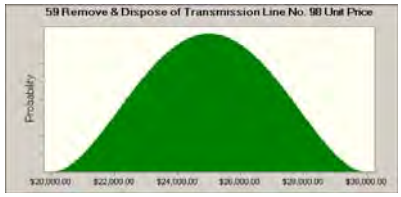
Mean	0.24	(=L72)
Std. Dev.	0.00	(=0.000001)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Unit Price **Cell: R72**

BetaPERT distribution with parameters:

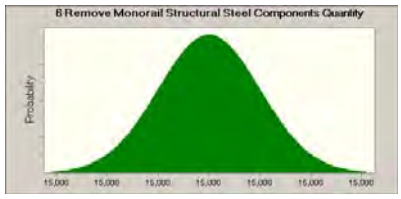
Minimum	$20,000.00	(=Q72)
Likeliest	$25,000.00	(=R72)
Maximum	$30,000.00	(=S72)



Assumption: 6 Remove Monorail Structural Steel Components Quantity **Cell: L19**

Normal distribution with parameters:

Mean	15,000	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 6 Remove Monorail Structural Steel Components Unit Price **Cell: R19**

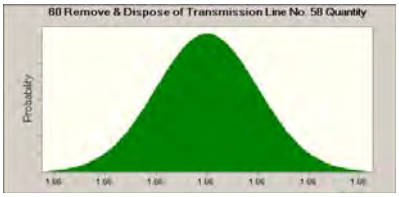
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q19)
Likeliest	$0.65	(=R19)
Maximum	$0.75	(=S19)

Assumption: 60 Remove & Dispose of Transmission Line No. 58 Quantity **Cell: L73**

Normal distribution with parameters:

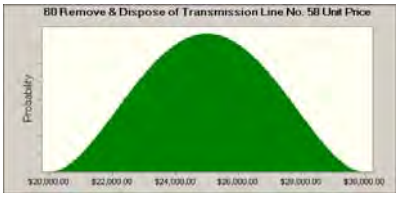
Mean	1.66	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

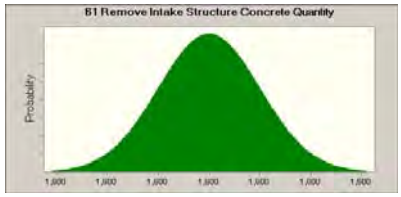
Minimum	$20,000.00	(=Q73)
Likeliest	$25,000.00	(=R73)
Maximum	$30,000.00	(=S73)



Assumption: 61 Remove Intake Structure Concrete Quantity **Cell: L74**

Normal distribution with parameters:

Mean	1,600	(=L74)
Std. Dev.	0	(=0.000001)



Assumption: 61 Remove Intake Structure Concrete Unit Price **Cell: R74**

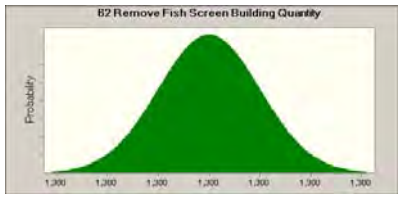
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q74)
Likeliest	$260.00	(=R74)
Maximum	$390.00	(=S74)

Assumption: 62 Remove Fish Screen Building Quantity **Cell: L75**

Normal distribution with parameters:

Mean	1,300	(=L75)
Std. Dev.	0	(=0.000001)



Assumption: 62 Remove Fish Screen Building Unit Price **Cell: R75**

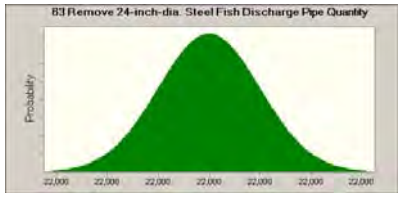
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q75)
Likeliest	$40.00	(=R75)
Maximum	$42.00	(=S75)

Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Quantity **Cell: L76**

Normal distribution with parameters:

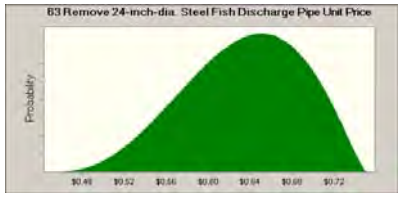
Mean	22,000	(=L76)
Std. Dev.	0	(=0.000001)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Unit Price **Cell: R76**

BetaPERT distribution with parameters:

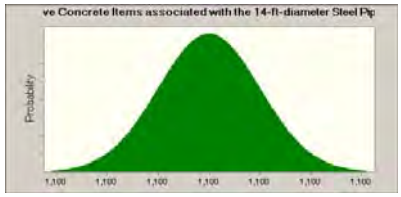
Minimum	$0.45	(=Q76)
Likeliest	$0.65	(=R76)
Maximum	$0.75	(=S76)



Assumption: 64 Remove Concrete Items associated with the 14-ft-diameter Steel Pipe. Qu **Cell: L77**

Normal distribution with parameters:

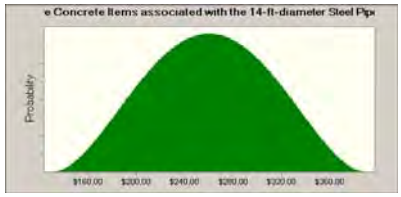
Mean	1,100	(=L77)
Std. Dev.	0	(=0.000001)



Assumption: 64 Remove Concrete Items associated with the 14-ft-diameter Steel Pipe. Unit **Cell: R77**

BetaPERT distribution with parameters:

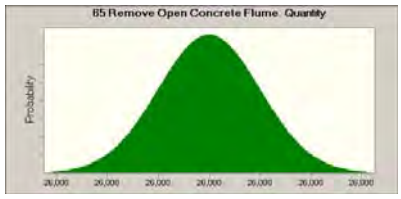
Minimum	$130.00	(=Q77)
Likeliest	$260.00	(=R77)
Maximum	$390.00	(=S77)



Assumption: 65 Remove Open Concrete Flume. Quantity **Cell: L78**

Normal distribution with parameters:

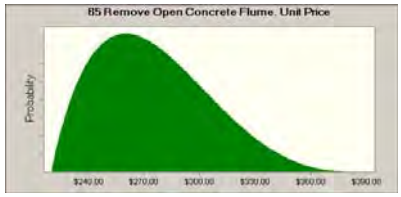
Mean	26,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove Open Concrete Flume. Unit Price **Cell: R78**

BetaPERT distribution with parameters:

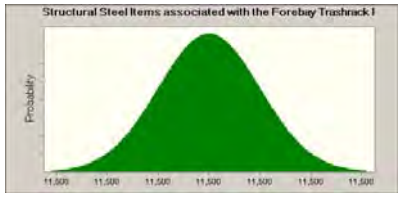
Minimum	$220.00	(=Q78)
Likeliest	$260.00	(=R78)
Maximum	$390.00	(=S78)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: L79**

Normal distribution with parameters:

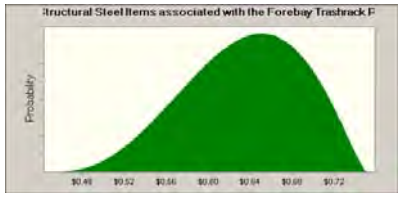
Mean	11,500	(=L79)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: R79**

BetaPERT distribution with parameters:

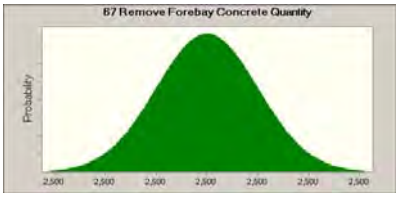
Minimum	$0.45	(=Q79)
Likeliest	$0.65	(=R79)
Maximum	$0.75	(=S79)



Assumption: 67 Remove Forebay Concrete Quantity **Cell: L80**

Normal distribution with parameters:

Mean	2,500	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove Forebay Concrete Unit Price **Cell: R80**

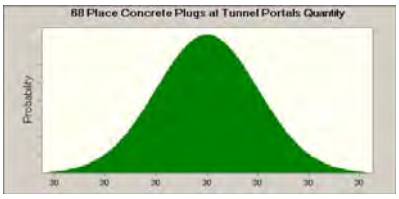
BetaPERT distribution with parameters:

Minimum	$220.00	(=Q80)
Likeliest	$260.00	(=R80)
Maximum	$390.00	(=S80)

Assumption: 68 Place Concrete Plugs at Tunnel Portals Quantity **Cell: L81**

Normal distribution with parameters:

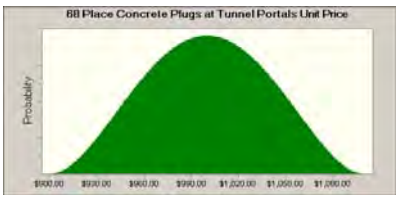
Mean	30	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Unit Price **Cell: R81**

BetaPERT distribution with parameters:

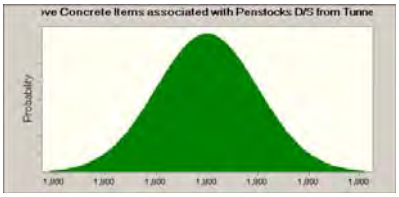
Minimum	$900.00	(=Q81)
Likeliest	$1,000.00	(=R81)
Maximum	$1,100.00	(=S81)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Quan **Cell: L82**

Normal distribution with parameters:

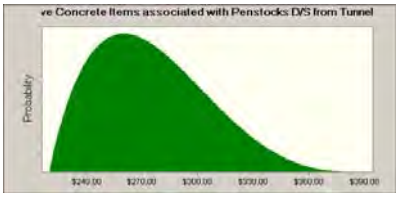
Mean	1,800	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Unit P **Cell: R82**

BetaPERT distribution with parameters:

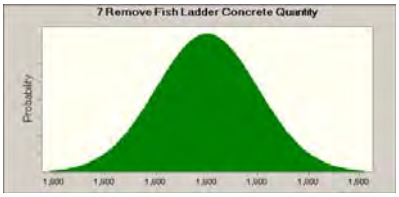
Minimum	$220.00	(=Q82)
Likeliest	$260.00	(=R82)
Maximum	$390.00	(=S82)



Assumption: 7 Remove Fish Ladder Concrete Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1,600	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 7 Remove Fish Ladder Concrete Unit Price **Cell: R20**

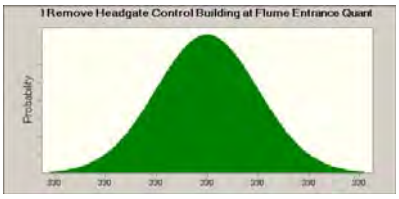
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q20)
Likeliest	$260.00	(=R20)
Maximum	$390.00	(=S20)

Assumption: 70 Remove Headgate Control Building at Flume Entrance Quantity **Cell: L83**

Normal distribution with parameters:

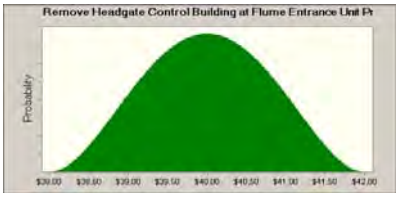
Mean	330	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove Headgate Control Building at Flume Entrance Unit Price **Cell: R83**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q83)
Likeliest	$40.00	(=R83)
Maximum	$42.00	(=S83)



Assumption: 71 Remove Forebay Spillway Gate House Quantity **Cell: L84**

Normal distribution with parameters:

Mean	570	(=L84)
Std. Dev.	0	(=0.000001)

Assumption: 71 Remove Forebay Spillway Gate House Unit Price **Cell: R84**

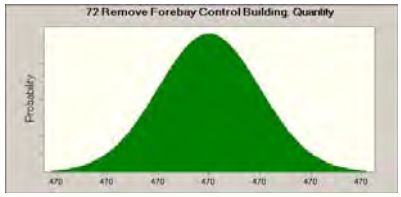
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q84)
Likeliest	$40.00	(=R84)
Maximum	$42.00	(=S84)

Assumption: 72 Remove Forebay Control Building. Quantity **Cell: L85**

Normal distribution with parameters:

Mean	470	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 72 Remove Forebay Control Building. Unit Price **Cell: R85**

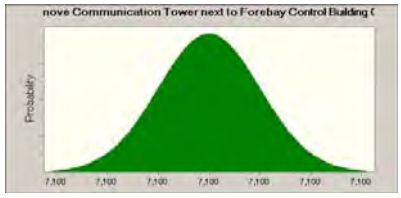
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q85)
Likeliest	$40.00	(=R85)
Maximum	$42.00	(=S85)

Assumption: 73 Remove Communication Tower next to Forebay Control Building Quantity **Cell: L86**

Normal distribution with parameters:

Mean	7,100	(=L86)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove Communication Tower next to Forebay Control Building Unit Price **Cell: R86**

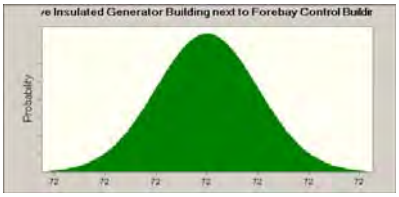
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q86)
Likeliest	$0.65	(=R86)
Maximum	$0.75	(=S86)

Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Qty **Cell: L87**

Normal distribution with parameters:

Mean	72	(=L87)
Std. Dev.	0	(=0.000001)



Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Unit **Cell: R87**

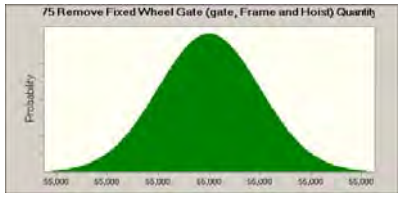
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q87)
Likeliest	$40.00	(=R87)
Maximum	$42.00	(=S87)

Assumption: 75 Remove Fixed Wheel Gate (gate, Frame and Hoist) Quantity **Cell: L88**

Normal distribution with parameters:

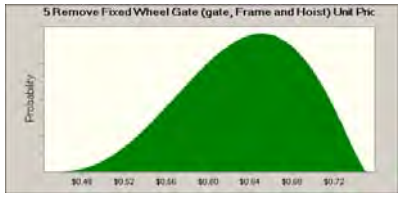
Mean	55,000	(=L88)
Std. Dev.	0	(=0.000001)



Assumption: 75 Remove Fixed Wheel Gate (gate, Frame and Hoist) Unit Price **Cell: R88**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q88)
Likeliest	$0.65	(=R88)
Maximum	$0.75	(=S88)



Assumption: 76 Remove Trash rack and trash rake (steel) Quantity **Cell: L89**

Normal distribution with parameters:

Mean	75,000	(=L89)
Std. Dev.	0	(=0.000001)

Assumption: 76 Remove Trash rack and trash rake (steel) Unit Price **Cell: R89**

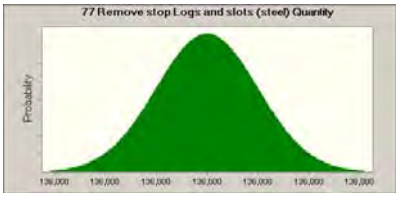
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q89)
Likeliest	$0.50	(=R89)
Maximum	$0.70	(=S89)

Assumption: 77 Remove stop Logs and slots (steel) Quantity **Cell: L90**

Normal distribution with parameters:

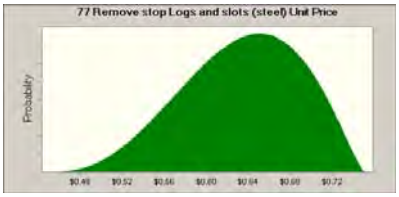
Mean	136,000	(=L90)
Std. Dev.	0	(=0.000001)



Assumption: 77 Remove stop Logs and slots (steel) Unit Price **Cell: R90**

BetaPERT distribution with parameters:

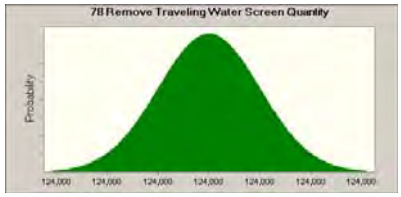
Minimum	$0.45	(=Q90)
Likeliest	$0.65	(=R90)
Maximum	$0.75	(=S90)



Assumption: 78 Remove Traveling Water Screen Quantity **Cell: L91**

Normal distribution with parameters:

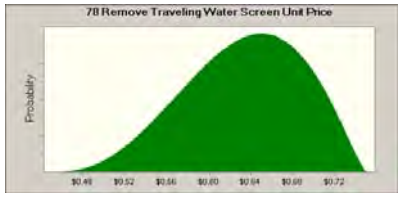
Mean	124,000	(=L91)
Std. Dev.	0	(=0.000001)



Assumption: 78 Remove Traveling Water Screen Unit Price **Cell: R91**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q91)
Likeliest	$0.65	(=R91)
Maximum	$0.75	(=S91)



Assumption: 79 Remove Fish By-Pass and Supports (steel) Quantity **Cell: L92**

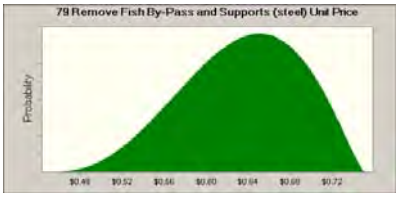
Normal distribution with parameters:

Mean	610,000	(=L92)
Std. Dev.	0	(=0.000001)

Assumption: 79 Remove Fish By-Pass and Supports (steel) Unit Price **Cell: R92**

BetaPERT distribution with parameters:

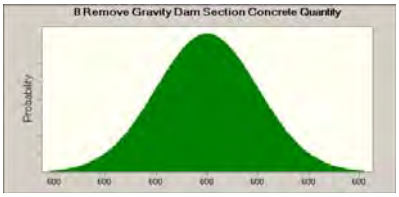
Minimum	$0.45	(=Q92)
Likeliest	$0.65	(=R92)
Maximum	$0.75	(=S92)



Assumption: 8 Remove Gravity Dam Section Concrete Quantity **Cell: L21**

Normal distribution with parameters:

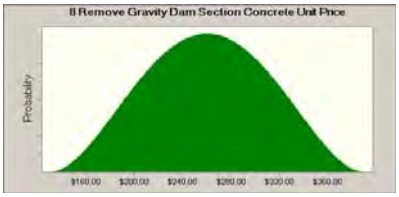
Mean	600	(=L21)
Std. Dev.	0	(=0.000001)



Assumption: 8 Remove Gravity Dam Section Concrete Unit Price **Cell: R21**

BetaPERT distribution with parameters:

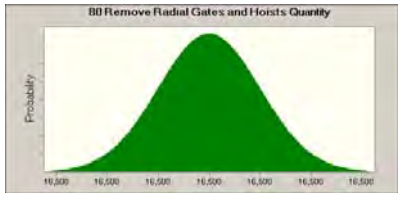
Minimum	$130.00	(=Q21)
Likeliest	$260.00	(=R21)
Maximum	$390.00	(=S21)



Assumption: 80 Remove Radial Gates and Hoists Quantity **Cell: L93**

Normal distribution with parameters:

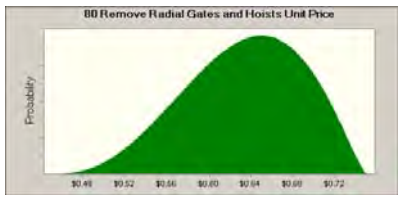
Mean	16,500	(=L93)
Std. Dev.	0	(=0.000001)



Assumption: 80 Remove Radial Gates and Hoists Unit Price **Cell: R93**

BetaPERT distribution with parameters:

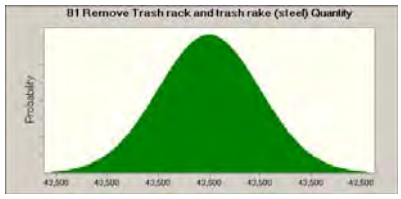
Minimum	$0.45	(=Q93)
Likeliest	$0.65	(=R93)
Maximum	$0.75	(=S93)



Assumption: 81 Remove Trash rack and trash rake (steel) Quantity **Cell: L94**

Normal distribution with parameters:

Mean	43,500	(=L94)
Std. Dev.	0	(=0.000001)



Assumption: 81 Remove Trash rack and trash rake (steel) Unit Price **Cell: R94**

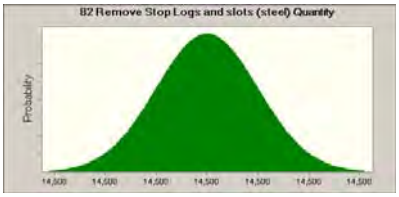
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q94)
Likeliest	$0.50	(=R94)
Maximum	$0.70	(=S94)

Assumption: 82 Remove Stop Logs and slots (steel) Quantity **Cell: L95**

Normal distribution with parameters:

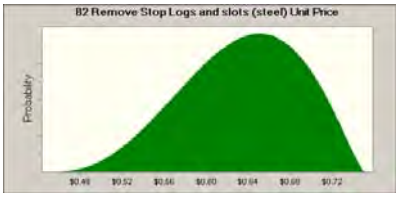
Mean	14,500	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: 82 Remove Stop Logs and slots (steel) Unit Price **Cell: R95**

BetaPERT distribution with parameters:

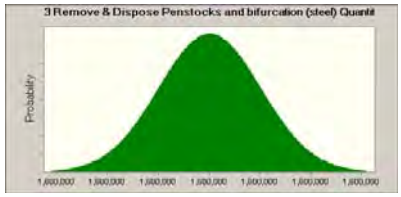
Minimum	$0.45	(=Q95)
Likeliest	$0.65	(=R95)
Maximum	$0.75	(=S95)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Quantity **Cell: L96**

Normal distribution with parameters:

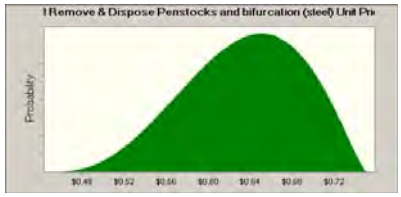
Mean	1,600,000	(=L96)
Std. Dev.	0	(=0.000001)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Unit Price **Cell: R96**

BetaPERT distribution with parameters:

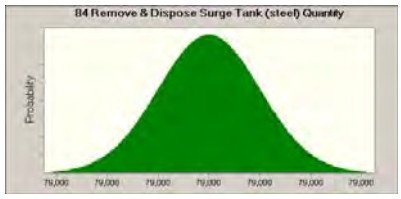
Minimum	$0.45	(=Q96)
Likeliest	$0.65	(=R96)
Maximum	$0.75	(=S96)



Assumption: 84 Remove & Dispose Surge Tank (steel) Quantity **Cell: L97**

Normal distribution with parameters:

Mean	79,000	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: 84 Remove & Dispose Surge Tank (steel) Unit Price **Cell: R97**

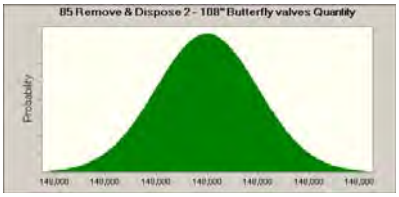
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q97)
Likeliest	$0.65	(=R97)
Maximum	$0.75	(=S97)

Assumption: 85 Remove & Dispose 2 - 108" Butterfly valves Quantity **Cell: L98**

Normal distribution with parameters:

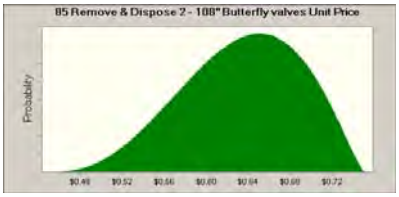
Mean	148,000	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: 85 Remove & Dispose 2 - 108" Butterfly valves Unit Price **Cell: R98**

BetaPERT distribution with parameters:

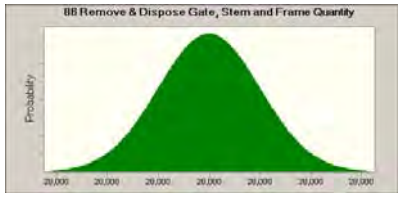
Minimum	$0.45	(=Q98)
Likeliest	$0.65	(=R98)
Maximum	$0.75	(=S98)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Quantity **Cell: L99**

Normal distribution with parameters:

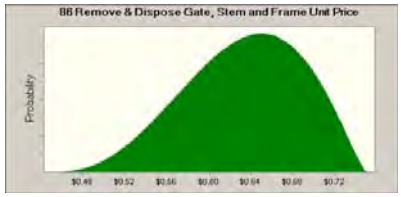
Mean	28,000	(=L99)
Std. Dev.	0	(=0.000001)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Unit Price **Cell: R99**

BetaPERT distribution with parameters:

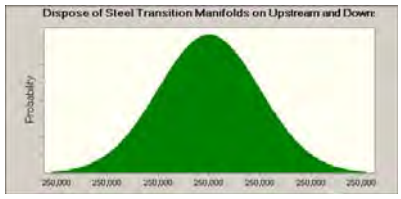
Minimum	$0.45	(=Q99)
Likeliest	$0.65	(=R99)
Maximum	$0.75	(=S99)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs **Cell: L100**

Normal distribution with parameters:

Mean	250,000	(=L100)
Std. Dev.	0	(=0.000001)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs **Cell: R100**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q100)
Likeliest	$0.50	(=R100)
Maximum	$0.70	(=S100)

Assumption: 88 Temporary Access Roads Quantity **Cell: L101**

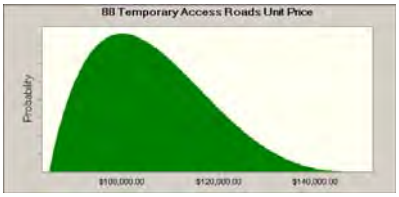
Normal distribution with parameters:

Mean	2	(=L101)
Std. Dev.	0	(=0.000001)

Assumption: 88 Temporary Access Roads Unit Price **Cell: R101**

BetaPERT distribution with parameters:

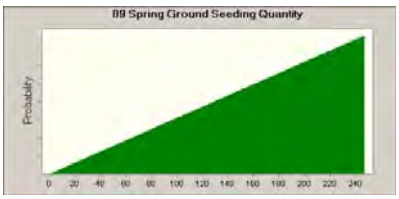
Minimum	$85,000.00	(=Q101)
Likeliest	$100,000.00	(=S101)
Maximum	$150,000.00	(=R101)



Assumption: 89 Spring Ground Seeding Quantity **Cell: L102**

Triangular distribution with parameters:

Minimum	0	(=M102)
Likeliest	247	(=L102)
Maximum	247	(=K102)



Assumption: 89 Spring Ground Seeding Unit Price **Cell: R102**

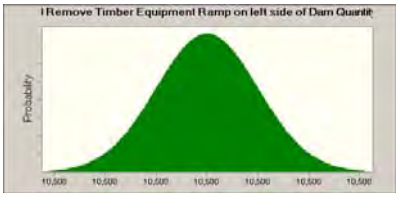
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q102)
Likeliest	$3,500.00	(=R102)
Maximum	$4,000.00	(=S102)

Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Quantity **Cell: L22**

Normal distribution with parameters:

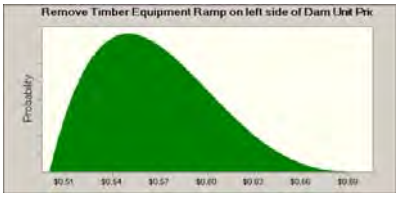
Mean	10,500	(=L22)
Std. Dev.	0	(=0.000001)



Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Unit Price **Cell: R22**

BetaPERT distribution with parameters:

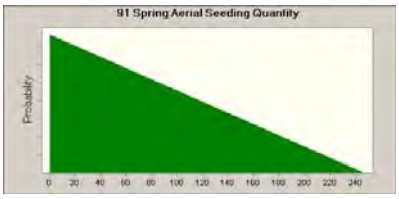
Minimum	$0.50	(=Q22)
Likeliest	$0.55	(=R22)
Maximum	$0.70	(=S22)



Assumption: 91 Spring Aerial Seeding Quantity **Cell: L104**

Triangular distribution with parameters:

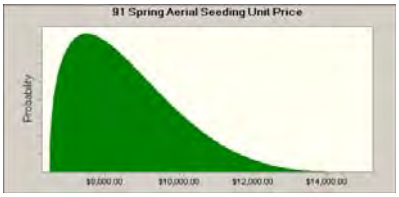
Minimum	0	(=K104)
Likeliest	0	(=L104)
Maximum	247	(=M104)



Assumption: 91 Spring Aerial Seeding Unit Price **Cell: R104**

BetaPERT distribution with parameters:

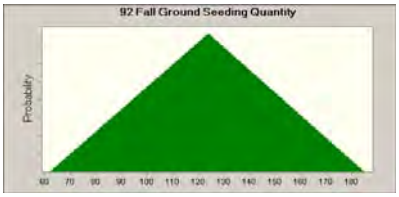
Minimum	$6,500.00	(=Q104)
Likeliest	$7,500.00	(=R104)
Maximum	$15,000.00	(=S104)



Assumption: 92 Fall Ground Seeding Quantity **Cell: L105**

Triangular distribution with parameters:

Minimum	62	(=K105)
Likeliest	124	(=L105)
Maximum	185	(=M105)



Assumption: 92 Fall Ground Seeding Unit Price **Cell: R105**

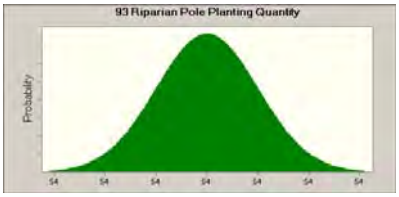
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q105)
Likeliest	$3,500.00	(=R105)
Maximum	$4,000.00	(=S105)

Assumption: 93 Riparian Pole Planting Quantity **Cell: L106**

Normal distribution with parameters:

Mean	54	(=L106)
Std. Dev.	0	(=0.000001)



Assumption: 93 Riparian Pole Planting Unit Price **Cell: R106**

BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q106)
Likeliest	$8,500.00	(=R106)
Maximum	$10,000.00	(=S106)

Assumption: 94 Weed Management Quantity **Cell: L107**

Triangular distribution with parameters:

Minimum	62	(=K107)
Likeliest	124	(=L107)
Maximum	185	(=M107)

Assumption: 94 Weed Management Unit Price **Cell: R107**

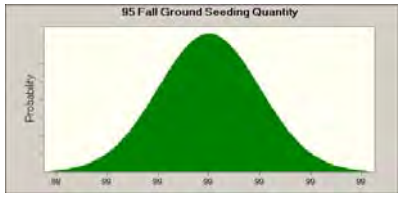
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q107)
Likeliest	$1,500.00	(=R107)
Maximum	$2,000.00	(=S107)

Assumption: 95 Fall Ground Seeding Quantity **Cell: L108**

Normal distribution with parameters:

Mean	99	(=L108)
Std. Dev.	0	(=0.000001)



Assumption: 95 Fall Ground Seeding Unit Price **Cell: R108**

BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q108)
Likeliest	$3,500.00	(=R108)
Maximum	$4,000.00	(=S108)

Assumption: 96 Weed Management Quantity **Cell: L109**

Normal distribution with parameters:

Mean	99	(=L109)
Std. Dev.	0	(=0.000001)

Assumption: 96 Weed Management Unit Price **Cell: R109**

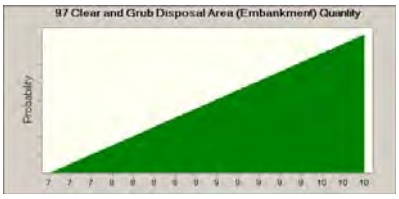
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q109)
Likeliest	$1,500.00	(=R109)
Maximum	$2,000.00	(=S109)

Assumption: 97 Clear and Grub Disposal Area (Embankment) Quantity **Cell: L110**

Triangular distribution with parameters:

Minimum	7	(=M110)
Likeliest	10	(=L110)
Maximum	10	(=K110)



Assumption: 97 Clear and Grub Disposal Area (Embankment) Unit Price **Cell: R110**

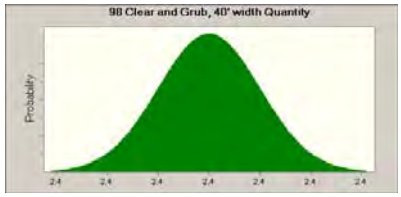
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q110)
Likeliest	$5,000.00	(=R110)
Maximum	$6,000.00	(=S110)

Assumption: 98 Clear and Grub, 40' width Quantity **Cell: L111**

Normal distribution with parameters:

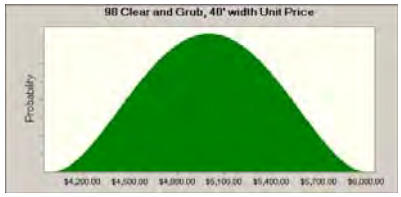
Mean	2.4	(=L111)
Std. Dev.	0.0	(=0.000001)



Assumption: 98 Clear and Grub, 40' width Unit Price **Cell: R111**

BetaPERT distribution with parameters:

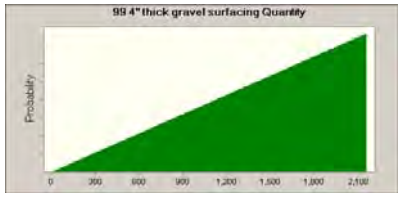
Minimum	$4,000.00	(=Q111)
Likeliest	$5,000.00	(=R111)
Maximum	$6,000.00	(=S111)



Assumption: 99 4" thick gravel surfacing Quantity **Cell: L112**

Triangular distribution with parameters:

Minimum	0	(=K112)
Likeliest	2,150	(=L112)
Maximum	2,150	(=M112)



Assumption: 99 4" thick gravel surfacing Unit Price **Cell: R112**

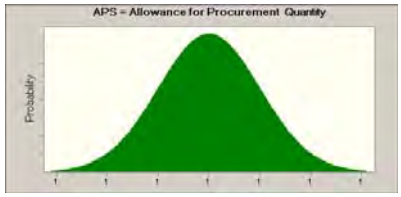
BetaPERT distribution with parameters:

Minimum	$20.00	(=Q112)
Likeliest	$30.00	(=R112)
Maximum	$40.00	(=S112)

Assumption: APS = Allowance for Procurement Quantity **Cell: L140**

Normal distribution with parameters:

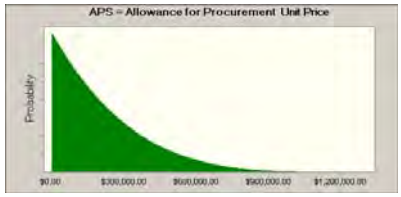
Mean	1	(=L140)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R140**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q140)
Likeliest	$0.00	(=R140)
Maximum	$1,304,080.00	(=S140)



Assumption: Construction Contingencies Quantity **Cell: L143**

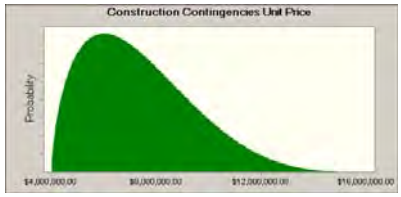
Normal distribution with parameters:

Mean	1	(=L143)
Std. Dev.	0	(=0.000001)

Assumption: Construction Contingencies Unit Price **Cell: R143**

BetaPERT distribution with parameters:

Minimum	$4,000,000.00	(=Q143)
Likeliest	$6,000,000.00	(=R143)
Maximum	$16,000,000.00	(=S143)



Assumption: Design Contingencies Quantity **Cell: L139**

Normal distribution with parameters:

Mean	1	(=L139)
Std. Dev.	0	(=0.000001)

Assumption: Design Contingencies Unit Price **Cell: R139**

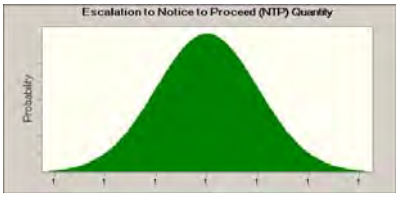
BetaPERT distribution with parameters:

Minimum	$1,203,466.00	(=Q139)
Likeliest	$2,908,175.00	(=R139)
Maximum	$8,996,798.00	(=S139)

Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L136**

Normal distribution with parameters:

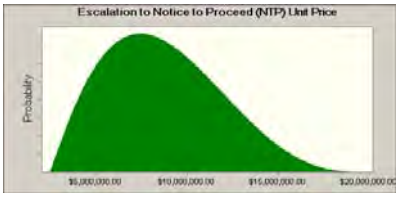
Mean	1	(=L136)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R136**

BetaPERT distribution with parameters:

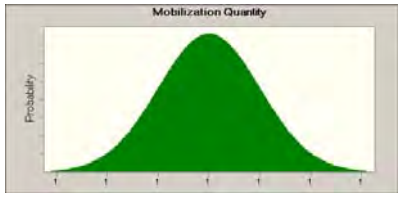
Minimum	$2,461,844.00	(=Q136)
Likeliest	$7,444,775.00	(=R136)
Maximum	$19,749,377.00	(=S136)



Assumption: Mobilization Quantity **Cell: L134**

Normal distribution with parameters:

Mean	1	(=L134)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R134**

BetaPERT distribution with parameters:

Minimum	$730,000.00	(=Q134)
Likeliest	$1,050,000.00	(=R134)
Maximum	$1,750,000.00	(=S134)

Assumption: Non-Contract Cost Quantity **Cell: L145**

Normal distribution with parameters:

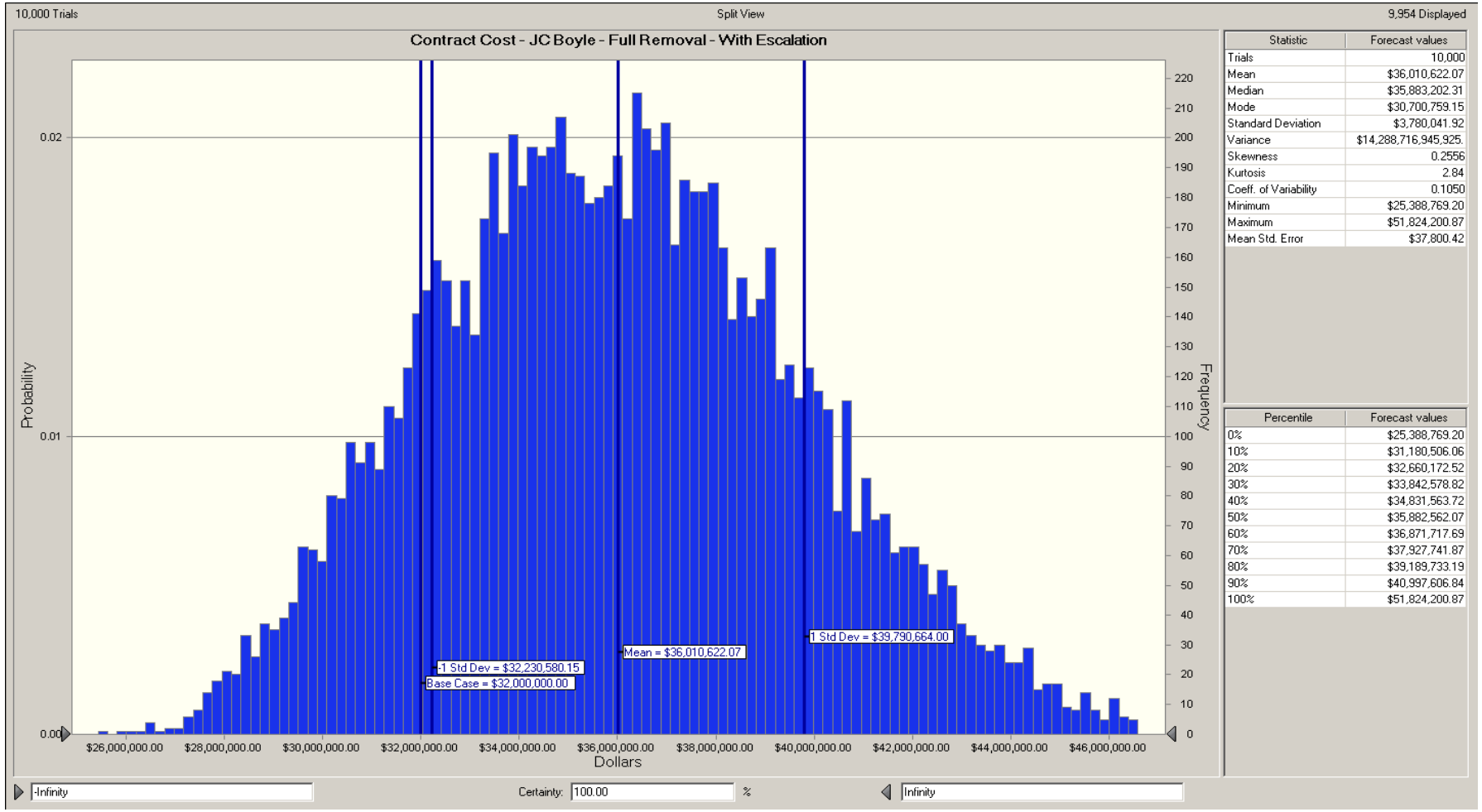
Mean	1	(=L145)
Std. Dev.	0	(=0.000001)

Assumption: Non-Contract Cost Unit Price **Cell: R145**

BetaPERT distribution with parameters:

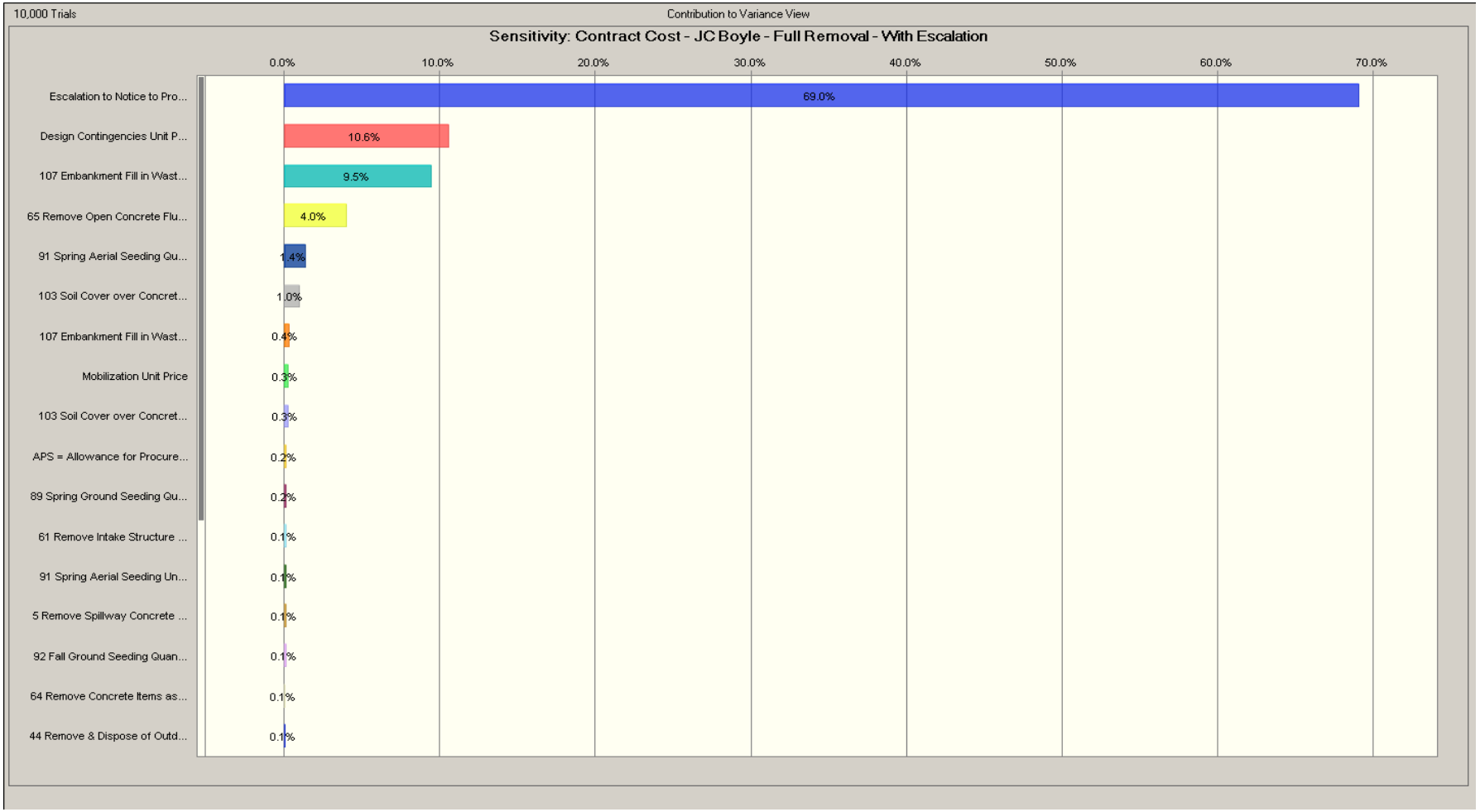
Minimum	$12,000,000.00	(=Q145)
Likeliest	$21,000,000.00	(=R145)
Maximum	$52,000,000.00	(=S145)

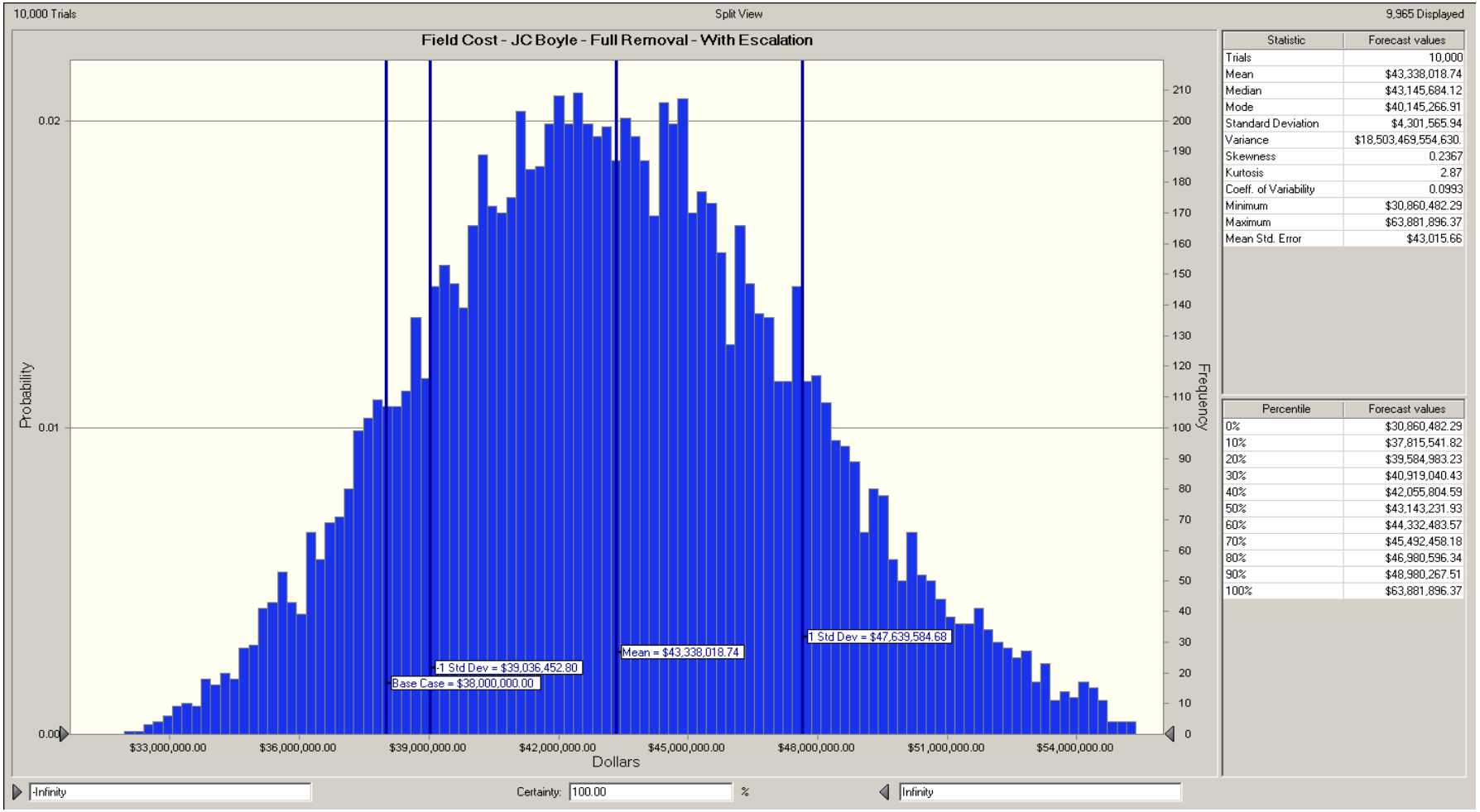
End of Assumptions



Statistic	Forecast values
Trials	10,000
Mean	$36,010,622.07
Median	$35,883,202.31
Mode	$30,700,759.15
Standard Deviation	$3,780,041.92
Variance	$14,288,716,945,925.
Skewness	0.2556
Kurtosis	2.84
Coeff. of Variability	0.1050
Minimum	$25,388,769.20
Maximum	$51,824,200.87
Mean Std. Error	$37,800.42

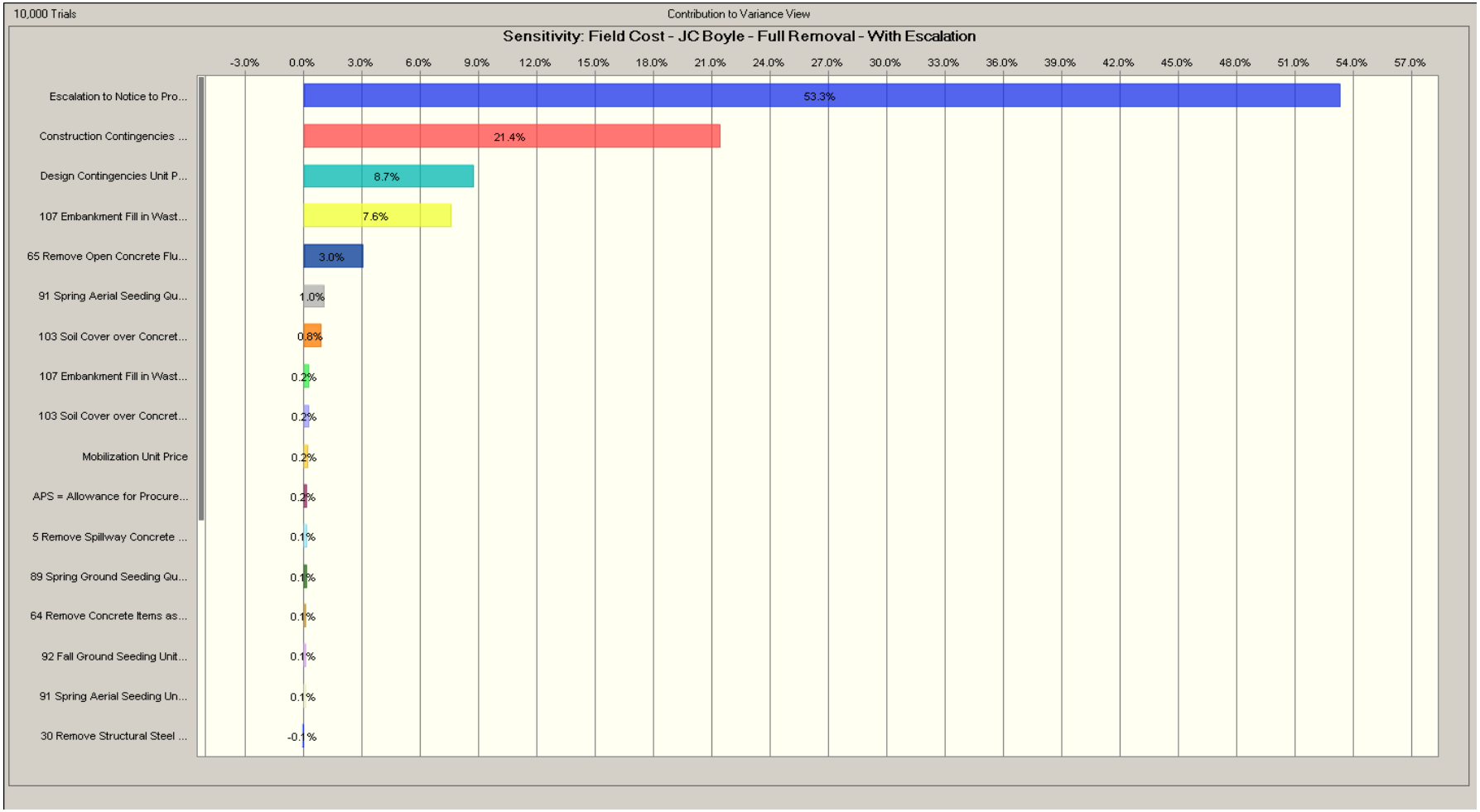
Percentile	Forecast values
0%	$25,388,769.20
10%	$31,180,506.06
20%	$32,660,172.52
30%	$33,842,578.82
40%	$34,831,563.72
50%	$35,882,562.07
60%	$36,871,717.69
70%	$37,927,741.87
80%	$39,189,733.19
90%	$40,997,606.84
100%	$51,824,200.87


10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - JC Boyle - Full Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Escalation to Notice to Pro...
69.0%
Design Contingencies Unit P...
10.6%
107 Embankment Fill in Wast...
9.5%
65 Remove Open Concrete Flu...
4.0%
91 Spring Aerial Seeding Qu...
1.4%
103 Soil Cover over Concret...
1.0%
107 Embankment Fill in Wast...
0.4%
Mobilization Unit Price
0.3%
103 Soil Cover over Concret...
0.3%
APS = Allowance for Procure...
0.2%
89 Spring Ground Seeding Qu...
0.2%
61 Remove Intake Structure ...
0.1%
91 Spring Aerial Seeding Un...
0.1%
5 Remove Spillway Concrete ...
0.1%
92 Fall Ground Seeding Quan...
0.1%
64 Remove Concrete Items as...
0.1%
44 Remove & Dispose of Outd...
0.1%

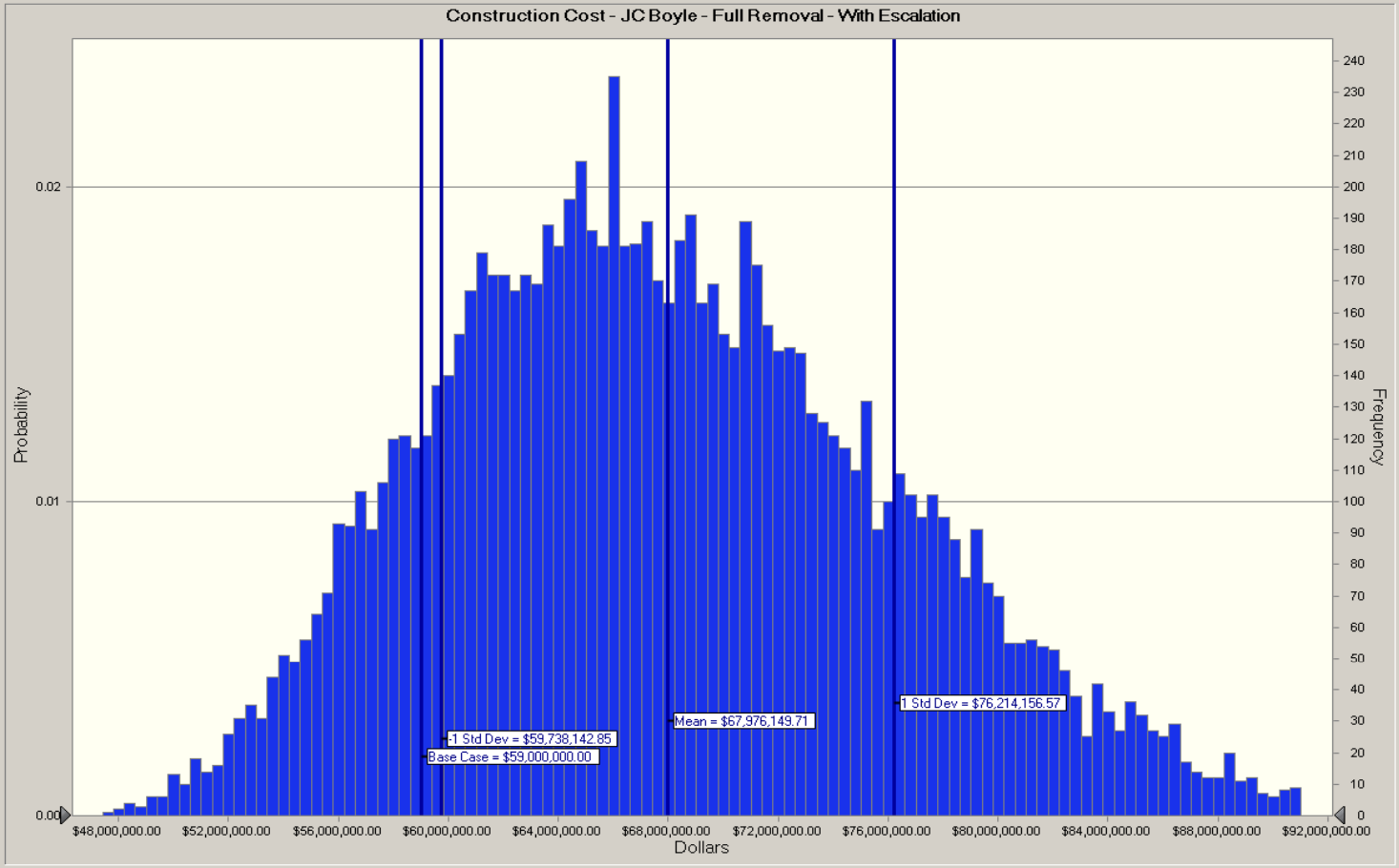


Statistic	Forecast values
Trials	10,000
Mean	$43,338,018.74
Median	$43,145,684.12
Mode	$40,145,266.91
Standard Deviation	$4,301,565.94
Variance	$18,503,469,554,630.
Skewness	0.2367
Kurtosis	2.87
Coeff. of Variability	0.0993
Minimum	$30,860,482.29
Maximum	$63,881,896.37
Mean Std. Error	$43,015.66

Percentile	Forecast values
0%	$30,860,482.29
10%	$37,815,541.82
20%	$39,584,983.23
30%	$40,919,040.43
40%	$42,055,804.59
50%	$43,143,231.93
60%	$44,332,483.57
70%	$45,492,458.18
80%	$46,980,596.34
90%	$48,980,267.51
100%	$63,881,896.37


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - JC Boyle - Full Removal - With Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
48.0%
51.0%
54.0%
57.0%
Escalation to Notice to Pro...
53.3%
Construction Contingencies ...
21.4%
Design Contingencies Unit P...
8.7%
107 Embankment Fill in Wast...
7.6%
65 Remove Open Concrete Flu...
3.0%
91 Spring Aerial Seeding Qu...
1.0%
103 Soil Cover over Concret...
0.8%
107 Embankment Fill in Wast...
0.2%
103 Soil Cover over Concret...
0.2%
Mobilization Unit Price
0.2%
APS = Allowance for Procure...
0.2%
5 Remove Spillway Concrete ...
0.1%
89 Spring Ground Seeding Qu...
0.1%
64 Remove Concrete Items as...
0.1%
92 Fall Ground Seeding Unit...
0.1%
91 Spring Aerial Seeding Un...
0.1%
30 Remove Structural Steel ...
-0.1%

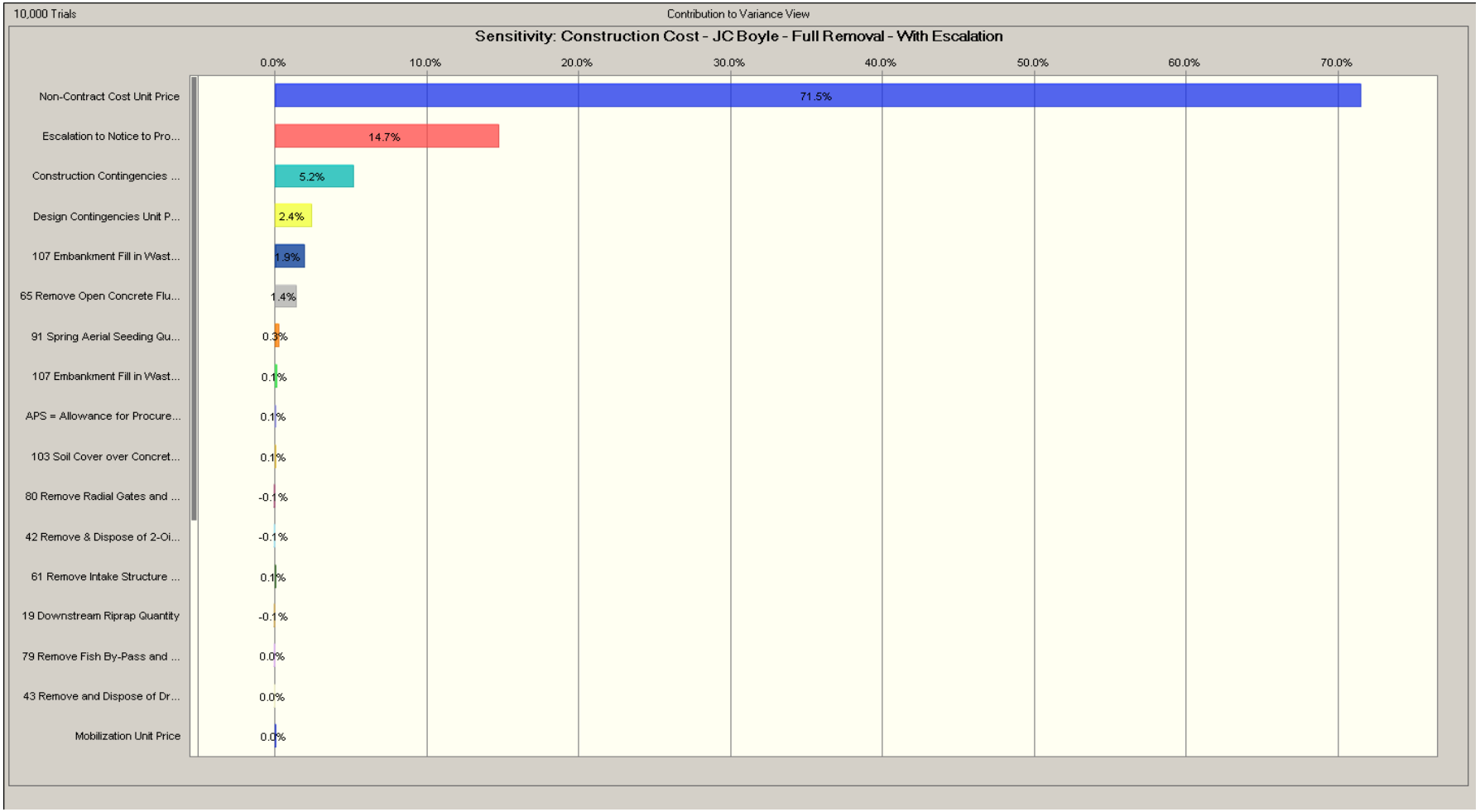
10,000 Trials | Split View | 9,962 Displayed



Statistic	Forecast values
Trials	10,000
Mean	$67,976,149.71
Median	$67,291,572.36
Mode	$60,532,044.08
Standard Deviation	$8,238,006.86
Variance	$67,864,757,095,121.
Skewness	0.3457
Kurtosis	2.77
Coeff. of Variability	0.1212
Minimum	$47,412,732.61
Maximum	$98,309,455.64
Mean Std. Error	$82,380.07

Percentile	Forecast values
0%	$47,412,732.61
10%	$57,697,844.30
20%	$60,740,227.88
30%	$63,093,663.62
40%	$65,217,366.50
50%	$67,291,551.45
60%	$69,570,804.95
70%	$72,038,631.40
80%	$75,092,359.27
90%	$79,203,569.30
100%	$98,309,455.64

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - JC Boyle - Full Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
71.5%
Escalation to Notice to Pro...
14.7%
Construction Contingencies ...
5.2%
Design Contingencies Unit P...
2.4%
107 Embankment Fill in Wast...
1.9%
65 Remove Open Concrete Flu...
1.4%
91 Spring Aerial Seeding Qu...
0.3%
107 Embankment Fill in Wast...
0.1%
APS = Allowance for Procure...
0.1%
103 Soil Cover over Concret...
0.1%
80 Remove Radial Gates and ...
-0.1%
42 Remove & Dispose of 2-Oi...
-0.1%
61 Remove Intake Structure ...
0.1%
19 Downstream Riprap Quantity
-0.1%
79 Remove Fish By-Pass and ...
0.0%
43 Remove and Dispose of Dr...
0.0%
Mobilization Unit Price
0.0%

ESTIMATE WORKSHEET

FEATURE:

REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[JC Boyle - Full Removal Crystal Ball - without Escalation - 2011-04.xls]Copco 2 - Full - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	1	Removal of Diversion Conduit Bulkheads.	8130	14	14	14	CY	$725.00	$850.00	$950.00	$10,150.00	$11,900.00	$13,300.00
	2	Remove Water from behind Tailrace Cofferdam.	8130	500,000	500,000	500,000	GAL	$0.01	$0.01	$0.01	$5,000.00	$5,000.00	$5,000.00
	3	Provide Dewatering behind Tailrace Cofferdam	8130	1	1	1	LS	$28,000.00	$30,000.00	$160,000.00	$28,000.00	$30,000.00	$160,000.00
	4	Construct Embankment Cofferdam in Tailrace around Powerhouse	8130	2,000	2,000	2,000	CY	$50.00	$60.00	$100.00	$100,000.00	$120,000.00	$200,000.00
	5	Remove Spillway Concrete	8130	2,500	2,500	2,500	CY	$130.00	$260.00	$390.00	$325,000.00	$650,000.00	$975,000.00
	6	Remove Monorail Structural Steel Components	8130	15,000	15,000	15,000	LBS	$0.45	$0.65	$0.75	$6,750.00	$9,750.00	$11,250.00
	7	Remove Fish Ladder Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	8	Remove Gravity Dam Section Concrete	8130	600	600	600	CY	$130.00	$260.00	$390.00	$78,000.00	$156,000.00	$234,000.00
	9	Remove Timber Equipment Ramp on left side of Dam	8130	10,500	10,500	10,500	LBS	$0.50	$0.55	$0.70	$5,250.00	$5,775.00	$7,350.00
	10	Remove Pressure-Treated Lumber from Footbridge around Intake Structure	8130	3,600	3,600	3,600	LBS	$0.50	$0.55	$0.70	$1,800.00	$1,980.00	$2,520.00
	11	Remove Storage Shed located on access road	8130	1,728	1,728	1,728	SF	$38.00	$40.00	$42.00	$65,664.00	$69,120.00	$72,576.00
	12	Remove Warehouse located on access road	8130	1,920	1,920	1,920	SF	$38.00	$40.00	$42.00	$72,960.00	$76,800.00	$80,640.00
	13	Remove Fire System Control Bldg. on left abutment.	8130	385	385	385	SF	$38.00	$40.00	$42.00	$14,630.00	$15,400.00	$16,170.00
	14	Remove Dam Communication Bldg. on left abutment.	8130	331	331	331	SF	$38.00	$40.00	$42.00	$12,578.00	$13,240.00	$13,902.00
	15	Remove Concrete Slab on left abutment for former Control House	8130	6	6	6	CY	$130.00	$260.00	$390.00	$780.00	$1,560.00	$2,340.00
	16	Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment.	8130	1	1	1	CY	$130.00	$260.00	$390.00	$130.00	$260.00	$390.00
	17	Remove Reservoir Level Gauge House on Dam Crest	8130	24	24	24	SF	$38.00	$40.00	$42.00	$912.00	$960.00	$1,008.00
	18	Upstream Riprap	8313	2,220	2,220	2,220	CY	$8.00	$9.00	$12.00	$17,760.00	$19,980.00	$26,640.00
	19	Downstream Riprap	8313	1,850	1,850	1,850	CY	$8.00	$9.00	$12.00	$14,800.00	$16,650.00	$22,200.00
	20	Miscellaneous Excavation	8313	132,500	132,500	132,500	CY	$8.00	$9.00	$12.00	$1,060,000.00	$1,192,500.00	$1,590,000.00
	21	Cutoff Wall Concrete Demolition	8313	70	70	70	CY	$130.00	$260.00	$390.00	$9,100.00	$18,200.00	$27,300.00
	22	Cutoff Wall Anchors	8313	285	285	285	EA	$9.00	$10.00	$12.00	$2,565.00	$2,850.00	$3,420.00
	23	Remove & Dispose Hand Rails and Light Poles	8420	5,000	5,000	5,000	LBS	$0.45	$0.65	$0.75	$2,250.00	$3,250.00	$3,750.00
	24	Remove & Dispose Spillway Radial Gates and Hoists	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	25	Remove & Dispose Stop Logs and Slots (steel)	8420	92,000	92,000	92,000	LBS	$0.45	$0.65	$0.75	$41,400.00	$59,800.00	$69,000.00
	26	Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure	8420	4,200	4,200	4,200	LBS	$0.45	$0.65	$0.75	$1,890.00	$2,730.00	$3,150.00
	27	Remove & Dispose of Spillway gate motor & control panel	8430	1	1	1	EA	$500.00	$600.00	$700.00	$500.00	$600.00	$700.00
	28	Remove & Dispose of Distribution equipment , panelboards	8430	1	1	1	EA	$5,500.00	$6,000.00	$6,500.00	$5,500.00	$6,000.00	$6,500.00
	29	Remove Powerhouse Concrete down to Elevation 3324.0	8130	1,500	1,500	1,500	CY	$300.00	$370.00	$800.00	$450,000.00	$555,000.00	$1,200,000.00
	30	Remove Structural Steel Items associated with Powerhouse	8130	94,000	94,000	94,000	LBS	$0.45	$0.65	$0.75	$42,300.00	$61,100.00	$70,500.00
	31	Remove Warehouse near Powerhouse	8130	5,200	5,200	5,200	SF	$38.00	$40.00	$42.00	$197,600.00	$208,000.00	$218,400.00
	32	Remove & Dispose of 2 - Governor oil systems	8420	52,500	52,500	52,500	LBS	$0.45	$0.65	$0.75	$23,625.00	$34,125.00	$39,375.00
	33	Remove & Dispose of Cooling water and bearing oil systems	8420	6,500	6,500	6,500	LBS	$0.45	$0.65	$0.75	$2,925.00	$4,225.00	$4,875.00
	34	Remove & Dispose of 2 - Francis Turbines	8420	560,000	560,000	560,000	LBS	$0.45	$0.65	$0.75	$252,000.00	$364,000.00	$420,000.00
	35	Remove & Dispose of 150 Ton crane	8420	240,000	240,000	240,000	LBS	$0.45	$0.65	$0.75	$108,000.00	$156,000.00	$180,000.00
	36	Remove & Dispose of Compressed Air systems	8420	1,100	1,100	1,100	LBS	$0.45	$0.65	$0.75	$495.00	$715.00	$825.00
	37	Remove & Dispose of 2 - CO2 systems	8420	6,600	6,600	6,600	LBS	$0.45	$0.65	$0.75	$2,970.00	$4,290.00	$4,950.00
	38	Remove & Dispose of Plant Water and Fire Protection	8420	3,100	3,100	3,100	LBS	$0.45	$0.65	$0.75	$1,395.00	$2,015.00	$2,325.00
	39	Remove & Dispose of Transformer Oil Fire protection	8420	6,500	6,500	6,500	LBS	$0.45	$0.65	$0.75	$2,925.00	$4,225.00	$4,875.00
	40	Remove & Dispose of Unwatering Piping	8420	33,000	33,000	33,000	LBS	$0.45	$0.65	$0.75	$14,850.00	$21,450.00	$24,750.00
	41	Remove & Dispose of Drainage Piping	8420	10,000	10,000	10,000	LBS	$0.45	$0.65	$0.75	$4,500.00	$6,500.00	$7,500.00
	42	Remove & Dispose of 2-Oil Sump pumps	8420	2,000	2,000	2,000	LBS	$0.45	$0.65	$0.75	$900.00	$1,300.00	$1,500.00
	43	Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Powerhouse	8420	65,000	65,000	65,000	LBS	$0.45	$0.65	$0.75	$29,250.00	$42,250.00	$48,750.00
	44	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA	8430	2	2	2	EA	$150,000.00	$200,000.00	$250,000.00	$300,000.00	$400,000.00	$500,000.00
	45	Remove & Dispose of Excitation equipment for 53/50 MVA Generator	8430	2	2	2	EA	$12,000.00	$12,500.00	$13,000.00	$24,000.00	$25,000.00	$26,000.00
	46	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator	8430	2	2	2	EA	$6,000.00	$7,000.00	$8,000.00	$12,000.00	$14,000.00	$16,000.00
	47	Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator	8430	2	2	2	EA	$2,000.00	$3,000.00	$4,000.00	$4,000.00	$6,000.00	$8,000.00

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[JC Boyle - Full Removal Crystal Ball - without Escalation - 2011-04.xls]Copco 2 - Full - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	48	Remove & Dispose of Generator Switchgear, 15kV - (6 sections)	8430	1	1	1	EA	$19,000.00	$20,000.00	$21,000.00	$19,000.00	$20,000.00	$21,000.00
	49	Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections)	8430	1	1	1	EA	$8,000.00	$9,000.00	$10,000.00	$8,000.00	$9,000.00	$10,000.00
	50	Remove & Dispose of Unit and plant control switchboard	8430	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	51	Remove & Dispose of Battery system	8430	1	1	1	EA	$7,000.00	$8,000.00	$9,000.00	$7,000.00	$8,000.00	$9,000.00
	52	Remove & Dispose of Raceways, Conduit and Cable	8430	1	1	1	EA	$10,000.00	$11,000.00	$12,000.00	$10,000.00	$11,000.00	$12,000.00
	53	Remove & Dispose of Misc. power & control boards	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	54	Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	55	Remove & Dispose of Gantry Crane control equipment (3 cubicles)	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	56	Remove & Dispose of Conduit and Cable	8430	1	1	1	EA	$9,000.00	$10,000.00	$11,000.00	$9,000.00	$10,000.00	$11,000.00
	57	Remove & Dispose of Exterior Lighting	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	58	Remove & Dispose of Transmission Line No. 59	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	59	Remove & Dispose of Transmission Line No. 98	8430	0.24	0.24	0.24	MILE	$20,000.00	$25,000.00	$30,000.00	$4,800.00	$6,000.00	$7,200.00
	60	Remove & Dispose of Transmission Line No. 58	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	61	Remove Intake Structure Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	62	Remove Fish Screen Building	8130	1,300	1,300	1,300	SF	$38.00	$40.00	$42.00	$49,400.00	$52,000.00	$54,600.00
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	8130	22,000	22,000	22,000	LBS	$0.45	$0.65	$0.75	$9,900.00	$14,300.00	$16,500.00
	64	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	8130	1,100	1,100	1,100	CY	$130.00	$260.00	$390.00	$143,000.00	$286,000.00	$429,000.00
	65	Remove Open Concrete Flume.	8130	26,000	26,000	26,000	CY	$220.00	$260.00	$390.00	$5,720,000.00	$6,760,000.00	$10,140,000.00
	66	Remove Structural Steel Items associated with the Forebay Trashrack Piers	8130	11,500	11,500	11,500	LBS	$0.45	$0.65	$0.75	$5,175.00	$7,475.00	$8,625.00
	67	Remove Forebay Concrete	8130	2,500	2,500	2,500	CY	$220.00	$260.00	$390.00	$550,000.00	$650,000.00	$975,000.00
	68	Place Concrete Plugs at Tunnel Portals	8130	30	30	30	CY	$900.00	$1,000.00	$1,100.00	$27,000.00	$30,000.00	$33,000.00
	69	Remove Concrete Items associated with Penstocks D/S from Tunnel	8130	1,800	1,800	1,800	CY	$220.00	$260.00	$390.00	$396,000.00	$468,000.00	$702,000.00
	70	Remove Headgate Control Building at Flume Entrance	8130	330	330	330	SF	$38.00	$40.00	$42.00	$12,540.00	$13,200.00	$13,860.00
	71	Remove Forebay Spillway Gate House	8130	570	570	570	SF	$38.00	$40.00	$42.00	$21,660.00	$22,800.00	$23,940.00
	72	Remove Forebay Control Building.	8130	470	470	470	SF	$38.00	$40.00	$42.00	$17,860.00	$18,800.00	$19,740.00
	73	Remove Communication Tower next to Forebay Control Building	8130	7,100	7,100	7,100	LBS	$0.45	$0.65	$0.75	$3,195.00	$4,615.00	$5,325.00
	74	Remove Insulated Generator Building next to Forebay Control Building	8130	72	72	72	SF	$38.00	$40.00	$42.00	$2,736.00	$2,880.00	$3,024.00
	75	Remove Fixed Wheel Gate (gate, Frame and Hoist)	8420	55,000	55,000	55,000	LBS	$0.45	$0.65	$0.75	$24,750.00	$35,750.00	$41,250.00
	76	Remove Trash rack and trash rake (steel)	8420	75,000	75,000	75,000	LBS	$0.45	$0.50	$0.70	$33,750.00	$37,500.00	$52,500.00
	77	Remove stop Logs and slots (steel)	8420	136,000	136,000	136,000	LBS	$0.45	$0.65	$0.75	$61,200.00	$88,400.00	$102,000.00
	78	Remove Traveling Water Screen	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	79	Remove Fish By-Pass and Supports (steel)	8420	610,000	610,000	610,000	LBS	$0.45	$0.65	$0.75	$274,500.00	$396,500.00	$457,500.00
	80	Remove Radial Gates and Hoists	8420	16,500	16,500	16,500	LBS	$0.45	$0.65	$0.75	$7,425.00	$10,725.00	$12,375.00
	81	Remove Trash rack and trash rake (steel)	8420	43,500	43,500	43,500	LBS	$0.45	$0.50	$0.70	$19,575.00	$21,750.00	$30,450.00
	82	Remove Stop Logs and slots (steel)	8420	14,500	14,500	14,500	LBS	$0.45	$0.65	$0.75	$6,525.00	$9,425.00	$10,875.00
	83	Remove & Dispose Penstocks and bifurcation (steel)	8420	1,600,000	1,600,000	1,600,000	LBS	$0.45	$0.65	$0.75	$720,000.00	$1,040,000.00	$1,200,000.00
	84	Remove & Dispose Surge Tank (steel)	8420	79,000	79,000	79,000	LBS	$0.45	$0.65	$0.75	$35,550.00	$51,350.00	$59,250.00
	85	Remove & Dispose 2 - 108" Butterfly valves	8420	148,000	148,000	148,000	LBS	$0.45	$0.65	$0.75	$66,600.00	$96,200.00	$111,000.00
	86	Remove & Dispose Gate, Stem and Frame	8420	28,000	28,000	28,000	LBS	$0.45	$0.65	$0.75	$12,600.00	$18,200.00	$21,000.00
	87	Remove & Dispose of Steel Transition Manifolds on Upstream and Downstream	8420	250,000	250,000	250,000	LBS	$0.45	$0.50	$0.70	$112,500.00	$125,000.00	$175,000.00
	88	Temporary Access Roads	8140	2	2	2	MILE	$85,000.00	$150,000.00	$100,000.00	$170,000.00	$300,000.00	$200,000.00
	89	Spring Ground Seeding	8220	247	247	0	ACRES	$3,000.00	$3,500.00	$4,000.00	$741,000.00	$864,500.00	$0.00
	90	Spring Barge Seeding	8220	0	0	0	ACRES				$0.00	$0.00	$0.00
	91	Spring Aerial Seeding	8220	0	0	247	ACRES	$6,500.00	$7,500.00	$15,000.00	$0.00	$0.00	$3,705,000.00
	92	Fall Ground Seeding	8220	62	124	185	ACRES	$3,000.00	$3,500.00	$4,000.00	$186,000.00	$434,000.00	$740,000.00
	93	Riparian Pole Planting	8220	54	54	54	ACRES	$4,000.00	$8,500.00	$10,000.00	$216,000.00	$459,000.00	$540,000.00
	94	Weed Management	8220	62	124	185	ACRES	$1,000.00	$1,500.00	$2,000.00	$62,000.00	$186,000.00	$370,000.00
	95	Fall Ground Seeding	8220	99	99	99	ACRES	$3,000.00	$3,500.00	$4,000.00	$297,000.00	$346,500.00	$396,000.00

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[JC Boyle - Full Removal Crystal Ball - without Escalation - 2011-04.xls]Copco 2 - Full - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	96	Weed Management	8220	99	99	99	ACRES	$1,000.00	$1,500.00	$2,000.00	$99,000.00	$148,500.00	$198,000.00
	97	Clear and Grub Disposal Area (Embankment)	8313	10	10	7	ACRES	$4,000.00	$5,000.00	$6,000.00	$40,000.00	$50,000.00	$42,000.00
	98	Clear and Grub, 40' width	8313	2.4	2.4	2.4	ACRES	$4,000.00	$5,000.00	$6,000.00	$9,600.00	$12,000.00	$14,400.00
	99	4" thick gravel surfacing	8313	0	2,150	2,150	TON	$20.00	$30.00	$40.00	$0.00	$64,500.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	8313	4	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$16,000.00	$0.00	$0.00
	101	Clear and grub, 20' width	8313	1	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$0.00	$0.00
	102	4" thick gravel surfacing	8313	0	0	0	TON				$0.00	$0.00	$0.00
	103	Soil Cover over Concrete Rubble	8313	13,000	13,000	0	CY	$25.00	$140.00	$150.00	$325,000.00	$1,820,000.00	$0.00
	104	Dispose of Concrete Rubble from Dam	8313	0	0	0	CY				$0.00	$0.00	$0.00
	105	Dispose of Concrete Rubble from Flume/Forebay	8313	0	0	0	CY				$0.00	$0.00	$0.00
	106	Dispose of Concrete Rubble from Power House	8313	0	0	0	CY				$0.00	$0.00	$0.00
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	8313	0	0	41,000	CY	$25.00	$140.00	$150.00	$0.00	$0.00	$6,150,000.00
	108	Topsy Recreation Area - Concrete total	BLM	68	68	68	CY	$175.00	$220.00	$320.00	$11,900.00	$14,960.00	$21,760.00
	109	Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite decking	BLM	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	110	Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platform	BLM	200	200	200	SF	$12.00	$13.00	$14.00	$2,400.00	$2,600.00	$2,800.00
	111	Topsy Recreation Area - Regrade to natural contour and reseed	BLM	300	300	300	SF	$3.00	$4.00	$5.00	$900.00	$1,200.00	$1,500.00
	112	Pioneer Park - Picnic tables to be removed and hauled away	BLM	12	12	12	EA	$55.00	$60.00	$65.00	$660.00	$720.00	$780.00
	113	Pioneer Park - 12 Concrete fire rings	BLM	5	5	5	CY	$175.00	$220.00	$320.00	$875.00	$1,100.00	$1,600.00
	114	Pioneer Park - Portable toilets to be removed and hauled away	BLM	2	2	2	EA	$900.00	$1,000.00	$1,200.00	$1,800.00	$2,000.00	$2,400.00
	115	Pioneer Park - Signs to be removed and hauled away	BLM	6	6	6	EA	$135.00	$150.00	$160.00	$810.00	$900.00	$960.00
	116	Pioneer Park - Dumpster to be removed and hauled away	BLM	1	1	1	EA	$900.00	$1,000.00	$1,200.00	$900.00	$1,000.00	$1,200.00
	117	Pioneer Park - Remove paved access road	BLM	200	200	200	LF	$230.00	$250.00	$270.00	$46,000.00	$50,000.00	$54,000.00
	118	Pioneer Park - Regrage to natural contour, rip, plant and seed parking and recreation site	BLM	1	1	1	ACRES	$19,000.00	$20,000.00	$22,000.00	$9,500.00	$10,000.00	$11,000.00
		Subtotal 1									$14,604,690.00	$20,597,050.00	$35,199,745.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$730,000.00	$1,050,000.00	$1,750,000.00	$730,000.00	$1,050,000.00	$1,750,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)											
		NOT INCLUDED											
		Design Contingencies (MPL ~ 8%; MP ~ 10%; MPH ~ 15%)		1	1	1	ls	$1,165,310.00	$2,352,950.00	$5,200,411.00	$1,165,310.00	$2,352,950.00	$5,200,411.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$849,844.00	$0.00	$0.00	$849,844.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$16,500,000.00**	**$24,000,000.00**	**$43,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$3,000,000.00	$5,000,000.00	$11,000,000.00	$3,000,000.00	$5,000,000.00	$11,000,000.00
		FIELD COST									**$19,500,000.00**	**$29,000,000.00**	**$54,000,000.00**
		Non-Contract Cost (MPL ~ 52%; MP ~ 55%; MPH ~ 61%)		1	1	1	ls	$10,500,000.00	$16,000,000.00	$33,000,000.00	$10,500,000.00	$16,000,000.00	$33,000,000.00
		CONSTRUCTION COST									**$30,000,000.00**	**$45,000,000.00**	**$87,000,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES		
BY	See Group Worksheets	CHECKED: See Group Worksheets	BY	Craig Grush, P.E.	CHECKED
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	05/25/11	PEER REVIEW

05-25-11
6/3/11

Crystal Ball Report - Full
Simulation started on 6/8/2011 at 7:35:13
Simulation stopped on 6/8/2011 at 7:36:19

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	65.96
Trials/second (average)	152
Random numbers per sec	35,780
Crystal Ball data:	
Assumptions	236
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP

UNIT PRICES BY Craig A. Grush

DATE 6/8/2011

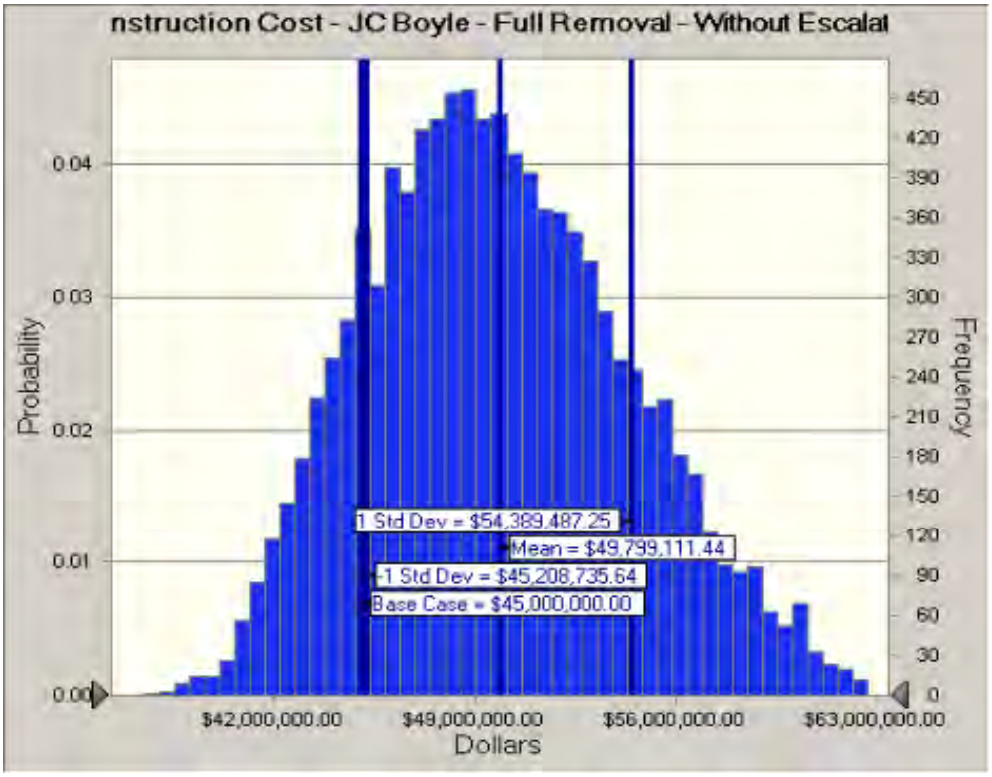
DATE	PEER REVIEWER(S)	CODE
6/8/11	Signature	8170
	DAN MAA Printed Name	
	Signature	
	Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [JC Boyle - Full Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyle -

Forecast: Construction Cost - JC Boyle - Full Removal - Without Escalation **Cell: U146**

Summary:
Entire range is from $36,773,885.99 to $67,904,113.51
Base case is $45,000,000.00
After 10,000 trials, the std. error of the mean is $45,903.76



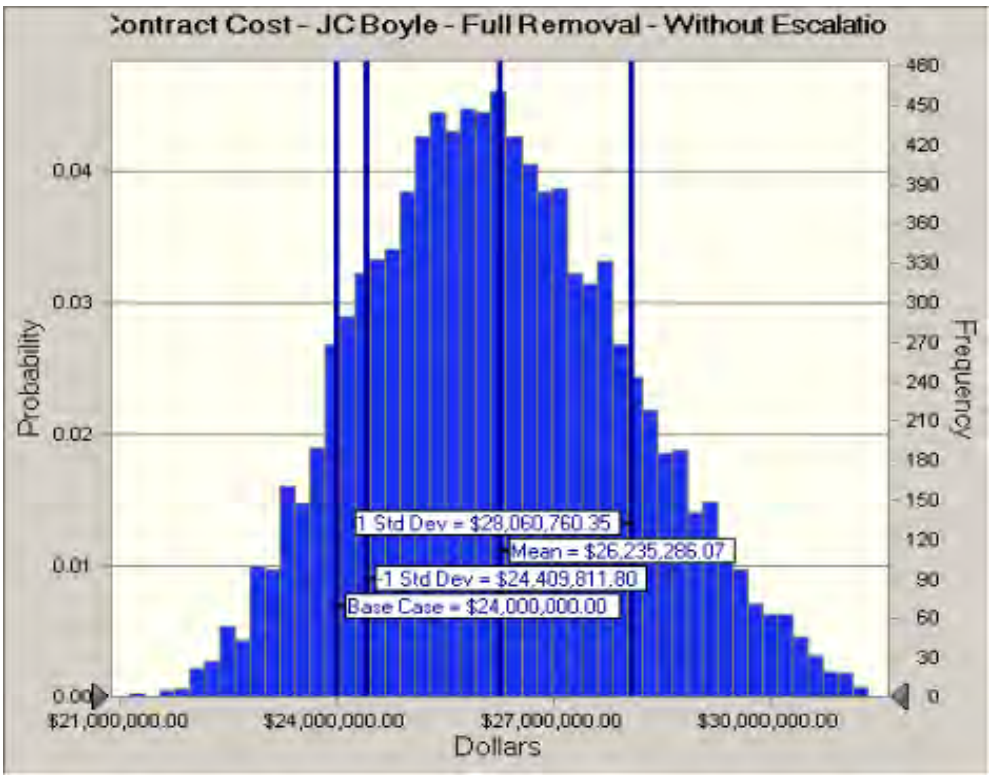
Forecast: Construction Cost - JC Boyle - Full Removal - Without Escalation (cont'd) **Cell: U146**

Statistics:	Forecast values
Trials	10,000
Mean	$49,799,111.44
Median	$49,462,679.43
Mode	---
Standard Deviation	$4,590,375.80
Variance	$21,071,550,026,106.40
Skewness	0.3181
Kurtosis	2.76
Coeff. of Variability	0.0922
Minimum	$36,773,885.99
Maximum	$67,904,113.51
Range Width	$31,130,227.52
Mean Std. Error	$45,903.76

Percentiles:	Forecast values
0%	$36,773,885.99
10%	$44,015,119.87
20%	$45,772,742.32
30%	$47,094,931.34
40%	$48,298,164.97
50%	$49,462,561.82
60%	$50,708,328.70
70%	$52,125,048.95
80%	$53,736,834.33
90%	$56,012,672.44
100%	$67,904,113.51

Forecast: Contract Cost - JC Boyle - Full Removal - Without Escalation **Cell: U142**

Summary:
Entire range is from $20,648,493.64 to $33,203,008.32
Base case is $24,000,000.00
After 10,000 trials, the std. error of the mean is $18,254.74



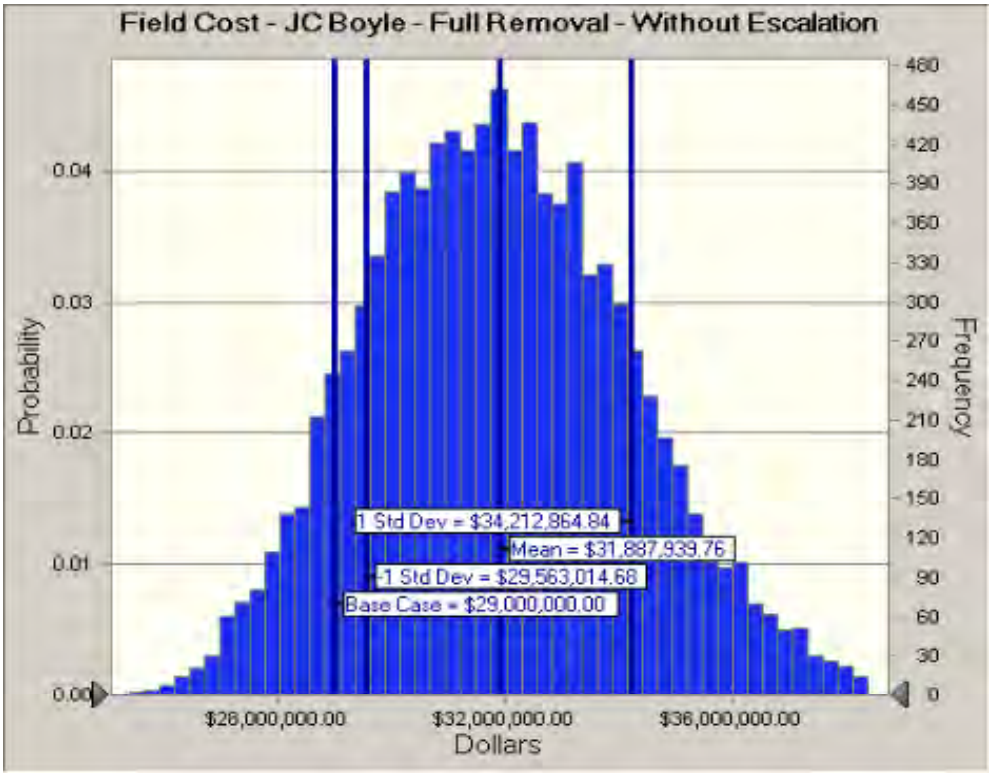
Forecast: Contract Cost - JC Boyle - Full Removal - Without Escalation (cont'd) **Cell: U142**

Statistics:	Forecast values
Trials	10,000
Mean	$26,235,286.07
Median	$26,133,571.99
Mode	---
Standard Deviation	$1,825,474.27
Variance	$3,332,356,320,071.09
Skewness	0.2834
Kurtosis	2.84
Coeff. of Variability	0.0696
Minimum	$20,648,493.64
Maximum	$33,203,008.32
Range Width	$12,554,514.68
Mean Std. Error	$18,254.74

Percentiles:	Forecast values
0%	$20,648,493.64
10%	$23,951,205.47
20%	$24,618,627.57
30%	$25,184,864.45
40%	$25,661,736.87
50%	$26,133,481.83
60%	$26,609,727.03
70%	$27,143,784.84
80%	$27,780,301.18
90%	$28,691,888.64
100%	$33,203,008.32

Forecast: Field Cost - JC Boyle - Full Removal - Without Escalation **Cell: U144**

Summary:
Entire range is from $24,967,338.59 to $42,005,454.52
Base case is $29,000,000.00
After 10,000 trials, the std. error of the mean is $23,249.25



Forecast: Field Cost - JC Boyle - Full Removal - Without Escalation (cont'd) **Cell: U144**

Statistics:	Forecast values
Trials	10,000
Mean	$31,887,939.76
Median	$31,808,251.33
Mode	---
Standard Deviation	$2,324,925.08
Variance	$5,405,276,629,028.43
Skewness	0.2314
Kurtosis	2.87
Coeff. of Variability	0.0729
Minimum	$24,967,338.59
Maximum	$42,005,454.52
Range Width	$17,038,115.93
Mean Std. Error	$23,249.25

Percentiles:	Forecast values
0%	$24,967,338.59
10%	$28,927,298.76
20%	$29,860,434.57
30%	$30,532,615.95
40%	$31,186,553.32
50%	$31,808,237.48
60%	$32,406,566.76
70%	$33,096,985.95
80%	$33,853,140.61
90%	$34,919,619.18
100%	$42,005,454.52

End of Forecasts

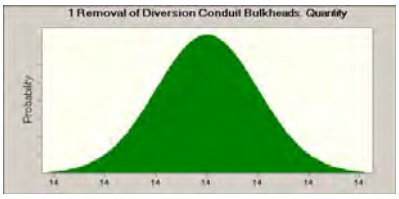
Assumptions

Worksheet: [JC Boyle - Full Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyle -

Assumption: 1 Removal of Diversion Conduit Bulkheads. Quantity **Cell: L14**

Normal distribution with parameters:

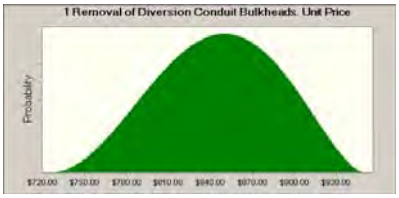
Mean	14	(=L14)
Std. Dev.	0	(=0.000001)



Assumption: 1 Removal of Diversion Conduit Bulkheads. Unit Price **Cell: R14**

BetaPERT distribution with parameters:

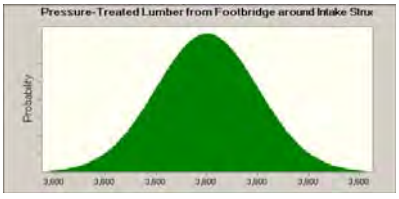
Minimum	$725.00	(=Q14)
Likeliest	$850.00	(=R14)
Maximum	$950.00	(=S14)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structu **Cell: L23**

Normal distribution with parameters:

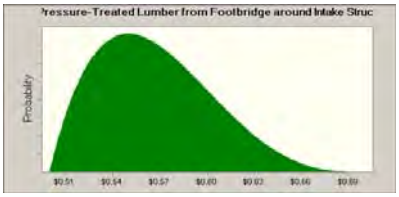
Mean	3,600	(=L23)
Std. Dev.	0	(=0.000001)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structure **Cell: R23**

BetaPERT distribution with parameters:

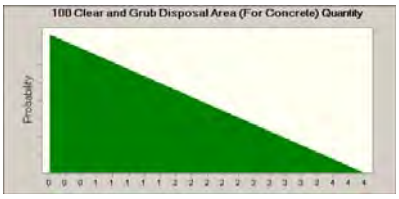
Minimum	$0.50	(=Q23)
Likeliest	$0.55	(=R23)
Maximum	$0.70	(=S23)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Quantity **Cell: L113**

Triangular distribution with parameters:

Minimum	0	(=M113)
Likeliest	0	(=L113)
Maximum	4	(=K113)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Unit Price **Cell: R113**

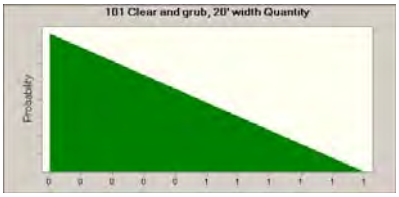
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q113)
Likeliest	$5,000.00	(=R113)
Maximum	$6,000.00	(=S113)

Assumption: 101 Clear and grub, 20' width Quantity **Cell: L114**

Triangular distribution with parameters:

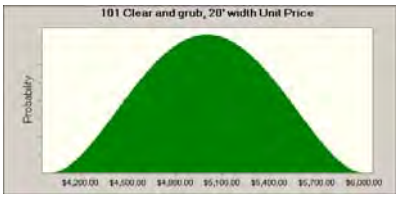
Minimum	0	(=M114)
Likeliest	0	(=L114)
Maximum	1	(=K114)



Assumption: 101 Clear and grub, 20' width Unit Price **Cell: R114**

BetaPERT distribution with parameters:

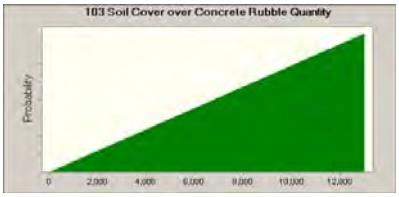
Minimum	$4,000.00	(=Q114)
Likeliest	$5,000.00	(=R114)
Maximum	$6,000.00	(=S114)



Assumption: 103 Soil Cover over Concrete Rubble Quantity **Cell: L116**

Triangular distribution with parameters:

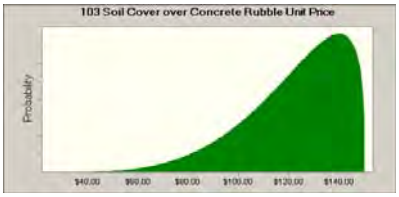
Minimum	0	(=M116)
Likeliest	13,000	(=L116)
Maximum	13,000	(=K116)



Assumption: 103 Soil Cover over Concrete Rubble Unit Price **Cell: R116**

BetaPERT distribution with parameters:

Minimum	$25.00	(=Q116)
Likeliest	$140.00	(=R116)
Maximum	$150.00	(=S116)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Quantity **Cell: L120**

Triangular distribution with parameters:

Minimum	0	(=K120)
Likeliest	0	(=L120)
Maximum	41,000	(=M120)

Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Unit Price **Cell: R120**

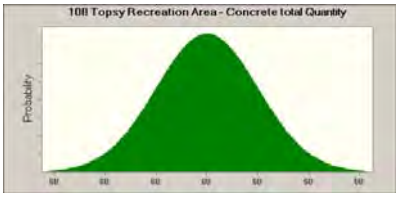
BetaPERT distribution with parameters:

Minimum	$25.00	(=Q120)
Likeliest	$140.00	(=R120)
Maximum	$150.00	(=S120)

Assumption: 108 Topsy Recreation Area - Concrete total Quantity **Cell: L121**

Normal distribution with parameters:

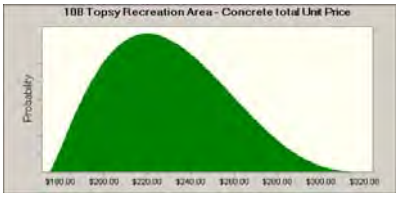
Mean	68	(=L121)
Std. Dev.	0	(=0.000001)



Assumption: 108 Topsy Recreation Area - Concrete total Unit Price **Cell: R121**

BetaPERT distribution with parameters:

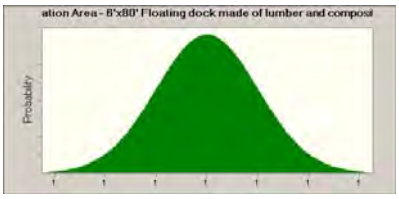
Minimum	$175.00	(=Q121)
Likeliest	$220.00	(=R121)
Maximum	$320.00	(=S121)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite **Cell: L122**

Normal distribution with parameters:

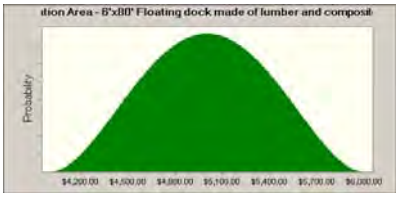
Mean	1	(=L122)
Std. Dev.	0	(=0.000001)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and Cell: R122

BetaPERT distribution with parameters:

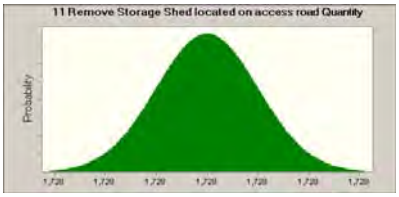
Minimum	$4,000.00	(=Q122)
Likeliest	$5,000.00	(=R122)
Maximum	$6,000.00	(=S122)



Assumption: 11 Remove Storage Shed located on access road Quantity **Cell: L24**

Normal distribution with parameters:

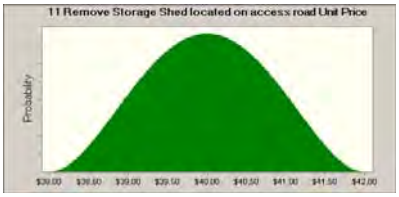
Mean	1,728	(=L24)
Std. Dev.	0	(=0.000001)



Assumption: 11 Remove Storage Shed located on access road Unit Price **Cell: R24**

BetaPERT distribution with parameters:

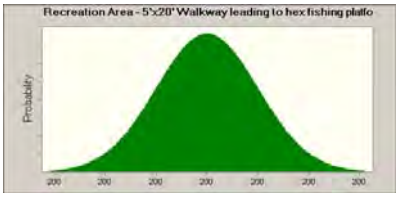
Minimum	$38.00	(=Q24)
Likeliest	$40.00	(=R24)
Maximum	$42.00	(=S24)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: L123

Normal distribution with parameters:

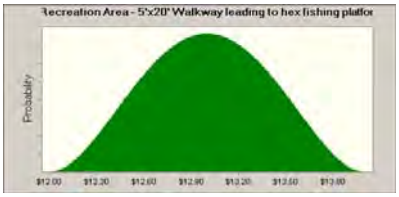
Mean	200	(=L123)
Std. Dev.	0	(=0.000001)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: R123

BetaPERT distribution with parameters:

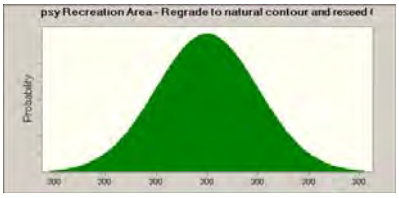
Minimum	$12.00	(=Q123)
Likeliest	$13.00	(=R123)
Maximum	$14.00	(=S123)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Quantity Cell: L124

Normal distribution with parameters:

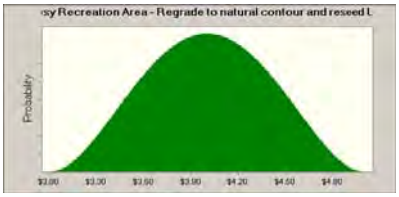
Mean	300	(=L124)
Std. Dev.	0	(=0.000001)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Unit Price Cell: R124

BetaPERT distribution with parameters:

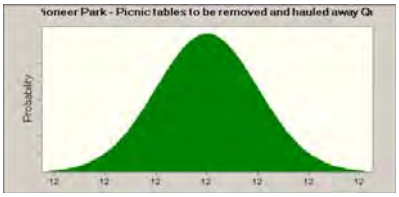
Minimum	$3.00	(=Q124)
Likeliest	$4.00	(=R124)
Maximum	$5.00	(=S124)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Quantity Cell: L125

Normal distribution with parameters:

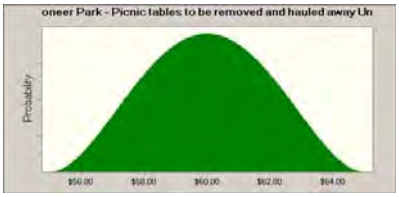
Mean	12	(=L125)
Std. Dev.	0	(=0.000001)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Unit Price Cell: R125

BetaPERT distribution with parameters:

Minimum	$55.00	(=Q125)
Likeliest	$60.00	(=R125)
Maximum	$65.00	(=S125)



Assumption: 113 Pioneer Park - 12 Concrete fire rings Quantity **Cell: L126**

Normal distribution with parameters:

Mean	5	(=L126)
Std. Dev.	0	(=0.000001)

Assumption: 113 Pioneer Park - 12 Concrete fire rings Unit Price **Cell: R126**

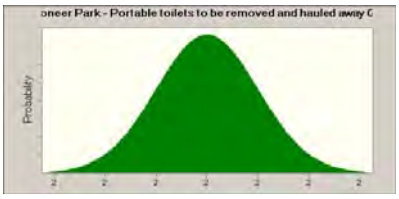
BetaPERT distribution with parameters:

Minimum	$175.00	(=Q126)
Likeliest	$220.00	(=R126)
Maximum	$320.00	(=S126)

Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Quantity **Cell: L127**

Normal distribution with parameters:

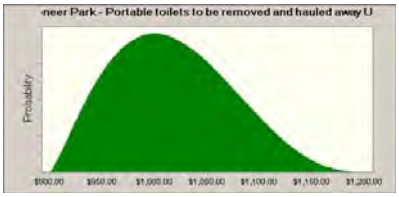
Mean	2	(=L127)
Std. Dev.	0	(=0.000001)



Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Unit Price **Cell: R127**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q127)
Likeliest	$1,000.00	(=R127)
Maximum	$1,200.00	(=S127)



Assumption: 115 Pioneer Park - Signs to be removed and hauled away Quantity **Cell: L128**

Normal distribution with parameters:

Mean	6	(=L128)
Std. Dev.	0	(=0.000001)

Assumption: 115 Pioneer Park - Signs to be removed and hauled away Unit Price **Cell: R128**

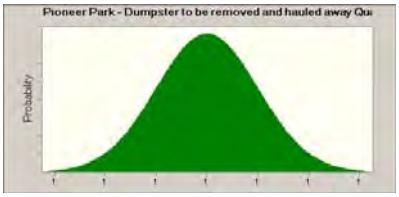
BetaPERT distribution with parameters:

Minimum	$135.00	(=Q128)
Likeliest	$150.00	(=R128)
Maximum	$160.00	(=S128)

Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Quantity **Cell: L129**

Normal distribution with parameters:

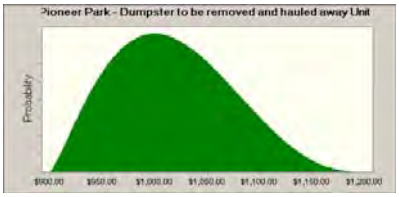
Mean	1	(=L129)
Std. Dev.	0	(=0.000001)



Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Unit Price **Cell: R129**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q129)
Likeliest	$1,000.00	(=R129)
Maximum	$1,200.00	(=S129)



Assumption: 117 Pioneer Park - Remove paved access road Quantity **Cell: L130**

Normal distribution with parameters:

Mean	200	(=L130)
Std. Dev.	0	(=0.000001)

Assumption: 117 Pioneer Park - Remove paved access road Unit Price **Cell: R130**

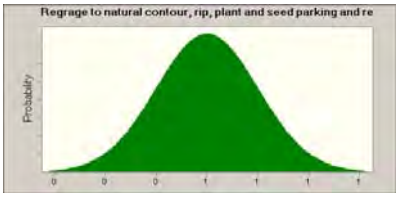
BetaPERT distribution with parameters:

Minimum	$230.00	(=Q130)
Likeliest	$250.00	(=R130)
Maximum	$270.00	(=S130)

Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: L131**

Normal distribution with parameters:

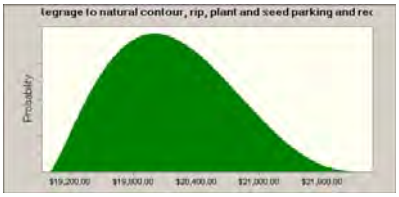
Mean	1	(=L131)
Std. Dev.	0	(=0.000001)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: R131**

BetaPERT distribution with parameters:

Minimum	$19,000.00	(=Q131)
Likeliest	$20,000.00	(=R131)
Maximum	$22,000.00	(=S131)



Assumption: 12 Remove Warehouse located on access road Quantity **Cell: L25**

Normal distribution with parameters:

Mean	1,920	(=L25)
Std. Dev.	0	(=0.000001)

Assumption: 12 Remove Warehouse located on access road Unit Price **Cell: R25**

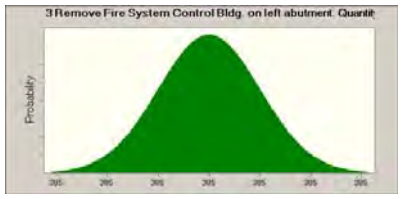
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q25)
Likeliest	$40.00	(=R25)
Maximum	$42.00	(=S25)

Assumption: 13 Remove Fire System Control Bldg. on left abutment. Quantity **Cell: L26**

Normal distribution with parameters:

Mean	385	(=L26)
Std. Dev.	0	(=0.000001)



Assumption: 13 Remove Fire System Control Bldg. on left abutment. Unit Price **Cell: R26**

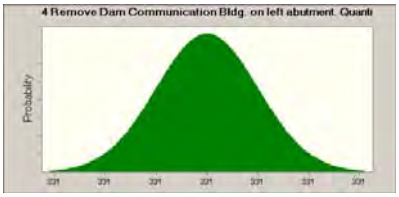
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q26)
Likeliest	$40.00	(=R26)
Maximum	$42.00	(=S26)

Assumption: 14 Remove Dam Communication Bldg. on left abutment. Quantity **Cell: L27**

Normal distribution with parameters:

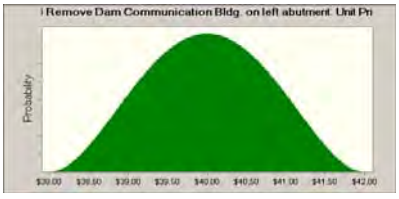
Mean	331	(=L27)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove Dam Communication Bldg. on left abutment. Unit Price **Cell: R27**

BetaPERT distribution with parameters:

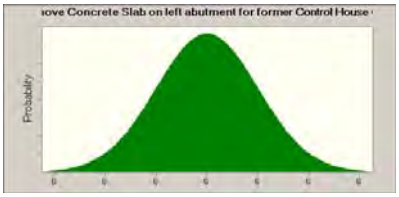
Minimum	$38.00	(=Q27)
Likeliest	$40.00	(=R27)
Maximum	$42.00	(=S27)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Quantity **Cell: L28**

Normal distribution with parameters:

Mean	6	(=L28)
Std. Dev.	0	(=0.000001)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Unit Price **Cell: R28**

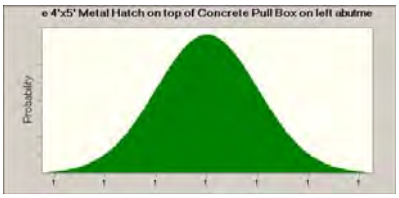
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q28)
Likeliest	$260.00	(=R28)
Maximum	$390.00	(=S28)

Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment Quantity **Cell: L29**

Normal distribution with parameters:

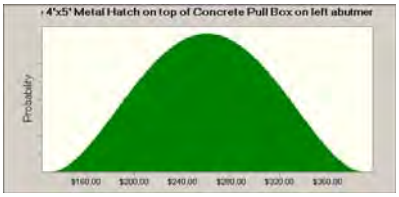
Mean	1	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment Cell: R29

BetaPERT distribution with parameters:

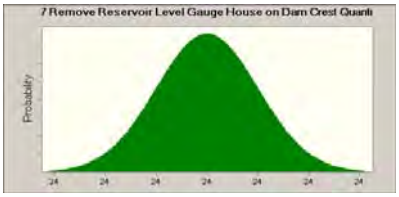
Minimum	$130.00	(=Q29)
Likeliest	$260.00	(=R29)
Maximum	$390.00	(=S29)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Quantity Cell: L30

Normal distribution with parameters:

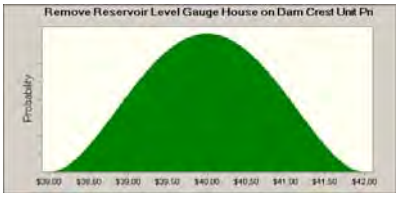
Mean	24	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Unit Price Cell: R30

BetaPERT distribution with parameters:

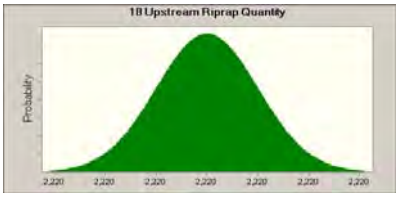
Minimum	$38.00	(=Q30)
Likeliest	$40.00	(=R30)
Maximum	$42.00	(=S30)



Assumption: 18 Upstream Riprap Quantity **Cell: L31**

Normal distribution with parameters:

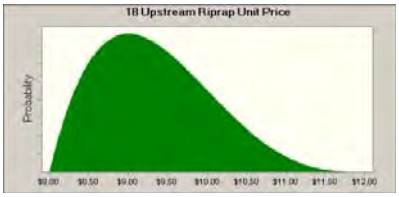
Mean	2,220	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 18 Upstream Riprap Unit Price **Cell: R31**

BetaPERT distribution with parameters:

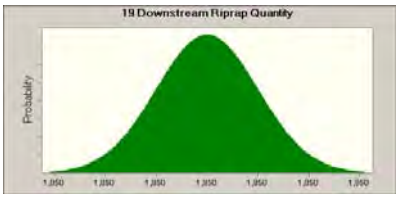
Minimum	$8.00	(=Q31)
Likeliest	$9.00	(=R31)
Maximum	$12.00	(=S31)



Assumption: 19 Downstream Riprap Quantity **Cell: L32**

Normal distribution with parameters:

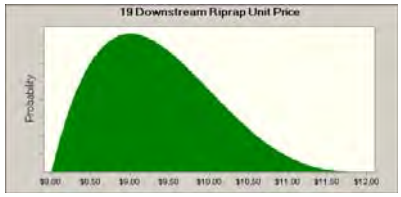
Mean	1,850	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 19 Downstream Riprap Unit Price **Cell: R32**

BetaPERT distribution with parameters:

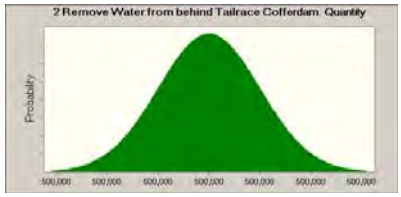
Minimum	$8.00	(=Q32)
Likeliest	$9.00	(=R32)
Maximum	$12.00	(=S32)



Assumption: 2 Remove Water from behind Tailrace Cofferdam. Quantity **Cell: L15**

Normal distribution with parameters:

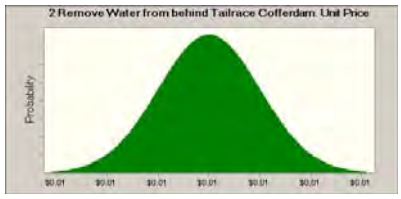
Mean	500,000	(=L15)
Std. Dev.	0	(=0.000001)



Assumption: 2 Remove Water from behind Tailrace Cofferdam. Unit Price **Cell: R15**

Normal distribution with parameters:

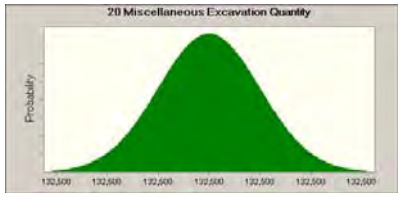
Mean	$0.01	(=R15)
Std. Dev.	$0.00	(=0.000001)



Assumption: 20 Miscellaneous Excavation Quantity **Cell: L33**

Normal distribution with parameters:

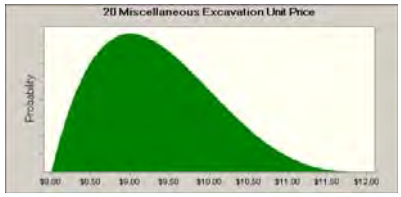
Mean	132,500	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 20 Miscellaneous Excavation Unit Price **Cell: R33**

BetaPERT distribution with parameters:

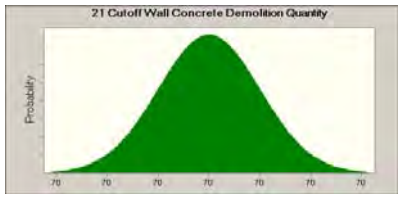
Minimum	$8.00	(=Q33)
Likeliest	$9.00	(=R33)
Maximum	$12.00	(=S33)



Assumption: 21 Cutoff Wall Concrete Demolition Quantity **Cell: L34**

Normal distribution with parameters:

Mean	70	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 21 Cutoff Wall Concrete Demolition Unit Price **Cell: R34**

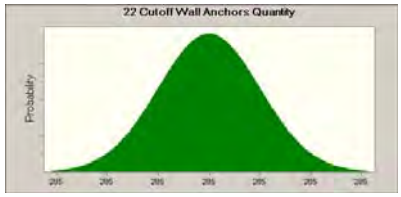
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q34)
Likeliest	$260.00	(=R34)
Maximum	$390.00	(=S34)

Assumption: 22 Cutoff Wall Anchors Quantity **Cell: L35**

Normal distribution with parameters:

Mean	285	(=L35)
Std. Dev.	0	(=0.000001)



Assumption: 22 Cutoff Wall Anchors Unit Price **Cell: R35**

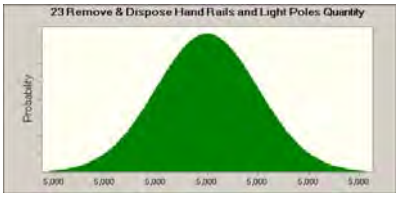
BetaPERT distribution with parameters:

Minimum	$9.00	(=Q35)
Likeliest	$10.00	(=R35)
Maximum	$12.00	(=S35)

Assumption: 23 Remove & Dispose Hand Rails and Light Poles Quantity **Cell: L36**

Normal distribution with parameters:

Mean	5,000	(=L36)
Std. Dev.	0	(=0.000001)



Assumption: 23 Remove & Dispose Hand Rails and Light Poles Unit Price **Cell: R36**

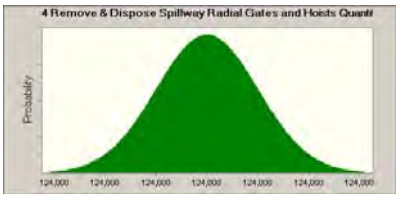
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q36)
Likeliest	$0.65	(=R36)
Maximum	$0.75	(=S36)

Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Quantity **Cell: L37**

Normal distribution with parameters:

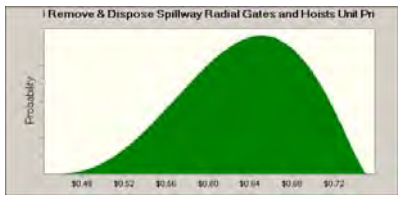
Mean	124,000	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Unit Price **Cell: R37**

BetaPERT distribution with parameters:

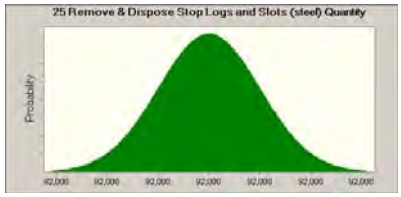
Minimum	$0.45	(=Q37)
Likeliest	$0.65	(=R37)
Maximum	$0.75	(=S37)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Quantity **Cell: L38**

Normal distribution with parameters:

Mean	92,000	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Unit Price **Cell: R38**

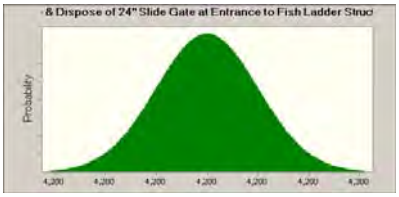
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q38)
Likeliest	$0.65	(=R38)
Maximum	$0.75	(=S38)

Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure Cell: L39

Normal distribution with parameters:

Mean	4,200	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure Cell: R39

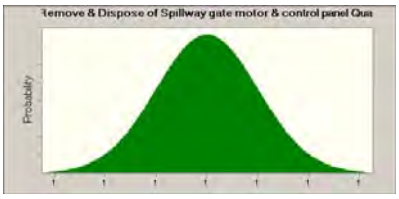
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q39)
Likeliest	$0.65	(=R39)
Maximum	$0.75	(=S39)

Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Quantity Cell: L40

Normal distribution with parameters:

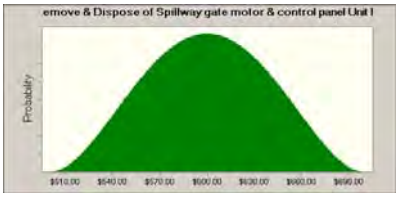
Mean	1	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Unit Price Cell: R40

BetaPERT distribution with parameters:

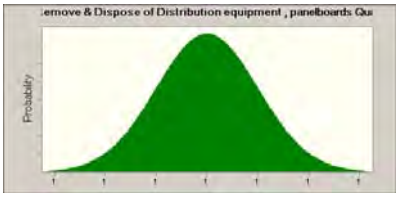
Minimum	$500.00	(=Q40)
Likeliest	$600.00	(=R40)
Maximum	$700.00	(=S40)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Quantity Cell: L41

Normal distribution with parameters:

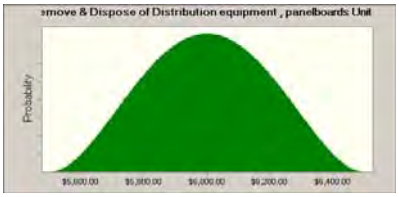
Mean	1	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Unit Price Cell: R41

BetaPERT distribution with parameters:

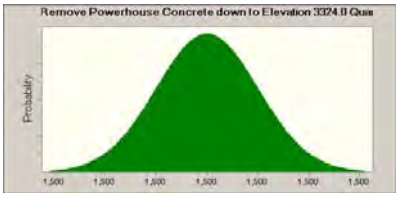
Minimum	$5,500.00	(=Q41)
Likeliest	$6,000.00	(=R41)
Maximum	$6,500.00	(=S41)



Assumption: 29 Remove Powerhouse Concrete down to Elevation 3324.0 Quantity **Cell: L42**

Normal distribution with parameters:

Mean	1,500	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 29 Remove Powerhouse Concrete down to Elevation 3324.0 Unit Price **Cell: R42**

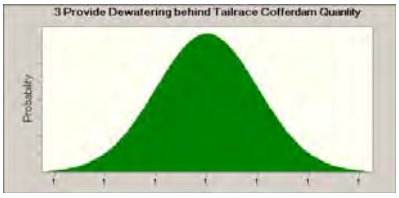
BetaPERT distribution with parameters:

Minimum	$300.00	(=Q42)
Likeliest	$370.00	(=R42)
Maximum	$800.00	(=S42)

Assumption: 3 Provide Dewatering behind Tailrace Cofferdam Quantity **Cell: L16**

Normal distribution with parameters:

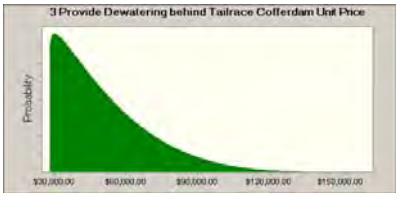
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



Assumption: 3 Provide Dewatering behind Tailrace Cofferdam Unit Price **Cell: R16**

BetaPERT distribution with parameters:

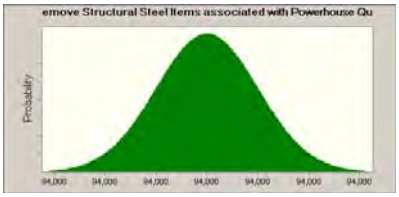
Minimum	$28,000.00	(=Q16)
Likeliest	$30,000.00	(=R16)
Maximum	$160,000.00	(=S16)



Assumption: 30 Remove Structural Steel Items associated with Powerhouse Quantity **Cell: L43**

Normal distribution with parameters:

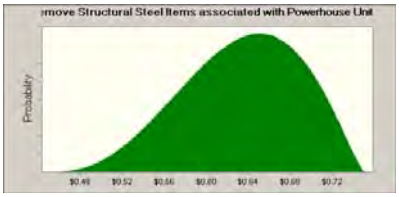
Mean	94,000	(=L43)
Std. Dev.	0	(=0.000001)



Assumption: 30 Remove Structural Steel Items associated with Powerhouse Unit Price **Cell: R43**

BetaPERT distribution with parameters:

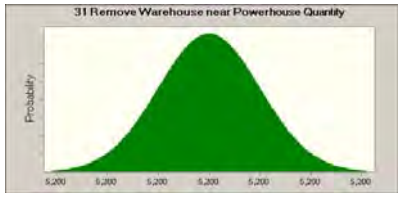
Minimum	$0.45	(=Q43)
Likeliest	$0.65	(=R43)
Maximum	$0.75	(=S43)



Assumption: 31 Remove Warehouse near Powerhouse Quantity **Cell: L44**

Normal distribution with parameters:

Mean	5,200	(=L44)
Std. Dev.	0	(=0.000001)



Assumption: 31 Remove Warehouse near Powerhouse Unit Price **Cell: R44**

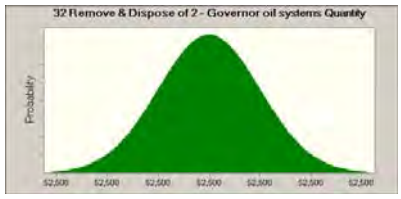
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q44)
Likeliest	$40.00	(=R44)
Maximum	$42.00	(=S44)

Assumption: 32 Remove & Dispose of 2 - Governor oil systems Quantity **Cell: L45**

Normal distribution with parameters:

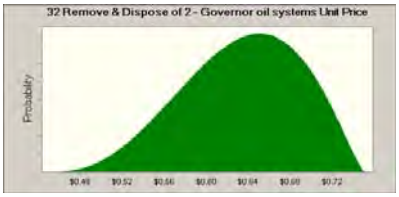
Mean	52,500	(=L45)
Std. Dev.	0	(=0.000001)



Assumption: 32 Remove & Dispose of 2 - Governor oil systems Unit Price **Cell: R45**

BetaPERT distribution with parameters:

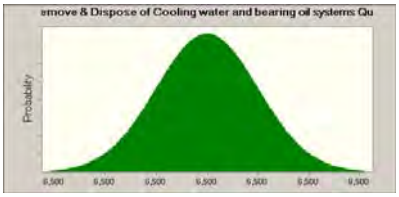
Minimum	$0.45	(=Q45)
Likeliest	$0.65	(=R45)
Maximum	$0.75	(=S45)



Assumption: 33 Remove & Dispose of Cooling water and bearing oil systems Quantity **Cell: L46**

Normal distribution with parameters:

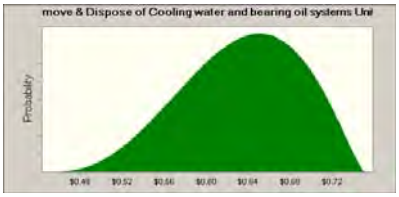
Mean	6,500	(=L46)
Std. Dev.	0	(=0.000001)



Assumption: 33 Remove & Dispose of Cooling water and bearing oil systems Unit Price **Cell: R46**

BetaPERT distribution with parameters:

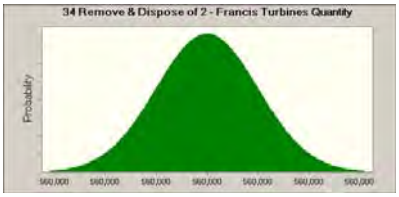
Minimum	$0.45	(=Q46)
Likeliest	$0.65	(=R46)
Maximum	$0.75	(=S46)



Assumption: 34 Remove & Dispose of 2 - Francis Turbines Quantity **Cell: L47**

Normal distribution with parameters:

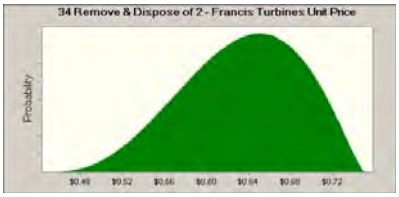
Mean	560,000	(=L47)
Std. Dev.	0	(=0.000001)



Assumption: 34 Remove & Dispose of 2 - Francis Turbines Unit Price **Cell: R47**

BetaPERT distribution with parameters:

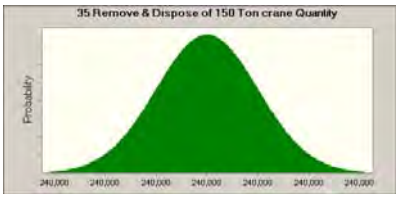
Minimum	$0.45	(=Q47)
Likeliest	$0.65	(=R47)
Maximum	$0.75	(=S47)



Assumption: 35 Remove & Dispose of 150 Ton crane Quantity **Cell: L48**

Normal distribution with parameters:

Mean	240,000	(=L48)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose of 150 Ton crane Unit Price **Cell: R48**

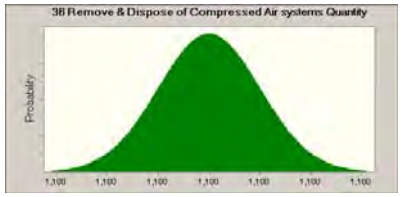
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q48)
Likeliest	$0.65	(=R48)
Maximum	$0.75	(=S48)

Assumption: 36 Remove & Dispose of Compressed Air systems Quantity **Cell: L49**

Normal distribution with parameters:

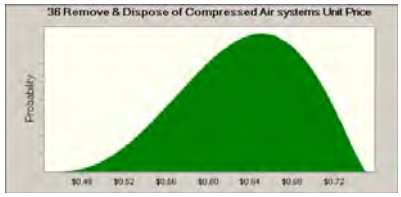
Mean	1,100	(=L49)
Std. Dev.	0	(=0.000001)



Assumption: 36 Remove & Dispose of Compressed Air systems Unit Price **Cell: R49**

BetaPERT distribution with parameters:

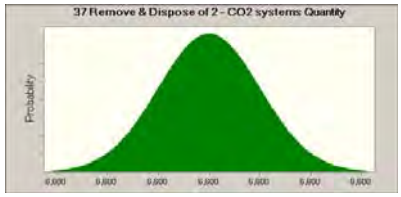
Minimum	$0.45	(=Q49)
Likeliest	$0.65	(=R49)
Maximum	$0.75	(=S49)



Assumption: 37 Remove & Dispose of 2 - CO2 systems Quantity **Cell: L50**

Normal distribution with parameters:

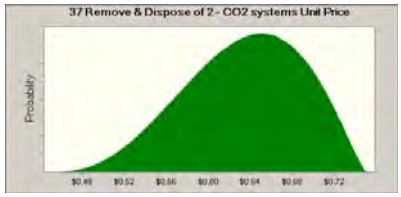
Mean	6,600	(=L50)
Std. Dev.	0	(=0.000001)



Assumption: 37 Remove & Dispose of 2 - CO2 systems Unit Price **Cell: R50**

BetaPERT distribution with parameters:

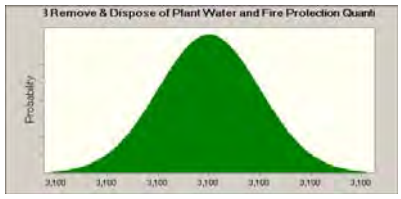
Minimum	$0.45	(=Q50)
Likeliest	$0.65	(=R50)
Maximum	$0.75	(=S50)



Assumption: 38 Remove & Dispose of Plant Water and Fire Protection Quantity **Cell: L51**

Normal distribution with parameters:

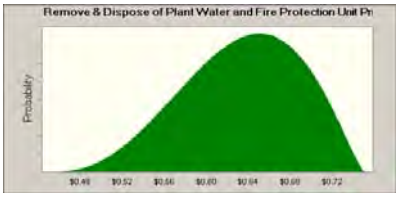
Mean	3,100	(=L51)
Std. Dev.	0	(=0.000001)



Assumption: 38 Remove & Dispose of Plant Water and Fire Protection Unit Price **Cell: R51**

BetaPERT distribution with parameters:

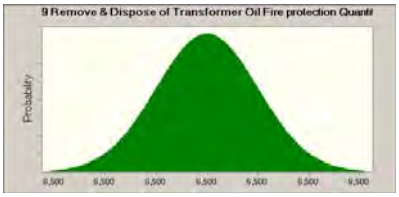
Minimum	$0.45	(=Q51)
Likeliest	$0.65	(=R51)
Maximum	$0.75	(=S51)



Assumption: 39 Remove & Dispose of Transformer Oil Fire protection Quantity **Cell: L52**

Normal distribution with parameters:

Mean	6,500	(=L52)
Std. Dev.	0	(=0.000001)



Assumption: 39 Remove & Dispose of Transformer Oil Fire protection Unit Price **Cell: R52**

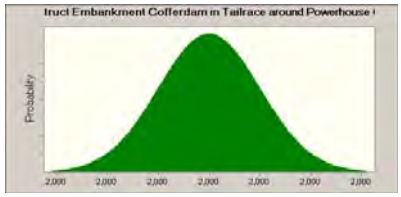
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q52)
Likeliest	$0.65	(=R52)
Maximum	$0.75	(=S52)

Assumption: 4 Construct Embankment Cofferdam in Tailrace around Powerhouse Quantity **Cell: L17**

Normal distribution with parameters:

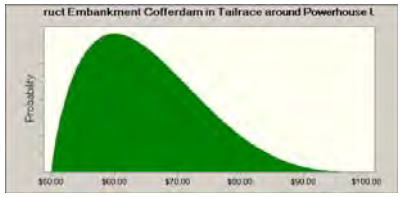
Mean	2,000	(=L17)
Std. Dev.	0	(=0.000001)



Assumption: 4 Construct Embankment Cofferdam in Tailrace around Powerhouse Unit Price **Cell: R17**

BetaPERT distribution with parameters:

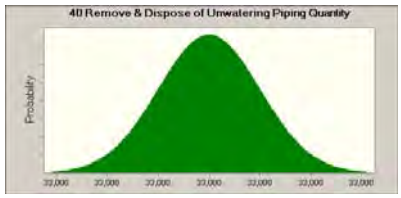
Minimum	$50.00	(=Q17)
Likeliest	$60.00	(=R17)
Maximum	$100.00	(=S17)



Assumption: 40 Remove & Dispose of Unwatering Piping Quantity **Cell: L53**

Normal distribution with parameters:

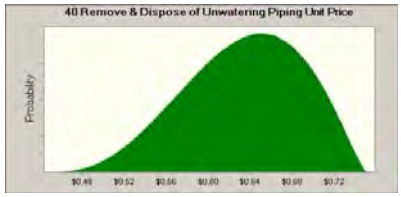
Mean	33,000	(=L53)
Std. Dev.	0	(=0.000001)



Assumption: 40 Remove & Dispose of Unwatering Piping Unit Price **Cell: R53**

BetaPERT distribution with parameters:

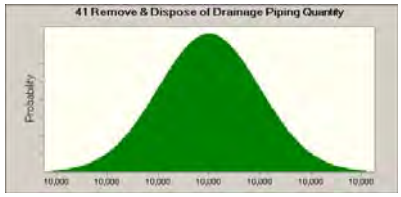
Minimum	$0.45	(=Q53)
Likeliest	$0.65	(=R53)
Maximum	$0.75	(=S53)



Assumption: 41 Remove & Dispose of Drainage Piping Quantity **Cell: L54**

Normal distribution with parameters:

Mean	10,000	(=L54)
Std. Dev.	0	(=0.000001)



Assumption: 41 Remove & Dispose of Drainage Piping Unit Price **Cell: R54**

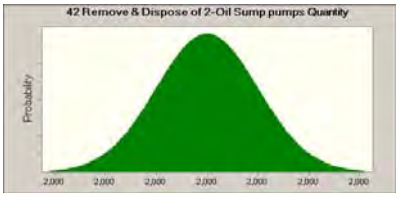
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q54)
Likeliest	$0.65	(=R54)
Maximum	$0.75	(=S54)

Assumption: 42 Remove & Dispose of 2-Oil Sump pumps Quantity **Cell: L55**

Normal distribution with parameters:

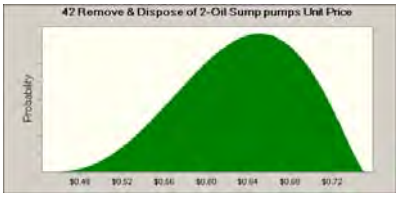
Mean	2,000	(=L55)
Std. Dev.	0	(=0.000001)



Assumption: 42 Remove & Dispose of 2-Oil Sump pumps Unit Price **Cell: R55**

BetaPERT distribution with parameters:

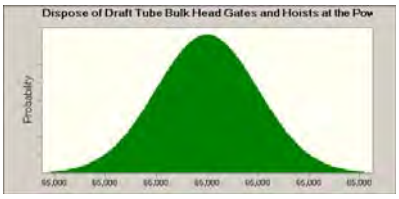
Minimum	$0.45	(=Q55)
Likeliest	$0.65	(=R55)
Maximum	$0.75	(=S55)



Assumption: 43 Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Pow **Cell: L56**

Normal distribution with parameters:

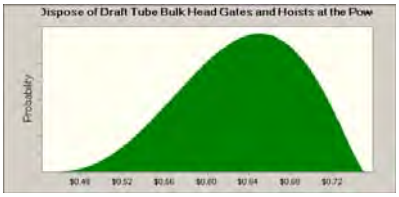
Mean	65,000	(=L56)
Std. Dev.	0	(=0.000001)



Assumption: 43 Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Pow **Cell: R56**

BetaPERT distribution with parameters:

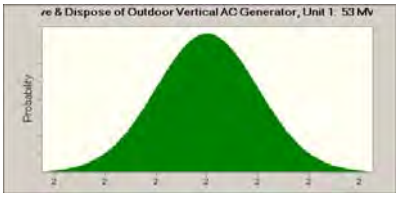
Minimum	$0.45	(=Q56)
Likeliest	$0.65	(=R56)
Maximum	$0.75	(=S56)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA, Qua **Cell: L57**

Normal distribution with parameters:

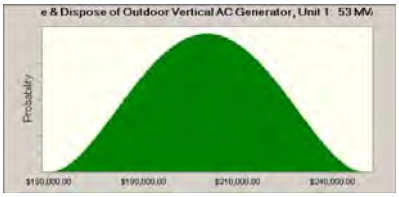
Mean	2	(=L57)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA, Unit **Cell: R57**

BetaPERT distribution with parameters:

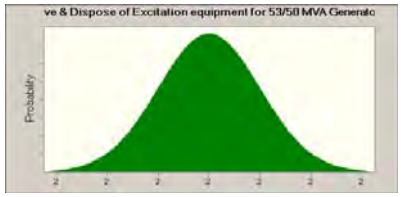
Minimum	$150,000.00	(=Q57)
Likeliest	$200,000.00	(=R57)
Maximum	$250,000.00	(=S57)



Assumption: 45 Remove & Dispose of Excitation equipment for 53/50 MVA Generator **Cell: L58**

Normal distribution with parameters:

Mean	2	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 45 Remove & Dispose of Excitation equipment for 53/50 MVA Generator **Cell: R58**

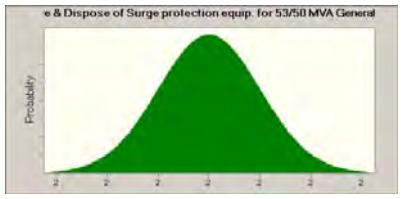
BetaPERT distribution with parameters:

Minimum	$12,000.00	(=Q58)
Likeliest	$12,500.00	(=R58)
Maximum	$13,000.00	(=S58)

Assumption: 46 Remove & Dispose of Surge protection equip. for 53/50 MVA Generator **Cell: L59**

Normal distribution with parameters:

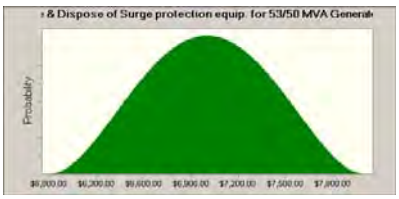
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 46 Remove & Dispose of Surge protection equip. for 53/50 MVA Generator **Cell: R59**

BetaPERT distribution with parameters:

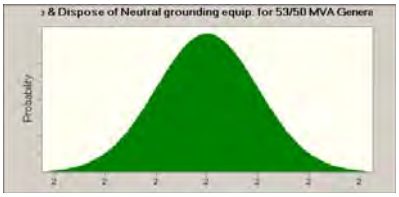
Minimum	$6,000.00	(=Q59)
Likeliest	$7,000.00	(=R59)
Maximum	$8,000.00	(=S59)



Assumption: 47 Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator **Cell: L60**

Normal distribution with parameters:

Mean	2	(=L60)
Std. Dev.	0	(=0.000001)



Assumption: 47 Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator **Cell: R60**

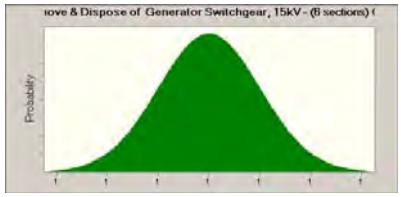
BetaPERT distribution with parameters:

Minimum	$2,000.00	(=Q60)
Likeliest	$3,000.00	(=R60)
Maximum	$4,000.00	(=S60)

Assumption: 48 Remove & Dispose of Generator Switchgear, 15kV - (6 sections) Quantity **Cell: L61**

Normal distribution with parameters:

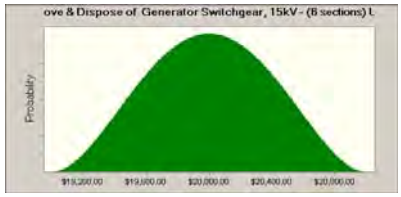
Mean	1	(=L61)
Std. Dev.	0	(=0.000001)



Assumption: 48 Remove & Dispose of Generator Switchgear, 15kV - (6 sections) Unit Price **Cell: R61**

BetaPERT distribution with parameters:

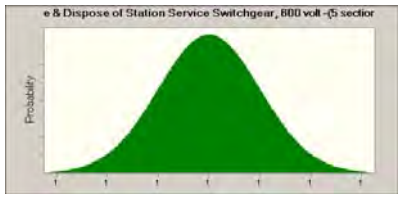
Minimum	$19,000.00	(=Q61)
Likeliest	$20,000.00	(=R61)
Maximum	$21,000.00	(=S61)



Assumption: 49 Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections) Qty **Cell: L62**

Normal distribution with parameters:

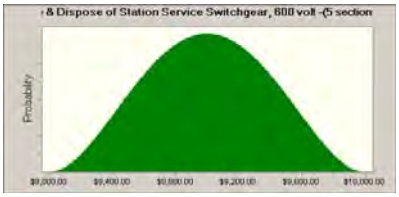
Mean	1	(=L62)
Std. Dev.	0	(=0.000001)



Assumption: 49 Remove & Dispose of Station Service Switchgear, 600 volt -(5 section) **Cell: R62**

BetaPERT distribution with parameters:

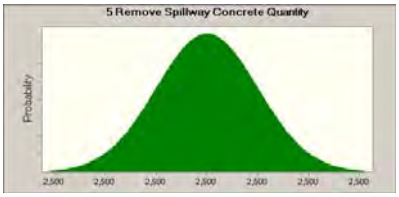
Minimum	$8,000.00	(=Q62)
Likeliest	$9,000.00	(=R62)
Maximum	$10,000.00	(=S62)



Assumption: 5 Remove Spillway Concrete Quantity **Cell: L18**

Normal distribution with parameters:

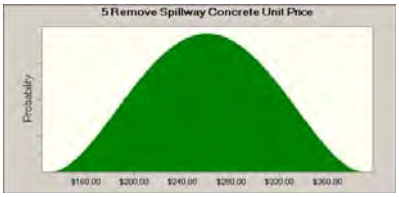
Mean	2,500	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove Spillway Concrete Unit Price **Cell: R18**

BetaPERT distribution with parameters:

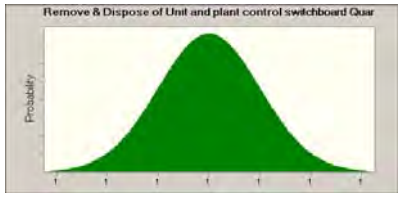
Minimum	$130.00	(=Q18)
Likeliest	$260.00	(=R18)
Maximum	$390.00	(=S18)



Assumption: 50 Remove & Dispose of Unit and plant control switchboard Quantity Cell: L63

Normal distribution with parameters:

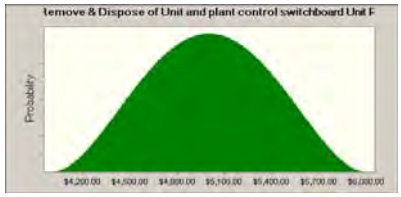
Mean	1	(=L63)
Std. Dev.	0	(=0.000001)



Assumption: 50 Remove & Dispose of Unit and plant control switchboard Unit Price Cell: R63

BetaPERT distribution with parameters:

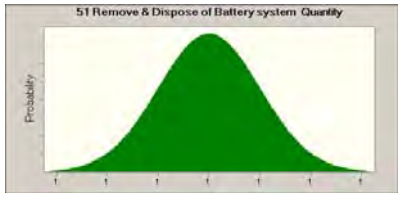
Minimum	$4,000.00	(=Q63)
Likeliest	$5,000.00	(=R63)
Maximum	$6,000.00	(=S63)



Assumption: 51 Remove & Dispose of Battery system Quantity Cell: L64

Normal distribution with parameters:

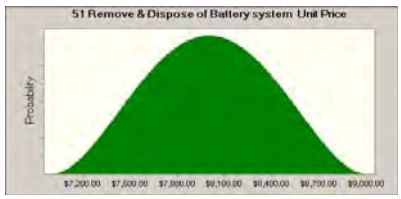
Mean	1	(=L64)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose of Battery system Unit Price **Cell: R64**

BetaPERT distribution with parameters:

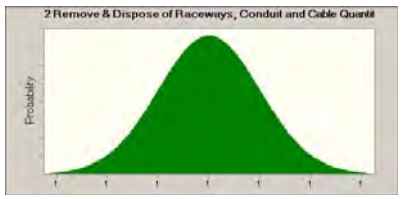
Minimum	$7,000.00	(=Q64)
Likeliest	$8,000.00	(=R64)
Maximum	$9,000.00	(=S64)



Assumption: 52 Remove & Dispose of Raceways, Conduit and Cable Quantity **Cell: L65**

Normal distribution with parameters:

Mean	1	(=L65)
Std. Dev.	0	(=0.000001)



Assumption: 52 Remove & Dispose of Raceways, Conduit and Cable Unit Price **Cell: R65**

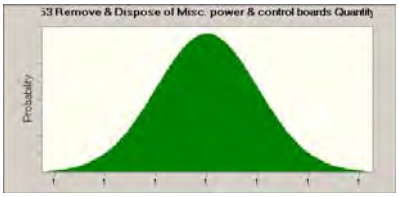
BetaPERT distribution with parameters:

Minimum	$10,000.00	(=Q65)
Likeliest	$11,000.00	(=R65)
Maximum	$12,000.00	(=S65)

Assumption: 53 Remove & Dispose of Misc. power & control boards Quantity **Cell: L66**

Normal distribution with parameters:

Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 53 Remove & Dispose of Misc. power & control boards Unit Price **Cell: R66**

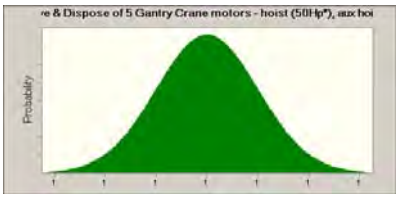
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q66)
Likeliest	$6,000.00	(=R66)
Maximum	$7,000.00	(=S66)

Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Qu **Cell: L67**

Normal distribution with parameters:

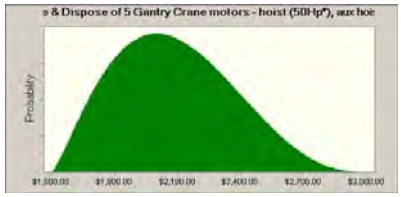
Mean	1	(=L67)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoi Cell: R67

BetaPERT distribution with parameters:

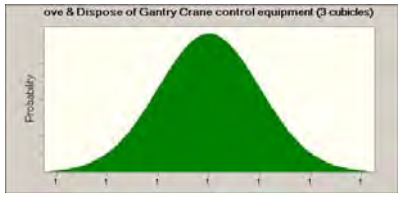
Minimum	$1,500.00	(=Q67)
Likeliest	$2,000.00	(=R67)
Maximum	$3,000.00	(=S67)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Qu Cell: L68

Normal distribution with parameters:

Mean	1	(=L68)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Qu Cell: R68

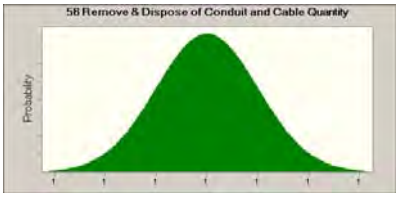
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q68)
Likeliest	$6,000.00	(=R68)
Maximum	$7,000.00	(=S68)

Assumption: 56 Remove & Dispose of Conduit and Cable Quantity **Cell: L69**

Normal distribution with parameters:

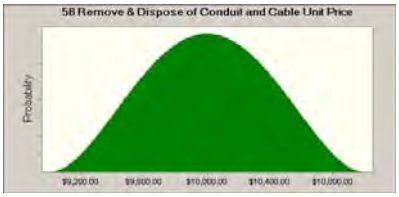
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose of Conduit and Cable Unit Price **Cell: R69**

BetaPERT distribution with parameters:

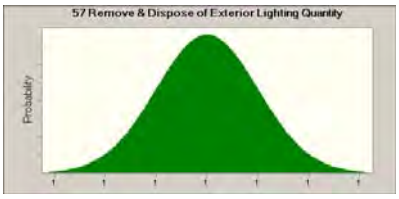
Minimum	$9,000.00	(=Q69)
Likeliest	$10,000.00	(=R69)
Maximum	$11,000.00	(=S69)



Assumption: 57 Remove & Dispose of Exterior Lighting Quantity **Cell: L70**

Normal distribution with parameters:

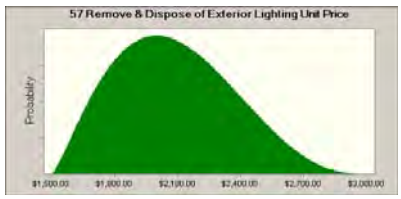
Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose of Exterior Lighting Unit Price **Cell: R70**

BetaPERT distribution with parameters:

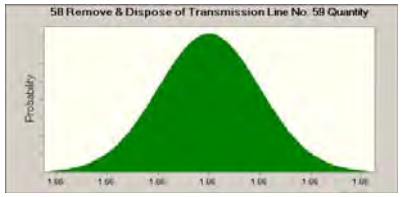
Minimum	$1,500.00	(=Q70)
Likeliest	$2,000.00	(=R70)
Maximum	$3,000.00	(=S70)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Quantity **Cell: L71**

Normal distribution with parameters:

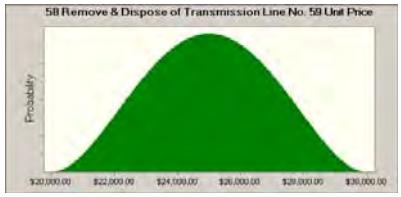
Mean	1.66	(=L71)
Std. Dev.	0.00	(=0.000001)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Unit Price **Cell: R71**

BetaPERT distribution with parameters:

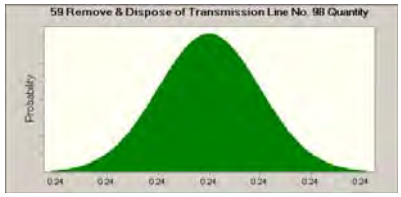
Minimum	$20,000.00	(=Q71)
Likeliest	$25,000.00	(=R71)
Maximum	$30,000.00	(=S71)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Quantity **Cell: L72**

Normal distribution with parameters:

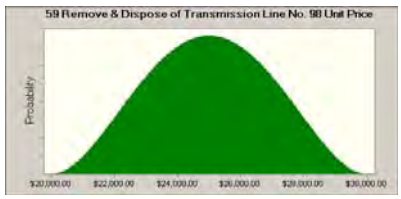
Mean	0.24	(=L72)
Std. Dev.	0.00	(=0.000001)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Unit Price **Cell: R72**

BetaPERT distribution with parameters:

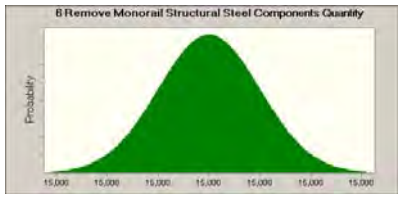
Minimum	$20,000.00	(=Q72)
Likeliest	$25,000.00	(=R72)
Maximum	$30,000.00	(=S72)



Assumption: 6 Remove Monorail Structural Steel Components Quantity **Cell: L19**

Normal distribution with parameters:

Mean	15,000	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 6 Remove Monorail Structural Steel Components Unit Price **Cell: R19**

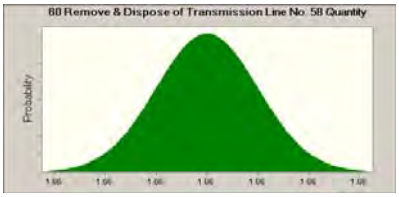
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q19)
Likeliest	$0.65	(=R19)
Maximum	$0.75	(=S19)

Assumption: 60 Remove & Dispose of Transmission Line No. 58 Quantity **Cell: L73**

Normal distribution with parameters:

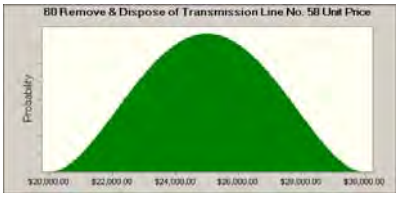
Mean	1.66	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

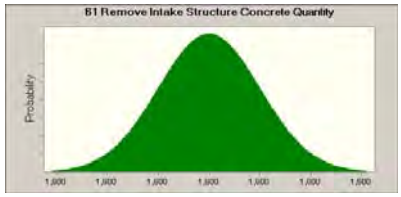
Minimum	$20,000.00	(=Q73)
Likeliest	$25,000.00	(=R73)
Maximum	$30,000.00	(=S73)



Assumption: 61 Remove Intake Structure Concrete Quantity **Cell: L74**

Normal distribution with parameters:

Mean	1,600	(=L74)
Std. Dev.	0	(=0.000001)



Assumption: 61 Remove Intake Structure Concrete Unit Price **Cell: R74**

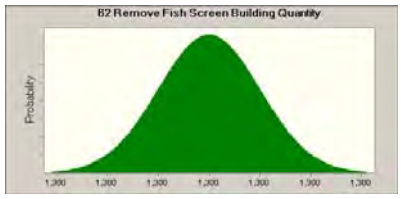
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q74)
Likeliest	$260.00	(=R74)
Maximum	$390.00	(=S74)

Assumption: 62 Remove Fish Screen Building Quantity **Cell: L75**

Normal distribution with parameters:

Mean	1,300	(=L75)
Std. Dev.	0	(=0.000001)



Assumption: 62 Remove Fish Screen Building Unit Price **Cell: R75**

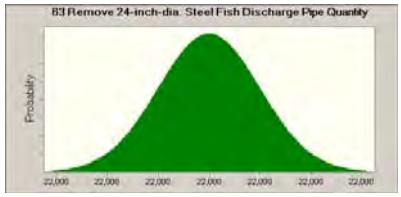
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q75)
Likeliest	$40.00	(=R75)
Maximum	$42.00	(=S75)

Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Quantity **Cell: L76**

Normal distribution with parameters:

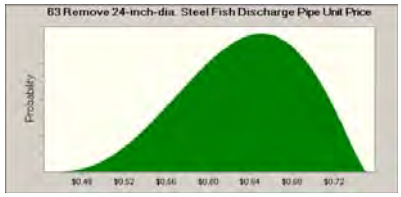
Mean	22,000	(=L76)
Std. Dev.	0	(=0.000001)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Unit Price **Cell: R76**

BetaPERT distribution with parameters:

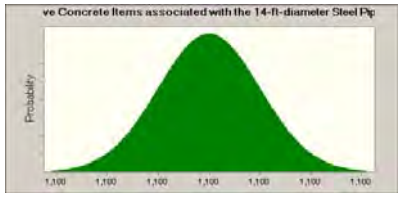
Minimum	$0.45	(=Q76)
Likeliest	$0.65	(=R76)
Maximum	$0.75	(=S76)



Assumption: 64 Remove Concrete Items associated with the 14-ft-diameter Steel Pipe Qu **Cell: L77**

Normal distribution with parameters:

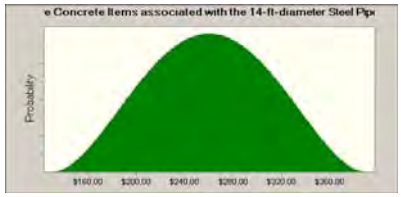
Mean	1,100	(=L77)
Std. Dev.	0	(=0.000001)



Assumption: 64 Remove Concrete Items associated with the 14-ft-diameter Steel Pipe Unit **Cell: R77**

BetaPERT distribution with parameters:

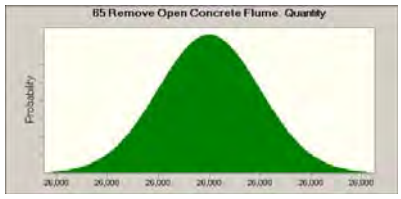
Minimum	$130.00	(=Q77)
Likeliest	$260.00	(=R77)
Maximum	$390.00	(=S77)



Assumption: 65 Remove Open Concrete Flume. Quantity **Cell: L78**

Normal distribution with parameters:

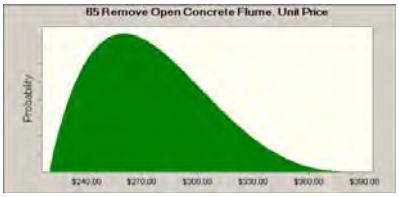
Mean	26,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove Open Concrete Flume. Unit Price **Cell: R78**

BetaPERT distribution with parameters:

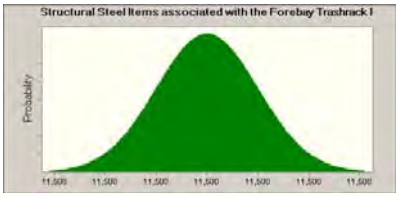
Minimum	$220.00	(=Q78)
Likeliest	$260.00	(=R78)
Maximum	$390.00	(=S78)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: L79**

Normal distribution with parameters:

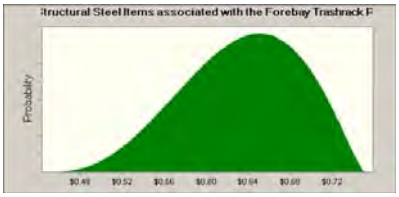
Mean	11,500	(=L79)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: R79**

BetaPERT distribution with parameters:

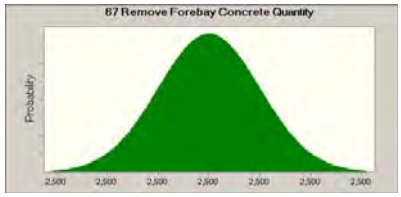
Minimum	$0.45	(=Q79)
Likeliest	$0.65	(=R79)
Maximum	$0.75	(=S79)



Assumption: 67 Remove Forebay Concrete Quantity **Cell: L80**

Normal distribution with parameters:

Mean	2,500	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove Forebay Concrete Unit Price **Cell: R80**

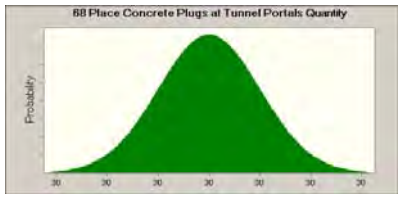
BetaPERT distribution with parameters:

Minimum	$220.00	(=Q80)
Likeliest	$260.00	(=R80)
Maximum	$390.00	(=S80)

Assumption: 68 Place Concrete Plugs at Tunnel Portals Quantity **Cell: L81**

Normal distribution with parameters:

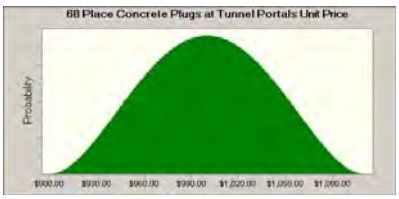
Mean	30	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Unit Price **Cell: R81**

BetaPERT distribution with parameters:

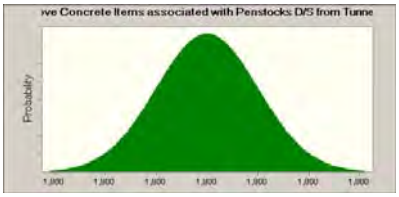
Minimum	$900.00	(=Q81)
Likeliest	$1,000.00	(=R81)
Maximum	$1,100.00	(=S81)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Quan **Cell: L82**

Normal distribution with parameters:

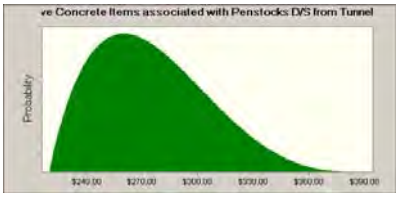
Mean	1,800	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Unit P **Cell: R82**

BetaPERT distribution with parameters:

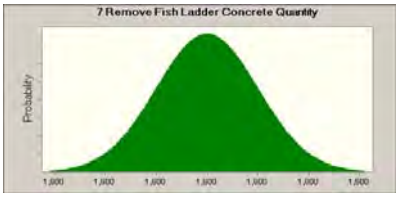
Minimum	$220.00	(=Q82)
Likeliest	$260.00	(=R82)
Maximum	$390.00	(=S82)



Assumption: 7 Remove Fish Ladder Concrete Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1,600	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 7 Remove Fish Ladder Concrete Unit Price **Cell: R20**

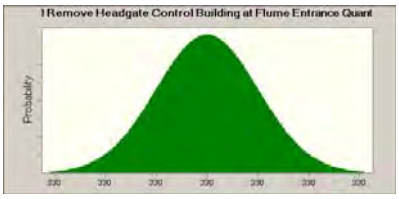
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q20)
Likeliest	$260.00	(=R20)
Maximum	$390.00	(=S20)

Assumption: 70 Remove Headgate Control Building at Flume Entrance Quantity **Cell: L83**

Normal distribution with parameters:

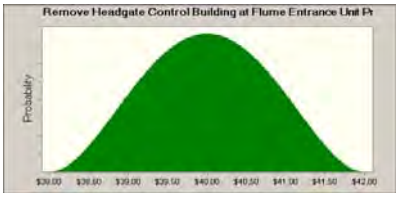
Mean	330	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove Headgate Control Building at Flume Entrance Unit Price **Cell: R83**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q83)
Likeliest	$40.00	(=R83)
Maximum	$42.00	(=S83)



Assumption: 71 Remove Forebay Spillway Gate House Quantity **Cell: L84**

Normal distribution with parameters:

Mean	570	(=L84)
Std. Dev.	0	(=0.000001)

Assumption: 71 Remove Forebay Spillway Gate House Unit Price **Cell: R84**

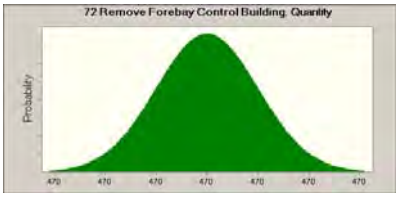
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q84)
Likeliest	$40.00	(=R84)
Maximum	$42.00	(=S84)

Assumption: 72 Remove Forebay Control Building. Quantity **Cell: L85**

Normal distribution with parameters:

Mean	470	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 72 Remove Forebay Control Building. Unit Price **Cell: R85**

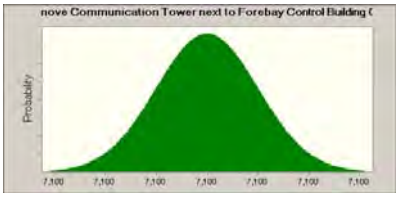
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q85)
Likeliest	$40.00	(=R85)
Maximum	$42.00	(=S85)

Assumption: 73 Remove Communication Tower next to Forebay Control Building Quantity **Cell: L86**

Normal distribution with parameters:

Mean	7,100	(=L86)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove Communication Tower next to Forebay Control Building UnitPrice **Cell: R86**

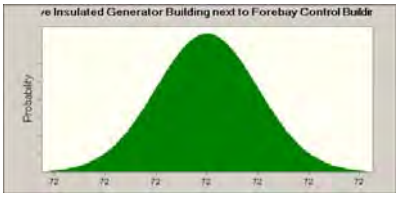
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q86)
Likeliest	$0.65	(=R86)
Maximum	$0.75	(=S86)

Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Qty **Cell: L87**

Normal distribution with parameters:

Mean	72	(=L87)
Std. Dev.	0	(=0.000001)



Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building UnitPr **Cell: R87**

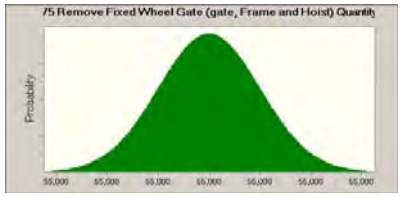
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q87)
Likeliest	$40.00	(=R87)
Maximum	$42.00	(=S87)

Assumption: 75 Remove Fixed Wheel Gate (gate, Frame and Hoist) Quantity **Cell: L88**

Normal distribution with parameters:

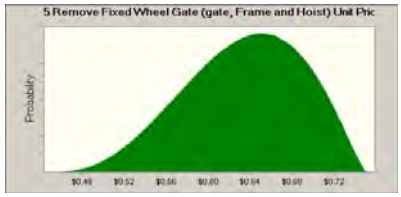
Mean	55,000	(=L88)
Std. Dev.	0	(=0.000001)



Assumption: 75 Remove Fixed Wheel Gate (gate, Frame and Hoist) Unit Price **Cell: R88**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q88)
Likeliest	$0.65	(=R88)
Maximum	$0.75	(=S88)



Assumption: 76 Remove Trash rack and trash rake (steel) Quantity **Cell: L89**

Normal distribution with parameters:

Mean	75,000	(=L89)
Std. Dev.	0	(=0.000001)

Assumption: 76 Remove Trash rack and trash rake (steel) Unit Price **Cell: R89**

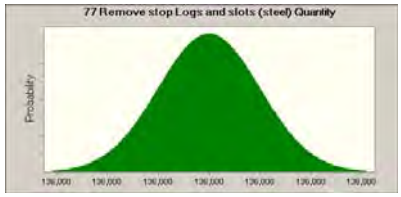
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q89)
Likeliest	$0.50	(=R89)
Maximum	$0.70	(=S89)

Assumption: 77 Remove stop Logs and slots (steel) Quantity **Cell: L90**

Normal distribution with parameters:

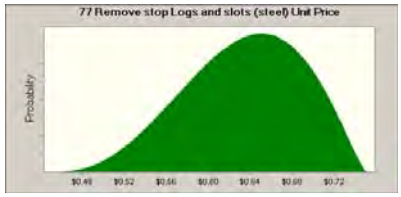
Mean	136,000	(=L90)
Std. Dev.	0	(=0.000001)



Assumption: 77 Remove stop Logs and slots (steel) Unit Price **Cell: R90**

BetaPERT distribution with parameters:

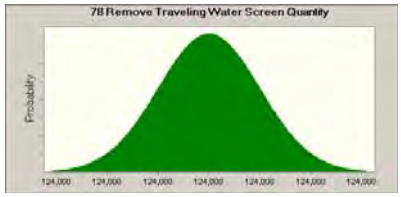
Minimum	$0.45	(=Q90)
Likeliest	$0.65	(=R90)
Maximum	$0.75	(=S90)



Assumption: 78 Remove Traveling Water Screen Quantity **Cell: L91**

Normal distribution with parameters:

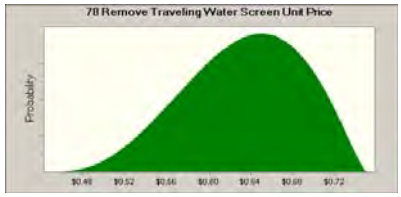
Mean	124,000	(=L91)
Std. Dev.	0	(=0.000001)



Assumption: 78 Remove Traveling Water Screen Unit Price **Cell: R91**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q91)
Likeliest	$0.65	(=R91)
Maximum	$0.75	(=S91)



Assumption: 79 Remove Fish By-Pass and Supports (steel) Quantity **Cell: L92**

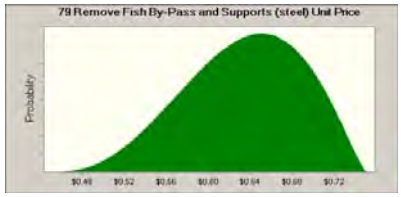
Normal distribution with parameters:

Mean	610,000	(=L92)
Std. Dev.	0	(=0.000001)

Assumption: 79 Remove Fish By-Pass and Supports (steel) Unit Price **Cell: R92**

BetaPERT distribution with parameters:

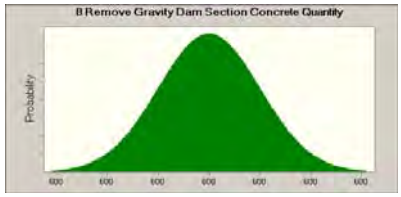
Minimum	$0.45	(=Q92)
Likeliest	$0.65	(=R92)
Maximum	$0.75	(=S92)



Assumption: 8 Remove Gravity Dam Section Concrete Quantity **Cell: L21**

Normal distribution with parameters:

Mean	600	(=L21)
Std. Dev.	0	(=0.000001)



Assumption: 8 Remove Gravity Dam Section Concrete Unit Price **Cell: R21**

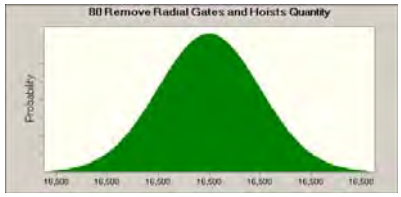
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q21)
Likeliest	$260.00	(=R21)
Maximum	$390.00	(=S21)

Assumption: 80 Remove Radial Gates and Hoists Quantity **Cell: L93**

Normal distribution with parameters:

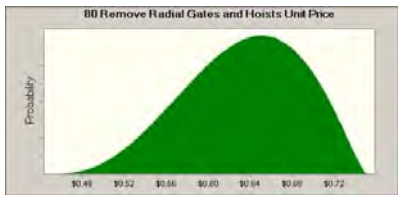
Mean	16,500	(=L93)
Std. Dev.	0	(=0.000001)



Assumption: 80 Remove Radial Gates and Hoists Unit Price **Cell: R93**

BetaPERT distribution with parameters:

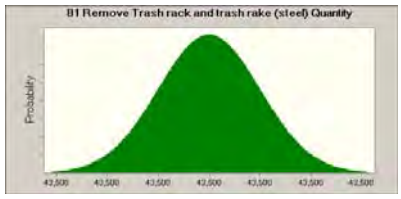
Minimum	$0.45	(=Q93)
Likeliest	$0.65	(=R93)
Maximum	$0.75	(=S93)



Assumption: 81 Remove Trash rack and trash rake (steel) Quantity **Cell: L94**

Normal distribution with parameters:

Mean	43,500	(=L94)
Std. Dev.	0	(=0.000001)



Assumption: 81 Remove Trash rack and trash rake (steel) Unit Price **Cell: R94**

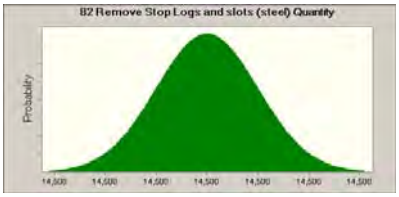
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q94)
Likeliest	$0.50	(=R94)
Maximum	$0.70	(=S94)

Assumption: 82 Remove Stop Logs and slots (steel) Quantity **Cell: L95**

Normal distribution with parameters:

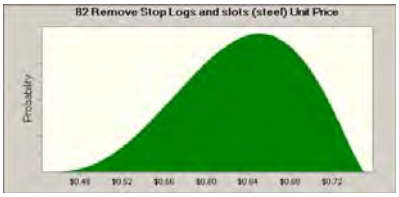
Mean	14,500	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: 82 Remove Stop Logs and slots (steel) Unit Price **Cell: R95**

BetaPERT distribution with parameters:

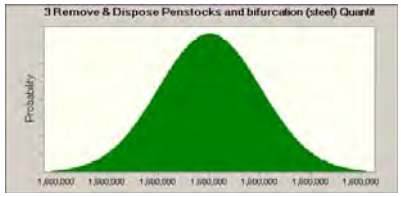
Minimum	$0.45	(=Q95)
Likeliest	$0.65	(=R95)
Maximum	$0.75	(=S95)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Quantity **Cell: L96**

Normal distribution with parameters:

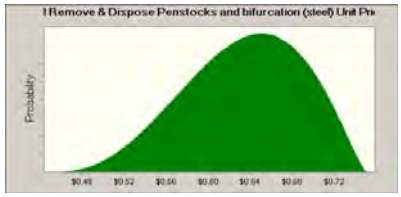
Mean	1,600,000	(=L96)
Std. Dev.	0	(=0.000001)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Unit Price **Cell: R96**

BetaPERT distribution with parameters:

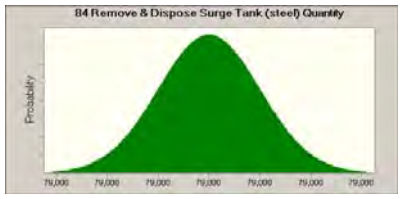
Minimum	$0.45	(=Q96)
Likeliest	$0.65	(=R96)
Maximum	$0.75	(=S96)



Assumption: 84 Remove & Dispose Surge Tank (steel) Quantity **Cell: L97**

Normal distribution with parameters:

Mean	79,000	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: 84 Remove & Dispose Surge Tank (steel) Unit Price **Cell: R97**

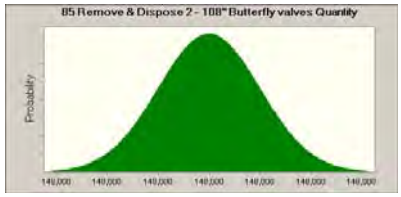
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q97)
Likeliest	$0.65	(=R97)
Maximum	$0.75	(=S97)

Assumption: 85 Remove & Dispose 2 - 108" Butterfly valves Quantity **Cell: L98**

Normal distribution with parameters:

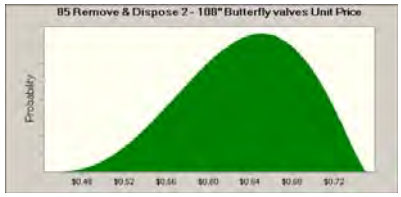
Mean	148,000	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: 85 Remove & Dispose 2 - 108" Butterfly valves Unit Price **Cell: R98**

BetaPERT distribution with parameters:

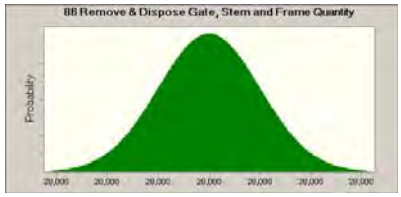
Minimum	$0.45	(=Q98)
Likeliest	$0.65	(=R98)
Maximum	$0.75	(=S98)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Quantity **Cell: L99**

Normal distribution with parameters:

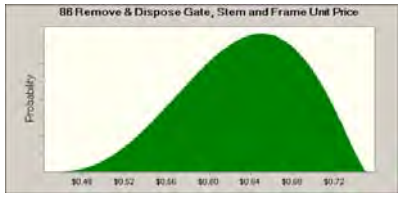
Mean	28,000	(=L99)
Std. Dev.	0	(=0.000001)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Unit Price **Cell: R99**

BetaPERT distribution with parameters:

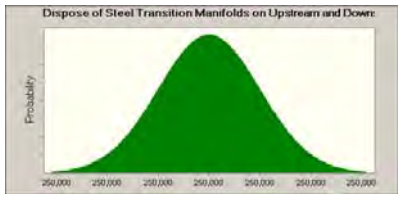
Minimum	$0.45	(=Q99)
Likeliest	$0.65	(=R99)
Maximum	$0.75	(=S99)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs **Cell: L100**

Normal distribution with parameters:

Mean	250,000	(=L100)
Std. Dev.	0	(=0.000001)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs **Cell: R100**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q100)
Likeliest	$0.50	(=R100)
Maximum	$0.70	(=S100)

Assumption: 88 Temporary Access Roads Quantity **Cell: L101**

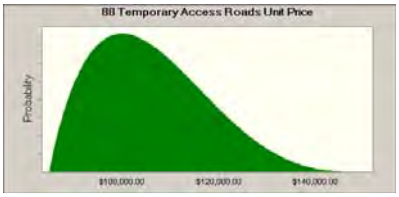
Normal distribution with parameters:

Mean	2	(=L101)
Std. Dev.	0	(=0.000001)

Assumption: 88 Temporary Access Roads Unit Price **Cell: R101**

BetaPERT distribution with parameters:

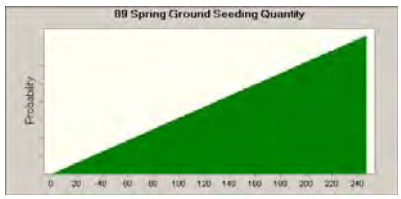
Minimum	$85,000.00	(=Q101)
Likeliest	$100,000.00	(=S101)
Maximum	$150,000.00	(=R101)



Assumption: 89 Spring Ground Seeding Quantity **Cell: L102**

Triangular distribution with parameters:

Minimum	0	(=M102)
Likeliest	247	(=L102)
Maximum	247	(=K102)



Assumption: 89 Spring Ground Seeding Unit Price **Cell: R102**

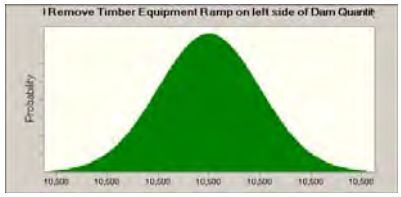
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q102)
Likeliest	$3,500.00	(=R102)
Maximum	$4,000.00	(=S102)

Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Quantity **Cell: L22**

Normal distribution with parameters:

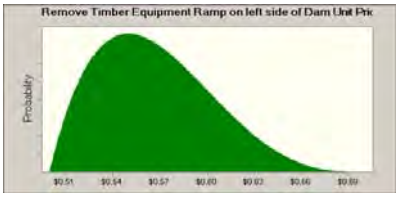
Mean	10,500	(=L22)
Std. Dev.	0	(=0.000001)



Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Unit Price **Cell: R22**

BetaPERT distribution with parameters:

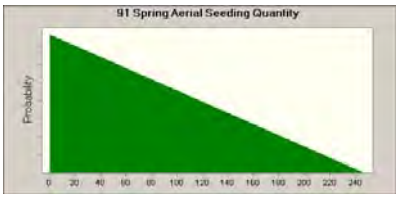
Minimum	$0.50	(=Q22)
Likeliest	$0.55	(=R22)
Maximum	$0.70	(=S22)



Assumption: 91 Spring Aerial Seeding Quantity **Cell: L104**

Triangular distribution with parameters:

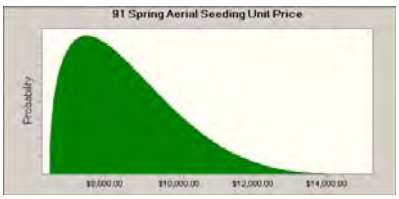
Minimum	0	(=K104)
Likeliest	0	(=L104)
Maximum	247	(=M104)



Assumption: 91 Spring Aerial Seeding Unit Price **Cell: R104**

BetaPERT distribution with parameters:

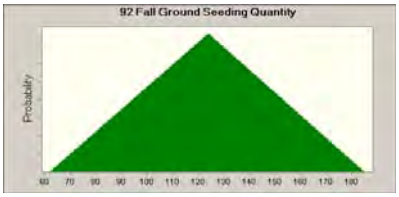
Minimum	$6,500.00	(=Q104)
Likeliest	$7,500.00	(=R104)
Maximum	$15,000.00	(=S104)



Assumption: 92 Fall Ground Seeding Quantity **Cell: L105**

Triangular distribution with parameters:

Minimum	62	(=K105)
Likeliest	124	(=L105)
Maximum	185	(=M105)



Assumption: 92 Fall Ground Seeding Unit Price **Cell: R105**

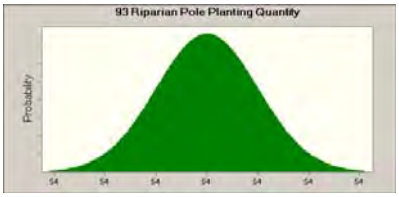
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q105)
Likeliest	$3,500.00	(=R105)
Maximum	$4,000.00	(=S105)

Assumption: 93 Riparian Pole Planting Quantity **Cell: L106**

Normal distribution with parameters:

Mean	54	(=L106)
Std. Dev.	0	(=0.000001)



Assumption: 93 Riparian Pole Planting Unit Price **Cell: R106**

BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q106)
Likeliest	$8,500.00	(=R106)
Maximum	$10,000.00	(=S106)

Assumption: 94 Weed Management Quantity **Cell: L107**

Triangular distribution with parameters:

Minimum	62	(=K107)
Likeliest	124	(=L107)
Maximum	185	(=M107)

Assumption: 94 Weed Management Unit Price **Cell: R107**

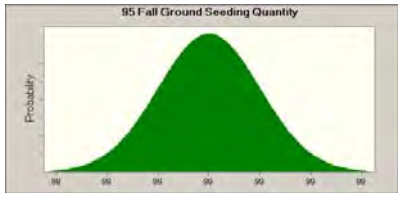
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q107)
Likeliest	$1,500.00	(=R107)
Maximum	$2,000.00	(=S107)

Assumption: 95 Fall Ground Seeding Quantity **Cell: L108**

Normal distribution with parameters:

Mean	99	(=L108)
Std. Dev.	0	(=0.000001)



Assumption: 95 Fall Ground Seeding Unit Price **Cell: R108**

BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q108)
Likeliest	$3,500.00	(=R108)
Maximum	$4,000.00	(=S108)

Assumption: 96 Weed Management Quantity **Cell: L109**

Normal distribution with parameters:

Mean	99	(=L109)
Std. Dev.	0	(=0.000001)

Assumption: 96 Weed Management Unit Price **Cell: R109**

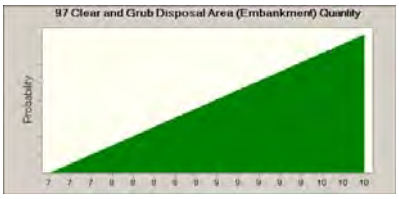
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q109)
Likeliest	$1,500.00	(=R109)
Maximum	$2,000.00	(=S109)

Assumption: 97 Clear and Grub Disposal Area (Embankment) Quantity **Cell: L110**

Triangular distribution with parameters:

Minimum	7	(=M110)
Likeliest	10	(=L110)
Maximum	10	(=K110)



Assumption: 97 Clear and Grub Disposal Area (Embankment) Unit Price **Cell: R110**

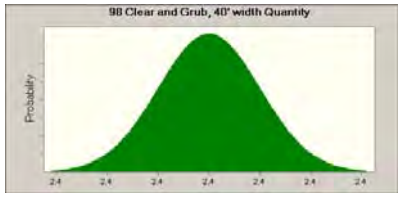
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q110)
Likeliest	$5,000.00	(=R110)
Maximum	$6,000.00	(=S110)

Assumption: 98 Clear and Grub, 40' width Quantity **Cell: L111**

Normal distribution with parameters:

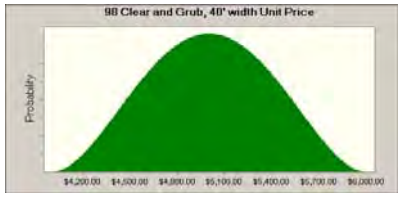
Mean	2.4	(=L111)
Std. Dev.	0.0	(=0.000001)



Assumption: 98 Clear and Grub, 40' width Unit Price **Cell: R111**

BetaPERT distribution with parameters:

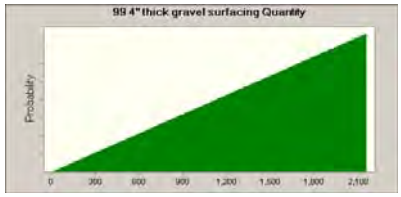
Minimum	$4,000.00	(=Q111)
Likeliest	$5,000.00	(=R111)
Maximum	$6,000.00	(=S111)



Assumption: 99 4" thick gravel surfacing Quantity **Cell: L112**

Triangular distribution with parameters:

Minimum	0	(=K112)
Likeliest	2,150	(=L112)
Maximum	2,150	(=M112)



Assumption: 99 4" thick gravel surfacing Unit Price **Cell: R112**

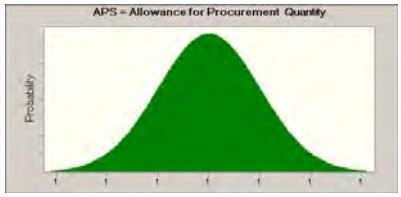
BetaPERT distribution with parameters:

Minimum	$20.00	(=Q112)
Likeliest	$30.00	(=R112)
Maximum	$40.00	(=S112)

Assumption: APS = Allowance for Procurement Quantity **Cell: L140**

Normal distribution with parameters:

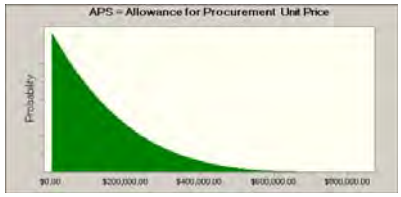
Mean	1	(=L140)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R140**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q140)
Likeliest	$0.00	(=R140)
Maximum	$849,844.00	(=S140)



Assumption: Construction Contingencies Quantity **Cell: L143**

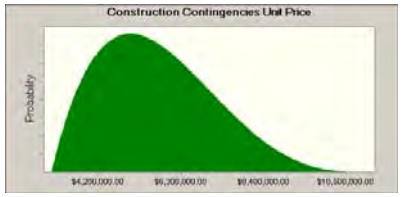
Normal distribution with parameters:

Mean	1	(=L143)
Std. Dev.	0	(=0.000001)

Assumption: Construction Contingencies Unit Price **Cell: R143**

BetaPERT distribution with parameters:

Minimum	$3,000,000.00	(=Q143)
Likeliest	$5,000,000.00	(=R143)
Maximum	$11,000,000.00	(=S143)



Assumption: Design Contingencies Quantity **Cell: L139**

Normal distribution with parameters:

Mean	1	(=L139)
Std. Dev.	0	(=0.000001)

Assumption: Design Contingencies Unit Price **Cell: R139**

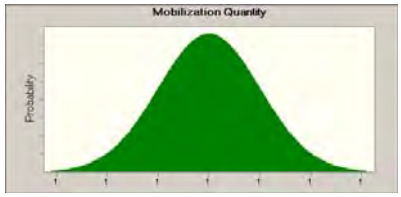
BetaPERT distribution with parameters:

Minimum	$1,165,310.00	(=Q139)
Likeliest	$2,352,950.00	(=R139)
Maximum	$5,200,411.00	(=S139)

Assumption: Mobilization Quantity **Cell: L134**

Normal distribution with parameters:

Mean	1	(=L134)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R134**

BetaPERT distribution with parameters:

Minimum	$730,000.00	(=Q134)
Likeliest	$1,050,000.00	(=R134)
Maximum	$1,750,000.00	(=S134)

Assumption: Non-Contract Cost Quantity **Cell: L145**

Normal distribution with parameters:

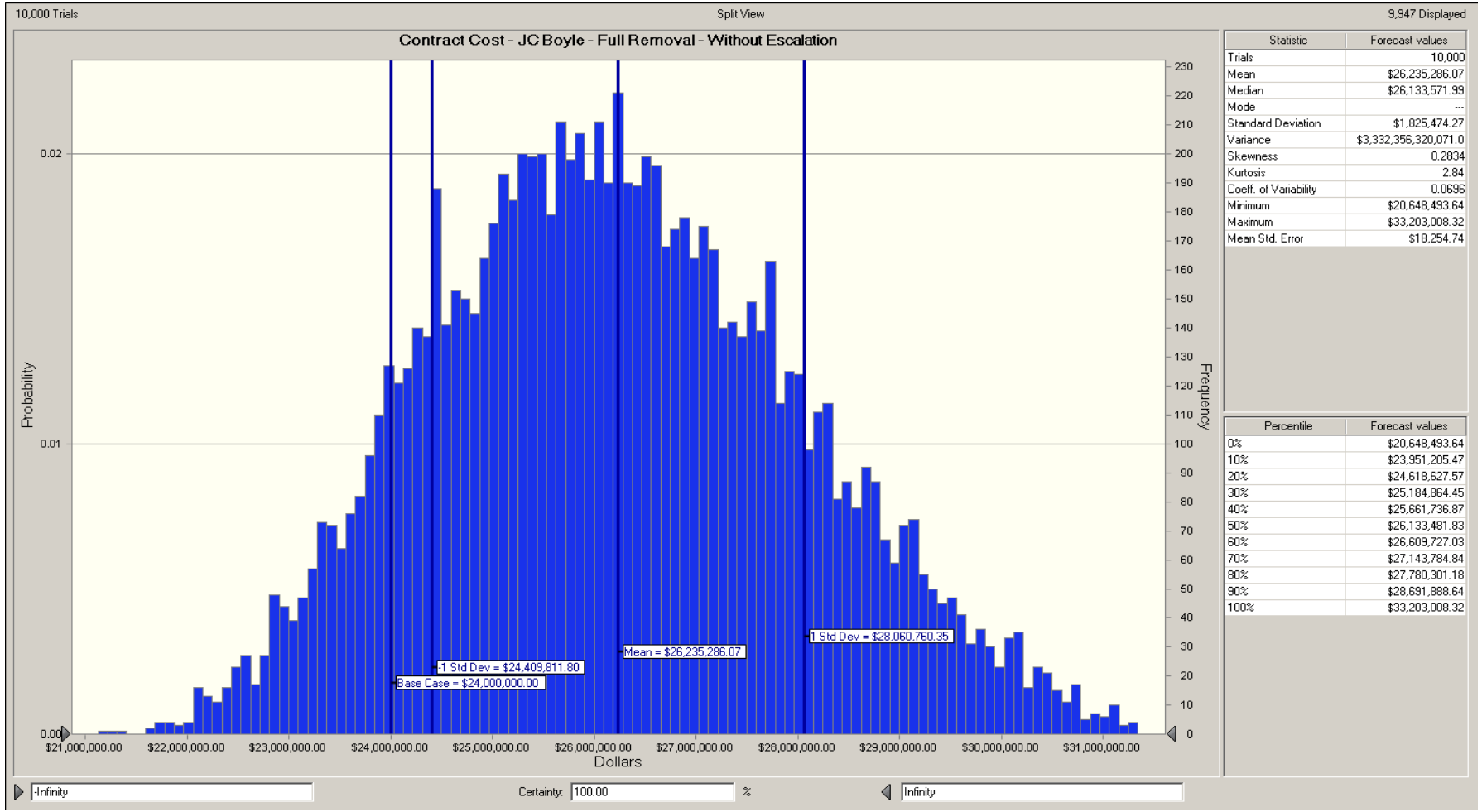
Mean	1	(=L145)
Std. Dev.	0	(=0.000001)

Assumption: Non-Contract Cost Unit Price **Cell: R145**

BetaPERT distribution with parameters:

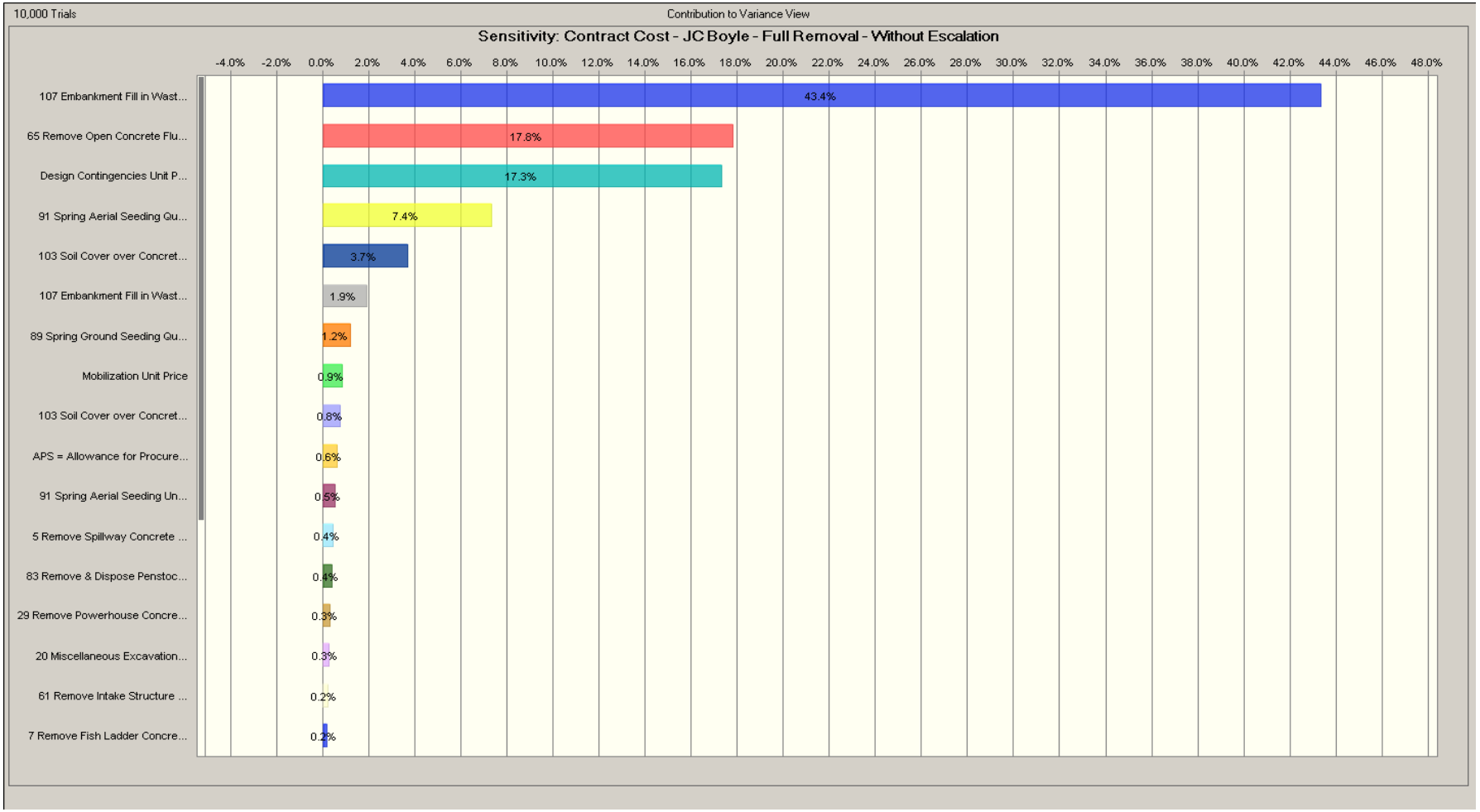
Minimum	$10,500,000.00	(=Q145)
Likeliest	$16,000,000.00	(=R145)
Maximum	$33,000,000.00	(=S145)

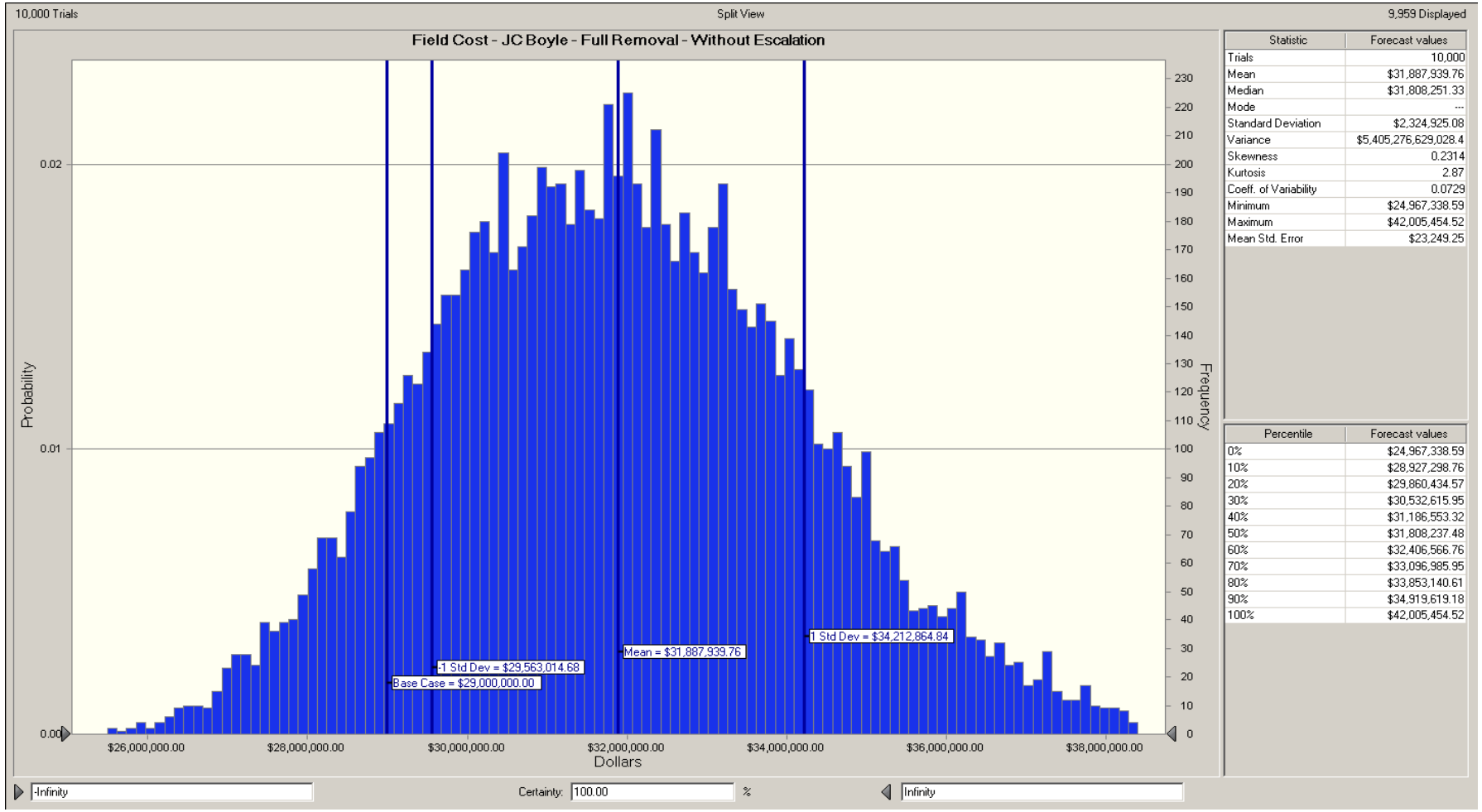
End of Assumptions



Statistic	Forecast values
Trials	10,000
Mean	$26,235,286.07
Median	$26,133,571.99
Mode	---
Standard Deviation	$1,825,474.27
Variance	$3,332,356,320,071.0
Skewness	0.2834
Kurtosis	2.84
Coeff. of Variability	0.0696
Minimum	$20,648,493.64
Maximum	$33,203,008.32
Mean Std. Error	$18,254.74

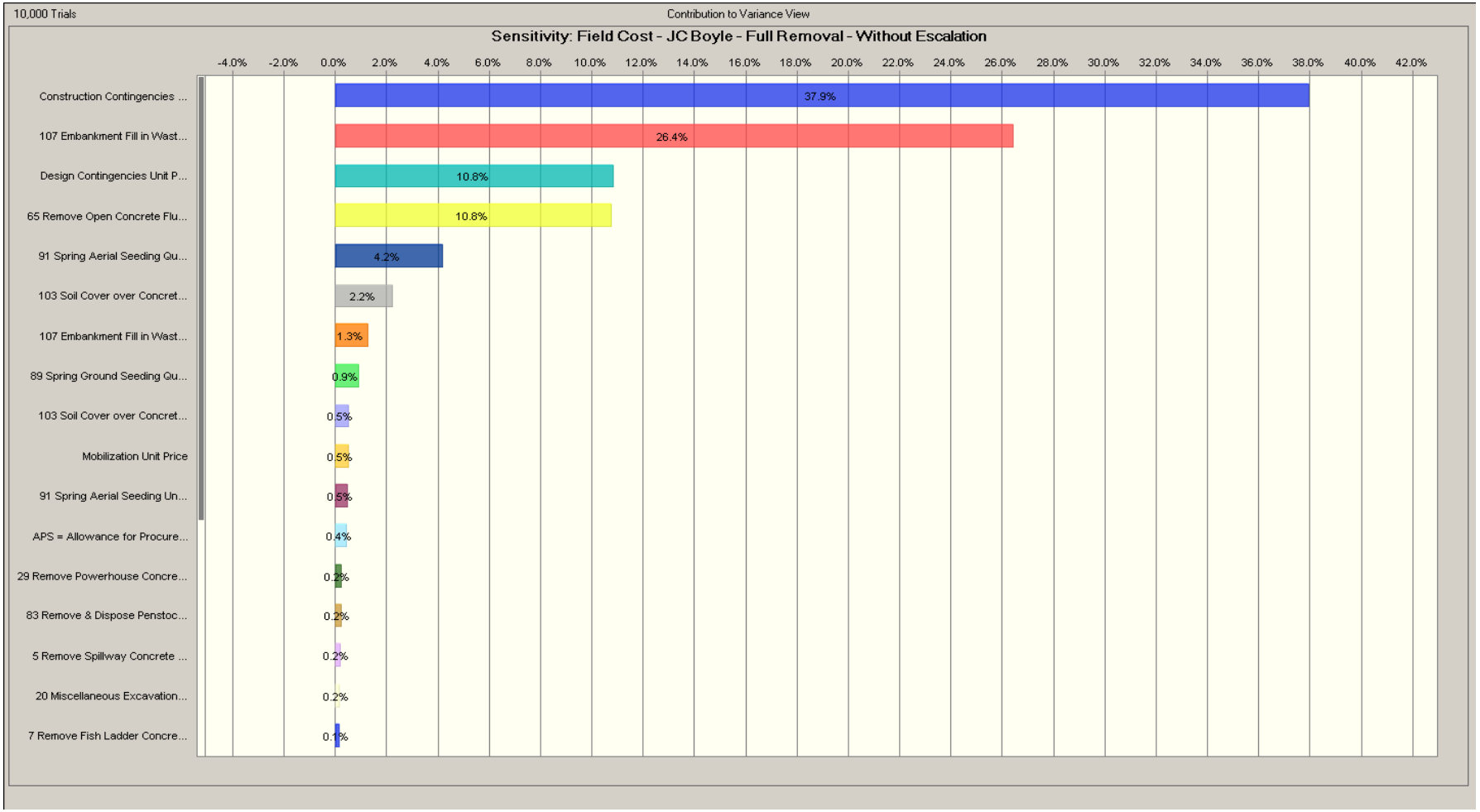
Percentile	Forecast values
0%	$20,648,493.64
10%	$23,951,205.47
20%	$24,618,627.57
30%	$25,184,864.45
40%	$25,661,736.87
50%	$26,133,481.83
60%	$26,609,727.03
70%	$27,143,784.84
80%	$27,780,301.18
90%	$28,691,888.64
100%	$33,203,008.32

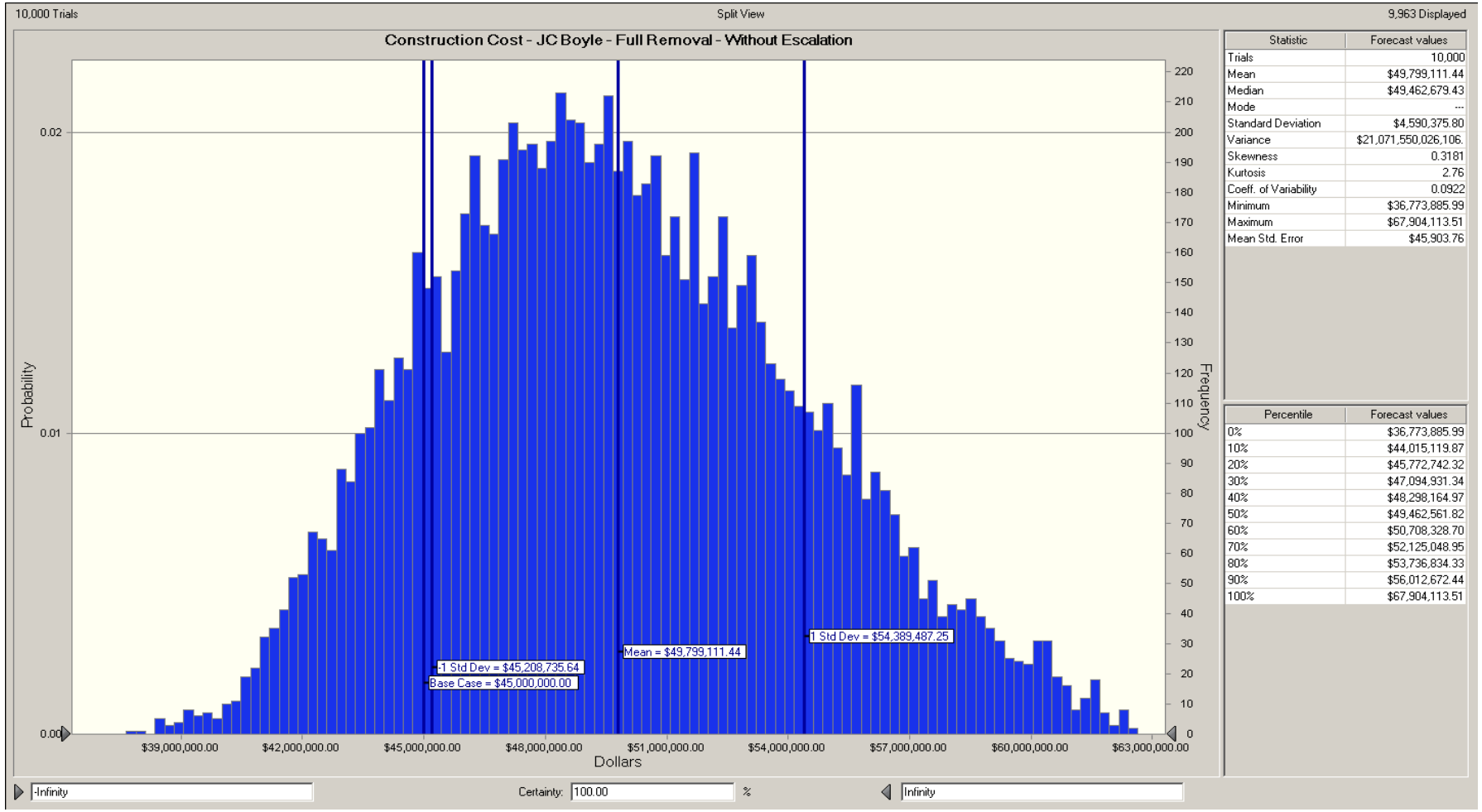

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - JC Boyle - Full Removal - Without Escalation
-4.0% -2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0% 22.0% 24.0% 26.0% 28.0% 30.0% 32.0% 34.0% 36.0% 38.0% 40.0% 42.0% 44.0% 46.0% 48.0%
107 Embankment Fill in Wast... 43.4%
65 Remove Open Concrete Flu... 17.8%
Design Contingencies Unit P... 17.3%
91 Spring Aerial Seeding Qu... 7.4%
103 Soil Cover over Concret... 3.7%
107 Embankment Fill in Wast... 1.9%
89 Spring Ground Seeding Qu... 1.2%
Mobilization Unit Price 0.9%
103 Soil Cover over Concret... 0.8%
APS = Allowance for Procure... 0.6%
91 Spring Aerial Seeding Un... 0.5%
5 Remove Spillway Concrete ... 0.4%
83 Remove & Dispose Penstoc... 0.4%
29 Remove Powerhouse Concre... 0.3%
20 Miscellaneous Excavation... 0.3%
61 Remove Intake Structure ... 0.2%
7 Remove Fish Ladder Concre... 0.2%



Statistic	Forecast values
Trials	10,000
Mean	$31,887,939.76
Median	$31,808,251.33
Mode	---
Standard Deviation	$2,324,925.08
Variance	$5,405,276,629,028.4
Skewness	0.2314
Kurtosis	2.87
Coeff. of Variability	0.0729
Minimum	$24,967,338.59
Maximum	$42,005,454.52
Mean Std. Error	$23,249.25

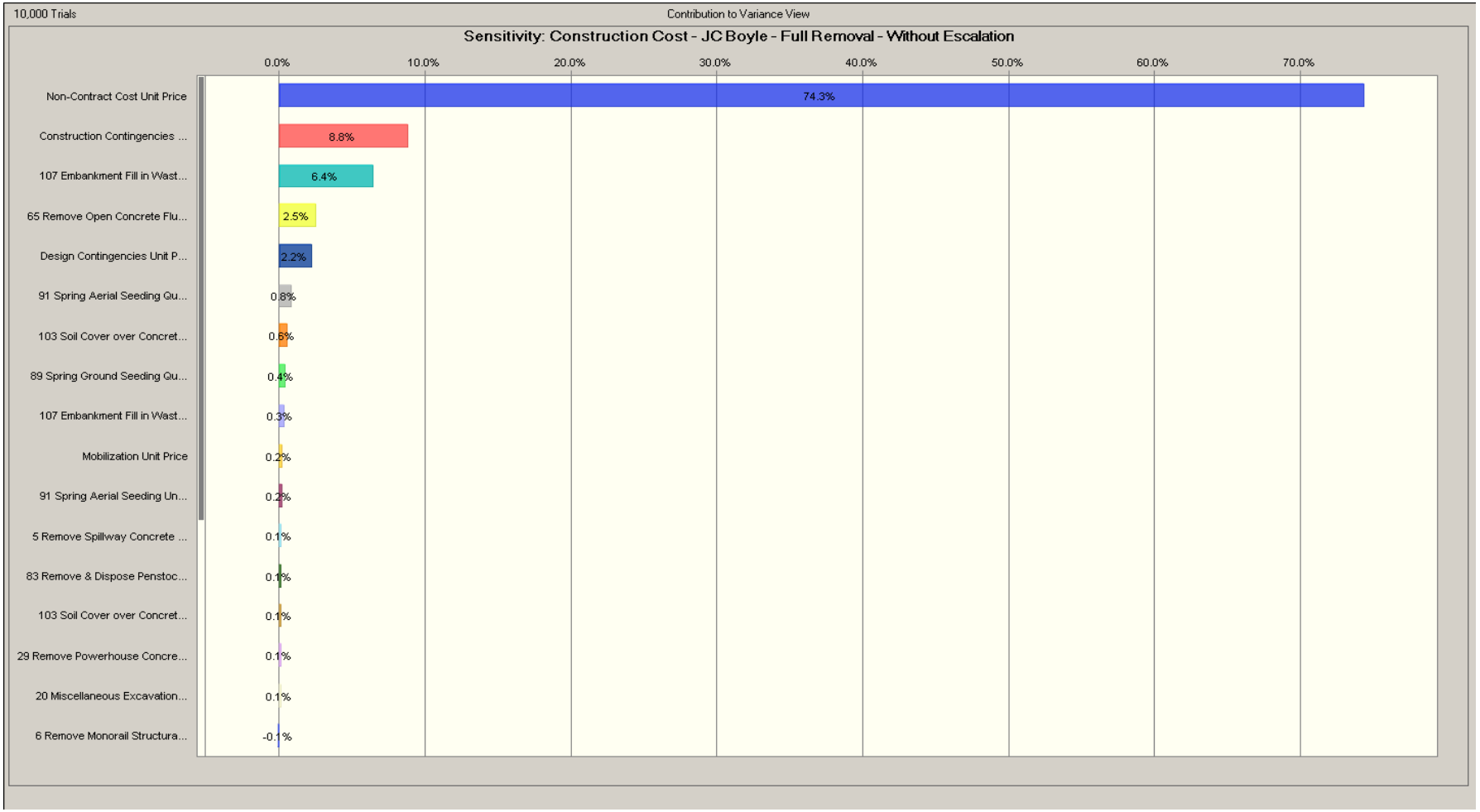
Percentile	Forecast values
0%	$24,967,338.59
10%	$28,927,298.76
20%	$29,860,434.57
30%	$30,532,615.95
40%	$31,186,553.32
50%	$31,808,237.48
60%	$32,406,566.76
70%	$33,096,985.95
80%	$33,853,140.61
90%	$34,919,619.18
100%	$42,005,454.52


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - JC Boyle - Full Removal - Without Escalation
-4.0% -2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0% 22.0% 24.0% 26.0% 28.0% 30.0% 32.0% 34.0% 36.0% 38.0% 40.0% 42.0%
Construction Contingencies ... 37.9%
107 Embankment Fill in Wast... 26.4%
Design Contingencies Unit P... 10.8%
65 Remove Open Concrete Flu... 10.8%
91 Spring Aerial Seeding Qu... 4.2%
103 Soil Cover over Concret... 2.2%
107 Embankment Fill in Wast... 1.3%
89 Spring Ground Seeding Qu... 0.9%
103 Soil Cover over Concret... 0.5%
Mobilization Unit Price 0.5%
91 Spring Aerial Seeding Un... 0.5%
APS = Allowance for Procure... 0.4%
29 Remove Powerhouse Concre... 0.2%
83 Remove & Dispose Penstoc... 0.2%
5 Remove Spillway Concrete ... 0.2%
20 Miscellaneous Excavation... 0.2%
7 Remove Fish Ladder Concre... 0.1%



Statistic	Forecast values
Trials	10,000
Mean	$49,799,111.44
Median	$49,462,679.43
Mode	---
Standard Deviation	$4,590,375.80
Variance	$21,071,550,026,106.
Skewness	0.3181
Kurtosis	2.76
Coeff. of Variability	0.0922
Minimum	$36,773,885.99
Maximum	$67,904,113.51
Mean Std. Error	$45,903.76

Percentile	Forecast values
0%	$36,773,885.99
10%	$44,015,119.87
20%	$45,772,742.32
30%	$47,094,931.34
40%	$48,298,164.97
50%	$49,462,561.82
60%	$50,708,328.70
70%	$52,125,048.95
80%	$53,736,834.33
90%	$56,012,672.44
100%	$67,904,113.51


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - JC Boyle - Full Removal - Without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
74.3%
Construction Contingencies ...
8.8%
107 Embankment Fill in Wast...
6.4%
65 Remove Open Concrete Flu...
2.5%
Design Contingencies Unit P...
2.2%
91 Spring Aerial Seeding Qu...
0.8%
103 Soil Cover over Concret...
0.6%
89 Spring Ground Seeding Qu...
0.4%
107 Embankment Fill in Wast...
0.3%
Mobilization Unit Price
0.2%
91 Spring Aerial Seeding Un...
0.2%
5 Remove Spillway Concrete ...
0.1%
83 Remove & Dispose Penstoc...
0.1%
103 Soil Cover over Concret...
0.1%
29 Remove Powerhouse Concre...
0.1%
20 Miscellaneous Excavation...
0.1%
6 Remove Monorail Structura...
-0.1%

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1 _ OF _1 _

FEATURE:	PROJECT:
Klamath River Dams Removal **Partial Removal Option** **JC Boyle Dam & Powerplant Removal** **Most Probable** **50 Year Life Cycle** **Summary**	**Klamath River** **Oregon** **WOID:** AF652 **ESTIMATE LEVEL:** Feasibility **REGION:** MP **UNIT PRICE LEVEL:** Jul-10 **FILE:** U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MP\[JC Boyle

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$348,520.00
		Periodic Costs - Year 8					$166,451.00
		Periodic Costs - Year 17					$165,990.00
		Periodic Costs - Year 25					$83,724.60
		Periodic Costs - Year 33					$86,935.20
		Periodic Costs - Year 42					$42,113.00
		Periodic Costs - Year 50					0.00
		Annual Costs - Maintenance					$1,892,705.00
		(Assumes gov't service / construction contracts)					
		Subtotal 1					**$2,786,438.80**
		Mobilization	5%	+/-			$140,000.00
		Subtotal 1 with Mobilization					**$2,926,438.80**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					$1,006,450.20
		at	3.0%	per year for	120	months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$3,932,889.00**
		Design Contingencies	10%	+/-			$367,111.00
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$4,300,000.00**
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competive Request for Proposal					
		Subtotal 4 = Subtotal 3 + APS					**$4,300,000.00**
		TERO Fee (__% of Total Contract)		+/-			
		Subtotal 5 = Subtotal 4 + TERO Fee					**$4,300,000.00**
		CONTRACT COST					**$4,300,000.00**
		Construction Contingencies	20%	+/-			$900,000.00
		FIELD COST					**$5,200,000.00**
		Non-Contract Costs	30%	+/-			$1,600,000.00
		(Environmental Cultural / Mitigation ~ 7%,					
		Engineering Design ~ 5%, Maintenance Service Contract ~ 5%					
		Procurement ~ 2%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$6,800,000.00**
		Note: intial estimate completed 4/17/11, revised non-contract costs 5/12/11, design contingencyt costs 6/9/11					
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 6/9/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED** 6/9/11	**PEER REVIEW / DATE** DCD 6/13/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1 _ OF _3 _

FEATURE:	PROJECT:
Klamath River Dams Removal **Partial Removal Option** **JC Boyle Dam & Powerplant Removal** **Most Probable** **Life Cycle**	**Klamath River** **Oregon**
	WOID: AF652 — **ESTIMATE LEVEL:** Feasibility
	REGION: MP — **UNIT PRICE LEVEL:** Jul-10
	FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MP\[JC Boyle

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Remove paint on downstream face of power house (assume paint contains heavy metals)	86-68130	900	ft2	$30.00	$27,000.00
	2	Furnish, install, and maintain a 7-foot-high chain line fence around both ends of the 14-foot diameter penstock and the intake structure (assume fence includes two 3-foot-wide access gates) (assume replace two times) *Estimate assume minor paint repair ~ 2%*	86-68130	1,450	lf	$60.00	$87,000.00
	3	Repaint 14-foot-diameter penstock pipe between intake structure at dam and headgate structure (assume repaint 5 times) *Estimate assume minor paint repair ~ 2%*	86-68130	32,000	ft2	$4.00	$128,000.00
	4	Repaint rocker bent penstock pipe supports (assume repaint 5 times)	86-68130	3,000	ft2	$6.00	$18,000.00
	5	Repaint penstock intake structure trashracks (four separate 11.5-ft-wide by 40-ft-high openings) (assume repaint 5 times) *Estimate assume minor paint repair ~ 2%*	86-68130	4,200	ft2	$6.00	$25,200.00
	6	Repaint outside of fish screen building on top of penstock intake structure (assume repaint 5 times) *Estimate assume minor paint repair ~ 2%*	86-68130	3,900	ft2	$6.00	$23,400.00
	7	Repaint wheel gate in penstock intake structure (assume repaint 5 times) *Estimate assume minor paint repair ~ 2%*	86-68130	510	ft2	$12.00	$6,120.00
	8	Repaint wheel gate hoist frame (Assume repaint 5 times) *Estimate assume minor paint repair ~ 2%*	86-68130	2,000	ft2	$7.00	$14,000.00
		LIFE CYCLE SUBTOTAL: SHEET 1					**$328,720.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Atkins	**CHECKED** Shauna Hagen 5/13/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED** 4/25/11	**PEER REVIEW / DATE** DCD 5/13/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _2_ OF _3_

FEATURE:	PROJECT:
Klamath River Dams Removal **Partial Removal Option** **JC Boyle Dam & Powerplant Removal** **Most Probable** **Life Cycle**	**Klamath River** **Oregon**
	WOID: AF652 — **ESTIMATE LEVEL:** Feasibility
	REGION: MP — **UNIT PRICE LEVEL:** Jul-10
	FILE: U:\2011

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	9	Repaint stop log storage beams & columns on	86-68130	1,000	ft2	$9.00	$9,000.00
		intake structure and walkway					
		(Assume repaint 5 times)					
		Estimate assume minor paint repair ~ 2%					
	10	Repaint stop logs for wheel gate	86-68130	1,200	ft2	$9.00	$10,800.00
		(Assume repaint 5 times)					
		Estimate assume minor paint repair ~ 2%					
	11	Maintain existing 7-ft-high chain link fence	86-68130	180	lf	0	0
		around headgate structure					
		(fence includes 12-foot-wide access gate)					
		(assume replace two times)					
		LIFE CYCLE SUBTOTAL: SHEET 2					**$19,800.00**
		LIFE CYCLE TOTAL: JC BOYLE					**$348,520.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/13/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED** 4/25/11	**PEER REVIEW / DATE** DCW 5/13/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
Removal Site Maintenance
Most Probable
Life Cycle - 50 Year
Operation and Maintenance - Periodic Costs

PROJECT:
Klamath River
Oregon

WOID:	AF484	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL**	Jul-10

FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MP\[JC Boyle Probable.xlsx]O&M

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	**Site Maintenance - Annual: JC Boyle site only***		1	LS	$90,000.00	$90,000.00
		Labor needed per year - three sites	86-68130	120	mdy**		
		3-Man maintenance crew					
		6 Months active inspection/maintenance					
		2 Weeks full time (1 month each spring)					
		4 Full days, 2 times each month (5 months)					
		Site maintenance required at JC Boyle, Copco 1 & Copco 2					
		Estimate prorated the time at each dam site based					
		on percent of total partial removal construction costs					
		Equipment needed per year	86-68130	40	dy***		
		1-Service truck					
		Includes compressor, welder, generator					
		and general tools					
		Estimate prorated the time at each dam site based					
		on percent of total partial removal construction costs					
		Materials needed per year (percentage of labor	86-68130	15%			
		& equipment)					
		Road maintenance needed per year (percentage	86-68130	10%			
		of labor & equipment)					
		**Total estimated cost for all 3 sites is approximately $161,000 annually:*					
		prorated ± 55% for the JC Boyle site					
		** Man days per year for 50 years					
		***Days per year for 50 years					
		SUBTOTAL THIS SHEET					**$90,000.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/13/11
DATE PREPARED 04/18/11	**PEER REVIEW / DATE** Tom Hepler P.E. 4/18/11	**DATE PREPARED** 4/25/11	**PEER REVIEW / DATE** 5/13/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1_ OF _1_

FEATURE: Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Life Cycle - 50 Year Summary	**PROJECT:** Klamath River Oregon
	WOID: AF652 **ESTIMATE LEVE** Feasibility
	REGION MP **UNIT PRICE LEV** Jul-10
	FILE: U:\2011 Projects\Klamath\007 Crystal Ball\[Klamath Summary Cost Sheet_122310.xls]MPL_MP_MPH_Full

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$394,940.00
		Periodic Costs - Year 5					$219,930.92
		Periodic Costs - Year 10					$179,684.33
		Periodic Costs - Year 13					$62,645.06
		Periodic Costs - Year 15					$146,802.77
		Periodic Costs - Year 20					$119,937.60
		Periodic Costs - Year 25					$136,558.46
		Periodic Costs - Year 30					$80,059.80
		Periodic Costs - Year 35					$65,407.79
		Periodic Costs - Year 38					$22,803.62
		Periodic Costs - Year 40					$53,439.60
		Periodic Costs - Year 45					$43,659.93
		Periodic Costs - Year 50					0.00
		Annual Costs - Maintenance					$5,257,515.00
		(Assumes gov't service / construction contracts)					
		Subtotal 1					**$6,783,384.88**
		Mobilization	5%	+/-			$340,000.00
		Subtotal 1 with Mobilization					**$7,123,384.88**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					$3,807,399.12
		at	4.375%	per year for	120	months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$10,930,784.00**
		Design Contingencies	15%	+/-			$1,817,808.00
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$12,748,592.00**
		Allowance for Procurement Strategies (APS)	2.0%	+/-			$251,408.00
		Type of solicitation assumed is: Selective Request for Proposal					
		Subtotal 4 = Subtotal 3 + APS					**$13,000,000.00**
		CONTRACT COST					**$13,000,000.00**
		Construction Contingencies	25%	+/-			$3,000,000.00
		FIELD COST					**$16,000,000.00**
		Non-Contract Costs	35%	+/-			$6,000,000.00
		(Environmental Cultural / Mitigation ~ 10%,					
		Engineering Design ~ 7%, Maintenance Service Contract ~ 5%					
		Procurement ~ 2%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$22,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 6/9/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED** 6/9/11	**PEER REVIEW / DATE** 6/13/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Life Cycle - 50 Year
Operation and Maintenance - Initial Capital Costs

PROJECT:
Klamath River
Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	Jan-11

FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPH\[JC Boyle - MPH - Probable.xlsx]Initial Cost 2

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	9	Repaint stop log storage beams & columns on	86-68130	1,000	ft2	$9.00	$9,000.00
		intake structure and walkway					
		(assume repaint 9 times)					
		Estimate assume minor paint repair ~ 4%					
	10	Repaint stop logs for wheel gate	86-68130	1,200	ft2	$9.00	$10,800.00
		(assume repaint 9 times)					
		Estimate assume minor paint repair ~ 4%					
	11	Maintain existing 7-ft-high chain link fence	86-68130	180	lf	0	0
		around headgate structure					
		(fence includes 12-foot-wide access gate)					
		(assume replace 3 times)					
		LIFE CYCLE SUBTOTAL THIS SHEET					$19,800.00
		LIFE CYCLE TOTAL					**$394,940.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/13/11
DATE PREPARED 03/21/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/24/11	**DATE PREPARED**	**PEER REVIEW / DATE**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option Removal Site Maintenance Most Probable High Life Cycle - 50 Year Operation and Maintenance - Periodic Costs	Klamath River Oregon
	WOID: AF484 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL Jul-10
	FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPH\[JC Boyle - MPH - Probable.xlsx]O&M

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	**Site Maintenance - Annual: JC Boyle Site only***		1	LS	$250,000.00	$250,000.00
		Labor needed per year - threes sites:	86-68130	150			
		3-Man maintenance crew					
		6 Months active inspection/maintenance					
		2 Weeks full time (1 month each spring)					
		4 Full days, 2 times each month (5 months)					
		Site maintenance required at JC Boyle, Copco 1 & Copco 2					
		Estimate prorated amount of the time at each dam site based					
		on percent of total MP partial removal construction costs					
					dy***		
		Equipment needed per year	86-68130	50	dy**		
		1-Service truck					
		Includes compressor, welder, generator					
		and general tools					
		Estimate prorated the time at each dam site based					
		on percent of total partial removal construction costs					
		Materials needed per year (percentage of labor	86-68130	15%			
		& equipment)					
		Road maintenance needed per year (percentage	86-68130	10%			
		of labor & equipment)					
		**Total estimated cost for all 3 sites is approximately $462,000 annually:*					
		prorated ±55% for the JC Boyle site only					
		** Man days per year for 50 years					
		***Days per year for 50 years					
		SUBTOTAL THIS SHEET					**$250,000.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Stephen Latham	BY Greg Akins	CHECKED 5/4/11
DATE PREPARED 04/18/11	PEER REVIEW / DATE Tom Hepler P.E. 4/18/11	DATE PREPARED 5/4/11	PEER REVIEW / DATE DCD 5/4/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1 _ OF _1 _

FEATURE:	**PROJECT:**			
Klamath River Dams Removal	**Klamath River**			
Partial Removal Option	**Oregon**			
JC Boyle Dam & Powerplant Removal	**WOID:**	AF652	**ESTIMATE LEVEL**	Feasibility
Most Probable Low	**REGION**	MP	**UNIT PRICE LEVE**	Jul-10
Life Cycle - 50 Year	**FILE:**	U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPL\[JC Boyle - MPL - Probable.xlsx]Life Cycle Summary		
Summary				

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$299,400.00
		Periodic Costs - Year 17					$100,600.00
		Periodic Costs - Year 25					$29,667.63
		Periodic Costs - Year 33					$52,688.00
		Periodic Costs - Year 50					0.00
		(Assumes gov't service / construction contracts)					
		Annual Costs - Maintenance					$1,114,593.00
		Subtotal 1					**$1,596,948.63**
		Mobilization	5%	+/-			$80,000.00
		Subtotal 1 with Mobilization					**$1,676,948.63**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					$269,218.37
		at	1.5%	per year for	120	months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$1,946,167.00**
		Design Contingencies	8%	+/-			$153,833.00
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$2,100,000.00**
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Full and open sealed bid competition					
		Subtotal 4 = Subtotal 3 + APS					**$2,100,000.00**
		CONTRACT COST					**$2,100,000.00**
		Construction Contingencies	18%	+/-			$400,000.00
		FIELD COST					**$2,500,000.00**
		Non-Contract Costs	25%	+/-			$600,000.00
		(Environmental Cultural / Mitigation ~ 5%, Engineering					
		Design ~ 4%, Maintenance Service Contract ~ 4%					
		Procurement ~ 1%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$3,100,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		**PRICES**	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/18/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED** 5/13/11	**PEER REVIEW / DATE** 6/13/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Life Cycle - 50 Year
Operation and Maintenance - Initial Capital Costs

PROJECT:
Klamath River
Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	Jan-11

FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPL\[JC Boyle - MPL - Probable.xlsx]Life Cycle Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Remove paint on downstream face of power	86-68130	900	ft2	$30.00	$27,000.00
		house (assume paint contains heavy metals)					
	2	Furnish, install, and maintain a 7-foot-high chain	86-68130	1,450	lf	$50.00	$72,500.00
		line fence around both ends of the 14-foot diameter					
		penstock and the intake structure (assume fence					
		includes two 3-foot-wide access gates)					
		(assume 1 replacement)					
		Estimate assume minor paint repair ~ 2%					
	3	Repaint 14-foot-diameter penstock pipe between	86-68130	32,000	ft2	$3.50	$112,000.00
		intake structure at dam and headgate structure					
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	4	Repaint rocker bent penstock pipe supports	86-68130	3,000	ft2	$5.00	$15,000.00
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	5	Repaint penstock intake structure trashracks	86-68130	4,200	ft2	$5.00	$21,000.00
		(four separate 11.5-ft-wide by 40-ft-high openings)					
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	6	Repaint outside of fish screen building on top of	86-68130	3,900	ft2	$5.00	$19,500.00
		penstock intake structure					
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	7	Repaint wheel gate in penstock intake structure	86-68130	510	ft2	$10.00	$5,100.00
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	8	Repaint wheel gate hoist frame	86-68130	2,000	ft2	$6.50	$13,000.00
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
				LIFE CYCLE SUBTOTAL THIS SHEET			**$285,100.00**

QUANTITIES		**PRICES**	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/4/11
DATE PREPARED 03/21/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/24/11	**DATE PREPARED** 5/4/11	**PEER REVIEW / DATE** DCD 5/4/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Life Cycle - 50 Year
Operation and Maintenance - Initial Capital Costs

PROJECT:
Klamath River
Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	Jan-11

FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPL\[JC Boyle - MPL - Probable.xlsx]Life Cycle Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	9	Repaint stop log storage beams & columns on	86-68130	1,000	ft2	$6.50	$6,500.00
		intake structure and walkway					
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	10	Repaint stop logs for wheel gate	86-68130	1,200	ft2	$6.50	$7,800.00
		(assume repaint 2 times)					
		Estimate assume minor paint repair ~ 2%					
	11	Maintain existing 7-ft-high chain link fence	86-68130	180	lf	0	0
		around headgate structure					
		(fence includes 12-foot-wide access gate)					
		(assume replace 1 time)					
		LIFE CYCLE SUBTOTAL THIS SHEET					$14,300.00
		LIFE CYCLE TOTAL					**$299,400.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 5/4/11
DATE PREPARED 03/21/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/24/11	**DATE PREPARED** 5/4/11	**PEER REVIEW / DATE** DCD 5/4/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
Removal Site Maintenance
Most Probable Low
Life Cycle - 50 Year
Operation and Maintenance - Periodic Costs

PROJECT:
Klamath River
Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL	Jul-10

FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\MPL\[JC Boyle - MPL - Probable.xlsx]Life Cycle Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	**Site Maintenance - Annual**		1	LS	$53,000.00	$53,000.00
		Labor needed per year	86-68130	90	mdy*		
		3-Man maintenance crew					
		6 Months active inspection/maintenance					
		2 Weeks full time (1 month each spring)					
		4 Full days, 2 times each month (5 months)					
		Site maintenance required at JC Boyle,					
		Copco 1 & Copco 2					
		Estimate prorated the time at each dam site based					
		on percent of total partial removal construction costs					
		Equipment needed per year	86-68130	30	dy**		
		1-Service truck					
		Includes compressor, welder, generator					
		and general tools					
		Estimate prorated the time at each dam site based					
		on percent of total partial removal construction costs					
		Materials needed per year (percentage of labor	86-68130	15%			
		& equipment)					
		Road maintenance needed per year (percentage	86-68130	10%			
		of labor & equipment)					
		* Man days per year for 50 years					
		**Days per year for 50 years					
		SUBTOTAL THIS SHEET					**$53,000.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Stephen Latham	BY Greg Akins	CHECKED 5/4/11
DATE PREPARED 04/18/11	PEER REVIEW / DATE Tom Hepler P.E. 4/18/11	DATE PREPARED 5/4/11	PEER REVIEW / DATE DCD 5/4/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1 _ OF _1 _

FEATURE: Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable - Escalation NOT Included 50 Year Life Cycle Summary	**PROJECT:** Klamath River Oregon
	WOID: AF652 **ESTIMATE LEVEL:** Feasibility
	REGION: MP **UNIT PRICE LEVEL:** Jul-10
	FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\Escalation\[JC Boyle

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$348,520.00
		Periodic Costs - Year 8					$166,451.00
		Periodic Costs - Year 17					$165,990.00
		Periodic Costs - Year 25					$83,724.60
		Periodic Costs - Year 33					$86,935.20
		Periodic Costs - Year 42					$42,113.00
		Periodic Costs - Year 50					0.00
		Annual Costs - Maintenance					$1,892,705.00
		(Assumes gov't service / construction contracts)					
		Subtotal 1					**$2,786,438.80**
		Mobilization	5%	+/-			$140,000.00
		Subtotal 1 with Mobilization					**$2,926,438.80**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					
		None Include		per year for		months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$2,926,438.80**
		Design Contingencies	10%	+/-			$273,561.20
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$3,200,000.00**
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competive Request for Proposal					
		Subtotal 4 = Subtotal 3 + APS					**$3,200,000.00**
		TERO Fee (__% of Total Contract)		+/-			
		Subtotal 5 = Subtotal 4 + TERO Fee					**$3,200,000.00**
		CONTRACT COST					**$3,200,000.00**
		Construction Contingencies	20%	+/-			$700,000.00
		FIELD COST					**$3,900,000.00**
		Non-Contract Costs	30%	+/-			$1,200,000.00
		(Environmental Cultural / Mitigation ~ 7%,					
		Engineering Design ~ 5%, Maintenance Service Contract ~ 5%					
		Procurement ~ 2%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$5,100,000.00**
		Note: intial estimate completed 4/17/11, revised non-contract costs 5/12/11, design contingencyt costs 6/9/11					
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 6/15/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED**	**PEER REVIEW / DATE** 6/15/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1 _ OF _1 _

FEATURE:	PROJECT:
Klamath River Dams Removal **Partial Removal Option** **JC Boyle Dam & Powerplant Removal** **Most Probable High - Escalation NOT Included** **Life Cycle - 50 Year** **Summary**	**Klamath River** **Oregon**
	WOID: AF652 **ESTIMATE LEVE** Feasibility
	REGION MP **UNIT PRICE LEV** Jul-10
	FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\Escalation\[JC Boyle - MPH - Probable.xlsx]Life Cycle Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$394,940.00
		Periodic Costs - Year 5					$219,930.92
		Periodic Costs - Year 10					$179,684.33
		Periodic Costs - Year 13					$62,645.06
		Periodic Costs - Year 15					$146,802.77
		Periodic Costs - Year 20					$119,937.60
		Periodic Costs - Year 25					$136,558.46
		Periodic Costs - Year 30					$80,059.80
		Periodic Costs - Year 35					$65,407.79
		Periodic Costs - Year 38					$22,803.62
		Periodic Costs - Year 40					$53,439.60
		Periodic Costs - Year 45					$43,659.93
		Periodic Costs - Year 50					0.00
		Annual Costs - Maintenance					$5,257,515.00
		(Assumes gov't service / construction contracts)					
		Subtotal 1					**$6,783,384.88**
		Mobilization	5%	+/-			$340,000.00
		Subtotal 1 with Mobilization					**$7,123,384.88**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					
		None Included:		per year for		months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$7,123,384.88**
		Design Contingencies	15%	+/-			$1,112,777.12
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$8,236,162.00**
		Allowance for Procurement Strategies (APS)	2.0%	+/-			$163,838.00
		Type of solicitation assumed is: Selective Request for Proposal					
		Subtotal 4 = Subtotal 3 + APS					**$8,400,000.00**
		CONTRACT COST					**$8,400,000.00**
		Construction Contingencies	25%	+/-			$2,100,000.00
		FIELD COST					**$10,500,000.00**
		Non-Contract Costs	35%	+/-			$3,500,000.00
		(Environmental Cultural / Mitigation ~ 10%,					
		Engineering Design ~ 7%, Maintenance Service Contract ~ 5%					
		Procurement ~ 2%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$14,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 6/15/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED**	**PEER REVIEW / DATE** 6/15/11

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1_ OF _1_

FEATURE:	PROJECT:
Klamath River Dams Removal **Partial Removal Option** **JC Boyle Dam & Powerplant Removal** **Most Probable Low - Escalation NOT Included** **Life Cycle - 50 Year** **Summary**	**Klamath River** **Oregon**
	WOID: AF652 — **ESTIMATE LEVEL** Feasibility
	REGION MP — **UNIT PRICE LEVE** Jul-10
	FILE: U:\2011 Projects\Klamath\002 Completed Sheets\MP MPL MPH\03 - JC Boyle\Escalation\[JC Boyle - MPL - Probable.xlsx]Life Cycle Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs - Year 1					$299,400.00
		Periodic Costs - Year 17					$100,600.00
		Periodic Costs - Year 25					$29,667.63
		Periodic Costs - Year 33					$52,688.00
		Periodic Costs - Year 50					0.00
		(Assumes gov't service / construction contracts)					
		Annual Costs - Maintenance					$1,114,593.00
		Subtotal 1					**$1,596,948.63**
		Mobilization	5%	+/-			$80,000.00
		Subtotal 1 with Mobilization					**$1,676,948.63**
		Escalation to Notice to Proceed (NTP): from Unit Price Level (July, 2010) to NTP (July, 2020)					
		None Included		per year for		months.	
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					**$1,676,948.63**
		Design Contingencies	8%	+/-			$123,051.37
		Subtotal 3 = Subtotal 2 + Design Contingencies					**$1,800,000.00**
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Full and open sealed bid competition					
		Subtotal 4 = Subtotal 3 + APS					**$1,800,000.00**
		CONTRACT COST					**$1,800,000.00**
		Construction Contingencies	18%	+/-			$300,000.00
		FIELD COST					**$2,100,000.00**
		Non-Contract Costs	25%	+/-			$500,000.00
		(Environmental Cultural / Mitigation ~ 5%, Engineering					
		Design ~ 4%, Maintenance Service Contract ~ 4%					
		Procurement ~ 1%, Inspections ~ 10%					
		and Closeout ~ 1%)					
		CONSTRUCTION COST					**$2,600,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Stephen Latham	**BY** Greg Akins	**CHECKED** 4/15/11
DATE PREPARED 03/24/11	**PEER REVIEW / DATE** Tom Hepler P.E. 3/25/11	**DATE PREPARED**	**PEER REVIEW / DATE** DCD 4/15/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - Partial - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	1	Removal of Diversion Conduit Bulkheads.	8130	14	14	14	CY	$725.00	$850.00	$950.00	$10,150.00	$11,900.00	$13,300.00
	2	Remove Water from behind Tailrace Cofferdam.	8130	0	0	0	GAL				$0.00	$0.00	$0.00
	3	Provide Dewatering behind Tailrace Cofferdam	8130	0	0	0	LS				$0.00	$0.00	$0.00
	4	Construct Embankment Cofferdam in Tailrace around Powerhouse	8130	0	0	0	CY				$0.00	$0.00	$0.00
	5	Remove Spillway Concrete	8130	2,500	2,500	2,500	CY	$130.00	$260.00	$390.00	$325,000.00	$650,000.00	$975,000.00
	6	Remove Monorail Structural Steel Components	8130	15,000	15,000	15,000	LBS	$0.45	$0.65	$0.75	$6,750.00	$9,750.00	$11,250.00
	7	Remove Fish Ladder Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	8	Remove Gravity Dam Section Concrete	8130	0	0	0	CY				$0.00	$0.00	$0.00
	9	Remove Timber Equipment Ramp on left side of Dam	8130	10,500	10,500	10,500	LBS	$0.50	$0.55	$0.70	$5,250.00	$5,775.00	$7,350.00
	10	Remove Pressure-Treated Lumber from Footbridge around Intake Structure	8130	3,600	3,600	3,600	LBS	$0.50	$0.55	$0.70	$1,800.00	$1,980.00	$2,520.00
	11	Remove Storage Shed located on access road	8130	0	0	0	SF				$0.00	$0.00	$0.00
	12	Remove Warehouse located on access road	8130	0	0	0	SF				$0.00	$0.00	$0.00
	13	Remove Fire System Control Bldg. on left abutment.	8130	385	385	385	SF	$38.00	$40.00	$42.00	$14,630.00	$15,400.00	$16,170.00
	14	Remove Dam Communication Bldg. on left abutment.	8130	331	331	331	SF	$38.00	$40.00	$42.00	$12,578.00	$13,240.00	$13,902.00
	15	Remove Concrete Slab on left abutment for former Control House	8130	6	6	6	CY	$130.00	$260.00	$390.00	$780.00	$1,560.00	$2,340.00
	16	Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment.	8130	1	1	1	CY	$130.00	$260.00	$390.00	$130.00	$260.00	$390.00
	17	Remove Reservoir Level Gauge House on Dam Crest	8130	24	24	24	SF	$38.00	$40.00	$42.00	$912.00	$960.00	$1,008.00
	18	Upstream Riprap	8313	2,220	2,220	2,220	CY	$8.00	$9.00	$12.00	$17,760.00	$19,980.00	$26,640.00
	19	Downstream Riprap	8313	1,850	1,850	1,850	CY	$8.00	$9.00	$12.00	$14,800.00	$16,650.00	$22,200.00
	20	Miscellaneous Excavation	8313	132,500	132,500	132,500	CY	$8.00	$9.00	$12.00	$1,060,000.00	$1,192,500.00	$1,590,000.00
	21	Cutoff Wall Concrete Demolition	8313	70	70	70	CY	$130.00	$260.00	$390.00	$9,100.00	$18,200.00	$27,300.00
	22	Cutoff Wall Anchors	8313	285	285	285	EA	$9.00	$10.00	$12.00	$2,565.00	$2,850.00	$3,420.00
	23	Remove & Dispose Hand Rails and Light Poles	8420	5,000	5,000	5,000	LBS	$0.45	$0.65	$0.75	$2,250.00	$3,250.00	$3,750.00
	24	Remove & Dispose Spillway Radial Gates and Hoists	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	25	Remove & Dispose Stop Logs and Slots (steel)	8420	92,000	92,000	92,000	LBS	$0.45	$0.65	$0.75	$41,400.00	$59,800.00	$69,000.00
	26	Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure	8420	4,200	4,200	4,200	LBS	$0.45	$0.65	$0.75	$1,890.00	$2,730.00	$3,150.00
	26A	Remove Petroleum Products from Red Barn Area	8420	1,600	1,600	1,600	GAL	$8.00	$10.00	$12.00	$12,800.00	$16,000.00	$19,200.00
	27	Remove & Dispose of Spillway gate motor & control panel	8430	1	1	1	EA	$500.00	$600.00	$700.00	$500.00	$600.00	$700.00
	28	Remove & Dispose of Distribution equipment , panelboards	8430	1	1	1	EA	$5,500.00	$6,000.00	$6,500.00	$5,500.00	$6,000.00	$6,500.00
	29	Remove Powerhouse Concrete down to Elevation 3324.0	8130	0	0	0	CY				$0.00	$0.00	$0.00
	30	Remove Structural Steel Items associated with Powerhouse	8130	0	0	0	LBS				$0.00	$0.00	$0.00
	31	Remove Warehouse near Powerhouse	8130	5,200	5,200	5,200	SF	$38.00	$40.00	$42.00	$197,600.00	$208,000.00	$218,400.00
	32	Remove & Dispose of 2 - Governor oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	33	Remove & Dispose of Cooling water and bearing oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	34	Remove & Dispose of 2 - Francis Turbines	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	35	Remove & Dispose of 150 Ton crane	8420	240,000	240,000	240,000	LBS	$0.45	$0.65	$0.75	$108,000.00	$156,000.00	$180,000.00
	36	Remove & Dispose of Compressed Air systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	37	Remove & Dispose of 2 - CO2 systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	38	Remove & Dispose of Plant Water and Fire Protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	39	Remove & Dispose of Transformer Oil Fire protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	40	Remove & Dispose of Unwatering Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	41	Remove & Dispose of Drainage Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	42	Remove & Dispose of 2-Oil Sump pumps	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	43	Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Powerhouse	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	43A	Remove Petroleum Products from Mechanical Equipment	8420	2,700	2,700	2,700	GAL	$8.00	$10.00	$12.00	$21,600.00	$27,000.00	$32,400.00
	44	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA	8430	2	2	2	EA	$150,000.00	$200,000.00	$250,000.00	$300,000.00	$400,000.00	$500,000.00
	45	Remove & Dispose of Excitation equipment for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - Partial - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	46	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	47	Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	48	Remove & Dispose of Generator Switchgear, 15kV - (6 sections)	8430	0	0	0	EA				$0.00	$0.00	$0.00
	49	Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections)	8430	0	0	0	EA				$0.00	$0.00	$0.00
	50	Remove & Dispose of Unit and plant control switchboard	8430	0	0	0	EA				$0.00	$0.00	$0.00
	51	Remove & Dispose of Battery system	8430	1	1	1	EA	$7,000.00	$8,000.00	$9,000.00	$7,000.00	$8,000.00	$9,000.00
	52	Remove & Dispose of Raceways, Conduit and Cable	8430	0	0	0	EA				$0.00	$0.00	$0.00
	53	Remove & Dispose of Misc. power & control boards	8430	0	0	0	EA				$0.00	$0.00	$0.00
	54	Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	55	Remove & Dispose of Gantry Crane control equipment (3 cubicles)	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	56	Remove & Dispose of Conduit and Cable	8430	1	1	1	EA	$9,000.00	$10,000.00	$11,000.00	$9,000.00	$10,000.00	$11,000.00
	57	Remove & Dispose of Exterior Lighting	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	58	Remove & Dispose of Transmission Line No. 59	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	59	Remove & Dispose of Transmission Line No. 98	8430	0.24	0.24	0.24	MILE	$20,000.00	$25,000.00	$30,000.00	$4,800.00	$6,000.00	$7,200.00
	60	Remove & Dispose of Transmission Line No. 58	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	61	Remove Intake Structure Concrete	8130	0	0	0	CY				$0.00	$0.00	$0.00
	62	Remove Fish Screen Building	8130	0	0	0	SF				$0.00	$0.00	$0.00
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	8130	22,000	22,000	22,000	LBS	$0.45	$0.65	$0.75	$9,900.00	$14,300.00	$16,500.00
	64	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	8130	0	0	0	CY				$0.00	$0.00	$0.00
	65	Remove Open Concrete Flume.	8130	12,200	12,200	12,200	CY	$220.00	$260.00	$390.00	$2,684,000.00	$3,172,000.00	$4,758,000.00
	66	Remove Structural Steel Items associated with the Forebay Trashrack Piers	8130	11,500	11,500	11,500	LBS	$0.45	$0.65	$0.75	$5,175.00	$7,475.00	$8,625.00
	67	Remove Forebay Concrete	8130	1,500	1,500	1,500	CY	$220.00	$260.00	$390.00	$330,000.00	$390,000.00	$585,000.00
	68	Place Concrete Plugs at Tunnel Portals	8130	30	30	30	CY	$900.00	$1,000.00	$1,100.00	$27,000.00	$30,000.00	$33,000.00
	69	Remove Concrete Items associated with Penstocks D/S from Tunnel	8130	1,800	1,800	1,800	CY	$220.00	$260.00	$390.00	$396,000.00	$468,000.00	$702,000.00
	70	Remove Headgate Control Building at Flume Entrance	8130	330	330	330	SF	$38.00	$40.00	$42.00	$12,540.00	$13,200.00	$13,860.00
	71	Remove Forebay Spillway Gate House	8130	570	570	570	SF	$38.00	$40.00	$42.00	$21,660.00	$22,800.00	$23,940.00
	72	Remove Forebay Control Building.	8130	470	470	470	SF	$38.00	$40.00	$42.00	$17,860.00	$18,800.00	$19,740.00
	73	Remove Communication Tower next to Forebay Control Building	8130	7,100	7,100	7,100	LBS	$0.45	$0.65	$0.75	$3,195.00	$4,615.00	$5,325.00
	74	Remove Insulated Generator Building next to Forebay Control Building	8130	72	72	72	SF	$38.00	$40.00	$42.00	$2,736.00	$2,880.00	$3,024.00
	75	Remove Fixed Wheel Gate (gate, Frame and Hoist)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	76	Remove Trash rack and trash rake (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	77	Remove stop Logs and slots (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	78	Remove Traveling Water Screen	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	79	Remove Fish By-Pass and Supports (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	80	Remove Radial Gates and Hoists	8420	16,500	16,500	16,500	LBS	$0.45	$0.65	$0.75	$7,425.00	$10,725.00	$12,375.00
	81	Remove Trash rack and trash rake (steel)	8420	43,500	43,500	43,500	LBS	$0.45	$0.50	$0.70	$19,575.00	$21,750.00	$30,450.00
	82	Remove Stop Logs and slots (steel)	8420	14,500	14,500	14,500	LBS	$0.45	$0.65	$0.75	$6,525.00	$9,425.00	$10,875.00
	83	Remove & Dispose Penstocks and bifurcation (steel)	8420	1,600,000	1,600,000	1,600,000	LBS	$0.45	$0.65	$0.75	$720,000.00	$1,040,000.00	$1,200,000.00
	84	Remove & Dispose Surge Tank (steel)	8420	79,000	79,000	79,000	LBS	$0.45	$0.65	$0.75	$35,550.00	$51,350.00	$59,250.00
	85	Remove & Dispose 2 - 108" Butterfly valves	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	86	Remove & Dispose Gate, Stem and Frame	8420	28,000	28,000	28,000	LBS	$0.45	$0.65	$0.75	$12,600.00	$18,200.00	$21,000.00
	87	Remove & Dispose of Steel Transition Manifolds on Upstream and Downstream	8420	250,000	250,000	250,000	LBS	$0.45	$0.50	$0.70	$112,500.00	$125,000.00	$175,000.00
	87A	Remove Petroleum Products from Mechanical Equipment	8420	380	380	380	GAL	$8.00	$10.00	$12.00	$3,040.00	$3,800.00	$4,560.00
	88	Temporary Access Roads	8140	2	2	2	MILE	$85,000.00	$150,000.00	$100,000.00	$170,000.00	$300,000.00	$200,000.00
	89	Spring Ground Seeding	8220	247	247	0	ACRES	$3,000.00	$3,500.00	$4,000.00	$741,000.00	$864,500.00	$0.00
	90	Spring Barge Seeding	8220	0	0	0	ACRES				$0.00	$0.00	$0.00
	91	Spring Aerial Seeding	8220	0	0	247	ACRES	$6,500.00	$7,500.00	$15,000.00	$0.00	$0.00	$3,705,000.00
	92	Fall Ground Seeding	8220	62	124	185	ACRES	$3,000.00	$3,500.00	$4,000.00	$186,000.00	$434,000.00	$740,000.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - Partial - with Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	93	Riparian Pole Planting	8220	54	54	54	ACRES	$4,000.00	$8,500.00	$10,000.00	$216,000.00	$459,000.00	$540,000.00
	94	Weed Management	8220	62	124	185	ACRES	$1,000.00	$1,500.00	$2,000.00	$62,000.00	$186,000.00	$370,000.00
	95	Fall Ground Seeding	8220	99	99	99	ACRES	$3,000.00	$3,500.00	$4,000.00	$297,000.00	$346,500.00	$396,000.00
	96	Weed Management	8220	99	99	99	ACRES	$1,000.00	$1,500.00	$2,000.00	$99,000.00	$148,500.00	$198,000.00
	97	Clear and Grub Disposal Area (Embankment)	8313	10	10	5	ACRES	$4,000.00	$5,000.00	$6,000.00	$40,000.00	$50,000.00	$30,000.00
	98	Clear and Grub, 40' width	8313	2.4	2.4	2.4	ACRES	$4,000.00	$5,000.00	$6,000.00	$9,600.00	$12,000.00	$14,400.00
	99	4" thick gravel surfacing	8313	0	2,150	2,150	TON	$20.00	$30.00	$40.00	$0.00	$64,500.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	8313	4	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$16,000.00	$0.00	$0.00
	101	Clear and grub, 20' width	8313	1	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$0.00	$0.00
	102	4" thick gravel surfacing	8313	0	0	0	TON				$0.00	$0.00	$0.00
	103	Soil Cover over Concrete Rubble	8313	13,000	13,000	0	CY	$25.00	$140.00	$150.00	$325,000.00	$1,820,000.00	$0.00
	104	Dispose of Concrete Rubble from Dam	8313	0	0	0	CY				$0.00	$0.00	$0.00
	105	Dispose of Concrete Rubble from Flume/Forebay	8313	0	0	0	CY				$0.00	$0.00	$0.00
	106	Dispose of Concrete Rubble from Power House	8313	0	0	0	CY				$0.00	$0.00	$0.00
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	8313	0	0	60,000	CY	$25.00	$140.00	$150.00	$0.00	$0.00	$9,000,000.00
	108	Topsy Recreation Area - Concrete total	BLM	68	68	68	CY	$175.00	$220.00	$320.00	$11,900.00	$14,960.00	$21,760.00
	109	Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite decking	BLM	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	110	Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platform	BLM	200	200	200	SF	$12.00	$13.00	$14.00	$2,400.00	$2,600.00	$2,800.00
	111	Topsy Recreation Area - Regrade to natural contour and reseed	BLM	300	300	300	SF	$3.00	$4.00	$5.00	$900.00	$1,200.00	$1,500.00
	112	Pioneer Park - Picnic tables to be removed and hauled away	BLM	12	12	12	EA	$55.00	$60.00	$65.00	$660.00	$720.00	$780.00
	113	Pioneer Park - 12 Concrete fire rings	BLM	5	5	5	CY	$175.00	$220.00	$320.00	$875.00	$1,100.00	$1,600.00
	114	Pioneer Park - Portable toilets to be removed and hauled away	BLM	2	2	2	EA	$900.00	$1,000.00	$1,200.00	$1,800.00	$2,000.00	$2,400.00
	115	Pioneer Park - Signs to be removed and hauled away	BLM	6	6	6	EA	$135.00	$150.00	$160.00	$810.00	$900.00	$960.00
	116	Pioneer Park - Dumpster to be removed and hauled away	BLM	1	1	1	EA	$900.00	$1,000.00	$1,200.00	$900.00	$1,000.00	$1,200.00
	117	Pioneer Park - Remove paved access road	BLM	200	200	200	LF	$230.00	$250.00	$270.00	$46,000.00	$50,000.00	$54,000.00
	118	Pioneer Park - Regrage to natural contour, rip, plant and seed parking and recreation site	BLM	1	1	1	ACRES	$19,000.00	$20,000.00	$22,000.00	$9,500.00	$10,000.00	$11,000.00
		Subtotal 1									$9,205,371.00	$13,652,785.00	$27,668,614.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$460,000.00	$680,000.00	$1,400,000.00	$460,000.00	$680,000.00	$1,400,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)		1	1	1	ls	$1,551,687.00	$4,929,280.00	$15,536,968.00	$1,551,687.00	$4,929,280.00	$15,536,968.00
		from Unit Price Level (July 2010) to NTP (Jan. 2020)											
		MPL - 1.5% / year for 10 yr.; MP - 3.0% /year for 10 yr.; MPH - 4.375% / year for 10 yr.											
		Design Contingencies (MPL ~ 8%; MP ~ 10%; MPH ~ 15%)		1	1	1	ls	$782,942.00	$1,737,935.00	$6,368,490.00	$782,942.00	$1,737,935.00	$6,368,490.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$1,025,928.00	$0.00	$0.00	$1,025,928.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$12,000,000.00**	**$21,000,000.00**	**$52,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$2,500,000.00	$4,000,000.00	$13,000,000.00	$2,500,000.00	$4,000,000.00	$13,000,000.00
		FIELD COST									**$14,500,000.00**	**$25,000,000.00**	**$65,000,000.00**
		Non-Contract Cost (MPL ~ 62%; MP ~ 65%; MPH ~ 71%)		1	1	1	ls	$8,500,000.00	$16,000,000.00	$45,000,000.00	$8,500,000.00	$16,000,000.00	$45,000,000.00
		CONSTRUCTION COST									**$23,000,000.00**	**$41,000,000.00**	**$110,000,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES		
BY	See Group Worksheets	CHECKED: See Group Worksheets	BY	Craig Grush, P.E.	CHECKED
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	05/25/11	PEER REVIEW

Crystal Ball Report - Full
Simulation started on 6/8/2011 at 8:22:01
Simulation stopped on 6/8/2011 at 8:22:51

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	49.86
Trials/second (average)	201
Random numbers per sec	34,494
Crystal Ball data:	
Assumptions	172
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP
UNIT PRICES BY Craig A. Grosh
DATE 6/8/2011

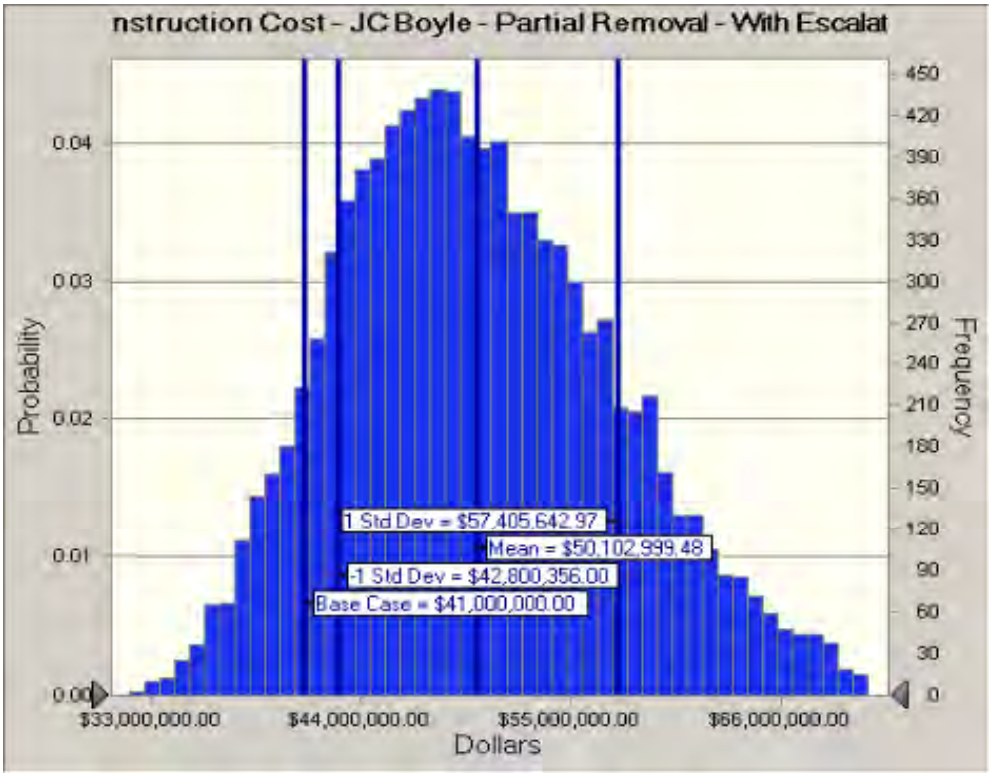
DATE	PEER REVIEWER(S)	CODE
6/8/11	Signature DAN MAAG Printed Name	8170
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [JC Boyle - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - I

Forecast: Construction Cost - JC Boyle - Partial Removal - With Escalation **Cell: U149**

Summary:
Entire range is from $31,827,565.40 to $76,438,651.93
Base case is $41,000,000.00
After 10,000 trials, the std. error of the mean is $73,026.43



Forecast: Construction Cost - JC Boyle - Partial Removal - With Escalation (cont'd) Cell: U149

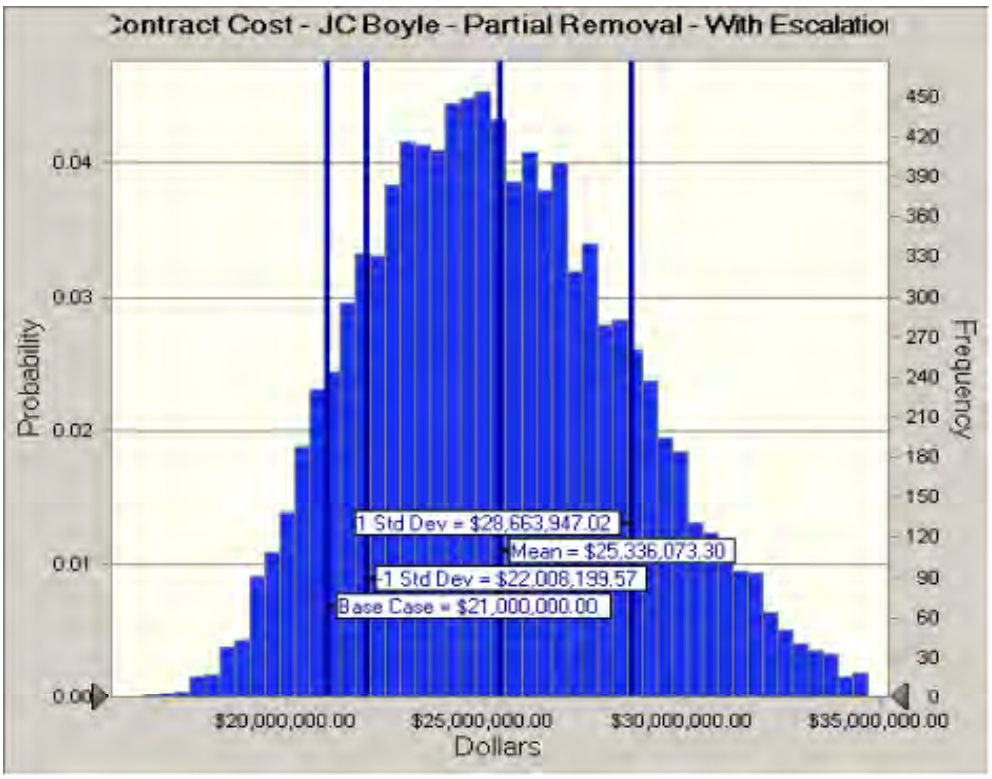
Statistics:	Forecast values
Trials	10,000
Mean	$50,102,999.48
Median	$49,412,294.49
Mode	---
Standard Deviation	$7,302,643.48
Variance	$53,328,601,827,000.60
Skewness	0.4073
Kurtosis	2.90
Coeff. of Variability	0.1458
Minimum	$31,827,565.40
Maximum	$76,438,651.93
Range Width	$44,611,086.53
Mean Std. Error	$73,026.43

Percentiles:	Forecast values
0%	$31,827,565.40
10%	$41,189,789.30
20%	$43,730,783.60
30%	$45,754,535.69
40%	$47,604,843.87
50%	$49,411,137.28
60%	$51,394,849.25
70%	$53,622,800.53
80%	$56,300,726.05
90%	$59,887,252.19
100%	$76,438,651.93

Forecast: Contract Cost - JC Boyle - Partial Removal - With Escalation **Cell: U145**

Summary:

Entire range is from $15,966,296.72 to $38,360,525.84
Base case is $21,000,000.00
After 10,000 trials, the std. error of the mean is $33,278.74



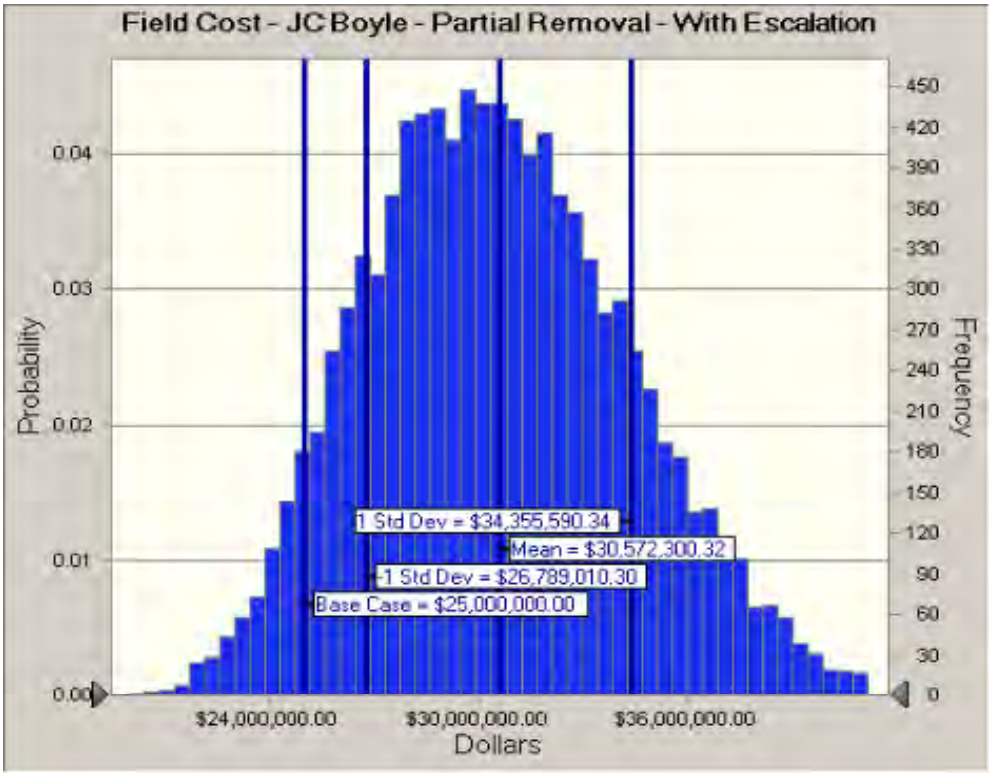
Forecast: Contract Cost - JC Boyle - Partial Removal - With Escalation (cont'd) **Cell: U145**

Statistics:	Forecast values
Trials	10,000
Mean	$25,336,073.30
Median	$25,106,435.59
Mode	---
Standard Deviation	$3,327,873.73
Variance	$11,074,743,534,877.10
Skewness	0.3521
Kurtosis	2.87
Coeff. of Variability	0.1313
Minimum	$15,966,296.72
Maximum	$38,360,525.84
Range Width	$22,394,229.12
Mean Std. Error	$33,278.74

Percentiles:	Forecast values
0%	$15,966,296.72
10%	$21,162,229.06
20%	$22,401,882.28
30%	$23,353,498.19
40%	$24,253,181.82
50%	$25,106,431.97
60%	$26,003,887.66
70%	$26,991,889.22
80%	$28,189,977.90
90%	$29,753,761.24
100%	$38,360,525.84

Forecast: Field Cost - JC Boyle - Partial Removal - With Escalation **Cell: U147**

Summary:
Entire range is from $19,923,182.20 to $45,105,480.30
Base case is $25,000,000.00
After 10,000 trials, the std. error of the mean is $37,832.90



Forecast: Field Cost - JC Boyle - Partial Removal - With Escalation (cont'd) **Cell: U147**

Statistics:	Forecast values
Trials	10,000
Mean	$30,572,300.32
Median	$30,359,774.98
Mode	---
Standard Deviation	$3,783,290.02
Variance	$14,313,283,385,328.70
Skewness	0.3097
Kurtosis	2.88
Coeff. of Variability	0.1237
Minimum	$19,923,182.20
Maximum	$45,105,480.30
Range Width	$25,182,298.09
Mean Std. Error	$37,832.90

Percentiles:	Forecast values
0%	$19,923,182.20
10%	$25,834,663.55
20%	$27,269,274.04
30%	$28,344,703.45
40%	$29,376,260.21
50%	$30,359,109.92
60%	$31,364,896.18
70%	$32,452,803.19
80%	$33,808,455.36
90%	$35,608,405.82
100%	$45,105,480.30

End of Forecasts

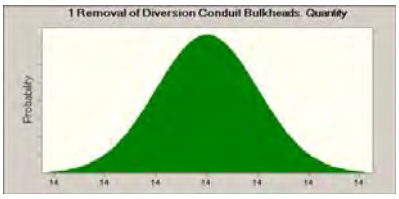
Assumptions

Worksheet: [JC Boyle - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]JC Boyle - I

Assumption: 1 Removal of Diversion Conduit Bulkheads. Quantity **Cell: L14**

Normal distribution with parameters:

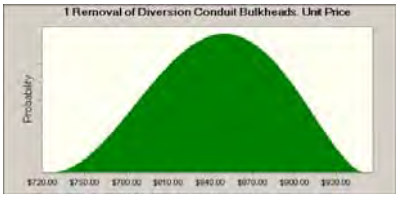
Mean	14	(=L14)
Std. Dev.	0	(=0.000001)



Assumption: 1 Removal of Diversion Conduit Bulkheads. Unit Price **Cell: R14**

BetaPERT distribution with parameters:

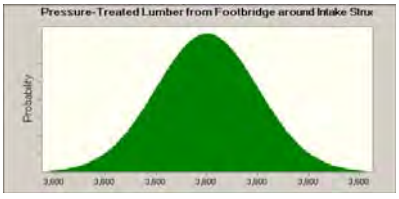
Minimum	$725.00	(=Q14)
Likeliest	$850.00	(=R14)
Maximum	$950.00	(=S14)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structu **Cell: L23**

Normal distribution with parameters:

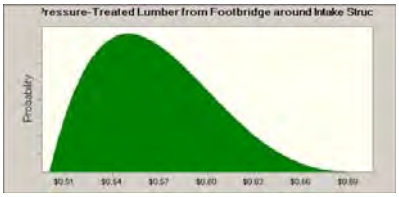
Mean	3,600	(=L23)
Std. Dev.	0	(=0.000001)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structure **Cell: R23**

BetaPERT distribution with parameters:

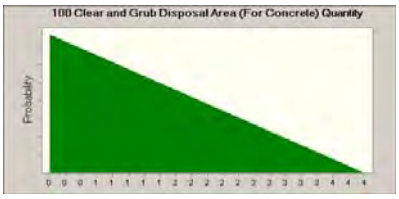
Minimum	$0.50	(=Q23)
Likeliest	$0.55	(=R23)
Maximum	$0.70	(=S23)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Quantity **Cell: L116**

Triangular distribution with parameters:

Minimum	0	(=M116)
Likeliest	0	(=L116)
Maximum	4	(=K116)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Unit Price **Cell: R116**

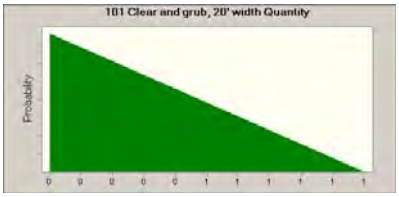
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q116)
Likeliest	$5,000.00	(=R116)
Maximum	$6,000.00	(=S116)

Assumption: 101 Clear and grub, 20' width Quantity **Cell: L117**

Triangular distribution with parameters:

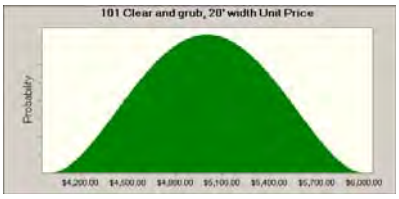
Minimum	0	(=M117)
Likeliest	0	(=L117)
Maximum	1	(=K117)



Assumption: 101 Clear and grub, 20' width Unit Price **Cell: R117**

BetaPERT distribution with parameters:

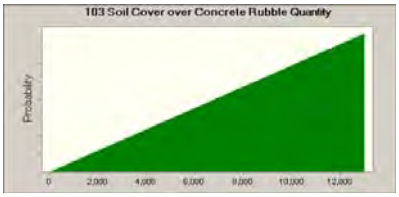
Minimum	$4,000.00	(=Q117)
Likeliest	$5,000.00	(=R117)
Maximum	$6,000.00	(=S117)



Assumption: 103 Soil Cover over Concrete Rubble Quantity **Cell: L119**

Triangular distribution with parameters:

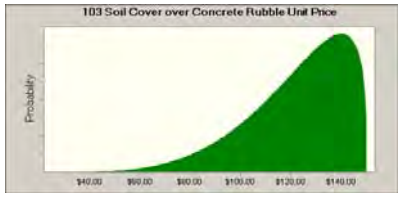
Minimum	0	(=M119)
Likeliest	13,000	(=L119)
Maximum	13,000	(=K119)



Assumption: 103 Soil Cover over Concrete Rubble Unit Price **Cell: R119**

BetaPERT distribution with parameters:

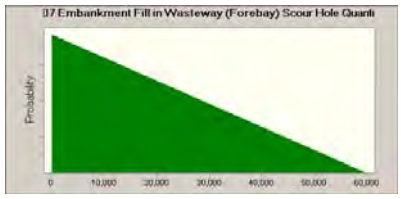
Minimum	$25.00	(=Q119)
Likeliest	$140.00	(=R119)
Maximum	$150.00	(=S119)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Quantity **Cell: L123**

Triangular distribution with parameters:

Minimum	0	(=K123)
Likeliest	0	(=L123)
Maximum	60,000	(=M123)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Unit Price **Cell: R123**

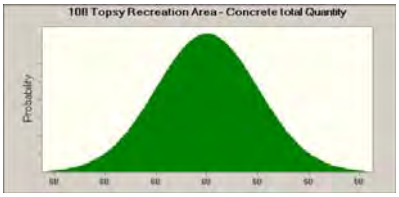
BetaPERT distribution with parameters:

Minimum	$25.00	(=Q123)
Likeliest	$140.00	(=R123)
Maximum	$150.00	(=S123)

Assumption: 108 Topsy Recreation Area - Concrete total Quantity **Cell: L124**

Normal distribution with parameters:

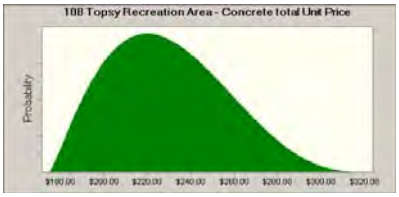
Mean	68	(=L124)
Std. Dev.	0	(=0.000001)



Assumption: 108 Topsy Recreation Area - Concrete total Unit Price **Cell: R124**

BetaPERT distribution with parameters:

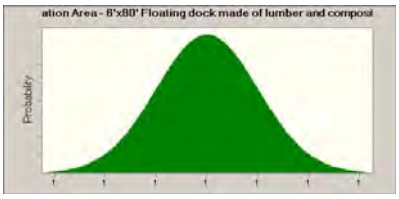
Minimum	$175.00	(=Q124)
Likeliest	$220.00	(=R124)
Maximum	$320.00	(=S124)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite **Cell: L125**

Normal distribution with parameters:

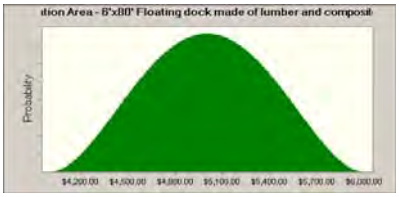
Mean	1	(=L125)
Std. Dev.	0	(=0.000001)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composi Cell: R125

BetaPERT distribution with parameters:

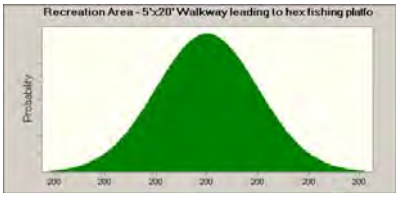
Minimum	$4,000.00	(=Q125)
Likeliest	$5,000.00	(=R125)
Maximum	$6,000.00	(=S125)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: L126

Normal distribution with parameters:

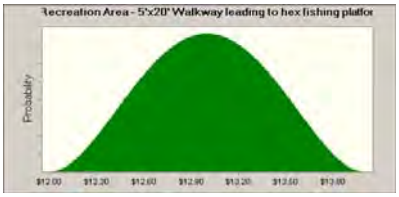
Mean	200	(=L126)
Std. Dev.	0	(=0.000001)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: R126

BetaPERT distribution with parameters:

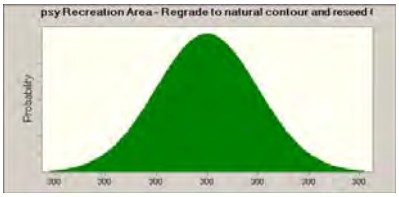
Minimum	$12.00	(=Q126)
Likeliest	$13.00	(=R126)
Maximum	$14.00	(=S126)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Quantity **Cell: L127**

Normal distribution with parameters:

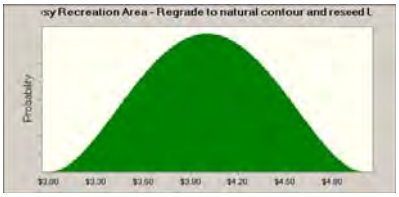
Mean	300	(=L127)
Std. Dev.	0	(=0.000001)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Unit Price **Cell: R127**

BetaPERT distribution with parameters:

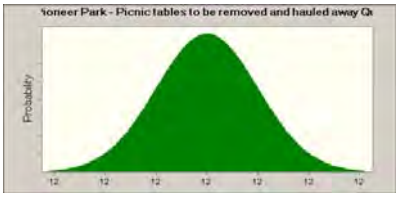
Minimum	$3.00	(=Q127)
Likeliest	$4.00	(=R127)
Maximum	$5.00	(=S127)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Quantity **Cell: L128**

Normal distribution with parameters:

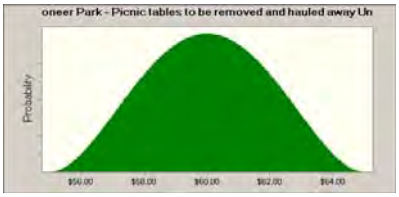
Mean	12	(=L128)
Std. Dev.	0	(=0.000001)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Unit Price **Cell: R128**

BetaPERT distribution with parameters:

Minimum	$55.00	(=Q128)
Likeliest	$60.00	(=R128)
Maximum	$65.00	(=S128)



Assumption: 113 Pioneer Park - 12 Concrete fire rings Quantity **Cell: L129**

Normal distribution with parameters:

Mean	5	(=L129)
Std. Dev.	0	(=0.000001)

Assumption: 113 Pioneer Park - 12 Concrete fire rings Unit Price **Cell: R129**

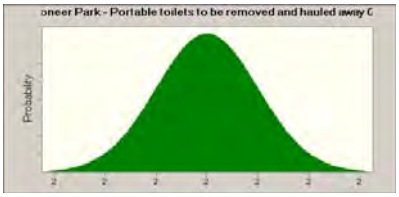
BetaPERT distribution with parameters:

Minimum	$175.00	(=Q129)
Likeliest	$220.00	(=R129)
Maximum	$320.00	(=S129)

Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Quantity **Cell: L130**

Normal distribution with parameters:

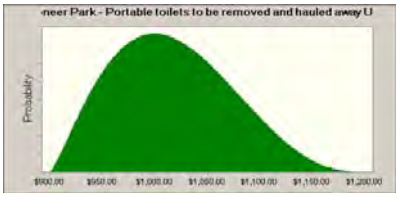
Mean	2	(=L130)
Std. Dev.	0	(=0.000001)



Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Unit Price **Cell: R130**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q130)
Likeliest	$1,000.00	(=R130)
Maximum	$1,200.00	(=S130)



Assumption: 115 Pioneer Park - Signs to be removed and hauled away Quantity **Cell: L131**

Normal distribution with parameters:

Mean	6	(=L131)
Std. Dev.	0	(=0.000001)

Assumption: 115 Pioneer Park - Signs to be removed and hauled away Unit Price **Cell: R131**

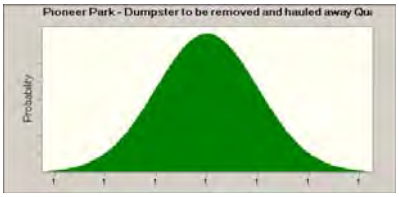
BetaPERT distribution with parameters:

Minimum	$135.00	(=Q131)
Likeliest	$150.00	(=R131)
Maximum	$160.00	(=S131)

Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Quantity **Cell: L132**

Normal distribution with parameters:

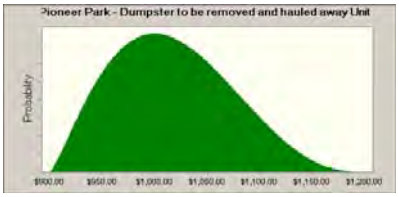
Mean	1	(=L132)
Std. Dev.	0	(=0.000001)



Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Unit Price **Cell: R132**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q132)
Likeliest	$1,000.00	(=R132)
Maximum	$1,200.00	(=S132)



Assumption: 117 Pioneer Park - Remove paved access road Quantity **Cell: L133**

Normal distribution with parameters:

Mean	200	(=L133)
Std. Dev.	0	(=0.000001)

Assumption: 117 Pioneer Park - Remove paved access road Unit Price **Cell: R133**

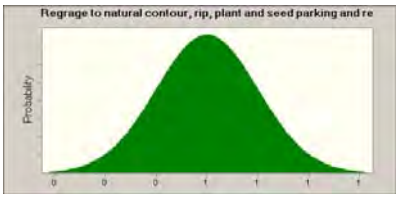
BetaPERT distribution with parameters:

Minimum	$230.00	(=Q133)
Likeliest	$250.00	(=R133)
Maximum	$270.00	(=S133)

Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: L134**

Normal distribution with parameters:

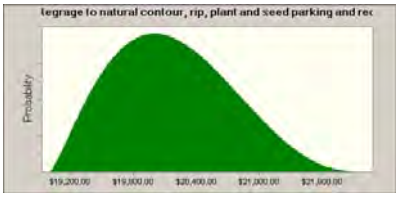
Mean	1	(=L134)
Std. Dev.	0	(=0.000001)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and **Cell: R134**

BetaPERT distribution with parameters:

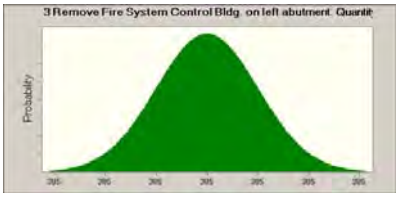
Minimum	$19,000.00	(=Q134)
Likeliest	$20,000.00	(=R134)
Maximum	$22,000.00	(=S134)



Assumption: 13 Remove Fire System Control Bldg. on left abutment. Quantity **Cell: L26**

Normal distribution with parameters:

Mean	385	(=L26)
Std. Dev.	0	(=0.000001)



Assumption: 13 Remove Fire System Control Bldg. on left abutment. Unit Price **Cell: R26**

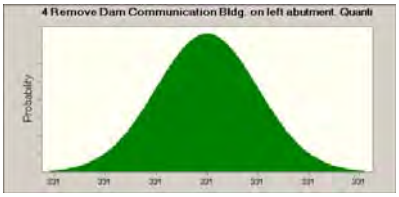
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q26)
Likeliest	$40.00	(=R26)
Maximum	$42.00	(=S26)

Assumption: 14 Remove Dam Communication Bldg. on left abutment. Quantity **Cell: L27**

Normal distribution with parameters:

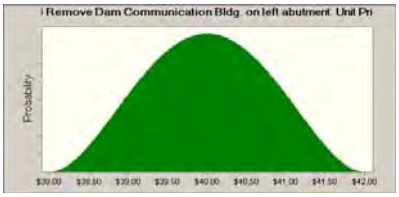
Mean	331	(=L27)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove Dam Communication Bldg. on left abutment. Unit Price **Cell: R27**

BetaPERT distribution with parameters:

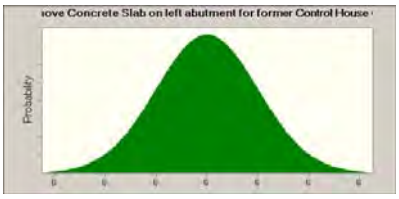
Minimum	$38.00	(=Q27)
Likeliest	$40.00	(=R27)
Maximum	$42.00	(=S27)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Quantity **Cell: L28**

Normal distribution with parameters:

Mean	6	(=L28)
Std. Dev.	0	(=0.000001)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Ut **Cell: R28**

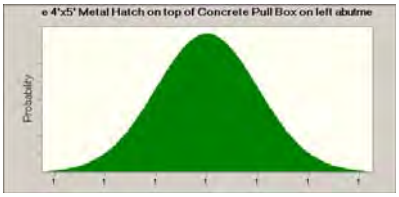
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q28)
Likeliest	$260.00	(=R28)
Maximum	$390.00	(=S28)

Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment: **Cell: Q29**

Normal distribution with parameters:

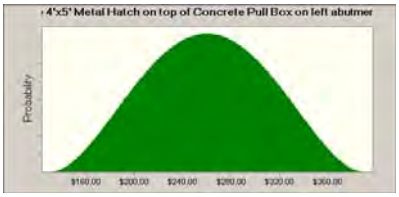
Mean	1	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment: **Cell: R29**

BetaPERT distribution with parameters:

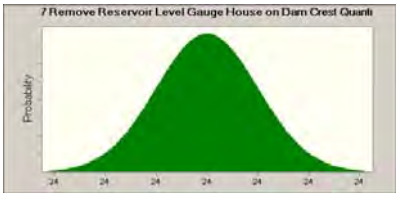
Minimum	$130.00	(=Q29)
Likeliest	$260.00	(=R29)
Maximum	$390.00	(=S29)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Quantity **Cell: L30**

Normal distribution with parameters:

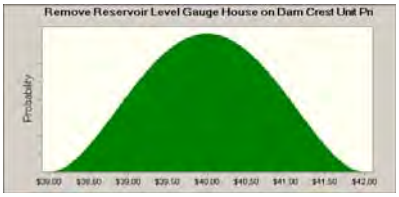
Mean	24	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Unit Price **Cell: R30**

BetaPERT distribution with parameters:

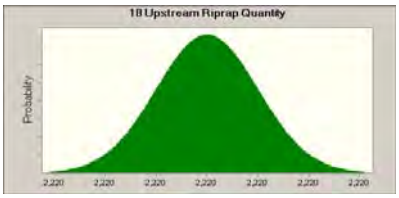
Minimum	$38.00	(=Q30)
Likeliest	$40.00	(=R30)
Maximum	$42.00	(=S30)



Assumption: 18 Upstream Riprap Quantity **Cell: L31**

Normal distribution with parameters:

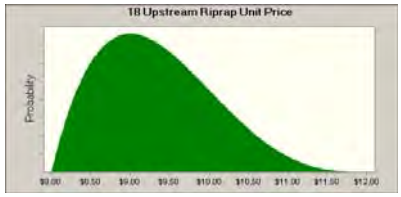
Mean	2,220	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 18 Upstream Riprap Unit Price **Cell: R31**

BetaPERT distribution with parameters:

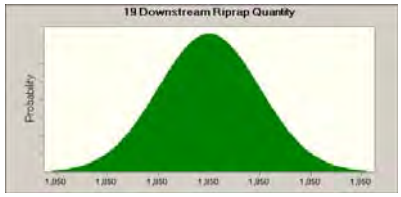
Minimum	$8.00	(=Q31)
Likeliest	$9.00	(=R31)
Maximum	$12.00	(=S31)



Assumption: 19 Downstream Riprap Quantity **Cell: L32**

Normal distribution with parameters:

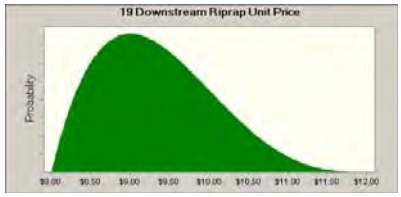
Mean	1,850	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 19 Downstream Riprap Unit Price **Cell: R32**

BetaPERT distribution with parameters:

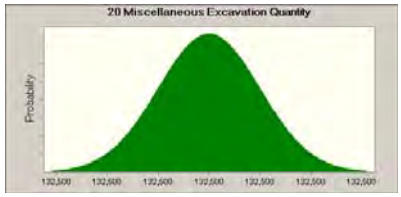
Minimum	$8.00	(=Q32)
Likeliest	$9.00	(=R32)
Maximum	$12.00	(=S32)



Assumption: 20 Miscellaneous Excavation Quantity **Cell: L33**

Normal distribution with parameters:

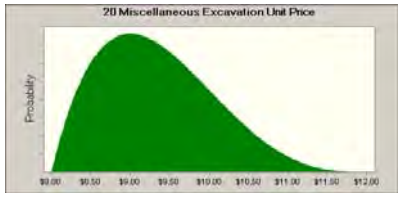
Mean	132,500	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 20 Miscellaneous Excavation Unit Price **Cell: R33**

BetaPERT distribution with parameters:

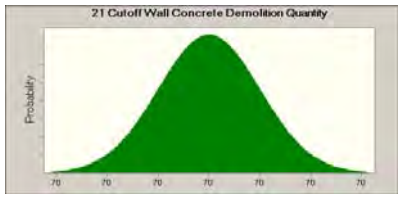
Minimum	$8.00	(=Q33)
Likeliest	$9.00	(=R33)
Maximum	$12.00	(=S33)



Assumption: 21 Cutoff Wall Concrete Demolition Quantity **Cell: L34**

Normal distribution with parameters:

Mean	70	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 21 Cutoff Wall Concrete Demolition Unit Price **Cell: R34**

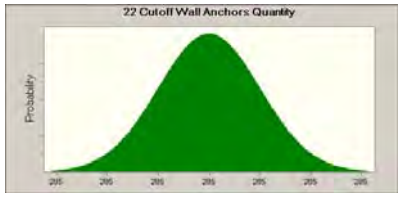
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q34)
Likeliest	$260.00	(=R34)
Maximum	$390.00	(=S34)

Assumption: 22 Cutoff Wall Anchors Quantity **Cell: L35**

Normal distribution with parameters:

Mean	285	(=L35)
Std. Dev.	0	(=0.000001)



Assumption: 22 Cutoff Wall Anchors Unit Price **Cell: R35**

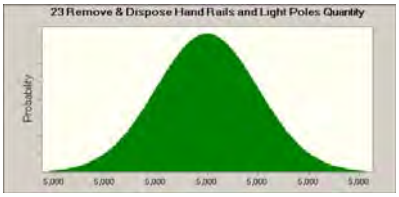
BetaPERT distribution with parameters:

Minimum	$9.00	(=Q35)
Likeliest	$10.00	(=R35)
Maximum	$12.00	(=S35)

Assumption: 23 Remove & Dispose Hand Rails and Light Poles Quantity **Cell: L36**

Normal distribution with parameters:

Mean	5,000	(=L36)
Std. Dev.	0	(=0.000001)



Assumption: 23 Remove & Dispose Hand Rails and Light Poles Unit Price **Cell: R36**

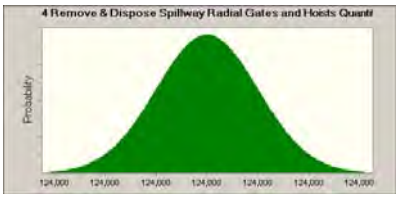
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q36)
Likeliest	$0.65	(=R36)
Maximum	$0.75	(=S36)

Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Quantity **Cell: L37**

Normal distribution with parameters:

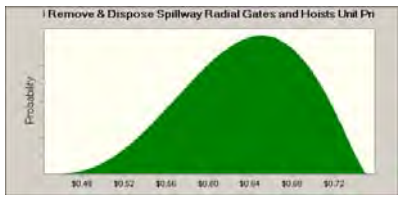
Mean	124,000	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Unit Price **Cell: R37**

BetaPERT distribution with parameters:

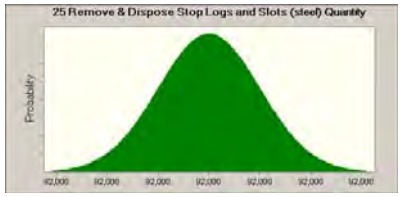
Minimum	$0.45	(=Q37)
Likeliest	$0.65	(=R37)
Maximum	$0.75	(=S37)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Quantity **Cell: L38**

Normal distribution with parameters:

Mean	92,000	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Unit Price **Cell: R38**

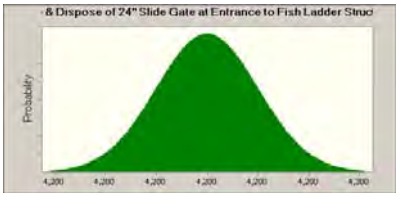
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q38)
Likeliest	$0.65	(=R38)
Maximum	$0.75	(=S38)

Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure **Cell: L39**

Normal distribution with parameters:

Mean	4,200	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure **Cell: R39**

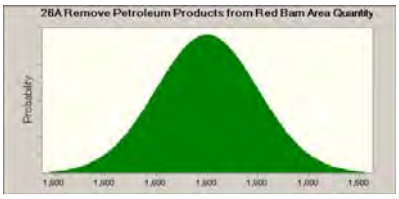
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q39)
Likeliest	$0.65	(=R39)
Maximum	$0.75	(=S39)

Assumption: 26A Remove Petroleum Products from Red Barn Area Quantity **Cell: L40**

Normal distribution with parameters:

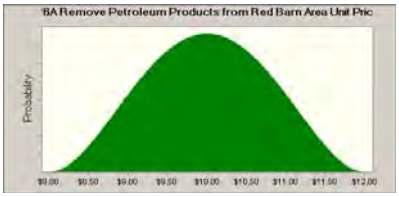
Mean	1,600	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 26A Remove Petroleum Products from Red Barn Area Unit Price **Cell: R40**

BetaPERT distribution with parameters:

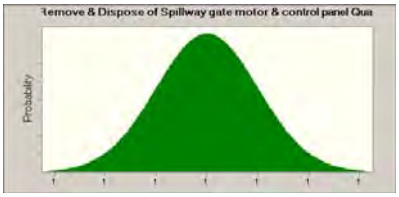
Minimum	$8.00	(=Q40)
Likeliest	$10.00	(=R40)
Maximum	$12.00	(=S40)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Quantity **Cell: L41**

Normal distribution with parameters:

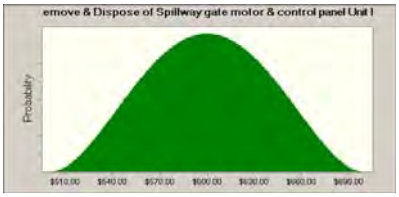
Mean	1	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Unit Price **Cell: R41**

BetaPERT distribution with parameters:

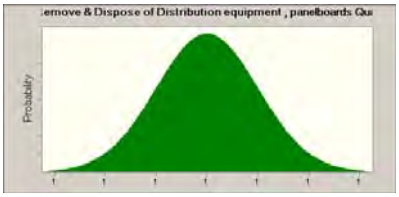
Minimum	$500.00	(=Q41)
Likeliest	$600.00	(=R41)
Maximum	$700.00	(=S41)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Quantity **Cell: L42**

Normal distribution with parameters:

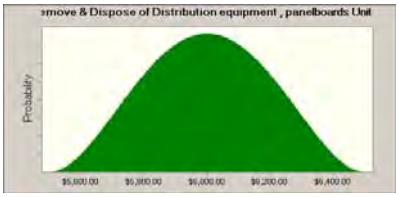
Mean	1	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Unit Price **Cell: R42**

BetaPERT distribution with parameters:

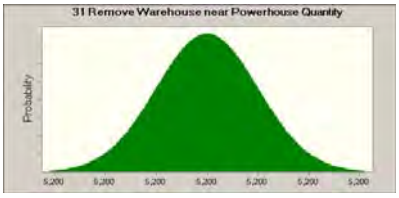
Minimum	$5,500.00	(=Q42)
Likeliest	$6,000.00	(=R42)
Maximum	$6,500.00	(=S42)



Assumption: 31 Remove Warehouse near Powerhouse Quantity **Cell: L45**

Normal distribution with parameters:

Mean	5,200	(=L45)
Std. Dev.	0	(=0.000001)



Assumption: 31 Remove Warehouse near Powerhouse Unit Price **Cell: R45**

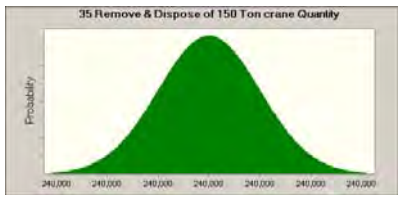
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q45)
Likeliest	$40.00	(=R45)
Maximum	$42.00	(=S45)

Assumption: 35 Remove & Dispose of 150 Ton crane Quantity **Cell: L49**

Normal distribution with parameters:

Mean	240,000	(=L49)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose of 150 Ton crane Unit Price **Cell: R49**

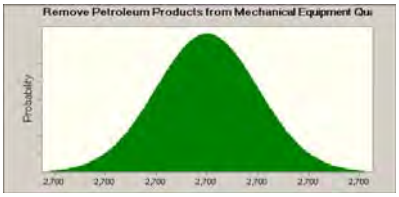
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q49)
Likeliest	$0.65	(=R49)
Maximum	$0.75	(=S49)

Assumption: 43A Remove Petroleum Products from Mechanical Equipment Quantity **Cell: L58**

Normal distribution with parameters:

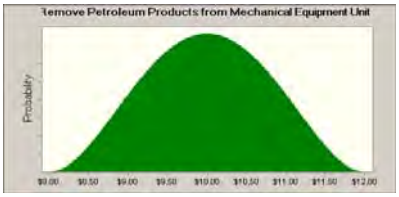
Mean	2,700	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 43A Remove Petroleum Products from Mechanical Equipment Unit Price **Cell: R58**

BetaPERT distribution with parameters:

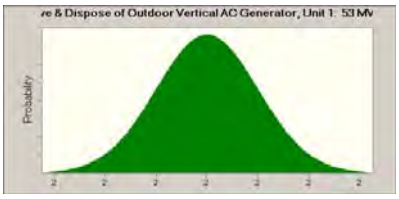
Minimum	$8.00	(=Q58)
Likeliest	$10.00	(=R58)
Maximum	$12.00	(=S58)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Qua **Cell: L59**

Normal distribution with parameters:

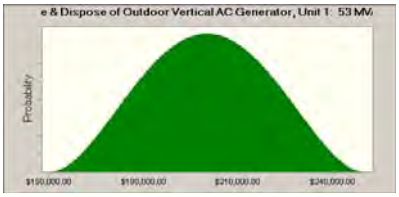
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Cell: R59

BetaPERT distribution with parameters:

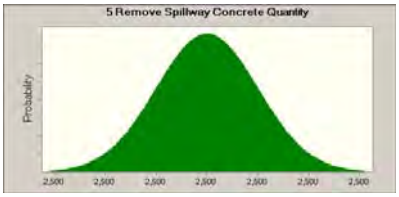
Minimum	$150,000.00	(=Q59)
Likeliest	$200,000.00	(=R59)
Maximum	$250,000.00	(=S59)



Assumption: 5 Remove Spillway Concrete Quantity Cell: L18

Normal distribution with parameters:

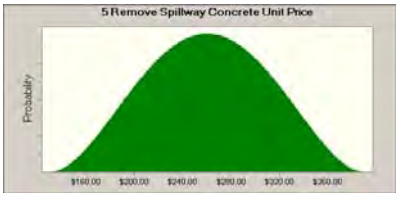
Mean	2,500	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove Spillway Concrete Unit Price Cell: R18

BetaPERT distribution with parameters:

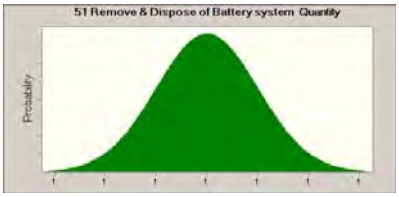
Minimum	$130.00	(=Q18)
Likeliest	$260.00	(=R18)
Maximum	$390.00	(=S18)



Assumption: 51 Remove & Dispose of Battery system Quantity **Cell: L66**

Normal distribution with parameters:

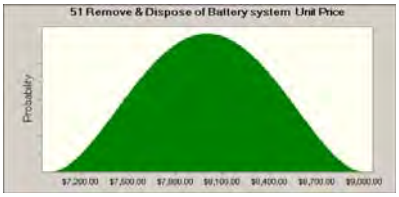
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose of Battery system Unit Price **Cell: R66**

BetaPERT distribution with parameters:

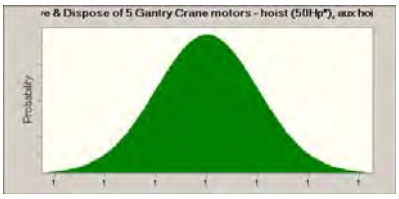
Minimum	$7,000.00	(=Q66)
Likeliest	$8,000.00	(=R66)
Maximum	$9,000.00	(=S66)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoi **Cell: L69**

Normal distribution with parameters:

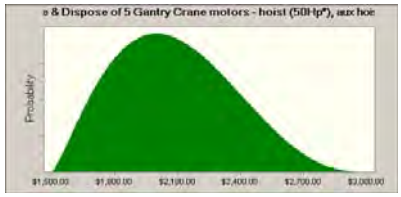
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Cell: R69

BetaPERT distribution with parameters:

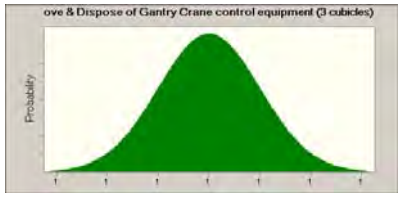
Minimum	$1,500.00	(=Q69)
Likeliest	$2,000.00	(=R69)
Maximum	$3,000.00	(=S69)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Quantit Cell: L70

Normal distribution with parameters:

Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Unit Pr Cell: R70

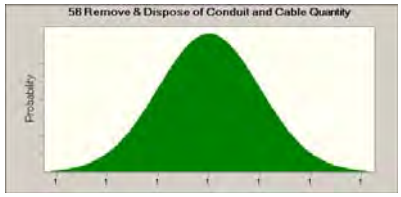
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q70)
Likeliest	$6,000.00	(=R70)
Maximum	$7,000.00	(=S70)

Assumption: 56 Remove & Dispose of Conduit and Cable Quantity **Cell: L71**

Normal distribution with parameters:

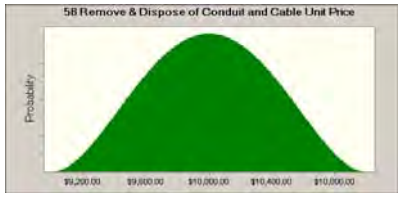
Mean	1	(=L71)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose of Conduit and Cable Unit Price **Cell: R71**

BetaPERT distribution with parameters:

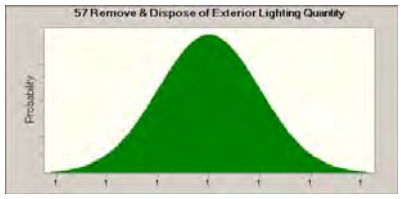
Minimum	$9,000.00	(=Q71)
Likeliest	$10,000.00	(=R71)
Maximum	$11,000.00	(=S71)



Assumption: 57 Remove & Dispose of Exterior Lighting Quantity **Cell: L72**

Normal distribution with parameters:

Mean	1	(=L72)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose of Exterior Lighting Unit Price **Cell: R72**

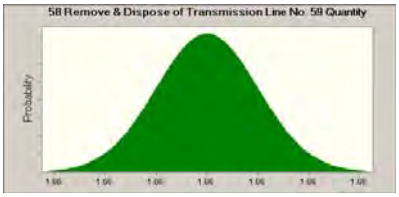
BetaPERT distribution with parameters:

Minimum	$1,500.00	(=Q72)
Likeliest	$2,000.00	(=R72)
Maximum	$3,000.00	(=S72)

Assumption: 58 Remove & Dispose of Transmission Line No. 59 Quantity **Cell: L73**

Normal distribution with parameters:

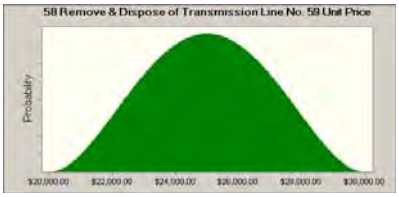
Mean	1.66	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

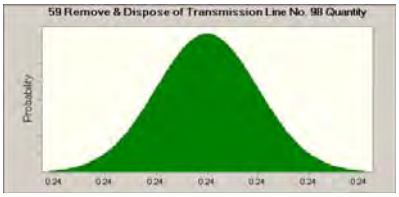
Minimum	$20,000.00	(=Q73)
Likeliest	$25,000.00	(=R73)
Maximum	$30,000.00	(=S73)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Quantity **Cell: L74**

Normal distribution with parameters:

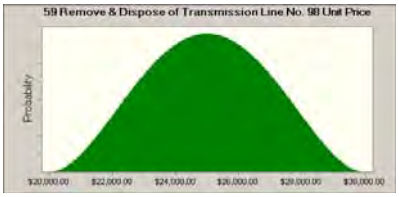
Mean	0.24	(=L74)
Std. Dev.	0.00	(=0.000001)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Unit Price **Cell: R74**

BetaPERT distribution with parameters:

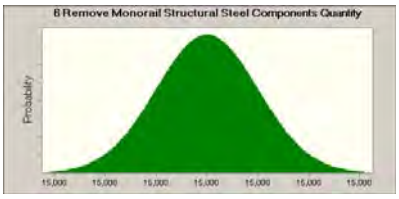
Minimum	$20,000.00	(=Q74)
Likeliest	$25,000.00	(=R74)
Maximum	$30,000.00	(=S74)



Assumption: 6 Remove Monorail Structural Steel Components Quantity **Cell: L19**

Normal distribution with parameters:

Mean	15,000	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 6 Remove Monorail Structural Steel Components Unit Price **Cell: R19**

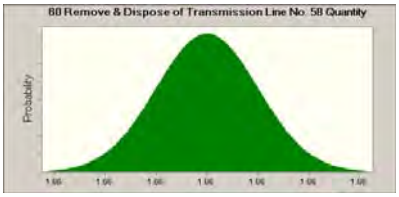
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q19)
Likeliest	$0.65	(=R19)
Maximum	$0.75	(=S19)

Assumption: 60 Remove & Dispose of Transmission Line No. 58 Quantity **Cell: L75**

Normal distribution with parameters:

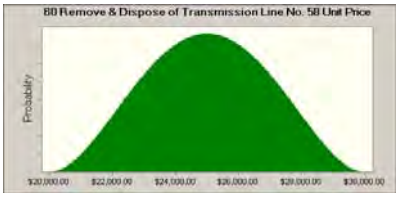
Mean	1.66	(=L75)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Unit Price **Cell: R75**

BetaPERT distribution with parameters:

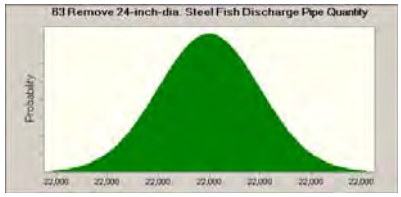
Minimum	$20,000.00	(=Q75)
Likeliest	$25,000.00	(=R75)
Maximum	$30,000.00	(=S75)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Quantity **Cell: L78**

Normal distribution with parameters:

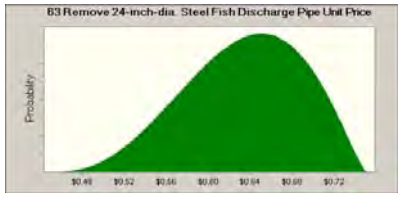
Mean	22,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Unit Price **Cell: R78**

BetaPERT distribution with parameters:

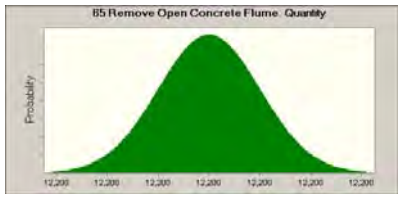
Minimum	$0.45	(=Q78)
Likeliest	$0.65	(=R78)
Maximum	$0.75	(=S78)



Assumption: 65 Remove Open Concrete Flume. Quantity **Cell: L80**

Normal distribution with parameters:

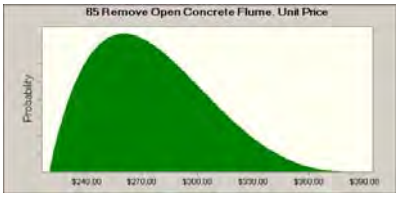
Mean	12,200	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove Open Concrete Flume. Unit Price **Cell: R80**

BetaPERT distribution with parameters:

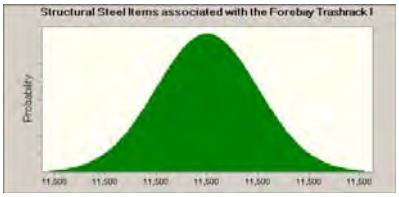
Minimum	$220.00	(=Q80)
Likeliest	$260.00	(=R80)
Maximum	$390.00	(=S80)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: L81**

Normal distribution with parameters:

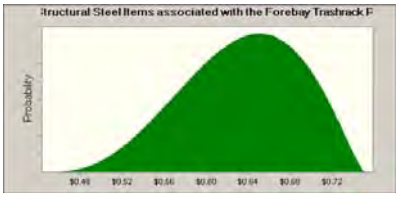
Mean	11,500	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: R81**

BetaPERT distribution with parameters:

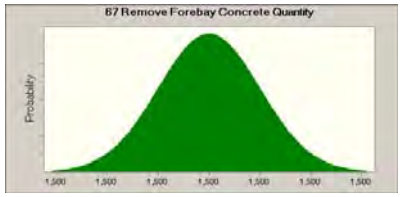
Minimum	$0.45	(=Q81)
Likeliest	$0.65	(=R81)
Maximum	$0.75	(=S81)



Assumption: 67 Remove Forebay Concrete Quantity **Cell: L82**

Normal distribution with parameters:

Mean	1,500	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove Forebay Concrete Unit Price **Cell: R82**

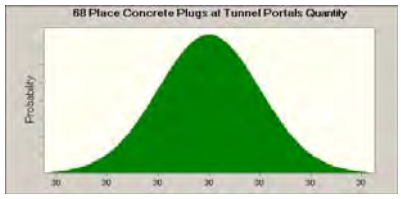
BetaPERT distribution with parameters:

Minimum	$220.00	(=Q82)
Likeliest	$260.00	(=R82)
Maximum	$390.00	(=S82)

Assumption: 68 Place Concrete Plugs at Tunnel Portals Quantity **Cell: L83**

Normal distribution with parameters:

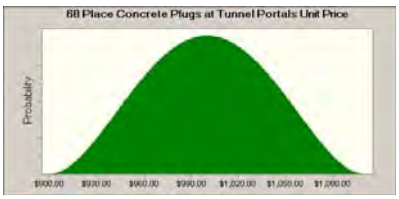
Mean	30	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Unit Price **Cell: R83**

BetaPERT distribution with parameters:

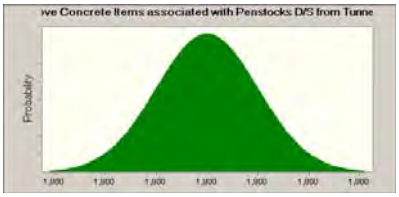
Minimum	$900.00	(=Q83)
Likeliest	$1,000.00	(=R83)
Maximum	$1,100.00	(=S83)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Quan **Cell: L84**

Normal distribution with parameters:

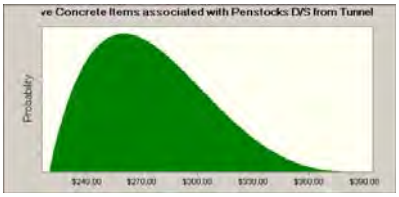
Mean	1,800	(=L84)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Unit P **Cell: R84**

BetaPERT distribution with parameters:

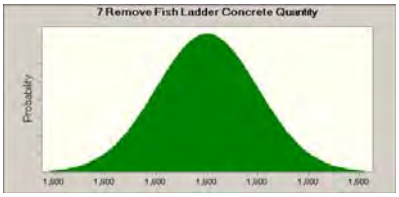
Minimum	$220.00	(=Q84)
Likeliest	$260.00	(=R84)
Maximum	$390.00	(=S84)



Assumption: 7 Remove Fish Ladder Concrete Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1,600	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 7 Remove Fish Ladder Concrete Unit Price **Cell: R20**

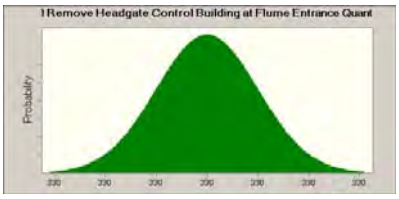
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q20)
Likeliest	$260.00	(=R20)
Maximum	$390.00	(=S20)

Assumption: 70 Remove Headgate Control Building at Flume Entrance Quantity **Cell: L85**

Normal distribution with parameters:

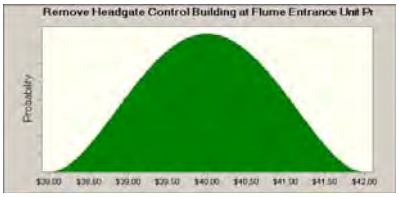
Mean	330	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove Headgate Control Building at Flume Entrance Unit Price **Cell: R85**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q85)
Likeliest	$40.00	(=R85)
Maximum	$42.00	(=S85)



Assumption: 71 Remove Forebay Spillway Gate House Quantity **Cell: L86**

Normal distribution with parameters:

Mean	570	(=L86)
Std. Dev.	0	(=0.000001)

Assumption: 71 Remove Forebay Spillway Gate House Unit Price **Cell: R86**

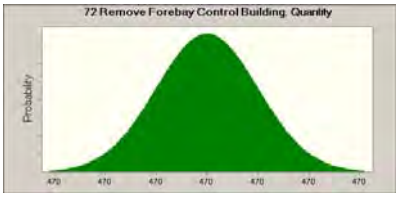
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q86)
Likeliest	$40.00	(=R86)
Maximum	$42.00	(=S86)

Assumption: 72 Remove Forebay Control Building. Quantity **Cell: L87**

Normal distribution with parameters:

Mean	470	(=L87)
Std. Dev.	0	(=0.000001)



Assumption: 72 Remove Forebay Control Building. Unit Price **Cell: R87**

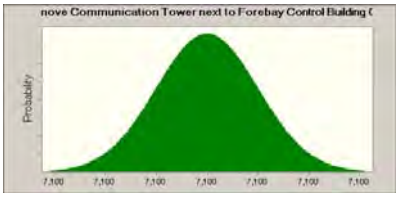
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q87)
Likeliest	$40.00	(=R87)
Maximum	$42.00	(=S87)

Assumption: 73 Remove Communication Tower next to Forebay Control Building Quantity **Cell: L88**

Normal distribution with parameters:

Mean	7,100	(=L88)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove Communication Tower next to Forebay Control Building Unit Price **Cell: R88**

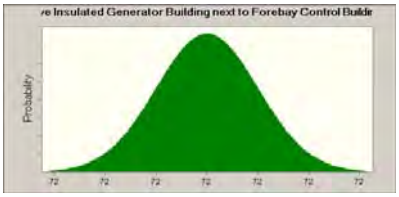
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q88)
Likeliest	$0.65	(=R88)
Maximum	$0.75	(=S88)

Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Qty **Cell: L89**

Normal distribution with parameters:

Mean	72	(=L89)
Std. Dev.	0	(=0.000001)



Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Unit **Cell: R89**

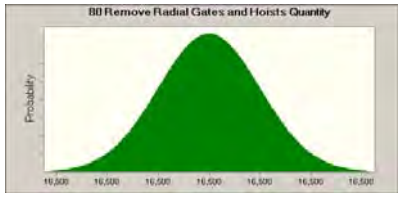
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q89)
Likeliest	$40.00	(=R89)
Maximum	$42.00	(=S89)

Assumption: 80 Remove Radial Gates and Hoists Quantity **Cell: L95**

Normal distribution with parameters:

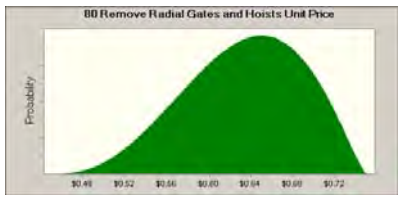
Mean	16,500	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: 80 Remove Radial Gates and Hoists Unit Price **Cell: R95**

BetaPERT distribution with parameters:

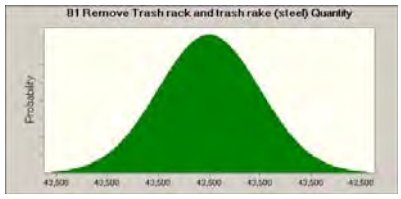
Minimum	$0.45	(=Q95)
Likeliest	$0.65	(=R95)
Maximum	$0.75	(=S95)



Assumption: 81 Remove Trash rack and trash rake (steel) Quantity **Cell: L96**

Normal distribution with parameters:

Mean	43,500	(=L96)
Std. Dev.	0	(=0.000001)



Assumption: 81 Remove Trash rack and trash rake (steel) Unit Price **Cell: R96**

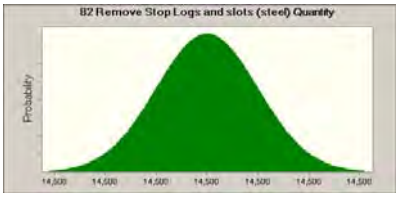
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q96)
Likeliest	$0.50	(=R96)
Maximum	$0.70	(=S96)

Assumption: 82 Remove Stop Logs and slots (steel) Quantity **Cell: L97**

Normal distribution with parameters:

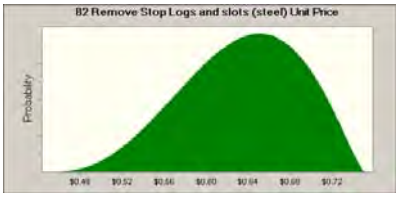
Mean	14,500	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: 82 Remove Stop Logs and slots (steel) Unit Price **Cell: R97**

BetaPERT distribution with parameters:

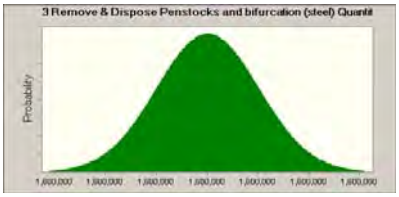
Minimum	$0.45	(=Q97)
Likeliest	$0.65	(=R97)
Maximum	$0.75	(=S97)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Quantity **Cell: L98**

Normal distribution with parameters:

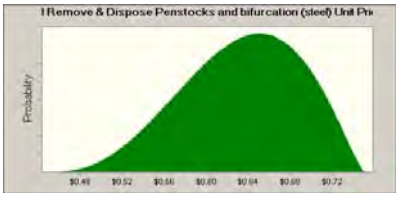
Mean	1,600,000	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Unit Price **Cell: R98**

BetaPERT distribution with parameters:

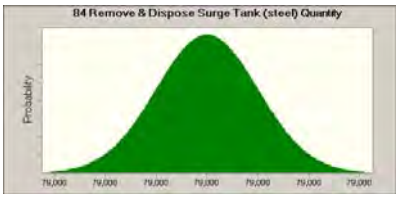
Minimum	$0.45	(=Q98)
Likeliest	$0.65	(=R98)
Maximum	$0.75	(=S98)



Assumption: 84 Remove & Dispose Surge Tank (steel) Quantity **Cell: L99**

Normal distribution with parameters:

Mean	79,000	(=L99)
Std. Dev.	0	(=0.000001)



Assumption: 84 Remove & Dispose Surge Tank (steel) Unit Price **Cell: R99**

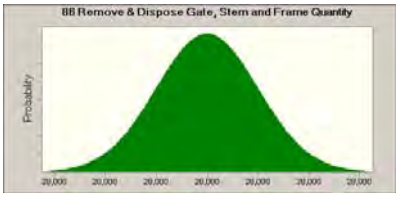
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q99)
Likeliest	$0.65	(=R99)
Maximum	$0.75	(=S99)

Assumption: 86 Remove & Dispose Gate, Stem and Frame Quantity **Cell: L101**

Normal distribution with parameters:

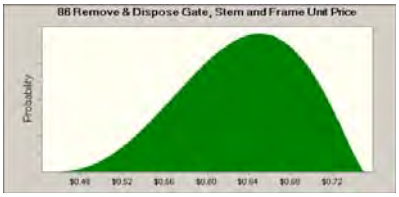
Mean	28,000	(=L101)
Std. Dev.	0	(=0.000001)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Unit Price **Cell: R101**

BetaPERT distribution with parameters:

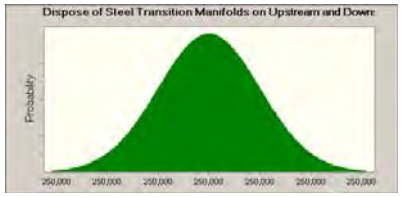
Minimum	$0.45	(=Q101)
Likeliest	$0.65	(=R101)
Maximum	$0.75	(=S101)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs Cell: L102

Normal distribution with parameters:

Mean	250,000	(=L102)
Std. Dev.	0	(=0.000001)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs Cell: R102

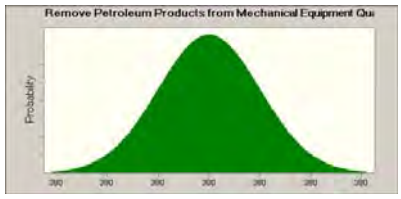
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q102)
Likeliest	$0.50	(=R102)
Maximum	$0.70	(=S102)

Assumption: 87A Remove Petroleum Products from Mechanical Equipment Quantity Cell: L103

Normal distribution with parameters:

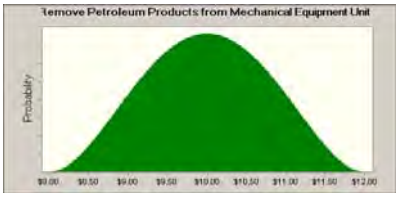
Mean	380	(=L103)
Std. Dev.	0	(=0.000001)



Assumption: 87A Remove Petroleum Products from Mechanical Equipment Unit Pri **Cell: R103**

BetaPERT distribution with parameters:

Minimum	$8.00	(=Q103)
Likeliest	$10.00	(=R103)
Maximum	$12.00	(=S103)



Assumption: 88 Temporary Access Roads Quantity **Cell: L104**

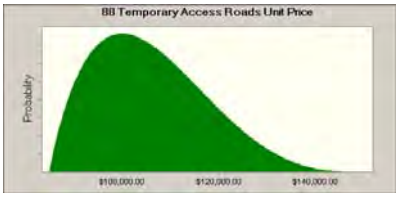
Normal distribution with parameters:

Mean	2	(=L104)
Std. Dev.	0	(=0.000001)

Assumption: 88 Temporary Access Roads Unit Price **Cell: R104**

BetaPERT distribution with parameters:

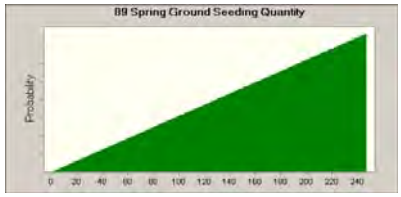
Minimum	$85,000.00	(=Q104)
Likeliest	$100,000.00	(=S104)
Maximum	$150,000.00	(=R104)



Assumption: 89 Spring Ground Seeding Quantity **Cell: L105**

Triangular distribution with parameters:

Minimum	0	(=M105)
Likeliest	247	(=L105)
Maximum	247	(=K105)



Assumption: 89 Spring Ground Seeding Unit Price **Cell: R105**

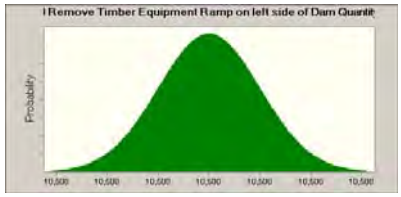
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q105)
Likeliest	$3,500.00	(=R105)
Maximum	$4,000.00	(=S105)

Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Quantity **Cell: L22**

Normal distribution with parameters:

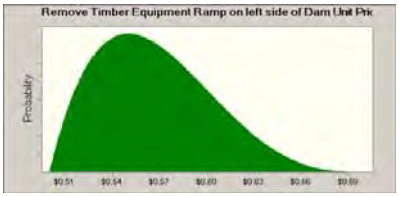
Mean	10,500	(=L22)
Std. Dev.	0	(=0.000001)



Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Unit Price **Cell: R22**

BetaPERT distribution with parameters:

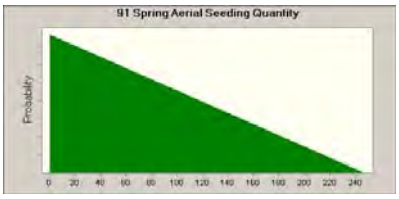
Minimum	$0.50	(=Q22)
Likeliest	$0.55	(=R22)
Maximum	$0.70	(=S22)



Assumption: 91 Spring Aerial Seeding Quantity **Cell: L107**

Triangular distribution with parameters:

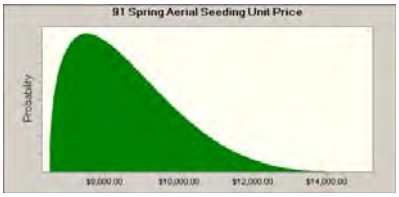
Minimum	0	(=K107)
Likeliest	0	(=L107)
Maximum	247	(=M107)



Assumption: 91 Spring Aerial Seeding Unit Price **Cell: R107**

BetaPERT distribution with parameters:

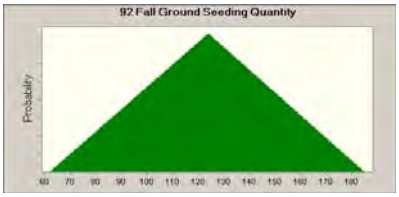
Minimum	$6,500.00	(=Q107)
Likeliest	$7,500.00	(=R107)
Maximum	$15,000.00	(=S107)



Assumption: 92 Fall Ground Seeding Quantity **Cell: L108**

Triangular distribution with parameters:

Minimum	62	(=K108)
Likeliest	124	(=L108)
Maximum	185	(=M108)



Assumption: 92 Fall Ground Seeding Unit Price **Cell: R108**

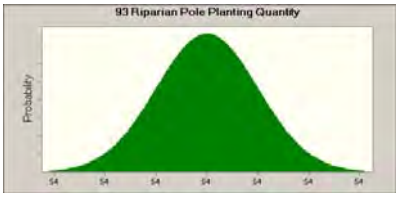
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q108)
Likeliest	$3,500.00	(=R108)
Maximum	$4,000.00	(=S108)

Assumption: 93 Riparian Pole Planting Quantity **Cell: L109**

Normal distribution with parameters:

Mean	54	(=L109)
Std. Dev.	0	(=0.000001)



Assumption: 93 Riparian Pole Planting Unit Price **Cell: R109**

BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q109)
Likeliest	$8,500.00	(=R109)
Maximum	$10,000.00	(=S109)

Assumption: 94 Weed Management Quantity **Cell: L110**

Triangular distribution with parameters:

Minimum	62	(=K110)
Likeliest	124	(=L110)
Maximum	185	(=M110)

Assumption: 94 Weed Management Unit Price **Cell: R110**

BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q110)
Likeliest	$1,500.00	(=R110)
Maximum	$2,000.00	(=S110)

Assumption: 95 Fall Ground Seeding Quantity **Cell: L111**

Normal distribution with parameters:

Mean	99	(=L111)
Std. Dev.	0	(=0.000001)

Assumption: 95 Fall Ground Seeding Unit Price **Cell: R111**

BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q111)
Likeliest	$3,500.00	(=R111)
Maximum	$4,000.00	(=S111)

Assumption: 96 Weed Management Quantity **Cell: L112**

Normal distribution with parameters:

Mean	99	(=L112)
Std. Dev.	0	(=0.000001)

Assumption: 96 Weed Management Unit Price **Cell: R112**

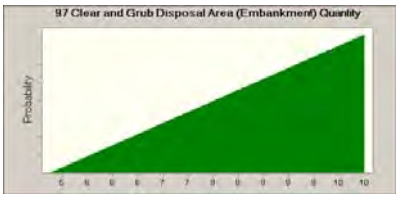
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q112)
Likeliest	$1,500.00	(=R112)
Maximum	$2,000.00	(=S112)

Assumption: 97 Clear and Grub Disposal Area (Embankment) Quantity **Cell: L113**

Triangular distribution with parameters:

Minimum	5	(=M113)
Likeliest	10	(=L113)
Maximum	10	(=K113)



Assumption: 97 Clear and Grub Disposal Area (Embankment) Unit Price **Cell: R113**

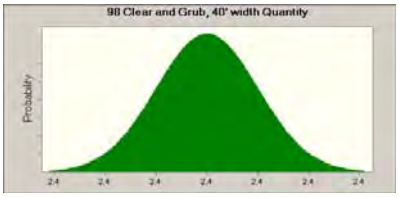
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q113)
Likeliest	$5,000.00	(=R113)
Maximum	$6,000.00	(=S113)

Assumption: 98 Clear and Grub, 40' width Quantity **Cell: L114**

Normal distribution with parameters:

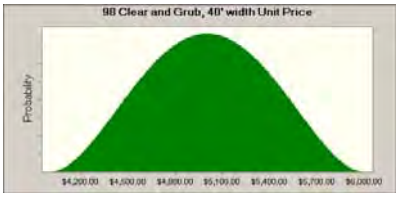
Mean	2.4	(=L114)
Std. Dev.	0.0	(=0.000001)



Assumption: 98 Clear and Grub, 40' width Unit Price **Cell: R114**

BetaPERT distribution with parameters:

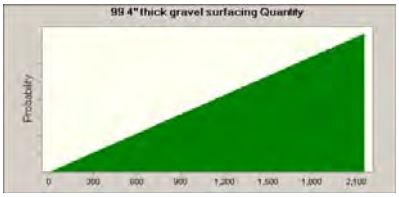
Minimum	$4,000.00	(=Q114)
Likeliest	$5,000.00	(=R114)
Maximum	$6,000.00	(=S114)



Assumption: 99 4" thick gravel surfacing Quantity **Cell: L115**

Triangular distribution with parameters:

Minimum	0	(=K115)
Likeliest	2,150	(=L115)
Maximum	2,150	(=M115)



Assumption: 99 4" thick gravel surfacing Unit Price **Cell: R115**

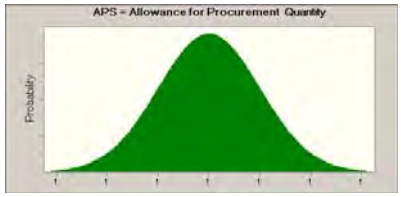
BetaPERT distribution with parameters:

Minimum	$20.00	(=Q115)
Likeliest	$30.00	(=R115)
Maximum	$40.00	(=S115)

Assumption: APS = Allowance for Procurement Quantity **Cell: L143**

Normal distribution with parameters:

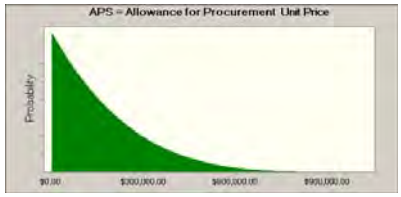
Mean	1	(=L143)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R143**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q143)
Likeliest	$0.00	(=R143)
Maximum	$1,025,928.00	(=S143)



Assumption: Construction Contingencies Quantity **Cell: L146**

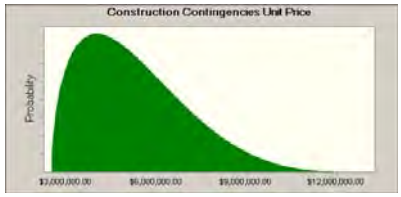
Normal distribution with parameters:

Mean	1	(=L146)
Std. Dev.	0	(=0.000001)

Assumption: Construction Contingencies Unit Price **Cell: R146**

BetaPERT distribution with parameters:

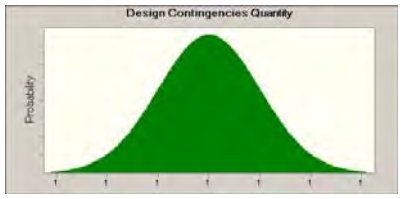
Minimum	$2,500,000.00	(=Q146)
Likeliest	$4,000,000.00	(=R146)
Maximum	$13,000,000.00	(=S146)



Assumption: Design Contingencies Quantity **Cell: L142**

Normal distribution with parameters:

Mean	1	(=L142)
Std. Dev.	0	(=0.000001)



Assumption: Design Contingencies Unit Price **Cell: R142**

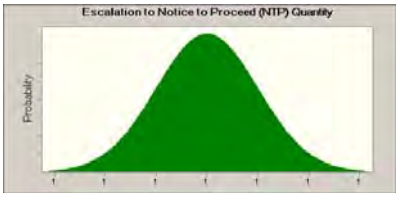
BetaPERT distribution with parameters:

Minimum	$782,942.00	(=Q142)
Likeliest	$1,737,935.00	(=R142)
Maximum	$6,368,490.00	(=S142)

Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L139**

Normal distribution with parameters:

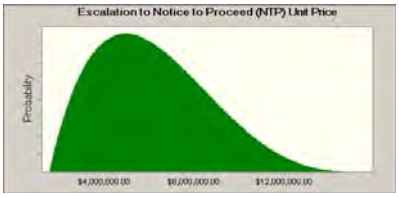
Mean	1	(=L139)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R139**

BetaPERT distribution with parameters:

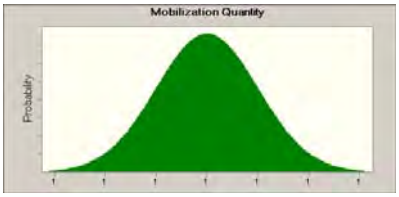
Minimum	$1,551,687.00	(=Q139)
Likeliest	$4,929,280.00	(=R139)
Maximum	$15,536,968.00	(=S139)



Assumption: Mobilization Quantity **Cell: L137**

Normal distribution with parameters:

Mean	1	(=L137)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R137**

BetaPERT distribution with parameters:

Minimum	$460,000.00	(=Q137)
Likeliest	$680,000.00	(=R137)
Maximum	$1,400,000.00	(=S137)

Assumption: Non-Contract Cost Quantity **Cell: L148**

Normal distribution with parameters:

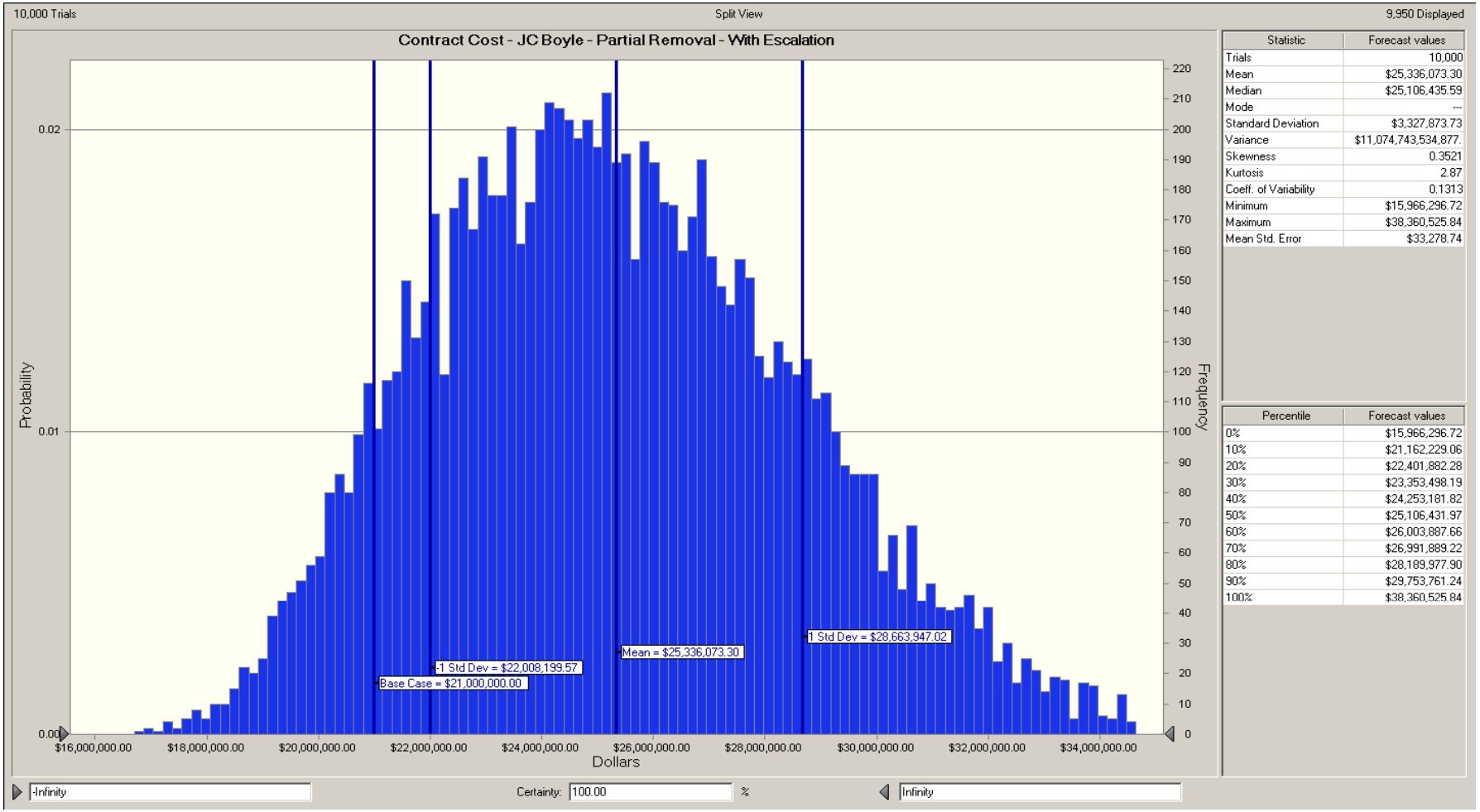
Mean	1	(=L148)
Std. Dev.	0	(=0.000001)

Assumption: Non-Contract Cost Unit Price **Cell: R148**

BetaPERT distribution with parameters:

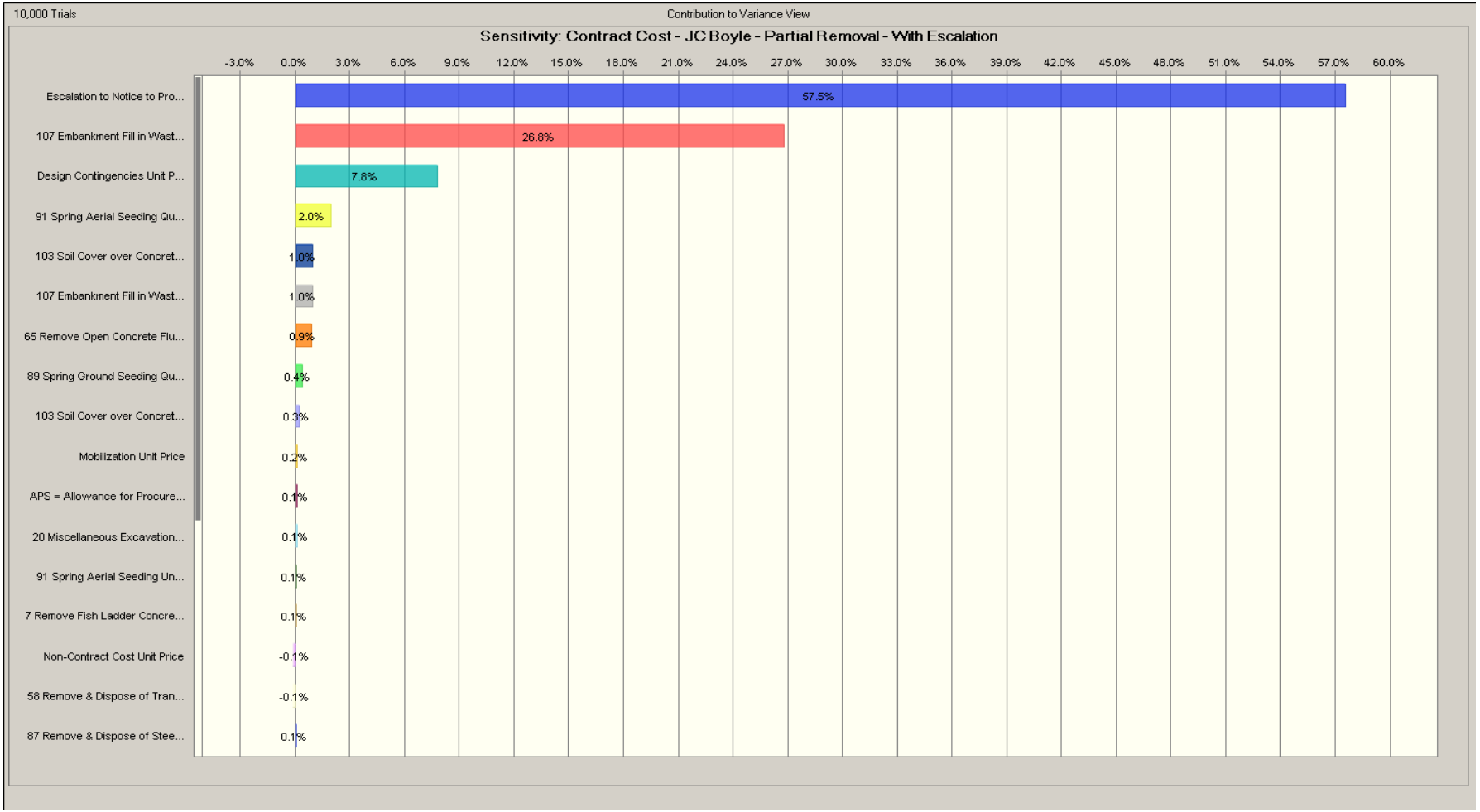
Minimum	$8,500,000.00	(=Q148)
Likeliest	$16,000,000.00	(=R148)
Maximum	$45,000,000.00	(=S148)

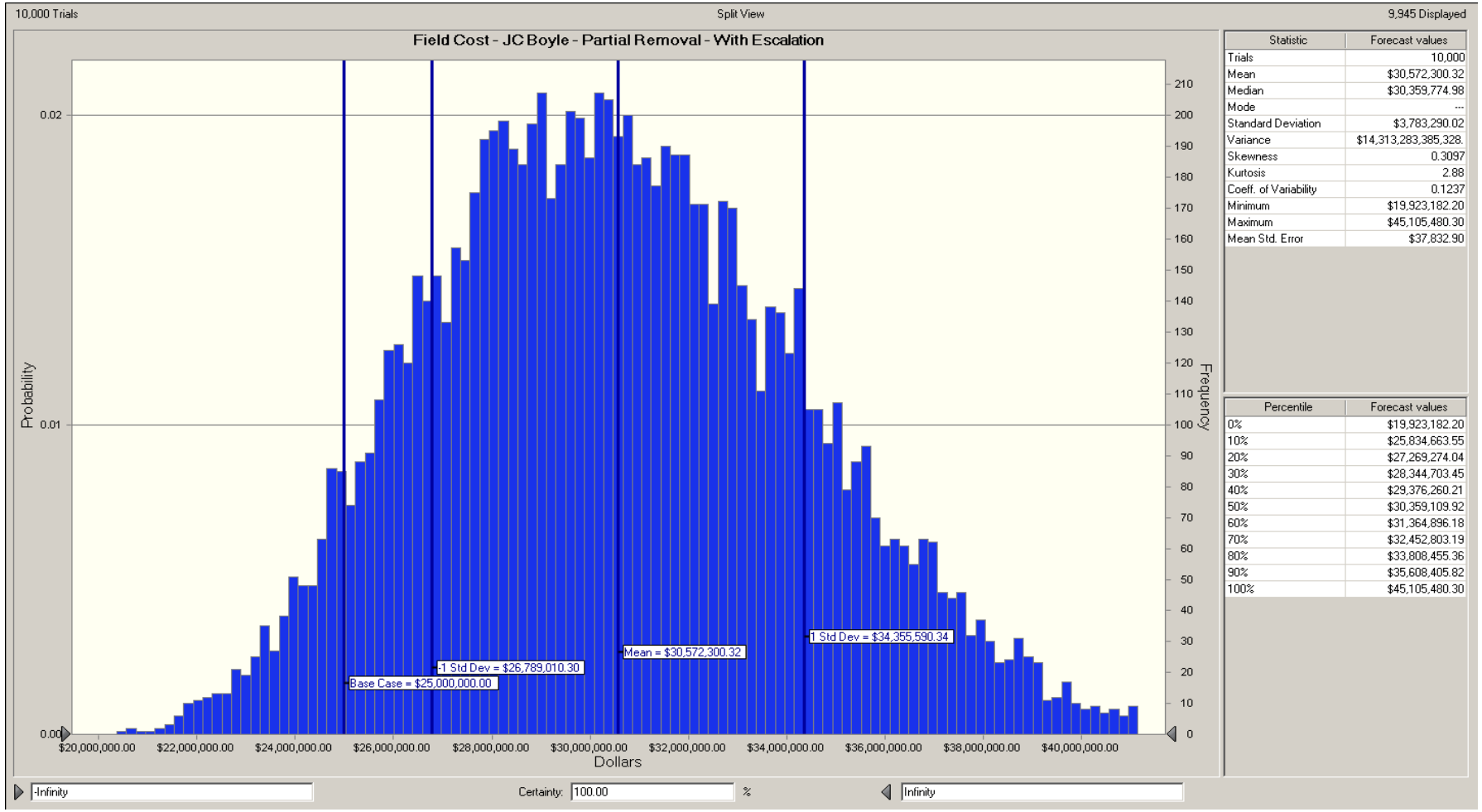
End of Assumptions



Statistic	Forecast values
Trials	10,000
Mean	$25,336,073.30
Median	$25,106,435.59
Mode	---
Standard Deviation	$3,327,873.73
Variance	$11,074,743,534,877.
Skewness	0.3521
Kurtosis	2.87
Coeff. of Variability	0.1313
Minimum	$15,966,296.72
Maximum	$38,360,525.84
Mean Std. Error	$33,278.74

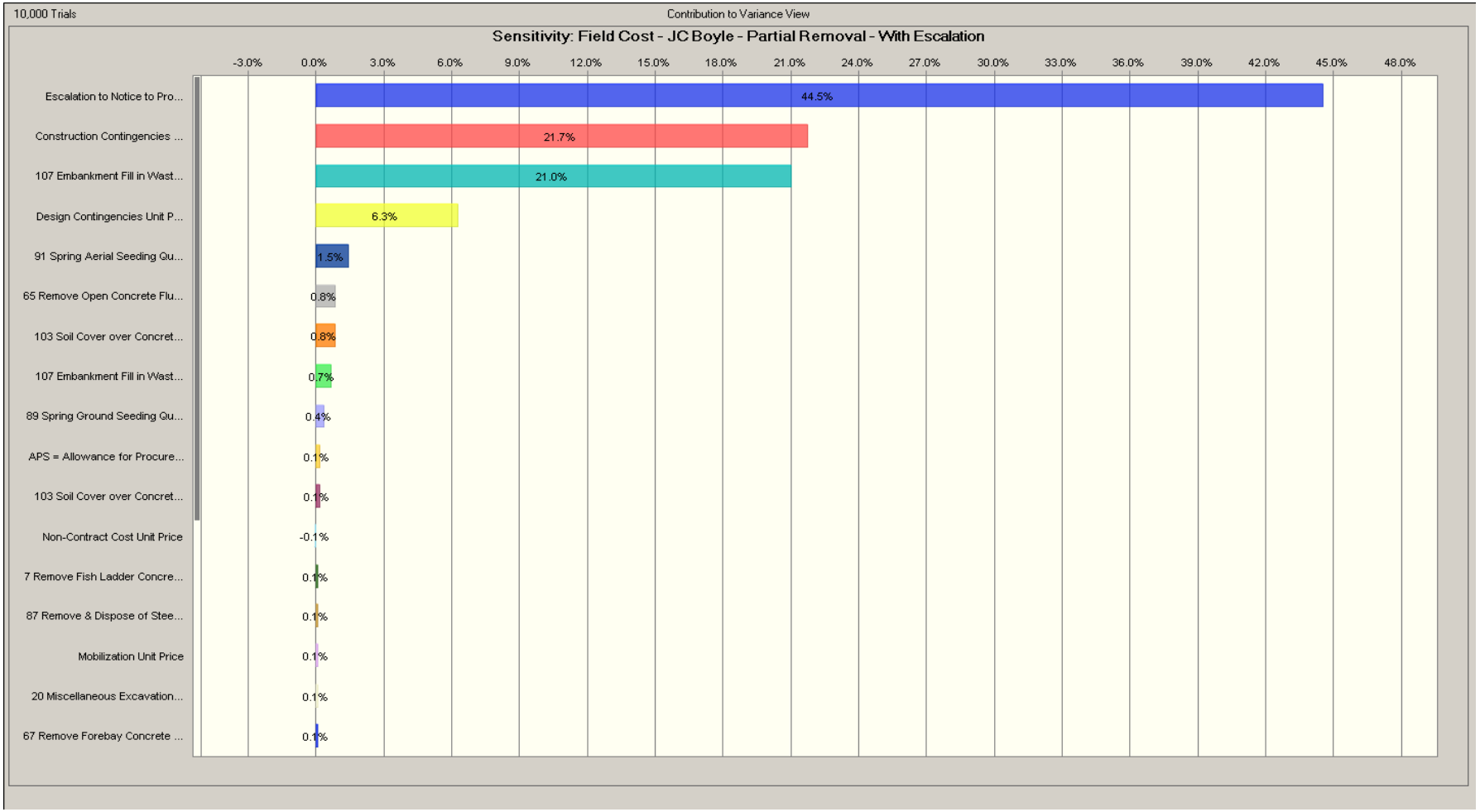
Percentile	Forecast values
0%	$15,966,296.72
10%	$21,162,229.06
20%	$22,401,882.28
30%	$23,353,498.19
40%	$24,253,181.82
50%	$25,106,431.97
60%	$26,003,887.66
70%	$26,991,889.22
80%	$28,189,977.90
90%	$29,753,761.24
100%	$38,360,525.84

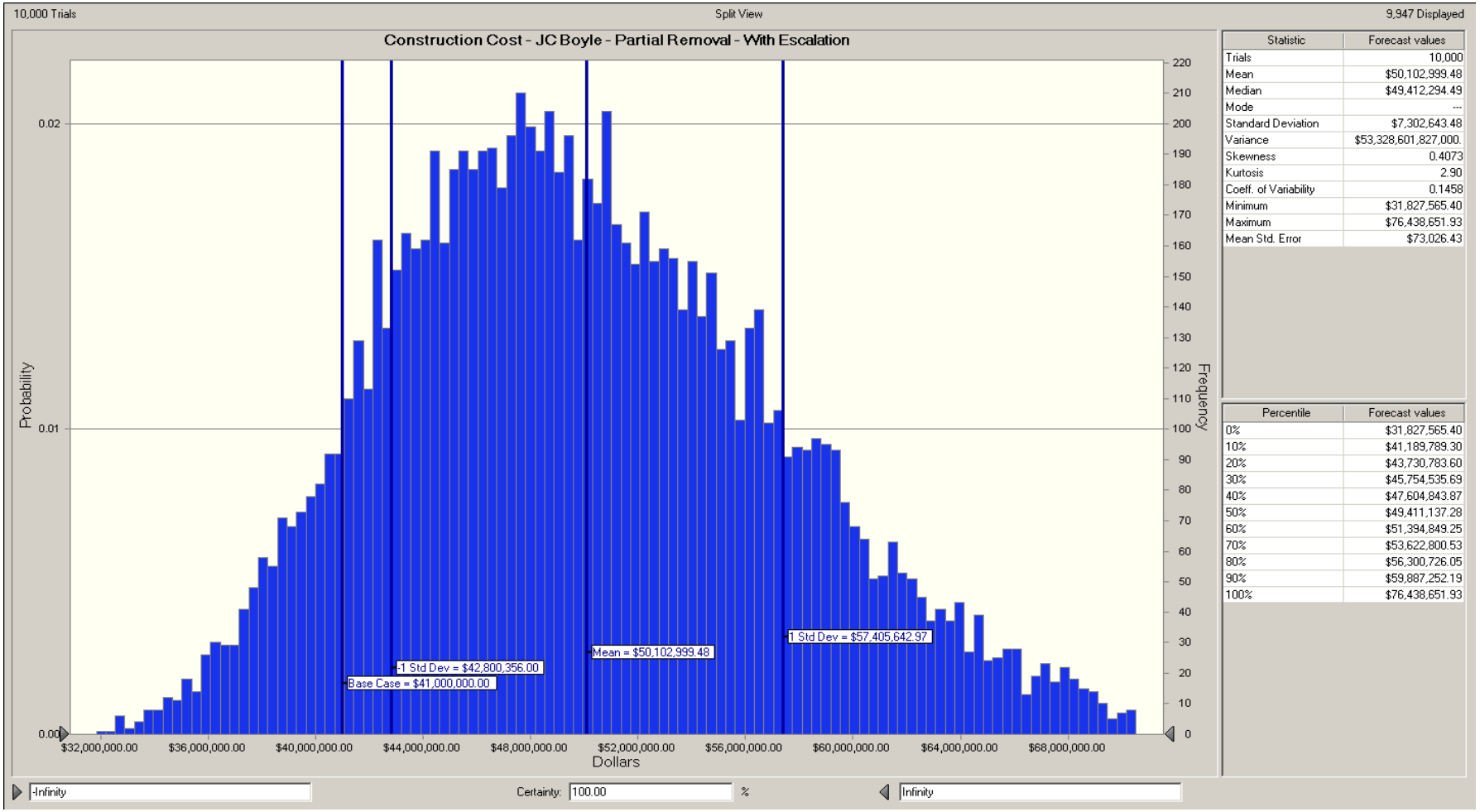

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - JC Boyle - Partial Removal - With Escalation
-3.0% 0.0% 3.0% 6.0% 9.0% 12.0% 15.0% 18.0% 21.0% 24.0% 27.0% 30.0% 33.0% 36.0% 39.0% 42.0% 45.0% 48.0% 51.0% 54.0% 57.0% 60.0%
Escalation to Notice to Pro... 57.5%
107 Embankment Fill in Wast... 26.8%
Design Contingencies Unit P... 7.8%
91 Spring Aerial Seeding Qu... 2.0%
103 Soil Cover over Concret... 1.0%
107 Embankment Fill in Wast... 1.0%
65 Remove Open Concrete Flu... 0.9%
89 Spring Ground Seeding Qu... 0.4%
103 Soil Cover over Concret... 0.3%
Mobilization Unit Price 0.2%
APS = Allowance for Procure... 0.1%
20 Miscellaneous Excavation... 0.1%
91 Spring Aerial Seeding Un... 0.1%
7 Remove Fish Ladder Concre... 0.1%
Non-Contract Cost Unit Price -0.1%
58 Remove & Dispose of Tran... -0.1%
87 Remove & Dispose of Stee... 0.1%



Statistic	Forecast values
Trials	10,000
Mean	$30,572,300.32
Median	$30,359,774.98
Mode	---
Standard Deviation	$3,783,290.02
Variance	$14,313,283,385,328.
Skewness	0.3097
Kurtosis	2.88
Coeff. of Variability	0.1237
Minimum	$19,923,182.20
Maximum	$45,105,480.30
Mean Std. Error	$37,832.90

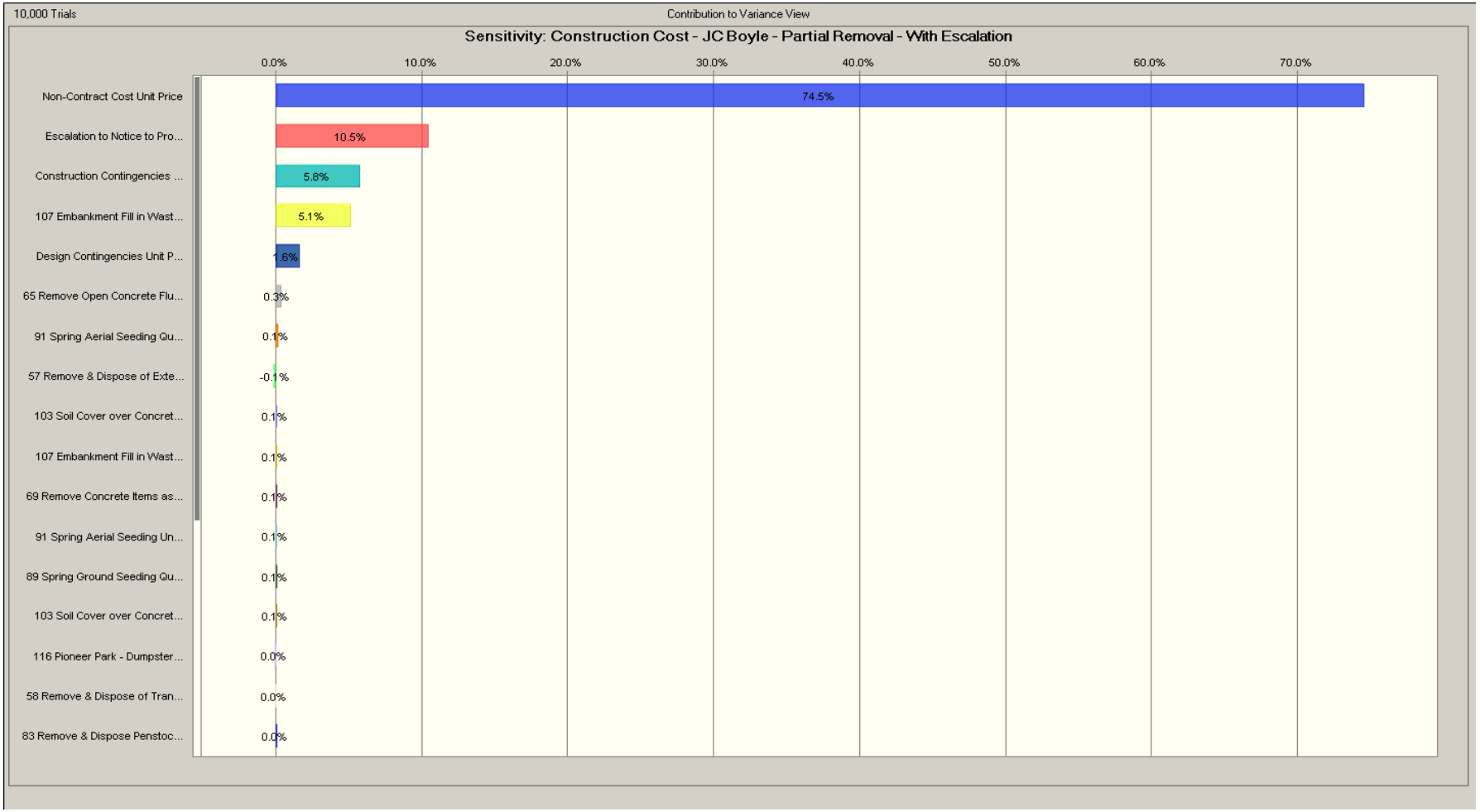
Percentile	Forecast values
0%	$19,923,182.20
10%	$25,834,663.55
20%	$27,269,274.04
30%	$28,344,703.45
40%	$29,376,260.21
50%	$30,359,109.92
60%	$31,364,896.18
70%	$32,452,803.19
80%	$33,808,455.36
90%	$35,608,405.82
100%	$45,105,480.30


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - JC Boyle - Partial Removal - With Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
48.0%
Escalation to Notice to Pro...
44.5%
Construction Contingencies ...
21.7%
107 Embankment Fill in Wast...
21.0%
Design Contingencies Unit P...
6.3%
91 Spring Aerial Seeding Qu...
1.5%
65 Remove Open Concrete Flu...
0.8%
103 Soil Cover over Concret...
0.8%
107 Embankment Fill in Wast...
0.7%
89 Spring Ground Seeding Qu...
0.4%
APS = Allowance for Procure...
0.1%
103 Soil Cover over Concret...
0.1%
Non-Contract Cost Unit Price
-0.1%
7 Remove Fish Ladder Concre...
0.1%
87 Remove & Dispose of Stee...
0.1%
Mobilization Unit Price
0.1%
20 Miscellaneous Excavation...
0.1%
67 Remove Forebay Concrete ...
0.1%



Statistic	Forecast values
Trials	10,000
Mean	$50,102,999.48
Median	$49,412,294.49
Mode	---
Standard Deviation	$7,302,643.48
Variance	$53,328,601,827,000.
Skewness	0.4073
Kurtosis	2.90
Coeff. of Variability	0.1458
Minimum	$31,827,565.40
Maximum	$76,438,651.93
Mean Std. Error	$73,026.43

Percentile	Forecast values
0%	$31,827,565.40
10%	$41,189,789.30
20%	$43,730,783.60
30%	$45,754,535.69
40%	$47,604,843.87
50%	$49,411,137.28
60%	$51,394,849.25
70%	$53,622,800.53
80%	$56,300,726.05
90%	$59,887,252.19
100%	$76,438,651.93


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - JC Boyle - Partial Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
74.5%
Escalation to Notice to Pro...
10.5%
Construction Contingencies ...
5.8%
107 Embankment Fill in Wast...
5.1%
Design Contingencies Unit P...
1.6%
65 Remove Open Concrete Flu...
0.3%
91 Spring Aerial Seeding Qu...
0.1%
57 Remove & Dispose of Exte...
-0.1%
103 Soil Cover over Concret...
0.1%
107 Embankment Fill in Wast...
0.1%
69 Remove Concrete Items as...
0.1%
91 Spring Aerial Seeding Un...
0.1%
89 Spring Ground Seeding Qu...
0.1%
103 Soil Cover over Concret...
0.1%
116 Pioneer Park - Dumpster...
0.0%
58 Remove & Dispose of Tran...
0.0%
83 Remove & Dispose Penstoc...
0.0%

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyle - Partial-without Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	1	Removal of Diversion Conduit Bulkheads.	8130	14	14	14	CY	$725.00	$850.00	$950.00	$10,150.00	$11,900.00	$13,300.00
	2	Remove Water from behind Tailrace Cofferdam.	8130	0	0	0	GAL				$0.00	$0.00	$0.00
	3	Provide Dewatering behind Tailrace Cofferdam	8130	0	0	0	LS				$0.00	$0.00	$0.00
	4	Construct Embankment Cofferdam in Tailrace around Powerhouse	8130	0	0	0	CY				$0.00	$0.00	$0.00
	5	Remove Spillway Concrete	8130	2,500	2,500	2,500	CY	$130.00	$260.00	$390.00	$325,000.00	$650,000.00	$975,000.00
	6	Remove Monorail Structural Steel Components	8130	15,000	15,000	15,000	LBS	$0.45	$0.65	$0.75	$6,750.00	$9,750.00	$11,250.00
	7	Remove Fish Ladder Concrete	8130	1,600	1,600	1,600	CY	$130.00	$260.00	$390.00	$208,000.00	$416,000.00	$624,000.00
	8	Remove Gravity Dam Section Concrete	8130	0	0	0	CY				$0.00	$0.00	$0.00
	9	Remove Timber Equipment Ramp on left side of Dam	8130	10,500	10,500	10,500	LBS	$0.50	$0.55	$0.70	$5,250.00	$5,775.00	$7,350.00
	10	Remove Pressure-Treated Lumber from Footbridge around Intake Structure	8130	3,600	3,600	3,600	LBS	$0.50	$0.55	$0.70	$1,800.00	$1,980.00	$2,520.00
	11	Remove Storage Shed located on access road	8130	0	0	0	SF				$0.00	$0.00	$0.00
	12	Remove Warehouse located on access road	8130	0	0	0	SF				$0.00	$0.00	$0.00
	13	Remove Fire System Control Bldg. on left abutment.	8130	385	385	385	SF	$38.00	$40.00	$42.00	$14,630.00	$15,400.00	$16,170.00
	14	Remove Dam Communication Bldg. on left abutment.	8130	331	331	331	SF	$38.00	$40.00	$42.00	$12,578.00	$13,240.00	$13,902.00
	15	Remove Concrete Slab on left abutment for former Control House	8130	6	6	6	CY	$130.00	$260.00	$390.00	$780.00	$1,560.00	$2,340.00
	16	Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment.	8130	1	1	1	CY	$130.00	$260.00	$390.00	$130.00	$260.00	$390.00
	17	Remove Reservoir Level Gauge House on Dam Crest	8130	24	24	24	SF	$38.00	$40.00	$42.00	$912.00	$960.00	$1,008.00
	18	Upstream Riprap	8313	2,220	2,220	2,220	CY	$8.00	$9.00	$12.00	$17,760.00	$19,980.00	$26,640.00
	19	Downstream Riprap	8313	1,850	1,850	1,850	CY	$8.00	$9.00	$12.00	$14,800.00	$16,650.00	$22,200.00
	20	Miscellaneous Excavation	8313	132,500	132,500	132,500	CY	$8.00	$9.00	$12.00	$1,060,000.00	$1,192,500.00	$1,590,000.00
	21	Cutoff Wall Concrete Demolition	8313	70	70	70	CY	$130.00	$260.00	$390.00	$9,100.00	$18,200.00	$27,300.00
	22	Cutoff Wall Anchors	8313	285	285	285	EA	$9.00	$10.00	$12.00	$2,565.00	$2,850.00	$3,420.00
	23	Remove & Dispose Hand Rails and Light Poles	8420	5,000	5,000	5,000	LBS	$0.45	$0.65	$0.75	$2,250.00	$3,250.00	$3,750.00
	24	Remove & Dispose Spillway Radial Gates and Hoists	8420	124,000	124,000	124,000	LBS	$0.45	$0.65	$0.75	$55,800.00	$80,600.00	$93,000.00
	25	Remove & Dispose Stop Logs and Slots (steel)	8420	92,000	92,000	92,000	LBS	$0.45	$0.65	$0.75	$41,400.00	$59,800.00	$69,000.00
	26	Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure	8420	4,200	4,200	4,200	LBS	$0.45	$0.65	$0.75	$1,890.00	$2,730.00	$3,150.00
	26A	Remove Petroleum Products from Red Barn Area	8420	1,600	1,600	1,600	GAL	$8.00	$10.00	$12.00	$12,800.00	$16,000.00	$19,200.00
	27	Remove & Dispose of Spillway gate motor & control panel	8430	1	1	1	EA	$500.00	$600.00	$700.00	$500.00	$600.00	$700.00
	28	Remove & Dispose of Distribution equipment , panelboards	8430	1	1	1	EA	$5,500.00	$6,000.00	$6,500.00	$5,500.00	$6,000.00	$6,500.00
	29	Remove Powerhouse Concrete down to Elevation 3324.0	8130	0	0	0	CY				$0.00	$0.00	$0.00
	30	Remove Structural Steel Items associated with Powerhouse	8130	0	0	0	LBS				$0.00	$0.00	$0.00
	31	Remove Warehouse near Powerhouse	8130	5,200	5,200	5,200	SF	$38.00	$40.00	$42.00	$197,600.00	$208,000.00	$218,400.00
	32	Remove & Dispose of 2 - Governor oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	33	Remove & Dispose of Cooling water and bearing oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	34	Remove & Dispose of 2 - Francis Turbines	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	35	Remove & Dispose of 150 Ton crane	8420	240,000	240,000	240,000	LBS	$0.45	$0.65	$0.75	$108,000.00	$156,000.00	$180,000.00
	36	Remove & Dispose of Compressed Air systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	37	Remove & Dispose of 2 - CO2 systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	38	Remove & Dispose of Plant Water and Fire Protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	39	Remove & Dispose of Transformer Oil Fire protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	40	Remove & Dispose of Unwatering Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	41	Remove & Dispose of Drainage Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	42	Remove & Dispose of 2-Oil Sump pumps	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	43	Remove and Dispose of Draft Tube Bulk Head Gates and Hoists at the Powerhouse	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	43A	Remove Petroleum Products from Mechanical Equipment	8420	2,700	2,700	2,700	GAL	$8.00	$10.00	$12.00	$21,600.00	$27,000.00	$32,400.00
	44	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA	8430	2	2	2	EA	$150,000.00	$200,000.00	$250,000.00	$300,000.00	$400,000.00	$500,000.00
	45	Remove & Dispose of Excitation equipment for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyle - Partial-without Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	46	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	47	Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	48	Remove & Dispose of Generator Switchgear, 15kV - (6 sections)	8430	0	0	0	EA				$0.00	$0.00	$0.00
	49	Remove & Dispose of Station Service Switchgear, 600 volt -(5 sections)	8430	0	0	0	EA				$0.00	$0.00	$0.00
	50	Remove & Dispose of Unit and plant control switchboard	8430	0	0	0	EA				$0.00	$0.00	$0.00
	51	Remove & Dispose of Battery system	8430	1	1	1	EA	$7,000.00	$8,000.00	$9,000.00	$7,000.00	$8,000.00	$9,000.00
	52	Remove & Dispose of Raceways, Conduit and Cable	8430	0	0	0	EA				$0.00	$0.00	$0.00
	53	Remove & Dispose of Misc. power & control boards	8430	0	0	0	EA				$0.00	$0.00	$0.00
	54	Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	55	Remove & Dispose of Gantry Crane control equipment (3 cubicles)	8430	1	1	1	EA	$5,000.00	$6,000.00	$7,000.00	$5,000.00	$6,000.00	$7,000.00
	56	Remove & Dispose of Conduit and Cable	8430	1	1	1	EA	$9,000.00	$10,000.00	$11,000.00	$9,000.00	$10,000.00	$11,000.00
	57	Remove & Dispose of Exterior Lighting	8430	1	1	1	EA	$1,500.00	$2,000.00	$3,000.00	$1,500.00	$2,000.00	$3,000.00
	58	Remove & Dispose of Transmission Line No. 59	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	59	Remove & Dispose of Transmission Line No. 98	8430	0.24	0.24	0.24	MILE	$20,000.00	$25,000.00	$30,000.00	$4,800.00	$6,000.00	$7,200.00
	60	Remove & Dispose of Transmission Line No. 58	8430	1.66	1.66	1.66	MILE	$20,000.00	$25,000.00	$30,000.00	$33,200.00	$41,500.00	$49,800.00
	61	Remove Intake Structure Concrete	8130	0	0	0	CY				$0.00	$0.00	$0.00
	62	Remove Fish Screen Building	8130	0	0	0	SF				$0.00	$0.00	$0.00
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	8130	22,000	22,000	22,000	LBS	$0.45	$0.65	$0.75	$9,900.00	$14,300.00	$16,500.00
	64	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	8130	0	0	0	CY				$0.00	$0.00	$0.00
	65	Remove Open Concrete Flume.	8130	12,200	12,200	12,200	CY	$220.00	$260.00	$390.00	$2,684,000.00	$3,172,000.00	$4,758,000.00
	66	Remove Structural Steel Items associated with the Forebay Trashrack Piers	8130	11,500	11,500	11,500	LBS	$0.45	$0.65	$0.75	$5,175.00	$7,475.00	$8,625.00
	67	Remove Forebay Concrete	8130	1,500	1,500	1,500	CY	$220.00	$260.00	$390.00	$330,000.00	$390,000.00	$585,000.00
	68	Place Concrete Plugs at Tunnel Portals	8130	30	30	30	CY	$900.00	$1,000.00	$1,100.00	$27,000.00	$30,000.00	$33,000.00
	69	Remove Concrete Items associated with Penstocks D/S from Tunnel	8130	1,800	1,800	1,800	CY	$220.00	$260.00	$390.00	$396,000.00	$468,000.00	$702,000.00
	70	Remove Headgate Control Building at Flume Entrance	8130	330	330	330	SF	$38.00	$40.00	$42.00	$12,540.00	$13,200.00	$13,860.00
	71	Remove Forebay Spillway Gate House	8130	570	570	570	SF	$38.00	$40.00	$42.00	$21,660.00	$22,800.00	$23,940.00
	72	Remove Forebay Control Building.	8130	470	470	470	SF	$38.00	$40.00	$42.00	$17,860.00	$18,800.00	$19,740.00
	73	Remove Communication Tower next to Forebay Control Building	8130	7,100	7,100	7,100	LBS	$0.45	$0.65	$0.75	$3,195.00	$4,615.00	$5,325.00
	74	Remove Insulated Generator Building next to Forebay Control Building	8130	72	72	72	SF	$38.00	$40.00	$42.00	$2,736.00	$2,880.00	$3,024.00
	75	Remove Fixed Wheel Gate (gate, Frame and Hoist)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	76	Remove Trash rack and trash rake (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	77	Remove stop Logs and slots (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	78	Remove Traveling Water Screen	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	79	Remove Fish By-Pass and Supports (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	80	Remove Radial Gates and Hoists	8420	16,500	16,500	16,500	LBS	$0.45	$0.65	$0.75	$7,425.00	$10,725.00	$12,375.00
	81	Remove Trash rack and trash rake (steel)	8420	43,500	43,500	43,500	LBS	$0.45	$0.50	$0.70	$19,575.00	$21,750.00	$30,450.00
	82	Remove Stop Logs and slots (steel)	8420	14,500	14,500	14,500	LBS	$0.45	$0.65	$0.75	$6,525.00	$9,425.00	$10,875.00
	83	Remove & Dispose Penstocks and bifurcation (steel)	8420	1,600,000	1,600,000	1,600,000	LBS	$0.45	$0.65	$0.75	$720,000.00	$1,040,000.00	$1,200,000.00
	84	Remove & Dispose Surge Tank (steel)	8420	79,000	79,000	79,000	LBS	$0.45	$0.65	$0.75	$35,550.00	$51,350.00	$59,250.00
	85	Remove & Dispose 2 - 108" Butterfly valves	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	86	Remove & Dispose Gate, Stem and Frame	8420	28,000	28,000	28,000	LBS	$0.45	$0.65	$0.75	$12,600.00	$18,200.00	$21,000.00
	87	Remove & Dispose of Steel Transition Manifolds on Upstream and Downstream	8420	250,000	250,000	250,000	LBS	$0.45	$0.50	$0.70	$112,500.00	$125,000.00	$175,000.00
	87A	Remove Petroleum Products from Mechanical Equipment	8420	380	380	380	GAL	$8.00	$10.00	$12.00	$3,040.00	$3,800.00	$4,560.00
	88	Temporary Access Roads	8140	2	2	2	MILE	$85,000.00	$150,000.00	$100,000.00	$170,000.00	$300,000.00	$200,000.00
	89	Spring Ground Seeding	8220	247	247	0	ACRES	$3,000.00	$3,500.00	$4,000.00	$741,000.00	$864,500.00	$0.00
	90	Spring Barge Seeding	8220	0	0	0	ACRES				$0.00	$0.00	$0.00
	91	Spring Aerial Seeding	8220	0	0	247	ACRES	$6,500.00	$7,500.00	$15,000.00	$0.00	$0.00	$3,705,000.00
	92	Fall Ground Seeding	8220	62	124	185	ACRES	$3,000.00	$3,500.00	$4,000.00	$186,000.00	$434,000.00	$740,000.00

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation NOT Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION: MP | **PRICE LEVEL:** Jul-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[JC Boyle - Partial Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyle - Partial-without Esc

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	93	Riparian Pole Planting	8220	54	54	54	ACRES	$4,000.00	$8,500.00	$10,000.00	$216,000.00	$459,000.00	$540,000.00
	94	Weed Management	8220	62	124	185	ACRES	$1,000.00	$1,500.00	$2,000.00	$62,000.00	$186,000.00	$370,000.00
	95	Fall Ground Seeding	8220	99	99	99	ACRES	$3,000.00	$3,500.00	$4,000.00	$297,000.00	$346,500.00	$396,000.00
	96	Weed Management	8220	99	99	99	ACRES	$1,000.00	$1,500.00	$2,000.00	$99,000.00	$148,500.00	$198,000.00
	97	Clear and Grub Disposal Area (Embankment)	8313	10	10	5	ACRES	$4,000.00	$5,000.00	$6,000.00	$40,000.00	$50,000.00	$30,000.00
	98	Clear and Grub, 40' width	8313	2.4	2.4	2.4	ACRES	$4,000.00	$5,000.00	$6,000.00	$9,600.00	$12,000.00	$14,400.00
	99	4" thick gravel surfacing	8313	0	2,150	2,150	TON	$20.00	$30.00	$40.00	$0.00	$64,500.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	8313	4	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$16,000.00	$0.00	$0.00
	101	Clear and grub, 20' width	8313	1	0	0	ACRES	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$0.00	$0.00
	102	4" thick gravel surfacing	8313	0	0	0	TON				$0.00	$0.00	$0.00
	103	Soil Cover over Concrete Rubble	8313	13,000	13,000	0	CY	$25.00	$140.00	$150.00	$325,000.00	$1,820,000.00	$0.00
	104	Dispose of Concrete Rubble from Dam	8313	0	0	0	CY				$0.00	$0.00	$0.00
	105	Dispose of Concrete Rubble from Flume/Forebay	8313	0	0	0	CY				$0.00	$0.00	$0.00
	106	Dispose of Concrete Rubble from Power House	8313	0	0	0	CY				$0.00	$0.00	$0.00
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	8313	0	0	60,000	CY	$25.00	$140.00	$150.00	$0.00	$0.00	$9,000,000.00
	108	Topsy Recreation Area - Concrete total	BLM	68	68	68	CY	$175.00	$220.00	$320.00	$11,900.00	$14,960.00	$21,760.00
	109	Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite decking	BLM	1	1	1	EA	$4,000.00	$5,000.00	$6,000.00	$4,000.00	$5,000.00	$6,000.00
	110	Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platform	BLM	200	200	200	SF	$12.00	$13.00	$14.00	$2,400.00	$2,600.00	$2,800.00
	111	Topsy Recreation Area - Regrade to natural contour and reseed	BLM	300	300	300	SF	$3.00	$4.00	$5.00	$900.00	$1,200.00	$1,500.00
	112	Pioneer Park - Picnic tables to be removed and hauled away	BLM	12	12	12	EA	$55.00	$60.00	$65.00	$660.00	$720.00	$780.00
	113	Pioneer Park - 12 Concrete fire rings	BLM	5	5	5	CY	$175.00	$220.00	$320.00	$875.00	$1,100.00	$1,600.00
	114	Pioneer Park - Portable toilets to be removed and hauled away	BLM	2	2	2	EA	$900.00	$1,000.00	$1,200.00	$1,800.00	$2,000.00	$2,400.00
	115	Pioneer Park - Signs to be removed and hauled away	BLM	6	6	6	EA	$135.00	$150.00	$160.00	$810.00	$900.00	$960.00
	116	Pioneer Park - Dumpster to be removed and hauled away	BLM	1	1	1	EA	$900.00	$1,000.00	$1,200.00	$900.00	$1,000.00	$1,200.00
	117	Pioneer Park - Remove paved access road	BLM	200	200	200	LF	$230.00	$250.00	$270.00	$46,000.00	$50,000.00	$54,000.00
	118	Pioneer Park - Regrage to natural contour, rip, plant and seed parking and recreation site	BLM	1	1	1	ACRES	$19,000.00	$20,000.00	$22,000.00	$9,500.00	$10,000.00	$11,000.00
		Subtotal 1									$9,205,371.00	$13,652,785.00	$27,668,614.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$460,000.00	$680,000.00	$1,400,000.00	$460,000.00	$680,000.00	$1,400,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)											
		NOT INCLUDED											
		Design Contingencies (MPL ~ 8%; MP ~ 10%; MPH ~ 15%)		1	1	1	ls	$834,629.00	$1,667,215.00	$4,274,078.00	$834,629.00	$1,667,215.00	$4,274,078.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$657,308.00	$0.00	$0.00	$657,308.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$10,500,000.00**	**$16,000,000.00**	**$34,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$2,000,000.00	$3,000,000.00	$9,000,000.00	$2,000,000.00	$3,000,000.00	$9,000,000.00
		FIELD COST									**$12,500,000.00**	**$19,000,000.00**	**$43,000,000.00**
		Non-Contract Cost (MPL ~ 62%; MP ~ 65%; MPH ~ 71%)		1	1	1	ls	$7,500,000.00	$12,000,000.00	$31,000,000.00	$7,500,000.00	$12,000,000.00	$31,000,000.00
		CONSTRUCTION COST									**$20,000,000.00**	**$31,000,000.00**	**$74,000,000.00**

Notes: This estimate does not include non-contract costs and should not be used for funding purposes.
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES		
BY	See Group Worksheets	CHECKED: See Group Worksheets	BY	Craig Grush, P.E.	CHECKED
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	05/25/11	PEER REVIEW

05-25-11
DCD 6/3/11

Crystal Ball Report - Full
Simulation started on 6/9/2011 at 6:57:50
Simulation stopped on 6/9/2011 at 6:58:39

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	49.28
Trials/second (average)	203
Random numbers per sec	34,495
Crystal Ball data:	
Assumptions	170
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP
UNIT PRICES BY Craig A. Grosh
DATE 6/9/2011

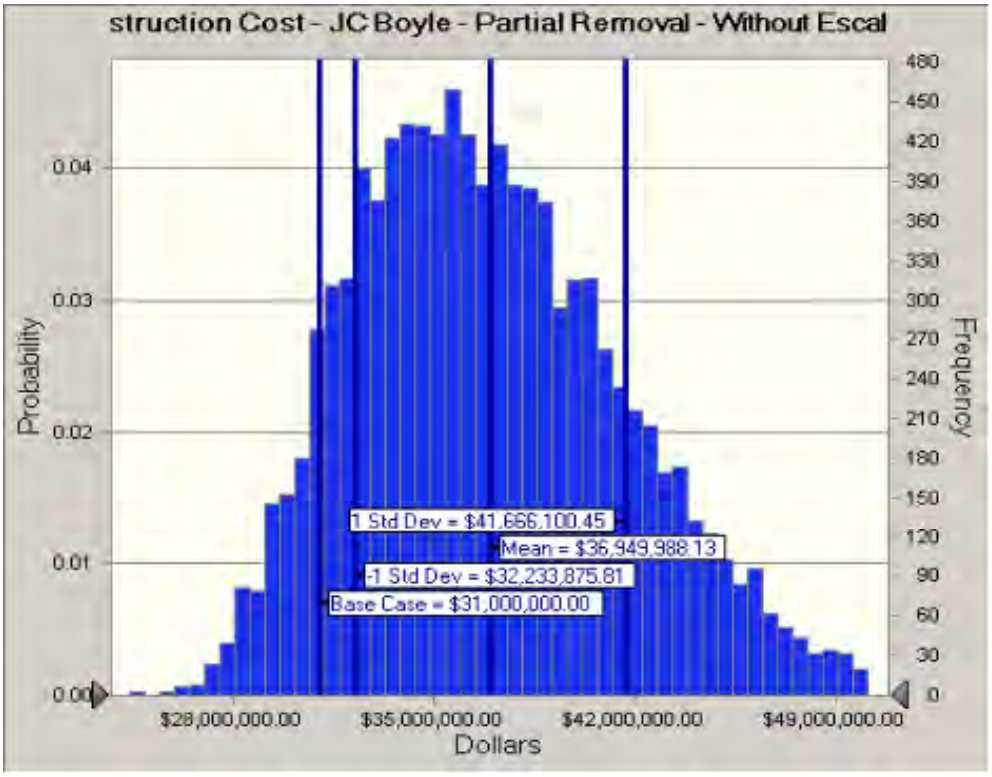
DATE	PEER REVIEWER(S)	CODE
6/9/11	Signature	8174
	Printed Name	
	Signature	
	Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [JC Boyle - Partial Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyl

Forecast: Construction Cost - JC Boyle - Partial Removal - Without Escalation **Cell: U149**

Summary:
Entire range is from $24,355,066.49 to $55,361,271.86
Base case is $31,000,000.00
After 10,000 trials, the std. error of the mean is $47,161.12



Forecast: Construction Cost - JC Boyle - Partial Removal - Without Escalation (cont'd) **Cell: U149**

Statistics:	Forecast values
Trials	10,000
Mean	$36,949,988.13
Median	$36,473,018.98
Mode	---
Standard Deviation	$4,716,112.32
Variance	$22,241,715,444,585.90
Skewness	0.4596
Kurtosis	2.90
Coeff. of Variability	0.1276
Minimum	$24,355,066.49
Maximum	$55,361,271.86
Range Width	$31,006,205.37
Mean Std. Error	$47,161.12

Percentiles:	Forecast values
0%	$24,355,066.49
10%	$31,207,615.59
20%	$32,746,006.67
30%	$34,049,145.62
40%	$35,283,089.48
50%	$36,472,704.68
60%	$37,796,120.24
70%	$39,203,936.50
80%	$40,915,806.85
90%	$43,424,675.89
100%	$55,361,271.86

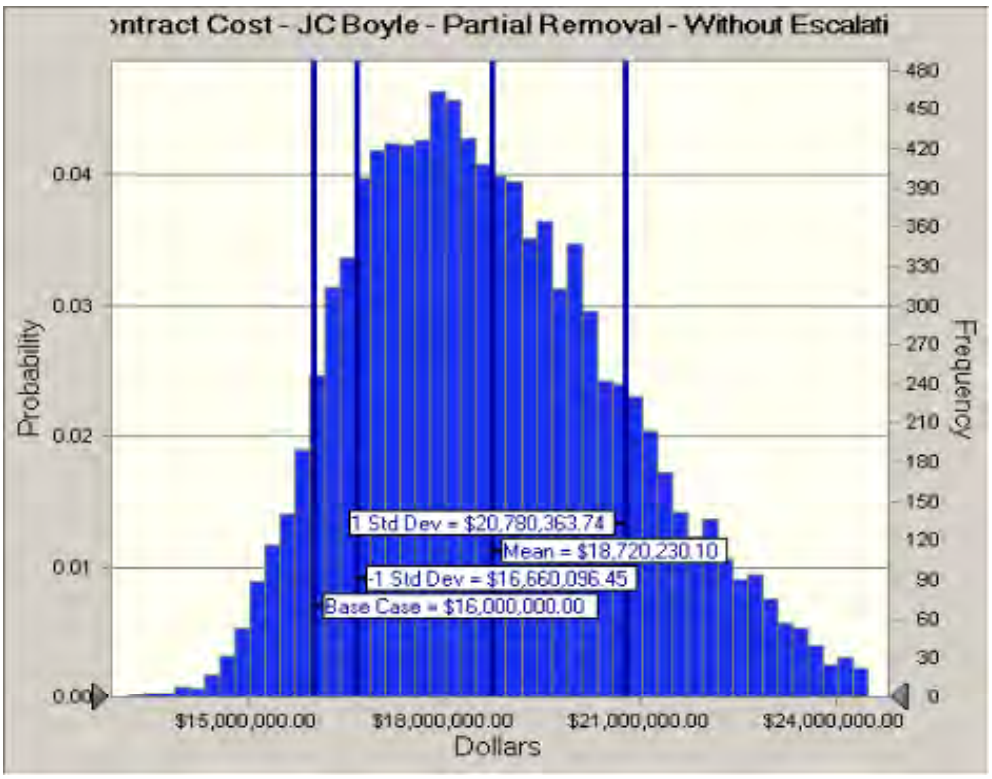
Forecast: Contract Cost - JC Boyle - Partial Removal - Without Escalation **Cell: U145**

Summary:

Entire range is from $13,173,585.07 to $26,823,131.37

Base case is $16,000,000.00

After 10,000 trials, the std. error of the mean is $20,601.34



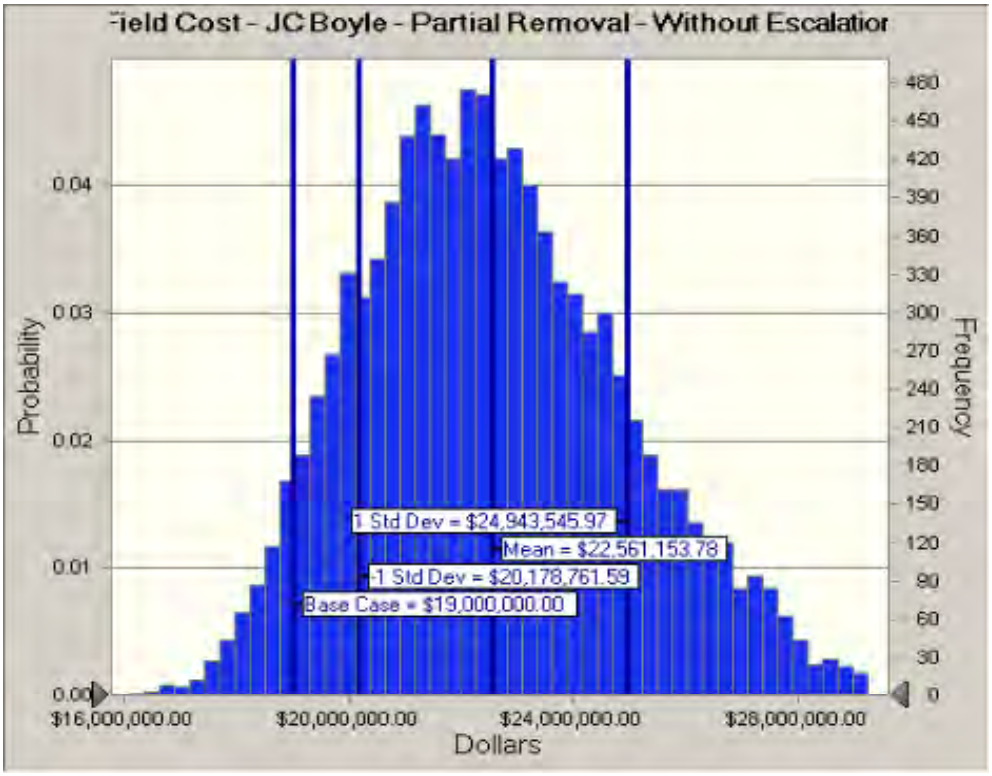
Forecast: Contract Cost - JC Boyle - Partial Removal - Without Escalation (cont'd) Cell: U145

Statistics:	Forecast values
Trials	10,000
Mean	$18,720,230.10
Median	$18,490,040.48
Mode	---
Standard Deviation	$2,060,133.65
Variance	$4,244,150,651,715.84
Skewness	0.4892
Kurtosis	2.92
Coeff. of Variability	0.1100
Minimum	$13,173,585.07
Maximum	$26,823,131.37
Range Width	$13,649,546.30
Mean Std. Error	$20,601.34

Percentiles:	Forecast values
0%	$13,173,585.07
10%	$16,244,649.75
20%	$16,893,752.41
30%	$17,435,491.40
40%	$17,970,005.58
50%	$18,490,034.64
60%	$19,059,777.40
70%	$19,701,982.30
80%	$20,464,313.55
90%	$21,539,140.59
100%	$26,823,131.37

Forecast: Field Cost - JC Boyle - Partial Removal - Without Escalation **Cell: U147**

Summary:
Entire range is from $16,097,763.98 to $32,618,398.33
Base case is $19,000,000.00
After 10,000 trials, the std. error of the mean is $23,823.92



Forecast: Field Cost - JC Boyle - Partial Removal - Without Escalation (cont'd) **Cell: U147**

Statistics:	Forecast values
Trials	10,000
Mean	$22,561,153.78
Median	$22,356,698.32
Mode	---
Standard Deviation	$2,382,392.19
Variance	$5,675,792,540,804.15
Skewness	0.4375
Kurtosis	3.04
Coeff. of Variability	0.1056
Minimum	$16,097,763.98
Maximum	$32,618,398.33
Range Width	$16,520,634.34
Mean Std. Error	$23,823.92

Percentiles:	Forecast values
0%	$16,097,763.98
10%	$19,626,275.05
20%	$20,498,898.70
30%	$21,173,690.04
40%	$21,766,730.97
50%	$22,356,361.56
60%	$22,963,125.19
70%	$23,657,646.94
80%	$24,531,514.11
90%	$25,821,030.03
100%	$32,618,398.33

End of Forecasts

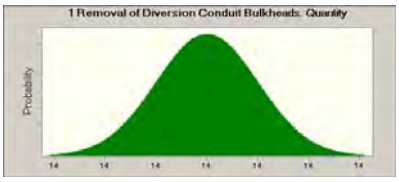
Assumptions

Worksheet: [JC Boyle - Partial Removal Crystal Ball - without Escalation - 2011-04.xls]JC Boyl

Assumption: 1 Removal of Diversion Conduit Bulkheads. Quantity **Cell: L14**

Normal distribution with parameters:

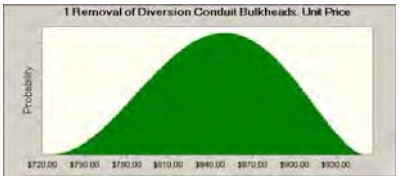
Mean	14	(=L14)
Std. Dev.	0	(=0.000001)



Assumption: 1 Removal of Diversion Conduit Bulkheads. Unit Price **Cell: R14**

BetaPERT distribution with parameters:

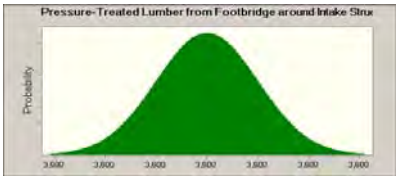
Minimum	$725.00	(=Q14)
Likeliest	$850.00	(=R14)
Maximum	$950.00	(=S14)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structu **Cell: L23**

Normal distribution with parameters:

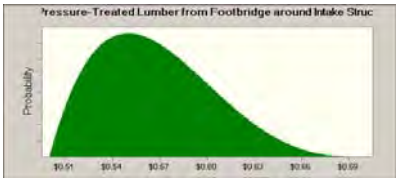
Mean	3,600	(=L23)
Std. Dev.	0	(=0.000001)



Assumption: 10 Remove Pressure-Treated Lumber from Footbridge around Intake Structure **Cell: R23**

BetaPERT distribution with parameters:

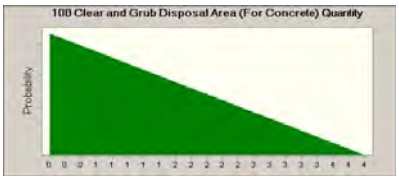
Minimum	$0.50	(=Q23)
Likeliest	$0.55	(=R23)
Maximum	$0.70	(=S23)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Quantity **Cell: L116**

Triangular distribution with parameters:

Minimum	0	(=M116)
Likeliest	0	(=L116)
Maximum	4	(=K116)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Unit Price **Cell: R116**

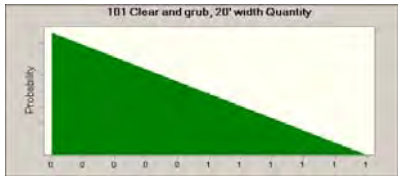
BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q116)
Likeliest	$5,000.00	(=R116)
Maximum	$6,000.00	(=S116)

Assumption: 101 Clear and grub, 20' width Quantity **Cell: L117**

Triangular distribution with parameters:

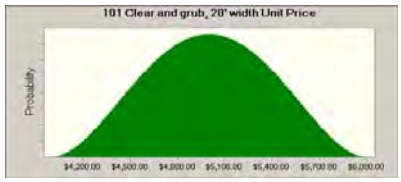
Minimum	0	(=M117)
Likeliest	0	(=L117)
Maximum	1	(=K117)



Assumption: 101 Clear and grub, 20' width Unit Price **Cell: R117**

BetaPERT distribution with parameters:

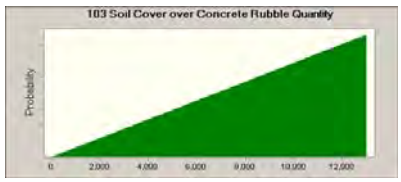
Minimum	$4,000.00	(=Q117)
Likeliest	$5,000.00	(=R117)
Maximum	$6,000.00	(=S117)



Assumption: 103 Soil Cover over Concrete Rubble Quantity **Cell: L119**

Triangular distribution with parameters:

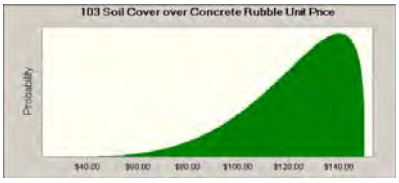
Minimum	0	(=M119)
Likeliest	13,000	(=L119)
Maximum	13,000	(=K119)



Assumption: 103 Soil Cover over Concrete Rubble Unit Price **Cell: R119**

BetaPERT distribution with parameters:

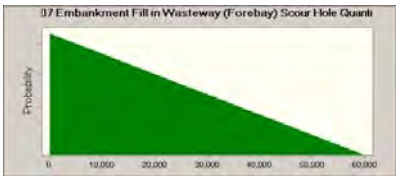
Minimum	$25.00	(=Q119)
Likeliest	$140.00	(=R119)
Maximum	$150.00	(=S119)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Quantity **Cell: L123**

Triangular distribution with parameters:

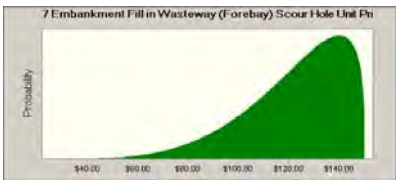
Minimum	0	(=K123)
Likeliest	0	(=L123)
Maximum	60,000	(=M123)



Assumption: 107 Embankment Fill in Wasteway (Forebay) Scour Hole Unit Price **Cell: R123**

BetaPERT distribution with parameters:

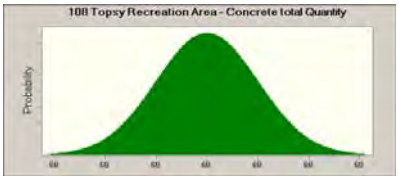
Minimum	$25.00	(=Q123)
Likeliest	$140.00	(=R123)
Maximum	$150.00	(=S123)



Assumption: 108 Topsy Recreation Area - Concrete total Quantity **Cell: L124**

Normal distribution with parameters:

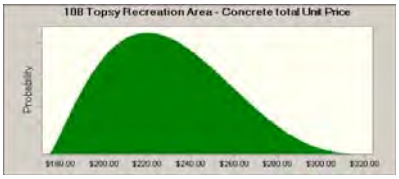
Mean	68	(=L124)
Std. Dev.	0	(=0.000001)



Assumption: 108 Topsy Recreation Area - Concrete total Unit Price **Cell: R124**

BetaPERT distribution with parameters:

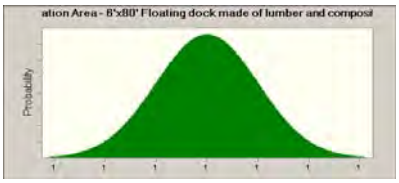
Minimum	$175.00	(=Q124)
Likeliest	$220.00	(=R124)
Maximum	$320.00	(=S124)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and compo **Cell: L125**

Normal distribution with parameters:

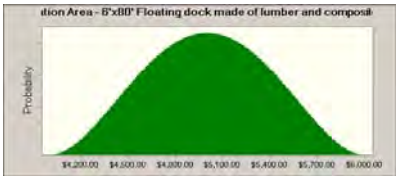
Mean	1	(=L125)
Std. Dev.	0	(=0.000001)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composi Cell: R125

BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q125)
Likeliest	$5,000.00	(=R125)
Maximum	$6,000.00	(=S125)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: L126

Normal distribution with parameters:

Mean	200	(=L126)
Std. Dev.	0	(=0.000001)

Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: R126

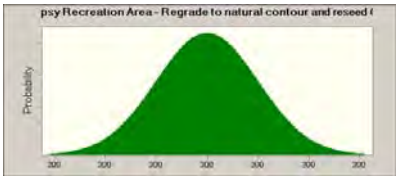
BetaPERT distribution with parameters:

Minimum	$12.00	(=Q126)
Likeliest	$13.00	(=R126)
Maximum	$14.00	(=S126)

Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Quantity **Cell: L127**

Normal distribution with parameters:

Mean	300	(=L127)
Std. Dev.	0	(=0.000001)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Unit Price **Cell: R127**

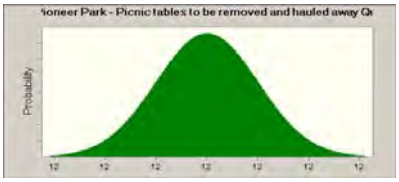
BetaPERT distribution with parameters:

Minimum	$3.00	(=Q127)
Likeliest	$4.00	(=R127)
Maximum	$5.00	(=S127)

Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Quantity **Cell: L128**

Normal distribution with parameters:

Mean	12	(=L128)
Std. Dev.	0	(=0.000001)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Unit Price **Cell: R128**

BetaPERT distribution with parameters:

Minimum	$55.00	(=Q128)
Likeliest	$60.00	(=R128)
Maximum	$65.00	(=S128)

Assumption: 113 Pioneer Park - 12 Concrete fire rings Quantity **Cell: L129**

Normal distribution with parameters:

Mean	5	(=L129)
Std. Dev.	0	(=0.000001)

Assumption: 113 Pioneer Park - 12 Concrete fire rings Unit Price **Cell: R129**

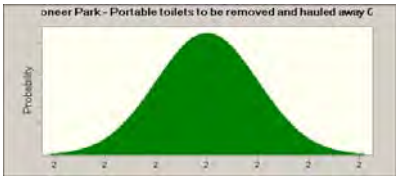
BetaPERT distribution with parameters:

Minimum	$175.00	(=Q129)
Likeliest	$220.00	(=R129)
Maximum	$320.00	(=S129)

Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Quantity **Cell: L130**

Normal distribution with parameters:

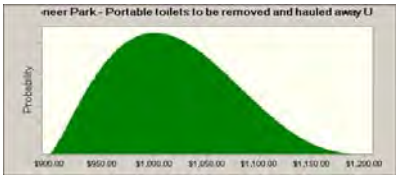
Mean	2	(=L130)
Std. Dev.	0	(=0.000001)



Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Unit Price **Cell: R130**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q130)
Likeliest	$1,000.00	(=R130)
Maximum	$1,200.00	(=S130)



Assumption: 115 Pioneer Park - Signs to be removed and hauled away Quantity **Cell: L131**

Normal distribution with parameters:

Mean	6	(=L131)
Std. Dev.	0	(=0.000001)

Assumption: 115 Pioneer Park - Signs to be removed and hauled away Unit Price **Cell: R131**

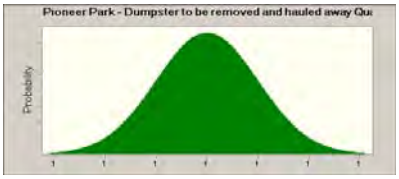
BetaPERT distribution with parameters:

Minimum	$135.00	(=Q131)
Likeliest	$150.00	(=R131)
Maximum	$160.00	(=S131)

Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Quantity **Cell: L132**

Normal distribution with parameters:

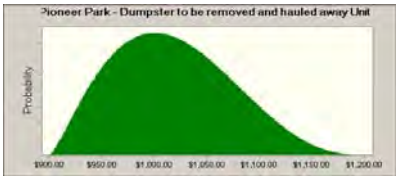
Mean	1	(=L132)
Std. Dev.	0	(=0.000001)



Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Unit Price **Cell: R132**

BetaPERT distribution with parameters:

Minimum	$900.00	(=Q132)
Likeliest	$1,000.00	(=R132)
Maximum	$1,200.00	(=S132)



Assumption: 117 Pioneer Park - Remove paved access road Quantity **Cell: L133**

Normal distribution with parameters:

Mean	200	(=L133)
Std. Dev.	0	(=0.000001)

Assumption: 117 Pioneer Park - Remove paved access road Unit Price **Cell: R133**

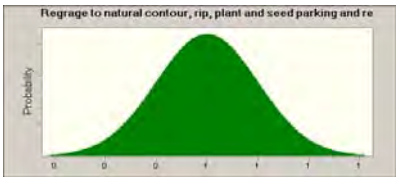
BetaPERT distribution with parameters:

Minimum	$230.00	(=Q133)
Likeliest	$250.00	(=R133)
Maximum	$270.00	(=S133)

Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: L134**

Normal distribution with parameters:

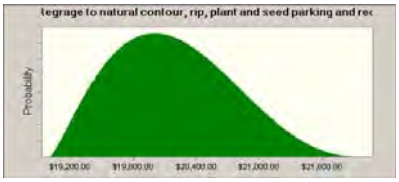
Mean	1	(=L134)
Std. Dev.	0	(=0.000001)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: R134**

BetaPERT distribution with parameters:

Minimum	$19,000.00	(=Q134)
Likeliest	$20,000.00	(=R134)
Maximum	$22,000.00	(=S134)



Assumption: 13 Remove Fire System Control Bldg. on left abutment. Quantity **Cell: L26**

Normal distribution with parameters:

Mean	385	(=L26)
Std. Dev.	0	(=0.000001)

Assumption: 13 Remove Fire System Control Bldg. on left abutment. Unit Price **Cell: R26**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q26)
Likeliest	$40.00	(=R26)
Maximum	$42.00	(=S26)

Assumption: 14 Remove Dam Communication Bldg. on left abutment. Quantity **Cell: L27**

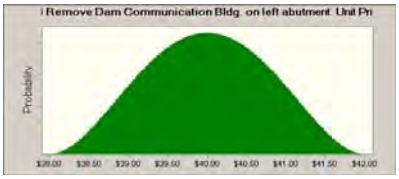
Normal distribution with parameters:

Mean	331	(=L27)
Std. Dev.	0	(=0.000001)

Assumption: 14 Remove Dam Communication Bldg. on left abutment. Unit Price **Cell: R27**

BetaPERT distribution with parameters:

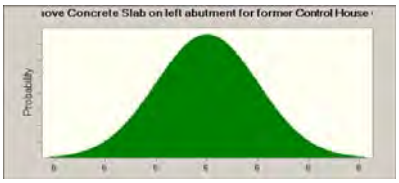
Minimum	$38.00	(=Q27)
Likeliest	$40.00	(=R27)
Maximum	$42.00	(=S27)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Quantity **Cell: L28**

Normal distribution with parameters:

Mean	6	(=L28)
Std. Dev.	0	(=0.000001)



Assumption: 15 Remove Concrete Slab on left abutment for former Control House Ut **Cell: R28**

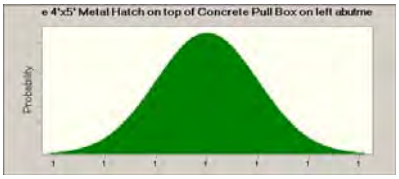
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q28)
Likeliest	$260.00	(=R28)
Maximum	$390.00	(=S28)

Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment **Cell: Q29**

Normal distribution with parameters:

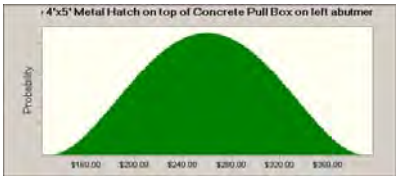
Mean	1	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 16 Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutment **Cell: R29**

BetaPERT distribution with parameters:

Minimum	$130.00	(=Q29)
Likeliest	$260.00	(=R29)
Maximum	$390.00	(=S29)



Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Quantity **Cell: L30**

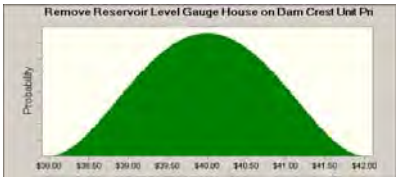
Normal distribution with parameters:

Mean	24	(=L30)
Std. Dev.	0	(=0.000001)

Assumption: 17 Remove Reservoir Level Gauge House on Dam Crest Unit Price **Cell: R30**

BetaPERT distribution with parameters:

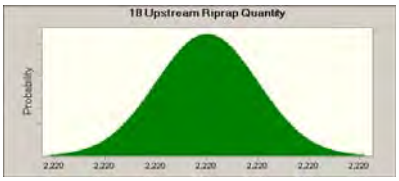
Minimum	$38.00	(=Q30)
Likeliest	$40.00	(=R30)
Maximum	$42.00	(=S30)



Assumption: 18 Upstream Riprap Quantity **Cell: L31**

Normal distribution with parameters:

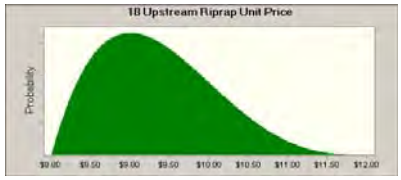
Mean	2,220	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 18 Upstream Riprap Unit Price **Cell: R31**

BetaPERT distribution with parameters:

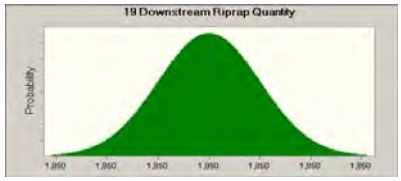
Minimum	$8.00	(=Q31)
Likeliest	$9.00	(=R31)
Maximum	$12.00	(=S31)



Assumption: 19 Downstream Riprap Quantity **Cell: L32**

Normal distribution with parameters:

Mean	1,850	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 19 Downstream Riprap Unit Price **Cell: R32**

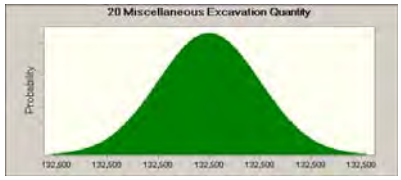
BetaPERT distribution with parameters:

Minimum	$8.00	(=Q32)
Likeliest	$9.00	(=R32)
Maximum	$12.00	(=S32)

Assumption: 20 Miscellaneous Excavation Quantity **Cell: L33**

Normal distribution with parameters:

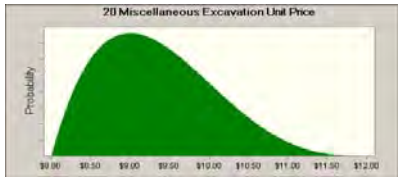
Mean	132,500	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 20 Miscellaneous Excavation Unit Price **Cell: R33**

BetaPERT distribution with parameters:

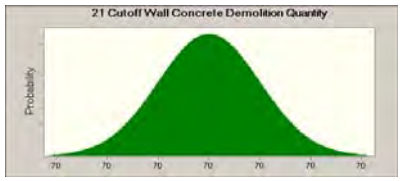
Minimum	$8.00	(=Q33)
Likeliest	$9.00	(=R33)
Maximum	$12.00	(=S33)



Assumption: 21 Cutoff Wall Concrete Demolition Quantity **Cell: L34**

Normal distribution with parameters:

Mean	70	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 21 Cutoff Wall Concrete Demolition Unit Price **Cell: R34**

BetaPERT distribution with parameters:

Minimum	$130.00	(=Q34)
Likeliest	$260.00	(=R34)
Maximum	$390.00	(=S34)

Assumption: 22 Cutoff Wall Anchors Quantity **Cell: L35**

Normal distribution with parameters:

Mean	285	(=L35)
Std. Dev.	0	(=0.000001)

Assumption: 22 Cutoff Wall Anchors Unit Price **Cell: R35**

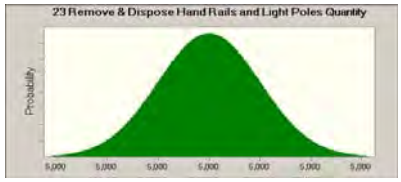
BetaPERT distribution with parameters:

Minimum	$9.00	(=Q35)
Likeliest	$10.00	(=R35)
Maximum	$12.00	(=S35)

Assumption: 23 Remove & Dispose Hand Rails and Light Poles Quantity **Cell: L36**

Normal distribution with parameters:

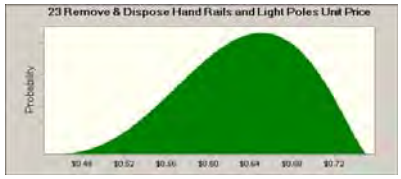
Mean	5,000	(=L36)
Std. Dev.	0	(=0.000001)



Assumption: 23 Remove & Dispose Hand Rails and Light Poles Unit Price **Cell: R36**

BetaPERT distribution with parameters:

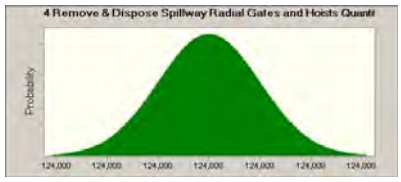
Minimum	$0.45	(=Q36)
Likeliest	$0.65	(=R36)
Maximum	$0.75	(=S36)



Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Quantity **Cell: L37**

Normal distribution with parameters:

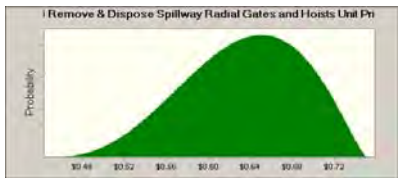
Mean	124,000	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 24 Remove & Dispose Spillway Radial Gates and Hoists Unit Price **Cell: R37**

BetaPERT distribution with parameters:

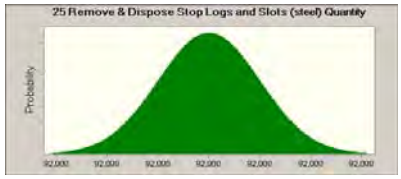
Minimum	$0.45	(=Q37)
Likeliest	$0.65	(=R37)
Maximum	$0.75	(=S37)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Quantity **Cell: L38**

Normal distribution with parameters:

Mean	92,000	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 25 Remove & Dispose Stop Logs and Slots (steel) Unit Price **Cell: R38**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q38)
Likeliest	$0.65	(=R38)
Maximum	$0.75	(=S38)

Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure **Cell: L39**

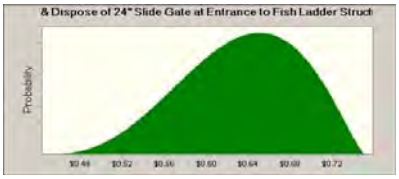
Normal distribution with parameters:

Mean	4,200	(=L39)
Std. Dev.	0	(=0.000001)

Assumption: 26 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure **Cell: R39**

BetaPERT distribution with parameters:

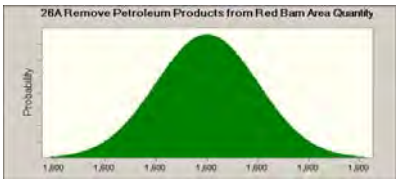
Minimum	$0.45	(=Q39)
Likeliest	$0.65	(=R39)
Maximum	$0.75	(=S39)



Assumption: 26A Remove Petroleum Products from Red Barn Area Quantity **Cell: L40**

Normal distribution with parameters:

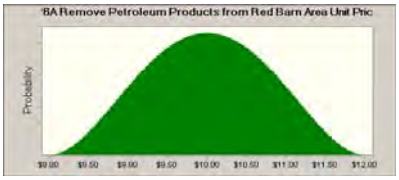
Mean	1,600	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 26A Remove Petroleum Products from Red Barn Area Unit Price **Cell: R40**

BetaPERT distribution with parameters:

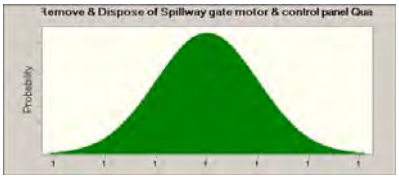
Minimum	$8.00	(=Q40)
Likeliest	$10.00	(=R40)
Maximum	$12.00	(=S40)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Quantity **Cell: L41**

Normal distribution with parameters:

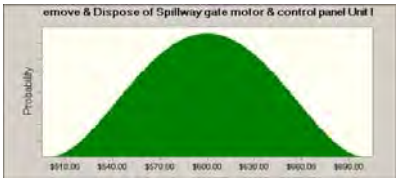
Mean	1	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Unit Price **Cell: R41**

BetaPERT distribution with parameters:

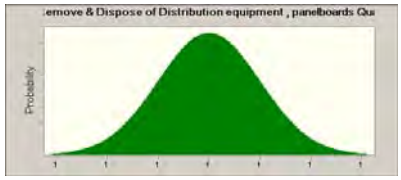
Minimum	$500.00	(=Q41)
Likeliest	$600.00	(=R41)
Maximum	$700.00	(=S41)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Quantity **Cell: L42**

Normal distribution with parameters:

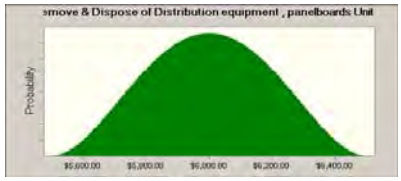
Mean	1	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Unit Price **Cell: R42**

BetaPERT distribution with parameters:

Minimum	$5,500.00	(=Q42)
Likeliest	$6,000.00	(=R42)
Maximum	$6,500.00	(=S42)



Assumption: 31 Remove Warehouse near Powerhouse Quantity **Cell: L45**

Normal distribution with parameters:

Mean	5,200	(=L45)
Std. Dev.	0	(=0.000001)

Assumption: 31 Remove Warehouse near Powerhouse Unit Price **Cell: R45**

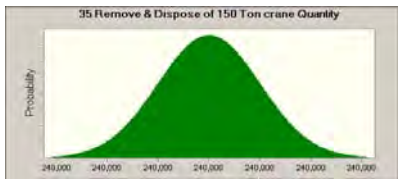
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q45)
Likeliest	$40.00	(=R45)
Maximum	$42.00	(=S45)

Assumption: 35 Remove & Dispose of 150 Ton crane Quantity **Cell: L49**

Normal distribution with parameters:

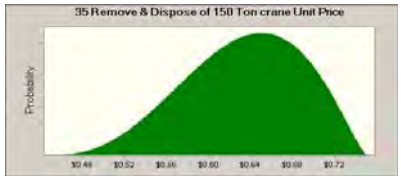
Mean	240,000	(=L49)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose of 150 Ton crane Unit Price **Cell: R49**

BetaPERT distribution with parameters:

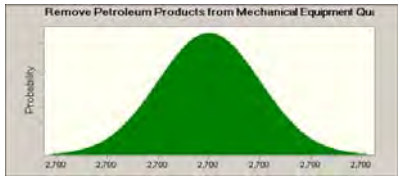
Minimum	$0.45	(=Q49)
Likeliest	$0.65	(=R49)
Maximum	$0.75	(=S49)



Assumption: 43A Remove Petroleum Products from Mechanical Equipment Quantity **Cell: L58**

Normal distribution with parameters:

Mean	2,700	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 43A Remove Petroleum Products from Mechanical Equipment Unit Price **Cell: R58**

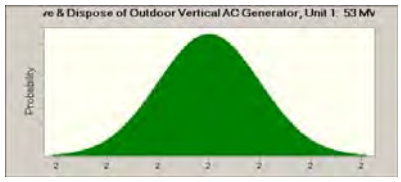
BetaPERT distribution with parameters:

Minimum	$8.00	(=Q58)
Likeliest	$10.00	(=R58)
Maximum	$12.00	(=S58)

Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Qua **Cell: L59**

Normal distribution with parameters:

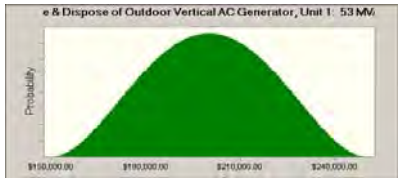
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Cell: R59

BetaPERT distribution with parameters:

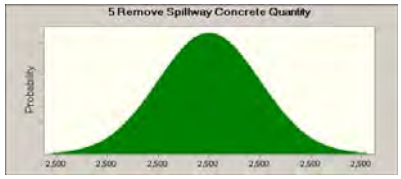
Minimum	$150,000.00	(=Q59)
Likeliest	$200,000.00	(=R59)
Maximum	$250,000.00	(=S59)



Assumption: 5 Remove Spillway Concrete Quantity Cell: L18

Normal distribution with parameters:

Mean	2,500	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove Spillway Concrete Unit Price Cell: R18

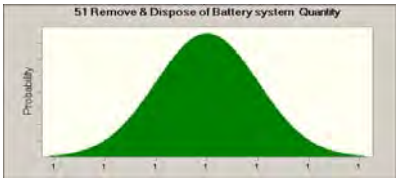
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q18)
Likeliest	$260.00	(=R18)
Maximum	$390.00	(=S18)

Assumption: 51 Remove & Dispose of Battery system Quantity **Cell: L66**

Normal distribution with parameters:

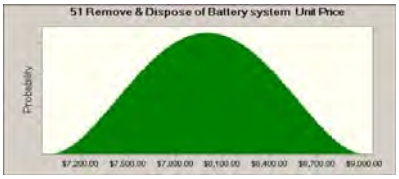
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose of Battery system Unit Price **Cell: R66**

BetaPERT distribution with parameters:

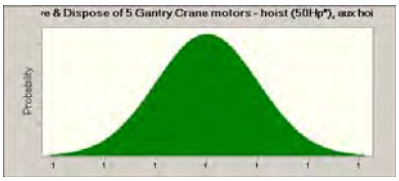
Minimum	$7,000.00	(=Q66)
Likeliest	$8,000.00	(=R66)
Maximum	$9,000.00	(=S66)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoi **Cell: L69**

Normal distribution with parameters:

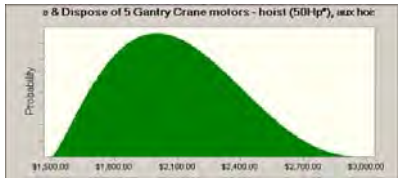
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Unit **Cell: R69**

BetaPERT distribution with parameters:

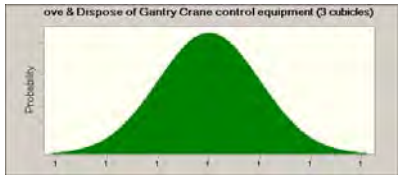
Minimum	$1,500.00	(=Q69)
Likeliest	$2,000.00	(=R69)
Maximum	$3,000.00	(=S69)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Quantity **Cell: L70**

Normal distribution with parameters:

Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Unit Price **Cell: R70**

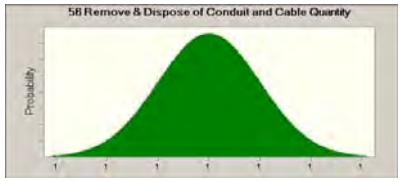
BetaPERT distribution with parameters:

Minimum	$5,000.00	(=Q70)
Likeliest	$6,000.00	(=R70)
Maximum	$7,000.00	(=S70)

Assumption: 56 Remove & Dispose of Conduit and Cable Quantity **Cell: L71**

Normal distribution with parameters:

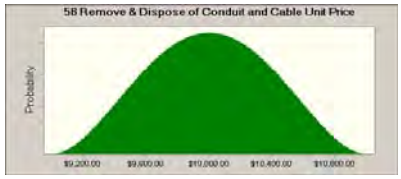
Mean	1	(=L71)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose of Conduit and Cable Unit Price **Cell: R71**

BetaPERT distribution with parameters:

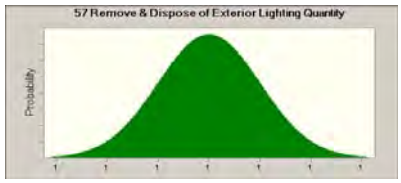
Minimum	$9,000.00	(=Q71)
Likeliest	$10,000.00	(=R71)
Maximum	$11,000.00	(=S71)



Assumption: 57 Remove & Dispose of Exterior Lighting Quantity **Cell: L72**

Normal distribution with parameters:

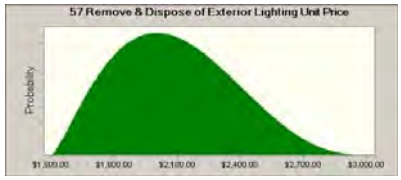
Mean	1	(=L72)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose of Exterior Lighting Unit Price **Cell: R72**

BetaPERT distribution with parameters:

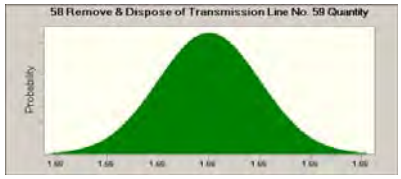
Minimum	$1,500.00	(=Q72)
Likeliest	$2,000.00	(=R72)
Maximum	$3,000.00	(=S72)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Quantity **Cell: L73**

Normal distribution with parameters:

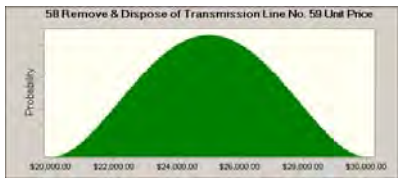
Mean	1.66	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

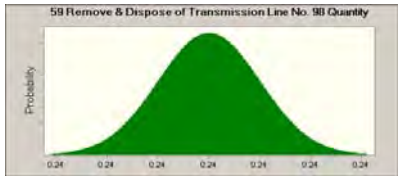
Minimum	$20,000.00	(=Q73)
Likeliest	$25,000.00	(=R73)
Maximum	$30,000.00	(=S73)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Quantity **Cell: L74**

Normal distribution with parameters:

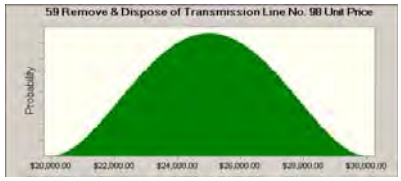
Mean	0.24	(=L74)
Std. Dev.	0.00	(=0.000001)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Unit Price **Cell: R74**

BetaPERT distribution with parameters:

Minimum	$20,000.00	(=Q74)
Likeliest	$25,000.00	(=R74)
Maximum	$30,000.00	(=S74)



Assumption: 6 Remove Monorail Structural Steel Components Quantity **Cell: L19**

Normal distribution with parameters:

Mean	15,000	(=L19)
Std. Dev.	0	(=0.000001)

Assumption: 6 Remove Monorail Structural Steel Components Unit Price **Cell: R19**

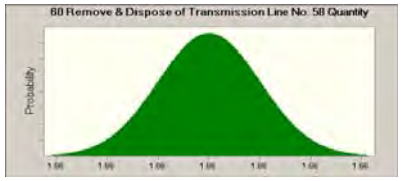
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q19)
Likeliest	$0.65	(=R19)
Maximum	$0.75	(=S19)

Assumption: 60 Remove & Dispose of Transmission Line No. 58 Quantity **Cell: L75**

Normal distribution with parameters:

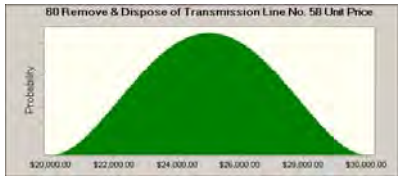
Mean	1.66	(=L75)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Unit Price **Cell: R75**

BetaPERT distribution with parameters:

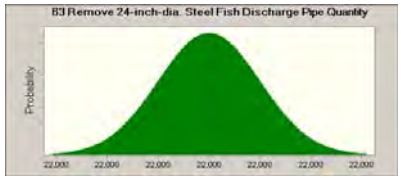
Minimum	$20,000.00	(=Q75)
Likeliest	$25,000.00	(=R75)
Maximum	$30,000.00	(=S75)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Quantity **Cell: L78**

Normal distribution with parameters:

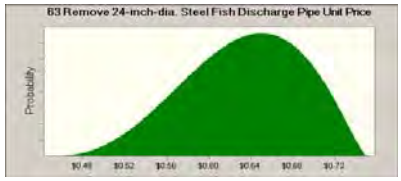
Mean	22,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Unit Price **Cell: R78**

BetaPERT distribution with parameters:

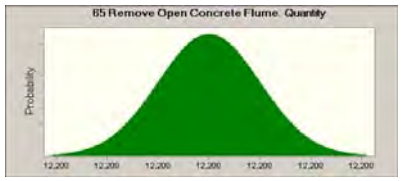
Minimum	$0.45	(=Q78)
Likeliest	$0.65	(=R78)
Maximum	$0.75	(=S78)



Assumption: 65 Remove Open Concrete Flume. Quantity **Cell: L80**

Normal distribution with parameters:

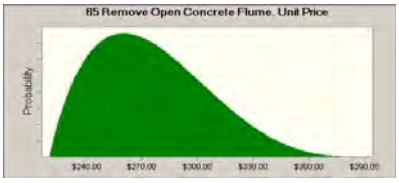
Mean	12,200	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove Open Concrete Flume. Unit Price **Cell: R80**

BetaPERT distribution with parameters:

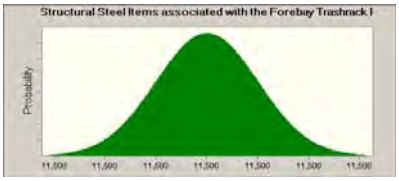
Minimum	$220.00	(=Q80)
Likeliest	$260.00	(=R80)
Maximum	$390.00	(=S80)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Pie **Cell: L81**

Normal distribution with parameters:

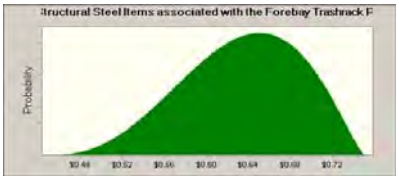
Mean	11,500	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Pie **Cell: R81**

BetaPERT distribution with parameters:

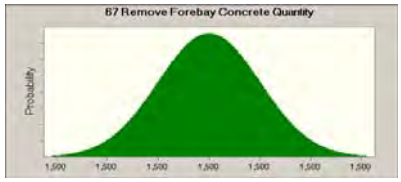
Minimum	$0.45	(=Q81)
Likeliest	$0.65	(=R81)
Maximum	$0.75	(=S81)



Assumption: 67 Remove Forebay Concrete Quantity **Cell: L82**

Normal distribution with parameters:

Mean	1,500	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove Forebay Concrete Unit Price **Cell: R82**

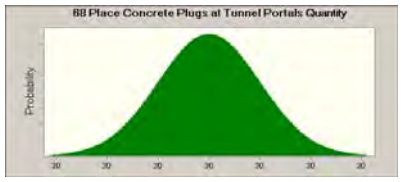
BetaPERT distribution with parameters:

Minimum	$220.00	(=Q82)
Likeliest	$260.00	(=R82)
Maximum	$390.00	(=S82)

Assumption: 68 Place Concrete Plugs at Tunnel Portals Quantity **Cell: L83**

Normal distribution with parameters:

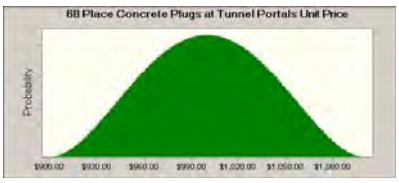
Mean	30	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Unit Price **Cell: R83**

BetaPERT distribution with parameters:

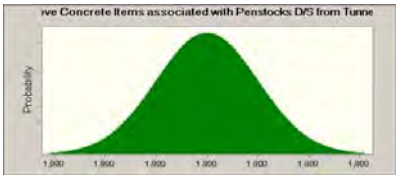
Minimum	$900.00	(=Q83)
Likeliest	$1,000.00	(=R83)
Maximum	$1,100.00	(=S83)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Quan **Cell: L84**

Normal distribution with parameters:

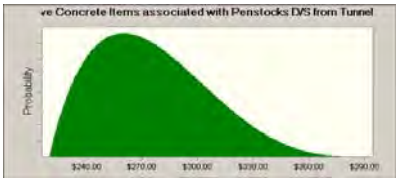
Mean	1,800	(=L84)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Unit P **Cell: R84**

BetaPERT distribution with parameters:

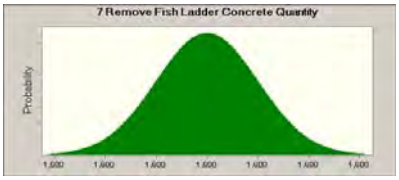
Minimum	$220.00	(=Q84)
Likeliest	$260.00	(=R84)
Maximum	$390.00	(=S84)



Assumption: 7 Remove Fish Ladder Concrete Quantity **Cell: L20**

Normal distribution with parameters:

Mean	1,600	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 7 Remove Fish Ladder Concrete Unit Price **Cell: R20**

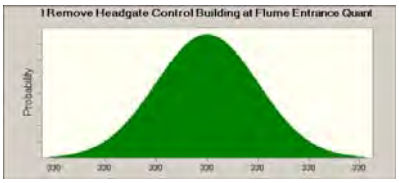
BetaPERT distribution with parameters:

Minimum	$130.00	(=Q20)
Likeliest	$260.00	(=R20)
Maximum	$390.00	(=S20)

Assumption: 70 Remove Headgate Control Building at Flume Entrance Quantity **Cell: L85**

Normal distribution with parameters:

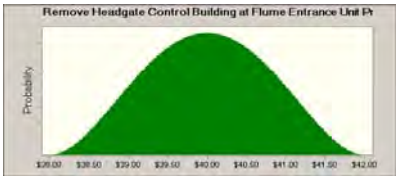
Mean	330	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove Headgate Control Building at Flume Entrance Unit Price **Cell: R85**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q85)
Likeliest	$40.00	(=R85)
Maximum	$42.00	(=S85)



Assumption: 71 Remove Forebay Spillway Gate House Quantity **Cell: L86**

Normal distribution with parameters:

Mean	570	(=L86)
Std. Dev.	0	(=0.000001)

Assumption: 71 Remove Forebay Spillway Gate House Unit Price **Cell: R86**

BetaPERT distribution with parameters:

Minimum	$38.00	(=Q86)
Likeliest	$40.00	(=R86)
Maximum	$42.00	(=S86)

Assumption: 72 Remove Forebay Control Building. Quantity **Cell: L87**

Normal distribution with parameters:

Mean	470	(=L87)
Std. Dev.	0	(=0.000001)

Assumption: 72 Remove Forebay Control Building. Unit Price **Cell: R87**

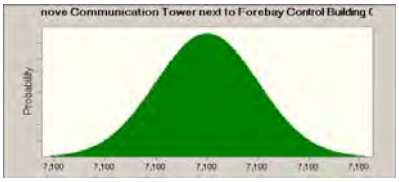
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q87)
Likeliest	$40.00	(=R87)
Maximum	$42.00	(=S87)

Assumption: 73 Remove Communication Tower next to Forebay Control Building Quantity **Cell: L88**

Normal distribution with parameters:

Mean	7,100	(=L88)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove Communication Tower next to Forebay Control Building Unit Price **Cell: R88**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q88)
Likeliest	$0.65	(=R88)
Maximum	$0.75	(=S88)

Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Qty **Cell: L89**

Normal distribution with parameters:

Mean	72	(=L89)
Std. Dev.	0	(=0.000001)

Assumption: 74 Remove Insulated Generator Building next to Forebay Control Building Unit **Cell: R89**

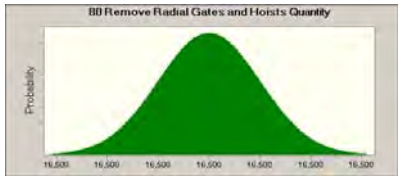
BetaPERT distribution with parameters:

Minimum	$38.00	(=Q89)
Likeliest	$40.00	(=R89)
Maximum	$42.00	(=S89)

Assumption: 80 Remove Radial Gates and Hoists Quantity **Cell: L95**

Normal distribution with parameters:

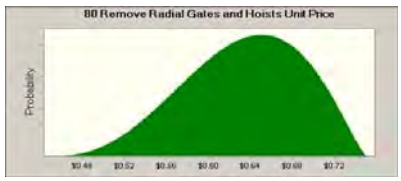
Mean	16,500	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: 80 Remove Radial Gates and Hoists Unit Price **Cell: R95**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q95)
Likeliest	$0.65	(=R95)
Maximum	$0.75	(=S95)



Assumption: 81 Remove Trash rack and trash rake (steel) Quantity **Cell: L96**

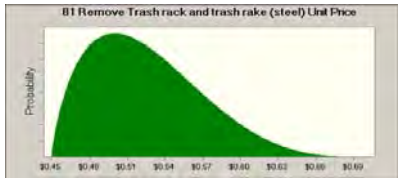
Normal distribution with parameters:

Mean	43,500	(=L96)
Std. Dev.	0	(=0.000001)

Assumption: 81 Remove Trash rack and trash rake (steel) Unit Price **Cell: R96**

BetaPERT distribution with parameters:

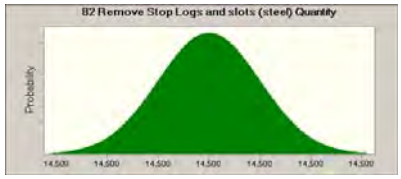
Minimum	$0.45	(=Q96)
Likeliest	$0.50	(=R96)
Maximum	$0.70	(=S96)



Assumption: 82 Remove Stop Logs and slots (steel) Quantity **Cell: L97**

Normal distribution with parameters:

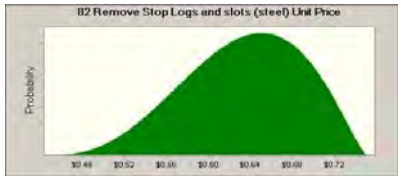
Mean	14,500	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: 82 Remove Stop Logs and slots (steel) Unit Price **Cell: R97**

BetaPERT distribution with parameters:

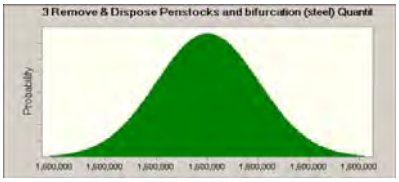
Minimum	$0.45	(=Q97)
Likeliest	$0.65	(=R97)
Maximum	$0.75	(=S97)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Quantity **Cell: L98**

Normal distribution with parameters:

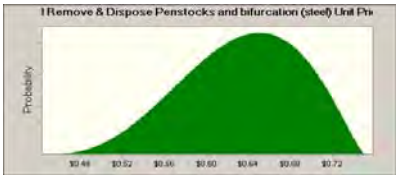
Mean	1,600,000	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Unit Price **Cell: R98**

BetaPERT distribution with parameters:

Minimum	$0.45	(=Q98)
Likeliest	$0.65	(=R98)
Maximum	$0.75	(=S98)



Assumption: 84 Remove & Dispose Surge Tank (steel) Quantity **Cell: L99**

Normal distribution with parameters:

Mean	79,000	(=L99)
Std. Dev.	0	(=0.000001)

Assumption: 84 Remove & Dispose Surge Tank (steel) Unit Price **Cell: R99**

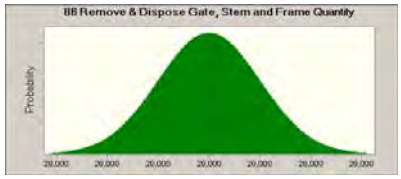
BetaPERT distribution with parameters:

Minimum	$0.45	(=Q99)
Likeliest	$0.65	(=R99)
Maximum	$0.75	(=S99)

Assumption: 86 Remove & Dispose Gate, Stem and Frame Quantity **Cell: L101**

Normal distribution with parameters:

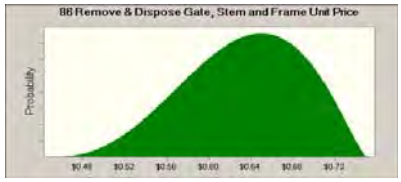
Mean	28,000	(=L101)
Std. Dev.	0	(=0.000001)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Unit Price **Cell: R101**

BetaPERT distribution with parameters:

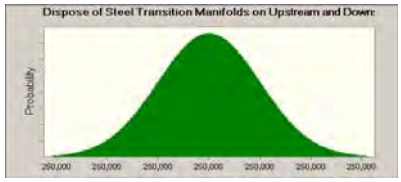
Minimum	$0.45	(=Q101)
Likeliest	$0.65	(=R101)
Maximum	$0.75	(=S101)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Down Cell: L102

Normal distribution with parameters:

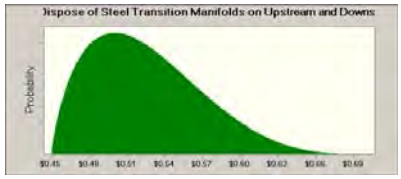
Mean	250,000	(=L102)
Std. Dev.	0	(=0.000001)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Down Cell: R102

BetaPERT distribution with parameters:

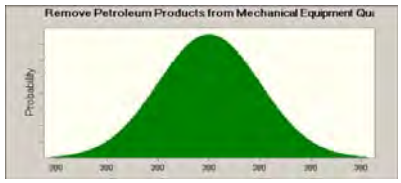
Minimum	$0.45	(=Q102)
Likeliest	$0.50	(=R102)
Maximum	$0.70	(=S102)



Assumption: 87A Remove Petroleum Products from Mechanical Equipment Quantity Cell: L103

Normal distribution with parameters:

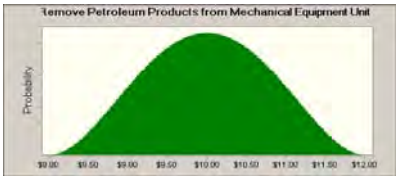
Mean	380	(=L103)
Std. Dev.	0	(=0.000001)



Assumption: 87A Remove Petroleum Products from Mechanical Equipment Unit Pri **Cell: R103**

BetaPERT distribution with parameters:

Minimum	$8.00	(=Q103)
Likeliest	$10.00	(=R103)
Maximum	$12.00	(=S103)



Assumption: 88 Temporary Access Roads Quantity **Cell: L104**

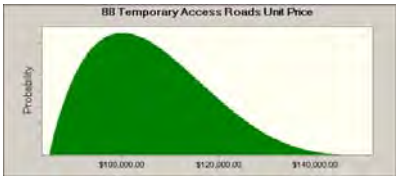
Normal distribution with parameters:

Mean	2	(=L104)
Std. Dev.	0	(=0.000001)

Assumption: 88 Temporary Access Roads Unit Price **Cell: R104**

BetaPERT distribution with parameters:

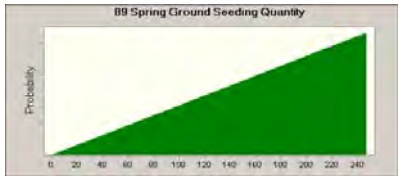
Minimum	$85,000.00	(=Q104)
Likeliest	$100,000.00	(=S104)
Maximum	$150,000.00	(=R104)



Assumption: 89 Spring Ground Seeding Quantity **Cell: L105**

Triangular distribution with parameters:

Minimum	0	(=M105)
Likeliest	247	(=L105)
Maximum	247	(=K105)



Assumption: 89 Spring Ground Seeding Unit Price **Cell: R105**

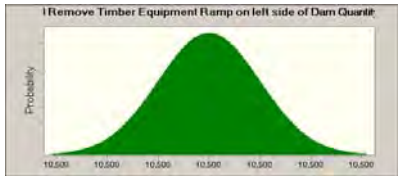
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q105)
Likeliest	$3,500.00	(=R105)
Maximum	$4,000.00	(=S105)

Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Quantity **Cell: L22**

Normal distribution with parameters:

Mean	10,500	(=L22)
Std. Dev.	0	(=0.000001)



Assumption: 9 Remove Timber Equipment Ramp on left side of Dam Unit Price **Cell: R22**

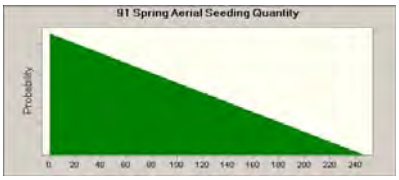
BetaPERT distribution with parameters:

Minimum	$0.50	(=Q22)
Likeliest	$0.55	(=R22)
Maximum	$0.70	(=S22)

Assumption: 91 Spring Aerial Seeding Quantity **Cell: L107**

Triangular distribution with parameters:

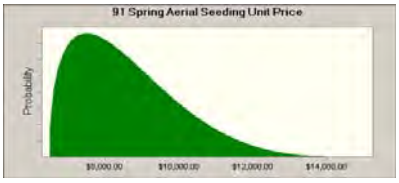
Minimum	0	(=K107)
Likeliest	0	(=L107)
Maximum	247	(=M107)



Assumption: 91 Spring Aerial Seeding Unit Price **Cell: R107**

BetaPERT distribution with parameters:

Minimum	$6,500.00	(=Q107)
Likeliest	$7,500.00	(=R107)
Maximum	$15,000.00	(=S107)



Assumption: 92 Fall Ground Seeding Quantity **Cell: L108**

Triangular distribution with parameters:

Minimum	62	(=K108)
Likeliest	124	(=L108)
Maximum	185	(=M108)

Assumption: 92 Fall Ground Seeding Unit Price **Cell: R108**

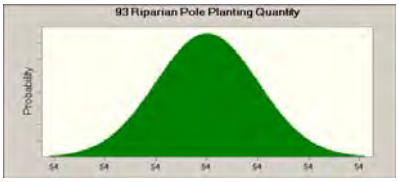
BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q108)
Likeliest	$3,500.00	(=R108)
Maximum	$4,000.00	(=S108)

Assumption: 93 Riparian Pole Planting Quantity **Cell: L109**

Normal distribution with parameters:

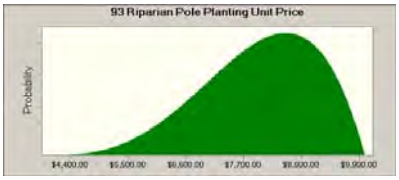
Mean	54	(=L109)
Std. Dev.	0	(=0.000001)



Assumption: 93 Riparian Pole Planting Unit Price **Cell: R109**

BetaPERT distribution with parameters:

Minimum	$4,000.00	(=Q109)
Likeliest	$8,500.00	(=R109)
Maximum	$10,000.00	(=S109)



Assumption: 94 Weed Management Quantity **Cell: L110**

Triangular distribution with parameters:

Minimum	62	(=K110)
Likeliest	124	(=L110)
Maximum	185	(=M110)

Assumption: 94 Weed Management Unit Price **Cell: R110**

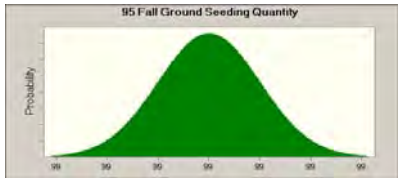
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q110)
Likeliest	$1,500.00	(=R110)
Maximum	$2,000.00	(=S110)

Assumption: 95 Fall Ground Seeding Quantity **Cell: L111**

Normal distribution with parameters:

Mean	99	(=L111)
Std. Dev.	0	(=0.000001)



Assumption: 95 Fall Ground Seeding Unit Price **Cell: R111**

BetaPERT distribution with parameters:

Minimum	$3,000.00	(=Q111)
Likeliest	$3,500.00	(=R111)
Maximum	$4,000.00	(=S111)

Assumption: 96 Weed Management Quantity **Cell: L112**

Normal distribution with parameters:

Mean	99	(=L112)
Std. Dev.	0	(=0.000001)

Assumption: 96 Weed Management Unit Price **Cell: R112**

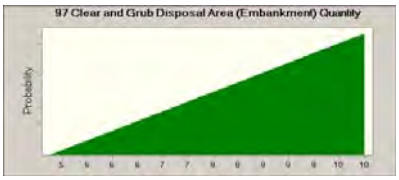
BetaPERT distribution with parameters:

Minimum	$1,000.00	(=Q112)
Likeliest	$1,500.00	(=R112)
Maximum	$2,000.00	(=S112)

Assumption: 97 Clear and Grub Disposal Area (Embankment) Quantity **Cell: L113**

Triangular distribution with parameters:

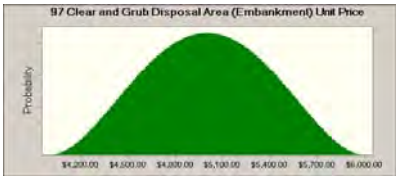
Minimum	5	(=M113)
Likeliest	10	(=L113)
Maximum	10	(=K113)



Assumption: 97 Clear and Grub Disposal Area (Embankment) Unit Price **Cell: R113**

BetaPERT distribution with parameters:

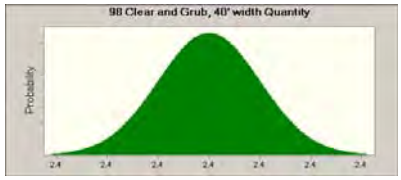
Minimum	$4,000.00	(=Q113)
Likeliest	$5,000.00	(=R113)
Maximum	$6,000.00	(=S113)



Assumption: 98 Clear and Grub, 40' width Quantity **Cell: L114**

Normal distribution with parameters:

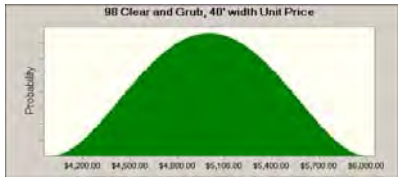
Mean	2.4	(=L114)
Std. Dev.	0.0	(=0.000001)



Assumption: 98 Clear and Grub, 40' width Unit Price **Cell: R114**

BetaPERT distribution with parameters:

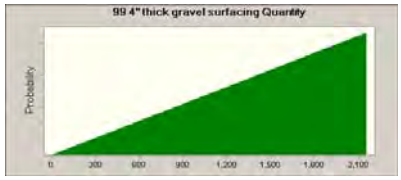
Minimum	$4,000.00	(=Q114)
Likeliest	$5,000.00	(=R114)
Maximum	$6,000.00	(=S114)



Assumption: 99 4" thick gravel surfacing Quantity **Cell: L115**

Triangular distribution with parameters:

Minimum	0	(=K115)
Likeliest	2,150	(=L115)
Maximum	2,150	(=M115)



Assumption: 99 4" thick gravel surfacing Unit Price **Cell: R115**

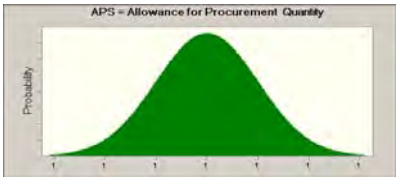
BetaPERT distribution with parameters:

Minimum	$20.00	(=Q115)
Likeliest	$30.00	(=R115)
Maximum	$40.00	(=S115)

Assumption: APS = Allowance for Procurement Quantity **Cell: L143**

Normal distribution with parameters:

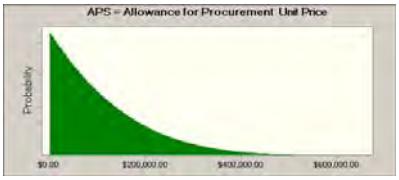
Mean	1	(=L143)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R143**

BetaPERT distribution with parameters:

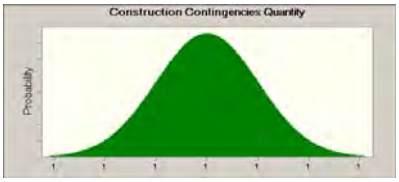
Minimum	$0.00	(=Q143)
Likeliest	$0.00	(=R143)
Maximum	$657,308.00	(=S143)



Assumption: Construction Contingencies Quantity **Cell: L146**

Normal distribution with parameters:

Mean	1	(=L146)
Std. Dev.	0	(=0.000001)



Assumption: Construction Contingencies Unit Price **Cell: R146**

BetaPERT distribution with parameters:

Minimum	$2,000,000.00	(=Q146)
Likeliest	$3,000,000.00	(=R146)
Maximum	$9,000,000.00	(=S146)

Assumption: Design Contingencies Quantity **Cell: L142**

Normal distribution with parameters:

Mean	1	(=L142)
Std. Dev.	0	(=0.000001)

Assumption: Design Contingencies Unit Price **Cell: R142**

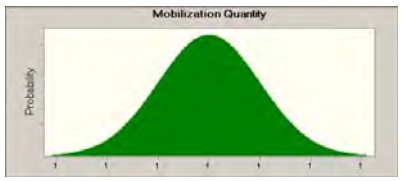
BetaPERT distribution with parameters:

Minimum	$834,629.00	(=Q142)
Likeliest	$1,667,215.00	(=R142)
Maximum	$4,274,078.00	(=S142)

Assumption: Mobilization Quantity **Cell: L137**

Normal distribution with parameters:

Mean	1	(=L137)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R137**

BetaPERT distribution with parameters:

Minimum	$460,000.00	(=Q137)
Likeliest	$680,000.00	(=R137)
Maximum	$1,400,000.00	(=S137)

Assumption: Non-Contract Cost Quantity **Cell: L148**

Normal distribution with parameters:

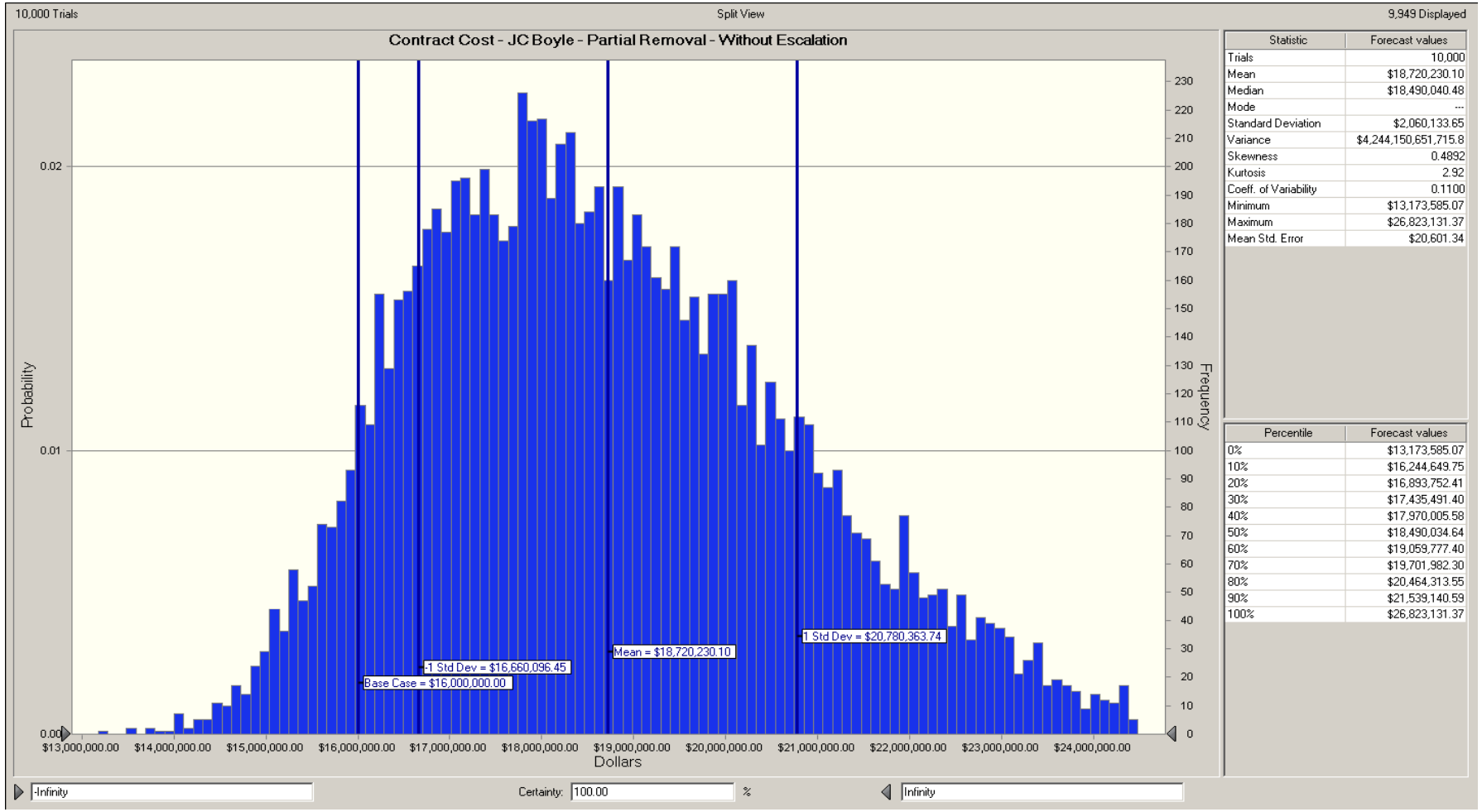
Mean	1	(=L148)
Std. Dev.	0	(=0.000001)

Assumption: Non-Contract Cost Unit Price **Cell: R148**

BetaPERT distribution with parameters:

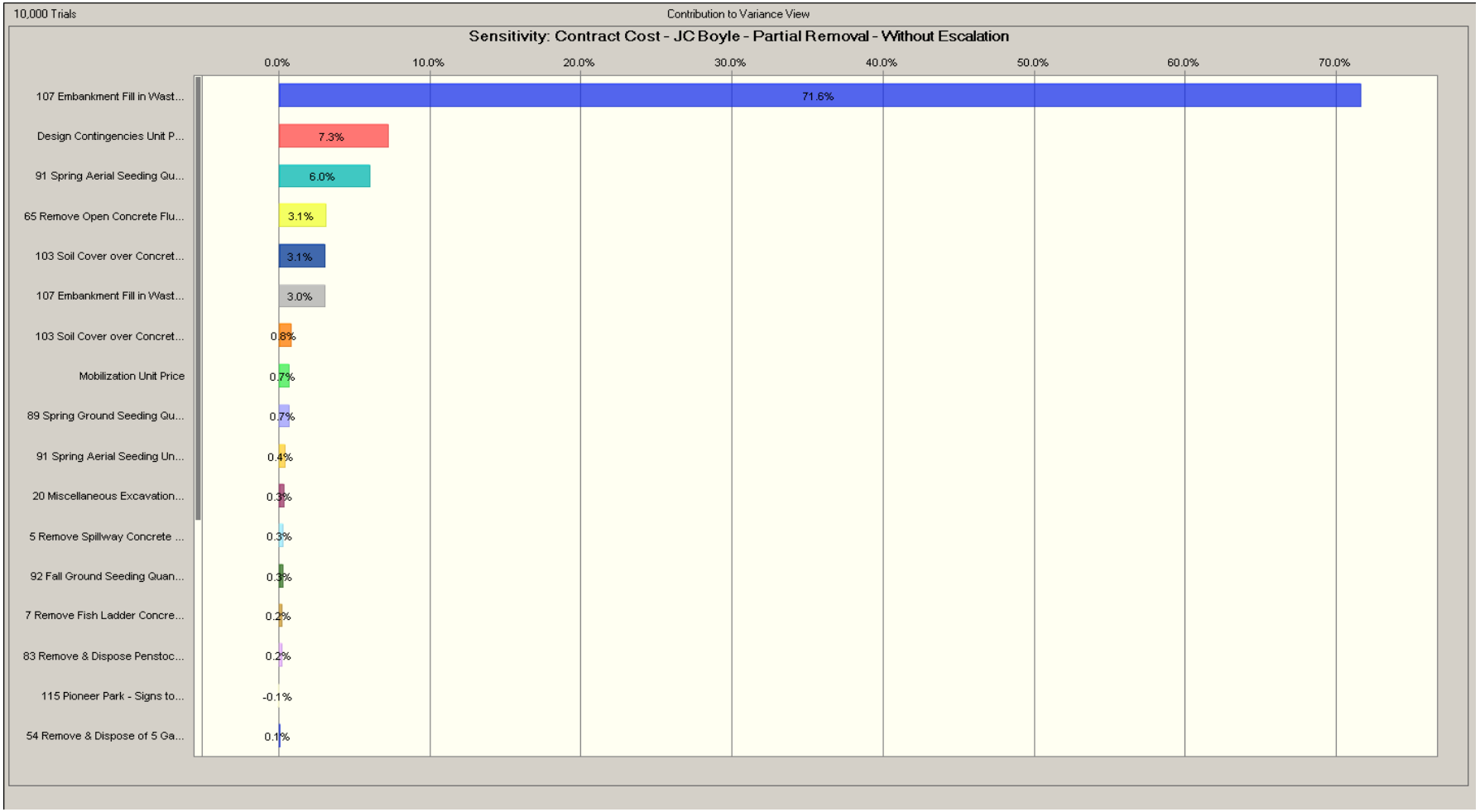
Minimum	$7,500,000.00	(=Q148)
Likeliest	$12,000,000.00	(=R148)
Maximum	$31,000,000.00	(=S148)

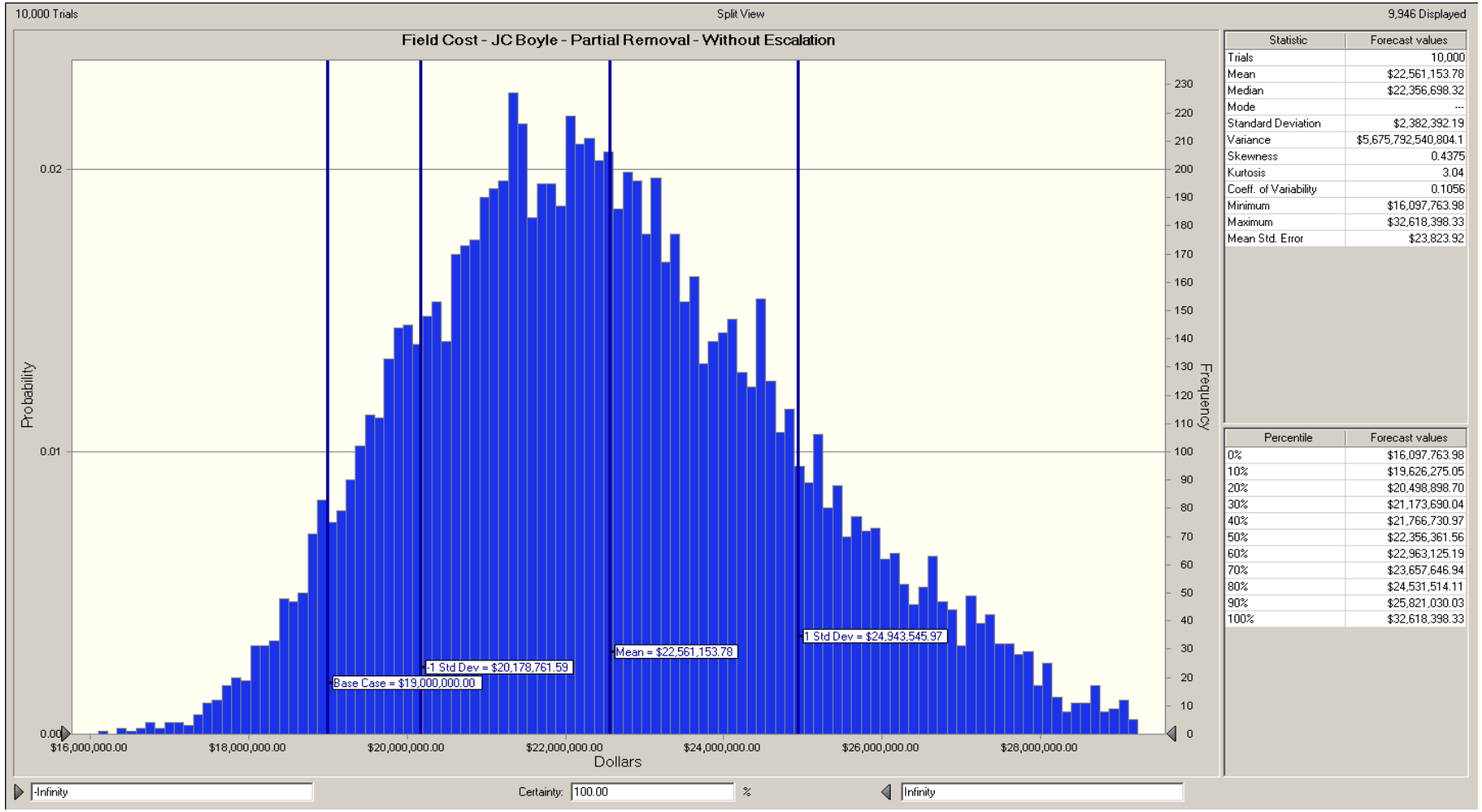
End of Assumptions



Statistic	Forecast values
Trials	10,000
Mean	$18,720,230.10
Median	$18,490,040.48
Mode	---
Standard Deviation	$2,060,133.65
Variance	$4,244,150,651,715.8
Skewness	0.4892
Kurtosis	2.92
Coeff. of Variability	0.1100
Minimum	$13,173,585.07
Maximum	$26,823,131.37
Mean Std. Error	$20,601.34

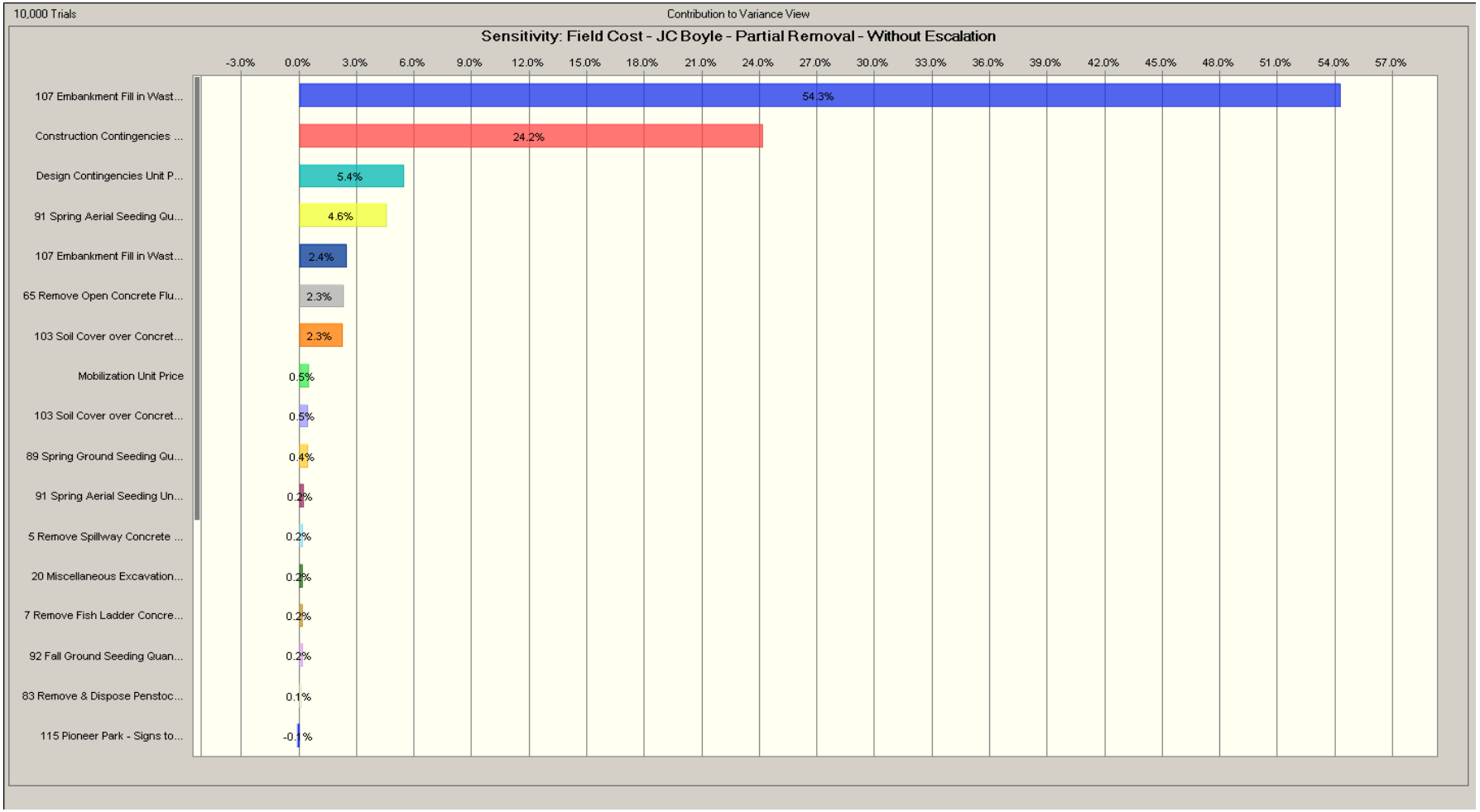
Percentile	Forecast values
0%	$13,173,585.07
10%	$16,244,649.75
20%	$16,893,752.41
30%	$17,435,491.40
40%	$17,970,005.58
50%	$18,490,034.64
60%	$19,059,777.40
70%	$19,701,982.30
80%	$20,464,313.55
90%	$21,539,140.59
100%	$26,823,131.37

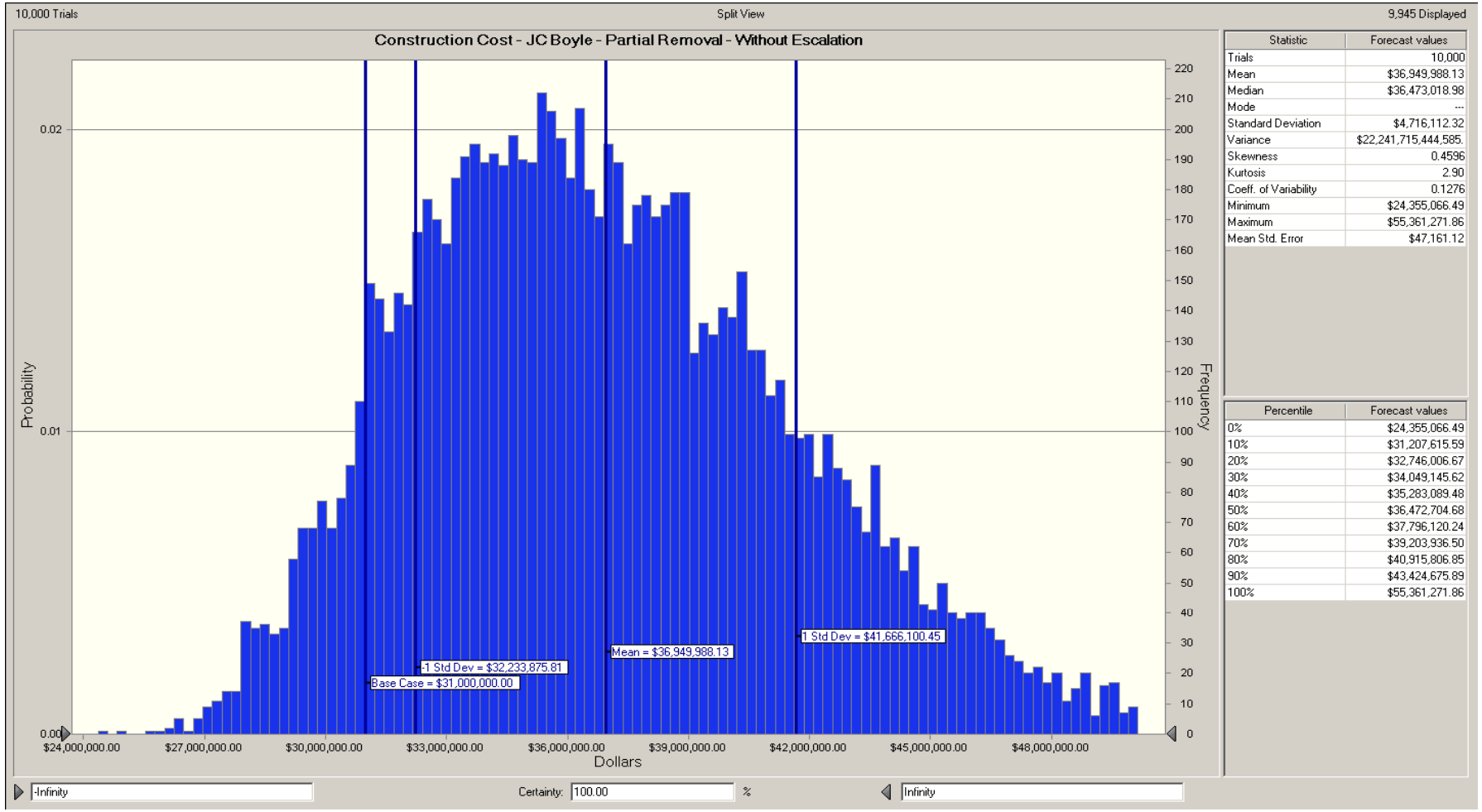

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - JC Boyle - Partial Removal - Without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
107 Embankment Fill in Wast...
71.6%
Design Contingencies Unit P...
7.3%
91 Spring Aerial Seeding Qu...
6.0%
65 Remove Open Concrete Flu...
3.1%
103 Soil Cover over Concret...
3.1%
107 Embankment Fill in Wast...
3.0%
103 Soil Cover over Concret...
0.8%
Mobilization Unit Price
0.7%
89 Spring Ground Seeding Qu...
0.7%
91 Spring Aerial Seeding Un...
0.4%
20 Miscellaneous Excavation...
0.3%
5 Remove Spillway Concrete ...
0.3%
92 Fall Ground Seeding Quan...
0.3%
7 Remove Fish Ladder Concre...
0.2%
83 Remove & Dispose Penstoc...
0.2%
115 Pioneer Park - Signs to...
-0.1%
54 Remove & Dispose of 5 Ga...
0.1%



Statistic	Forecast values
Trials	10,000
Mean	$22,561,153.78
Median	$22,356,698.32
Mode	---
Standard Deviation	$2,382,392.19
Variance	$5,675,792,540,804.1
Skewness	0.4375
Kurtosis	3.04
Coeff. of Variability	0.1056
Minimum	$16,097,763.98
Maximum	$32,618,398.33
Mean Std. Error	$23,823.92

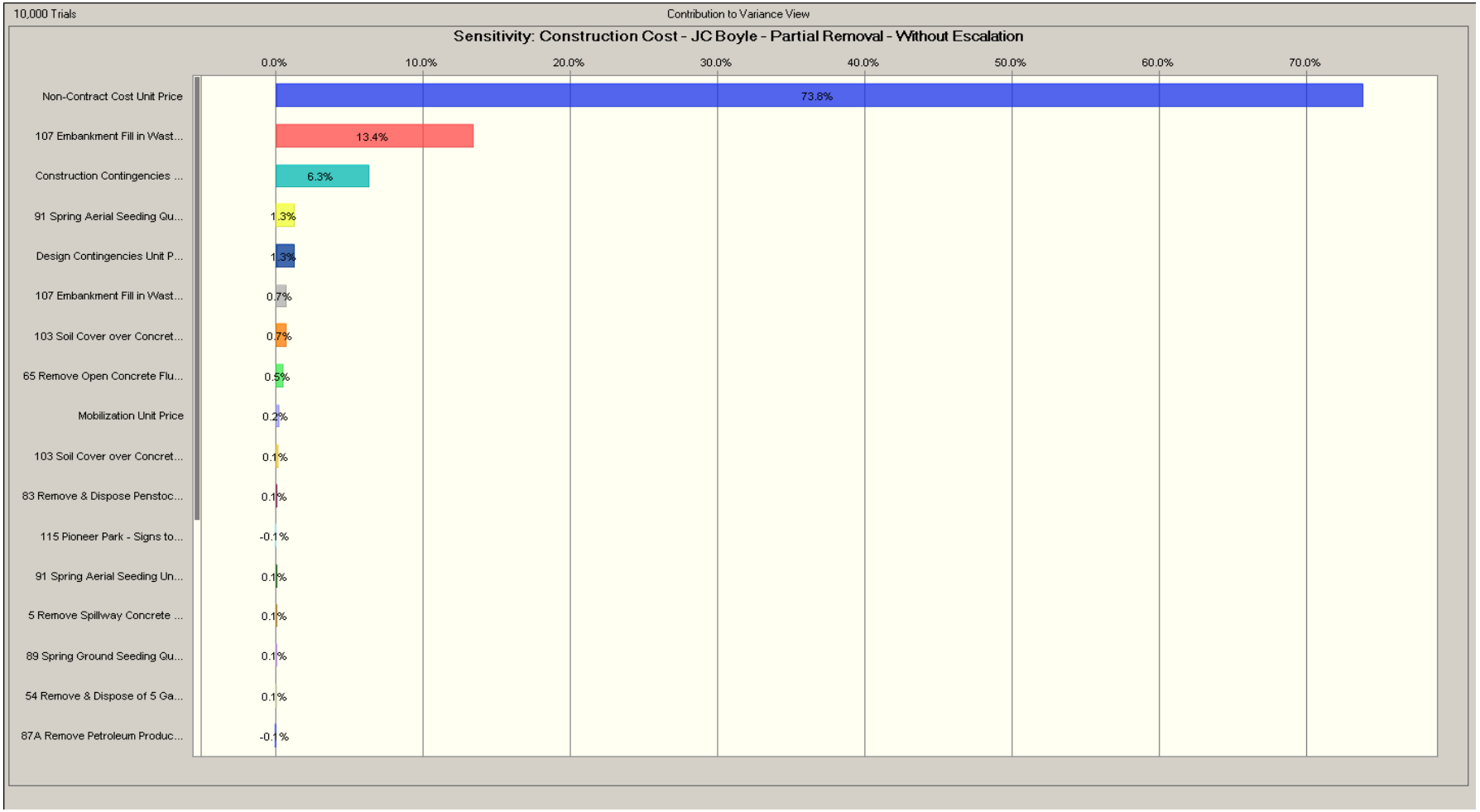
Percentile	Forecast values
0%	$16,097,763.98
10%	$19,626,275.05
20%	$20,498,898.70
30%	$21,173,690.04
40%	$21,766,730.97
50%	$22,356,361.56
60%	$22,963,125.19
70%	$23,657,646.94
80%	$24,531,514.11
90%	$25,821,030.03
100%	$32,618,398.33


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - JC Boyle - Partial Removal - Without Escalation
-3.0% 0.0% 3.0% 6.0% 9.0% 12.0% 15.0% 18.0% 21.0% 24.0% 27.0% 30.0% 33.0% 36.0% 39.0% 42.0% 45.0% 48.0% 51.0% 54.0% 57.0%
107 Embankment Fill in Wast... 54.3%
Construction Contingencies ... 24.2%
Design Contingencies Unit P... 5.4%
91 Spring Aerial Seeding Qu... 4.6%
107 Embankment Fill in Wast... 2.4%
65 Remove Open Concrete Flu... 2.3%
103 Soil Cover over Concret... 2.3%
Mobilization Unit Price 0.5%
103 Soil Cover over Concret... 0.5%
89 Spring Ground Seeding Qu... 0.4%
91 Spring Aerial Seeding Un... 0.2%
5 Remove Spillway Concrete ... 0.2%
20 Miscellaneous Excavation... 0.2%
7 Remove Fish Ladder Concre... 0.2%
92 Fall Ground Seeding Quan... 0.2%
83 Remove & Dispose Penstoc... 0.1%
115 Pioneer Park - Signs to... -0.1%



Statistic	Forecast values
Trials	10,000
Mean	$36,949,988.13
Median	$36,473,018.98
Mode	---
Standard Deviation	$4,716,112.32
Variance	$22,241,715,444,585.
Skewness	0.4596
Kurtosis	2.90
Coeff. of Variability	0.1276
Minimum	$24,355,066.49
Maximum	$55,361,271.86
Mean Std. Error	$47,161.12

Percentile	Forecast values
0%	$24,355,066.49
10%	$31,207,615.59
20%	$32,746,006.67
30%	$34,049,145.62
40%	$35,283,089.48
50%	$36,472,704.68
60%	$37,796,120.24
70%	$39,203,936.50
80%	$40,915,806.85
90%	$43,424,675.89
100%	$55,361,271.86


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - JC Boyle - Partial Removal - Without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
73.8%
107 Embankment Fill in Wast...
13.4%
Construction Contingencies ...
6.3%
91 Spring Aerial Seeding Qu...
1.3%
Design Contingencies Unit P...
1.3%
107 Embankment Fill in Wast...
0.7%
103 Soil Cover over Concret...
0.7%
65 Remove Open Concrete Flu...
0.5%
Mobilization Unit Price
0.2%
103 Soil Cover over Concret...
0.1%
83 Remove & Dispose Penstoc...
0.1%
115 Pioneer Park - Signs to...
-0.1%
91 Spring Aerial Seeding Un...
0.1%
5 Remove Spillway Concrete ...
0.1%
89 Spring Ground Seeding Qu...
0.1%
54 Remove & Dispose of 5 Ga...
0.1%
87A Remove Petroleum Produc...
-0.1%

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Included
Life Cycle
SUMMARY ESTIMATE

PROJECT:
Klamath River
Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION MP | **PRICE LEVEL:** Jul-10
FILE: U:\2011 Projects\Klamath\007 Crystal Ball\3\with\[03 JC Boyle Crystal Ball Spreadsheet with esc A.xlsx]Construction costs sensitivity

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	PI 1	Periodic Costs - Year 1	86-68130	1	1	1	LS	$299,400.00	$348,520.00	$394,940.00	$299,400.00	$348,520.00	$394,940.00
	PI 2	Periodic Costs - Year 5	86-68130	0	0	1	LS	$219,930.92	$219,930.92	$219,930.92	$0.00	$0.00	$219,930.92
	PI 3	Periodic Costs - Year 8	86-68130	0	1	0	LS	$166,451.00	$166,451.00	$166,451.00	$0.00	$166,451.00	$0.00
	PI 4	Periodic Costs - Year 10	86-68130	0	0	1	LS	$179,684.33	$179,684.33	$179,684.33	$0.00	$0.00	$179,684.33
	PI 5	Periodic Costs - Year 13	86-68130	0	0	1	LS	$62,645.06	$62,645.06	$62,645.06	$0.00	$0.00	$62,645.06
	PI 6	Periodic Costs - Year 15	86-68130	0	0	1	LS	$146,802.77	$146,802.77	$146,802.77	$0.00	$0.00	$146,802.77
	PI 7	Periodic Costs - Year 17	86-68130	1	1	0	LS	$100,600.00	$165,990.00	$165,990.00	$100,600.00	$165,990.00	$0.00
	PI 8	Periodic Costs - Year 20	86-68130	0	0	1	LS	$119,937.60	$119,937.60	$119,937.60	$0.00	$0.00	$119,937.60
	PI 9	Periodic Costs - Year 25	86-68130	1	1	1	LS	$29,667.63	$83,724.60	$136,558.46	$29,667.63	$83,724.60	$136,558.46
	PI 10	Periodic Costs - Year 30	86-68130	0	0	1	LS	$80,059.80	$80,059.80	$80,059.80	$0.00	$0.00	$80,059.80
	PI 11	Periodic Costs - Year 33	86-68130	1	1	0	LS	$52,688.00	$86,935.20	$86,935.20	$52,688.00	$86,935.20	$0.00
	PI 12	Periodic Costs - Year 35	86-68130	0	0	1	LS	$65,407.79	$65,407.79	$65,407.79	$0.00	$0.00	$65,407.79
	PI 13	Periodic Costs - Year 38	86-68130	0	0	1	LS	$22,803.62	$22,803.62	$22,803.62	$0.00	$0.00	$22,803.62
	PI 14	Periodic Costs - Year 40	86-68130	0	0	1	LS	$53,439.60	$53,439.60	$53,439.60	$0.00	$0.00	$53,439.60
	PI 15	Periodic Costs - Year 42	86-68130	0	1	0	LS	$42,113.00	$42,113.00	$42,113.00	$0.00	$42,113.00	$0.00
	PI 16	Periodic Costs - Year 45	86-68130	0	0	1	LS	$43,659.93	$43,659.93	$43,659.93	$0.00	$0.00	$43,659.93
	PI 17	Annual Costs - Maintenance	86-68130	1	1	1	LS	$1,114,593.00	$1,892,705.00	$5,257,515.00	$1,114,593.00	$1,892,705.00	$5,257,515.00
		Subtotal 1									$1,596,948.63	$2,786,438.80	$6,783,384.88
		Mobilization		1	1	1	LS	$80,000.00	$140,000.00	$340,000.00	$80,000.00	$140,000.00	$340,000.00
		Subtotal 1 w/ mobilization									**$1,676,948.63**	**$2,926,438.80**	**$7,123,384.88**
		Escalation to Notice to Proceed (NTP)		1	1	1	LS	$269,218.37	$1,006,450.20	$3,807,399.12	$269,218.37	$1,006,450.20	$3,807,399.12
		Design Contingencies		1	1	1	LS	$153,833.00	$367,111.00	$1,817,808.00	$153,833.00	$367,111.00	$1,817,808.00
		APS = Allowance for		0	0	1	LS	$0.00	$0.00	$251,408.00	$0.00	$0.00	$251,408.00
		Procurement Strategies (if applicable)											
		CONTRACT COST									**$2,100,000.00**	**$4,300,000.00**	**$13,000,000.00**
		Construction Contingencies		1	1	1	LS	$400,000.00	$900,000.00	$3,000,000.00	$400,000.00	$900,000.00	$3,000,000.00
		FIELD COST									**$2,500,000.00**	**$5,200,000.00**	**$16,000,000.00**
		Non-Contract Costs		1	1	1	LS	$600,000.00	$1,600,000.00	$6,000,000.00	$600,000.00	$1,600,000.00	$6,000,000.00
		CONSTRUCTION COST									**$3,100,000.00**	**$6,800,000.00**	**$22,000,000.00**

Notes:
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES			
BY	Rick Benik	CHECKED: Stephen Latham	BY	Greg Akins	CHECKED	
DATE PREPARED	3/24/2011	PEER REVIEW: Tom Hepler P.E.	DATE PREPARED	06/15/11	PEER REVIEW	

Crystal Ball Report - Full
Simulation started on 6/15/2011 at 11:21:48
Simulation stopped on 6/15/2011 at 11:22:03

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	15.04
Trials/second (average)	665
Random numbers per sec	30,577
Crystal Ball data:	
Assumptions	46
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP

UNIT PRICES BY _____

DATE _____

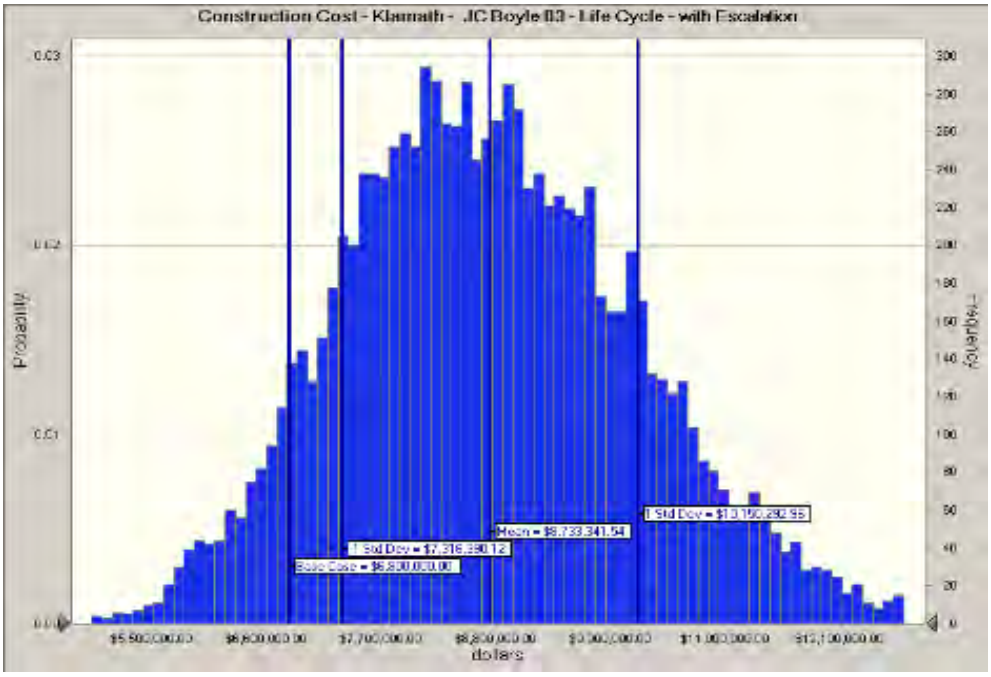
DATE	PEER REVIEWER(S)	CODE
6/15/2011	Signature	86-68170
	Craig A. Grush Printed Name	
	Signature	
	Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [03 JC Boyle Crystal Ball Spreadsheet with esc.xlsx]SUMMARY 480 FP

Forecast: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - with Escalation **Cell: U40**

Summary:
Entire range is from $4,906,957.06 to $14,663,440.72
Base case is $6,800,000.00
After 10,000 trials, the std. error of the mean is $14,169.51



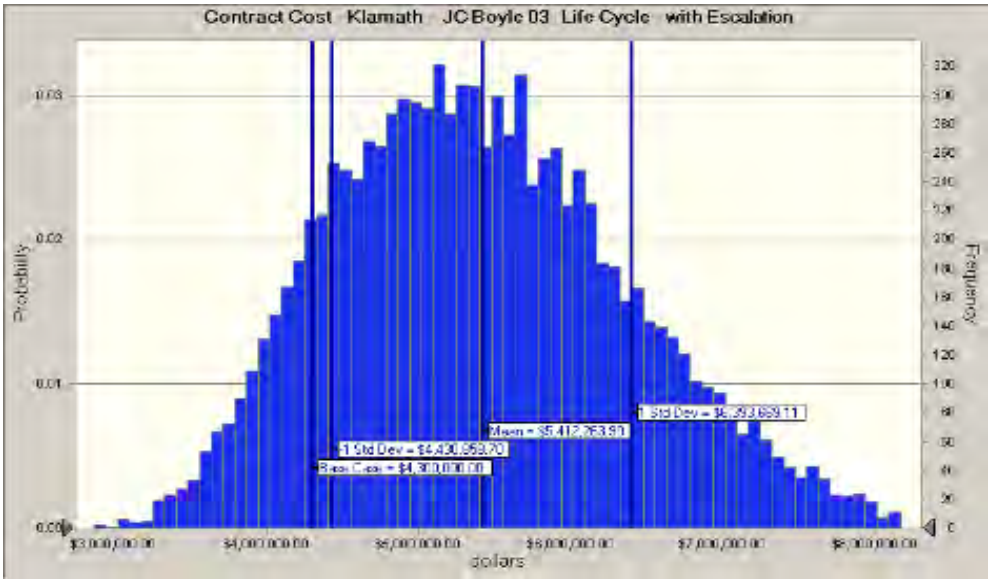
Forecast: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - with Escalation (cont'd) **Cell: U40**

Statistics:	Forecast values
Trials	10,000
Mean	$8,733,341.54
Median	$8,652,216.29
Mode	---
Standard Deviation	$1,416,951.42
Variance	################
Skewness	0.3006
Kurtosis	2.98
Coeff. of Variability	0.1622
Minimum	$4,906,957.06
Maximum	$14,663,440.72
Range Width	$9,756,483.66
Mean Std. Error	$14,169.51

Percentiles:	Forecast values
0%	$4,906,957.06
10%	$6,961,004.48
20%	$7,517,881.59
30%	$7,917,026.82
40%	$8,278,688.10
50%	$8,652,113.35
60%	$9,023,408.50
70%	$9,445,870.27
80%	$9,937,095.29
90%	$10,593,746.53
100%	$14,663,440.72

Forecast: Contract Cost - Klamath - JC Boyle 03- Life Cycle - with Escalation **Cell: U36**

Summary:
Entire range is from $2,871,985.48 to $9,679,699.54
Base case is $4,300,000.00
After 10,000 trials, the std. error of the mean is $9,814.05



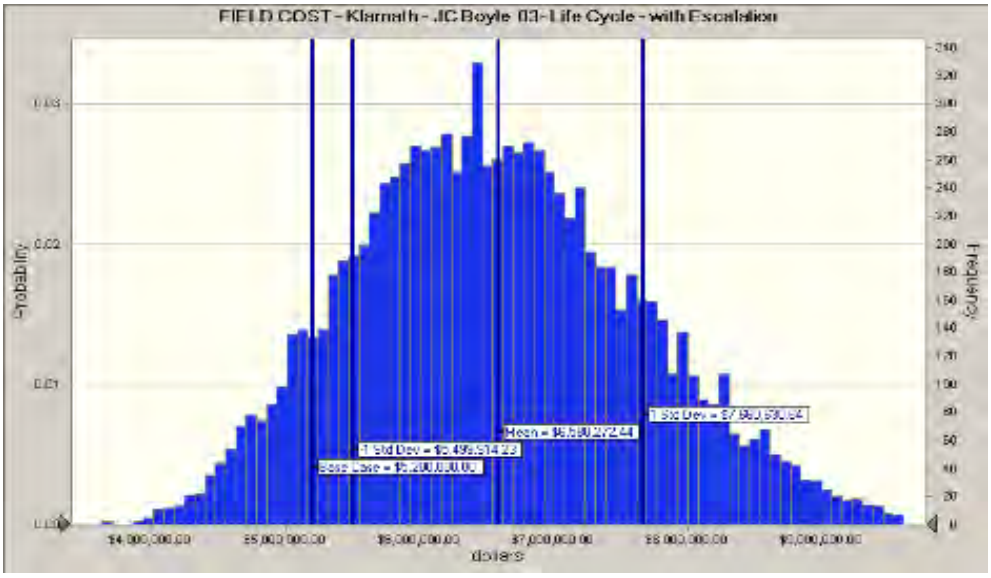
Statistics:	Forecast values
Trials	10,000
Mean	$5,412,263.90
Median	$5,341,294.65
Mode	---
Standard Deviation	$981,405.20
Variance	################
Skewness	0.3905
Kurtosis	2.93
Coeff. of Variability	0.1813
Minimum	$2,871,985.48
Maximum	$9,679,699.54
Range Width	$6,807,714.06
Mean Std. Error	$9,814.05

Forecast: Contract Cost - Klamath - JC Boyle 03- Life Cycle - with Escalation (cont'd) **Cell: U36**

Percentiles:	Forecast values
0%	$2,871,985.48
10%	$4,194,682.01
20%	$4,533,193.27
30%	$4,829,175.78
40%	$5,089,494.47
50%	$5,341,203.31
60%	$5,611,633.30
70%	$5,889,107.56
80%	$6,227,915.60
90%	$6,738,499.77
100%	$9,679,699.54

Forecast: FIELD COST - Klamath - JC Boyle 03- Life Cycle - with Escalation **Cell: U38**

Summary:
Entire range is from $3,461,859.43 to $10,767,729.47
Base case is $5,200,000.00
After 10,000 trials, the std. error of the mean is $10,803.58



Statistics:	Forecast values
Trials	10,000
Mean	$6,580,272.44
Median	$6,509,731.75
Mode	---
Standard Deviation	$1,080,358.20
Variance	################
Skewness	0.3341
Kurtosis	2.97
Coeff. of Variability	0.1642
Minimum	$3,461,859.43
Maximum	$10,767,729.47
Range Width	$7,305,870.04
Mean Std. Error	$10,803.58

Forecast: FIELD COST - Klamath - JC Boyle 03- Life Cycle - with Escalation (cont'd) **Cell: U38**

Percentiles:	Forecast values
0%	$3,461,859.43
10%	$5,220,393.08
20%	$5,649,748.87
30%	$5,956,161.74
40%	$6,239,703.84
50%	$6,509,706.31
60%	$6,796,987.43
70%	$7,110,016.31
80%	$7,487,138.50
90%	$8,012,557.94
100%	$10,767,729.47

End of Forecasts

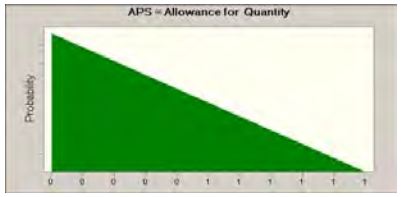
Assumptions

Worksheet: [03 JC Boyle Crystal Ball Spreadsheet with esc.xlsx]SUMMARY 480 FP

Assumption: APS = Allowance for Quantity **Cell: L34**

Triangular distribution with parameters:

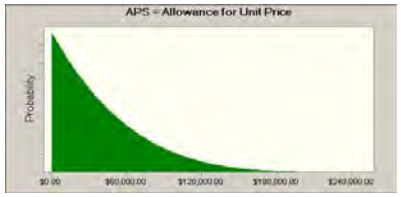
Minimum	0	(=K34)
Likeliest	0	(=L34)
Maximum	1	(=M34)



Assumption: APS = Allowance for Unit Price **Cell: R34**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q34)
Likeliest	$0.00	(=R34)
Maximum	$251,408.00	(=S34)



Assumption: Construction Contingencies Quantity **Cell: L37**

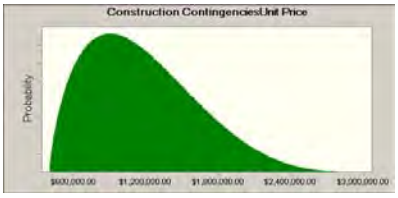
Normal distribution with parameters:

Mean	1	(=L37)
Std. Dev.	0	

Assumption: Construction ContingenciesUnit Price **Cell: R37**

BetaPERT distribution with parameters:

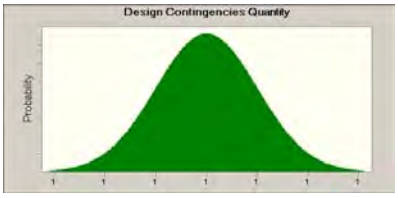
Minimum	$400,000.00	(=Q37)
Likeliest	$900,000.00	(=R37)
Maximum	$3,000,000.00	(=S37)



Assumption: Design Contingencies Quantity **Cell: L33**

Normal distribution with parameters:

Mean	1	(=L33)
Std. Dev.	0	



Assumption: Design ContingenciesUnit Price **Cell: R33**

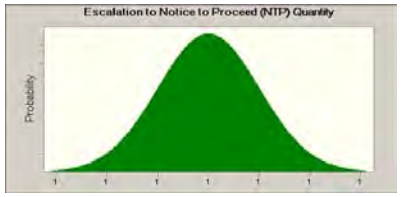
BetaPERT distribution with parameters:

Minimum	$153,833.00	(=Q33)
Likeliest	$367,111.00	(=R33)
Maximum	$1,817,808.00	(=S33)

Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L32**

Normal distribution with parameters:

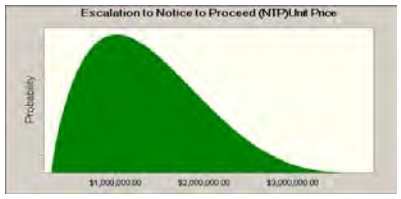
Mean	1	(=L32)
Std. Dev.	0	



Assumption: Escalation to Notice to Proceed (NTP)Unit Price **Cell: R32**

BetaPERT distribution with parameters:

Minimum	$269,218.37	(=Q32)
Likeliest	$1,006,450.20	(=R32)
Maximum	$3,807,399.12	(=S32)



Assumption: Mobilization Quantity **Cell: L30**

Normal distribution with parameters:

Mean	1	(=L30)
Std. Dev.	0	

Assumption: MobilizationUnit Price **Cell: R30**

BetaPERT distribution with parameters:

Minimum	$80,000.00	(=Q30)
Likeliest	$140,000.00	(=R30)
Maximum	$340,000.00	(=S30)

Assumption: Non-Contract Costs Quantity **Cell: L39**

Normal distribution with parameters:

Mean	1	(=L39)
Std. Dev.	0	

Assumption: Non-Contract Costs Unit Price **Cell: R39**

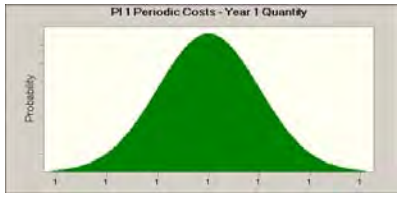
BetaPERT distribution with parameters:

Minimum	$600,000.00	(=Q39)
Likeliest	$1,600,000.00	(=R39)
Maximum	$6,000,000.00	(=S39)

Assumption: PI 1 Periodic Costs - Year 1 Quantity **Cell: L12**

Normal distribution with parameters:

Mean	1	(=L12)
Std. Dev.	0	



Assumption: PI 1 Periodic Costs - Year 8Unit Price **Cell: R12**

BetaPERT distribution with parameters:

Minimum	$299,400.00	(=Q12)
Likeliest	$348,520.00	(=R12)
Maximum	$394,940.00	(=S12)

Assumption: PI 10 Periodic Costs - Year 30 Quantity **Cell: L21**

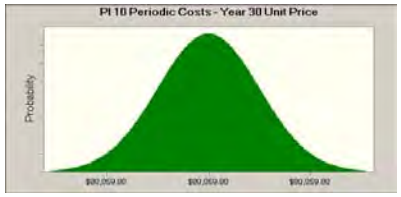
Triangular distribution with parameters:

Minimum	0	(=K21)
Likeliest	0	(=L21)
Maximum	1	(=M21)

Assumption: PI 10 Periodic Costs - Year 30 Unit Price **Cell: R21**

Normal distribution with parameters:

Mean	$80,059.80	(=R21)
Std. Dev.	$0.00	



Assumption: PI 11 Periodic Costs - Year 33 Quantity **Cell: L22**

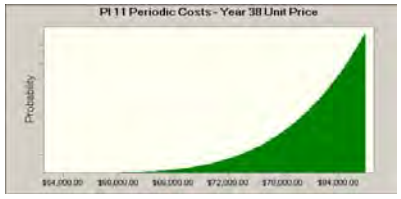
Triangular distribution with parameters:

Minimum	0	(=M22)
Likeliest	1	(=K22)
Maximum	1	(=L22)

Assumption: PI 11 Periodic Costs - Year 38 Unit Price **Cell: R22**

BetaPERT distribution with parameters:

Minimum	$52,688.00	(=Q22)
Likeliest	$86,935.20	(=R22)
Maximum	$86,935.20	(=S22)



Assumption: PI 12 Periodic Costs - Year 35 Quantity **Cell: L23**

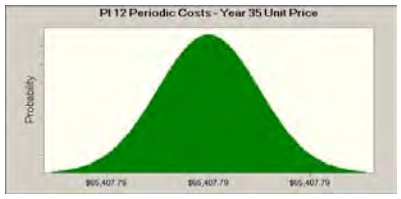
Triangular distribution with parameters:

Minimum	0	(=K23)
Likeliest	0	(=L23)
Maximum	1	(=M23)

Assumption: PI 12 Periodic Costs - Year 35 Unit Price **Cell: R23**

Normal distribution with parameters:

Mean	$65,407.79	(=R23)
Std. Dev.	$0.00	



Assumption: PI 13 Periodic Costs - Year 38 Quantity **Cell: L24**

Triangular distribution with parameters:

Minimum	0	(=K24)
Likeliest	0	(=L24)
Maximum	1	(=M24)

Assumption: PI 13 Periodic Costs - Year 38 Unit Price **Cell: R24**

Normal distribution with parameters:

Mean	$22,803.62	(=R24)
Std. Dev.	$0.00	

Assumption: PI 14 Periodic Costs - Year 40 Quantity **Cell: L25**

Triangular distribution with parameters:

Minimum	0	(=K25)
Likeliest	0	(=L25)
Maximum	1	(=M25)

Assumption: PI 14 Periodic Costs - Year 40 Unit Price **Cell: R25**

Normal distribution with parameters:

Mean	$53,439.60	(=R25)
Std. Dev.	$0.00	

Assumption: PI 15 Periodic Costs - Year 42 Quantity **Cell: L26**

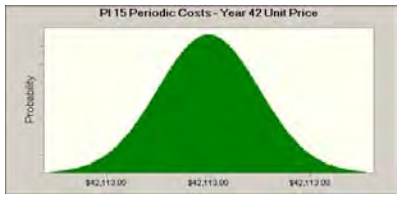
Triangular distribution with parameters:

Minimum	0	(=K26)
Likeliest	0	(=M26)
Maximum	1	(=L26)

Assumption: PI 15 Periodic Costs - Year 42 Unit Price **Cell: R26**

Normal distribution with parameters:

Mean	$42,113.00	(=R26)
Std. Dev.	$0.00	



Assumption: PI 16 Periodic Costs - Year 45 Quantity **Cell: L27**

Triangular distribution with parameters:

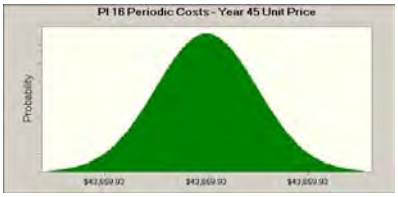
Minimum	0	(=K27)
Likeliest	0	(=L27)
Maximum	1	(=M27)

Assumption: PI 16 Periodic Costs - Year 45 Unit Price

Cell: R27

Normal distribution with parameters:

Mean	$43,659.93	(=R27)
Std. Dev.	$0.00	



Assumption: PI 17 Annual Costs - Maintenance Quantity

Cell: L28

Normal distribution with parameters:

Mean	1	(=L28)
Std. Dev.	0	

Assumption: PI 17 Annual Costs - Maintenance Unit Price

Cell: R28

BetaPERT distribution with parameters:

Minimum	$1,114,593.00	(=Q28)
Likeliest	$1,892,705.00	(=R28)
Maximum	$5,257,515.00	(=S28)

Assumption: PI 2 Periodic Costs - Year 5 Quantity **Cell: L13**

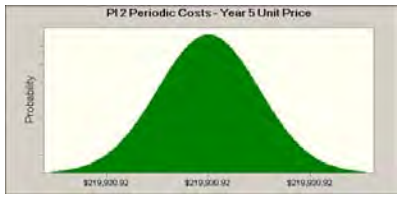
Triangular distribution with parameters:

Minimum	0	(=K13)
Likeliest	0	(=L13)
Maximum	1	(=M13)

Assumption: PI 2 Periodic Costs - Year 5 Unit Price **Cell: R13**

Normal distribution with parameters:

Mean	$219,930.92	(=R13)
Std. Dev.	$0.00	



Assumption: PI 3 Periodic Costs - Year 8 Quantity **Cell: L14**

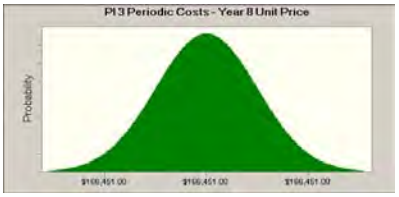
Triangular distribution with parameters:

Minimum	0	(=K14)
Likeliest	0	(=M14)
Maximum	1	(=L14)

Assumption: PI 3 Periodic Costs - Year 8 Unit Price **Cell: R14**

Normal distribution with parameters:

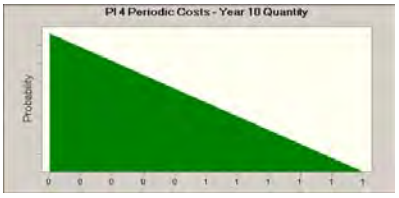
Mean	$166,451.00	(=R14)
Std. Dev.	$0.00	



Assumption: PI 4 Periodic Costs - Year 10 Quantity **Cell: L15**

Triangular distribution with parameters:

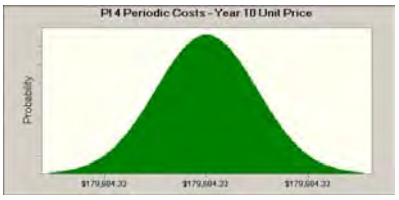
Minimum	0	(=K15)
Likeliest	0	(=L15)
Maximum	1	(=M15)



Assumption: PI 4 Periodic Costs - Year 10 Unit Price **Cell: R15**

Normal distribution with parameters:

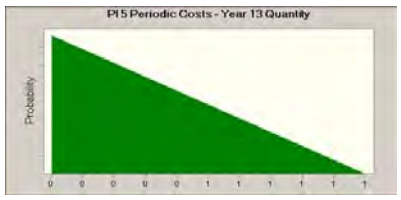
Mean	$179,684.33	(=R15)
Std. Dev.	$0.00	



Assumption: PI 5 Periodic Costs - Year 13 Quantity **Cell: L16**

Triangular distribution with parameters:

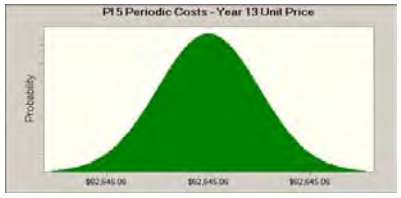
Minimum	0	(=K16)
Likeliest	0	(=L16)
Maximum	1	(=M16)



Assumption: PI 5 Periodic Costs - Year 13 Unit Price **Cell: R16**

Normal distribution with parameters:

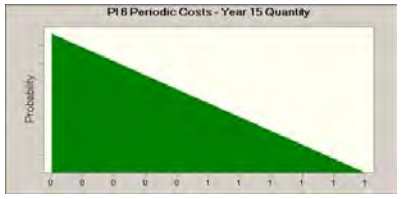
Mean	$62,645.06	(=R16)
Std. Dev.	$0.00	



Assumption: PI 6 Periodic Costs - Year 15 Quantity **Cell: L17**

Triangular distribution with parameters:

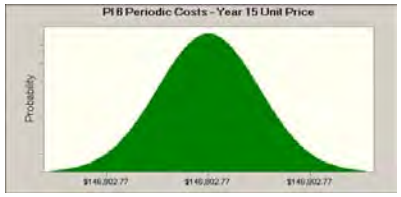
Minimum	0	(=K17)
Likeliest	0	(=L17)
Maximum	1	(=M17)



Assumption: PI 6 Periodic Costs - Year 15 Unit Price **Cell: R17**

Normal distribution with parameters:

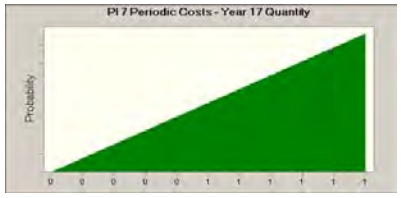
Mean	$146,802.77	(=R17)
Std. Dev.	$0.00	



Assumption: PI 7 Periodic Costs - Year 17 Quantity **Cell: L18**

Triangular distribution with parameters:

Minimum	0	(=M18)
Likeliest	1	(=K18)
Maximum	1	(=L18)



Assumption: PI 7 Periodic Costs - Year 25Unit Price **Cell: R18**

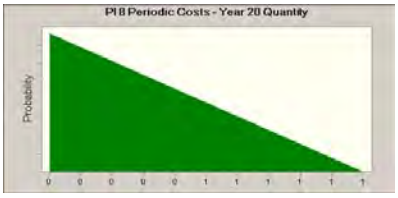
BetaPERT distribution with parameters:

Minimum	$100,600.00	(=Q18)
Likeliest	$165,990.00	(=R18)
Maximum	$165,990.00	(=S18)

Assumption: PI 8 Periodic Costs - Year 20 Quantity **Cell: L19**

Triangular distribution with parameters:

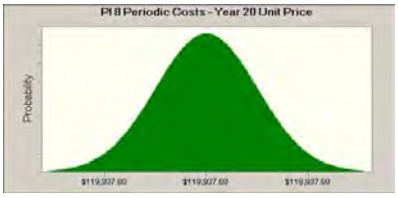
Minimum	0	(=K19)
Likeliest	0	(=L19)
Maximum	1	(=M19)



Assumption: PI 8 Periodic Costs - Year 20 Unit Price **Cell: R19**

Normal distribution with parameters:

Mean	$119,937.60	(=R19)
Std. Dev.	$0.00	



Assumption: PI 9 Periodic Costs - Year 25 Quantity **Cell: L20**

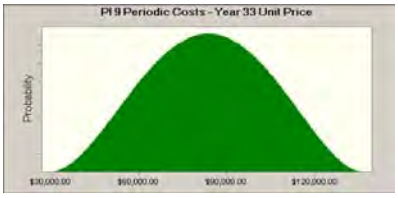
Normal distribution with parameters:

Mean	1	(=L20)
Std. Dev.	0	

Assumption: PI 9 Periodic Costs - Year 33 Unit Price **Cell: R20**

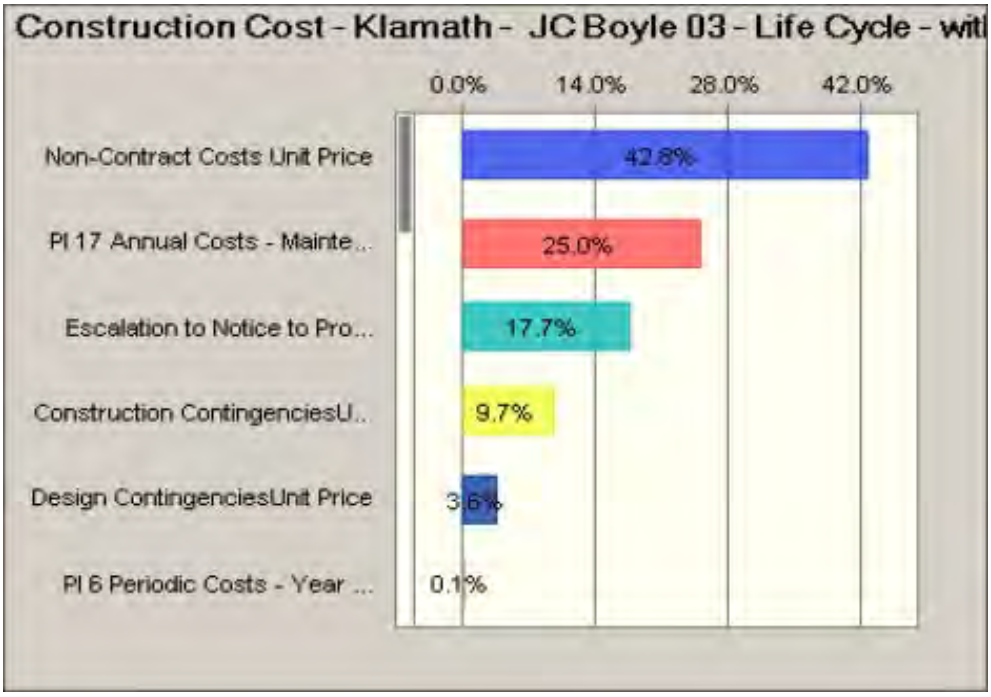
BetaPERT distribution with parameters:

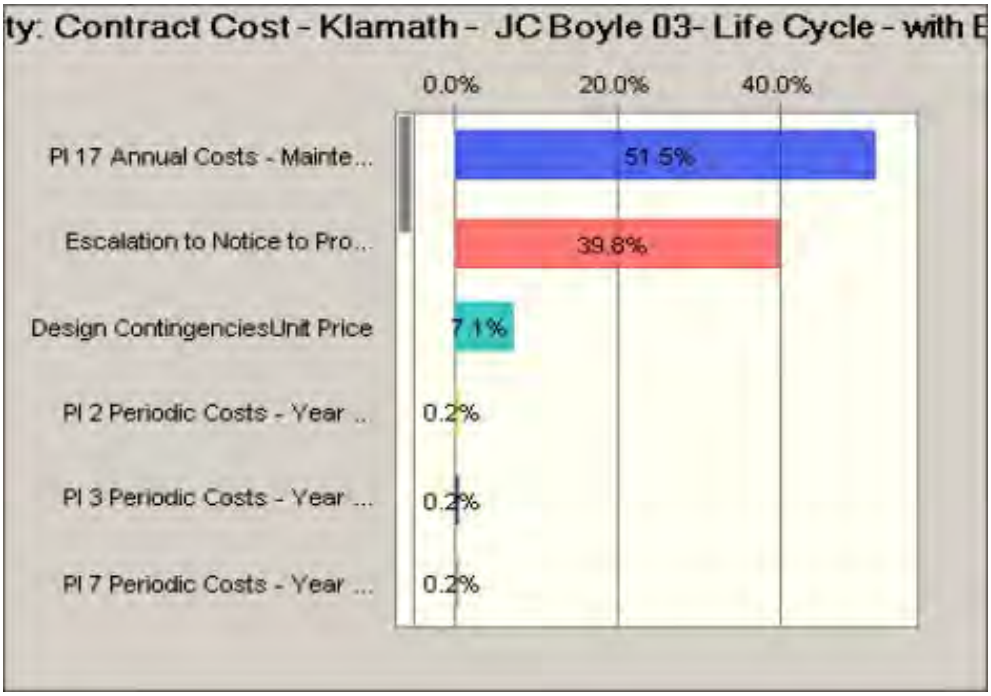
Minimum	$29,667.63	(=Q20)
Likeliest	$83,724.60	(=R20)
Maximum	$136,558.46	(=S20)

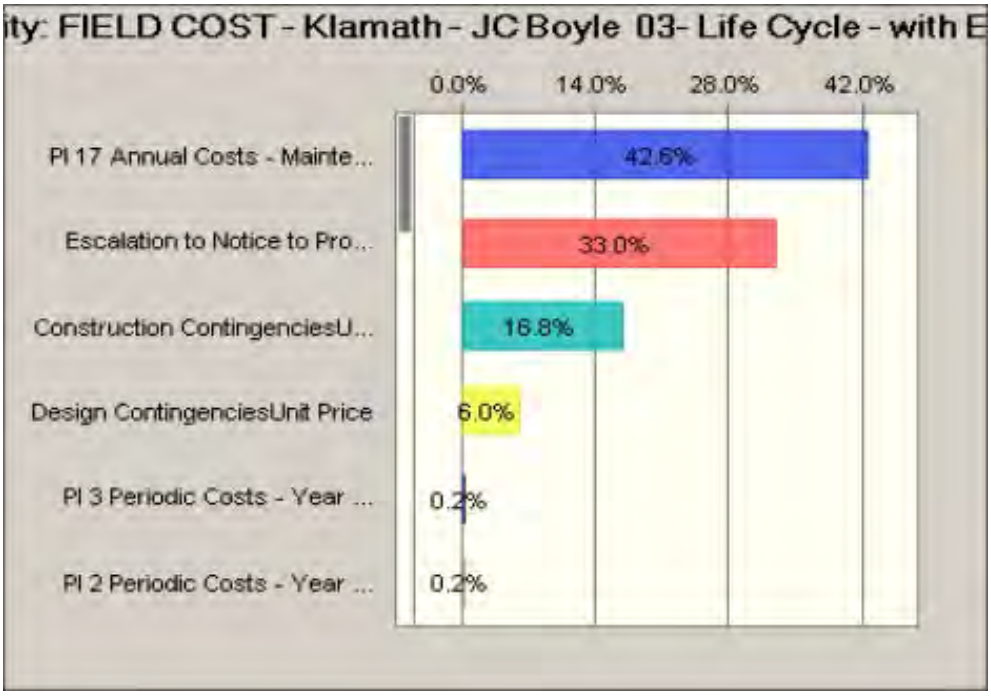


End of Assumptions

Sensitivity Charts




ty: Contract Cost - Klamath - JC Boyle 03- Life Cycle - with E
0.0%
20.0%
40.0%
Pl 17 Annual Costs - Mainte...
51.5%
Escalation to Notice to Pro...
39.8%
Design ContingenciesUnit Price
7.1%
Pl 2 Periodic Costs - Year ...
0.2%
Pl 3 Periodic Costs - Year ...
0.2%
Pl 7 Periodic Costs - Year ...
0.2%

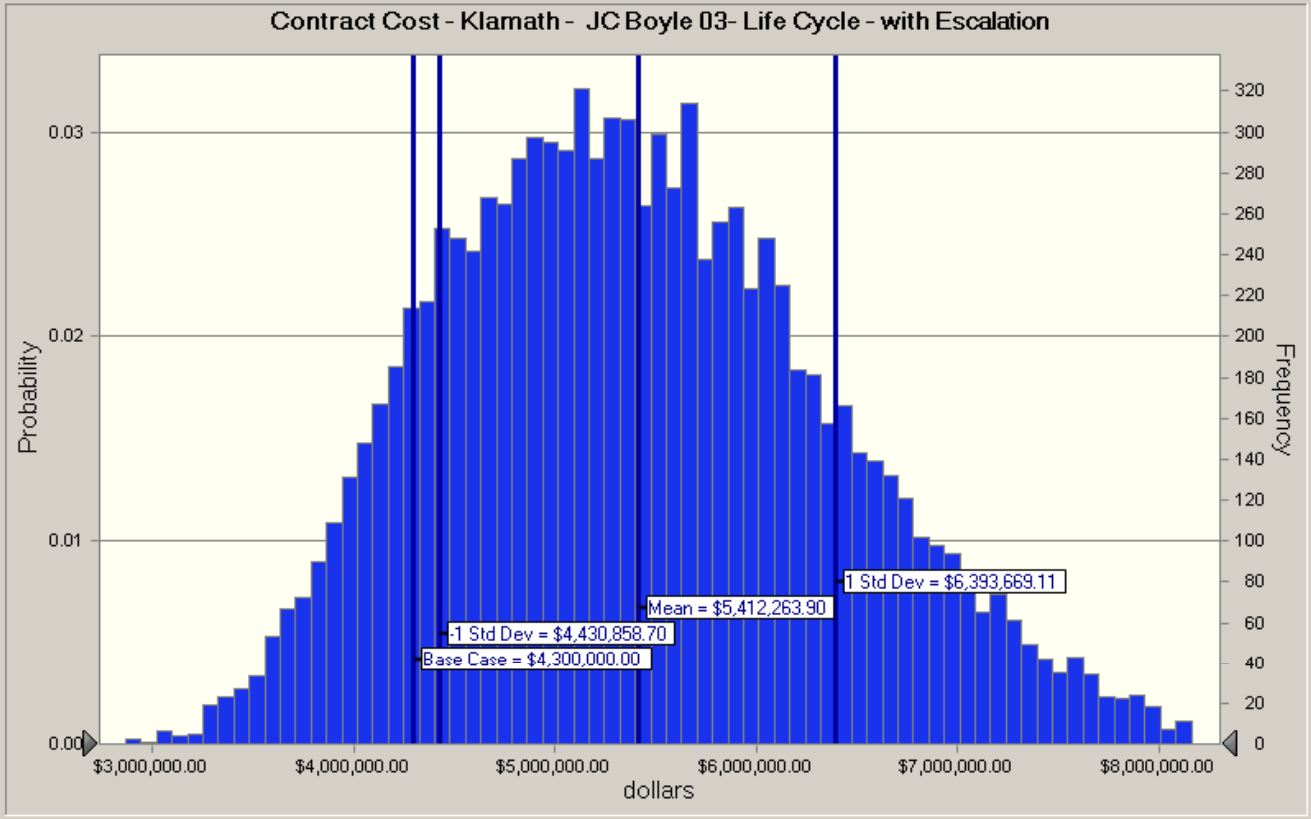

ity: FIELD COST - Klamath - JC Boyle 03- Life Cycle - with E
0.0%
14.0%
28.0%
42.0%
Pl 17 Annual Costs - Mainte...
42.6%
Escalation to Notice to Pro...
33.0%
Construction ContingenciesU...
16.8%
Design ContingenciesUnit Price
6.0%
Pl 3 Periodic Costs - Year ...
0.2%
Pl 2 Periodic Costs - Year ...
0.2%

No target forecast has been specified

No target forecast has been specified

End of Sensitivity Charts

10,000 Trials | Split View | 9,952 Displayed

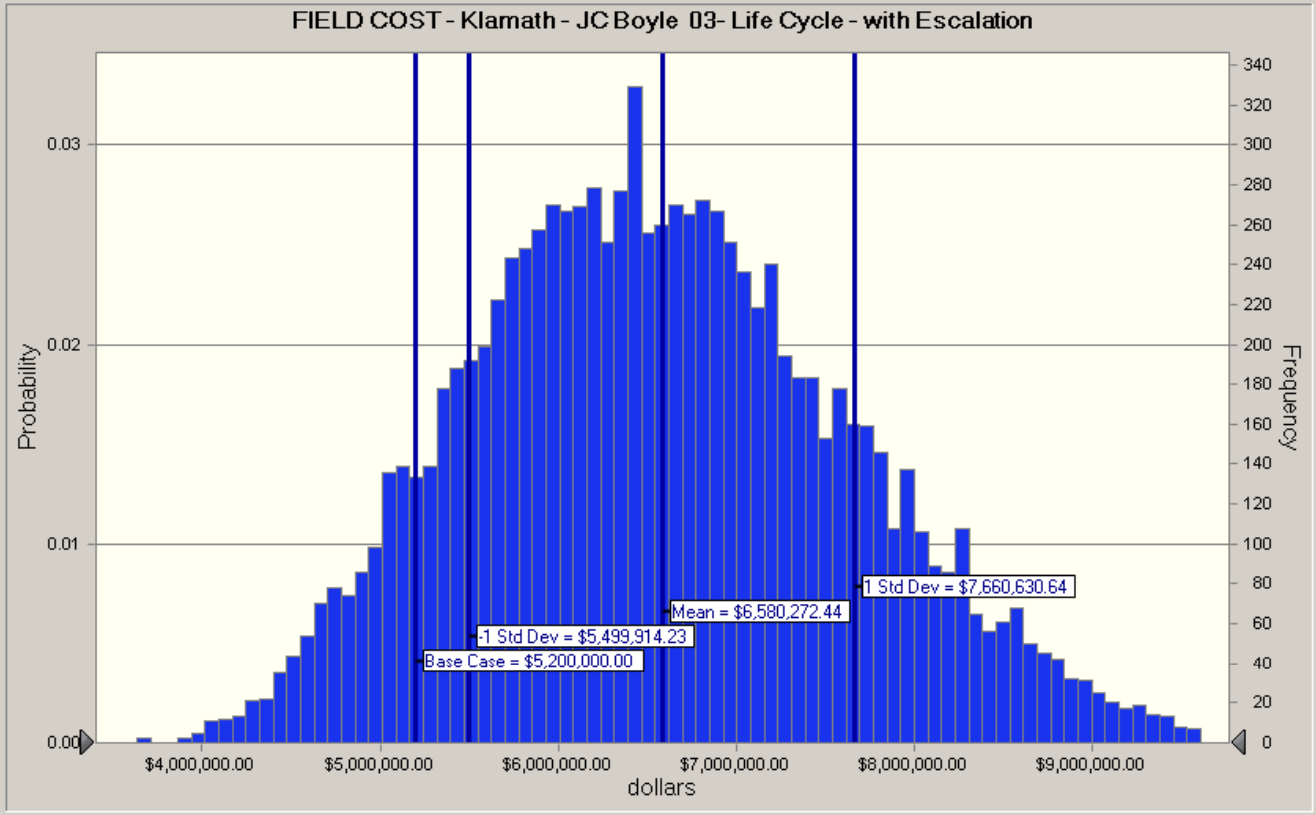


Statistic	Forecast values
Trials	10,000
Mean	$5,412,263.90
Median	$5,341,294.65
Mode	---
Standard Deviation	$981,405.20
Variance	$963,156,173,392.16
Skewness	0.3905
Kurtosis	2.93
Coeff. of Variability	0.1813
Minimum	$2,871,985.48
Maximum	$9,679,699.54
Mean Std. Error	$9,814.05

Percentile	Forecast values
0%	$2,871,985.48
10%	$4,194,682.01
20%	$4,533,193.27
30%	$4,829,175.78
40%	$5,089,494.47
50%	$5,341,203.31
60%	$5,611,633.30
70%	$5,889,107.56
80%	$6,227,915.60
90%	$6,738,499.77
100%	$9,679,699.54

-Infinity | Certainty: 100.00 % | Infinity

10,000 Trials | Split View | 9,940 Displayed

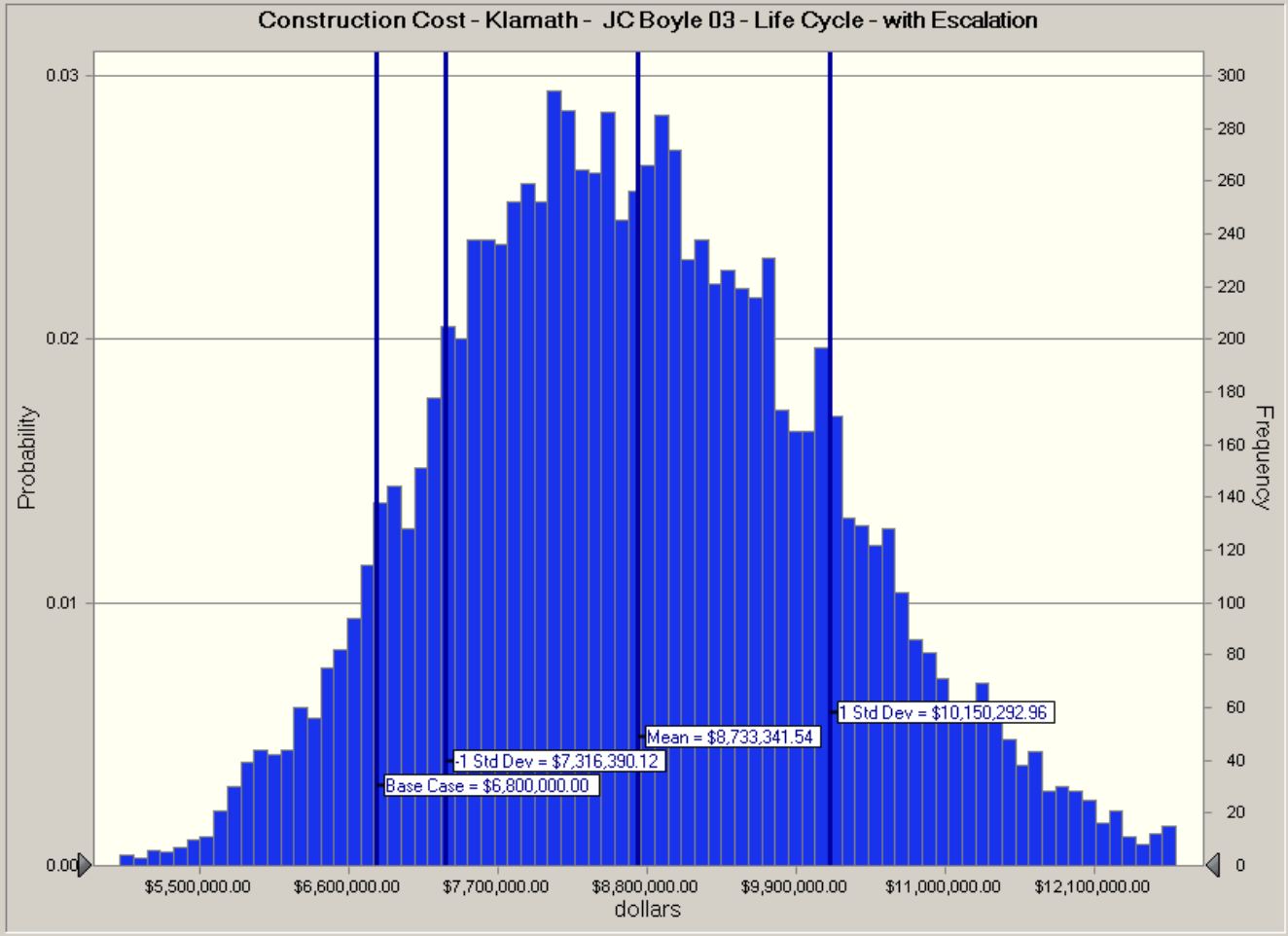


Statistic	Forecast values
Trials	10,000
Mean	$6,580,272.44
Median	$6,509,731.75
Mode	---
Standard Deviation	$1,080,358.20
Variance	$1,167,173,843,916.5
Skewness	0.3341
Kurtosis	2.97
Coeff. of Variability	0.1642
Minimum	$3,461,859.43
Maximum	$10,767,729.47
Mean Std. Error	$10,803.58

Percentile	Forecast values
0%	$3,461,859.43
10%	$5,220,393.08
20%	$5,649,748.87
30%	$5,956,161.74
40%	$6,239,703.84
50%	$6,509,706.31
60%	$6,796,987.43
70%	$7,110,016.31
80%	$7,487,138.50
90%	$8,012,557.94
100%	$10,767,729.47

-Infinity | Certainty: 100.00 % | Infinity

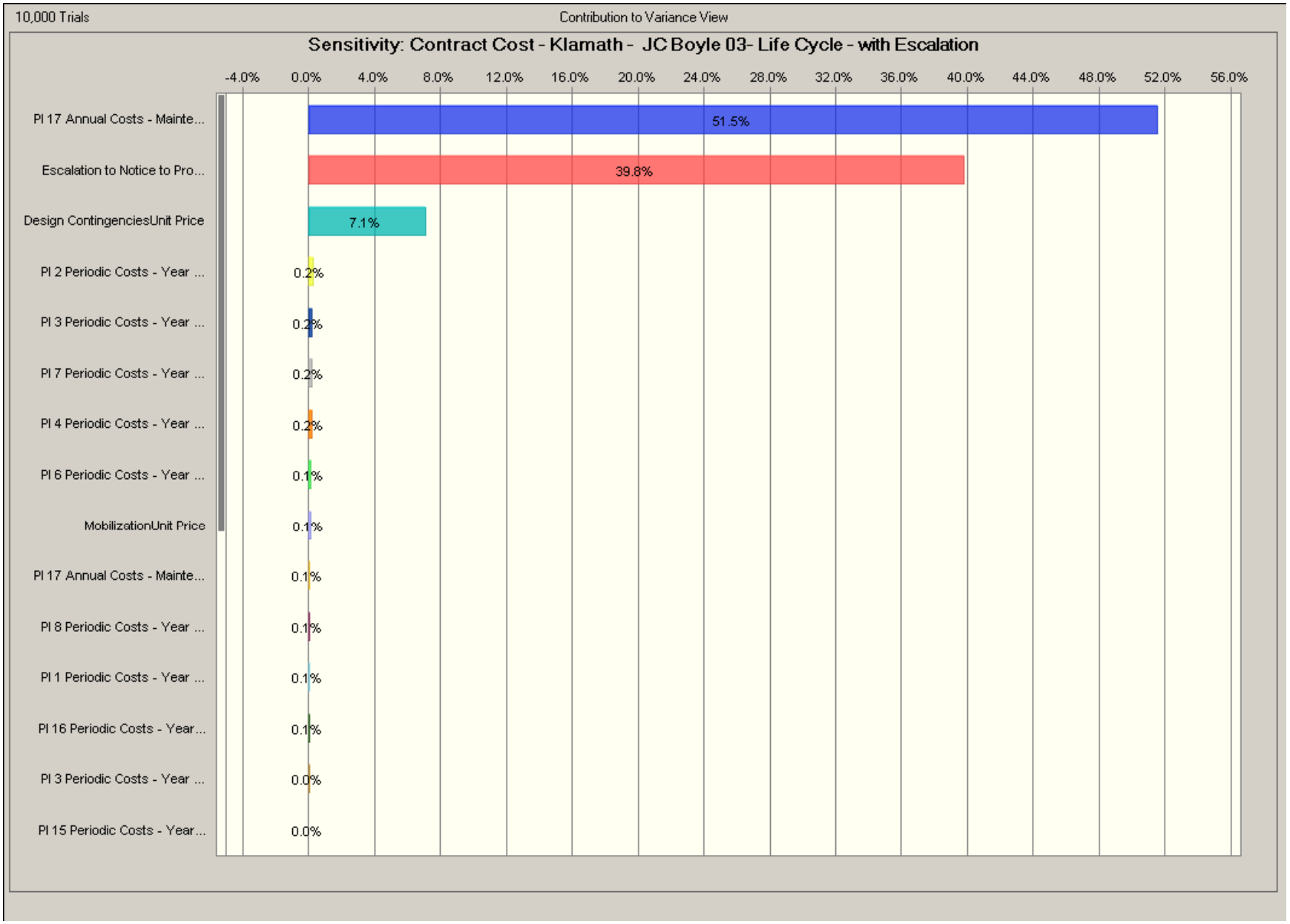
10,000 Trials | Split View | 9,952 Displayed

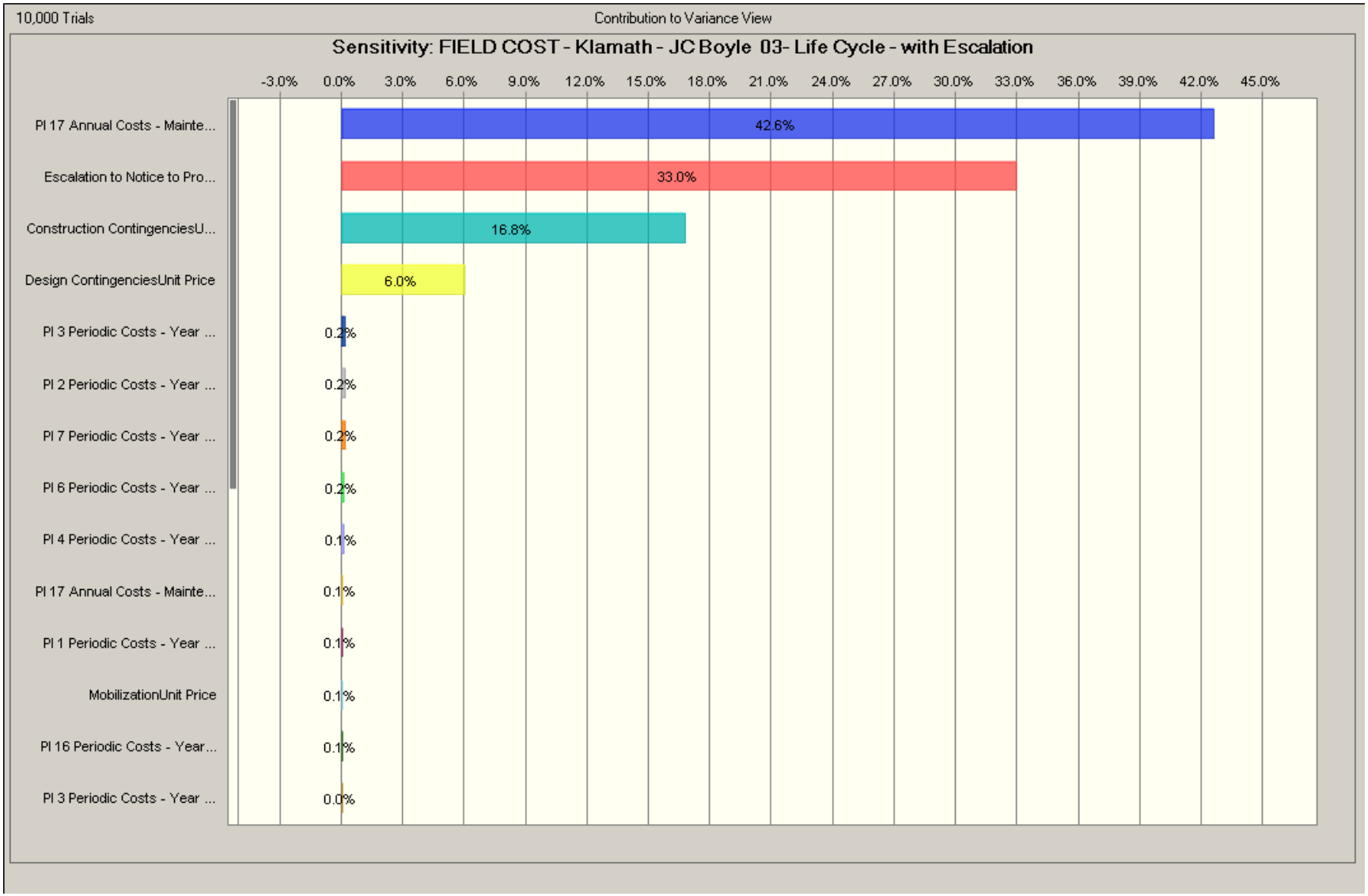


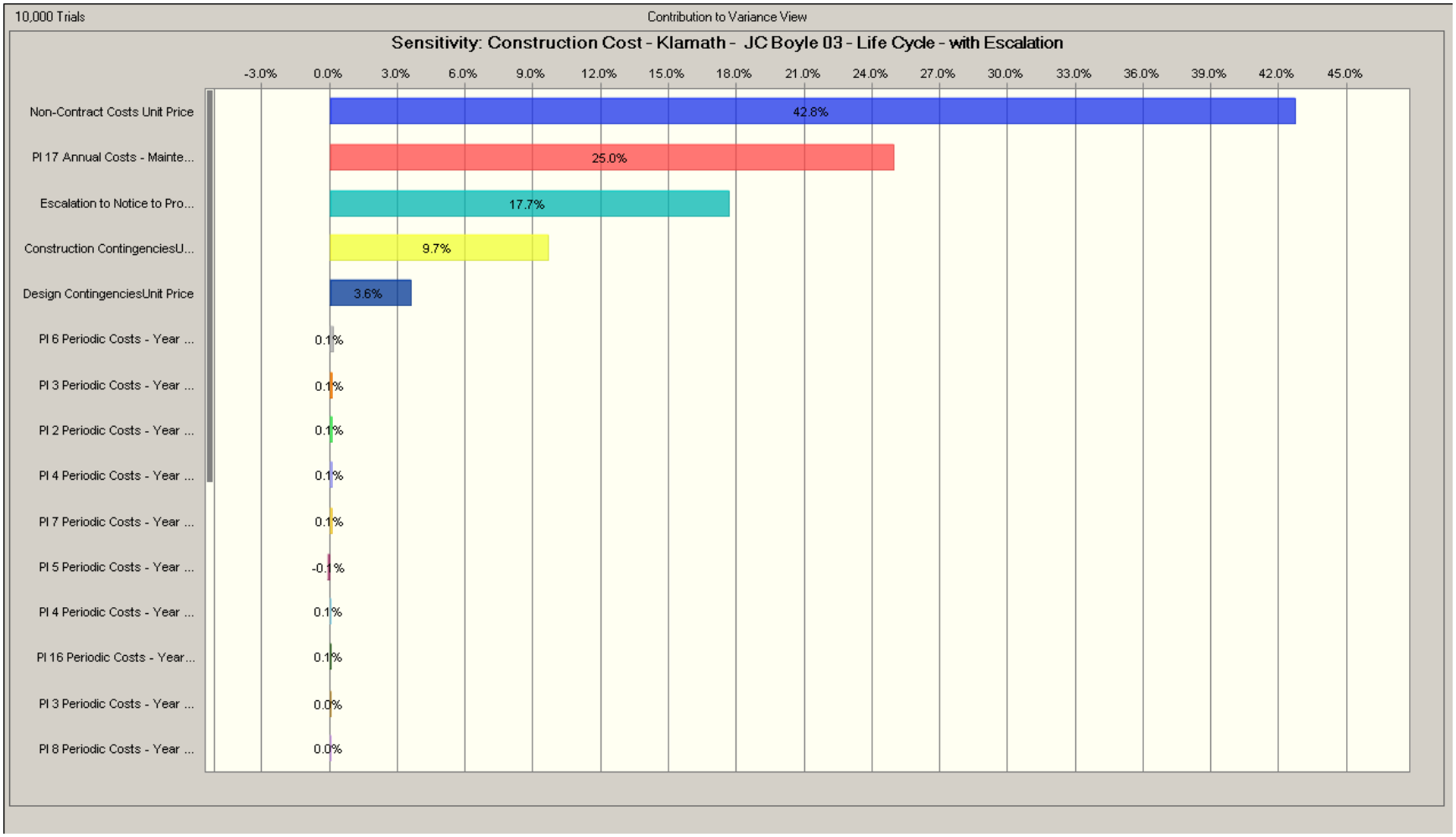
Statistic	Forecast values
Trials	10,000
Mean	$8,733,341.54
Median	$8,652,216.29
Mode	---
Standard Deviation	$1,416,951.42
Variance	$2,007,751,329,729.8
Skewness	0.3006
Kurtosis	2.98
Coeff. of Variability	0.1622
Minimum	$4,906,957.06
Maximum	$14,663,440.72
Mean Std. Error	$14,169.51

Percentile	Forecast values
0%	$4,906,957.06
10%	$6,961,004.48
20%	$7,517,881.59
30%	$7,917,026.82
40%	$8,278,688.10
50%	$8,652,113.35
60%	$9,023,408.50
70%	$9,445,870.27
80%	$9,937,095.29
90%	$10,593,746.53
100%	$14,663,440.72

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Klamath - JC Boyle 03- Life Cycle - with Escalation
-4.0%
0.0%
4.0%
8.0%
12.0%
16.0%
20.0%
24.0%
28.0%
32.0%
36.0%
40.0%
44.0%
48.0%
52.0%
56.0%
Pl 17 Annual Costs - Mainte...
51.5%
Escalation to Notice to Pro...
39.8%
Design ContingenciesUnit Price
7.1%
Pl 2 Periodic Costs - Year ...
0.2%
Pl 3 Periodic Costs - Year ...
0.2%
Pl 7 Periodic Costs - Year ...
0.2%
Pl 4 Periodic Costs - Year ...
0.2%
Pl 6 Periodic Costs - Year ...
0.1%
MobilizationUnit Price
0.1%
Pl 17 Annual Costs - Mainte...
0.1%
Pl 8 Periodic Costs - Year ...
0.1%
Pl 1 Periodic Costs - Year ...
0.1%
Pl 16 Periodic Costs - Year...
0.1%
Pl 3 Periodic Costs - Year ...
0.0%
Pl 15 Periodic Costs - Year...
0.0%


10,000 Trials
Contribution to Variance View
Sensitivity: FIELD COST - Klamath - JC Boyle 03- Life Cycle - with Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
Pl 17 Annual Costs - Mainte...
42.6%
Escalation to Notice to Pro...
33.0%
Construction ContingenciesU...
16.8%
Design ContingenciesUnit Price
6.0%
Pl 3 Periodic Costs - Year ...
0.2%
Pl 2 Periodic Costs - Year ...
0.2%
Pl 7 Periodic Costs - Year ...
0.2%
Pl 6 Periodic Costs - Year ...
0.2%
Pl 4 Periodic Costs - Year ...
0.1%
Pl 17 Annual Costs - Mainte...
0.1%
Pl 1 Periodic Costs - Year ...
0.1%
MobilizationUnit Price
0.1%
Pl 16 Periodic Costs - Year...
0.1%
Pl 3 Periodic Costs - Year ...
0.0%


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - with Escalation
-3.0%
0.0%
3.0%
6.0%
9.0%
12.0%
15.0%
18.0%
21.0%
24.0%
27.0%
30.0%
33.0%
36.0%
39.0%
42.0%
45.0%
Non-Contract Costs Unit Price
42.8%
PI 17 Annual Costs - Mainte...
25.0%
Escalation to Notice to Pro...
17.7%
Construction ContingenciesU...
9.7%
Design ContingenciesUnit Price
3.6%
PI 6 Periodic Costs - Year ...
0.1%
PI 3 Periodic Costs - Year ...
0.1%
PI 2 Periodic Costs - Year ...
0.1%
PI 4 Periodic Costs - Year ...
0.1%
PI 7 Periodic Costs - Year ...
0.1%
PI 5 Periodic Costs - Year ...
-0.1%
PI 4 Periodic Costs - Year ...
0.1%
PI 16 Periodic Costs - Year...
0.1%
PI 3 Periodic Costs - Year ...
0.0%
PI 8 Periodic Costs - Year ...
0.0%

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Escalation Not Included
Life Cycle
SUMMARY ESTIMATE

PROJECT: Klamath River
Oregon

WOID: AF652 | **ESTIMATE LEVEL:** Feasibility
REGION MP | **PRICE LEVEL:** Jul-10
FILE: U:\2011 Projects\Klamath\007 Crystal Ball\3\without\[03 JC Boyle Crystal Ball Spreadsheet wo esc.xlsx]SUMMARY 480 FP

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	PI 1	Periodic Costs - Year 1	86-68130	1	1	1	LS	$299,400.00	$348,520.00	$394,940.00	$299,400.00	$348,520.00	$394,940.00
	PI 2	Periodic Costs - Year 5	86-68130	0	0	1	LS	$219,930.92	$219,930.92	$219,930.92	$0.00	$0.00	$219,930.92
	PI 3	Periodic Costs - Year 8	86-68130	0	1	0	LS	$166,451.00	$166,451.00	$166,451.00	$0.00	$166,451.00	$0.00
	PI 4	Periodic Costs - Year 10	86-68130	0	0	1	LS	$179,684.33	$179,684.33	$179,684.33	$0.00	$0.00	$179,684.33
	PI 5	Periodic Costs - Year 13	86-68130	0	0	1	LS	$62,645.06	$62,645.06	$62,645.06	$0.00	$0.00	$62,645.06
	PI 6	Periodic Costs - Year 15	86-68130	0	0	1	LS	$146,802.77	$146,802.77	$146,802.77	$0.00	$0.00	$146,802.77
	PI 7	Periodic Costs - Year 17	86-68130	1	1	0	LS	$100,600.00	$165,990.00	$165,990.00	$100,600.00	$165,990.00	$0.00
	PI 8	Periodic Costs - Year 20	86-68130	0	0	1	LS	$119,937.60	$119,937.60	$119,937.60	$0.00	$0.00	$119,937.60
	PI 9	Periodic Costs - Year 25	86-68130	1	1	1	LS	$29,667.63	$83,724.60	$136,558.46	$29,667.63	$83,724.60	$136,558.46
	PI 10	Periodic Costs - Year 30	86-68130	0	0	1	LS	$80,059.80	$80,059.80	$80,059.80	$0.00	$0.00	$80,059.80
	PI 11	Periodic Costs - Year 33	86-68130	1	1	0	LS	$52,688.00	$86,935.20	$86,935.20	$52,688.00	$86,935.20	$0.00
	PI 12	Periodic Costs - Year 35	86-68130	0	0	1	LS	$65,407.79	$65,407.79	$65,407.79	$0.00	$0.00	$65,407.79
	PI 13	Periodic Costs - Year 38	86-68130	0	0	1	LS	$22,803.62	$22,803.62	$22,803.62	$0.00	$0.00	$22,803.62
	PI 14	Periodic Costs - Year 40	86-68130	0	0	1	LS	$53,439.60	$53,439.60	$53,439.60	$0.00	$0.00	$53,439.60
	PI 15	Periodic Costs - Year 42	86-68130	0	1	0	LS	$42,113.00	$42,113.00	$42,113.00	$0.00	$42,113.00	$0.00
	PI 16	Periodic Costs - Year 45	86-68130	0	0	1	LS	$43,659.93	$43,659.93	$43,659.93	$0.00	$0.00	$43,659.93
	PI 17	Annual Costs - Maintenance	86-68130	1	1	1	LS	$1,114,593.00	$1,892,705.00	$5,257,515.00	$1,114,593.00	$1,892,705.00	$5,257,515.00
		Subtotal 1									$1,596,948.63	$2,786,438.80	$6,783,384.88
		Mobilization		1	1	1	LS	$80,000.00	$140,000.00	$340,000.00	$80,000.00	$140,000.00	$340,000.00
		Subtotal 1 w/ mobilization									**$1,676,948.63**	**$2,926,438.80**	**$7,123,384.88**
		Escalation to Notice to Proceed (NTP) - Not Included									$0.00	$0.00	$0.00
		Design Contingencies		1	1	1	LS	$123,051.37	$367,111.00	$1,112,777.12	$123,051.37	$273,561.20	$1,112,777.12
		APS = Allowance for		0	0	1	LS	$0.00	$0.00	$163,838.00	$0.00	$0.00	$163,838.00
		Procurement Strategies (if applicable)											
		CONTRACT COST									**$1,800,000.00**	**$3,200,000.00**	**$8,400,000.00**
		Construction Contingencies		1	1	1	LS	$300,000.00	$900,000.00	$2,100,000.00	$300,000.00	$700,000.00	$2,100,000.00
		FIELD COST									**$2,100,000.00**	**$3,900,000.00**	**$10,500,000.00**
		Non-Contract Costs		1	1	1	LS	$500,000.00	$1,600,000.00	$3,500,000.00	$500,000.00	$1,200,000.00	$3,500,000.00
		CONSTRUCTION COST									**$2,600,000.00**	**$5,100,000.00**	**$14,000,000.00**

Notes:
Reference documents RM D&S Cost Estimate (FAC 09-01) and RM D&S CCE and PCE (FAC 09-02)

QUANTITIES			PRICES			
BY	Rick Benik	CHECKED: Stephen Latham	BY	Greg Akins	CHECKED	6/15/11
DATE PREPARED	3/24/2011	PEER REVIEW: Tom Hepler P.E.	DATE PREPARED	06/15/11	PEER REVIEW	6/15/2011

Crystal Ball Report - Full
Simulation started on 6/15/2011 at 11:39:21
Simulation stopped on 6/15/2011 at 11:39:35

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	999
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	14.05
Trials/second (average)	712
Random numbers per sec	31,325
Crystal Ball data:	
Assumptions	44
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP

UNIT PRICES BY _____

DATE 6/15/11

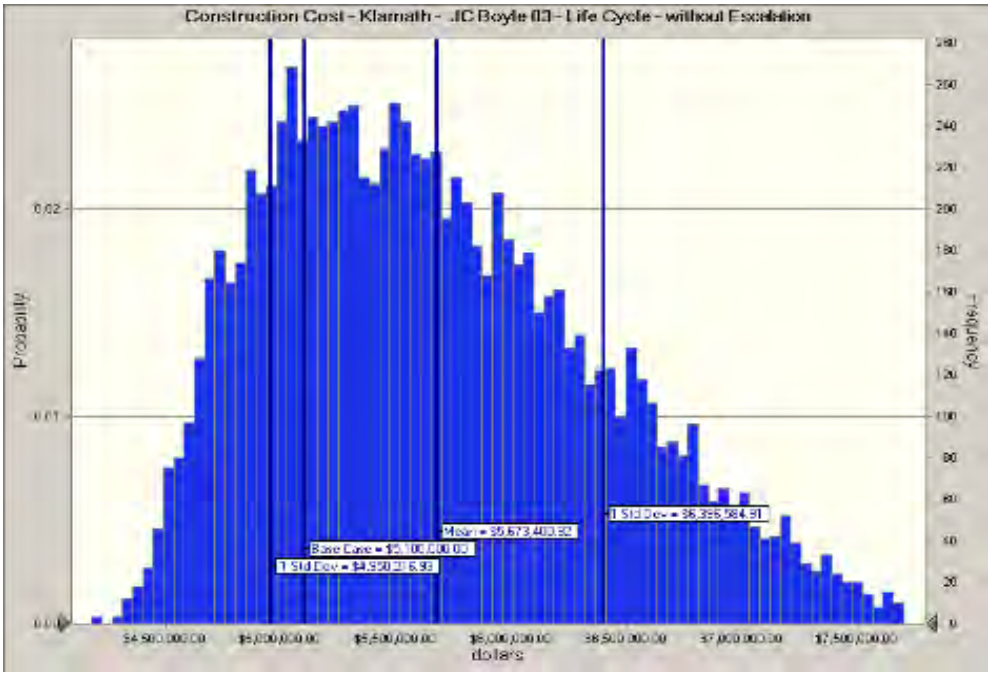
DATE	PEER REVIEWER(S)	CODE
6/15/2011	Signature	86-68170
	Craig A. Grush Printed Name	
	Signature	
	Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [03 JC Boyle Crystal Ball Spreadsheet wo esc.xlsx]SUMMARY 480 FP

Forecast: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - without Escalation **Cell: U40**

Summary:
Entire range is from $4,178,652.35 to $8,397,437.42
Base case is $5,100,000.00
After 10,000 trials, the std. error of the mean is $7,231.84



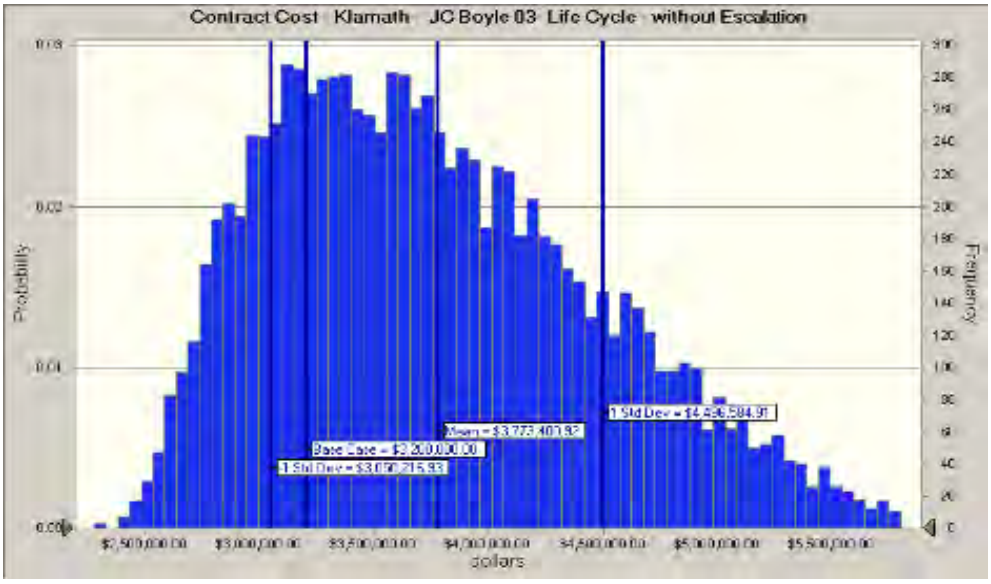
Forecast: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - without Escalation (cont'd) **Cell: U40**

Statistics:	Forecast values
Trials	10,000
Mean	$5,673,400.92
Median	$5,572,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	################
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1275
Minimum	$4,178,652.35
Maximum	$8,397,437.42
Range Width	$4,218,785.07
Mean Std. Error	$7,231.84

Percentiles:	Forecast values
0%	$4,178,652.35
10%	$4,802,876.93
20%	$5,014,714.63
30%	$5,196,407.30
40%	$5,383,956.43
50%	$5,572,715.58
60%	$5,780,241.69
70%	$6,014,459.15
80%	$6,300,999.77
90%	$6,696,838.47
100%	$8,397,437.42

Forecast: Contract Cost - Klamath - JC Boyle 03- Life Cycle - without Escalation **Cell: U36**

Summary:
Entire range is from $2,278,652.35 to $6,497,437.42
Base case is $3,200,000.00
After 10,000 trials, the std. error of the mean is $7,231.84



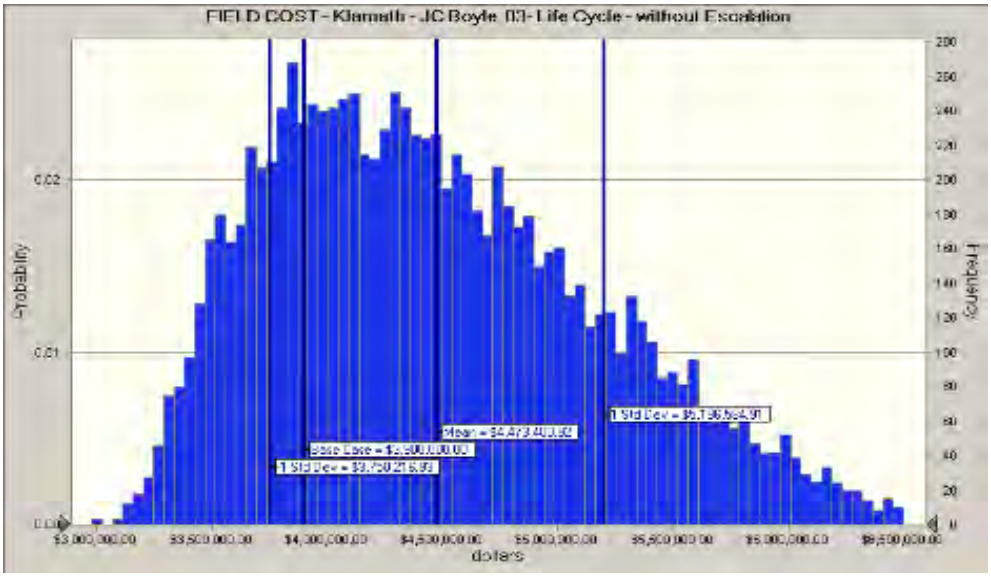
Statistics:	Forecast values
Trials	10,000
Mean	$3,773,400.92
Median	$3,672,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	################
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1917
Minimum	$2,278,652.35
Maximum	$6,497,437.42
Range Width	$4,218,785.07
Mean Std. Error	$7,231.84

Forecast: Contract Cost - Klamath - JC Boyle 03- Life Cycle - without Escalation (cont'd) Cell: U36

Percentiles:	Forecast values
0%	$2,278,652.35
10%	$2,902,876.93
20%	$3,114,714.63
30%	$3,296,407.30
40%	$3,483,956.43
50%	$3,672,715.58
60%	$3,880,241.69
70%	$4,114,459.15
80%	$4,400,999.77
90%	$4,796,838.47
100%	$6,497,437.42

Forecast: FIELD COST - Klamath - JC Boyle 03- Life Cycle - without Escalation **Cell: U38**

Summary:
Entire range is from $2,978,652.35 to $7,197,437.42
Base case is $3,900,000.00
After 10,000 trials, the std. error of the mean is $7,231.84



Statistics:	Forecast values
Trials	10,000
Mean	$4,473,400.92
Median	$4,372,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	################
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1617
Minimum	$2,978,652.35
Maximum	$7,197,437.42
Range Width	$4,218,785.07
Mean Std. Error	$7,231.84

Forecast: FIELD COST - Klamath - JC Boyle 03- Life Cycle - without Escalation (cont'd) Cell: U38

Percentiles:	Forecast values
0%	$2,978,652.35
10%	$3,602,876.93
20%	$3,814,714.63
30%	$3,996,407.30
40%	$4,183,956.43
50%	$4,372,715.58
60%	$4,580,241.69
70%	$4,814,459.15
80%	$5,100,999.77
90%	$5,496,838.47
100%	$7,197,437.42

End of Forecasts

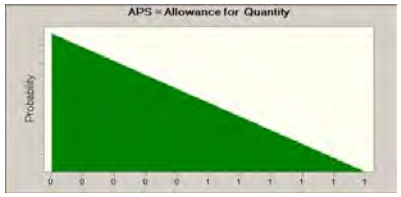
Assumptions

Worksheet: [03 JC Boyle Crystal Ball Spreadsheet wo esc.xlsx]SUMMARY 480 FP

Assumption: APS = Allowance for Quantity **Cell: L34**

Triangular distribution with parameters:

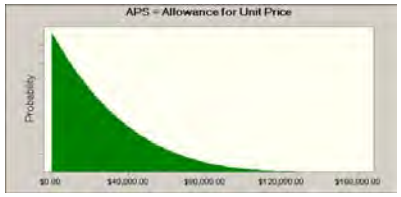
Minimum	0	(=K34)
Likeliest	0	(=L34)
Maximum	1	(=M34)



Assumption: APS = Allowance for Unit Price **Cell: R34**

BetaPERT distribution with parameters:

Minimum	$0.00	(=Q34)
Likeliest	$0.00	(=R34)
Maximum	$163,838.00	(=S34)



Assumption: Construction Contingencies Quantity **Cell: L37**

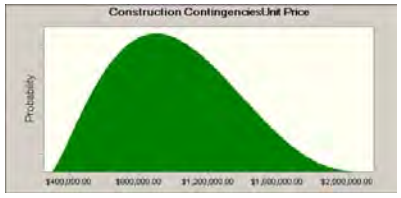
Normal distribution with parameters:

Mean	1	(=L37)
Std. Dev.	0	

Assumption: Construction ContingenciesUnit Price **Cell: R37**

BetaPERT distribution with parameters:

Minimum	$300,000.00	(=Q37)
Likeliest	$900,000.00	(=R37)
Maximum	$2,100,000.00	(=S37)



Assumption: Design Contingencies Quantity **Cell: L33**

Normal distribution with parameters:

Mean	1	(=L33)
Std. Dev.	0	

Assumption: Design ContingenciesUnit Price **Cell: R33**

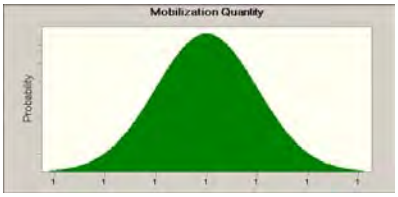
BetaPERT distribution with parameters:

Minimum	$123,051.37	(=Q33)
Likeliest	$367,111.00	(=R33)
Maximum	$1,112,777.12	(=S33)

Assumption: Mobilization Quantity **Cell: L30**

Normal distribution with parameters:

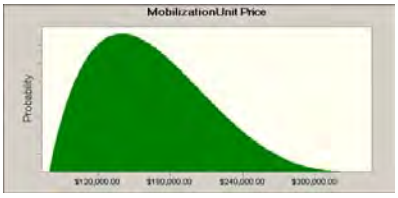
Mean	1	(=L30)
Std. Dev.	0	



Assumption: MobilizationUnit Price **Cell: R30**

BetaPERT distribution with parameters:

Minimum	$80,000.00	(=Q30)
Likeliest	$140,000.00	(=R30)
Maximum	$340,000.00	(=S30)



Assumption: Non-Contract Costs Quantity **Cell: L39**

Normal distribution with parameters:

Mean	1	(=L39)
Std. Dev.	0	

Assumption: Non-Contract Costs Unit Price **Cell: R39**

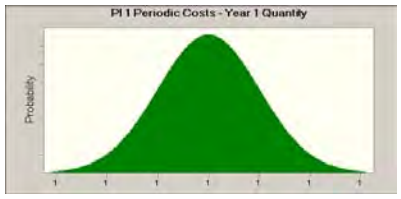
BetaPERT distribution with parameters:

Minimum	$500,000.00	(=Q39)
Likeliest	$1,600,000.00	(=R39)
Maximum	$3,500,000.00	(=S39)

Assumption: PI 1 Periodic Costs - Year 1 Quantity **Cell: L12**

Normal distribution with parameters:

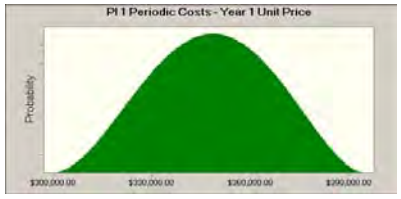
Mean	1	(=L12)
Std. Dev.	0	



Assumption: PI 1 Periodic Costs - Year 1 Unit Price **Cell: R12**

BetaPERT distribution with parameters:

Minimum	$299,400.00	(=Q12)
Likeliest	$348,520.00	(=R12)
Maximum	$394,940.00	(=S12)



Assumption: PI 10 Periodic Costs - Year 30 Quantity **Cell: L21**

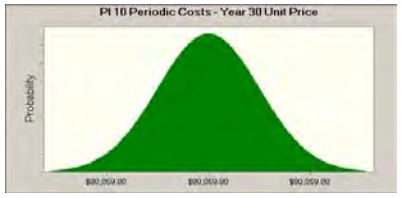
Triangular distribution with parameters:

Minimum	0	(=K21)
Likeliest	0	(=L21)
Maximum	1	(=M21)

Assumption: PI 10 Periodic Costs - Year 30 Unit Price **Cell: R21**

Normal distribution with parameters:

Mean	$80,059.80	(=R21)
Std. Dev.	$0.00	



Assumption: PI 11 Periodic Costs - Year 33 Quantity **Cell: L22**

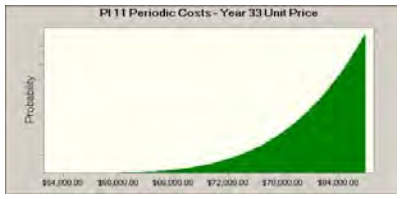
Triangular distribution with parameters:

Minimum	0	(=M22)
Likeliest	1	(=K22)
Maximum	1	(=L22)

Assumption: PI 11 Periodic Costs - Year 33 Unit Price **Cell: R22**

BetaPERT distribution with parameters:

Minimum	$52,688.00	(=Q22)
Likeliest	$86,935.20	(=R22)
Maximum	$86,935.20	(=S22)



Assumption: PI 12 Periodic Costs - Year 35 Quantity **Cell: L23**

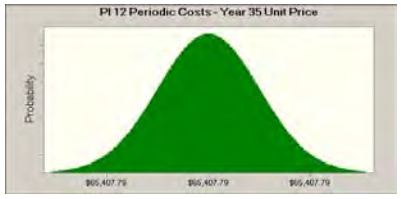
Triangular distribution with parameters:

Minimum	0	(=K23)
Likeliest	0	(=L23)
Maximum	1	(=M23)

Assumption: PI 12 Periodic Costs - Year 35 Unit Price **Cell: R23**

Normal distribution with parameters:

Mean	$65,407.79	(=R23)
Std. Dev.	$0.00	



Assumption: PI 13 Periodic Costs - Year 38 Quantity **Cell: L24**

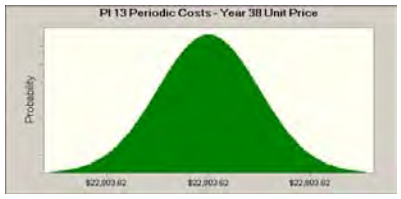
Triangular distribution with parameters:

Minimum	0	(=K24)
Likeliest	0	(=L24)
Maximum	1	(=M24)

Assumption: PI 13 Periodic Costs - Year 38 Unit Price **Cell: R24**

Normal distribution with parameters:

Mean	$22,803.62	(=R24)
Std. Dev.	$0.00	



Assumption: PI 14 Periodic Costs - Year 40 Quantity **Cell: L25**

Triangular distribution with parameters:

Minimum	0	(=K25)
Likeliest	0	(=L25)
Maximum	1	(=M25)

Assumption: PI 14 Periodic Costs - Year 40 Unit Price **Cell: R25**

Normal distribution with parameters:

Mean	$53,439.60	(=R25)
Std. Dev.	$0.00	

Assumption: PI 15 Periodic Costs - Year 42 Quantity **Cell: L26**

Triangular distribution with parameters:

Minimum	0	(=K26)
Likeliest	0	(=M26)
Maximum	1	(=L26)

Assumption: PI 15 Periodic Costs - Year 42 Unit Price **Cell: R26**

Normal distribution with parameters:

Mean	$42,113.00	(=R26)
Std. Dev.	$0.00	

Assumption: PI 16 Periodic Costs - Year 45 Quantity **Cell: L27**

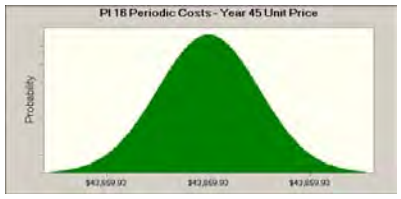
Triangular distribution with parameters:

Minimum	0	(=K27)
Likeliest	0	(=L27)
Maximum	1	(=M27)

Assumption: PI 16 Periodic Costs - Year 45 Unit Price **Cell: R27**

Normal distribution with parameters:

Mean	$43,659.93	(=R27)
Std. Dev.	$0.00	



Assumption: PI 17 Annual Costs - Maintenance Quantity **Cell: L28**

Normal distribution with parameters:

Mean	1	(=L28)
Std. Dev.	0	

Assumption: PI 17 Annual Costs - Maintenance Unit Price **Cell: R28**

BetaPERT distribution with parameters:

Minimum	$1,114,593.00	(=Q28)
Likeliest	$1,892,705.00	(=R28)
Maximum	$5,257,515.00	(=S28)

Assumption: PI 2 Periodic Costs - Year 5 Quantity **Cell: L13**

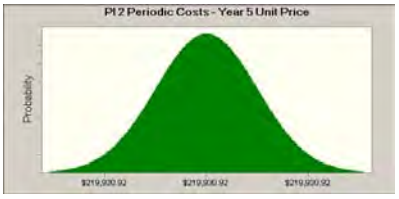
Triangular distribution with parameters:

Minimum	0	(=K13)
Likeliest	0	(=L13)
Maximum	1	(=M13)

Assumption: PI 2 Periodic Costs - Year 5 Unit Price **Cell: R13**

Normal distribution with parameters:

Mean	$219,930.92	(=R13)
Std. Dev.	$0.00	



Assumption: PI 3 Periodic Costs - Year 8 Quantity **Cell: L14**

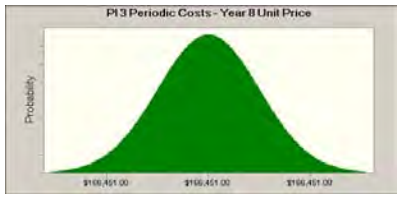
Triangular distribution with parameters:

Minimum	0	(=K14)
Likeliest	0	(=M14)
Maximum	1	(=L14)

Assumption: PI 3 Periodic Costs - Year 8 Unit Price **Cell: R14**

Normal distribution with parameters:

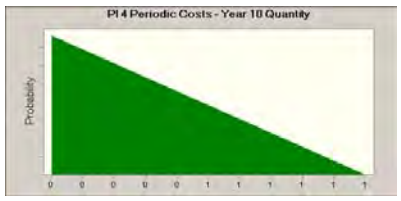
Mean	$166,451.00	(=R14)
Std. Dev.	$0.00	



Assumption: PI 4 Periodic Costs - Year 10 Quantity **Cell: L15**

Triangular distribution with parameters:

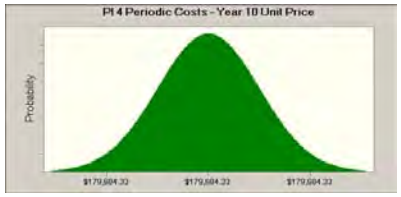
Minimum	0	(=K15)
Likeliest	0	(=L15)
Maximum	1	(=M15)



Assumption: PI 4 Periodic Costs - Year 10 Unit Price **Cell: R15**

Normal distribution with parameters:

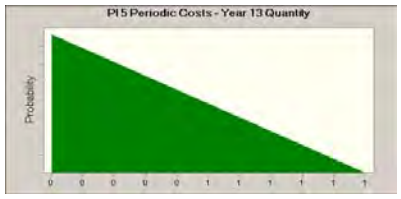
Mean	$179,684.33	(=R15)
Std. Dev.	$0.00	



Assumption: PI 5 Periodic Costs - Year 13 Quantity **Cell: L16**

Triangular distribution with parameters:

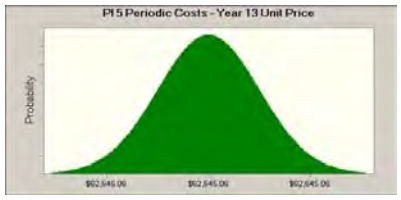
Minimum	0	(=K16)
Likeliest	0	(=L16)
Maximum	1	(=M16)



Assumption: PI 5 Periodic Costs - Year 13 Unit Price **Cell: R16**

Normal distribution with parameters:

Mean	$62,645.06	(=R16)
Std. Dev.	$0.00	



Assumption: PI 6 Periodic Costs - Year 15 Quantity **Cell: L17**

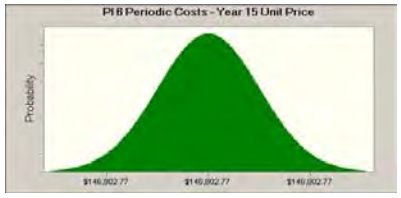
Triangular distribution with parameters:

Minimum	0	(=K17)
Likeliest	0	(=L17)
Maximum	1	(=M17)

Assumption: PI 6 Periodic Costs - Year 15 Unit Price **Cell: R17**

Normal distribution with parameters:

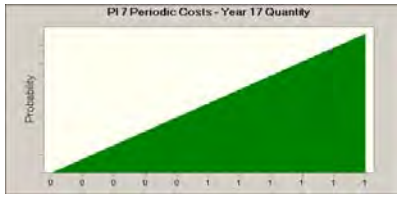
Mean	$146,802.77	(=R17)
Std. Dev.	$0.00	



Assumption: PI 7 Periodic Costs - Year 17 Quantity **Cell: L18**

Triangular distribution with parameters:

Minimum	0	(=M18)
Likeliest	1	(=K18)
Maximum	1	(=L18)

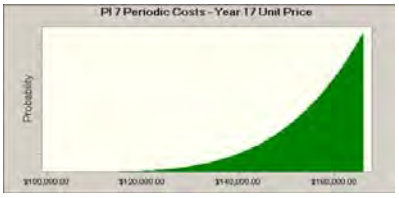


Assumption: PI 7 Periodic Costs - Year 17 Unit Price

Cell: R18

BetaPERT distribution with parameters:

Minimum	$100,600.00	(=Q18)
Likeliest	$165,990.00	(=R18)
Maximum	$165,990.00	(=S18)



Assumption: PI 8 Periodic Costs - Year 20 Quantity

Cell: L19

Triangular distribution with parameters:

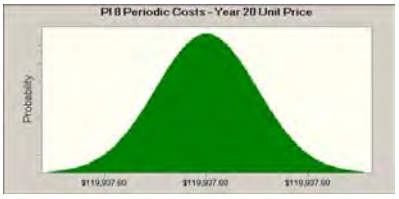
Minimum	0	(=K19)
Likeliest	0	(=L19)
Maximum	1	(=M19)

Assumption: PI 8 Periodic Costs - Year 20 Unit Price

Cell: R19

Normal distribution with parameters:

Mean	$119,937.60	(=R19)
Std. Dev.	$0.00	



Assumption: PI 9 Periodic Costs - Year 25 Quantity **Cell: L20**

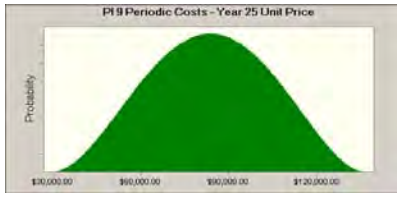
Normal distribution with parameters:

Mean	1	(=L20)
Std. Dev.	0	

Assumption: PI 9 Periodic Costs - Year 25 Unit Price **Cell: R20**

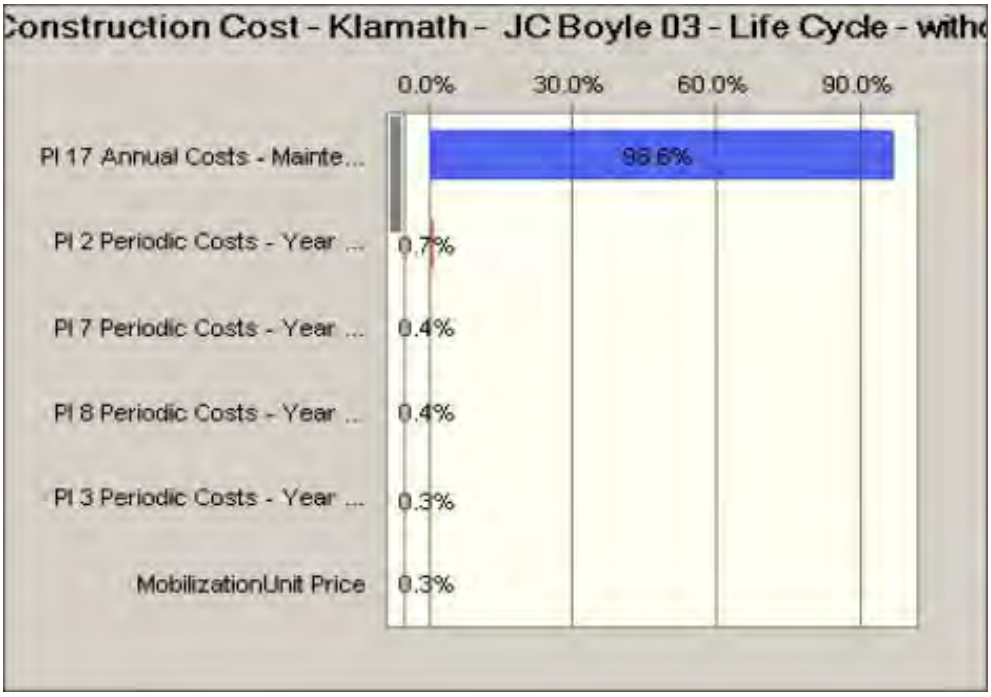
BetaPERT distribution with parameters:

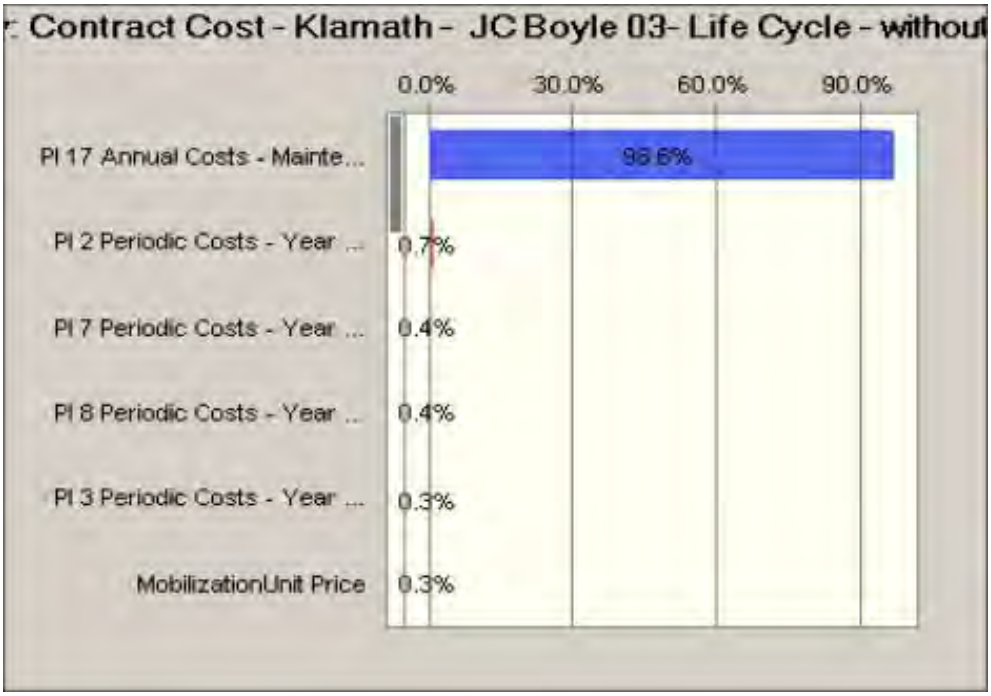
Minimum	$29,667.63	(=Q20)
Likeliest	$83,724.60	(=R20)
Maximum	$136,558.46	(=S20)

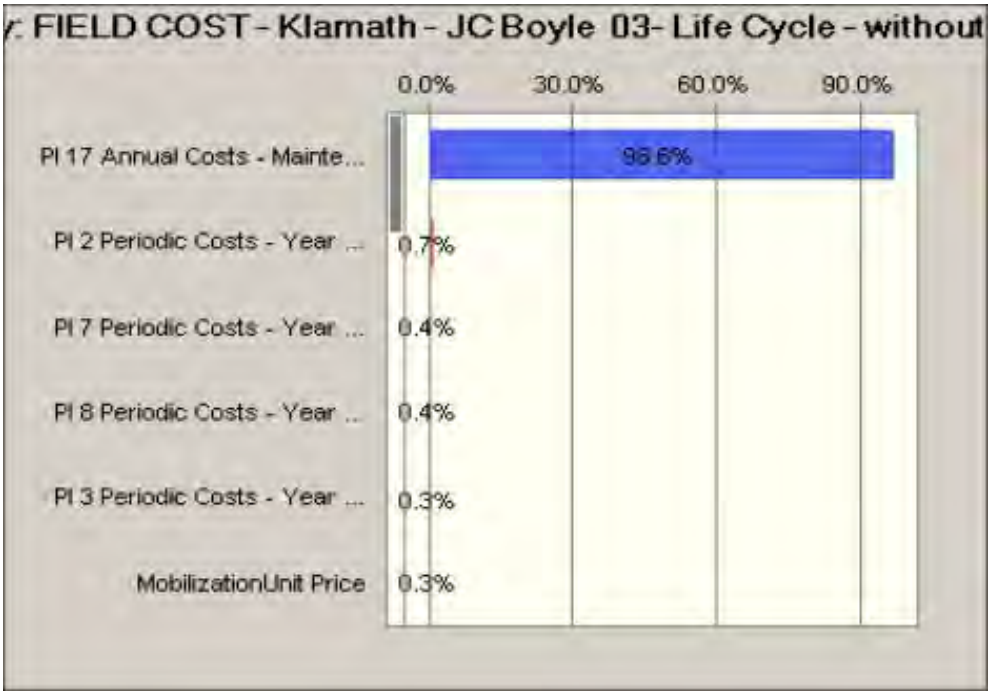


End of Assumptions

Sensitivity Charts



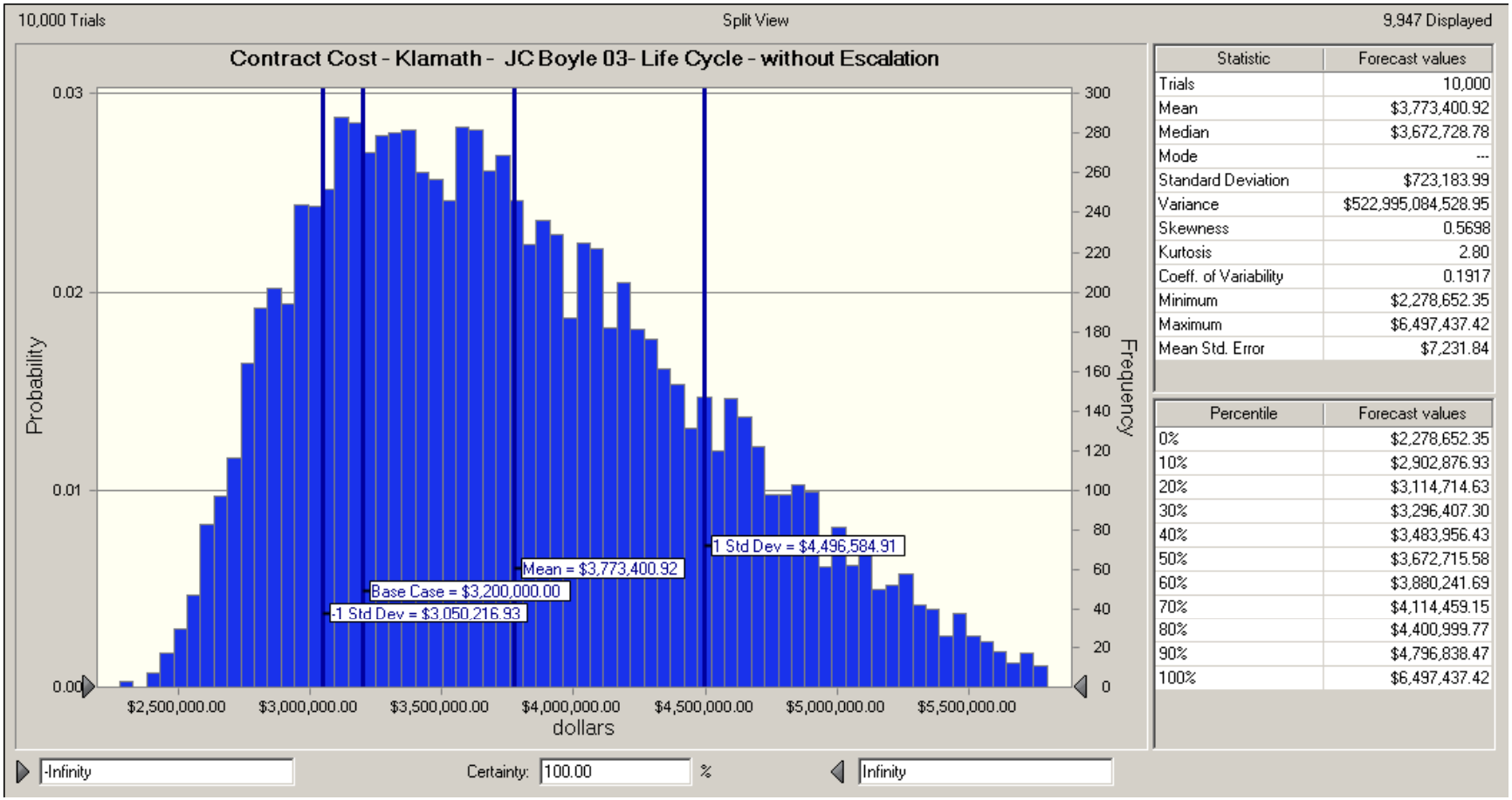

Contract Cost - Klamath - JC Boyle 03- Life Cycle - without
0.0%
30.0%
60.0%
90.0%
PI 17 Annual Costs - Mainte...
98.6%
PI 2 Periodic Costs - Year ...
0.7%
PI 7 Periodic Costs - Year ...
0.4%
PI 8 Periodic Costs - Year ...
0.4%
PI 3 Periodic Costs - Year ...
0.3%
MobilizationUnit Price
0.3%


FIELD COST - Klamath - JC Boyle 03- Life Cycle - without
0.0%
30.0%
60.0%
90.0%
PI 17 Annual Costs - Mainte...
98.6%
PI 2 Periodic Costs - Year ...
0.7%
PI 7 Periodic Costs - Year ...
0.4%
PI 8 Periodic Costs - Year ...
0.4%
PI 3 Periodic Costs - Year ...
0.3%
MobilizationUnit Price
0.3%

No target forecast has been specified

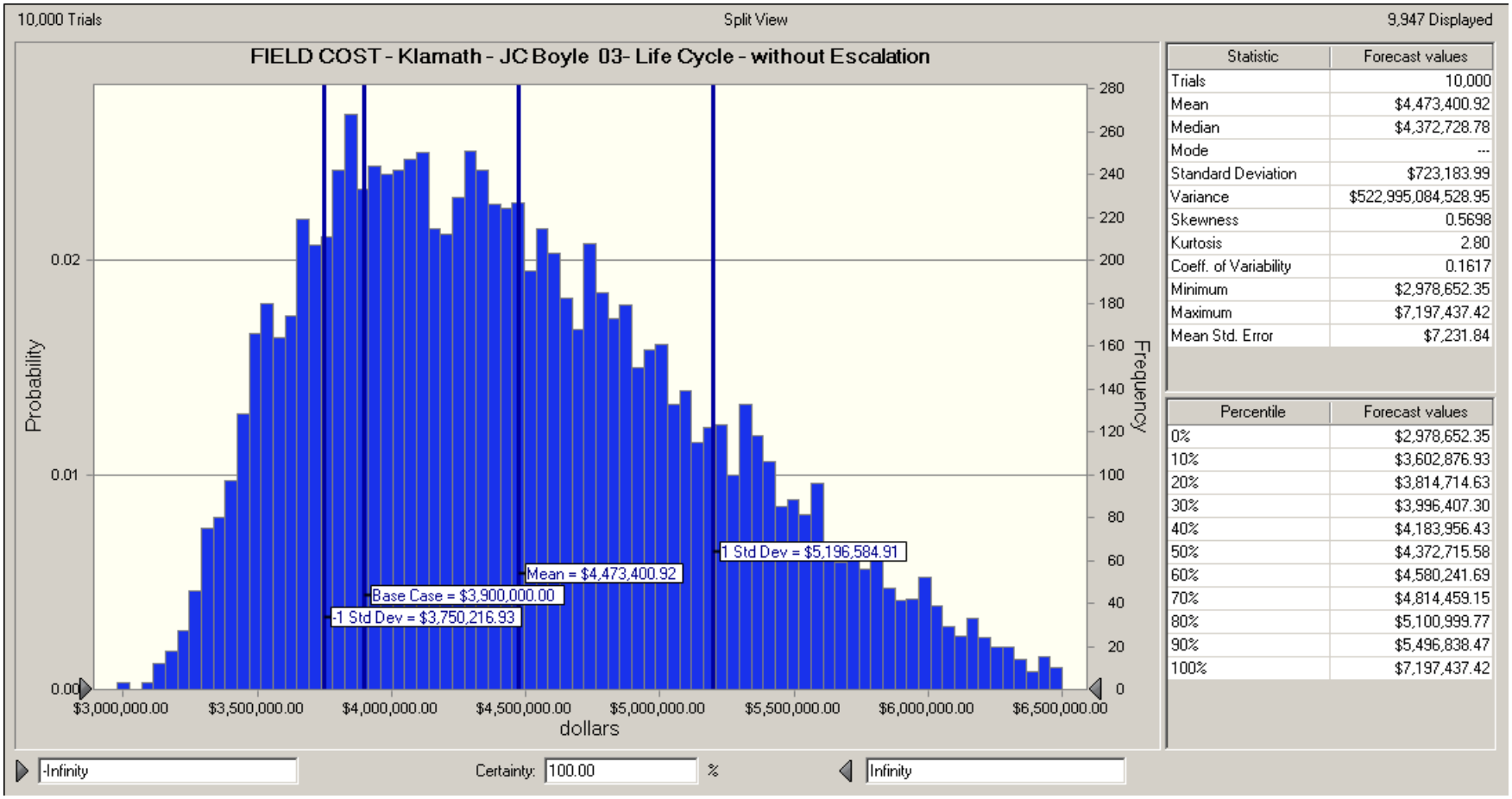
No target forecast has been specified

End of Sensitivity Charts



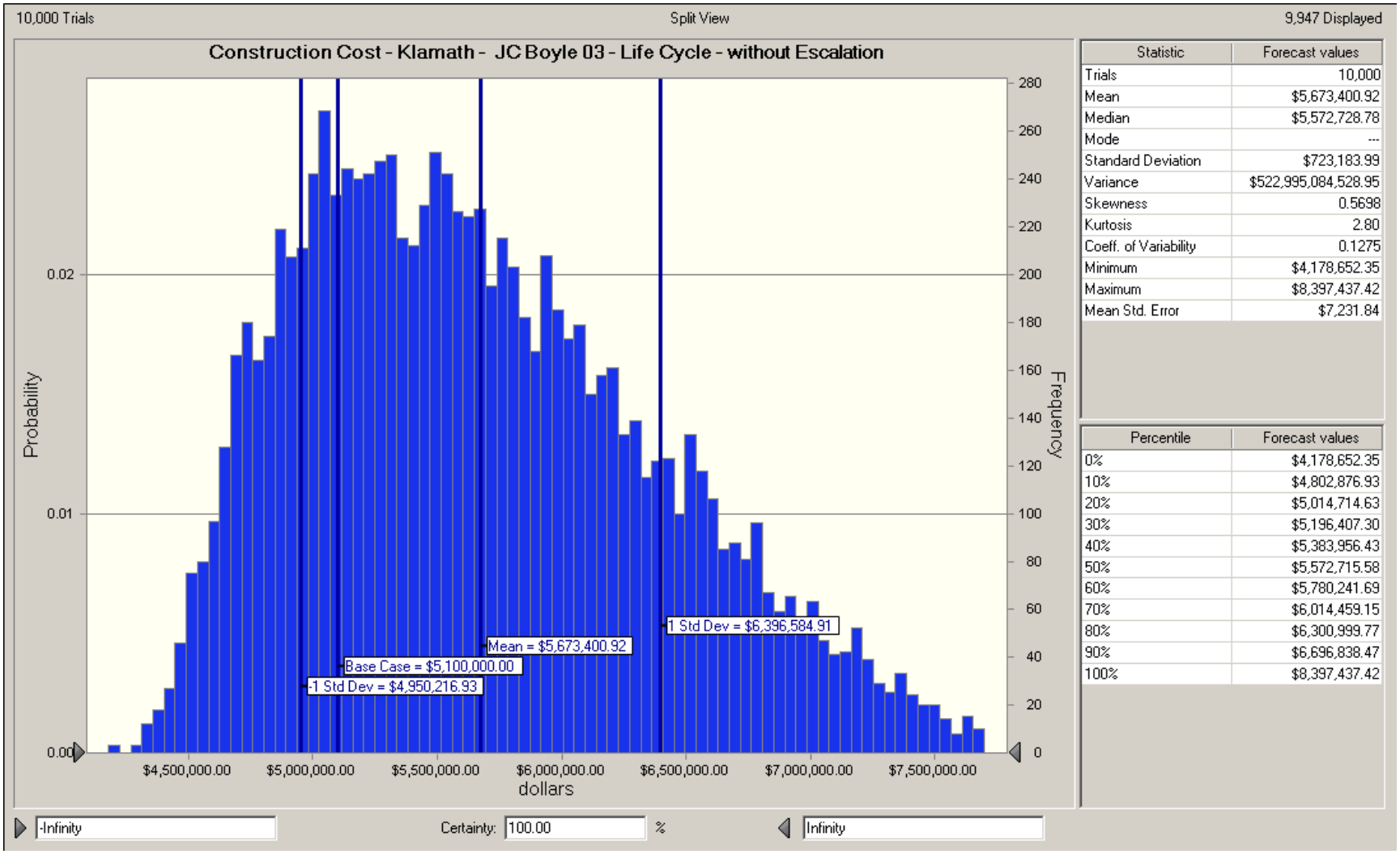
Statistic	Forecast values
Trials	10,000
Mean	$3,773,400.92
Median	$3,672,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	$522,995,084,528.95
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1917
Minimum	$2,278,652.35
Maximum	$6,497,437.42
Mean Std. Error	$7,231.84

Percentile	Forecast values
0%	$2,278,652.35
10%	$2,902,876.93
20%	$3,114,714.63
30%	$3,296,407.30
40%	$3,483,956.43
50%	$3,672,715.58
60%	$3,880,241.69
70%	$4,114,459.15
80%	$4,400,999.77
90%	$4,796,838.47
100%	$6,497,437.42



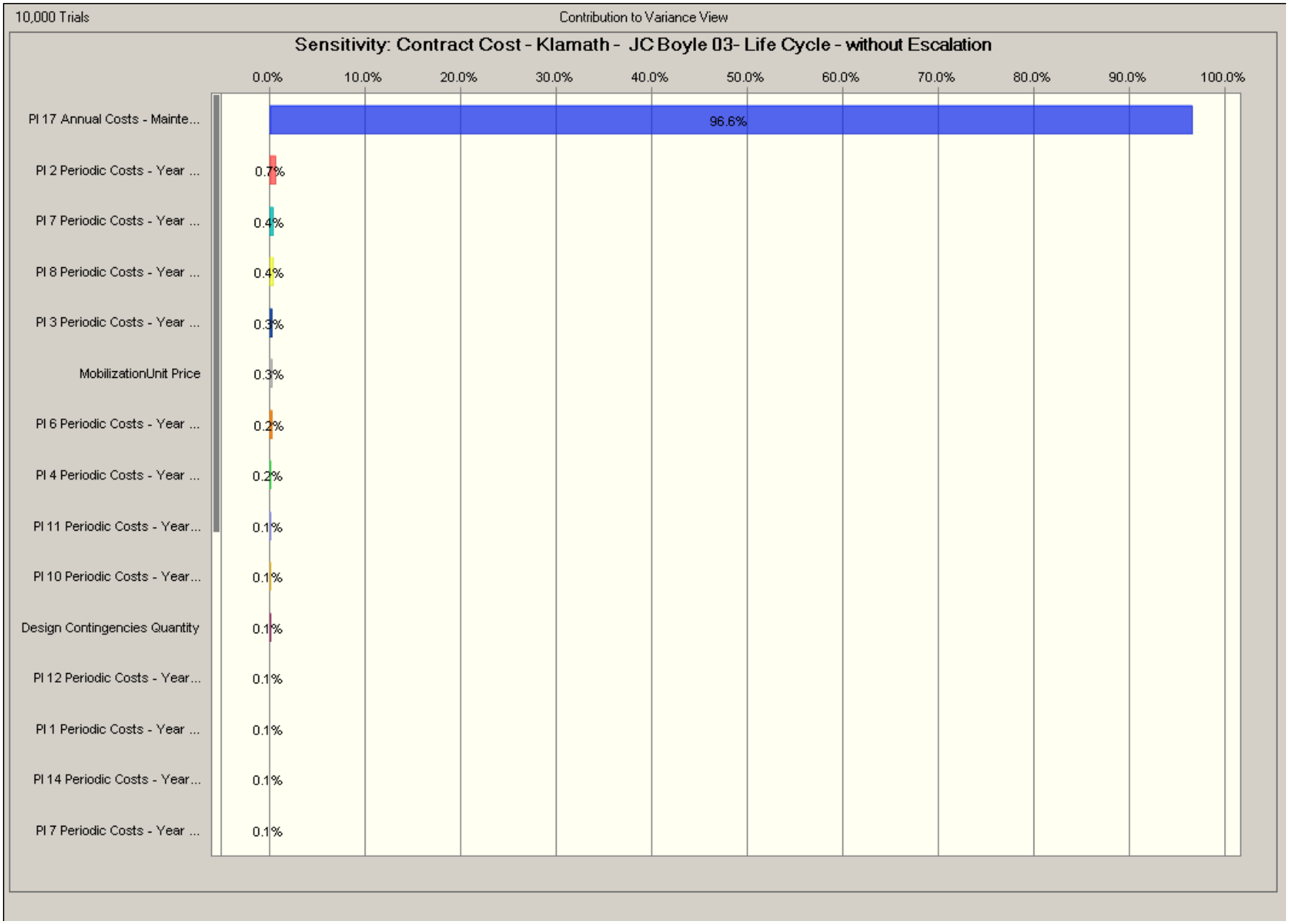
Statistic	Forecast values
Trials	10,000
Mean	$4,473,400.92
Median	$4,372,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	$522,995,084,528.95
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1617
Minimum	$2,978,652.35
Maximum	$7,197,437.42
Mean Std. Error	$7,231.84

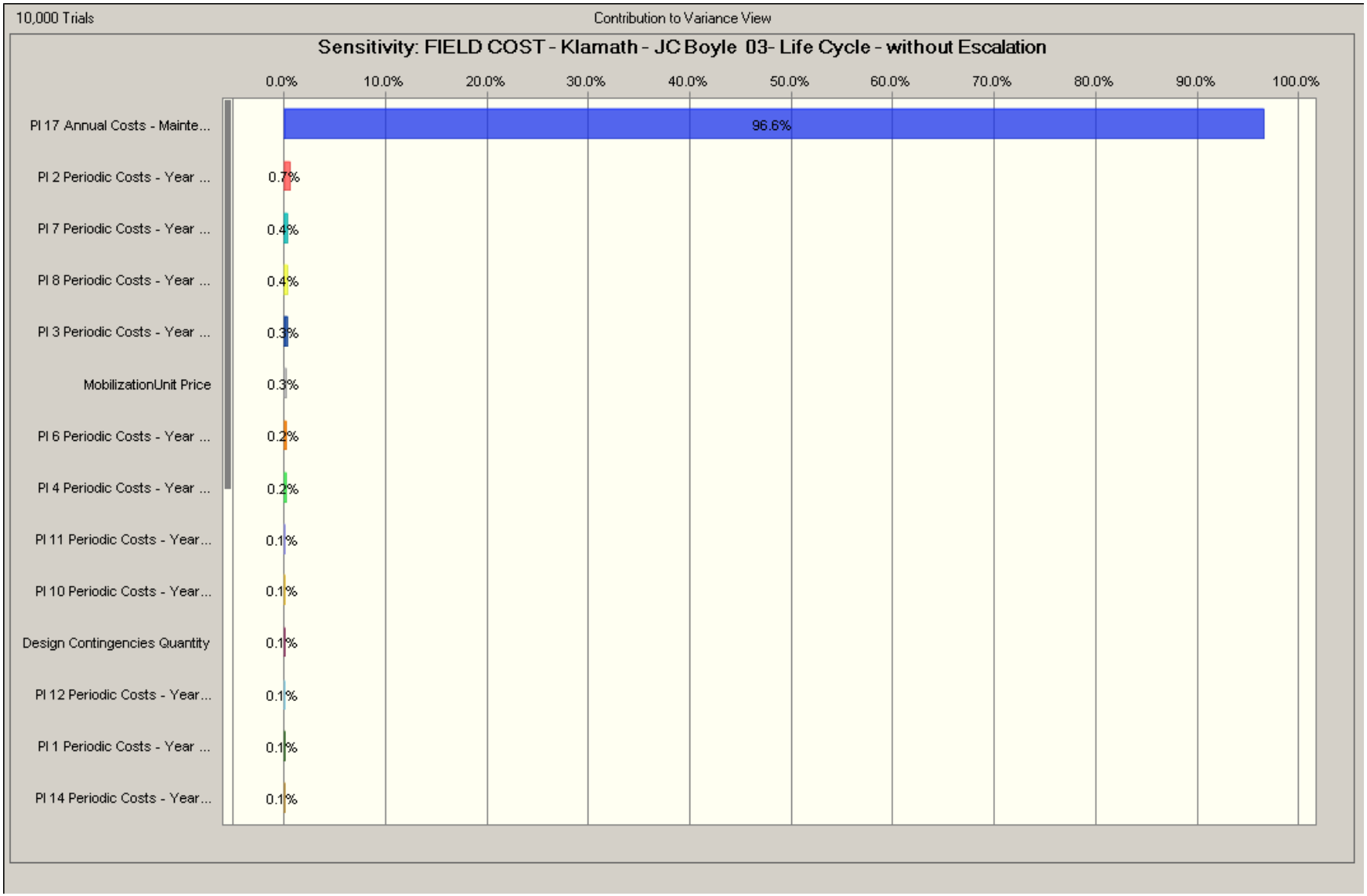
Percentile	Forecast values
0%	$2,978,652.35
10%	$3,602,876.93
20%	$3,814,714.63
30%	$3,996,407.30
40%	$4,183,956.43
50%	$4,372,715.58
60%	$4,580,241.69
70%	$4,814,459.15
80%	$5,100,999.77
90%	$5,496,838.47
100%	$7,197,437.42

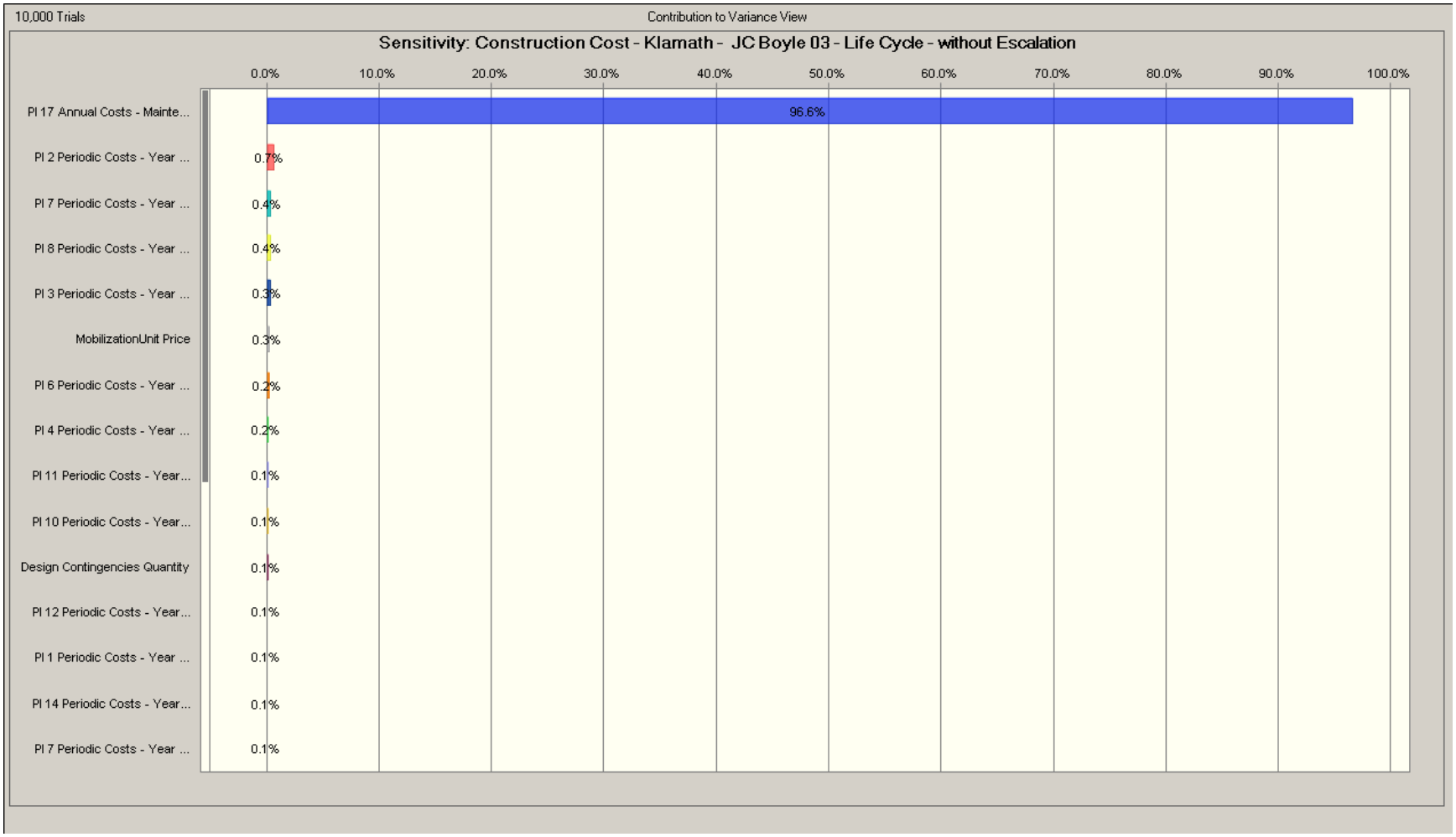


Statistic	Forecast values
Trials	10,000
Mean	$5,673,400.92
Median	$5,572,728.78
Mode	---
Standard Deviation	$723,183.99
Variance	$522,995,084,528.95
Skewness	0.5698
Kurtosis	2.80
Coeff. of Variability	0.1275
Minimum	$4,178,652.35
Maximum	$8,397,437.42
Mean Std. Error	$7,231.84

Percentile	Forecast values
0%	$4,178,652.35
10%	$4,802,876.93
20%	$5,014,714.63
30%	$5,196,407.30
40%	$5,383,956.43
50%	$5,572,715.58
60%	$5,780,241.69
70%	$6,014,459.15
80%	$6,300,999.77
90%	$6,696,838.47
100%	$8,397,437.42


10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Klamath - JC Boyle 03- Life Cycle - without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
Pl 17 Annual Costs - Mainte...
96.6%
Pl 2 Periodic Costs - Year ...
0.7%
Pl 7 Periodic Costs - Year ...
0.4%
Pl 8 Periodic Costs - Year ...
0.4%
Pl 3 Periodic Costs - Year ...
0.3%
MobilizationUnit Price
0.3%
Pl 6 Periodic Costs - Year ...
0.2%
Pl 4 Periodic Costs - Year ...
0.2%
Pl 11 Periodic Costs - Year...
0.1%
Pl 10 Periodic Costs - Year...
0.1%
Design Contingencies Quantity
0.1%
Pl 12 Periodic Costs - Year...
0.1%
Pl 1 Periodic Costs - Year ...
0.1%
Pl 14 Periodic Costs - Year...
0.1%
Pl 7 Periodic Costs - Year ...
0.1%


10,000 Trials
Contribution to Variance View
Sensitivity: FIELD COST - Klamath - JC Boyle 03- Life Cycle - without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
Pl 17 Annual Costs - Mainte...
96.6%
Pl 2 Periodic Costs - Year ...
0.7%
Pl 7 Periodic Costs - Year ...
0.4%
Pl 8 Periodic Costs - Year ...
0.4%
Pl 3 Periodic Costs - Year ...
0.3%
MobilizationUnit Price
0.3%
Pl 6 Periodic Costs - Year ...
0.2%
Pl 4 Periodic Costs - Year ...
0.2%
Pl 11 Periodic Costs - Year...
0.1%
Pl 10 Periodic Costs - Year...
0.1%
Design Contingencies Quantity
0.1%
Pl 12 Periodic Costs - Year...
0.1%
Pl 1 Periodic Costs - Year ...
0.1%
Pl 14 Periodic Costs - Year...
0.1%


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Klamath - JC Boyle 03 - Life Cycle - without Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
PI 17 Annual Costs - Mainte...
96.6%
PI 2 Periodic Costs - Year ...
0.7%
PI 7 Periodic Costs - Year ...
0.4%
PI 8 Periodic Costs - Year ...
0.4%
PI 3 Periodic Costs - Year ...
0.3%
MobilizationUnit Price
0.3%
PI 6 Periodic Costs - Year ...
0.2%
PI 4 Periodic Costs - Year ...
0.2%
PI 11 Periodic Costs - Year...
0.1%
PI 10 Periodic Costs - Year...
0.1%
Design Contingencies Quantity
0.1%
PI 12 Periodic Costs - Year...
0.1%
PI 1 Periodic Costs - Year ...
0.1%
PI 14 Periodic Costs - Year...
0.1%
PI 7 Periodic Costs - Year ...
0.1%

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Diversion and Care

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$950.00	$13,300.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
		Waste in scour hole					
	2	Remove Water from behind Tailrace Cofferdam.	86-68130	500,000	gals	$0.01	$5,000.00
		Unwatering of tailrace for removal of the powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for 2 days.					
	3	Provide Dewatering behind Tailrace Cofferdam	86-68130	1	ls		$160,000.00
		for removal of Powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for approximately 3 months.					
		SUBTOTAL THIS SHEET					**$178,300.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Tom Hepler P.E. 11/1/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

BUREAU OF RECLAMATION

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	Construct Embankment Cofferdam in Tailrace	86-68130	2,000	yd3	$100.00	$200,000.00
		around Powerhouse to remove in dry.					
		Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.					
		Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.					
		DIVERSION AND CARE SUBTOTAL					**$378,300.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$390.00	$975,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
		Waste in scour hole					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.75	$11,250.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
		Assume contains paint with heavy metals.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$390.00	$624,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
		Waste in scour hole					
	8	Remove Gravity Dam Section Concrete	86-68130	600	yd3	$390.00	$234,000.00
		3000 psi, mass concrete.					
		Waste in scour hole					
	9	Remove Timber Equipment Ramp on left side of	86-68130	10,500	lbs	$0.70	$7,350.00
		dam.					
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from	86-68130	3,600	lbs	$0.70	$2,520.00
		Footbridge around intake structure.					
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$1,854,120.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	11	Storage Shed located on access road about	86-68130	1,728	ft2	$42.00	$72,576.00
		440' from left abutment of dam.					
		48' x 36' wood frame construction.					
	12	Warehouse located on access road about 370'	86-68130	1,920	ft2	$42.00	$80,640.00
		from left abutment of dam (Red Barn).					
		60' x 32' wood frame construction.					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$42.00	$16,170.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$42.00	$13,902.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$390.00	$2,340.00
		Control House. 13'x13' house has been removed.					
		Waste in scour hole					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$390.00	$390.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
		Waste in scour hole					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$42.00	$1,008.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$187,026.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** DW 05-19-11
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Rick Benik P.E. 11/1/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCD 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$12.00	$26,640.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$12.00	$22,200.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$12.00	$1,590,000.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$390.00	$27,300.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
		Waste in scour hole					
	22	Cutoff Wall Anchors	86-68313	285	ea	$12.00	$3,420.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,669,560.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED** DW 05-19-11
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Daniel W. Osmun 11/1/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCO 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.75	$3,750.00
		(Assume contains paint with heavy metals)					
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.75	$93,000.00
		3 radial gates, 3 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.75	$69,000.00
		stop logs slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.75	$3,150.00
		Structure					
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
		SUBTOTAL THIS SHEET					**$168,900.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$700.00	$700.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$6,500.00	$6,500.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$3,886,806.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
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JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	29	Remove Powerhouse Concrete down to Elevation 3324.0 (springline of the turbines). Waste in scour hole	86-68130	1,500	yd3	$800.00	$1,200,000.00
	30	Remove Structural Steel Items associated with Powerhouse. Includes only WF beam shapes, crane rails, and penstock sections inside powerhouse. Assume contains paint with heavy metals.	86-68130	94,000	lbs	$0.75	$70,500.00
	31	Warehouse near Powerhouse. Large metal building on concrete slab.	86-68130	5,200	ft2	$42.00	$218,400.00
		SUBTOTAL THIS SHEET					**$1,488,900.00**

QUANTITIES		PRICES	
BY: Stephen Latham	CHECKED: Jonathan East	BY: Craig A. Grush, P.E.	CHECKED: 05-19-11
DATE PREPARED: 11/01/10	PEER REVIEW / DATE: Rick Benik P.E. 11/1/10	DATE PREPARED: 05/19/11	PEER REVIEW / DATE: 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	32	2 - Governor oil systems	86-68420	52,500	lbs	$0.75	$39,375.00
		governor, sump tanks, accumulator tank, piping					
		(Assume contains paint with heavy metals & petroleum products)					
	33	Cooling water and bearing oil systems	86-68420	6,500	lbs	$0.75	$4,875.00
		(Assume contains paint with heavy metals & petroleum products)					
	34	2 - Francis Turbines	86-68420	560,000	lbs	$0.75	$420,000.00
		(Includes runner, scroll case, draft tube and shaft)					
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	35	150 Ton crane	86-68420	240,000	lbs	$0.75	$180,000.00
		(Includes crane and embedded steel rail)					
		(Assume contains paint with heavy metals & petroleum products)					
	36	Compressed Air systems	86-68420	1,100	lbs	$0.75	$825.00
		(Assume contains paint with heavy metals & petroleum products)					
	37	2 - CO2 systems	86-68420	6,600	lbs	$0.75	$4,950.00
		(Assume contains paint with heavy metals & petroleum products)					
	38	Plant Water and Fire Protection	86-68420	3,100	lbs	$0.75	$2,325.00
		(Assume contains paint with heavy metals)					
	39	Transformer Oil Fire protection	86-68420	6,500	lbs	$0.75	$4,875.00
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					**$657,225.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	40	Unwatering Piping	86-68420	33,000	lbs	$0.75	$24,750.00
		(Assume contains paint with heavy metals)					
	41	Drainage Piping	86-68420	10,000	lbs	$0.75	$7,500.00
		(Assume contains paint with heavy metals)					
	42	2-Oil Sump pumps	86-68420	2,000	lbs	$0.75	$1,500.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	43	Remove and Dispose of Draft Tube Bulk Head	86-68420	65,000	lbs	$0.75	$48,750.00
		Gates and Hoists at the Powerhouse					
		4-Draft Tube Bulk Head Gates (12,000 lbs ea.)	48,000	lbs			
		4-Guides(2,400 lbs for the pair)	9,600	lbs			
		2-Hoist (3,700 lbs ea.)	7,400	lbs			
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
		SUBTOTAL THIS SHEET					**$82,500.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA	86-68430	2	EA	$250,000.00	$500,000.00
		(50 MW); Unit 2: 50 MVA (48 MW); 0.95PF,					
		11,500 V, 277 RPM, 3 Ph, including rotating exciter					
		Total weight each approximately: 657,000 lbs.					
		Stator: 175,000 lbs., Rotor: 290,000 lbs.					
		Heaviest lift: 300,000 lbs.					
	45	Excitation equipment for 53/50 MVA Generator	86-68430	2	EA	$13,000.00	$26,000.00
		(5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
	46	Surge protection equip. for 53/50 MVA Generator	86-68430	2	EA	$8,000.00	$16,000.00
		Total weight approximately: 1,500 lbs.					
	47	Neutral grounding equip. for 53/50 MVA Generato	86-68430	2	EA	$4,000.00	$8,000.00
		includes transformer					
		Total weight approximately: 500 lbs.					
	48	Generator Switchgear, 15kV - (6 sections)	86-68430	1	EA	$21,000.00	$21,000.00
		(750 lbs each), 3 ft x 6ft x 90 inches high					
		Total weight approximately: 4,500 lbs.					
	49	Station Service Switchgear, 600 volt -(5 sections)	86-68430	1	EA	$10,000.00	$10,000.00
		(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
		SUBTOTAL THIS SHEET					**$581,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment in the Powerplant:					
	50	Unit and plant control switchboard	86-68430	1	EA	$6,000.00	$6,000.00
		5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high					
		Total weight approximately: 1,000 lbs.					
	51	Battery system - assume 40 batteries, charger,	86-68430	1	EA	$9,000.00	$9,000.00
		racks and supports.					
		Total weight approximately: 2,500 lbs.					
	52	Raceways, Conduit and Cable	86-68430	1	EA	$12,000.00	$12,000.00
		(approx. 3000 lin. Ft. power & control cable,					
		1000 lin. Ft. conduit, 200 lin. Ft. cabletray)					
		Total weight approximately: 8,000 lbs.					
	53	Misc. power & control boards	86-68430	1	EA	$7,000.00	$7,000.00
		10 boards (50 lbs each) 3ft x 2 ft x 9 in					
		Total weight approximately: 500 lbs.					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist	86-68430	1	EA	$3,000.00	$3,000.00
		(30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*)					
		(Hp* Approx.) Total weight approximately: 750 lbs.					
	55	Gantry Crane control equipment (3 cubicles)	86-68430	1	EA	$7,000.00	$7,000.00
		Total weight approximately: 900 lbs.					
		SUBTOTAL THIS SHEET					**$44,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCW 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$11,000.00	$11,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$3,000.00	$3,000.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$30,000.00	$49,800.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$30,000.00	$7,200.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$30,000.00	$49,800.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$2,974,425.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	61	Remove Intake Structure Concrete	86-68130	1,600	yd3	$390.00	$624,000.00
		3000 psi, reinforced concrete.					
		Waste in scour hole					
	62	Remove Fish Screen Building	86-68130	1,300	ft2	$42.00	$54,600.00
		Building is located on top of intake structure.					
		Wood frame construction, with metal rib roof and metal siding.					
		Some wood is pressure-treated, which may be considered a					
		hazardous material.					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.75	$16,500.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
		Assume contains paint with heavy metals and/or asbestos					
	64	Remove Concrete Items associated with the					
		14-ft-diameter Steel Pipe.	86-68130	1,100	yd3	$390.00	$429,000.00
		Includes anchors for horiz. pipe bends, piers,					
		14-ft dia. concrete conduit section, outlet transition					
		with newer (2002) headgate vault section,					
		siphon spillway structure, and 22-ft-long spillway flume.					
		Waste in scour hole					
	65	Remove Open Concrete Flume.	86-68130	26,000	yd3	$390.00	$10,140,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		Includes 2,300 CY of unreinforced porous concrete					
		(gunite or shotcrete) on 1-wall flume reaches.					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$11,264,100.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCB 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.75	$8,625.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
		Assume contains paint with heavy metals.					
	67	Remove Forebay Concrete	86-68130	2,500	yd3	$390.00	$975,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, forebay sluiceway,					
		and forebay drainage items (man-hole,					
		12-inch concrete drain pipe).					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$1,100.00	$33,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$390.00	$702,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$42.00	$13,860.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$42.00	$23,940.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$42.00	$19,740.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$1,776,165.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.75	$5,325.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
		Assume contains paint with heavy metals.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$42.00	$3,024.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$8,349.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE NCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	75	Fixed Wheel Gate	86-68420	55,000	lbs	$0.75	$41,250.00
		Gate, frame and hoist (steel)					
		(Assume contains paint with heavy metals & petroleum products)					
	76	Trash rack and trash rake (steel)	86-68420	75,000	lbs	$0.70	$52,500.00
		(Assume contains asbestos)					
	77	Stop Logs and slots (steel)	86-68420	136,000	lbs	$0.75	$102,000.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
	78	Traveling Water Screen	86-68420	124,000	lbs	$0.75	$93,000.00
		4 traveling water screens	120,000	lbs			
		4 spraywater pumps	4,000	lbs			
		(Assume contains petroleum products and/or asbestos)					
	79	Fish By-Pass and Supports (steel), 4-Pronged	86-68420	610,000	lbs	$0.75	$457,500.00
		Inlet to Forebay, Spillway, Deer Escape Flume					
		(Assume contains paint with heavy metals and/or asbestos)					
		SUBTOTAL THIS SHEET					**$746,250.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.75	$12,375.00
		2 radial gates, 2 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.70	$30,450.00
		(Assumes contains asbestos)					
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.75	$10,875.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.75	$1,200,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
		(Assume contains paint with heavy metals and/or asbestos)					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.75	$59,250.00
		(Assume contains paint with heavy metals and/or asbestos)					
	85	2 - 108" Butterfly valves	86-68420	148,000	lbs	$0.75	$111,000.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
		SUBTOTAL THIS SHEET					**$1,423,950.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.75	$21,000.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	87	Steel Transition Manifolds on Upstream and Downstream	86-68420	250,000	lbs	$0.70	$175,000.00
		(Assume contains asbestos)					
		PENSTOCK SUBTOTAL					**$15,414,814.00**

QUANTITIES		PRICES	
BY T. J. Turnage	**CHECKED** K. Converse	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED October 20, 2010	**PEER REVIEW / DATE** Dan Drake 10/29/2010	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Appraisal
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$100,000.00	$200,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$200,000.00**

QUANTITIES		PRICES	
BY: Mark Leavitt	CHECKED: Gemperline, Joseph M	BY: Craig A. Grush, P.E.	CHECKED: 05-19-11
DATE PREPARED: 11/12/10	PEER REVIEW / DATE: Jeff Baysinger 12/14/2010	DATE PREPARED: 05/19/11	PEER REVIEW / DATE: DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING:	86-68220	0	Acres	$4,000.00	
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	247	Acres	$15,000.00	$3,705,000.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	92	FALL GROUND SEEDING:	86-68220	185	Acres	$4,000.00	$740,000.00
		Idaho fescue (Festuca idahoensis)	741	lbs PLS			
		Blue wildrye (Elymus glaucus)	741	lbs PLS			
		Small fescue (Vulpia microstachys)	741	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1112	lbs PLS			
		Sandberg bluegrass (Poa secunda)	93	lbs PLS			
		Spike bentgrass (Agrostis exarata)	46	lbs PLS			
		Wood mulch	57000	lbs			
		Tackifier	3420	lbs			
		SUBTOTAL THIS SHEET					**$4,445,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

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Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$10,000.00	$540,000.00
		Narrowleaf willow (Salix exigua)	37800	cutting			
		Arroyo willow (Salix lasiolepis)	5400	cutting			
		Shining willow (Salix lucida)	5400	cutting			
		Western serviceberry (Amelanchier alnifolia)	2700	cutting			
		Chokecherry (Prunus virginiana)	2700	transplant			
		Herbivore screen	54000	each			
		Chemical herbivore deterent	1080	gal			
		Polymer	170	lbs			
	94	WEED MANAGEMENT:	86-68220	185	Acres	$2,000.00	$370,000.00
		Herbicide, post-emergent	371	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$4,000.00	$396,000.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$2,000.00	$198,000.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$6,149,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 04/12/11	PEER REVIEW / DATE Greimann, Blair P 4/12/2011	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Road Improvements

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	7	acre	$6,000.00	$42,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$6,000.00	$14,400.00
	99	4" thick gravel surfacing	86-68313	2,150	ton	$40.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	0	acre	$6,000.00	
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		1 way traffic - off road dumps					
	101	Clear and grub, 20' width	86-68313	0	acres	$6,000.00	
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	0	yd3	$150.00	
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$142,400.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED DW 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCO 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Road Improvements

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	9,700	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	37,000	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	4,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	41,000	yd3	$150.00	$6,150,000.00
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$6,292,400.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DWO 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Recreational Facilities to be Removed
JC Boyle Reservoir
Most Probable High

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$320.00	$21,760.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$6,000.00	$6,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$14.00	$2,800.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$5.00	$1,500.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$65.00	$780.00
	113	12 Concrete fire rings	BLM	5	CY	$320.00	$1,600.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$1,200.00	$2,400.00
	115	Signs to be removed and hauled away	BLM	6	EA	$160.00	$960.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$1,200.00	$1,200.00
	117	Remove paved access road	BLM	200	LF	$270.00	$54,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$22,000.00	$11,000.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL THIS SHEET							**$104,000.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Bolye Dam & Powerplant Removal
Most Probable High
SUMMARY

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$378,300.00
		Dam Removal					$3,886,806.00
		Powerhouse/Switchyard/Transmission Line Removal					$2,974,425.00
		Penstock Removal					$15,414,814.00
		Reservoir Vegetative Restoration					$6,149,000.00
		Road Improvements					$6,292,400.00
		Recreational Facilities to be Removed					$104,000.00
		Subtotal					**$35,199,745.00**
		Mobilization	5%	+/-			$1,750,000.00
		Subtotal 1 with Mobilization					**$36,949,745.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$19,749,377.00
		(assumes 4.375%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$56,699,122.00
		Design Contingencies	15%	+/-			$8,996,798.00
		Allowance for Procurement Strategies (APS)	2%	+/-			$1,304,080.00
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$67,000,000.00**
		Construction Contingencies	25%	+/-			$16,000,000.00
		FIELD COST					**$83,000,000.00**
		Non-Contract Costs:	61%	+/-			$52,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 2%,					
		Engineering Design ~ 6%, Permitting ~ 4%,					
		Procurement ~ 2%, Construction Management					
		~ 11%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$135,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCR 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Diversion and Care

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$725.00	$10,150.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
	2	Remove Water from behind Tailrace Cofferdam.	86-68130	500,000	gals	$0.01	$5,000.00
		Unwatering of tailrace for removal of the powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for 2 days.					
	3	Provide Dewatering behind Tailrace Cofferdam	86-68130	1	ls		$28,000.00
		for removal of Powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for approximately 3 months.					
		SUBTOTAL THIS SHEET					**$43,150.00**

QUANTITIES		PRICES	
BY Rick Benik	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Tom Hepler P.E. 11/1/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Diversion and Care

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	Construct Embankment Cofferdam in Tailrace around Powerhouse to remove in dry.	86-68130	2,000	yd3	$50.00	$100,000.00
		Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.					
		Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.					
		DIVERSION AND CARE SUBTOTAL					**$143,150.00**

QUANTITIES		PRICES	
BY: Stephen Latham	CHECKED: Jonathan East	BY: Craig A. Grush, P.E.	CHECKED: 05-19-11
DATE PREPARED: 11/01/10	PEER REVIEW / DATE: Rick Benik P.E. 11/1/10	DATE PREPARED: 05/19/11	PEER REVIEW / DATE: 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$130.00	$325,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.45	$6,750.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$130.00	$208,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
	8	Remove Gravity Dam Section Concrete	86-68130	600	yd3	$130.00	$78,000.00
		3000 psi, mass concrete.					
	9	Remove Timber Equipment Ramp on left side of dam.	86-68130	10,500	lbs	$0.50	$5,250.00
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from Footbridge around intake structure.	86-68130	3,600	lbs	$0.50	$1,800.00
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$624,800.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED DN 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	11	Storage Shed located on access road about	86-68130	1,728	ft2	$38.00	$65,664.00
		440' from left abutment of dam.					
		48' x 36' wood frame construction.					
	12	Warehouse located on access road about 370'	86-68130	1,920	ft2	$38.00	$72,960.00
		from left abutment of dam (Red Barn).					
		60' x 32' wood frame construction.					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$38.00	$14,630.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$38.00	$12,578.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$130.00	$780.00
		Control House. 13'x13' house has been removed.					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$130.00	$130.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$38.00	$912.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$167,654.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$8.00	$17,760.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$8.00	$14,800.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$8.00	$1,060,000.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$130.00	$9,100.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
	22	Cutoff Wall Anchors	86-68313	285	ea	$9.00	$2,565.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,104,225.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.45	$2,250.00
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.45	$55,800.00
		3 radial gates, 3 hoists					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.45	$41,400.00
		stop logs slots embedded in concrete					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.45	$1,890.00
		Structure					
		SUBTOTAL THIS SHEET					**$101,340.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$500.00	$500.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$5,500.00	$5,500.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$2,004,019.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE ACQ 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	29	Remove Powerhouse Concrete down to					
		Elevation 3324.0 (springline of the turbines).	86-68130	1,500	yd3	$300.00	$450,000.00
		Waste in scour hole					
	30	Remove Structural Steel Items associated with					
		Powerhouse.	86-68130	94,000	lbs	$0.45	$42,300.00
		Includes only WF beam shapes, crane rails, and					
		penstock sections inside powerhouse.					
	31	Warehouse near Powerhouse.	86-68130	5,200	ft2	$38.00	$197,600.00
		Large metal building on concrete slab.					
		SUBTOTAL THIS SHEET					**$689,900.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	32	2 - Governor oil systems	86-68420	52,500	lbs	$0.45	$23,625.00
		governor, sump tanks, accumulator tank, piping					
	33	Cooling water and bearing oil systems	86-68420	6,500	lbs	$0.45	$2,925.00
	34	2 - Francis Turbines	86-68420	560,000	lbs	$0.45	$252,000.00
		(Includes runner, scroll case, draft tube and shaft)					
	35	150 Ton crane	86-68420	240,000	lbs	$0.45	$108,000.00
		(Includes crane and embedded steel rail)					
	36	Compressed Air systems	86-68420	1,100	lbs	$0.45	$495.00
	37	2 - CO2 systems	86-68420	6,600	lbs	$0.45	$2,970.00
	38	Plant Water and Fire Protection	86-68420	3,100	lbs	$0.45	$1,395.00
	39	Transformer Oil Fire protection	86-68420	6,500	lbs	$0.45	$2,925.00
		SUBTOTAL THIS SHEET					**$394,335.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE NCD 6/3/11

ESTIMATE WORKSHEET

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	40	Unwatering Piping	86-68420	33,000	lbs	$0.45	$14,850.00
	41	Drainage Piping	86-68420	10,000	lbs	$0.45	$4,500.00
	42	2-Oil Sump pumps	86-68420	2,000	lbs	$0.45	$900.00
	43	Remove and Dispose of Draft Tube Bulk Head	86-68420	65,000	lbs	$0.45	$29,250.00
		Gates and Hoists at the Powerhouse					
		4-Draft Tube Bulk Head Gates (12,000 lbs ea.)	48,000	lbs			
		4-Guides(2,400 lbs for the pair)	9,600	lbs			
		2-Hoist (3,700 lbs ea.)	7,400	lbs			
		SUBTOTAL THIS SHEET					**$49,500.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

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PROJECT:
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA	86-68430	2	EA	$150,000.00	$300,000.00
		(50 MW); Unit 2: 50 MVA (48 MW); 0.95PF,					
		11,500 V, 277 RPM, 3 Ph, including rotating exciter					
		Total weight each approximately: 657,000 lbs.					
		Stator: 175,000 lbs., Rotor: 290,000 lbs.					
		Heaviest lift: 300,000 lbs.					
	45	Excitation equipment for 53/50 MVA Generator	86-68430	2	EA	$12,000.00	$24,000.00
		(5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
	46	Surge protection equip. for 53/50 MVA Generator	86-68430	2	EA	$6,000.00	$12,000.00
		Total weight approximately: 1,500 lbs.					
	47	Neutral grounding equip. for 53/50 MVA Generato	86-68430	2	EA	$2,000.00	$4,000.00
		includes transformer					
		Total weight approximately: 500 lbs.					
	48	Generator Switchgear, 15kV - (6 sections)	86-68430	1	EA	$19,000.00	$19,000.00
		(750 lbs each), 3 ft x 6ft x 90 inches high					
		Total weight approximately: 4,500 lbs.					
	49	Station Service Switchgear, 600 volt -(5 sections)	86-68430	1	EA	$8,000.00	$8,000.00
		(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
		SUBTOTAL THIS SHEET					**$367,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

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Most Probable Low
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PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	50	Unit and plant control switchboard 5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high Total weight approximately: 1,000 lbs.	86-68430	1	EA	$4,000.00	$4,000.00
	51	Battery system - assume 40 batteries, charger, racks and supports. Total weight approximately: 2,500 lbs.	86-68430	1	EA	$7,000.00	$7,000.00
	52	Raceways, Conduit and Cable (approx. 3000 lin. Ft. power & control cable, 1000 lin. Ft. conduit, 200 lin. Ft. cabletray) Total weight approximately: 8,000 lbs.	86-68430	1	EA	$10,000.00	$10,000.00
	53	Misc. power & control boards 10 boards (50 lbs each) 3ft x 2 ft x 9 in Total weight approximately: 500 lbs.	86-68430	1	EA	$5,000.00	$5,000.00
		Remove and dispose of the following Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist (30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*) (Hp* Approx.) Total weight approximately: 750 lbs.	86-68430	1	EA	$1,500.00	$1,500.00
	55	Gantry Crane control equipment (3 cubicles) Total weight approximately: 900 lbs.	86-68430	1	EA	$5,000.00	$5,000.00
		SUBTOTAL THIS SHEET					**$32,500.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED DM 05-19-11
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ESTIMATE WORKSHEET

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Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$9,000.00	$9,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$1,500.00	$1,500.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$20,000.00	$33,200.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$20,000.00	$4,800.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$20,000.00	$33,200.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$1,614,935.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	61	Remove Intake Structure Concrete	86-68130	1,600	yd3	$130.00	$208,000.00
		3000 psi, reinforced concrete.					
	62	Remove Fish Screen Building	86-68130	1,300	ft2	$38.00	$49,400.00
		Building is located on top of intake structure.					
		Wood frame construction, with metal rib roof and metal siding.					
		Some wood is pressure-treated, which may be considered a					
		hazardous material.					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.45	$9,900.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
	64	Remove Concrete Items associated with the					
		14-ft-diameter Steel Pipe.	86-68130	1,100	yd3	$130.00	$143,000.00
		Includes anchors for horiz. pipe bends, piers,					
		14-ft dia. concrete conduit section, outlet transition					
		with newer (2002) headgate vault section,					
		siphon spillway structure, and 22-ft-long spillway flume.					
	65	Remove Open Concrete Flume.	86-68130	26,000	yd3	$220.00	$5,720,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		Includes 2,300 CY of unreinforced porous concrete					
		(gunite or shotcrete) on 1-wall flume reaches.					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$6,130,300.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Penstock	Klamath River Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.45	$5,175.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
	67	Remove Forebay Concrete	86-68130	2,500	yd3	$220.00	$550,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, forebay sluiceway,					
		and forebay drainage items (man-hole,					
		12-inch concrete drain pipe).					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$900.00	$27,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$220.00	$396,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$38.00	$12,540.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$38.00	$21,660.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$38.00	$17,860.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$1,030,235.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

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REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.45	$3,195.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$38.00	$2,736.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$5,931.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	75	Fixed Wheel Gate	86-68420	55,000	lbs	$0.45	$24,750.00
		Gate, frame and hoist (steel)					
	76	Trash rack and trash rake (steel)	86-68420	75,000	lbs	$0.45	$33,750.00
	77	Stop Logs and slots (steel)	86-68420	136,000	lbs	$0.45	$61,200.00
		stop log slots embedded in concrete					
	78	Traveling Water Screen	86-68420	124,000	lbs	$0.45	$55,800.00
		4 traveling water screens	120,000	lbs			
		4 spraywater pumps	4,000	lbs			
	79	Fish By-Pass and Supports (steel), 4-Pronged	86-68420	610,000	lbs	$0.45	$274,500.00
		Inlet to Forebay, Spillway, Deer Escape Flume					
		SUBTOTAL THIS SHEET					**$450,000.00**

QUANTITIES		PRICES	
BY T. J. Turnage	**CHECKED** K. Converse	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED October 28, 2010	**PEER REVIEW / DATE** Dan Drake 10/29/2010	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

ESTIMATE WORKSHEET

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Penstock

PROJECT:
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Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.45	$7,425.00
		2 radial gates, 2 hoists					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.45	$19,575.00
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.45	$6,525.00
		stop log slots embedded in concrete					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.45	$720,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.45	$35,550.00
	85	2 - 108" Butterfly valves	86-68420	148,000	lbs	$0.45	$66,600.00
		SUBTOTAL THIS SHEET					**$855,675.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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JC Boyle Dam & Powerplant Removal
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Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.45	$12,600.00
	87	Steel Transition Manifolds on Upstream and	86-68420	250,000	lbs	$0.45	$112,500.00
		PENSTOCK SUBTOTAL					**$8,597,241.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED October 20, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
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Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Appraisal
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$85,000.00	$170,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$170,000.00**

QUANTITIES		PRICES	
BY Mark Leavitt	CHECKED Gemperline, Joseph M	BY Craig A. Grusti, P.E.	CHECKED DW 05-19-11
DATE PREPARED 11/12/10	PEER REVIEW / DATE Jeff Baysinger 12/14/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCR 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Res Reveg

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING:	86-68220	247	Acres	$3,000.00	$741,000.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					**$741,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Res Reveg

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	0	Acres	$6,500.00	
	92	FALL GROUND SEEDING:	86-68220	62	Acres	$3,000.00	$186,000.00
		Idaho fescue (Festuca idahoensis)	247	lbs PLS			
		Blue wildrye (Elymus glaucus)	247	lbs PLS			
		Small fescue (Vulpia microstachys)	247	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	371	lbs PLS			
		Sandberg bluegrass (Poa secunda)	31	lbs PLS			
		Spike bentgrass (Agrostis exarata)	15	lbs PLS			
		Wood mulch	19000	lbs			
		Tackifier	1140	lbs			
		SUBTOTAL THIS SHEET					**$186,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Res Reveg

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$4,000.00	$216,000.00
		Narrowleaf willow (Salix exigua)	15120	cutting			
		Arroyo willow (Salix lasiolepis)	2160	cutting			
		Shining willow (Salix lucida)	2160	cutting			
		Western serviceberry (Amelanchier alnifolia)	1080	cutting			
		Chokecherry (Prunus virginiana)	1080	transplant			
		Herbivore screen	21600	each			
		Chemical herbivore deterent	432	gal			
		Polymer	68	lbs			
	94	WEED MANAGEMENT:	86-68220	62	Acres	$1,000.00	$62,000.00
		Herbicide, post-emergent	124	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$3,000.00	$297,000.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$1,000.00	$99,000.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$1,771,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 04/12/11	PEER REVIEW / DATE Greimann, Blair P 4/12/2011	DATE PREPARED 05/25/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Road Improvements

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	10	acre	$4,000.00	$40,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$4,000.00	$9,600.00
	99	4" thick gravel surfacing	86-68313	0	ton	$20.00	
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	4	acre	$4,000.00	$16,000.00
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		~~1 way traffic - off road dumps~~					
	101	Clear and grub, 20' width	86-68313	1	acres	$4,000.00	$4,000.00
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	13,000	yd3	$25.00	$325,000.00
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$394,600.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCO 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	9,700	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	37,000	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	4,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	0	yd3	$25.00	
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$394,600.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCO 6/3/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Recreational Facilities to be Removed
JC Boyle Reservoir
Most Probable Low

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$175.00	$11,900.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$4,000.00	$4,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$12.00	$2,400.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$3.00	$900.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$55.00	$660.00
	113	12 Concrete fire rings	BLM	5	CY	$175.00	$875.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$900.00	$1,800.00
	115	Signs to be removed and hauled away	BLM	6	EA	$135.00	$810.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$900.00	$900.00
	117	Remove paved access road	BLM	200	LF	$230.00	$46,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$19,000.00	$9,500.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL THIS SHEET							**$79,745.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Bolye Dam & Powerplant Removal
Most Probable Low
SUMMARY

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$143,150.00
		Dam Removal					$2,004,019.00
		Powerhouse/Switchyard/Transmission Line Removal					$1,614,935.00
		Penstock Removal					$8,597,241.00
		Reservoir Vegetative Restoration					$1,771,000.00
		Road Improvements					$394,600.00
		Recreational Facilities to be Removed					$79,745.00
		Subtotal					**$14,604,690.00**
		Mobilization	5%	+/-			$730,000.00
		Subtotal 1 with Mobilization					**$15,334,690.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$2,461,844.00
		(assumes 1.5%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$17,796,534.00
		Design Contingencies	8%	+/-			$1,203,466.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$19,000,000.00**
		Construction Contingencies	18%	+/-			$4,000,000.00
		FIELD COST					**$23,000,000.00**
		Non-Contract Costs:	52%	+/-			$12,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 1%,					
		Engineering Design ~ 3%, Permitting ~ 2%,					
		Procurement ~ 1%, Construction Management					
		~ 9%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$35,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF484 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$850.00	$11,900.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
		Waste in scour hole					
	2	Remove Water from behind Tailrace Cofferdam.	86-68130	500,000	gals	$0.01	$5,000.00
		Unwatering of tailrace for removal of the powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for 2 days.					
	3	Provide Dewatering behind Tailrace Cofferdam	86-68130	1	ls		$30,000.00
		for removal of Powerhouse in the dry.					
		Assume 3 inch portable trash pump operating for approximately 3 months.					
		SUBTOTAL THIS SHEET					**$46,900.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED MA
DATE PREPARED 11/01/10	PEER REVIEW / DATE Tom Hepler P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE BCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Diversion and Care

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	Construct Embankment Cofferdam in Tailrace	86-68130	2,000	yd3	$60.00	$120,000.00
		around Powerhouse to remove in dry.					
		Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.					
		Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.					
		DIVERSION AND CARE SUBTOTAL					**$166,900.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** AA
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Rick Benik P.E. 11/1/10	**DATE PREPARED** 04/18/11	**PEER REVIEW / DATE** DCO 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$260.00	$650,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
		Waste in scour hole					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.65	$9,750.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
		Assume contains paint with heavy metals.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$260.00	$416,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
		Waste in scour hole					
	8	Remove Gravity Dam Section Concrete	86-68130	600	yd3	$260.00	$156,000.00
		3000 psi, mass concrete.					
		Waste in scour hole					
	9	Remove Timber Equipment Ramp on left side of	86-68130	10,500	lbs	$0.55	$5,775.00
		dam.					
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from	86-68130	3,600	lbs	$0.55	$1,980.00
		Footbridge around intake structure.					
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$1,239,505.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCL 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	11	Storage Shed located on access road about	86-68130	1,728	ft2	$40.00	$69,120.00
		440' from left abutment of dam.					
		48' x 36' wood frame construction.					
	12	Warehouse located on access road about 370'	86-68130	1,920	ft2	$40.00	$76,800.00
		from left abutment of dam (Red Barn).					
		60' x 32' wood frame construction.					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$40.00	$15,400.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$40.00	$13,240.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$260.00	$1,560.00
		Control House. 13'x13' house has been removed.					
		Waste in scour hole					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$260.00	$260.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
		Waste in scour hole					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$40.00	$960.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$177,340.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Rick Benik P.E. 11/1/10	**DATE PREPARED** 04/18/11	**PEER REVIEW / DATE** 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$9.00	$19,980.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$9.00	$16,650.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$9.00	$1,192,500.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$260.00	$18,200.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
		Waste in scour hole					
	22	Cutoff Wall Anchors	86-68313	285	ea	$10.00	$2,850.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,250,180.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Daniel W. Osmun 11/1/10	**DATE PREPARED** 04/18/11	**PEER REVIEW / DATE** DCO 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
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JC Boyle Dam & Powerplant Removal
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Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.65	$3,250.00
		(Assume contains paint with heavy metals)					
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.65	$80,600.00
		3 radial gates, 3 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.65	$59,800.00
		stop logs slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.65	$2,730.00
		Structure					
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					**$146,380.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Dam

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$600.00	$600.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$6,000.00	$6,000.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$2,820,005.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	29	Remove Powerhouse Concrete down to					
		Elevation 3324.0 (springline of the turbines).	86-68130	1,500	yd3	$370.00	$555,000.00
		Waste in scour hole					
	30	Remove Structural Steel Items associated with					
		Powerhouse.	86-68130	94,000	lbs	$0.65	$61,100.00
		Includes only WF beam shapes, crane rails, and					
		penstock sections inside powerhouse.					
		Assume contains paint with heavy metals.					
	31	Warehouse near Powerhouse.	86-68130	5,200	ft2	$40.00	$208,000.00
		Large metal building on concrete slab.					
		SUBTOTAL THIS SHEET					**$824,100.00**

QUANTITIES		PRICES	
BY: Stephen Latham	CHECKED: Jonathan East	BY: Craig A. Grush, P.E.	CHECKED:
DATE PREPARED: 11/01/10	PEER REVIEW / DATE: Rick Benik P.E. 11/1/10	DATE PREPARED: 04/18/11	PEER REVIEW / DATE: DCD 4/19/11

ESTIMATE WORKSHEET

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PROJECT:
Klamath River
Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	32	2 - Governor oil systems	86-68420	52,500	lbs	$0.65	$34,125.00
		governor, sump tanks, accumulator tank, piping					
		(Assume contains paint with heavy metals & petroleum products)					
	33	Cooling water and bearing oil systems	86-68420	6,500	lbs	$0.65	$4,225.00
		(Assume contains paint with heavy metals & petroleum products)					
	34	2 - Francis Turbines	86-68420	560,000	lbs	$0.65	$364,000.00
		(Includes runner, scroll case, draft tube and shaft)					
		(Assume contains paint with heavy metals & petroleum products)					
	35	150 Ton crane	86-68420	240,000	lbs	$0.65	$156,000.00
		(Includes crane and embedded steel rail)					
		(Assume contains paint with heavy metals & petroleum products)					
	36	Compressed Air systems	86-68420	1,100	lbs	$0.65	$715.00
		(Assume contains paint with heavy metals & petroleum products)					
	37	2 - CO2 systems	86-68420	6,600	lbs	$0.65	$4,290.00
		(Assume contains paint with heavy metals & petroleum products)					
	38	Plant Water and Fire Protection	86-68420	3,100	lbs	$0.65	$2,015.00
		(Assume contains paint with heavy metals)					
	39	Transformer Oil Fire protection	86-68420	6,500	lbs	$0.65	$4,225.00
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					**$569,595.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
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Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	40	Unwatering Piping	86-68420	33,000	lbs	$0.65	$21,450.00
		(Assume contains paint with heavy metals)					
	41	Drainage Piping	86-68420	10,000	lbs	$0.65	$6,500.00
		(Assume contains paint with heavy metals)					
	42	2-Oil Sump pumps	86-68420	2,000	lbs	$0.65	$1,300.00
		(Assume contains paint with heavy metals & petroleum products)					
	43	Remove and Dispose of Draft Tube Bulk Head	86-68420	65,000	lbs	$0.65	$42,250.00
		Gates and Hoists at the Powerhouse					
		4-Draft Tube Bulk Head Gates (12,000 lbs ea.)	48,000	lbs			
		4-Guides(2,400 lbs for the pair)	9,600	lbs			
		2-Hoist (3,700 lbs ea.)	7,400	lbs			
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					**$71,500.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA	86-68430	2	EA	$200,000.00	$400,000.00
		(50 MW); Unit 2: 50 MVA (48 MW); 0.95PF,					
		11,500 V, 277 RPM, 3 Ph, including rotating exciter					
		Total weight each approximately: 657,000 lbs.					
		Stator: 175,000 lbs., Rotor: 290,000 lbs.					
		Heaviest lift: 300,000 lbs.					
	45	Excitation equipment for 53/50 MVA Generator	86-68430	2	EA	$12,500.00	$25,000.00
		(5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
	46	Surge protection equip. for 53/50 MVA Generator	86-68430	2	EA	$7,000.00	$14,000.00
		Total weight approximately: 1,500 lbs.					
	47	Neutral grounding equip. for 53/50 MVA Generato	86-68430	2	EA	$3,000.00	$6,000.00
		includes transformer					
		Total weight approximately: 500 lbs.					
	48	Generator Switchgear, 15kV - (6 sections)	86-68430	1	EA	$20,000.00	$20,000.00
		(750 lbs each), 3 ft x 6ft x 90 inches high					
		Total weight approximately: 4,500 lbs.					
	49	Station Service Switchgear, 600 volt -(5 sections)	86-68430	1	EA	$9,000.00	$9,000.00
		(400 lbs each), 3 ft x 3ft x 90 inches high					
		Total weight approximately: 2,000 lbs.					
		SUBTOTAL THIS SHEET					**$474,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	50	Unit and plant control switchboard 5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high Total weight approximately: 1,000 lbs.	86-68430	1	EA	$5,000.00	$5,000.00
	51	Battery system - assume 40 batteries, charger, racks and supports. Total weight approximately: 2,500 lbs.	86-68430	1	EA	$8,000.00	$8,000.00
	52	Raceways, Conduit and Cable (approx. 3000 lin. Ft. power & control cable, 1000 lin. Ft. conduit, 200 lin. Ft. cabletray) Total weight approximately: 8,000 lbs.	86-68430	1	EA	$11,000.00	$11,000.00
	53	Misc. power & control boards 10 boards (50 lbs each) 3ft x 2 ft x 9 in Total weight approximately: 500 lbs.	86-68430	1	EA	$6,000.00	$6,000.00
		Remove and dispose of the following Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist (30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*) (Hp* Approx.) Total weight approximately: 750 lbs.	86-68430	1	EA	$2,000.00	$2,000.00
	55	Gantry Crane control equipment (3 cubicles) Total weight approximately: 900 lbs.	86-68430	1	EA	$6,000.00	$6,000.00
		SUBTOTAL THIS SHEET					**$38,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

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Klamath River Dams Removal
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JC Boyle Dam & Powerplant Removal
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PROJECT:
Klamath River
Northern California/Southern Oregon

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$10,000.00	$10,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$2,000.00	$2,000.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$25,000.00	$41,500.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$25,000.00	$6,000.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$25,000.00	$41,500.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$2,078,195.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 1, 2010	PEER REVIEW / DATE L. Rossi 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:
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Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	61	Remove Intake Structure Concrete	86-68130	1,600	yd3	$260.00	$416,000.00
		3000 psi, reinforced concrete.					
		Waste in scour hole					
	62	Remove Fish Screen Building	86-68130	1,300	ft2	$40.00	$52,000.00
		Building is located on top of intake structure.					
		Wood frame construction, with metal rib roof and metal siding.					
		Some wood is pressure-treated, which may be considered a					
		hazardous material.					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.65	$14,300.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
		Assume contains paint with heavy metals.					
	64	Remove Concrete Items associated with the					
		14-ft-diameter Steel Pipe.	86-68130	1,100	yd3	$260.00	$286,000.00
		Includes anchors for horiz. pipe bends, piers,					
		14-ft dia. concrete conduit section, outlet transition					
		with newer (2002) headgate vault section,					
		siphon spillway structure, and 22-ft-long spillway flume.					
		Waste in scour hole					
	65	Remove Open Concrete Flume.	86-68130	26,000	yd3	$260.00	$6,760,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		Includes 2,300 CY of unreinforced porous concrete					
		(gunite or shotcrete) on 1-wall flume reaches.					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$7,528,300.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE 4/19/11

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF484 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.65	$7,475.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
		Assume contains paint with heavy metals.					
	67	Remove Forebay Concrete	86-68130	2,500	yd3	$260.00	$650,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, forebay sluiceway,					
		and forebay drainage items (man-hole,					
		12-inch concrete drain pipe).					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$1,000.00	$30,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$260.00	$468,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$40.00	$13,200.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$40.00	$22,800.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$40.00	$18,800.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$1,210,275.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCW 4/19/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
WOID: AF484	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.65	$4,615.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
		Assume contains paint with heavy metals.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$40.00	$2,880.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$7,495.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE 4/19/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
WOID: AF484	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	75	Fixed Wheel Gate	86-68420	55,000	lbs	$0.65	$35,750.00
		Gate, frame and hoist (steel)					
		(Assume contains paint with heavy metals & petroleum products)					
	76	Trash rack and trash rake (steel)	86-68420	75,000	lbs	$0.50	$37,500.00
	77	Stop Logs and slots (steel)	86-68420	136,000	lbs	$0.65	$88,400.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
	78	Traveling Water Screen	86-68420	124,000	lbs	$0.65	$80,600.00
		4 traveling water screens	120,000	lbs			
		4 spraywater pumps	4,000	lbs			
		(Assume contains petroleum products)					
	79	Fish By-Pass and Supports (steel), 4-Pronged	86-68420	610,000	lbs	$0.65	$396,500.00
		Inlet to Forebay, Spillway, Deer Escape Flume					
		(Assume contains paint with heavy metals)					
		SUBTOTAL THIS SHEET					**$638,750.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Penstock

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.65	$10,725.00
		2 radial gates, 2 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.50	$21,750.00
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.65	$9,425.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.65	$1,040,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
		(Assume contains paint with heavy metals)					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.65	$51,350.00
		(Assume contains paint with heavy metals)					
	85	2 - 108" Butterfly valves	86-68420	148,000	lbs	$0.65	$96,200.00
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					**$1,229,450.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 28, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
WOID: AF484	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.65	$18,200.00
		(Assume contains paint with heavy metals & petroleum products)					
	87	Steel Transition Manifolds on Upstream and Downstream	86-68420	250,000	lbs	$0.50	$125,000.00
		PENSTOCK SUBTOTAL					**$10,757,470.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED October 20, 2010	PEER REVIEW / DATE Dan Drake 10/29/2010	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Appraisal
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$150,000.00	$300,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$300,000.00**

QUANTITIES		PRICES	
BY Mark Leavitt	CHECKED Gemperline, Joseph M	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Dave Edwards 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCE 4/19/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING:	86-68220	247	Acres	$3,500.00	$864,500.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					**$864,500.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 04/12/11	PEER REVIEW / DATE 04/12/11	DATE PREPARED 04/18/11	PEER REVIEW / DATE 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #2
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#2 - MP Feas Est - 4-2011.xlsx]Res Reveg

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	0	Acres	$7,500.00	
	92	FALL GROUND SEEDING:	86-68220	124	Acres	$3,500.00	$434,000.00
		Idaho fescue (Festuca idahoensis)	494	lbs PLS			
		Blue wildrye (Elymus glaucus)	494	lbs PLS			
		Small fescue (Vulpia microstachys)	494	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	741	lbs PLS			
		Sandberg bluegrass (Poa secunda)	62	lbs PLS			
		Spike bentgrass (Agrostis exarata)	31	lbs PLS			
		Wood mulch	38000	lbs			
		Tackifier	2280	lbs			
		SUBTOTAL THIS SHEET					**$434,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 04/12/11	PEER REVIEW / DATE 04/12/11	DATE PREPARED 05/25/11	PEER REVIEW / DATE DAB 5/25/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$8,500.00	$459,000.00
		Narrowleaf willow (Salix exigua)	26460	cutting			
		Arroyo willow (Salix lasiolepis)	3780	cutting			
		Shining willow (Salix lucida)	3780	cutting			
		Western serviceberry (Amelanchier alnifolia)	1890	cutting			
		Chokecherry (Prunus virginiana)	1890	transplant			
		Herbivore screen	37800	each			
		Chemical herbivore deterent	756	gal			
		Polymer	119	lbs			
	94	WEED MANAGEMENT:	86-68220	124	Acres	$1,500.00	$186,000.00
		Herbicide, post-emergent	247	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$3,500.00	$346,500.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$1,500.00	$148,500.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$2,738,500.00**

QUANTITIES		PRICES	
BY: O'Meara, Scott A	CHECKED: Greimann, Blair P	BY: Craig A. Grush, P.E.	CHECKED: BH
DATE PREPARED: 04/12/11	PEER REVIEW / DATE: 04/12/11	DATE PREPARED: 04/18/11	PEER REVIEW / DATE: DEW 4/19/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #2 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF484 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#2 - MP Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	10	acre	$5,000.00	$50,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$5,000.00	$12,000.00
	99	4" thick gravel surfacing	86-68313	2,150	ton	$30.00	$64,500.00
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	0	acre	$5,000.00	
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		1 way traffic - off road dumps					
	101	Clear and grub, 20' width	86-68313	0	acres	$5,000.00	
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	13,000	yd3	$140.00	$1,820,000.00
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$1,946,500.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DOO 5/25/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #2 Klamath River Dams Removal Full Removal Option JC Boyle Dam & Powerplant Removal Most Probable Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF484 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal\Feasibility Estimates\MPL, MP, MPH - Revision #1 - 2011-03\JC Boyle\[Klamath Dams Removal - JC Boyle - Full Removal Option - REV#2 - MP Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	9,700	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	37,000	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	4,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	0	yd3	$140.00	
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$1,946,500.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grueb, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DOO 5/25/11

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Recreational Facilities to be Removed
JC Boyle Reservoir
Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$220.00	$14,960.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$5,000.00	$5,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$13.00	$2,600.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$4.00	$1,200.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$60.00	$720.00
	113	12 Concrete fire rings	BLM	5	CY	$220.00	$1,100.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$1,000.00	$2,000.00
	115	Signs to be removed and hauled away	BLM	6	EA	$150.00	$900.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$1,000.00	$1,000.00
	117	Remove paved access road	BLM	200	LF	$250.00	$50,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$20,000.00	$10,000.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL							**$89,480.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/01/10	PEER REVIEW / DATE Rick Benik P.E. 11/1/10	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCA 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
REVISION #1
Klamath River Dams Removal
Full Removal Option
JC Bolye Dam & Powerplant Removal
Most Probable
SUMMARY

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF484	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$166,900.00
		Dam Removal					$2,820,005.00
		Powerhouse/Switchyard/Transmission Line Removal					$2,078,195.00
		Penstock Removal					$10,757,470.00
		Reservoir Vegetative Restoration					$2,738,500.00
		Road Improvements					$1,946,500.00
		Recreational Facilities to be Removed					$89,480.00
		Subtotal					**$20,597,050.00**
		Mobilization	5%	+/-			$1,050,000.00
		Subtotal 1 with Mobilization					**$21,647,050.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$7,444,775.00
		(assumes 3%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$29,091,825.00
		Design Contingencies	10%	+/-			$2,908,175.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$32,000,000.00**
		Construction Contingencies	20%	+/-			$6,000,000.00
		FIELD COST					**$38,000,000.00**
		Non-Contract Costs:	55%	+/-			$21,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 35%, Design Data Collection ~ 1%,					
		Engineering Design ~ 4%, Permitting ~ 3%,					
		Procurement ~ 1%, Construction Management					
		~ 10%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$59,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 04/18/11	PEER REVIEW / DATE DCD 4/19/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$950.00	$13,300.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
		Waste in scour hole					
	~~2~~	~~Remove Water from behind Tailrace Cofferdam.~~	~~86-68130~~	~~500,000~~	~~gals~~		DELETED
		~~Unwatering of tailrace for removal of the powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for 2 days.~~					
	~~3~~	~~Provide Dewatering behind Tailrace Cofferdam~~	~~86-68130~~	~~1~~	~~ls~~		DELETED
		~~for removal of Powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for approximately 3 months.~~					
		SUBTOTAL THIS SHEET					**$13,300.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 12/20/10	PEER REVIEW / DATE Tom Hepler P.E. 12/20/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	~~Construct Embankment Cofferdam in Tailrace~~	~~86-68130~~	~~2,000~~	~~yd3~~		DELETED
		~~around Powerhouse to remove in dry.~~					
		~~Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.~~					
		~~Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.~~					
		DIVERSION AND CARE SUBTOTAL					**$13,300.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 12/20/10	PEER REVIEW / DATE Rick Benik P.E. 12/20/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Dam

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Dam

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$390.00	$975,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
		Waste in scour hole					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.75	$11,250.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
		Assume contains paint with heavy metals.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$390.00	$624,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
		Waste in scour hole					
	~~8~~	~~Remove Gravity Dam Section Concrete~~	~~86-68130~~	~~600~~	~~yd3~~		DELETED
		~~3000 psi, mass concrete.~~					
		~~Waste in scour hole~~					
	9	Remove Timber Equipment Ramp on left side of dam.	86-68130	10,500	lbs	$0.70	$7,350.00
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from	86-68130	3,600	lbs	$0.70	$2,520.00
		Footbridge around intake structure.					
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$1,620,120.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCB 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Dam

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~11~~	~~Storage Shed located on access road about~~	~~86-68130~~	~~1,728~~	~~ft2~~		DELETED
		~~440' from left abutment of dam.~~					
		~~48' x 36' wood frame construction.~~					
	~~12~~	~~Warehouse located on access road about 370'~~	~~86-68130~~	~~1,920~~	~~ft2~~		DELETED
		~~from left abutment of dam (Red Barn).~~					
		~~60' x 32' wood frame construction.~~					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$42.00	$16,170.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$42.00	$13,902.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$390.00	$2,340.00
		Control House. 13'x13' house has been removed.					
		Waste in scour hole					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$390.00	$390.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
		Waste in scour hole					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$42.00	$1,008.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$33,810.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grash, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Dam

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$12.00	$26,640.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$12.00	$22,200.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$12.00	$1,590,000.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$390.00	$27,300.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
		Waste in scour hole					
	22	Cutoff Wall Anchors	86-68313	285	ea	$12.00	$3,420.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,669,560.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED** DW 05-19-11
DATE PREPARED 11/12/10	**PEER REVIEW / DATE** Daniel W. Osmun 12/20/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCO 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.75	$3,750.00
		(Assume contains paint with heavy metals)					
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.75	$93,000.00
		3 radial gates, 3 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.75	$69,000.00
		stop logs slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.75	$3,150.00
		Structure					
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	26A	Remove Petroleum Products from Red Barn Area	86-68420	1,600	gal	$12.00	$19,200.00
		Includes quantities for the following:					
		Steel shed oil storage drums.					
		Misc. oil products, approx. 2 drums @ 55 gal.					
		Convault fuel tanks.					
		Diesel fuel tank @ 500 gal., Gasoline tank @ 1,000 gal.					
		Tanks to remain on-site.					
		SUBTOTAL THIS SHEET					**$188,100.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$700.00	$700.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$6,500.00	$6,500.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$3,518,790.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED November 12, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~29~~	~~Remove Powerhouse Concrete down to~~					
		~~Elevation 3324.0 (springline of the turbines).~~	~~86-68130~~	~~1,500~~	~~yd3~~		DELETED
		~~Waste in scour hole~~					
	~~30~~	~~Remove Structural Steel Items associated with~~					
		~~Powerhouse.~~	~~86-68130~~	~~94,000~~	~~lbs~~		DELETED
		~~Includes only WF beam shapes, crane rails, and~~					
		~~penstock sections inside powerhouse.~~					
		~~Assume contains paint with heavy metals.~~					
	31	Warehouse near Powerhouse.	86-68130	5,200	ft2	$42.00	$218,400.00
		Large metal building on concrete slab.					
		SUBTOTAL THIS SHEET					**$218,400.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	~~32~~	~~2 - Governor oil systems~~	~~86-68420~~	~~52,500~~	~~lbs~~		DELETED
		~~governor, sump tanks, accumulator tank, piping~~					
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~33~~	~~Cooling water and bearing oil systems~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~34~~	~~2 - Francis Turbines~~	~~86-68420~~	~~560,000~~	~~lbs~~		DELETED
		~~(Includes runner, scroll case, draft tube and shaft)~~					
		~~(Assume contains paint with heavy metals, petroleum products, and/or asbestos)~~					
	35	150 Ton crane	86-68420	240,000	lbs	$0.75	$180,000.00
		(Includes crane and embedded steel rail)					
		(Assume contains paint with heavy metals & petroleum products)					
	~~36~~	~~Compressed Air systems~~	~~86-68420~~	~~1,100~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~37~~	~~2 - CO2 systems~~	~~86-68420~~	~~6,600~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~38~~	~~Plant Water and Fire Protection~~	~~86-68420~~	~~3,100~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~39~~	~~Transformer Oil Fire protection~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
		SUBTOTAL THIS SHEET					**$180,000.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	~~40~~	~~Unwatering Piping~~	~~86-68420~~	~~33,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~41~~	~~Drainage Piping~~	~~86-68420~~	~~10,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~42~~	~~2-Oil Sump pumps~~	~~86-68420~~	~~2,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals, petroleum products, and/or asbestos)~~					
	~~43~~	~~Remove and Dispose of Draft Tube Bulk Head~~	~~86-68420~~	~~65,000~~	~~lbs~~		DELETED
		~~Gates and Hoists at the Powerhouse~~					
		~~4-Draft Tube Bulk Head Gates (12,000 lbs ea.)~~	~~48,000~~	~~lbs~~			
		~~4-Guides(2,400 lbs for the pair)~~	~~9,600~~	~~lbs~~			
		~~2-Hoist (3,700 lbs ea.)~~	~~7,400~~	~~lbs~~			
		~~(Assume contains paint with heavy metals, petroleum products, and/or asbestos)~~					
	43A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	2,700	gal	$12.00	$32,400.00
		Includes quantities for the following equipment:					
		From Item 34, Units 1 & 2, bearing oil systems.					
		DTE heavy oil, 400 gal. per unit, 800 gal. total.					
		From Item 32, Units 1 & 2, governor oil sumps and accumulator tanks.					
		Hydraulic oil, 925 gal. per unit, 1,850 gal. total.					
		The remaining items contain petroleum products in amounts too small to be					
		considered for this level of estimate.					
		SUBTOTAL THIS SHEET					**$32,400.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Powerhouse, Switchyard, and Transmission Line

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA (50 MW); Unit 2: 50 MVA (48 MW); 0.95PF, 11,500 V, 277 RPM, 3 Ph, including rotating exciter Total weight each approximately: 657,000 lbs. Stator: 175,000 lbs., Rotor: 290,000 lbs. Heaviest lift: 300,000 lbs.	86-68430	2	EA	$250,000.00	$500,000.00
	~~45~~	~~Excitation equipment for 53/50 MVA Generator (5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~46~~	~~Surge protection equip. for 53/50 MVA Generator~~ ~~Total weight approximately: 1,500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~47~~	~~Neutral grounding equip. for 53/50 MVA Generate includes transformer~~ ~~Total weight approximately: 500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~48~~	~~Generator Switchgear, 15kV - (6 sections) (750 lbs each), 3 ft x 6ft x 90 inches high~~ ~~Total weight approximately: 4,500 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
	~~49~~	~~Station Service Switchgear, 600 volt -(5 sections) (400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		SUBTOTAL THIS SHEET					**$500,000.00**

QUANTITIES		PRICES	
BY D. Berk	**CHECKED** T. Griess	**BY** Craig A. Grush, P.E.	**CHECKED** DW 05-19-11
DATE PREPARED November 17, 2010	**PEER REVIEW / DATE** L. Rossi 12/15/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCO 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon
WOID: AF652	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	~~50~~	~~Unit and plant control switchboard~~ ~~5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high~~ ~~Total weight approximately: 1,000 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
	51	Battery system - assume 40 batteries, charger, racks and supports. Total weight approximately: 2,500 lbs.	86-68430	1	EA	$9,000.00	$9,000.00
	~~52~~	~~Raceways, Conduit and Cable~~ ~~(approx. 3000 lin. Ft. power & control cable, 1000 lin. Ft. conduit, 200 lin. Ft. cabletray)~~ ~~Total weight approximately: 8,000 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
	~~53~~	~~Misc. power & control boards~~ ~~10 boards (50 lbs each) 3ft x 2 ft x 9 in~~ ~~Total weight approximately: 500 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		Remove and dispose of the following Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist (30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*) (Hp* Approx.) Total weight approximately: 750 lbs.	86-68430	1	EA	$3,000.00	$3,000.00
	55	Gantry Crane control equipment (3 cubicles) Total weight approximately: 900 lbs.	86-68430	1	EA	$7,000.00	$7,000.00
		SUBTOTAL THIS SHEET					**$19,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED DV 05-19-11
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$11,000.00	$11,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$3,000.00	$3,000.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$30,000.00	$49,800.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$30,000.00	$7,200.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$30,000.00	$49,800.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$1,070,600.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~61~~	~~Remove Intake Structure Concrete~~	~~86-68130~~	~~1,600~~	~~yd3~~		DELETED
		~~3000 psi, reinforced concrete.~~					
		~~Waste in scour hole~~					
	~~62~~	~~Remove Fish Screen Building~~	~~86-68130~~	~~1,300~~	~~ft2~~		DELETED
		~~Building is located on top of intake structure.~~					
		~~Wood frame construction, with metal rib roof and metal siding.~~					
		~~Some wood is pressure-treated, which may be considered a~~					
		~~hazardous material.~~					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.75	$16,500.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
		Assume contains paint with heavy metals.					
	~~64~~	~~Remove Concrete Items associated with the~~					
		~~14-ft-diameter Steel Pipe.~~	~~86-68130~~	~~1,100~~	~~yd3~~		DELETED
		~~Includes anchors for horiz. pipe bends, piers,~~					
		~~14-ft dia. concrete conduit section, outlet transition~~					
		~~with newer (2002) headgate vault section,~~					
		~~siphon spillway structure, and 22-ft-long spillway flume.~~					
		~~Waste in scour hole~~					
	65	Remove Open Concrete Flume Walls.	86-68130	12,200	yd3	$390.00	$4,758,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		~~Includes 2,300 CY of unreinforced porous concrete~~					
		~~(gunite or shotcrete) on 1-wall flume reaches.~~					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$4,774,500.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.75	$8,625.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
		Assume contains paint with heavy metals.					
	67	Remove Forebay Concrete Walls	86-68130	1,500	yd3	$390.00	$585,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, ~~forebay sluiceway~~,					
		and forebay drainage ~~items~~ (man-hole,					
		~~12-inch concrete drain pipe).~~					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$1,100.00	$33,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$390.00	$702,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$42.00	$13,860.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$42.00	$23,940.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$42.00	$19,740.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$1,386,165.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Penstock

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.75	$5,325.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
		Assume contains paint with heavy metals.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$42.00	$3,024.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$8,349.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	~~75~~	~~Fixed Wheel Gate~~	~~86-68420~~	~~55,000~~	~~lbs~~		DELETED
		~~Gate, frame and hoist (steel)~~					
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~76~~	~~Trash rack and trash rake (steel)~~	~~86-68420~~	~~75,000~~	~~lbs~~		DELETED
		~~(Assume contains asbestos)~~					
	~~77~~	~~Stop Logs and slots (steel)~~	~~86-68420~~	~~136,000~~	~~lbs~~		DELETED
		~~stop log slots embedded in concrete~~					
		~~(Assume contains paint with heavy metals)~~					
	~~78~~	~~Traveling Water Screen~~	~~86-68420~~	~~124,000~~	~~lbs~~		DELETED
		~~4 traveling water screens~~	~~120,000~~	~~lbs~~			
		~~4 spraywater pumps~~	~~4,000~~	~~lbs~~			
		~~(Assume contains petroleum products and/or asbestos)~~					
	~~79~~	~~Fish By-Pass and Supports (steel), 4-Pronged~~	~~86-68420~~	~~610,000~~	~~lbs~~		DELETED
		~~Inlet to Forebay, Spillway, Deer Escape Flume~~					
		~~(Assume contains paint with heavy metals and/or asbestos)~~					
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.75	$12,375.00
		2 radial gates, 2 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.70	$30,450.00
		(Assume contains asbestos)					
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.75	$10,875.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.75	$1,200,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
		(Assume contains paint with heavy metals and/or asbestos)					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.75	$59,250.00
		(Assume contains paint with heavy metals and/or asbestos)					
	~~85~~	~~2 - 108" Butterfly valves~~	~~86-68420~~	~~148,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals, petroleum products, and/or asbestos)~~					
		SUBTOTAL THIS SHEET					**$1,312,950.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.75	$21,000.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	87	Steel Transition Manifolds on Upstream and	86-68420				
		Downstream		250,000	lbs	$0.70	$175,000.00
		(Assume contains asbestos)					
	87A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	380	gal	$12.00	$4,560.00
		Includes quantities for the following equipment:					
		From Item 85, Units 1 & 2, butterfly valves and HPUs.					
		Hydraulic oil, 191 gal. per valve, 382 gal. total.					
		The remaining items contain petroleum products in amounts too small					
		to be considered for this level of estimate.					
		PENSTOCK SUBTOTAL					**$7,682,524.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Appraisal
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$100,000.00	$200,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$200,000.00**

QUANTITIES		PRICES	
BY Mark Leavitt	**CHECKED** Gemperline, Joseph M	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/12/10	**PEER REVIEW / DATE** Jeff Baysinger 12/14/2010	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable High Reservoir Vegetative Restoration	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING:	86-68220	0	Acres	$4,000.00	
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	247	Acres	$15,000.00	$3,705,000.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	92	FALL GROUND SEEDING:	86-68220	185	Acres	$4,000.00	$740,000.00
		Idaho fescue (Festuca idahoensis)	741	lbs PLS			
		Blue wildrye (Elymus glaucus)	741	lbs PLS			
		Small fescue (Vulpia microstachys)	741	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1112	lbs PLS			
		Sandberg bluegrass (Poa secunda)	93	lbs PLS			
		Spike bentgrass (Agrostis exarata)	46	lbs PLS			
		Wood mulch	57000	lbs			
		Tackifier	3420	lbs			
		SUBTOTAL THIS SHEET					**$4,445,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	**CHECKED** Greimann, Blair P 2/28/2011	**BY** Craig A. Grush, P.E.	**CHECKED** 05-25-11
DATE PREPARED 02/03/11	**PEER REVIEW / DATE**	**DATE PREPARED** 05/25/11	**PEER REVIEW / DATE** DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$10,000.00	$540,000.00
		Narrowleaf willow (Salix exigua)	37800	cutting			
		Arroyo willow (Salix lasiolepis)	5400	cutting			
		Shining willow (Salix lucida)	5400	cutting			
		Western serviceberry (Amelanchier alnifolia)	2700	cutting			
		Chokecherry (Prunus virginiana)	2700	transplant			
		Herbivore screen	54000	each			
		Chemical herbivore deterent	1080	gal			
		Polymer	170	lbs			
	94	WEED MANAGEMENT:	86-68220	185	Acres	$2,000.00	$370,000.00
		Herbicide, post-emergent	371	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$4,000.00	$396,000.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$2,000.00	$198,000.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$6,149,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	**CHECKED** Greimann, Blair P	**BY** Craig A. Grush, P.E.	**CHECKED** 05-25-11
DATE PREPARED 04/12/11	**PEER REVIEW / DATE** Greimann, Blair P 4/12/2011	**DATE PREPARED** 05/25/11	**PEER REVIEW / DATE** DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Road Improvements

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	5	acre	$6,000.00	$30,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$6,000.00	$14,400.00
	99	4" thick gravel surfacing	86-68313	2,150	ton	$40.00	$86,000.00
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	0	acre	$6,000.00	
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		1 way traffic - off road dumps					
	101	Clear and grub, 20' width	86-68313	0	acres	$6,000.00	
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	0	yd3	$150.00	
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$130,400.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED** 05-25-11
DATE PREPARED 12/10/10	**PEER REVIEW / DATE** Daniel W. Osmun 12/20/10	**DATE PREPARED** 05/25/11	**PEER REVIEW / DATE** DCO 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable High
Road Improvements

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	5,400	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	17,800	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	2,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	60,000	yd3	$150.00	$9,000,000.00
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$9,130,400.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/01/10	**PEER REVIEW / DATE** Daniel W. Osmun 11/1/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCO 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Reservoir
Most Probable High

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$320.00	$21,760.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$6,000.00	$6,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$14.00	$2,800.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$5.00	$1,500.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$65.00	$780.00
	113	12 Concrete fire rings	BLM	5	CY	$320.00	$1,600.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$1,200.00	$2,400.00
	115	Signs to be removed and hauled away	BLM	6	EA	$160.00	$960.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$1,200.00	$1,200.00
	117	Remove paved access road	BLM	200	LF	$270.00	$54,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$22,000.00	$11,000.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL THIS SHEET							**$104,000.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED 11/18/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Bolye Dam & Powerplant Removal
Most Probable High
SUMMARY

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF652**	**ESTIMATE LEVEL:**	**Feasibility**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPH Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$13,300.00
		Dam Removal					$3,518,790.00
		Powerhouse/Switchyard/Transmission Line Removal					$1,070,600.00
		Penstock Removal					$7,682,524.00
		Reservoir Vegetative Restoration					$6,149,000.00
		Road Improvements					$9,130,400.00
		Recreational Facilities to be Removed					$104,000.00
		Subtotal					**$27,668,614.00**
		Mobilization	5%	+/-			$1,400,000.00
		Subtotal 1 with Mobilization					**$29,068,614.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$15,536,968.00
		(assumes 4.375%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$44,605,582.00
		Design Contingencies	15%	+/-			$6,368,490.00
		Allowance for Procurement Strategies (APS)	2%	+/-			$1,025,928.00
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$52,000,000.00**
		Construction Contingencies	25%	+/-			$13,000,000.00
		FIELD COST					**$65,000,000.00**
		Non-Contract Costs:	71%	+/-			$45,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 45%, Design Data Collection ~ 2%,					
		Engineering Design ~ 6%, Permitting ~ 4%,					
		Procurement ~ 2%, Construction Management					
		~ 11%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$110,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	**CHECKED** Refer to Previous Sheets	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED	**PEER REVIEW / DATE** Refer to Previous Sheets	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$725.00	$10,150.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
	2	~~Remove Water from behind Tailrace Cofferdam.~~	~~86-68130~~	~~500,000~~	~~gals~~		DELETED
		~~Unwatering of tailrace for removal of the powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for 2 days.~~					
	3	~~Provide Dewatering behind Tailrace Cofferdam~~	~~86-68130~~	~~1~~	~~ls~~		DELETED
		~~for removal of Powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for approximately 3 months.~~					
		SUBTOTAL THIS SHEET					**$10,150.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 12/20/10	PEER REVIEW / DATE Tom Hepler P.E. 12/20/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	~~Construct Embankment Cofferdam in Tailrace~~	~~86-68130~~	~~2,000~~	~~yd3~~		DELETED
		~~around Powerhouse to remove in dry.~~					
		~~Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.~~					
		~~Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.~~					
		DIVERSION AND CARE SUBTOTAL					**$10,150.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 12/20/10	PEER REVIEW / DATE Rick Benik P.E. 12/20/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$130.00	$325,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.45	$6,750.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
		Assume contains paint with heavy metals.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$130.00	$208,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
	~~8~~	~~Remove Gravity Dam Section Concrete~~	~~86-68130~~	~~600~~	~~yd3~~		DELETED
		~~3000 psi, mass concrete.~~					
		~~Waste in scour hole~~					
	9	Remove Timber Equipment Ramp on left side of	86-68130	10,500	lbs	$0.50	$5,250.00
		dam.					
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from	86-68130	3,600	lbs	$0.50	$1,800.00
		Footbridge around intake structure.					
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$546,800.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~11~~	~~Storage Shed located on access road about~~	~~86-68130~~	~~1,728~~	~~ft2~~		DELETED
		~~440' from left abutment of dam.~~					
		~~48' x 36' wood frame construction.~~					
	~~12~~	~~Warehouse located on access road about 370'~~	~~86-68130~~	~~1,920~~	~~ft2~~		DELETED
		~~from left abutment of dam (Red Barn).~~					
		~~60' x 32' wood frame construction.~~					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$38.00	$14,630.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$38.00	$12,578.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$130.00	$780.00
		Control House. 13'x13' house has been removed.					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$130.00	$130.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$38.00	$912.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$29,030.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Dam

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$8.00	$17,760.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$8.00	$14,800.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$8.00	$1,060,000.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$130.00	$9,100.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
	22	Cutoff Wall Anchors	86-68313	285	ea	$9.00	$2,565.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,104,225.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED** 05-19-11
DATE PREPARED 11/12/10	**PEER REVIEW / DATE** Daniel W. Osmun 12/20/10	**DATE PREPARED** 05/19/11	**PEER REVIEW / DATE** 6/3/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Dam	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.45	$2,250.00
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.45	$55,800.00
		3 radial gates, 3 hoists					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.45	$41,400.00
		stop logs slots embedded in concrete					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.45	$1,890.00
		Structure					
	26A	Remove Petroleum Products from Red Barn Area	86-68420	1,600	gal	$8.00	$12,800.00
		Includes quantities for the following:					
		Steel shed oil storage drums.					
		Misc. oil products, approx. 2 drums @ 55 gal.					
		Convault fuel tanks.					
		Diesel fuel tank @ 500 gal., Gasoline tank @ 1,000 gal.					
		Tanks to remain on-site.					
		SUBTOTAL THIS SHEET					**$114,140.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DG 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Dam	Klamath River Northern California/Southern Oregon
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$500.00	$500.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$5,500.00	$5,500.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$1,800,195.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 12, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:		
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon		
	WOID: AF652	ESTIMATE LEVEL:	Feasibility
	REGION: MP	UNIT PRICE LEVEL:	July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~29~~	~~Remove Powerhouse Concrete down to~~					
		~~Elevation 3324.0 (springline of the turbines).~~	~~86-68130~~	~~1,500~~	~~yd3~~		DELETED
		~~Waste in scour hole~~					
	~~30~~	~~Remove Structural Steel Items associated with~~					
		~~Powerhouse.~~	~~86-68130~~	~~94,000~~	~~lbs~~		DELETED
		~~Includes only WF beam shapes, crane rails, and~~					
		~~penstock sections inside powerhouse.~~					
		~~Assume contains paint with heavy metals.~~					
	31	Warehouse near Powerhouse.	86-68130	5,200	ft2	$38.00	$197,600.00
		Large metal building on concrete slab.					
		SUBTOTAL THIS SHEET					**$197,600.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	~~32~~	~~2 - Governor oil systems~~	~~86-68420~~	~~52,500~~	~~lbs~~		DELETED
		~~governor, sump tanks, accumulator tank, piping~~					
	~~33~~	~~Cooling water and bearing oil systems~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
	~~34~~	~~2 - Francis Turbines~~	~~86-68420~~	~~560,000~~	~~lbs~~		DELETED
		~~(Includes runner, scroll case, draft tube and shaft)~~					
	35	150 Ton crane	86-68420	240,000	lbs	$0.45	$108,000.00
		(Includes crane and embedded steel rail)					
	~~36~~	~~Compressed Air systems~~	~~86-68420~~	~~1,100~~	~~lbs~~		DELETED
	~~37~~	~~2 - CO2 systems~~	~~86-68420~~	~~6,600~~	~~lbs~~		DELETED
	~~38~~	~~Plant Water and Fire Protection~~	~~86-68420~~	~~3,100~~	~~lbs~~		DELETED
	~~39~~	~~Transformer Oil Fire protection~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
		SUBTOTAL THIS SHEET					**$108,000.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

FEATURE:	PROJECT:
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	40	~~Unwatering Piping~~	~~86-68420~~	~~33,000~~	~~lbs~~		DELETED
	41	~~Drainage Piping~~	~~86-68420~~	~~10,000~~	~~lbs~~		DELETED
	42	~~2-Oil Sump pumps~~	~~86-68420~~	~~2,000~~	~~lbs~~		DELETED
	43	~~Remove and Dispose of Draft Tube Bulk Head~~	~~86-68420~~	~~65,000~~	~~lbs~~		DELETED
		~~Gates and Hoists at the Powerhouse~~					
		~~4-Draft Tube Bulk Head Gates (12,000 lbs ea.)~~	~~48,000~~	~~lbs~~			
		~~4-Guides(2,400 lbs for the pair)~~	~~9,600~~	~~lbs~~			
		~~2-Hoist (3,700 lbs ea.)~~	~~7,400~~	~~lbs~~			
	43A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	2,700	gal	$8.00	$21,600.00
		Includes quantities for the following equipment:					
		From Item 34, Units 1 & 2, bearing oil systems.					
		DTE heavy oil, 400 gal. per unit, 800 gal. total.					
		From Item 32, Units 1 & 2, governor oil sumps and accumulator tanks.					
		Hydraulic oil, 925 gal. per unit, 1,850 gal. total.					
		The remaining items contain petroleum products in amounts too small to be					
		considered for this level of estimate.					
		SUBTOTAL THIS SHEET					**$21,600.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA (50 MW); Unit 2: 50 MVA (48 MW); 0.95PF, 11,500 V, 277 RPM, 3 Ph, including rotating exciter Total weight each approximately: 657,000 lbs. Stator: 175,000 lbs., Rotor: 290,000 lbs. Heaviest lift: 300,000 lbs.	86-68430	2	EA	$150,000.00	$300,000.00
	~~45~~	~~Excitation equipment for 53/50 MVA Generator (5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~46~~	~~Surge protection equip. for 53/50 MVA Generator~~ ~~Total weight approximately: 1,500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~47~~	~~Neutral grounding equip. for 53/50 MVA Generato includes transformer~~ ~~Total weight approximately: 500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~48~~	~~Generator Switchgear, 15kV - (6 sections) (750 lbs each), 3 ft x 6ft x 90 inches high~~ ~~Total weight approximately: 4,500 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
	~~49~~	~~Station Service Switchgear, 600 volt -(5 sections) (400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		SUBTOTAL THIS SHEET					**$300,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

FEATURE:	PROJECT:
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	~~50~~	~~Unit and plant control switchboard~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high~~					
		~~Total weight approximately: 1,000 lbs.~~					
	51	Battery system - assume 40 batteries, charger, racks and supports.	86-68430	1	EA	$7,000.00	$7,000.00
		Total weight approximately: 2,500 lbs.					
	~~52~~	~~Raceways, Conduit and Cable~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~(approx. 3000 lin. Ft. power & control cable,~~					
		~~1000 lin. Ft. conduit, 200 lin. Ft. cabletray)~~					
		~~Total weight approximately: 8,000 lbs.~~					
	~~53~~	~~Misc. power & control boards~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~10 boards (50 lbs each) 3ft x 2 ft x 9 in~~					
		~~Total weight approximately: 500 lbs.~~					
		Remove and dispose of the following Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist (30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*) (Hp* Approx.) Total weight approximately: 750 lbs.	86-68430	1	EA	$1,500.00	$1,500.00
	55	Gantry Crane control equipment (3 cubicles)	86-68430	1	EA	$5,000.00	$5,000.00
		Total weight approximately: 900 lbs.					
		SUBTOTAL THIS SHEET					**$13,500.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$9,000.00	$9,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$1,500.00	$1,500.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$20,000.00	$33,200.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$20,000.00	$4,800.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$20,000.00	$33,200.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$722,400.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~61~~	~~Remove Intake Structure Concrete~~	~~86-68130~~	~~1,600~~	~~yd3~~		DELETED
		~~3000 psi, reinforced concrete.~~					
	~~62~~	~~Remove Fish Screen Building~~	~~86-68130~~	~~1,300~~	~~ft2~~		DELETED
		~~Building is located on top of intake structure.~~					
		~~Wood frame construction, with metal rib roof and metal siding.~~					
		~~Some wood is pressure-treated, which may be considered a~~					
		~~hazardous material.~~					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.45	$9,900.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
		Assume contains paint with heavy metals.					
	~~64~~	~~Remove Concrete Items associated with the~~					
		~~14-ft-diameter Steel Pipe.~~	~~86-68130~~	~~1,100~~	~~yd3~~		DELETED
		~~Includes anchors for horiz. pipe bends, piers,~~					
		~~14-ft dia. concrete conduit section, outlet transition~~					
		~~with newer (2002) headgate vault section,~~					
		~~siphon spillway structure, and 22-ft-long spillway flume.~~					
	65	Remove Open Concrete Flume Walls.	86-68130	12,200	yd3	$220.00	$2,684,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		~~Includes 2,300 CY of unreinforced porous concrete~~					
		~~(gunite or shotcrete) on 1-wall flume reaches.~~					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$2,693,900.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.45	$5,175.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
		Assume contains paint with heavy metals.					
	67	Remove Forebay Concrete Walls	86-68130	1,500	yd3	$220.00	$330,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, forebay sluiceway,					
		and forebay drainage ~~items~~ (man-hole,					
		~~12-inch concrete drain pipe).~~					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$900.00	$27,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$220.00	$396,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$38.00	$12,540.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$38.00	$21,660.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$38.00	$17,860.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$810,235.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Penstock	Klamath River Northern California/Southern Oregon
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.45	$3,195.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
		Assume contains paint with heavy metals.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$38.00	$2,736.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$5,931.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	~~75~~	~~Fixed Wheel Gate~~	~~86-68420~~	~~55,000~~	~~lbs~~		DELETED
		~~Gate, frame and hoist (steel)~~					
	~~76~~	~~Trash rack and trash rake (steel)~~	~~86-68420~~	~~75,000~~	~~lbs~~		DELETED
	~~77~~	~~Stop Logs and slots (steel)~~	~~86-68420~~	~~136,000~~	~~lbs~~		DELETED
		~~stop log slots embedded in concrete~~					
	~~78~~	~~Traveling Water Screen~~	~~86-68420~~	~~124,000~~	~~lbs~~		DELETED
		~~4 traveling water screens~~	~~120,000~~	~~lbs~~			
		~~4 spraywater pumps~~	~~4,000~~	~~lbs~~			
	~~79~~	~~Fish By-Pass and Supports (steel), 4-Pronged~~	~~86-68420~~	~~610,000~~	~~lbs~~		DELETED
		~~Inlet to Forebay, Spillway, Deer Escape Flume~~					
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED DW 05-19-11
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.45	$7,425.00
		2 radial gates, 2 hoists					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.45	$19,575.00
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.45	$6,525.00
		stop log slots embedded in concrete					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.45	$720,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.45	$35,550.00
	~~85~~	~~2 - 108" Butterfly valves~~	~~86-68420~~	~~148,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
		SUBTOTAL THIS SHEET					**$789,075.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.45	$12,600.00
	87	Steel Transition Manifolds on Upstream and	86-68420				
		Downstream		250,000	lbs	$0.45	$112,500.00
	87A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	380	gal	$8.00	$3,040.00
		Includes quantities for the following equipment:					
		From Item 85, Units 1 & 2, butterfly valves and HPUs.					
		Hydraulic oil, 191 gal. per valve, 382 gal. total.					
		The remaining items contain petroleum products in amounts too small					
		to be considered for this level of estimate.					
		PENSTOCK SUBTOTAL					**$4,427,281.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED 05-19-11
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ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Reservoir Vegetative Restoration	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Appraisal
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$85,000.00	$170,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$170,000.00**

QUANTITIES		PRICES	
BY Mark Leavitt	CHECKED Gemperline, Joseph M	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/12/10	PEER REVIEW / DATE Jeff Baysinger 12/14/2010	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING:	86-68220	247	Acres	$3,000.00	$741,000.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					**$741,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable Low
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF652	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	0	Acres	$6,500.00	
	92	FALL GROUND SEEDING:	86-68220	62	Acres	$3,000.00	$186,000.00
		Idaho fescue (Festuca idahoensis)	247	lbs PLS			
		Blue wildrye (Elymus glaucus)	247	lbs PLS			
		Small fescue (Vulpia microstachys)	247	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	371	lbs PLS			
		Sandberg bluegrass (Poa secunda)	31	lbs PLS			
		Spike bentgrass (Agrostis exarata)	15	lbs PLS			
		Wood mulch	19000	lbs			
		Tackifier	1140	lbs			
		SUBTOTAL THIS SHEET					**$186,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Reservoir Vegetative Restoration	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$4,000.00	$216,000.00
		Narrowleaf willow (Salix exigua)	15120	cutting			
		Arroyo willow (Salix lasiolepis)	2160	cutting			
		Shining willow (Salix lucida)	2160	cutting			
		Western serviceberry (Amelanchier alnifolia)	1080	cutting			
		Chokecherry (Prunus virginiana)	1080	transplant			
		Herbivore screen	21600	each			
		Chemical herbivore deterent	432	gal			
		Polymer	68	lbs			
	94	WEED MANAGEMENT:	86-68220	62	Acres	$1,000.00	$62,000.00
		Herbicide, post-emergent	124	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$3,000.00	$297,000.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$1,000.00	$99,000.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$1,771,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 04/12/11	PEER REVIEW / DATE Greimann, Blair P 4/12/2011	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCA 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	10	acre	$4,000.00	$40,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$4,000.00	$9,600.00
	99	4" thick gravel surfacing	86-68313	0	ton	$20.00	
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	4	acre	$4,000.00	$16,000.00
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		1 way traffic - off road dumps					
	101	Clear and grub, 20' width	86-68313	1	acres	$4,000.00	$4,000.00
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	13,000	yd3	$25.00	$325,000.00
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$394,600.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED DW 05-25-11
DATE PREPARED 12/10/10	PEER REVIEW / DATE Daniel W. Osmun 12/20/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCO 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Low Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	9,700	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	37,000	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	4,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	0	yd3	$25.00	
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$394,600.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE DCO 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Reservoir Most Probable Low	Klamath River Northern California/Southern Oregon
	WOID: AF652 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$175.00	$11,900.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$4,000.00	$4,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$12.00	$2,400.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$3.00	$900.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$55.00	$660.00
	113	12 Concrete fire rings	BLM	5	CY	$175.00	$875.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$900.00	$1,800.00
	115	Signs to be removed and hauled away	BLM	6	EA	$135.00	$810.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$900.00	$900.00
	117	Remove paved access road	BLM	200	LF	$230.00	$46,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$19,000.00	$9,500.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL THIS SHEET							**$79,745.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED 11/18/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:			
Klamath River Dams Removal Partial Removal Option JC Bolye Dam & Powerplant Removal Most Probable Low SUMMARY	Klamath River Northern California/Southern Oregon			
	WOID:	AF652	ESTIMATE LEVEL:	Feasibility
	REGION:	MP	UNIT PRICE LEVEL:	July-2010
	FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MPL Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$10,150.00
		Dam Removal					$1,800,195.00
		Powerhouse/Switchyard/Transmission Line Removal					$722,400.00
		Penstock Removal					$4,427,281.00
		Reservoir Vegetative Restoration					$1,771,000.00
		Road Improvements					$394,600.00
		Recreational Facilities to be Removed					$79,745.00
		Subtotal					**$9,205,371.00**
		Mobilization	5%	+/-			$460,000.00
		Subtotal 1 with Mobilization					**$9,665,371.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$1,551,687.00
		(assumes 1.5%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$11,217,058.00
		Design Contingencies	8%	+/-			$782,942.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$12,000,000.00**
		Construction Contingencies	18%	+/-			$2,500,000.00
		FIELD COST					**$14,500,000.00**
		Non-Contract Costs:	62%	+/-			$8,500,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 45%, Design Data Collection ~ 1%,					
		Engineering Design ~ 3%, Permitting ~ 2%,					
		Procurement ~ 1%, Construction Management					
		~ 9%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$23,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED 05-19-11
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 05/19/11	PEER REVIEW / DATE DCD 6/3/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Diversion and Care	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Removal of Diversion Conduit Bulkheads.	86-68130	14	CY	$850.00	$11,900.00
		Includes removing two 9.5'x10' concrete bulkheads, one at a time by blasting.					
		Waste in scour hole					
	2	~~Remove Water from behind Tailrace Cofferdam.~~	~~86-68130~~	~~500,000~~	~~gals~~		DELETED
		~~Unwatering of tailrace for removal of the powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for 2 days.~~					
	3	~~Provide Dewatering behind Tailrace Cofferdam~~	~~86-68130~~	~~1~~	~~ls~~		DELETED
		~~for removal of Powerhouse in the dry.~~					
		~~Assume 3 inch portable trash pump operating for approximately 3 months.~~					
		SUBTOTAL THIS SHEET					**$11,900.00**

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 12/20/10	PEER REVIEW / DATE Tom Hepler P.E. 12/20/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCJ 4/22/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Diversion and Care

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	4	~~Construct Embankment Cofferdam in Tailrace~~	~~86-68130~~	~~2,000~~	~~yd3~~		DELETED
		~~around Powerhouse to remove in dry.~~					
		~~Assumes 10 ft wide crest with 2:1 side slopes, approximately 101 ft long and 14 ft high.~~					
		~~Embankment material taken from removal of JC Boyle Dam, approximately 3 mile haul distance.~~					
		DIVERSION AND CARE SUBTOTAL					**$11,900.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 12/20/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/20/10	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCB 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Dam	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	5	Remove Spillway Concrete	86-68130	2,500	yd3	$260.00	$650,000.00
		3000 psi, reinforced and mass concrete.					
		Includes removal of two diversion culverts beneath spillway block 1.					
		Spillway concrete was estimated between dam Sta. 2+19.5 and Sta. 3+36.5.					
		Waste in scour hole					
	6	Remove Monorail Structural Steel Components	86-68130	15,000	lbs	$0.65	$9,750.00
		This structure used for installing steel stoplogs in spillway radial gate openings.					
		Assume contains paint with heavy metals.					
	7	Remove Fish Ladder Concrete	86-68130	1,600	yd3	$260.00	$416,000.00
		3000 psi, reinforced concrete.					
		Includes fish ladder intake at upstream end, diffusion box at downstream end,					
		and north abutment wall (which supports dam embankment).					
		This quantity is for concrete to the right of dam Sta. 3+36.5.					
		Waste in scour hole					
	~~8~~	~~Remove Gravity Dam Section Concrete~~	~~86-68130~~	~~600~~	~~yd3~~		DELETED
		~~3000 psi, mass concrete.~~					
		~~Waste in scour hole~~					
	9	Remove Timber Equipment Ramp on left side of	86-68130	10,500	lbs	$0.55	$5,775.00
		dam.					
		Timber is creosote pressure treated Douglas Fir assumed to weigh 36 lbs/ft3.					
		Volume of timber to be removed is approximately 290 ft3.					
	10	Remove Pressure-Treated Lumber from	86-68130	3,600	lbs	$0.55	$1,980.00
		Footbridge around intake structure.					
		2 in by 8 in Lumber assumed to weigh 30 lb/ft3.					
		Volume of lumber to be removed is approximately 120 ft3.					
		SUBTOTAL THIS SHEET					**$1,083,505.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Dam	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~11~~	~~Storage Shed located on access road about~~	~~86-68130~~	~~1,728~~	~~ft2~~		DELETED
		~~440' from left abutment of dam.~~					
		~~48' x 36' wood frame construction.~~					
	~~12~~	~~Warehouse located on access road about 370'~~	~~86-68130~~	~~1,920~~	~~ft2~~		DELETED
		~~from left abutment of dam (Red Barn).~~					
		~~60' x 32' wood frame construction.~~					
	13	Fire System Control Bldg. on left abutment.	86-68130	385	ft2	$40.00	$15,400.00
		15.25'x25.25' concrete block on concrete slab.					
	14	Dam Communication Bldg. on left abutment.	86-68130	331	ft2	$40.00	$13,240.00
		13.5'x24.5' metal building on concrete slab.					
	15	Concrete Slab on left abutment for former	86-68130	6	cy	$260.00	$1,560.00
		Control House. 13'x13' house has been removed.					
		Waste in scour hole					
	16	4'x5' Metal Hatch on top of Concrete Pull Box on	86-68130	1	cy	$260.00	$260.00
		left abutment. Metal hatch weighs approximately 400 lbs.					
		Waste in scour hole					
	17	Reservoir Level Gauge House on Dam Crest	86-68130	24	ft2	$40.00	$960.00
		4'x6' Metal building.					
		SUBTOTAL THIS SHEET					**$31,420.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Dam

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	18	Upstream Riprap	86-68313	2,220	yd3	$9.00	$19,980.00
		average size 50 lbs (from photograph)					
	19	Downstream Riprap	86-68313	1,850	yd3	$9.00	$16,650.00
		average size 50 lbs (from photograph)					
	20	Miscellaneous Excavation	86-68313	132,500	yd3	$9.00	$1,192,500.00
		Consists of finer earth fill materials such as					
		Zone 1, Zone 2, Filters and a Waste Rock					
		Zone					
	21	Cutoff Wall Concrete Demolition	86-68313	70	yd3	$260.00	$18,200.00
		The concrete cutoff wall is embedded in the					
		Zone 1 core and is anchored into bedrock.					
		Waste in scour hole					
	22	Cutoff Wall Anchors	86-68313	285	ea	$10.00	$2,850.00
		Cut #8 anchors at top of bedrock					
		Assume concrete rubble disposed of on					
		site but anchors hauled off site.					
		SUBTOTAL THIS SHEET					**$1,250,180.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	**CHECKED** Tuti Tierney	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/12/10	**PEER REVIEW / DATE** Daniel W. Osmun 12/20/10	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCO 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Dam	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at Dam:					
	23	Hand Rails and Light Poles	86-68420	5,000	lbs	$0.65	$3,250.00
		(Assume contains paint with heavy metals)					
	24	Spillway Radial Gates and Hoists	86-68420	124,000	lbs	$0.65	$80,600.00
		3 radial gates, 3 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	25	Stop Logs and Slots (steel)	86-68420	92,000	lbs	$0.65	$59,800.00
		stop logs slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Fish Ladder Structure:					
	26	24" Slide Gate at Entrance to Fish Ladder	86-68420	4,200	lbs	$0.65	$2,730.00
		Structure					
		(Assume contains paint with heavy metals & petroleum products)					
	26A	Remove Petroleum Products from Red Barn Area	86-68420	1,600	gal	$10.00	$16,000.00
		Includes quantities for the following:					
		Steel shed oil storage drums.					
		Misc. oil products, approx. 2 drums @ 55 gal.					
		Convault fuel tanks.					
		Diesel fuel tank @ 500 gal., Gasoline tank @ 1,000 gal.					
		Tanks to remain on-site.					
		SUBTOTAL THIS SHEET					**$162,380.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Dam	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at Spillway:					
	27	Spillway gate motor & control panel	86-68430	1	EA	$600.00	$600.00
		Total weight approximately: 500 lbs.					
	28	Distribution equipment , panelboards	86-68430	1	EA	$6,000.00	$6,000.00
		Total weight approximately: 500 lbs.					
		DAM SUBTOTAL					**$2,534,085.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 12, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCW 4/22/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Powerhouse, Switchyard, and Transmission Line

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~29~~	~~Remove Powerhouse Concrete down to~~					
		~~Elevation 3324.0 (springline of the turbines).~~	~~86-68130~~	~~1,500~~	~~yd3~~		DELETED
		~~Waste in scour hole~~					
	~~30~~	~~Remove Structural Steel Items associated with~~					
		~~Powerhouse.~~	~~86-68130~~	~~94,000~~	~~lbs~~		DELETED
		~~Includes only WF beam shapes, crane rails, and~~					
		~~penstock sections inside powerhouse.~~					
		~~Assume contains paint with heavy metals.~~					
	31	Warehouse near Powerhouse.	86-68130	5,200	ft2	$40.00	$208,000.00
		Large metal building on concrete slab.					
		SUBTOTAL THIS SHEET					**$208,000.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Power House:					
	~~32~~	~~2 - Governor oil systems~~	~~86-68420~~	~~52,500~~	~~lbs~~		DELETED
		~~governor, sump tanks, accumulator tank, piping~~					
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~33~~	~~Cooling water and bearing oil systems~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~34~~	~~2 - Francis Turbines~~	~~86-68420~~	~~560,000~~	~~lbs~~		DELETED
		~~(Includes runner, scroll case, draft tube and shaft)~~					
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	35	150 Ton crane	86-68420	240,000	lbs	$0.65	$156,000.00
		(Includes crane and embedded steel rail)					
		(Assume contains paint with heavy metals & petroleum products)					
	~~36~~	~~Compressed Air systems~~	~~86-68420~~	~~1,100~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~37~~	~~2 - CO2 systems~~	~~86-68420~~	~~6,600~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~38~~	~~Plant Water and Fire Protection~~	~~86-68420~~	~~3,100~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~39~~	~~Transformer Oil Fire protection~~	~~86-68420~~	~~6,500~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
		SUBTOTAL THIS SHEET					**$156,000.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon

WOID:	AF121	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	~~40~~	~~Unwatering Piping~~	~~86-68420~~	~~33,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~41~~	~~Drainage Piping~~	~~86-68420~~	~~10,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals)~~					
	~~42~~	~~2-Oil Sump pumps~~	~~86-68420~~	~~2,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~43~~	~~Remove and Dispose of Draft Tube Bulk Head~~	~~86-68420~~	~~65,000~~	~~lbs~~		DELETED
		~~Gates and Hoists at the Powerhouse~~					
		~~4-Draft Tube Bulk Head Gates (12,000 lbs ea.)~~	~~48,000~~	~~lbs~~			
		~~4-Guides(2,400 lbs for the pair)~~	~~9,600~~	~~lbs~~			
		~~2-Hoist (3,700 lbs ea.)~~	~~7,400~~	~~lbs~~			
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	43A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	2,700	gal	$10.00	$27,000.00
		Includes quantities for the following equipment:					
		From Item 34, Units 1 & 2, bearing oil systems.					
		DTE heavy oil, 400 gal. per unit, 800 gal. total.					
		From Item 32, Units 1 & 2, governor oil sumps and accumulator tanks.					
		Hydraulic oil, 925 gal. per unit, 1,850 gal. total.					
		The remaining items contain petroleum products in amounts too small to be					
		considered for this level of estimate.					
		SUBTOTAL THIS SHEET					**$27,000.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DWD 4/22/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	44	Outdoor Vertical AC Generator, Unit 1: 53 MVA (50 MW); Unit 2: 50 MVA (48 MW); 0.95PF, 11,500 V, 277 RPM, 3 Ph, including rotating exciter Total weight each approximately: 657,000 lbs. Stator: 175,000 lbs., Rotor: 290,000 lbs. Heaviest lift: 300,000 lbs.	86-68430	2	EA	$200,000.00	$400,000.00
	~~45~~	~~Excitation equipment for 53/50 MVA Generator (5 cabinets)(400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~46~~	~~Surge protection equip. for 53/50 MVA Generator~~ ~~Total weight approximately: 1,500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~47~~	~~Neutral grounding equip. for 53/50 MVA Generato includes transformer~~ ~~Total weight approximately: 500 lbs.~~	~~86-68430~~	~~2~~	~~EA~~		DELETED
	~~48~~	~~Generator Switchgear, 15kV - (6 sections) (750 lbs each), 3 ft x 6ft x 90 inches high~~ ~~Total weight approximately: 4,500 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
	~~49~~	~~Station Service Switchgear, 600 volt - (5 sections) (400 lbs each), 3 ft x 3ft x 90 inches high~~ ~~Total weight approximately: 2,000 lbs.~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		SUBTOTAL THIS SHEET					**$400,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		equipment in the Powerplant:					
	~~50~~	~~Unit and plant control switchboard~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~5 cubicles (200 lbs each), 2ft x 2ft x 90 in. high~~					
		~~Total weight approximately: 1,000 lbs.~~					
	51	Battery system - assume 40 batteries, charger,	86-68430	1	EA	$8,000.00	$8,000.00
		racks and supports.					
		Total weight approximately: 2,500 lbs.					
	~~52~~	~~Raceways, Conduit and Cable~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~(approx. 3000 lin. Ft. power & control cable,~~					
		~~1000 lin. Ft. conduit, 200 lin. Ft. cabletray)~~					
		~~Total weight approximately: 8,000 lbs.~~					
	~~53~~	~~Misc. power & control boards~~	~~86-68430~~	~~1~~	~~EA~~		DELETED
		~~10 boards (50 lbs each) 3ft x 2 ft x 9 in~~					
		~~Total weight approximately: 500 lbs.~~					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	54	5 Gantry Crane motors - hoist (50Hp*), aux hoist	86-68430	1	EA	$2,000.00	$2,000.00
		(30Hp*), aux hoist trolley (5Hp*), gantry (2-15Hp*)					
		(Hp* Approx.) Total weight approximately: 750 lbs.					
	55	Gantry Crane control equipment (3 cubicles)	86-68430	1	EA	$6,000.00	$6,000.00
		Total weight approximately: 900 lbs.					
		SUBTOTAL THIS SHEET					**$16,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Powerhouse, Switchyard, and Transmission Line	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following					
		Gantry Crane equipment at the Powerplant:					
	56	Conduit and Cable	86-68430	1	EA	$10,000.00	$10,000.00
		(approx. 3000 lin. Ft. power & control cable, 100 lin. Ft. power cable from reel, 1000 lin. Ft conduit)					
		Total weight approximately: 8,000 lbs.					
	57	Exterior Lighting	86-68430	1	EA	$2,000.00	$2,000.00
		6 poles with lights (250 lbs. each)					
		Total weight approximately: 1,500 lbs.					
		Remove and dispose of the following					
		Transmission Lines:					
	58	Transmission Line No. 59	86-68430	1.66	mile	$25,000.00	$41,500.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
	59	Transmission Line No. 98	86-68430	0.24	mile	$25,000.00	$6,000.00
		From Boyle Substation to Line Tie on Line 18					
		#2 AAC, 69-kV					
	60	Transmission Line No. 58	86-68430	1.66	mile	$25,000.00	$41,500.00
		From Boyle Substation to Line Tie					
		266.8 ACSR, 69-kV					
		Major substation equipment (transformers, circuit breakers, etc.) to be salvaged by Pacificorp					
		POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL					**$908,000.00**

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED November 17, 2010	PEER REVIEW / DATE L. Rossi 12/15/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	~~61~~	~~Remove Intake Structure Concrete~~	~~86-68130~~	~~1,600~~	~~yd3~~		DELETED
		~~3000 psi, reinforced concrete.~~					
		~~Waste in scour hole~~					
	~~62~~	~~Remove Fish Screen Building~~	~~86-68130~~	~~1,300~~	~~ft2~~		DELETED
		~~Building is located on top of intake structure.~~					
		~~Wood frame construction, with metal rib roof and metal siding.~~					
		~~Some wood is pressure-treated, which may be considered a~~					
		~~hazardous material.~~					
	63	Remove 24-inch-dia. Steel Fish Discharge Pipe	86-68130	22,000	lbs	$0.65	$14,300.00
		Pipe is located alongside the 14-ft-dia. steel pipe.					
		Length is estimated to be approx. 340 feet long					
		from Sta. 0+15.25 to the outlet at the Klamath River.					
		Assume contains paint with heavy metals.					
	~~64~~	~~Remove Concrete Items associated with the~~					
		~~14-ft-diameter Steel Pipe.~~	~~86-68130~~	~~1,100~~	~~yd3~~		DELETED
		~~Includes anchors for horiz. pipe bends, piers,~~					
		~~14-ft dia. concrete conduit section, outlet transition~~					
		~~with newer (2002) headgate vault section,~~					
		~~siphon spillway structure, and 22-ft-long spillway flume.~~					
		~~Waste in scour hole~~					
	65	Remove Open Concrete Flume Walls.	86-68130	12,200	yd3	$260.00	$3,172,000.00
		3000 psi, reinforced concrete.					
		Total flume length = 10,761 feet.					
		Includes both 2-wall and 1-wall flume reaches.					
		~~Includes 2,300 CY of unreinforced porous concrete~~					
		~~(gunite or shotcrete) on 1-wall flume reaches.~~					
		Waste in scour hole					
		SUBTOTAL THIS SHEET					**$3,186,300.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCO 4/22/11

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	66	Remove Structural Steel Items associated with the					
		Forebay Trashrack Piers.	86-68130	11,500	lbs	$0.65	$7,475.00
		Includes three 16 WF beams, each about 61.3 feet long, that support the trashracks.					
		Assume contains paint with heavy metals.					
	67	Remove Forebay Concrete Walls	86-68130	1,500	yd3	$260.00	$390,000.00
		3000 psi, reinforced concrete.					
		Includes forebay, forebay spillway, forebay sluiceway,					
		and forebay drainage ~~items~~ (man-hole,					
		~~12-inch concrete drain pipe).~~					
		Waste in scour hole					
	68	Place Concrete Plugs at Tunnel Portals	86-68130	30	yd3	$1,000.00	$30,000.00
		3000 psi, reinforced concrete min., two plugs @ 2-ft thick.					
		Upper portal is a concrete-lined horseshoe shape, 16.5 ft high by 15.5 ft wide.					
		Lower portal is a grouted, steel-lined conduit 16 feet in diameter.					
	69	Remove Concrete Items associated with					
		Penstocks D/S from Tunnel.	86-68130	1,800	yd3	$260.00	$468,000.00
		Includes surge tank support and anchor block #1,					
		anchor block #2, two anchor blocks at P.I. #3,					
		and all ring girder supports.					
		Waste in scour hole					
	70	Headgate Control Bldg. at Flume Entrance.	86-68130	330	ft2	$40.00	$13,200.00
		Concrete block on concrete slab.					
	71	Forebay Spillway Gate House	86-68130	570	ft2	$40.00	$22,800.00
		Metal building on wood frame covering forebay spillway radial gates.					
	72	Forebay Control Building.	86-68130	470	ft2	$40.00	$18,800.00
		Wood building on metal frame.					
		SUBTOTAL THIS SHEET					**$950,275.00**

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 11/17/10	PEER REVIEW / DATE Rick Benik P.E. 12/11/10	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Penstock

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	73	Communication Tower next to Forebay	86-68130	7,100	lbs	$0.65	$4,615.00
		Control Building.					
		Tower made of steel angles on top of concrete footings.					
		Assume contains paint with heavy metals.					
	74	Insulated Generator Building next to Forebay	86-68130	72	ft2	$40.00	$2,880.00
		Control Building.					
		Metal building on top of concrete footings.					
		SUBTOTAL THIS SHEET					**$7,495.00**

QUANTITIES		PRICES	
BY Stephen Latham	**CHECKED** Jonathan East	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/17/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Fish By-Pass Intake:					
	~~75~~	~~Fixed Wheel Gate~~	~~86-68420~~	~~55,000~~	~~lbs~~		DELETED
		~~Gate, frame and hoist (steel)~~					
		~~(Assume contains paint with heavy metals & petroleum products)~~					
	~~76~~	~~Trash rack and trash rake (steel)~~	~~86-68420~~	~~75,000~~	~~lbs~~		DELETED
	~~77~~	~~Stop Logs and slots (steel)~~	~~86-68420~~	~~136,000~~	~~lbs~~		DELETED
		~~stop log slots embedded in concrete~~					
		~~(Assume contains paint with heavy metals)~~					
	~~78~~	~~Traveling Water Screen~~	~~86-68420~~	~~124,000~~	~~lbs~~		DELETED
		~~4 traveling water screens~~	~~120,000~~	~~lbs~~			
		~~4 spraywater pumps~~	~~4,000~~	~~lbs~~			
		~~(Assume contains petroleum products)~~					
	~~79~~	~~Fish By-Pass and Supports (steel), 4-Pronged~~	~~86-68420~~	~~610,000~~	~~lbs~~		DELETED
		~~Inlet to Forebay, Spillway, Deer Escape Flume~~					
		~~(Assume contains paint with heavy metals)~~					
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
WOID: AF121	ESTIMATE LEVEL: Feasibility
REGION: MP	UNIT PRICE LEVEL: July-2010
FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Forebay, Spillway, Deer Escape Flume:					
	80	Radial Gates and Hoists	86-68420	16,500	lbs	$0.65	$10,725.00
		2 radial gates, 2 hoists					
		(Assume contains paint with heavy metals & petroleum products)					
	81	Trash rack and trash rake (steel)	86-68420	43,500	lbs	$0.50	$21,750.00
	82	Stop Logs and slots (steel)	86-68420	14,500	lbs	$0.65	$9,425.00
		stop log slots embedded in concrete					
		(Assume contains paint with heavy metals)					
		Remove and dispose of the following					
		equipment at the Penstock Intake:					
	83	Penstocks and bifurcation (steel)	86-68420	1,600,000	lbs	$0.65	$1,040,000.00
		Some portions embedded in natural rock, includes					
		pipe, expansion joints, and support rings					
		(Assume contains paint with heavy metals)					
	84	Surge Tank (steel)	86-68420	79,000	lbs	$0.65	$51,350.00
		(Assume contains paint with heavy metals)					
	~~85~~	~~2 - 108" Butterfly valves~~	~~86-68420~~	~~148,000~~	~~lbs~~		DELETED
		~~(Assume contains paint with heavy metals & petroleum products)~~					
		SUBTOTAL THIS SHEET					**$1,133,250.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Penstock	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following					
		equipment at the Head Gate Structure:					
	86	Gate, Stem and Frame	86-68420	28,000	lbs	$0.65	$18,200.00
		(Assume contains paint with heavy metals & petroleum products)					
	87	Steel Transition Manifolds on Upstream and	86-68420				
		Downstream		250,000	lbs	$0.50	$125,000.00
	87A	Remove Petroleum Products from Mechanical					
		Equipment.	86-68420	380	gal	$10.00	$3,800.00
		Includes quantities for the following equipment:					
		From Item 85, Units 1 & 2, butterfly valves and HPUs.					
		Hydraulic oil, 191 gal. per valve, 382 gal. total.					
		The remaining items contain petroleum products in amounts too small					
		to be considered for this level of estimate.					
		PENSTOCK SUBTOTAL					**$5,424,320.00**

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED K. Converse	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED December 9, 2010	PEER REVIEW / DATE Dan Drake 12/16/2010	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Appraisal
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	88	Temporary Access Roads	86-68140	2.0	Miles	$150,000.00	$300,000.00
		Blade primitive road as necessary in dry reservoir sediment for one time use by hydroseeding equipment. Existing topography is relatively flat with no significant excavation nor embankment anticipated.					
		SUBTOTAL THIS SHEET					**$300,000.00**

QUANTITIES		PRICES	
BY Mark Leavitt	**CHECKED** Gemperline, Joseph M	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/12/10	**PEER REVIEW / DATE** Jeff Baysinger 12/14/2010	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DJD 4/22/11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	89	SPRING GROUND SEEDING	86-68220	247	Acres	$3,500.00	$864,500.00
		Idaho fescue (Festuca idahoensis)	988	lbs PLS			
		Blue wildrye (Elymus glaucus)	988	lbs PLS			
		Small fescue (Vulpia microstachys)	988	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	1482	lbs PLS			
		Sandberg bluegrass (Poa secunda)	124	lbs PLS			
		Spike bentgrass (Agrostis exarata)	62	lbs PLS			
		Wood mulch	494000	lbs			
		Tackifier	29640	lbs			
	~~90~~	~~SPRING BARGE SEEDING:~~	~~86-68220~~		~~Acres~~		DELETED
		SUBTOTAL THIS SHEET					**$864,500.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	**CHECKED** Greimann, Blair P 2/28/2011	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 02/03/11	**PEER REVIEW / DATE**	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCW 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Reservoir Vegetative Restoration	Klamath River Northern California/Southern Oregon

WOID:	AF121	ESTIMATE LEVEL:	Feasibility
REGION:	MP	UNIT PRICE LEVEL:	July-2010
FILE:	C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Res Reveg		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	0	Acres	$7,500.00	
	92	FALL GROUND SEEDING:	86-68220	124	Acres	$3,500.00	$434,000.00
		Idaho fescue (Festuca idahoensis)	494	lbs PLS			
		Blue wildrye (Elymus glaucus)	494	lbs PLS			
		Small fescue (Vulpia microstachys)	494	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	741	lbs PLS			
		Sandberg bluegrass (Poa secunda)	62	lbs PLS			
		Spike bentgrass (Agrostis exarata)	31	lbs PLS			
		Wood mulch	38000	lbs			
		Tackifier	2280	lbs			
		SUBTOTAL THIS SHEET					**$434,000.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P 2/28/2011	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 02/03/11	PEER REVIEW / DATE	DATE PREPARED 05/25/11	PEER REVIEW / DATE WCQ 5-25-11

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Dam & Powerplant Removal
Most Probable
Reservoir Vegetative Restoration

PROJECT:

Klamath River
Northern California/Southern Oregon

WOID:	AF121	**ESTIMATE LEVEL:**	Feasibility
REGION:	MP	**UNIT PRICE LEVEL:**	July-2010

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING:	86-68220	54	Acres	$8,500.00	$459,000.00
		Narrowleaf willow (Salix exigua)	26460	cutting			
		Arroyo willow (Salix lasiolepis)	3780	cutting			
		Shining willow (Salix lucida)	3780	cutting			
		Western serviceberry (Amelanchier alnifolia)	1890	cutting			
		Chokecherry (Prunus virginiana)	1890	transplant			
		Herbivore screen	37800	each			
		Chemical herbivore deterent	756	gal			
		Polymer	119	lbs			
	94	WEED MANAGEMENT:	86-68220	124	Acres	$1,500.00	$186,000.00
		Herbicide, post-emergent	247	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	99	Acres	$3,500.00	$346,500.00
		Idaho fescue (Festuca idahoensis)	395	lbs PLS			
		Blue wildrye (Elymus glaucus)	395	lbs PLS			
		Small fescue (Vulpia microstachys)	395	lbs PLS			
		Bluebunch wheatgrass (Pseudoroegneria spicata)	593	lbs PLS			
		Sandberg bluegrass (Poa secunda)	49	lbs PLS			
		Spike bentgrass (Agrostis exarata)	25	lbs PLS			
		Wood mulch	197600	lbs			
		Tackifier	11856	lbs			
	96	WEED MANAGEMENT:	86-68220	99	Acres	$1,500.00	$148,500.00
		Herbicide, post-emergent	9	lbs AI			
	RESERVOIR VEGETATIVE RESTORATION SUBTOTAL						**$2,738,500.00**

QUANTITIES		PRICES	
BY O'Meara, Scott A	**CHECKED** Greimann, Blair P	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 04/12/11	**PEER REVIEW / DATE** Greimann, Blair P 4/12/2011	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCD 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:		
REVISION #1 Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Road Improvements	Klamath River Northern California/Southern Oregon		
	WOID: AF121	ESTIMATE LEVEL:	Feasibility
	REGION: MP	UNIT PRICE LEVEL:	July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Road Improvements		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required					
		to prepare disposal sites and remove the					
		earth fill embankment and concrete cutoff wall					
		of J. C. Boyle Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area (Embankment)	86-68313	10	acre	$5,000.00	$50,000.00
		Estimated haul distance 1/2 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (15% bulking factor).					
		Prepare Haul Road (For Embankment) - 0.5 mi					
		2 way traffic - off road dumps or scrapers					
	98	Clear and grub, 40' width	86-68313	2.4	acre	$5,000.00	$12,000.00
	99	4" thick gravel surfacing	86-68313	2,150	ton	$30.00	$64,500.00
	100	Clear and Grub Disposal Area (For Concrete)	86-68313	0	acre	$5,000.00	
		Estimated haul distance 3/10 mile.					
		Disposed fill estimated to be 10' deep					
		and traffic compacted (50% bulking factor).					
		Prepare Haul Road (For Concrete) - 0.3 mi					
		1 way traffic - off road dumps					
	101	Clear and grub, 20' width	86-68313	0	acres	$5,000.00	
	~~102~~	~~4" thick gravel surfacing~~	~~86-68313~~	~~650~~	~~ton~~		DELETED
	103	Soil Cover over Concrete Rubble	86-68313	13,000	yd3	$140.00	$1,820,000.00
		Assume 2' thick cover from embankment - 2.75 mile haul.					
		SUBTOTAL THIS SHEET					**$1,946,500.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED DW 05-25-11
DATE PREPARED 12/10/10	PEER REVIEW / DATE Daniel W. Osmun 12/20/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE ACQ 5-25-11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
REVISION #1 Klamath River Dams Removal Partial Removal Option JC Boyle Dam & Powerplant Removal Most Probable Road Improvements	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - REV#1 - MP Feas Est - 4-2011.xlsx]Road Improvements

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Disposal of Concrete Rubble in Wasteway (Forebay) Scour Hole					
	104	Rubble from Dam	86-68313	5,400	yd3	Included in concrete removal items	
		Haul distance 2.75 miles (across dam). A 30 percent bulking factor was applied.					
	105	Rubble from Flume/Forebay	86-68313	17,800	yd3	Included in concrete removal items	
		Haul distance 1.0 mile (midpoint of flume). A 30 percent bulking factor was applied.					
	106	Rubble from Power House	86-68313	2,300	yd3	Included in concrete removal items	
		Haul distance 1.75 miles. A 30 percent bulking factor was applied.					
	107	Embankment Fill in Wasteway (Forebay) Scour Hole	86-68313	0	yd3	$140.00	
		To restore scour hole to original contours.					
		ROAD IMPROVEMENTS SUBTOTAL					**$1,946,500.00**

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 05-25-11
DATE PREPARED 11/01/10	PEER REVIEW / DATE Daniel W. Osmun 11/1/10	DATE PREPARED 05/25/11	PEER REVIEW / DATE 5-25-11

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial Removal Option
JC Boyle Reservoir
Most Probable

PROJECT:
Klamath River
Northern California/Southern Oregon

WOID:	**AF121**	**ESTIMATE LEVEL:**	**Feasibility**
REGION:	**MP**	**UNIT PRICE LEVEL:**	**July-2010**

FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Topsy Recreation Site					
	108	Concrete total	BLM	68	CY	$220.00	$14,960.00
		Boat ramp 20'x100'x8" (55 CY)					
		Concrete abutment 7'x12'x2' (6.3 CY)					
		Fishing deck footer (6 CY)					
	109	6'x80' Floating dock made of lumber and	BLM	1	EA	$5,000.00	$5,000.00
		composite decking					
	110	5'x20' Walkway leading to hex fishing platform	BLM	200	FT^2	$13.00	$2,600.00
		Consists of lumber frame with composite decking					
		and railing					
	111	Regrade to natural contour and reseed	BLM	300	FT^2	$4.00	$1,200.00
		Pioneer Park					
	112	Picnic tables to be removed and hauled away	BLM	12	EA	$60.00	$720.00
	113	12 Concrete fire rings	BLM	5	CY	$220.00	$1,100.00
	114	Portable toilets to be removed and hauled away	BLM	2	EA	$1,000.00	$2,000.00
	115	Signs to be removed and hauled away	BLM	6	EA	$150.00	$900.00
	116	Dumpster to be removed and hauled away	BLM	1	EA	$1,000.00	$1,000.00
	117	Remove paved access road	BLM	200	LF	$250.00	$50,000.00
	118	Regrage to natural contour, rip, plant and seed	BLM	0.5	ACRE	$20,000.00	$10,000.00
		parking and recreation site					
RECREATIONAL FACILITIES REMOVAL SUBTOTAL THIS SHEET							**$89,480.00**

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	**CHECKED** Sheena Barnes	**BY** Craig A. Grush, P.E.	**CHECKED**
DATE PREPARED 11/18/10	**PEER REVIEW / DATE** Rick Benik P.E. 12/11/10	**DATE PREPARED** 04/22/11	**PEER REVIEW / DATE** DCB 4/22/11

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Klamath River Dams Removal Partial Removal Option JC Bolye Dam & Powerplant Removal Most Probable SUMMARY	Klamath River Northern California/Southern Oregon
	WOID: AF121 — ESTIMATE LEVEL: Feasibility
	REGION: MP — UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\JC Boyle\[Klamath Dams Removal - JC Boyle - Partial Removal Option - MP Feas Est - 4-2011.xlsx]Summary

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		555,400	CY	$0.00	$0.00
		Diversion and Care					$11,900.00
		Dam Removal					$2,534,085.00
		Powerhouse/Switchyard/Transmission Line Removal					$908,000.00
		Penstock Removal					$5,424,320.00
		Reservoir Vegetative Restoration					$2,738,500.00
		Road Improvements					$1,946,500.00
		Recreational Facilities to be Removed					$89,480.00
		Subtotal					**$13,652,785.00**
		Mobilization	5%	+/-			$680,000.00
		Subtotal 1 with Mobilization					**$14,332,785.00**
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020					$4,929,280.00
		(assumes 3%/yr compounding over 10 years)					
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$19,262,065.00
		Design Contingencies	10%	+/-			$1,737,935.00
		Allowance for Procurement Strategies (APS)	0%	+/-			
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					**$21,000,000.00**
		Construction Contingencies	20%	+/-			$4,000,000.00
		FIELD COST					**$25,000,000.00**
		Non-Contract Costs:	65%	+/-			$16,000,000.00
		(Environmental & Cultural Resources					
		Mitigation ~ 45%, Design Data Collection ~ 1%,					
		Engineering Design ~ 4%, Permitting ~ 3%,					
		Procurement ~ 1%, Construction Management					
		~ 10%, and Closeout ~ 1%)					
		CONSTRUCTION COST					**$41,000,000.00**
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 04/22/11	PEER REVIEW / DATE DCD 4/22/11