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

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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

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	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

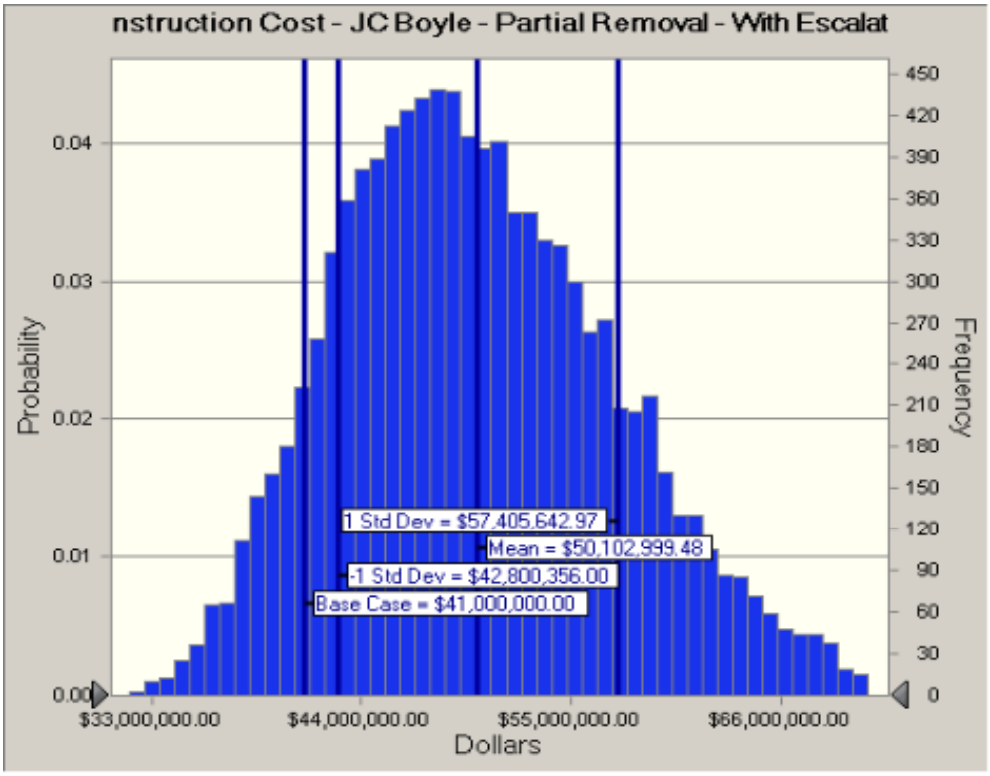
DATE	PEER REVIEWER(S)	CODE
6/8/11	Signature DAN MAAG Printed Name	8170
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

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



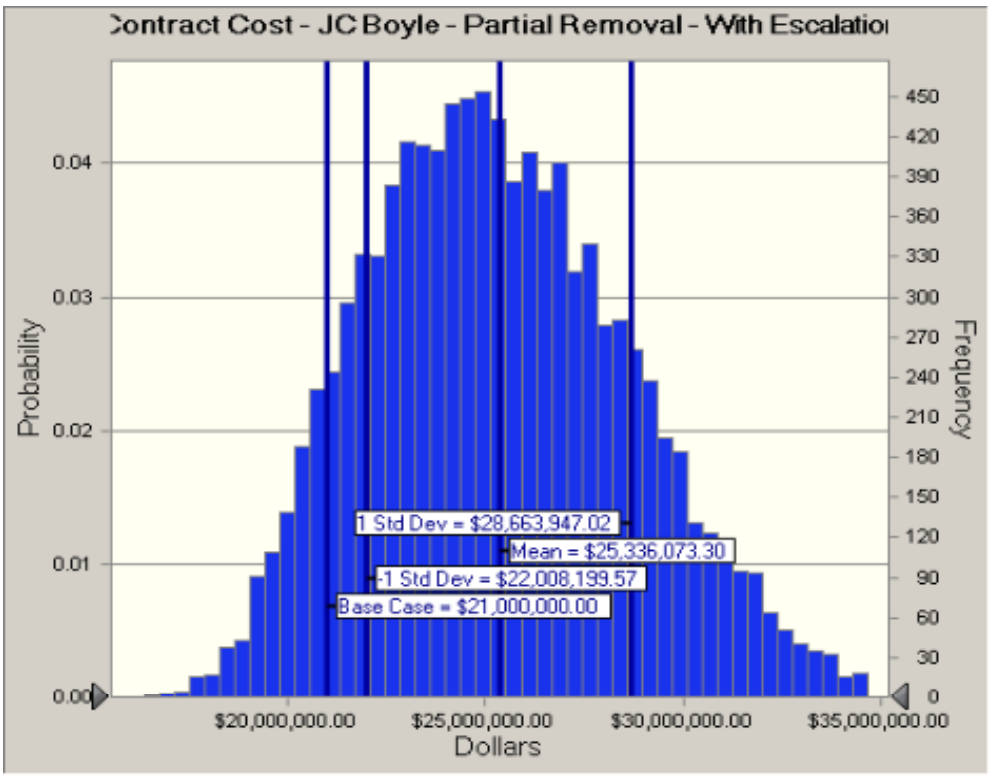
Forecast: Construction Cost - JC Boyle - Partial Removal - With Escalation (cont'd) Cell: U149

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



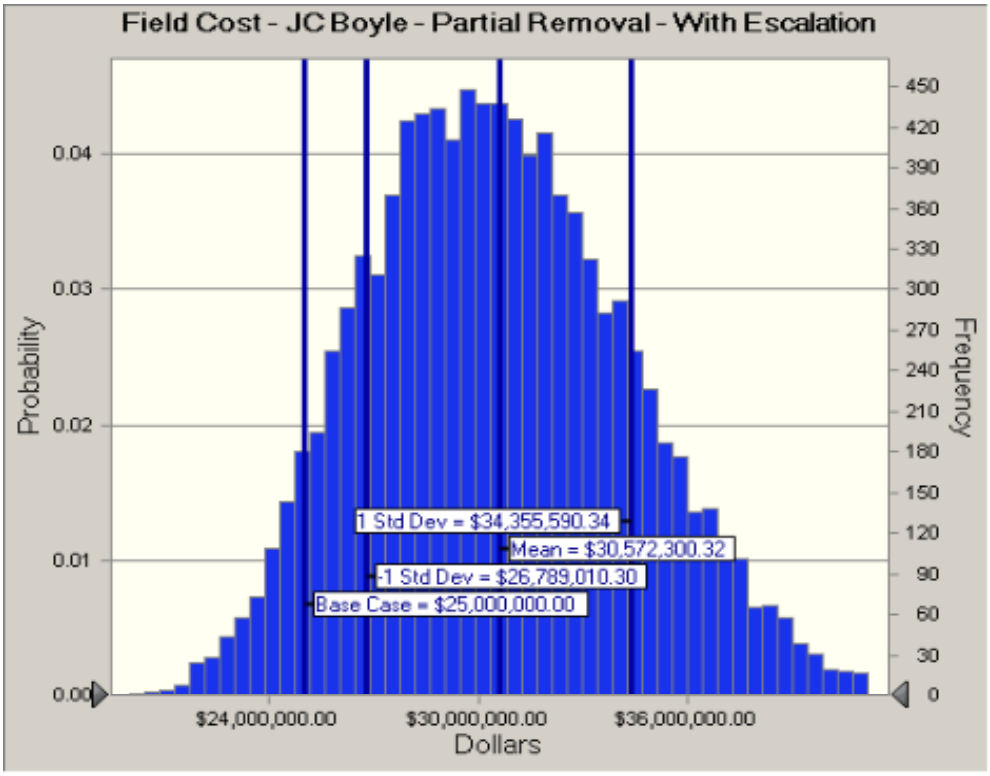
Forecast: Contract Cost - JC Boyle - Partial Removal - With Escalation (cont'd) **Cell: U145**

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

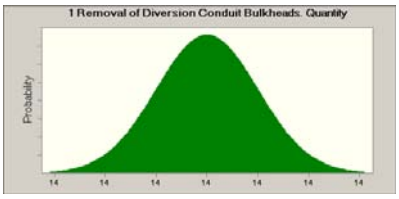
Assumptions

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:

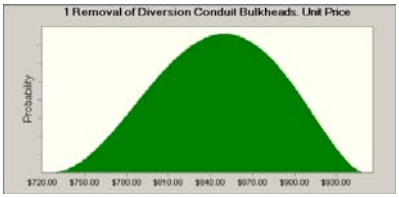
Mean	14	(=L14)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

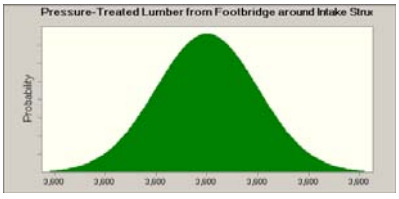
Minimum	$725.00	(=Q14)
Likeliest	$850.00	(=R14)
Maximum	$950.00	(=S14)



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

Normal distribution with parameters:

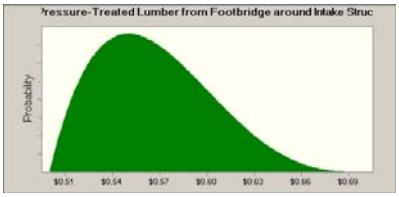
Mean	3,600	(=L23)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

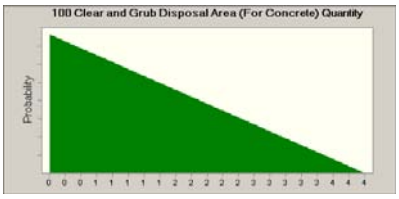
Minimum	$0.50	(=Q23)
Likeliest	$0.55	(=R23)
Maximum	$0.70	(=S23)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Quantity **Cell: L116**

Triangular distribution with parameters:

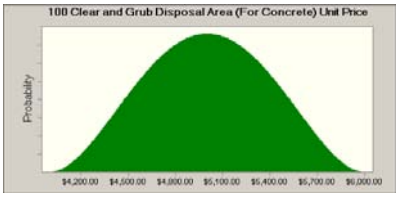
Minimum	0	(=M116)
Likeliest	0	(=L116)
Maximum	4	(=K116)



Assumption: 100 Clear and Grub Disposal Area (For Concrete) Unit Price **Cell: R116**

BetaPERT distribution with parameters:

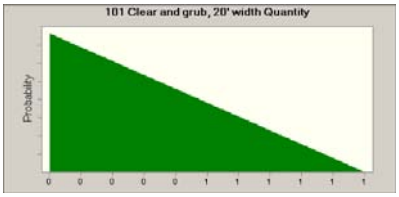
Minimum	$4,000.00	(=Q116)
Likeliest	$5,000.00	(=R116)
Maximum	$6,000.00	(=S116)



Assumption: 101 Clear and grub, 20' width Quantity **Cell: L117**

Triangular distribution with parameters:

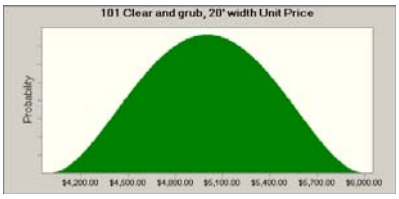
Minimum	0	(=M117)
Likeliest	0	(=L117)
Maximum	1	(=K117)



Assumption: 101 Clear and grub, 20' width Unit Price **Cell: R117**

BetaPERT distribution with parameters:

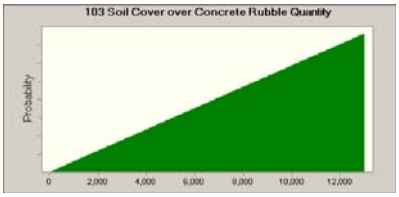
Minimum	$4,000.00	(=Q117)
Likeliest	$5,000.00	(=R117)
Maximum	$6,000.00	(=S117)



Assumption: 103 Soil Cover over Concrete Rubble Quantity **Cell: L119**

Triangular distribution with parameters:

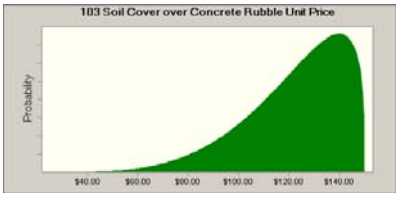
Minimum	0	(=M119)
Likeliest	13,000	(=L119)
Maximum	13,000	(=K119)



Assumption: 103 Soil Cover over Concrete Rubble Unit Price **Cell: R119**

BetaPERT distribution with parameters:

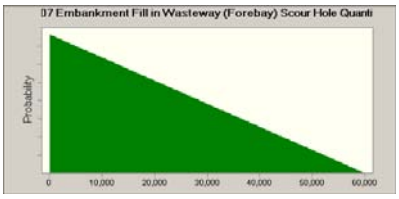
Minimum	$25.00	(=Q119)
Likeliest	$140.00	(=R119)
Maximum	$150.00	(=S119)



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**

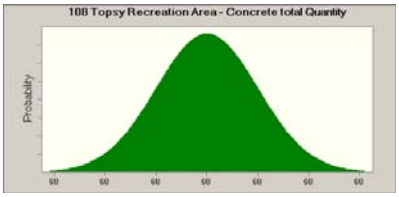
BetaPERT distribution with parameters:

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:

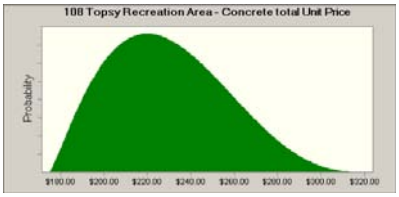
Mean	68	(=L124)
Std. Dev.	0	(=0.000001)



Assumption: 108 Topsy Recreation Area - Concrete total Unit Price **Cell: R124**

BetaPERT distribution with parameters:

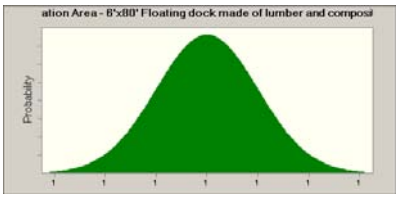
Minimum	$175.00	(=Q124)
Likeliest	$220.00	(=R124)
Maximum	$320.00	(=S124)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composite **Cell: L125**

Normal distribution with parameters:

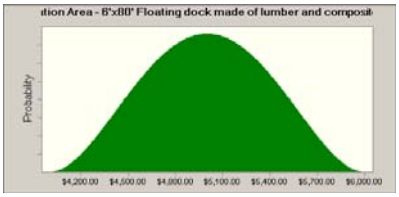
Mean	1	(=L125)
Std. Dev.	0	(=0.000001)



Assumption: 109 Topsy Recreation Area - 6'x80' Floating dock made of lumber and composi Cell: R125

BetaPERT distribution with parameters:

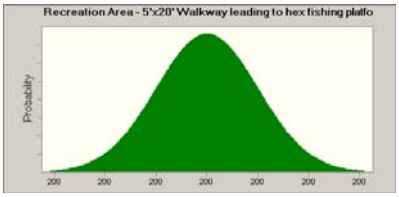
Minimum	$4,000.00	(=Q125)
Likeliest	$5,000.00	(=R125)
Maximum	$6,000.00	(=S125)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: L126

Normal distribution with parameters:

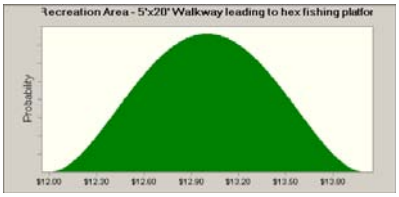
Mean	200	(=L126)
Std. Dev.	0	(=0.000001)



Assumption: 110 Topsy Recreation Area - 5'x20' Walkway leading to hex fishing platfo Cell: R126

BetaPERT distribution with parameters:

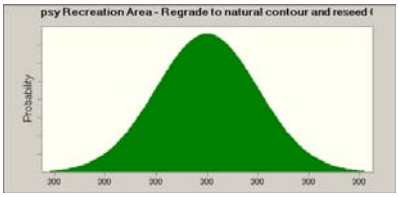
Minimum	$12.00	(=Q126)
Likeliest	$13.00	(=R126)
Maximum	$14.00	(=S126)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Quantity Cell: L127

Normal distribution with parameters:

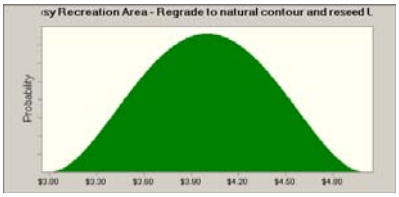
Mean	300	(=L127)
Std. Dev.	0	(=0.000001)



Assumption: 111 Topsy Recreation Area - Regrade to natural contour and reseed Unit Price Cell: R127

BetaPERT distribution with parameters:

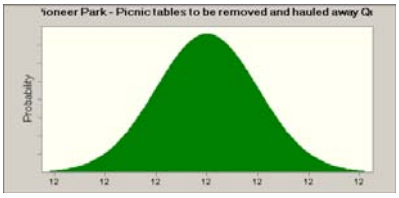
Minimum	$3.00	(=Q127)
Likeliest	$4.00	(=R127)
Maximum	$5.00	(=S127)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Quantity Cell: L128

Normal distribution with parameters:

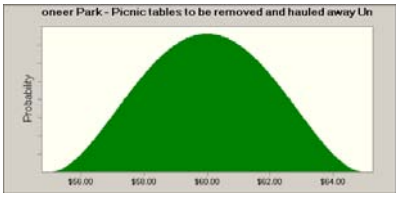
Mean	12	(=L128)
Std. Dev.	0	(=0.000001)



Assumption: 112 Pioneer Park - Picnic tables to be removed and hauled away Unit Price **Cell: R128**

BetaPERT distribution with parameters:

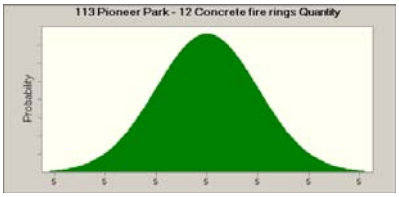
Minimum	$55.00	(=Q128)
Likeliest	$60.00	(=R128)
Maximum	$65.00	(=S128)



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**

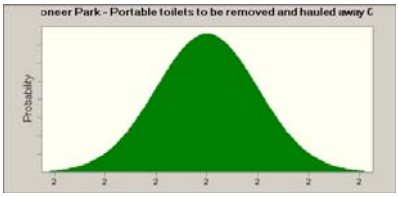
BetaPERT distribution with parameters:

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:

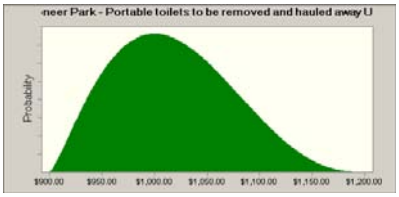
Mean	2	(=L130)
Std. Dev.	0	(=0.000001)



Assumption: 114 Pioneer Park - Portable toilets to be removed and hauled away Unit Price **Cell: R130**

BetaPERT distribution with parameters:

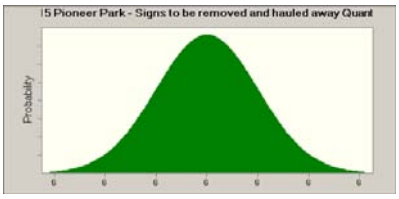
Minimum	$900.00	(=Q130)
Likeliest	$1,000.00	(=R130)
Maximum	$1,200.00	(=S130)



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**

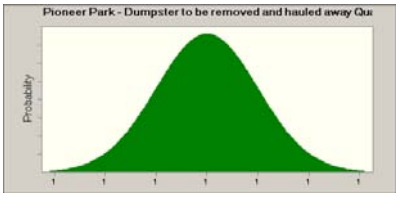
BetaPERT distribution with parameters:

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:

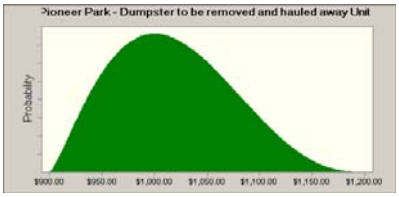
Mean	1	(=L132)
Std. Dev.	0	(=0.000001)



Assumption: 116 Pioneer Park - Dumpster to be removed and hauled away Unit Price **Cell: R132**

BetaPERT distribution with parameters:

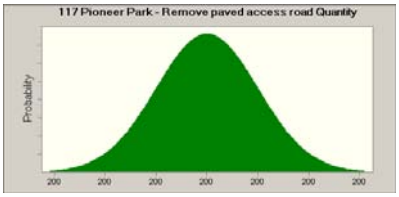
Minimum	$900.00	(=Q132)
Likeliest	$1,000.00	(=R132)
Maximum	$1,200.00	(=S132)



Assumption: 117 Pioneer Park - Remove paved access road Quantity **Cell: L133**

Normal distribution with parameters:

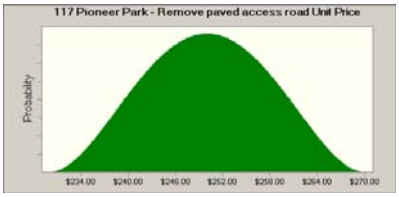
Mean	200	(=L133)
Std. Dev.	0	(=0.000001)



Assumption: 117 Pioneer Park - Remove paved access road Unit Price **Cell: R133**

BetaPERT distribution with parameters:

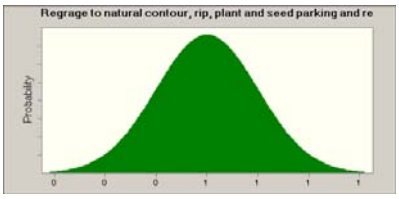
Minimum	$230.00	(=Q133)
Likeliest	$250.00	(=R133)
Maximum	$270.00	(=S133)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: L134**

Normal distribution with parameters:

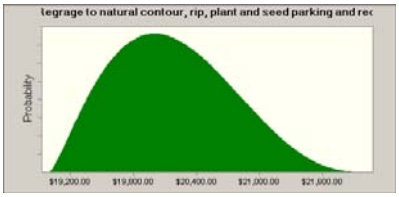
Mean	1	(=L134)
Std. Dev.	0	(=0.000001)



Assumption: 118 Pioneer Park - Regrage to natural contour, rip, plant and seed parking and re **Cell: R134**

BetaPERT distribution with parameters:

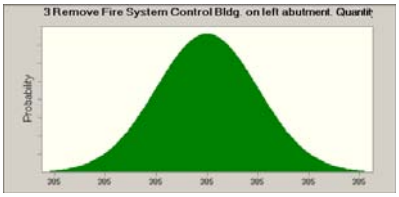
Minimum	$19,000.00	(=Q134)
Likeliest	$20,000.00	(=R134)
Maximum	$22,000.00	(=S134)



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

Normal distribution with parameters:

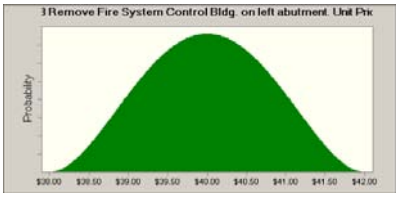
Mean	385	(=L26)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

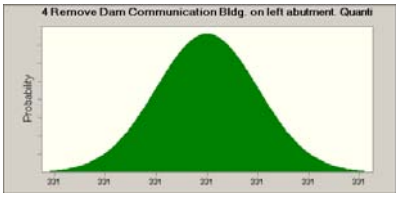
Minimum	$38.00	(=Q26)
Likeliest	$40.00	(=R26)
Maximum	$42.00	(=S26)



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

Normal distribution with parameters:

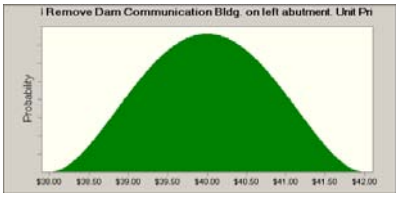
Mean	331	(=L27)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

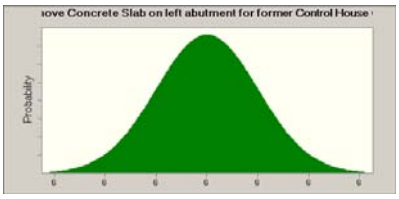
Minimum	$38.00	(=Q27)
Likeliest	$40.00	(=R27)
Maximum	$42.00	(=S27)



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

Normal distribution with parameters:

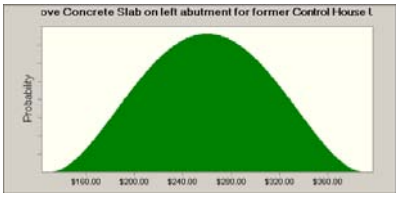
Mean	6	(=L28)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

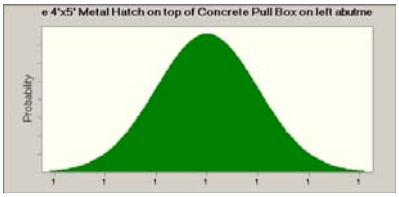
Minimum	$130.00	(=Q28)
Likeliest	$260.00	(=R28)
Maximum	$390.00	(=S28)



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

Normal distribution with parameters:

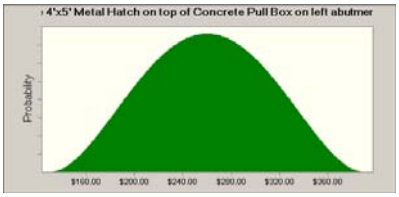
Mean	1	(=L29)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

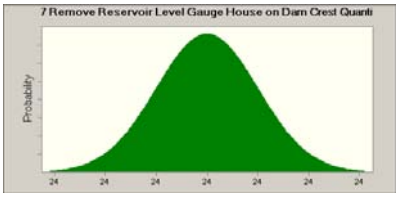
Minimum	$130.00	(=Q29)
Likeliest	$260.00	(=R29)
Maximum	$390.00	(=S29)



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

Normal distribution with parameters:

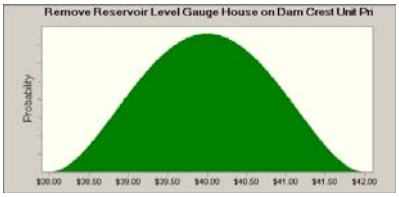
Mean	24	(=L30)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

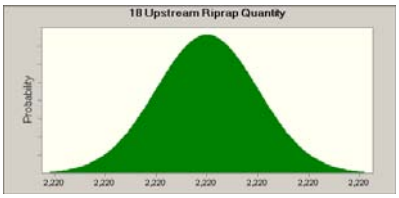
Minimum	$38.00	(=Q30)
Likeliest	$40.00	(=R30)
Maximum	$42.00	(=S30)



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

Normal distribution with parameters:

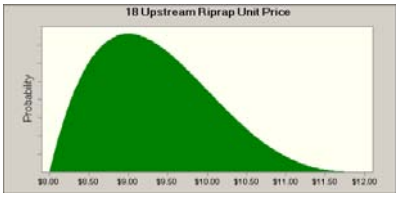
Mean	2,220	(=L31)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

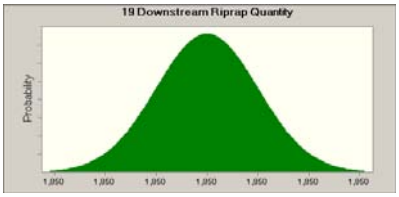
Minimum	$8.00	(=Q31)
Likeliest	$9.00	(=R31)
Maximum	$12.00	(=S31)



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

Normal distribution with parameters:

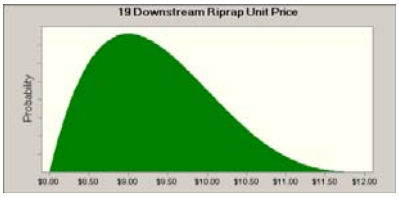
Mean	1,850	(=L32)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

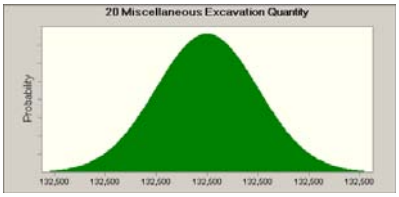
Minimum	$8.00	(=Q32)
Likeliest	$9.00	(=R32)
Maximum	$12.00	(=S32)



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

Normal distribution with parameters:

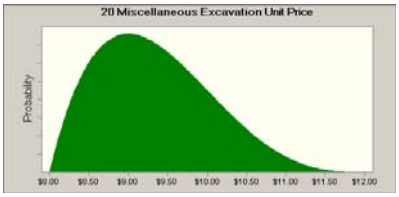
Mean	132,500	(=L33)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

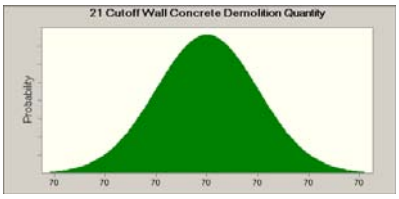
Minimum	$8.00	(=Q33)
Likeliest	$9.00	(=R33)
Maximum	$12.00	(=S33)



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**

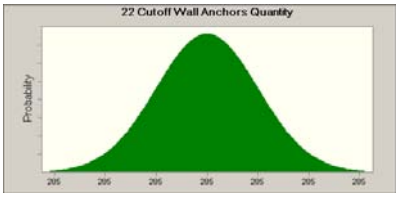
BetaPERT distribution with parameters:

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**

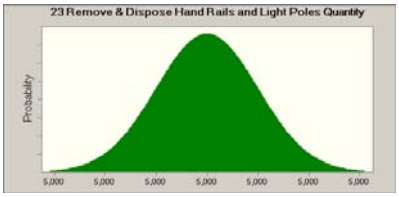
BetaPERT distribution with parameters:

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**

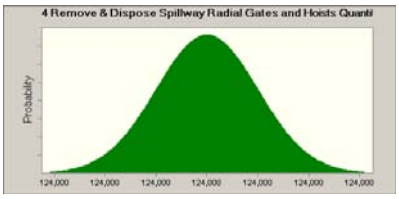
BetaPERT distribution with parameters:

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:

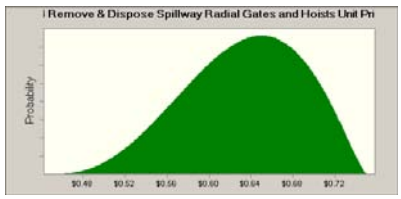
Mean	124,000	(=L37)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

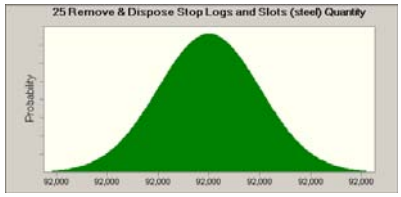
Minimum	$0.45	(=Q37)
Likeliest	$0.65	(=R37)
Maximum	$0.75	(=S37)



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

Normal distribution with parameters:

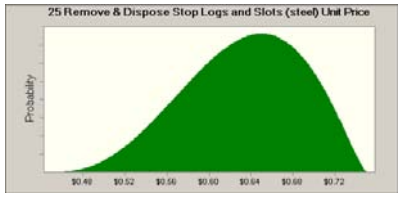
Mean	92,000	(=L38)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

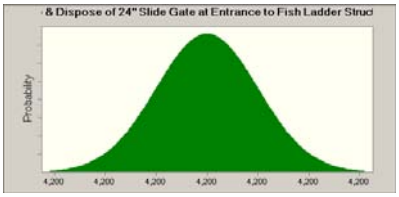
Minimum	$0.45	(=Q38)
Likeliest	$0.65	(=R38)
Maximum	$0.75	(=S38)



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**

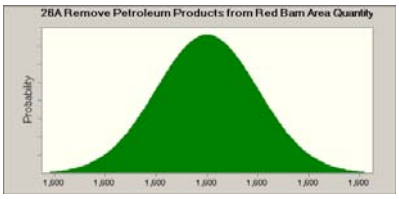
BetaPERT distribution with parameters:

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:

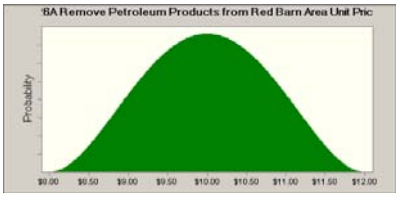
Mean	1,600	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 26A Remove Petroleum Products from Red Barn Area Unit Price **Cell: R40**

BetaPERT distribution with parameters:

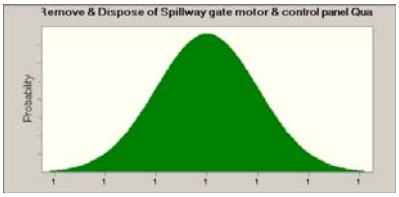
Minimum	$8.00	(=Q40)
Likeliest	$10.00	(=R40)
Maximum	$12.00	(=S40)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Quantity **Cell: L41**

Normal distribution with parameters:

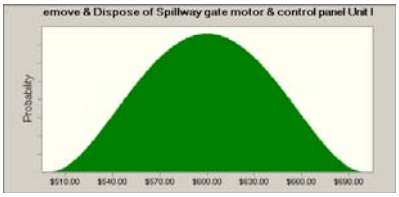
Mean	1	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove & Dispose of Spillway gate motor & control panel Unit Price **Cell: R41**

BetaPERT distribution with parameters:

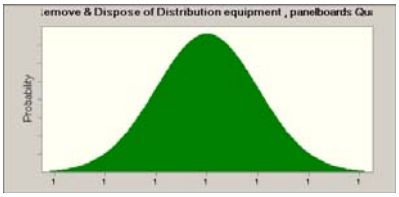
Minimum	$500.00	(=Q41)
Likeliest	$600.00	(=R41)
Maximum	$700.00	(=S41)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Quantity **Cell: L42**

Normal distribution with parameters:

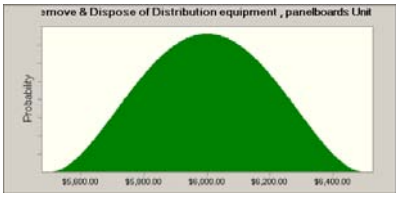
Mean	1	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove & Dispose of Distribution equipment , panelboards Unit Price **Cell: R42**

BetaPERT distribution with parameters:

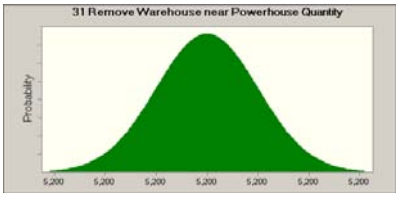
Minimum	$5,500.00	(=Q42)
Likeliest	$6,000.00	(=R42)
Maximum	$6,500.00	(=S42)



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**

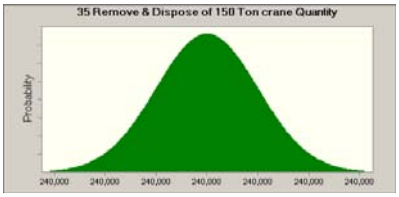
BetaPERT distribution with parameters:

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:

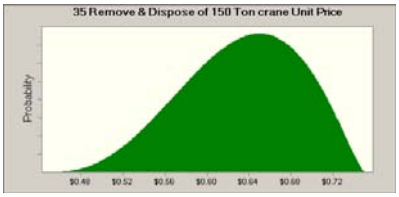
Mean	240,000	(=L49)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose of 150 Ton crane Unit Price **Cell: R49**

BetaPERT distribution with parameters:

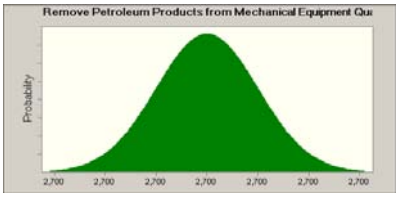
Minimum	$0.45	(=Q49)
Likeliest	$0.65	(=R49)
Maximum	$0.75	(=S49)



Assumption: 43A Remove Petroleum Products from Mechanical Equipment Quantity **Cell: L58**

Normal distribution with parameters:

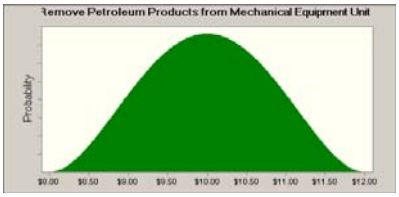
Mean	2,700	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 43A Remove Petroleum Products from Mechanical Equipment Unit Price **Cell: R58**

BetaPERT distribution with parameters:

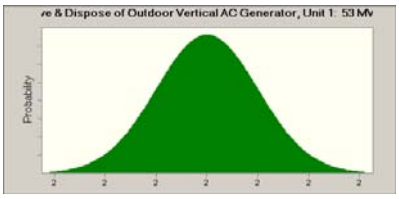
Minimum	$8.00	(=Q58)
Likeliest	$10.00	(=R58)
Maximum	$12.00	(=S58)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Qua **Cell: L59**

Normal distribution with parameters:

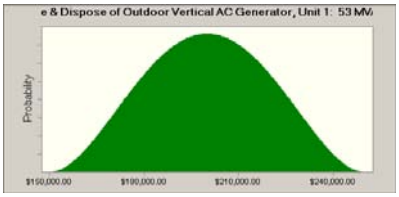
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA Cell: R59

BetaPERT distribution with parameters:

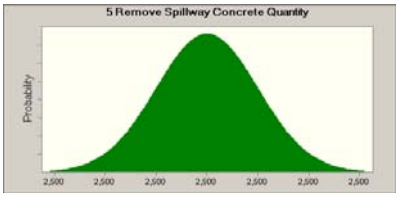
Minimum	$150,000.00	(=Q59)
Likeliest	$200,000.00	(=R59)
Maximum	$250,000.00	(=S59)



Assumption: 5 Remove Spillway Concrete Quantity Cell: L18

Normal distribution with parameters:

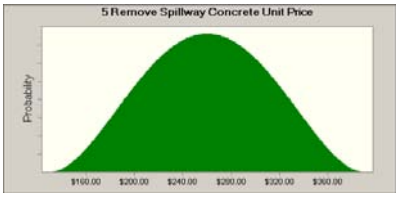
Mean	2,500	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Remove Spillway Concrete Unit Price Cell: R18

BetaPERT distribution with parameters:

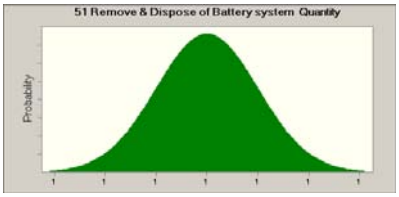
Minimum	$130.00	(=Q18)
Likeliest	$260.00	(=R18)
Maximum	$390.00	(=S18)



Assumption: 51 Remove & Dispose of Battery system Quantity **Cell: L66**

Normal distribution with parameters:

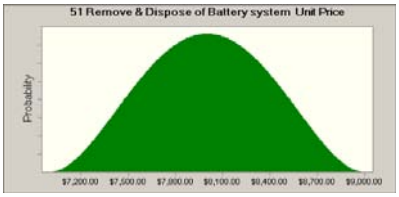
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose of Battery system Unit Price **Cell: R66**

BetaPERT distribution with parameters:

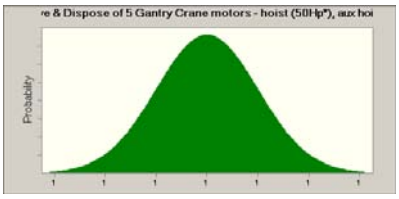
Minimum	$7,000.00	(=Q66)
Likeliest	$8,000.00	(=R66)
Maximum	$9,000.00	(=S66)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoi **Cell: L69**

Normal distribution with parameters:

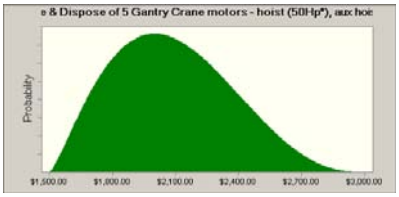
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist Cell: R69

BetaPERT distribution with parameters:

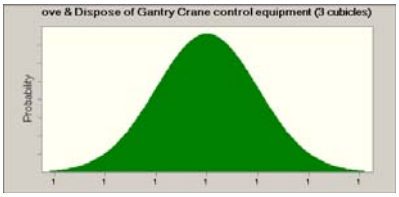
Minimum	$1,500.00	(=Q69)
Likeliest	$2,000.00	(=R69)
Maximum	$3,000.00	(=S69)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Qty Cell: L70

Normal distribution with parameters:

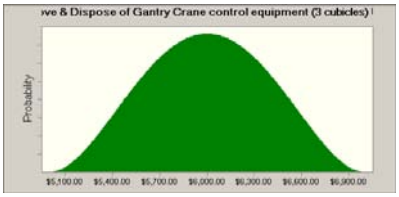
Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose of Gantry Crane control equipment (3 cubicles) Unit Price Cell: R70

BetaPERT distribution with parameters:

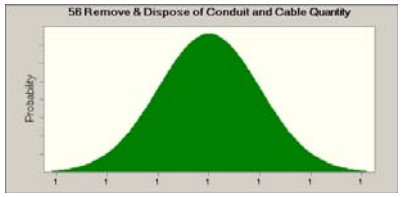
Minimum	$5,000.00	(=Q70)
Likeliest	$6,000.00	(=R70)
Maximum	$7,000.00	(=S70)



Assumption: 56 Remove & Dispose of Conduit and Cable Quantity **Cell: L71**

Normal distribution with parameters:

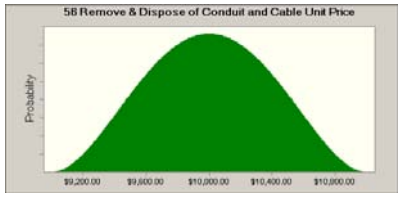
Mean	1	(=L71)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose of Conduit and Cable Unit Price **Cell: R71**

BetaPERT distribution with parameters:

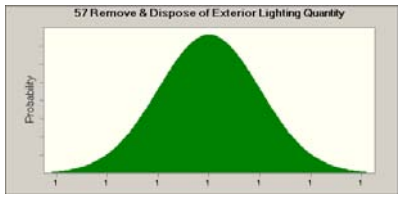
Minimum	$9,000.00	(=Q71)
Likeliest	$10,000.00	(=R71)
Maximum	$11,000.00	(=S71)



Assumption: 57 Remove & Dispose of Exterior Lighting Quantity **Cell: L72**

Normal distribution with parameters:

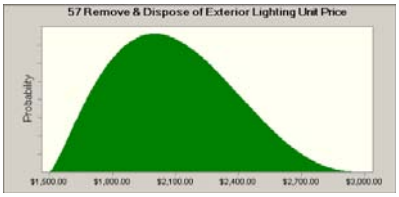
Mean	1	(=L72)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose of Exterior Lighting Unit Price **Cell: R72**

BetaPERT distribution with parameters:

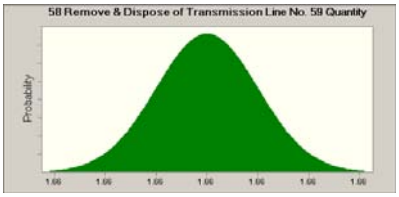
Minimum	$1,500.00	(=Q72)
Likeliest	$2,000.00	(=R72)
Maximum	$3,000.00	(=S72)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Quantity **Cell: L73**

Normal distribution with parameters:

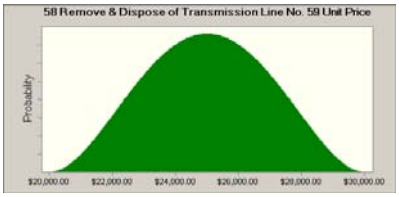
Mean	1.66	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 58 Remove & Dispose of Transmission Line No. 59 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

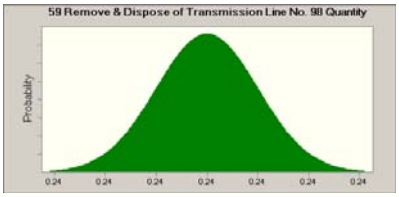
Minimum	$20,000.00	(=Q73)
Likeliest	$25,000.00	(=R73)
Maximum	$30,000.00	(=S73)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Quantity **Cell: L74**

Normal distribution with parameters:

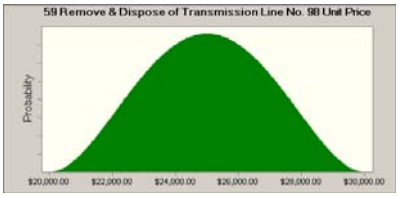
Mean	0.24	(=L74)
Std. Dev.	0.00	(=0.000001)



Assumption: 59 Remove & Dispose of Transmission Line No. 98 Unit Price **Cell: R74**

BetaPERT distribution with parameters:

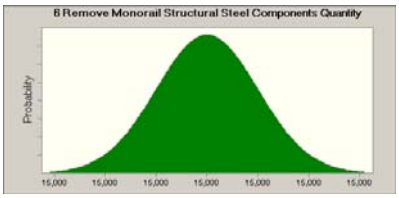
Minimum	$20,000.00	(=Q74)
Likeliest	$25,000.00	(=R74)
Maximum	$30,000.00	(=S74)



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

Normal distribution with parameters:

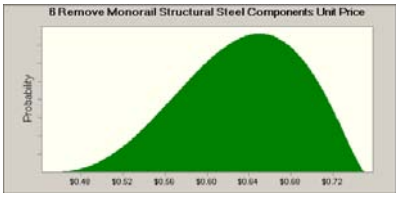
Mean	15,000	(=L19)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

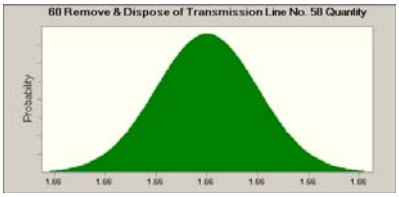
Minimum	$0.45	(=Q19)
Likeliest	$0.65	(=R19)
Maximum	$0.75	(=S19)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Quantity **Cell: L75**

Normal distribution with parameters:

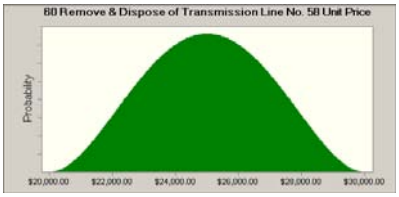
Mean	1.66	(=L75)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose of Transmission Line No. 58 Unit Price **Cell: R75**

BetaPERT distribution with parameters:

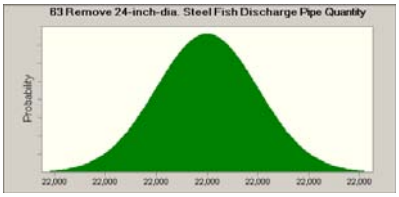
Minimum	$20,000.00	(=Q75)
Likeliest	$25,000.00	(=R75)
Maximum	$30,000.00	(=S75)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Quantity **Cell: L78**

Normal distribution with parameters:

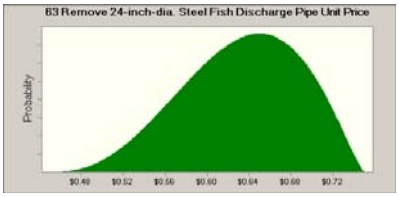
Mean	22,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 63 Remove 24-inch-dia. Steel Fish Discharge Pipe Unit Price **Cell: R78**

BetaPERT distribution with parameters:

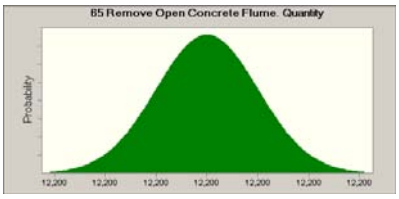
Minimum	$0.45	(=Q78)
Likeliest	$0.65	(=R78)
Maximum	$0.75	(=S78)



Assumption: 65 Remove Open Concrete Flume. Quantity **Cell: L80**

Normal distribution with parameters:

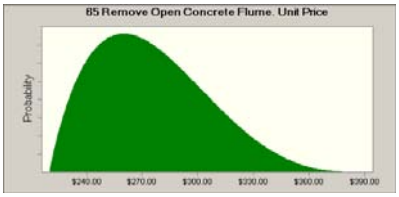
Mean	12,200	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove Open Concrete Flume. Unit Price **Cell: R80**

BetaPERT distribution with parameters:

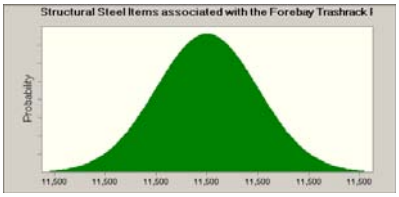
Minimum	$220.00	(=Q80)
Likeliest	$260.00	(=R80)
Maximum	$390.00	(=S80)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: L81**

Normal distribution with parameters:

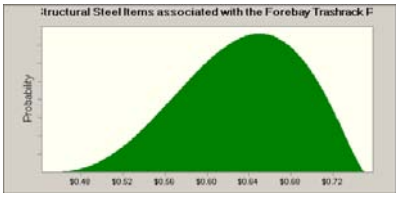
Mean	11,500	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove Structural Steel Items associated with the Forebay Trashrack Price **Cell: R81**

BetaPERT distribution with parameters:

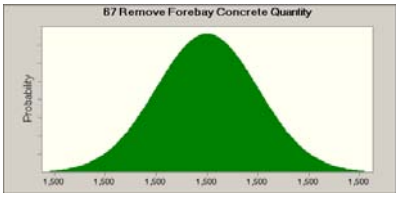
Minimum	$0.45	(=Q81)
Likeliest	$0.65	(=R81)
Maximum	$0.75	(=S81)



Assumption: 67 Remove Forebay Concrete Quantity **Cell: L82**

Normal distribution with parameters:

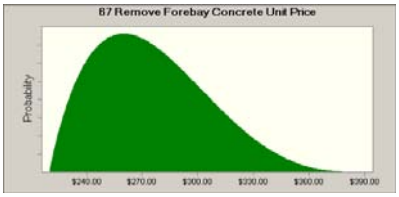
Mean	1,500	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove Forebay Concrete Unit Price **Cell: R82**

BetaPERT distribution with parameters:

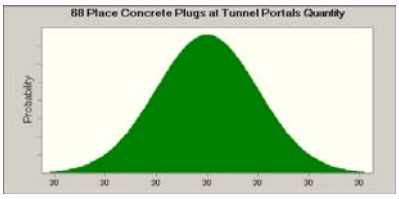
Minimum	$220.00	(=Q82)
Likeliest	$260.00	(=R82)
Maximum	$390.00	(=S82)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Quantity **Cell: L83**

Normal distribution with parameters:

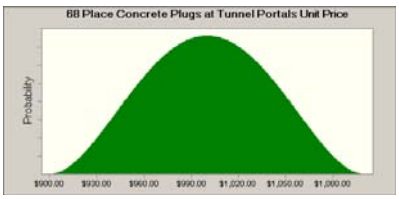
Mean	30	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 68 Place Concrete Plugs at Tunnel Portals Unit Price **Cell: R83**

BetaPERT distribution with parameters:

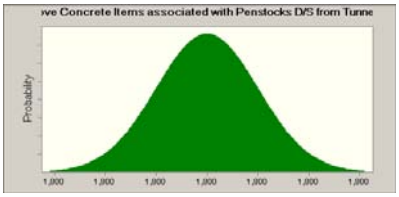
Minimum	$900.00	(=Q83)
Likeliest	$1,000.00	(=R83)
Maximum	$1,100.00	(=S83)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Quan **Cell: L84**

Normal distribution with parameters:

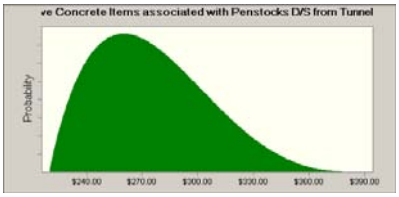
Mean	1,800	(=L84)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove Concrete Items associated with Penstocks D/S from Tunnel Unit P **Cell: R84**

BetaPERT distribution with parameters:

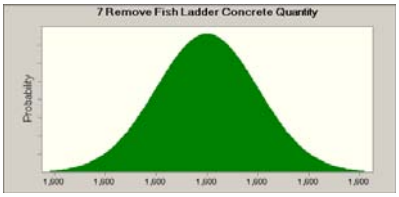
Minimum	$220.00	(=Q84)
Likeliest	$260.00	(=R84)
Maximum	$390.00	(=S84)



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**

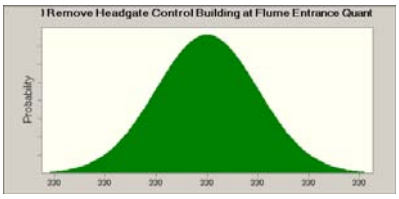
BetaPERT distribution with parameters:

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:

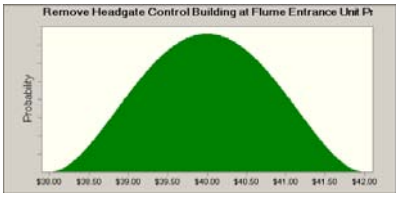
Mean	330	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove Headgate Control Building at Flume Entrance Unit Price **Cell: R85**

BetaPERT distribution with parameters:

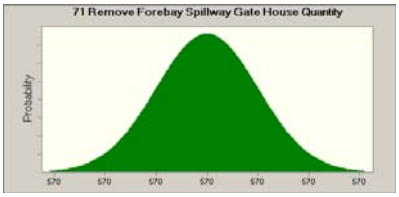
Minimum	$38.00	(=Q85)
Likeliest	$40.00	(=R85)
Maximum	$42.00	(=S85)



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**

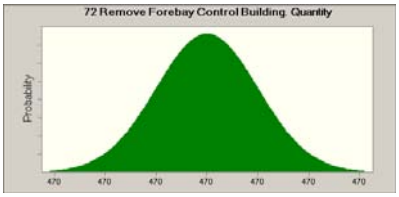
BetaPERT distribution with parameters:

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**

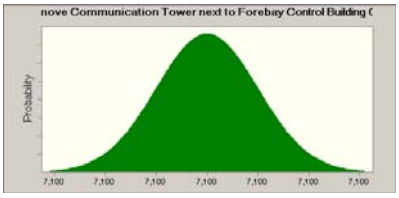
BetaPERT distribution with parameters:

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:

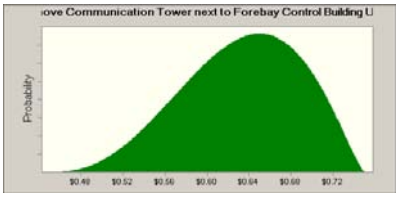
Mean	7,100	(=L88)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove Communication Tower next to Forebay Control Building UnitPrice **Cell: R88**

BetaPERT distribution with parameters:

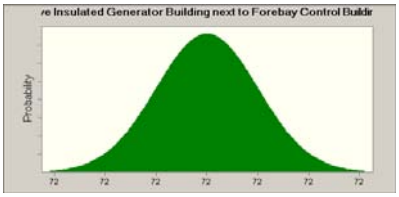
Minimum	$0.45	(=Q88)
Likeliest	$0.65	(=R88)
Maximum	$0.75	(=S88)



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 UnitPr **Cell: R89**

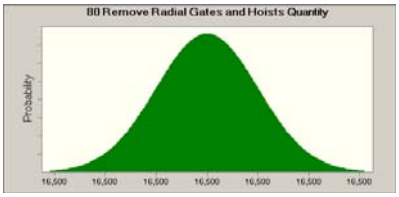
BetaPERT distribution with parameters:

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:

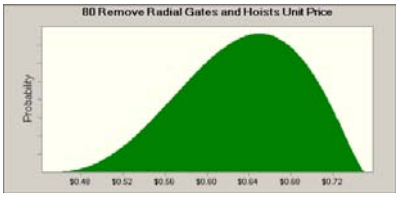
Mean	16,500	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: 80 Remove Radial Gates and Hoists Unit Price **Cell: R95**

BetaPERT distribution with parameters:

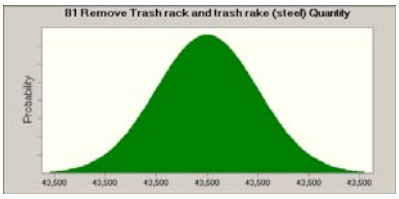
Minimum	$0.45	(=Q95)
Likeliest	$0.65	(=R95)
Maximum	$0.75	(=S95)



Assumption: 81 Remove Trash rack and trash rake (steel) Quantity **Cell: L96**

Normal distribution with parameters:

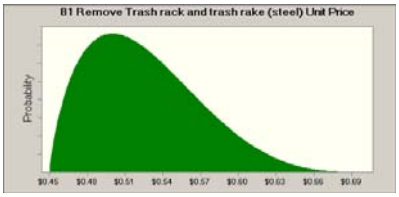
Mean	43,500	(=L96)
Std. Dev.	0	(=0.000001)



Assumption: 81 Remove Trash rack and trash rake (steel) Unit Price **Cell: R96**

BetaPERT distribution with parameters:

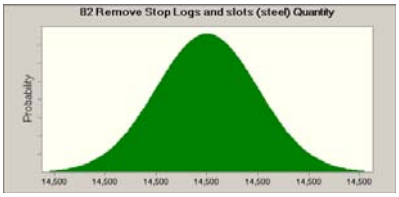
Minimum	$0.45	(=Q96)
Likeliest	$0.50	(=R96)
Maximum	$0.70	(=S96)



Assumption: 82 Remove Stop Logs and slots (steel) Quantity **Cell: L97**

Normal distribution with parameters:

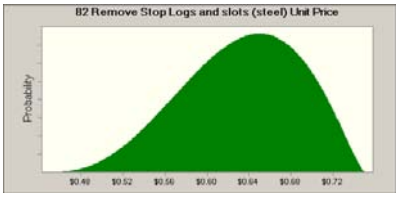
Mean	14,500	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: 82 Remove Stop Logs and slots (steel) Unit Price **Cell: R97**

BetaPERT distribution with parameters:

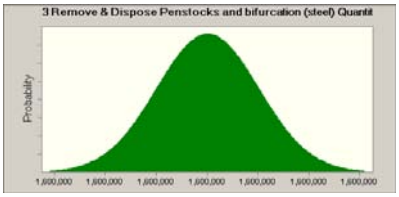
Minimum	$0.45	(=Q97)
Likeliest	$0.65	(=R97)
Maximum	$0.75	(=S97)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Quantity **Cell: L98**

Normal distribution with parameters:

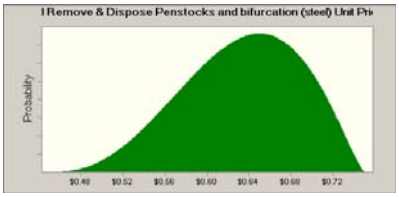
Mean	1,600,000	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: 83 Remove & Dispose Penstocks and bifurcation (steel) Unit Price **Cell: R98**

BetaPERT distribution with parameters:

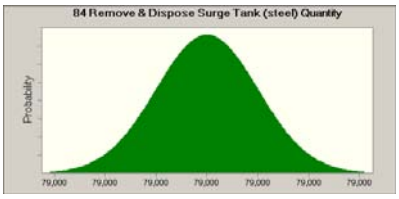
Minimum	$0.45	(=Q98)
Likeliest	$0.65	(=R98)
Maximum	$0.75	(=S98)



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**

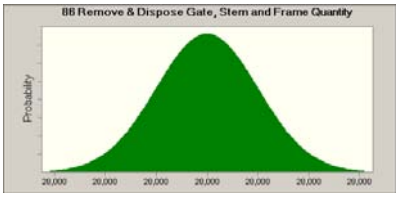
BetaPERT distribution with parameters:

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:

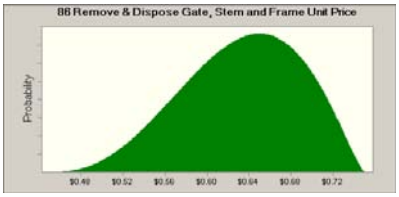
Mean	28,000	(=L101)
Std. Dev.	0	(=0.000001)



Assumption: 86 Remove & Dispose Gate, Stem and Frame Unit Price **Cell: R101**

BetaPERT distribution with parameters:

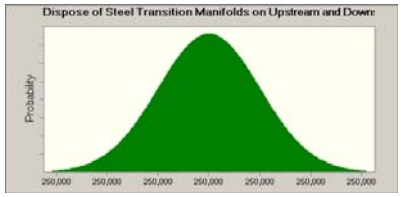
Minimum	$0.45	(=Q101)
Likeliest	$0.65	(=R101)
Maximum	$0.75	(=S101)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs Cell: L102

Normal distribution with parameters:

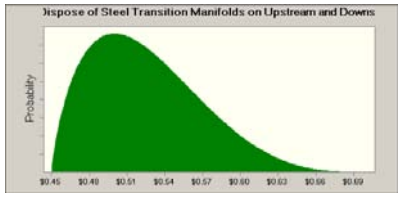
Mean	250,000	(=L102)
Std. Dev.	0	(=0.000001)



Assumption: 87 Remove & Dispose of Steel Transition Manifolds on Upstream and Downs Cell: R102

BetaPERT distribution with parameters:

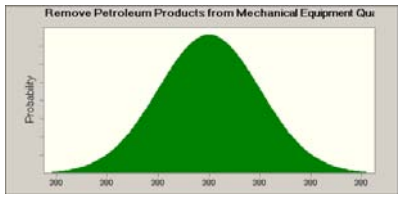
Minimum	$0.45	(=Q102)
Likeliest	$0.50	(=R102)
Maximum	$0.70	(=S102)



Assumption: 87A Remove Petroleum Products from Mechanical Equipment Quantity Cell: L103

Normal distribution with parameters:

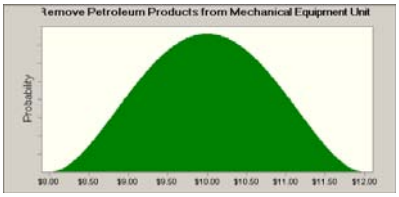
Mean	380	(=L103)
Std. Dev.	0	(=0.000001)



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**

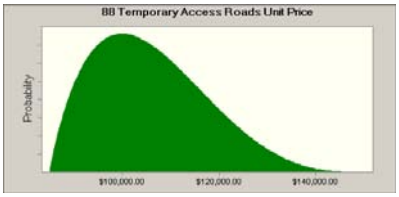
Normal distribution with parameters:

Mean	2	(=L104)
Std. Dev.	0	(=0.000001)

Assumption: 88 Temporary Access Roads Unit Price **Cell: R104**

BetaPERT distribution with parameters:

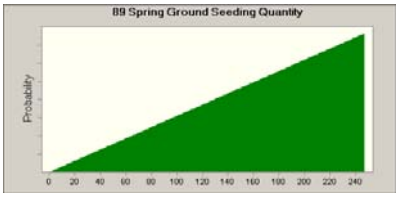
Minimum	$85,000.00	(=Q104)
Likeliest	$100,000.00	(=S104)
Maximum	$150,000.00	(=R104)



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**

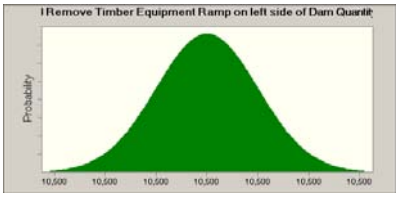
BetaPERT distribution with parameters:

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:

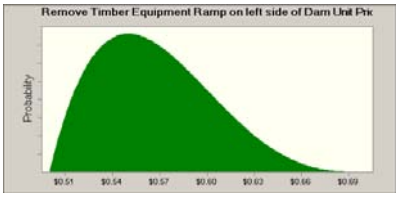
Mean	10,500	(=L22)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

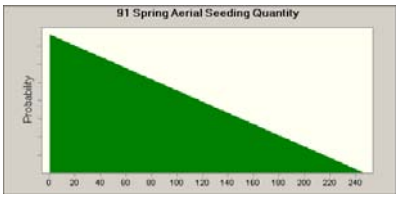
Minimum	$0.50	(=Q22)
Likeliest	$0.55	(=R22)
Maximum	$0.70	(=S22)



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**

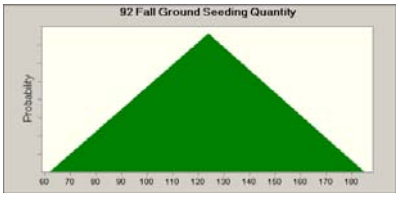
BetaPERT distribution with parameters:

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**

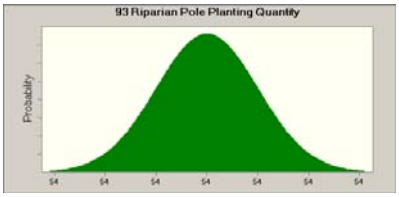
BetaPERT distribution with parameters:

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:

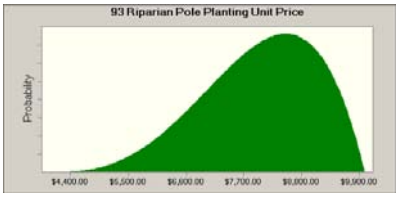
Mean	54	(=L109)
Std. Dev.	0	(=0.000001)



Assumption: 93 Riparian Pole Planting Unit Price **Cell: R109**

BetaPERT distribution with parameters:

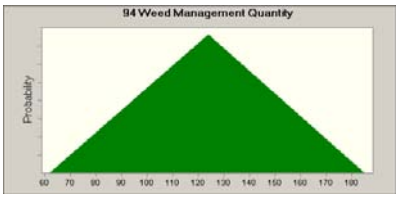
Minimum	$4,000.00	(=Q109)
Likeliest	$8,500.00	(=R109)
Maximum	$10,000.00	(=S109)



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**

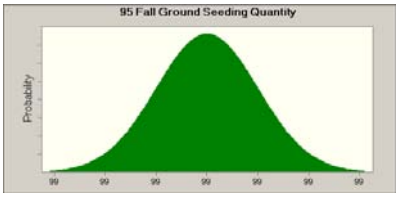
BetaPERT distribution with parameters:

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**

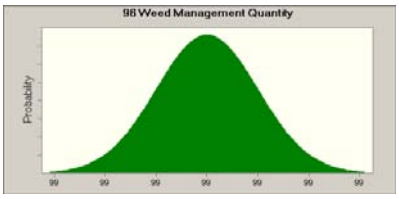
BetaPERT distribution with parameters:

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**

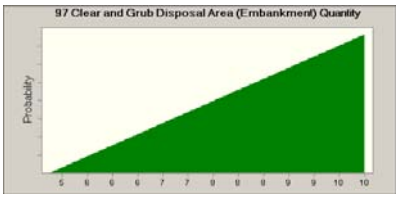
BetaPERT distribution with parameters:

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:

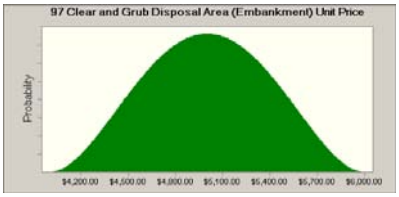
Minimum	5	(=M113)
Likeliest	10	(=L113)
Maximum	10	(=K113)



Assumption: 97 Clear and Grub Disposal Area (Embankment) Unit Price **Cell: R113**

BetaPERT distribution with parameters:

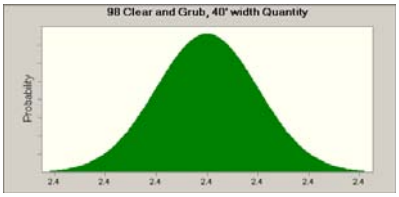
Minimum	$4,000.00	(=Q113)
Likeliest	$5,000.00	(=R113)
Maximum	$6,000.00	(=S113)



Assumption: 98 Clear and Grub, 40' width Quantity **Cell: L114**

Normal distribution with parameters:

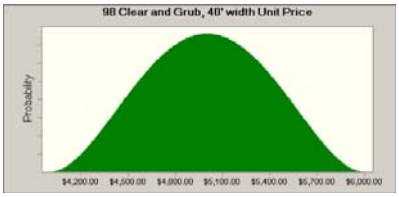
Mean	2.4	(=L114)
Std. Dev.	0.0	(=0.000001)



Assumption: 98 Clear and Grub, 40' width Unit Price **Cell: R114**

BetaPERT distribution with parameters:

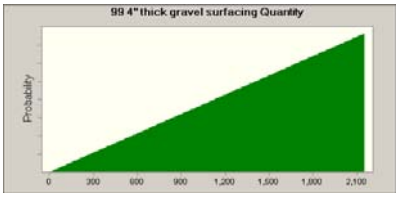
Minimum	$4,000.00	(=Q114)
Likeliest	$5,000.00	(=R114)
Maximum	$6,000.00	(=S114)



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**

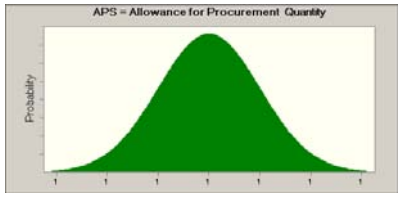
BetaPERT distribution with parameters:

Minimum	$20.00	(=Q115)
Likeliest	$30.00	(=R115)
Maximum	$40.00	(=S115)

Assumption: APS = Allowance for Procurement Quantity **Cell: L143**

Normal distribution with parameters:

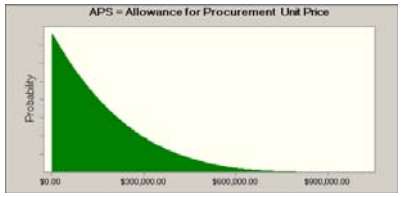
Mean	1	(=L143)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R143**

BetaPERT distribution with parameters:

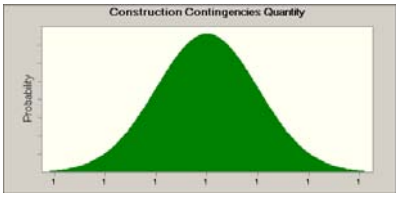
Minimum	$0.00	(=Q143)
Likeliest	$0.00	(=R143)
Maximum	$1,025,928.00	(=S143)



Assumption: Construction Contingencies Quantity **Cell: L146**

Normal distribution with parameters:

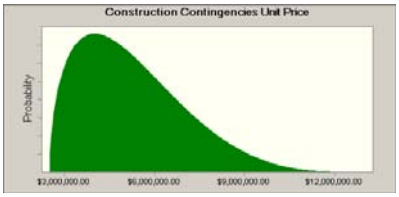
Mean	1	(=L146)
Std. Dev.	0	(=0.000001)



Assumption: Construction Contingencies Unit Price **Cell: R146**

BetaPERT distribution with parameters:

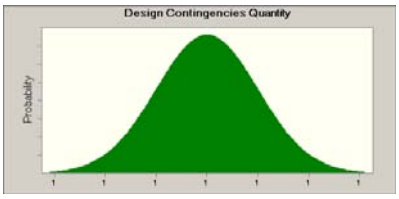
Minimum	$2,500,000.00	(=Q146)
Likeliest	$4,000,000.00	(=R146)
Maximum	$13,000,000.00	(=S146)



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**

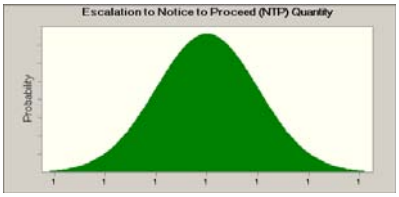
BetaPERT distribution with parameters:

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:

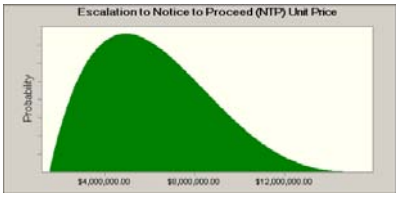
Mean	1	(=L139)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R139**

BetaPERT distribution with parameters:

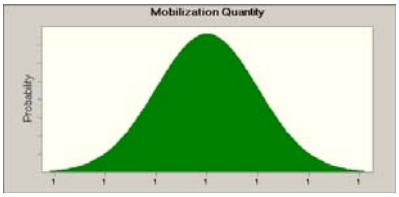
Minimum	$1,551,687.00	(=Q139)
Likeliest	$4,929,280.00	(=R139)
Maximum	$15,536,968.00	(=S139)



Assumption: Mobilization Quantity **Cell: L137**

Normal distribution with parameters:

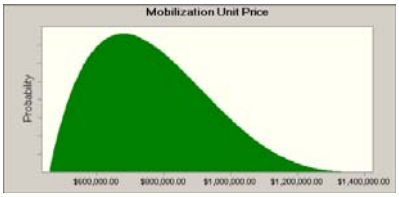
Mean	1	(=L137)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R137**

BetaPERT distribution with parameters:

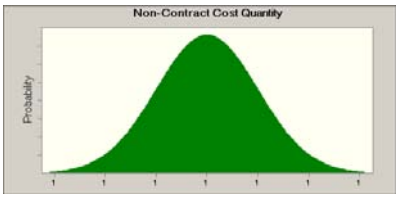
Minimum	$460,000.00	(=Q137)
Likeliest	$680,000.00	(=R137)
Maximum	$1,400,000.00	(=S137)



Assumption: Non-Contract Cost Quantity **Cell: L148**

Normal distribution with parameters:

Mean	1	(=L148)
Std. Dev.	0	(=0.000001)

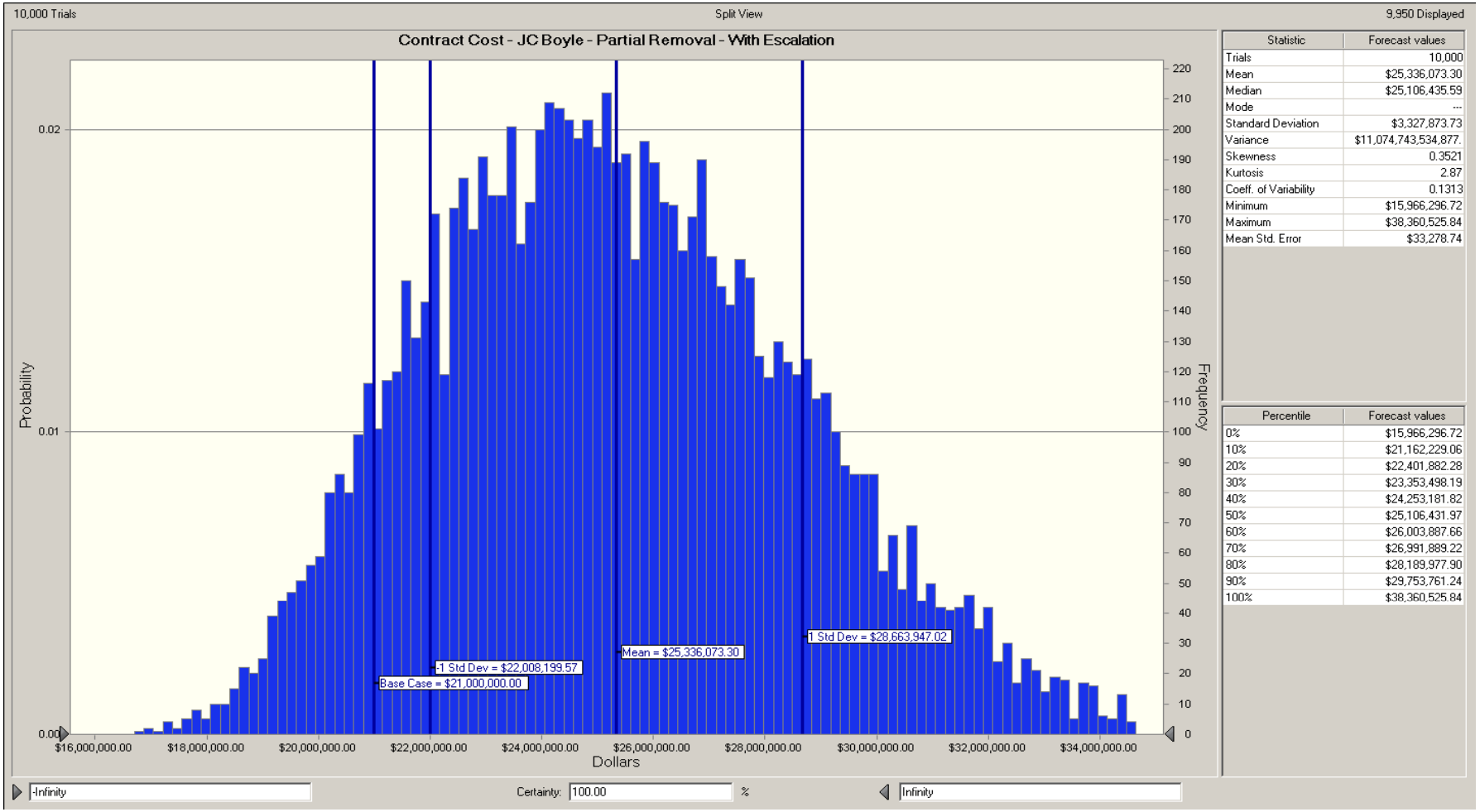


Assumption: Non-Contract Cost Unit Price **Cell: R148**

BetaPERT distribution with parameters:

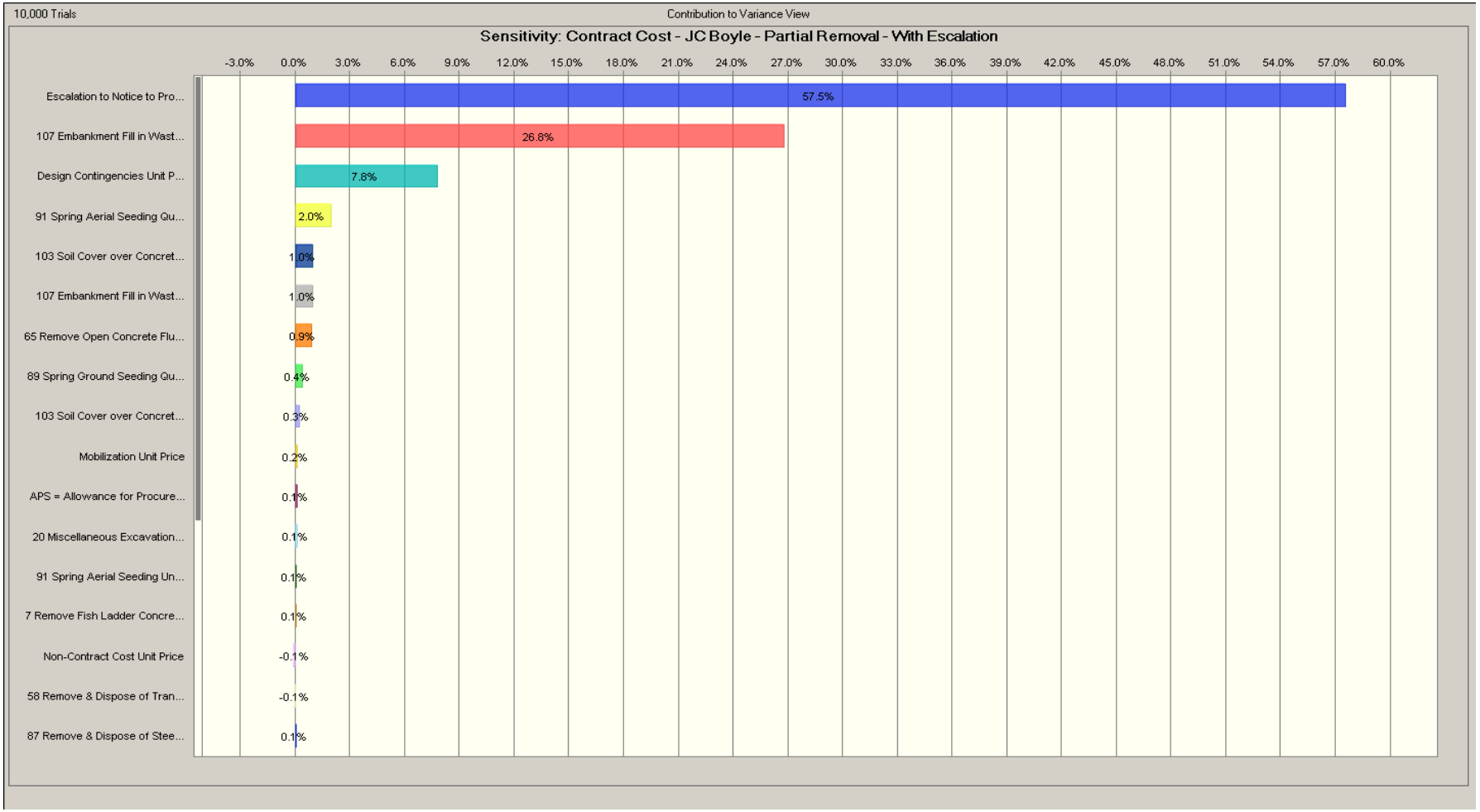
Minimum	$8,500,000.00	(=Q148)
Likeliest	$16,000,000.00	(=R148)
Maximum	$45,000,000.00	(=S148)

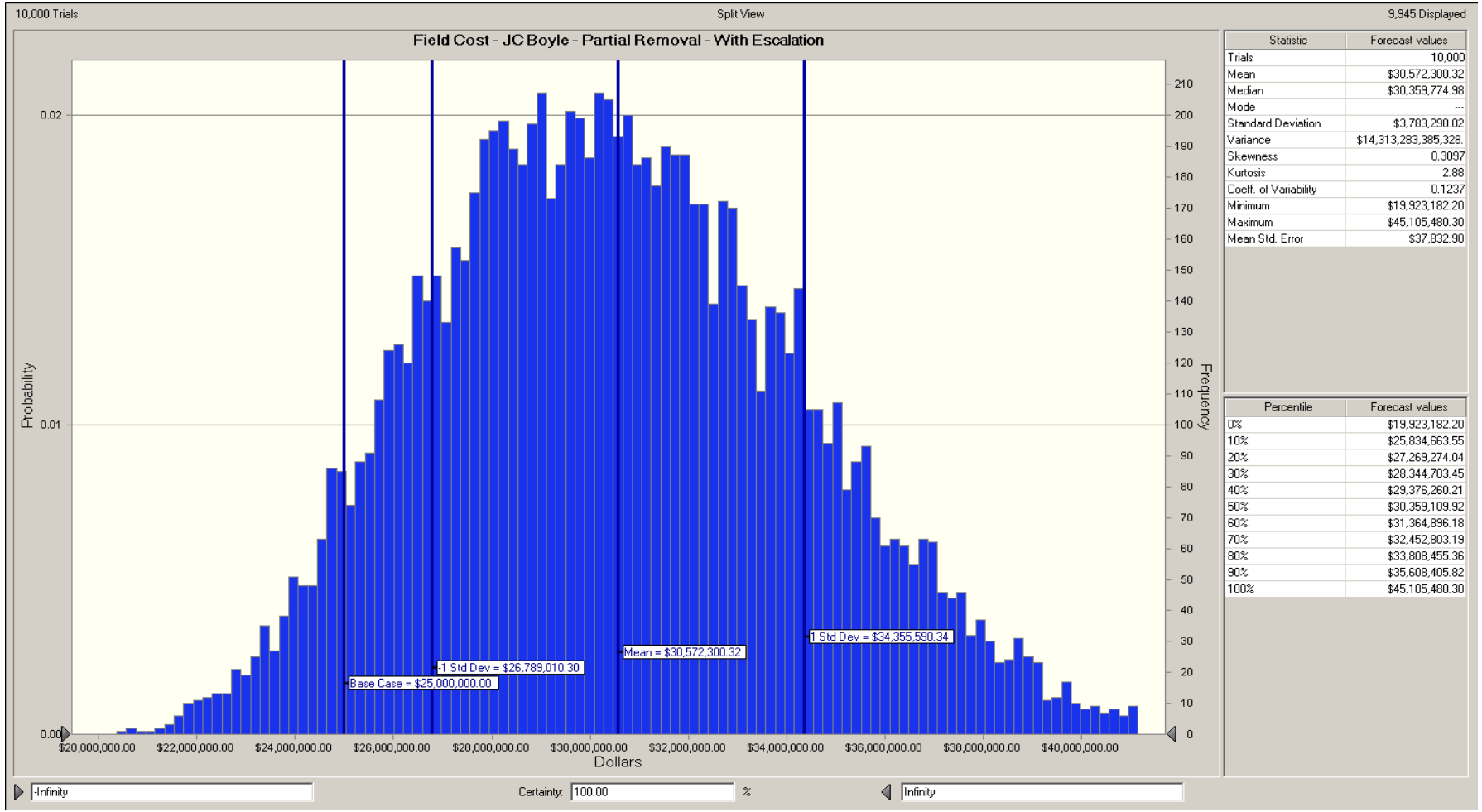
End of Assumptions



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

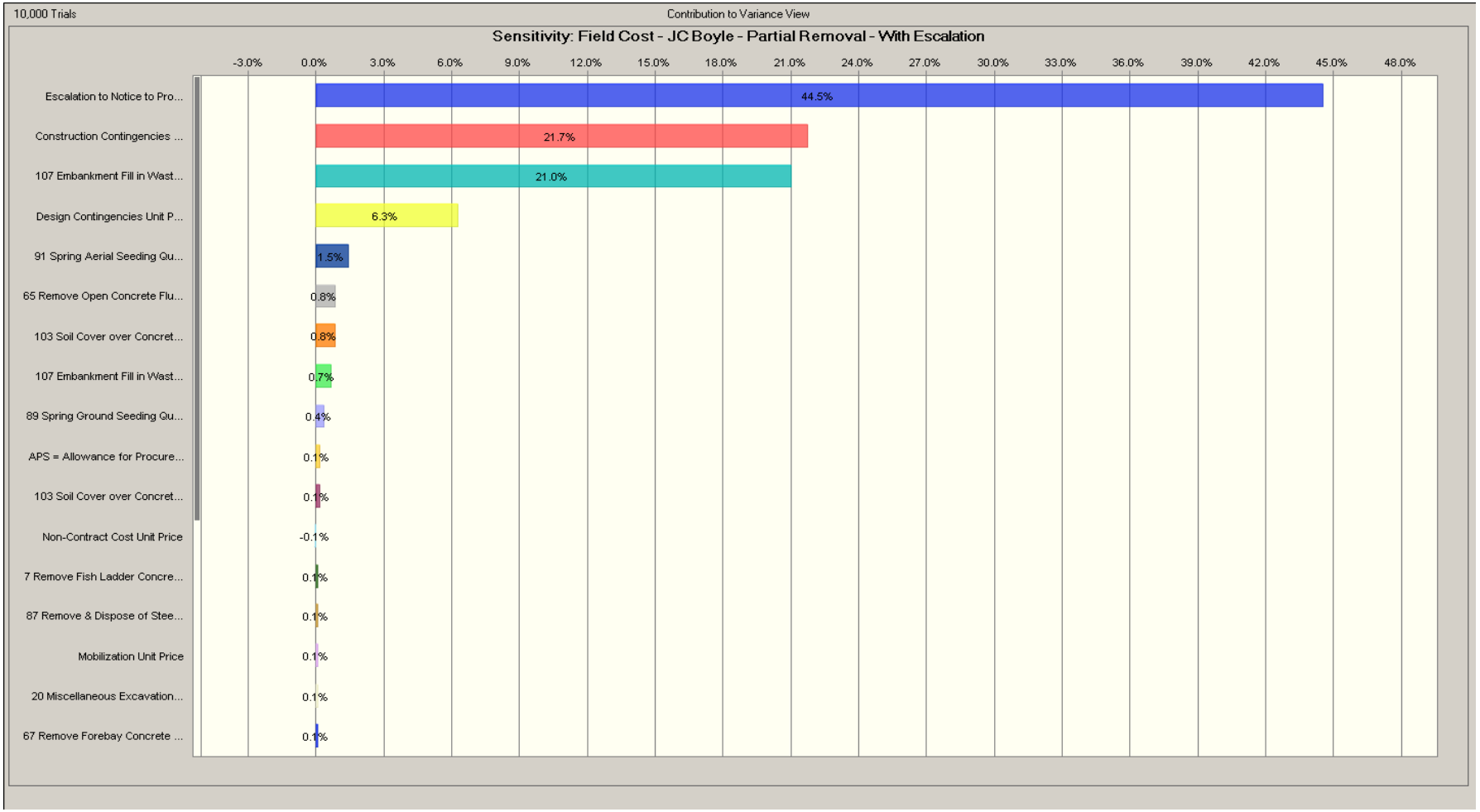
Percentile	Forecast values
0%	$15,966,296.72
10%	$21,162,229.06
20%	$22,401,882.28
30%	$23,353,498.19
40%	$24,253,181.82
50%	$25,106,431.97
60%	$26,003,887.66
70%	$26,991,889.22
80%	$28,189,977.90
90%	$29,753,761.24
100%	$38,360,525.84

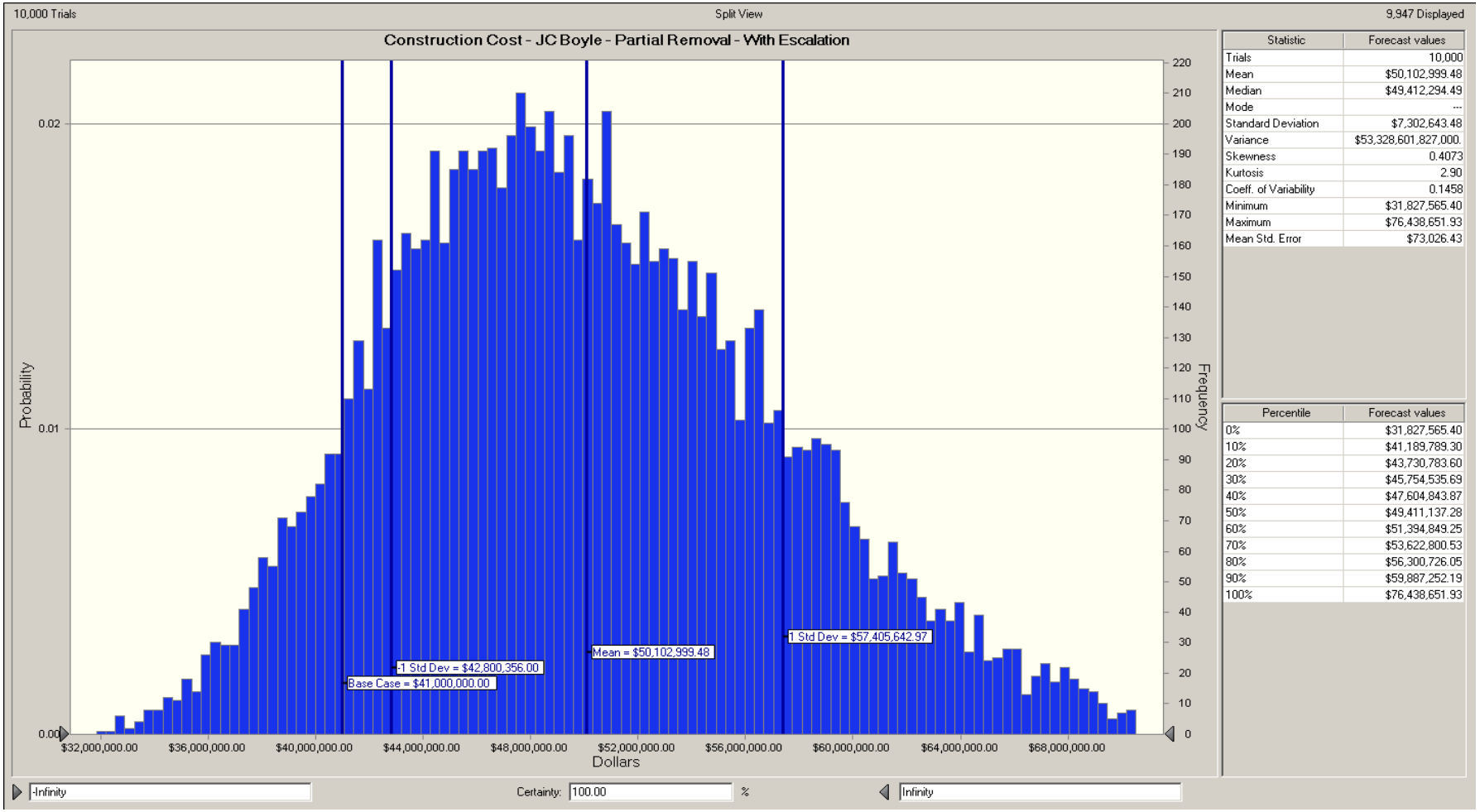

10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - JC Boyle - Partial Removal - With Escalation
-3.0% 0.0% 3.0% 6.0% 9.0% 12.0% 15.0% 18.0% 21.0% 24.0% 27.0% 30.0% 33.0% 36.0% 39.0% 42.0% 45.0% 48.0% 51.0% 54.0% 57.0% 60.0%
Escalation to Notice to Pro... 57.5%
107 Embankment Fill 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

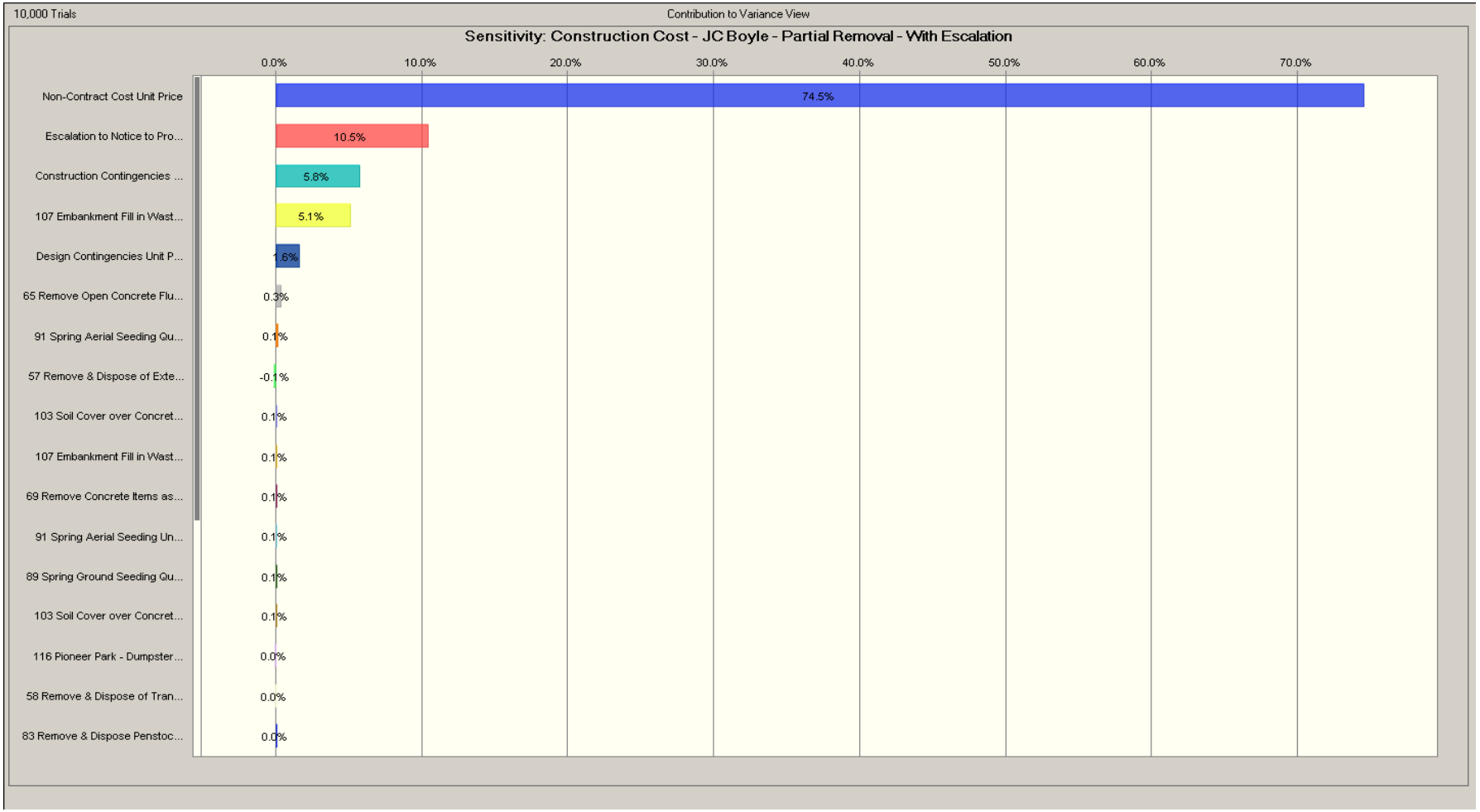
Percentile	Forecast values
0%	$19,923,182.20
10%	$25,834,663.55
20%	$27,269,274.04
30%	$28,344,703.45
40%	$29,376,260.21
50%	$30,359,109.92
60%	$31,364,896.18
70%	$32,452,803.19
80%	$33,808,455.36
90%	$35,608,405.82
100%	$45,105,480.30


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%