BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

REVISION #1
Klamath River Dams Removal
Full Removal Option
Copco No. 2 Dam & Powerplant Removal
Escalation Included
SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

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

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	1	Construct and Remove Embankment Cofferdam-Right Side of Dam	8130	3,100	3,100	3,100	CY	$70.00	$85.00	$130.00	$217,000.00	$263,500.00	$403,000.00
	2	Furnish, Install and Remove Riprap	8130	465	465	465	CY	$120.00	$150.00	$200.00	$55,800.00	$69,750.00	$93,000.00
	3	Provide Dewatering behind Cofferdams	8130	1	1	1	LS	$40,000.00	$45,000.00	$300,000.00	$40,000.00	$45,000.00	$300,000.00
	4	Remove Water from behind Cofferdams	8130	241,000	241,000	241,000	GAL	$0.01	$0.01	$0.01	$2,410.00	$2,410.00	$2,410.00
	5	Construct and Remove Embankment Cofferdam-Left Side of Dam	8130	1,100	1,100	1,100	CY	$70.00	$85.00	$130.00	$77,000.00	$93,500.00	$143,000.00
	6	Furnish, Install and Remove Riprap	8130	250	250	250	CY	$120.00	$150.00	$200.00	$30,000.00	$37,500.00	$50,000.00
	7	Provide Dewatering behind Left Side Cofferdam	8130	1	1	1	LS	$40,000.00	$45,000.00	$300,000.00	$40,000.00	$45,000.00	$300,000.00
	8	Remove Water from behind Cofferdam	8130	36,000	36,000	36,000	GAL	$0.04	$0.05	$0.08	$1,440.00	$1,800.00	$2,880.00
	9	Remove Water from behind Tailrace Cofferdam	8130	400,000	400,000	400,000	GAL	$0.01	$0.01	$0.01	$4,000.00	$4,000.00	$4,000.00
	10	Provide Dewatering behind Tailrace Cofferdam	8130	1	1	1	LS	$30,000.00	$35,000.00	$250,000.00	$30,000.00	$35,000.00	$250,000.00
	11	Construct Embankment Cofferdam across Tailrace	8130	1,700	1,700	1,700	CY	$70.00	$85.00	$130.00	$119,000.00	$144,500.00	$221,000.00
	12	Construct 240-ft-long, 2-span concrete Bridge	8130	0	0	7,440	SF	$200.00	$300.00	$600.00	$0.00	$0.00	$4,464,000.00
	13	Remove and dispose of existing bridge	8130	0	0	1	LS	$300,000.00	$400,000.00	$800,000.00	$0.00	$0.00	$800,000.00
	14	Remove Concrete in Dam	8130	4,400	4,400	4,400	CY	$270.00	$315.00	$500.00	$1,188,000.00	$1,386,000.00	$2,200,000.00
	15	Remove concrete equipment slab from top of embankment wing dam on right abutment	8130	5	5	5	CY	$170.00	$215.00	$380.00	$850.00	$1,075.00	$1,900.00
	16	Remove Concrete Wingwall	8130	220	220	220	CY	$170.00	$215.00	$380.00	$37,400.00	$47,300.00	$83,600.00
	17	Right Abutment Removal - Random Fill	8313	1,200	1,200	1,200	CY	$13.00	$15.00	$18.00	$15,600.00	$18,000.00	$21,600.00
	18	Right Abutment Removal - Remove Hand Placed Riprap	8313	7,800	7,800	7,800	SF	$0.85	$1.00	$1.30	$6,630.00	$7,800.00	$10,140.00
	19	Right Abutment Removal - Gunite Curtain Wall	8313	210	210	210	CY	$170.00	$215.00	$380.00	$35,700.00	$45,150.00	$79,800.00
	20	Remove & Dispose - Hand Rails and Light Poles	8420	5,000	5,000	5,000	LBS	$0.60	$0.85	$1.00	$3,000.00	$4,250.00	$5,000.00
	21	Remove & Dispose - Radial Gates and Hoists	8420	66,000	66,000	66,000	LBS	$0.60	$0.85	$1.00	$39,600.00	$56,100.00	$66,000.00
	22	Remove & Dispose - 5-Raidal Gate stoplogs & slots (steel)	8420	95,800	95,800	95,800	LBS	$0.60	$0.85	$1.00	$57,480.00	$81,430.00	$95,800.00
	23	Remove & Dispose - Spillway intake gate motor & control panel	8430	1	1	1	EA	$900.00	$1,000.00	$1,500.00	$900.00	$1,000.00	$1,500.00
	24	Remove & Dispose - Spillway radial gate motors & control panel	8430	1	1	1	EA	$900.00	$1,000.00	$1,500.00	$900.00	$1,000.00	$1,500.00
	25	Remove & Dispose - Spillway trashrake motor, festoon cable & control panel	8430	1	1	1	EA	$400.00	$500.00	$600.00	$400.00	$500.00	$600.00
	26	Remove & Dispose - Distribution equipment , panelboards	8430	1	1	1	EA	$4,000.00	$4,500.00	$5,000.00	$4,000.00	$4,500.00	$5,000.00
	27	Remove Copper Shingles from Roof of Powerhouse	8130	7,000	7,000	7,000	SF	$2.00	$2.50	$3.00	$14,000.00	$17,500.00	$21,000.00
	28	Remove Powerhouse Concrete down to spring-line of turbine	8130	1,050	1,050	1,050	CY	$270.00	$350.00	$1,000.00	$283,500.00	$367,500.00	$1,050,000.00
	29	Remove Structural Steel items associated with Powerhouse	8130	220,000	220,000	220,000	LBS	$0.60	$0.85	$1.00	$132,000.00	$187,000.00	$220,000.00
	30	Remove Control House Concrete	8130	30	30	30	CY	$170.00	$215.00	$380.00	$5,100.00	$6,450.00	$11,400.00
	31	Remove Control House Structural Steel items	8130	3,500	3,500	3,500	LBS	$0.60	$0.85	$1.00	$2,100.00	$2,975.00	$3,500.00
	32	Remove Shop Building	8130	3,600	3,600	3,600	SF	$55.00	$60.00	$65.00	$198,000.00	$216,000.00	$234,000.00
	33	Remove & Dispose - 2- Govenor oil systems	8420	38,000	38,000	38,000	LBS	$0.60	$0.85	$1.00	$22,800.00	$32,300.00	$38,000.00
	34	Remove & Dispose - Cooling water and bearing oil systems	8420	13,300	13,300	13,300	LBS	$0.60	$0.85	$1.00	$7,980.00	$11,305.00	$13,300.00
	35	Remove & Dispose - Oil / Water seperator tank and piping	8420	2,700	2,700	2,700	LBS	$0.60	$0.85	$1.00	$1,620.00	$2,295.00	$2,700.00
	36	Remove & Dispose - 12 - Cast Iron Columns	8420	54,000	54,000	54,000	LBS	$0.60	$0.85	$1.00	$32,400.00	$45,900.00	$54,000.00
	37	Remove & Dispose - 2 - Francis Turbines	8420	660,000	660,000	660,000	LBS	$0.60	$0.85	$1.00	$396,000.00	$561,000.00	$660,000.00
	38	Remove & Dispose - 2-40 Ton indoor crane	8420	140,000	140,000	140,000	LBS	$0.60	$0.85	$1.00	$84,000.00	$119,000.00	$140,000.00
	39	Remove & Dispose - Compressed Air systems	8420	1,000	1,000	1,000	LBS	$0.60	$0.85	$1.00	$600.00	$850.00	$1,000.00
	40	Remove & Dispose - 2 - CO2 systems	8420	2,100	2,100	2,100	LBS	$0.60	$0.85	$1.00	$1,260.00	$1,785.00	$2,100.00
	41	Remove & Dispose - Plant Water and Fire Protection	8420	3,100	3,100	3,100	LBS	$0.60	$0.85	$1.00	$1,860.00	$2,635.00	$3,100.00
	42	Remove & Dispose - Transformer Oil Fire protection	8420	6,500	6,500	6,500	LBS	$0.60	$0.85	$1.00	$3,900.00	$5,525.00	$6,500.00
	43	Remove & Dispose - Unwatering Piping	8420	32,000	32,000	32,000	LBS	$0.60	$0.85	$1.00	$19,200.00	$27,200.00	$32,000.00
	44	Remove & Dispose - Drainage Piping	8420	10,000	10,000	10,000	LBS	$0.60	$0.85	$1.00	$6,000.00	$8,500.00	$10,000.00
	45	Remove & Dispose - AC Generator, Indoor Vertical	8430	2	2	2	EA	$120,000.00	$125,000.00	$130,000.00	$240,000.00	$250,000.00	$260,000.00
	46	Remove & Dispose - Excitation equipment for 15 MVA Generator	8430	2	2	2	EA	$5,000.00	$6,000.00	$7,000.00	$10,000.00	$12,000.00	$14,000.00
	47	Remove & Dispose - Surge protection equip. for 15 MVA Generator	8430	2	2	2	EA	$1,500.00	$2,000.00	$3,000.00	$3,000.00	$4,000.00	$6,000.00

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SUMMARY ESTIMATE

PROJECT: Klamath River, Northern California/Southern Oregon

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

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	MPL QUANTITY	MP QUANTITY	MPH QUANTITY	UNIT	MPL UNIT PRICE	MP UNIT PRICE	MPH UNIT PRICE	MPL TOTAL	MP TOTAL	MPH TOTAL
	48	Remove & Dispose - Neutral grounding equip. for 15 MVA Generator	8430	2	2	2	EA	$1,500.00	$2,000.00	$3,000.00	$3,000.00	$4,000.00	$6,000.00
	49	Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers	8430	1	1	1	EA	$15,000.00	$20,000.00	$25,000.00	$15,000.00	$20,000.00	$25,000.00
	50	Remove & Dispose - Station Service Switchgear, 600 volt -(5 sections)	8430	1	1	1	EA	$15,000.00	$20,000.00	$25,000.00	$15,000.00	$20,000.00	$25,000.00
	51	Remove & Dispose - Unit and plant control switchboard	8430	1	1	1	EA	$14,000.00	$15,000.00	$17,000.00	$14,000.00	$15,000.00	$17,000.00
	52	Remove & Dispose - Battery system	8430	1	1	1	EA	$9,000.00	$10,000.00	$12,000.00	$9,000.00	$10,000.00	$12,000.00
	53	Remove & Dispose - Raceways, Conduit and Cable	8430	1	1	1	EA	$14,000.00	$15,000.00	$17,000.00	$14,000.00	$15,000.00	$17,000.00
	54	Remove & Dispose - Misc. power & control boards	8430	1	1	1	EA	$4,000.00	$5,000.00	$7,000.00	$4,000.00	$5,000.00	$7,000.00
	55	Remove & Dispose - 7 40-Ton Travelling Crane motors-hoist (2-30Hp*),	8430	1	1	1	EA	$2,000.00	$2,500.00	$3,000.00	$2,000.00	$2,500.00	$3,000.00
	56	Remove & Dispose - 40-Ton Travelling Crane control equipment	8430	1	1	1	EA	$9,000.00	$10,000.00	$12,000.00	$9,000.00	$10,000.00	$12,000.00
	57	Remove & Dispose - 40-Ton Travelling Crane Festoon Cable	8430	1	1	1	EA	$1,000.00	$1,500.00	$2,000.00	$1,000.00	$1,500.00	$2,000.00
	58	Remove & Dispose - Step-up Transformers, outdoor, oil-filled, 1-phase, 10/20 MVA 6600/72000 volt	8430	0	0	0	EA				$0.00	$0.00	$0.00
	59	Remove & Dispose - Step-up Transformers, outdoor, oil-filled, 1-phase, 10/20 MVA, 73800/230000 volt	8430	0	0	0	EA				$0.00	$0.00	$0.00
	60	Remove & Dispose - Transmission Line No. 15	8430	0.14	0.14	0.14	MILE	$25,000.00	$30,000.00	$40,000.00	$3,500.00	$4,200.00	$5,600.00
	61	Remove Intake Structure Concrete	8130	1,500	1,500	1,500	CY	$170.00	$215.00	$380.00	$255,000.00	$322,500.00	$570,000.00
	62	Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe	8130	1,300	1,300	1,300	CY	$170.00	$215.00	$380.00	$221,000.00	$279,500.00	$494,000.00
	63	Place Concrete Plugs for Tunnels	8130	100	100	100	CY	$1,100.00	$1,200.00	$1,300.00	$110,000.00	$120,000.00	$130,000.00
	64	Remove Concrete Items associated with Penstocks D/S from Tunnel No. 2	8130	3,500	3,500	3,500	CY	$170.00	$215.00	$380.00	$595,000.00	$752,500.00	$1,330,000.00
	65	Remove and Dispose of Caterpiller Gate (steel)	8420	50,000	50,000	50,000	LBS	$0.60	$0.85	$1.00	$30,000.00	$42,500.00	$50,000.00
	66	Remove and Dispose of Trash rack and trash rake (steel)	8420	86,000	86,000	86,000	LBS	$0.60	$0.75	$0.85	$51,600.00	$64,500.00	$73,100.00
	67	Remove and Dispose of Stop Logs and slots for intake (steel)	8420	220,000	220,000	220,000	LBS	$0.60	$0.85	$1.00	$132,000.00	$187,000.00	$220,000.00
	68	Remove and Dispose of Wood Staves Soaked in Creosote	8420	1,100,000	1,100,000	1,100,000	LBS	$0.65	$0.70	$0.85	$715,000.00	$770,000.00	$935,000.00
	69	Remove and Dispose of Cradles (steel)	8420	290,000	290,000	290,000	LBS	$0.60	$0.85	$1.00	$174,000.00	$246,500.00	$290,000.00
	70	Remove and Dispose of Bands (steel)	8420	463,000	463,000	463,000	LBS	$0.60	$0.85	$1.00	$277,800.00	$393,550.00	$463,000.00
	71	Remove and Dispose of Penstock after bifurcation to butterfly valves	8420	860,000	860,000	860,000	LBS	$0.60	$0.85	$1.00	$516,000.00	$731,000.00	$860,000.00
	72	Remove and Dispose of Bifurcated vent pipes and support structure	8420	19,500	19,500	19,500	LBS	$0.60	$0.85	$1.00	$11,700.00	$16,575.00	$19,500.00
	73	Remove and Dispose of 2 - 138" Butterfly valves	8420	148,000	148,000	148,000	LBS	$0.60	$0.85	$1.00	$88,800.00	$125,800.00	$148,000.00
		Subtotal 1									$6,739,830.00	$8,436,910.00	$18,102,530.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$340,000.00	$420,000.00	$910,000.00	$340,000.00	$420,000.00	$910,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)		1	1	1	ls	$1,136,602.00	$3,046,036.00	$10,162,062.00	$1,136,602.00	$3,046,036.00	$10,162,062.00
		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	$683,568.00	$1,097,054.00	$4,154,392.00	$683,568.00	$1,097,054.00	$4,154,392.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$671,016.00	$0.00	$0.00	$671,016.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$8,900,000.00**	**$13,000,000.00**	**$34,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$1,600,000.00	$2,500,000.00	$9,000,000.00	$1,600,000.00	$2,500,000.00	$9,000,000.00
		FIELD COST									**$10,500,000.00**	**$15,500,000.00**	**$43,000,000.00**
		Non-Contract Cost (MPL ~ 52%; MP ~ 55%; MPH ~ 61%)		1	1	1	ls	$5,500,000.00	$8,500,000.00	$26,000,000.00	$5,500,000.00	$8,500,000.00	$26,000,000.00
		CONSTRUCTION COST									**$16,000,000.00**	**$24,000,000.00**	**$69,000,000.00**

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	DW 05-25-11
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets		DATE PREPARED	05/25/11	PEER REVIEW	DCA 6/3/11

Crystal Ball Report - Full
Simulation started on 6/8/2011 at 12:49:07
Simulation stopped on 6/8/2011 at 12:49:59

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)	51.78
Trials/second (average)	193
Random numbers per sec	29,742
Crystal Ball data:	
Assumptions	154
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

TECHNICAL SERVICE CENTER
ESTIMATING, SPECIFICATIONS
AND VALUE PROGRAM GROUP
UNIT PRICES BY Craig A. Grush
DATE 6/9/2011

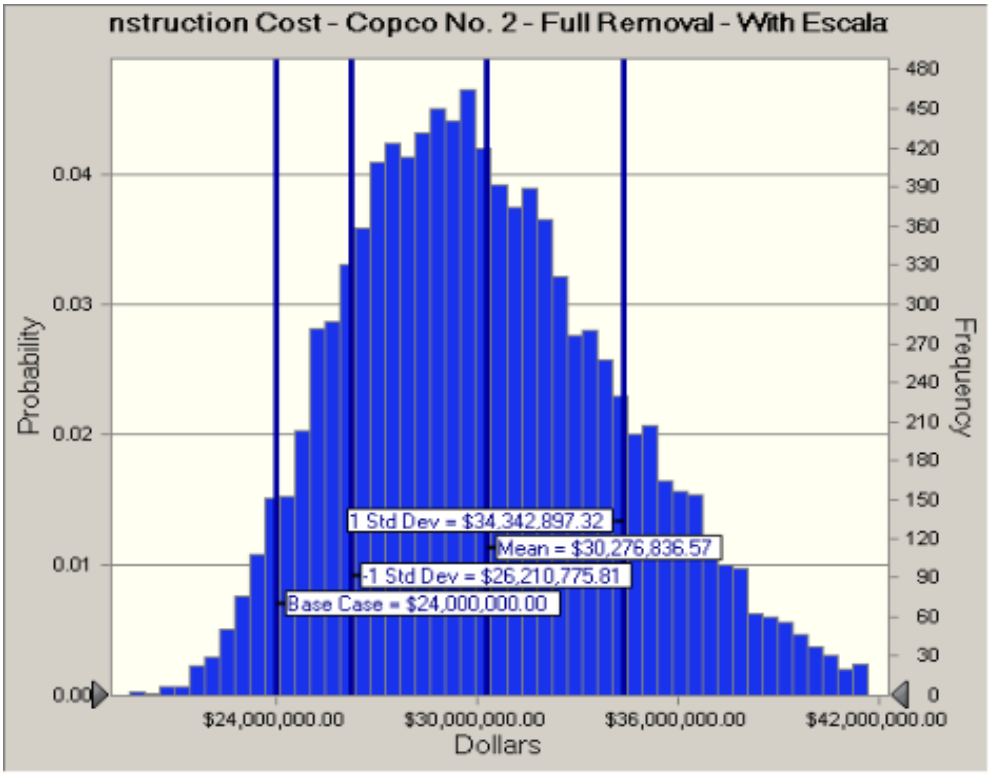
DATE	PEER REVIEWER(S)	CODE
6/9/11	Signature DAN MAAR Printed Name	8170
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

Worksheet: [Copco 2 - Full Removal Crystal Ball - with Escalation - 2011-04.xls]Copco 2 - Full

Forecast: Construction Cost - Copco No. 2 - Full Removal - With Escalation **Cell: U101**

Summary:
Entire range is from $19,600,022.02 to $46,617,455.61
Base case is $24,000,000.00
After 10,000 trials, the std. error of the mean is $40,660.61



Forecast: Construction Cost - Copco No. 2 - Full Removal - With Escalation (cont'd) Cell: U101

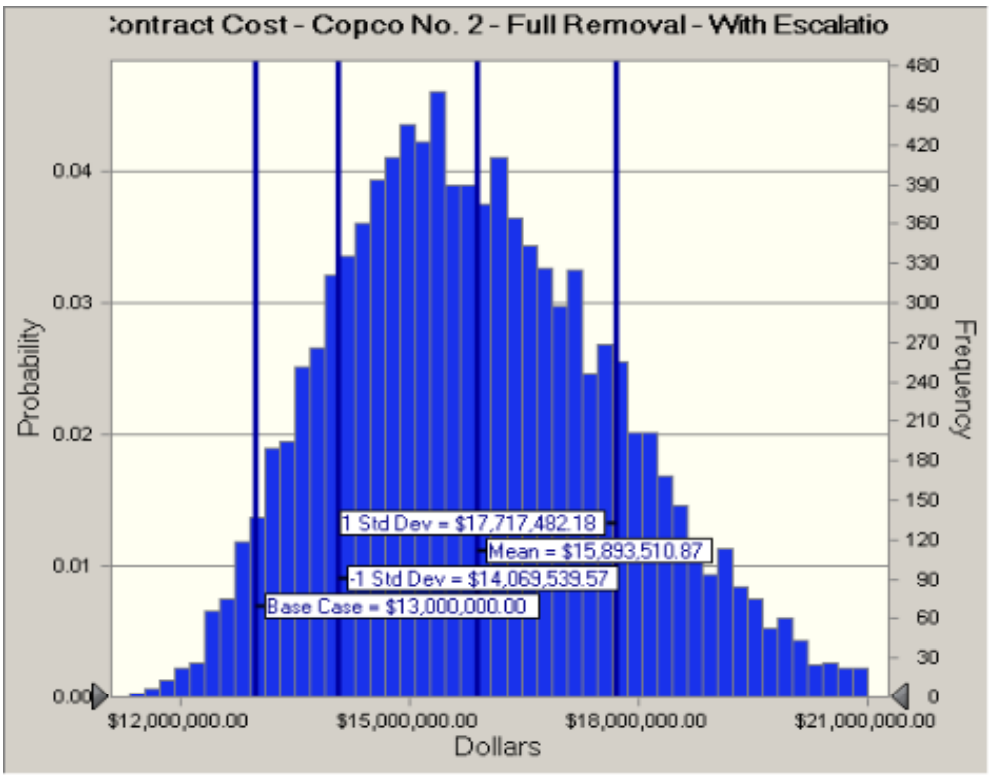
Statistics:	Forecast values
Trials	10,000
Mean	$30,276,836.57
Median	$29,852,759.55
Mode	---
Standard Deviation	$4,066,060.76
Variance	$16,532,850,088,294.10
Skewness	0.4595
Kurtosis	2.95
Coeff. of Variability	0.1343
Minimum	$19,600,022.02
Maximum	$46,617,455.61
Range Width	$27,017,433.59
Mean Std. Error	$40,660.61

Percentiles:	Forecast values
0%	$19,600,022.02
10%	$25,314,965.30
20%	$26,732,187.90
30%	$27,814,772.61
40%	$28,875,989.65
50%	$29,851,421.66
60%	$30,950,921.89
70%	$32,156,784.61
80%	$33,724,473.97
90%	$35,886,502.51
100%	$46,617,455.61

Forecast: Contract Cost - Copco No. 2 - Full Removal - With Escalation **Cell: U97**

Summary:

Entire range is from $11,342,441.45 to $22,813,757.17
Base case is $13,000,000.00
After 10,000 trials, the std. error of the mean is $18,239.71



Forecast: Contract Cost - Copco No. 2 - Full Removal - With Escalation (cont'd) **Cell: U97**

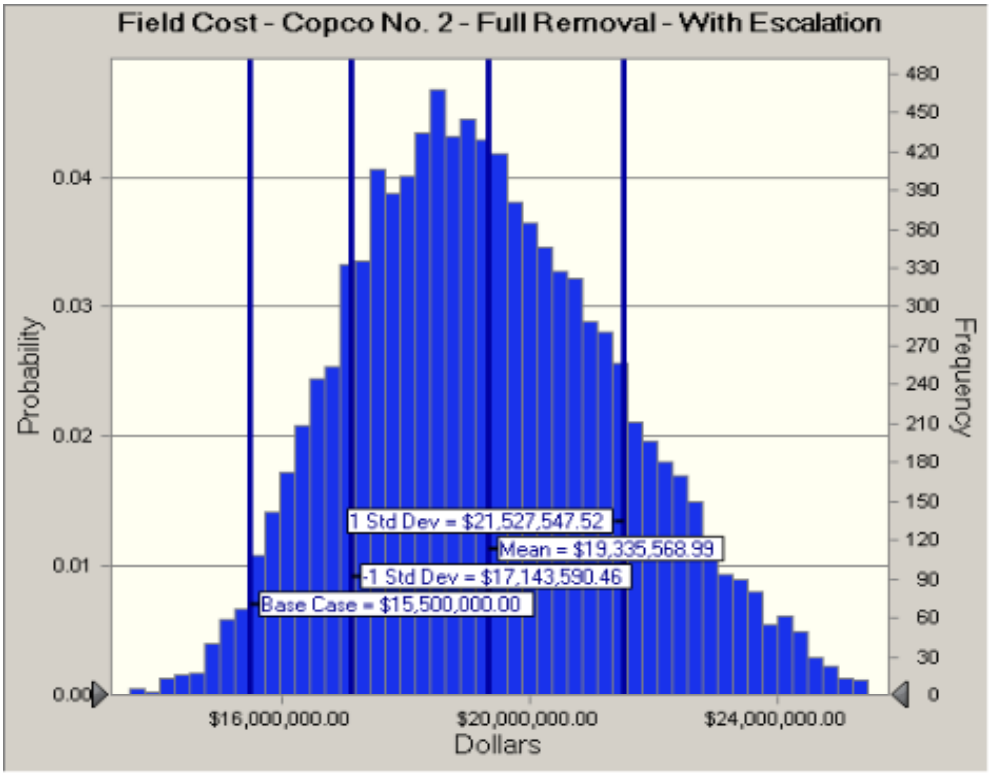
Statistics:	Forecast values
Trials	10,000
Mean	$15,893,510.87
Median	$15,732,288.47
Mode	---
Standard Deviation	$1,823,971.31
Variance	$3,326,871,333,287.62
Skewness	0.3964
Kurtosis	2.84
Coeff. of Variability	0.1148
Minimum	$11,342,441.45
Maximum	$22,813,757.17
Range Width	$11,471,315.72
Mean Std. Error	$18,239.71

Percentiles:	Forecast values
0%	$11,342,441.45
10%	$13,640,753.26
20%	$14,288,131.00
30%	$14,798,788.08
40%	$15,253,020.43
50%	$15,731,934.56
60%	$16,230,472.55
70%	$16,794,134.43
80%	$17,468,218.55
90%	$18,358,651.26
100%	$22,813,757.17

Forecast: Field Cost - Copco No. 2 - Full Removal - With Escalation **Cell: U99**

Summary:

Entire range is from $13,547,597.36 to $27,683,965.73
Base case is $15,500,000.00
After 10,000 trials, the std. error of the mean is $21,919.79



Forecast: Field Cost - Copco No. 2 - Full Removal - With Escalation (cont'd) **Cell: U99**

Statistics:	Forecast values
Trials	10,000
Mean	$19,335,568.99
Median	$19,151,240.09
Mode	---
Standard Deviation	$2,191,978.53
Variance	$4,804,769,888,090.42
Skewness	0.3803
Kurtosis	2.92
Coeff. of Variability	0.1134
Minimum	$13,547,597.36
Maximum	$27,683,965.73
Range Width	$14,136,368.38
Mean Std. Error	$21,919.79

Percentiles:	Forecast values
0%	$13,547,597.36
10%	$16,615,926.69
20%	$17,429,404.48
30%	$18,046,141.40
40%	$18,590,021.91
50%	$19,150,042.77
60%	$19,737,270.05
70%	$20,405,701.80
80%	$21,196,522.40
90%	$22,313,891.28
100%	$27,683,965.73

End of Forecasts

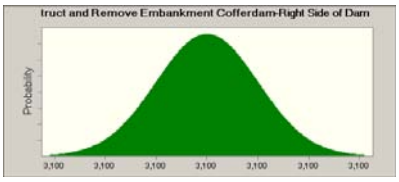
Assumptions

Worksheet: [Copco 2 - Full Removal Crystal Ball - with Escalation - 2011-04.xls]Copco 2 - Full

Assumption: 1 Construct and Remove Embankment Cofferdam-Right Side of Dam Quantity **Cell: L14**

Normal distribution with parameters:

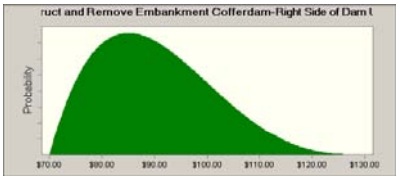
Mean	3,100	(=L14)
Std. Dev.	0	(=0.000001)



Assumption: 1 Construct and Remove Embankment Cofferdam-Right Side of Dam Unit Pr **Cell: R14**

BetaPERT distribution with parameters:

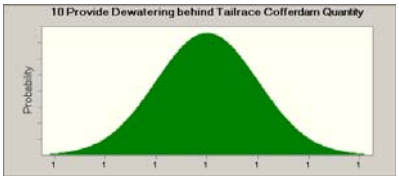
Minimum	$70.00	(=Q14)
Likeliest	$85.00	(=R14)
Maximum	$130.00	(=S14)



Assumption: 10 Provide Dewatering behind Tailrace Cofferdam Quantity **Cell: L23**

Normal distribution with parameters:

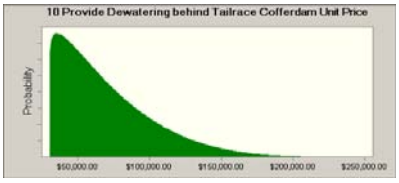
Mean	1	(=L23)
Std. Dev.	0	(=0.000001)



Assumption: 10 Provide Dewatering behind Tailrace Cofferdam Unit Price **Cell: R23**

BetaPERT distribution with parameters:

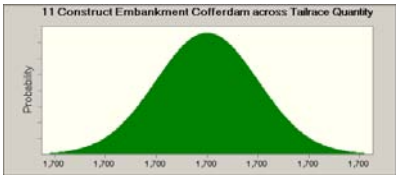
Minimum	$30,000.00	(=Q23)
Likeliest	$35,000.00	(=R23)
Maximum	$250,000.00	(=S23)



Assumption: 11 Construct Embankment Cofferdam across Tailrace Quantity **Cell: L24**

Normal distribution with parameters:

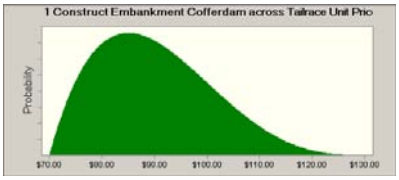
Mean	1,700	(=L24)
Std. Dev.	0	(=0.000001)



Assumption: 11 Construct Embankment Cofferdam across Tailrace Unit Price **Cell: R24**

BetaPERT distribution with parameters:

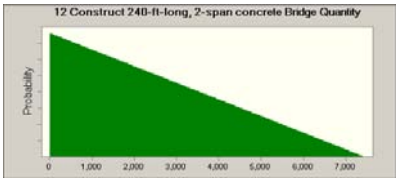
Minimum	$70.00	(=Q24)
Likeliest	$85.00	(=R24)
Maximum	$130.00	(=S24)



Assumption: 12 Construct 240-ft-long, 2-span concrete Bridge Quantity **Cell: L25**

Triangular distribution with parameters:

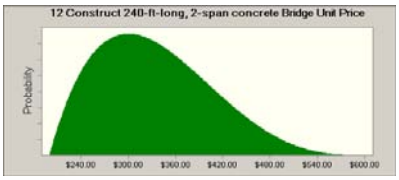
Minimum	0	(=K25)
Likeliest	0	(=L25)
Maximum	7,440	(=M25)



Assumption: 12 Construct 240-ft-long, 2-span concrete Bridge Unit Price **Cell: R25**

BetaPERT distribution with parameters:

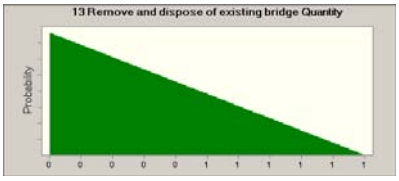
Minimum	$200.00	(=Q25)
Likeliest	$300.00	(=R25)
Maximum	$600.00	(=S25)



Assumption: 13 Remove and dispose of existing bridge Quantity **Cell: L26**

Triangular distribution with parameters:

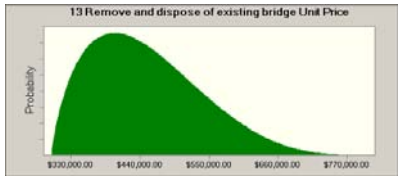
Minimum	0	(=K26)
Likeliest	0	(=L26)
Maximum	1	(=M26)



Assumption: 13 Remove and dispose of existing bridge Unit Price **Cell: R26**

BetaPERT distribution with parameters:

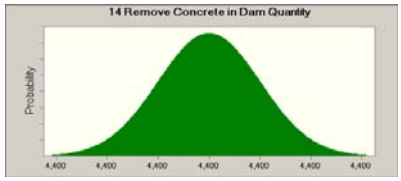
Minimum	$300,000.00	(=Q26)
Likeliest	$400,000.00	(=R26)
Maximum	$800,000.00	(=S26)



Assumption: 14 Remove Concrete in Dam Quantity **Cell: L27**

Normal distribution with parameters:

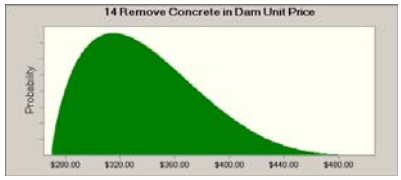
Mean	4,400	(=L27)
Std. Dev.	0	(=0.000001)



Assumption: 14 Remove Concrete in Dam Unit Price **Cell: R27**

BetaPERT distribution with parameters:

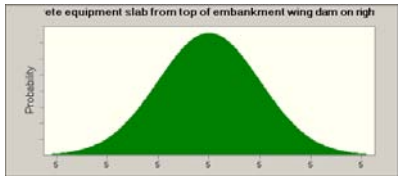
Minimum	$270.00	(=Q27)
Likeliest	$315.00	(=R27)
Maximum	$500.00	(=S27)



Assumption: 15 Remove concrete equipment slab from top of embankment wing dam on righ **Cell: L28**

Normal distribution with parameters:

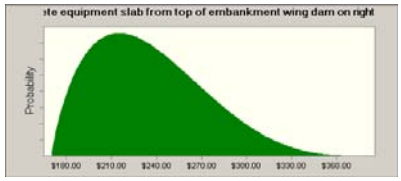
Mean	5	(=L28)
Std. Dev.	0	(=0.000001)



Assumption: 15 Remove concrete equipment slab from top of embankment wing dam on righ **Cell: R28**

BetaPERT distribution with parameters:

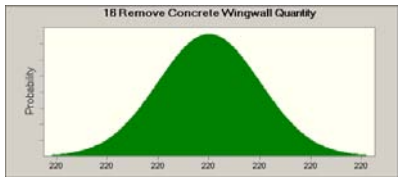
Minimum	$170.00	(=Q28)
Likeliest	$215.00	(=R28)
Maximum	$380.00	(=S28)



Assumption: 16 Remove Concrete Wingwall Quantity **Cell: L29**

Normal distribution with parameters:

Mean	220	(=L29)
Std. Dev.	0	(=0.000001)



Assumption: 16 Remove Concrete Wingwall Unit Price **Cell: R29**

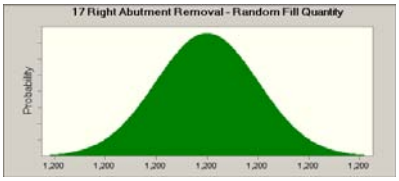
BetaPERT distribution with parameters:

Minimum	$170.00	(=Q29)
Likeliest	$215.00	(=R29)
Maximum	$380.00	(=S29)

Assumption: 17 Right Abutment Removal - Random Fill Quantity **Cell: L30**

Normal distribution with parameters:

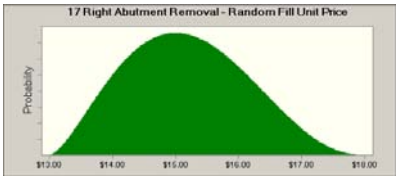
Mean	1,200	(=L30)
Std. Dev.	0	(=0.000001)



Assumption: 17 Right Abutment Removal - Random Fill Unit Price **Cell: R30**

BetaPERT distribution with parameters:

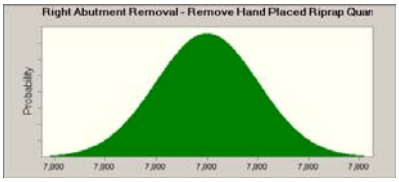
Minimum	$13.00	(=Q30)
Likeliest	$15.00	(=R30)
Maximum	$18.00	(=S30)



Assumption: 18 Right Abutment Removal - Remove Hand Placed Riprap Quantity **Cell: L31**

Normal distribution with parameters:

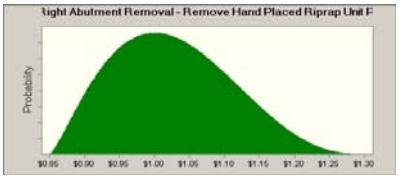
Mean	7,800	(=L31)
Std. Dev.	0	(=0.000001)



Assumption: 18 Right Abutment Removal - Remove Hand Placed Riprap Unit Price **Cell: R31**

BetaPERT distribution with parameters:

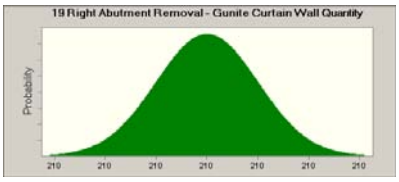
Minimum	$0.85	(=Q31)
Likeliest	$1.00	(=R31)
Maximum	$1.30	(=S31)



Assumption: 19 Right Abutment Removal - Gunite Curtain Wall Quantity **Cell: L32**

Normal distribution with parameters:

Mean	210	(=L32)
Std. Dev.	0	(=0.000001)



Assumption: 19 Right Abutment Removal - Gunite Curtain Wall Unit Price **Cell: R32**

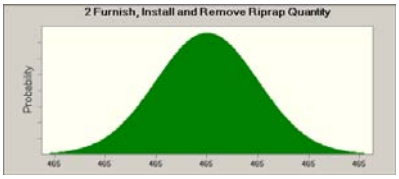
BetaPERT distribution with parameters:

Minimum	$170.00	(=Q32)
Likeliest	$215.00	(=R32)
Maximum	$380.00	(=S32)

Assumption: 2 Furnish, Install and Remove Riprap Quantity **Cell: L15**

Normal distribution with parameters:

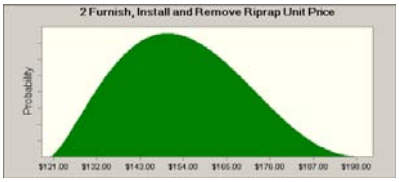
Mean	465	(=L15)
Std. Dev.	0	(=0.000001)



Assumption: 2 Furnish, Install and Remove Riprap Unit Price **Cell: R15**

BetaPERT distribution with parameters:

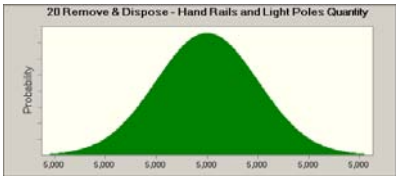
Minimum	$120.00	(=Q15)
Likeliest	$150.00	(=R15)
Maximum	$200.00	(=S15)



Assumption: 20 Remove & Dispose - Hand Rails and Light Poles Quantity **Cell: L33**

Normal distribution with parameters:

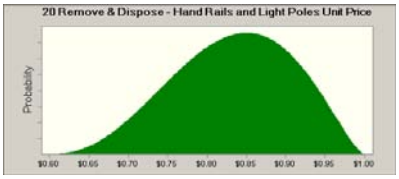
Mean	5,000	(=L33)
Std. Dev.	0	(=0.000001)



Assumption: 20 Remove & Dispose - Hand Rails and Light Poles Unit Price **Cell: R33**

BetaPERT distribution with parameters:

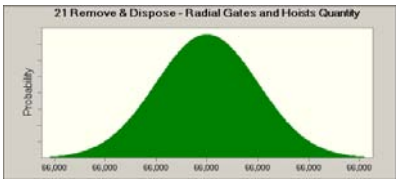
Minimum	$0.60	(=Q33)
Likeliest	$0.85	(=R33)
Maximum	$1.00	(=S33)



Assumption: 21 Remove & Dispose - Radial Gates and Hoists Quantity **Cell: L34**

Normal distribution with parameters:

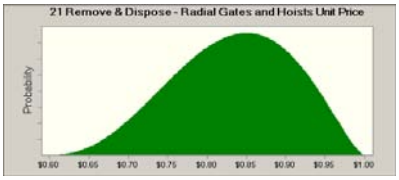
Mean	66,000	(=L34)
Std. Dev.	0	(=0.000001)



Assumption: 21 Remove & Dispose - Radial Gates and Hoists Unit Price **Cell: R34**

BetaPERT distribution with parameters:

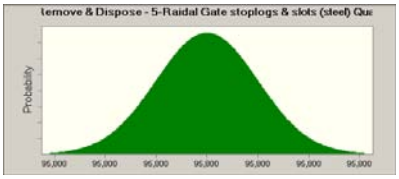
Minimum	$0.60	(=Q34)
Likeliest	$0.85	(=R34)
Maximum	$1.00	(=S34)



Assumption: 22 Remove & Dispose - 5-Raidal Gate stoplogs & slots (steel) Quantity **Cell: L35**

Normal distribution with parameters:

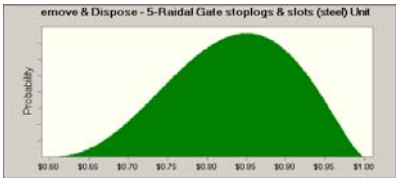
Mean	95,800	(=L35)
Std. Dev.	0	(=0.000001)



Assumption: 22 Remove & Dispose - 5-Raidal Gate stoplogs & slots (steel) Unit Price **Cell: R35**

BetaPERT distribution with parameters:

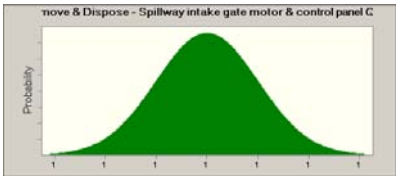
Minimum	$0.60	(=Q35)
Likeliest	$0.85	(=R35)
Maximum	$1.00	(=S35)



Assumption: 23 Remove & Dispose - Spillway intake gate motor & control panel Quantity **Cell: L36**

Normal distribution with parameters:

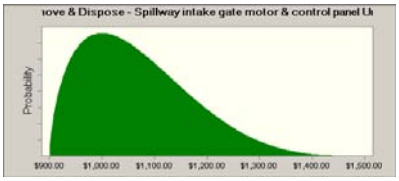
Mean	1	(=L36)
Std. Dev.	0	(=0.000001)



Assumption: 23 Remove & Dispose - Spillway intake gate motor & control panel Unit Price **Cell: R36**

BetaPERT distribution with parameters:

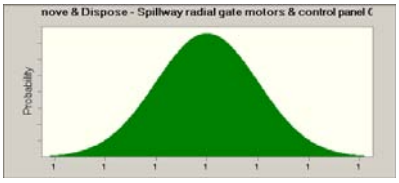
Minimum	$900.00	(=Q36)
Likeliest	$1,000.00	(=R36)
Maximum	$1,500.00	(=S36)



Assumption: 24 Remove & Dispose - Spillway radial gate motors & control panel Quantity **Cell: L37**

Normal distribution with parameters:

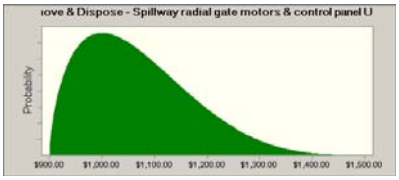
Mean	1	(=L37)
Std. Dev.	0	(=0.000001)



Assumption: 24 Remove & Dispose - Spillway radial gate motors & control panel Unit Price **Cell: R37**

BetaPERT distribution with parameters:

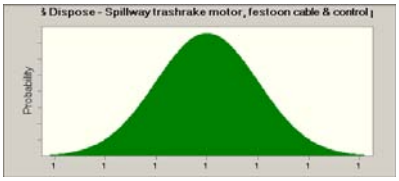
Minimum	$900.00	(=Q37)
Likeliest	$1,000.00	(=R37)
Maximum	$1,500.00	(=S37)



Assumption: 25 Remove & Dispose - Spillway trashrake motor, festoon cable & control pa **Cell: L38**

Normal distribution with parameters:

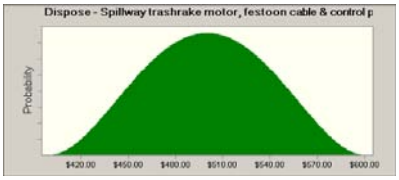
Mean	1	(=L38)
Std. Dev.	0	(=0.000001)



Assumption: 25 Remove & Dispose - Spillway trashrake motor, festoon cable & control pa **Cell: R38**

BetaPERT distribution with parameters:

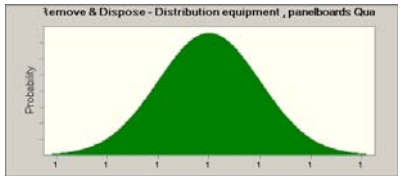
Minimum	$400.00	(=Q38)
Likeliest	$500.00	(=R38)
Maximum	$600.00	(=S38)



Assumption: 26 Remove & Dispose - Distribution equipment , panelboards Quantity Cell: L39

Normal distribution with parameters:

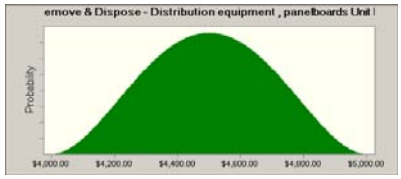
Mean	1	(=L39)
Std. Dev.	0	(=0.000001)



Assumption: 26 Remove & Dispose - Distribution equipment , panelboards Unit Price Cell: R39

BetaPERT distribution with parameters:

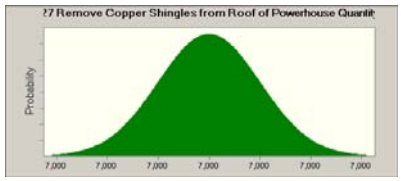
Minimum	$4,000.00	(=Q39)
Likeliest	$4,500.00	(=R39)
Maximum	$5,000.00	(=S39)



Assumption: 27 Remove Copper Shingles from Roof of Powerhouse Quantity Cell: L40

Normal distribution with parameters:

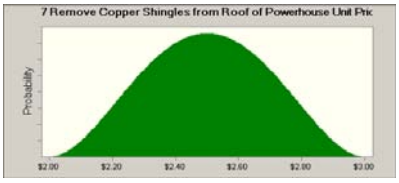
Mean	7,000	(=L40)
Std. Dev.	0	(=0.000001)



Assumption: 27 Remove Copper Shingles from Roof of Powerhouse Unit Price **Cell: R40**

BetaPERT distribution with parameters:

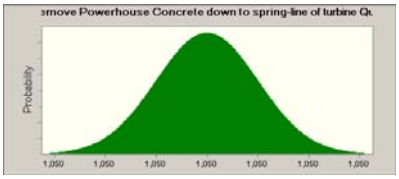
Minimum	$2.00	(=Q40)
Likeliest	$2.50	(=R40)
Maximum	$3.00	(=S40)



Assumption: 28 Remove Powerhouse Concrete down to spring-line of turbine Quantity **Cell: L41**

Normal distribution with parameters:

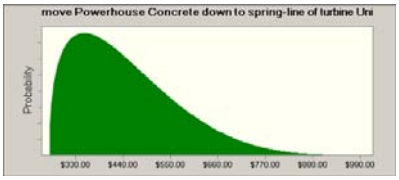
Mean	1,050	(=L41)
Std. Dev.	0	(=0.000001)



Assumption: 28 Remove Powerhouse Concrete down to spring-line of turbine Unit Price **Cell: R41**

BetaPERT distribution with parameters:

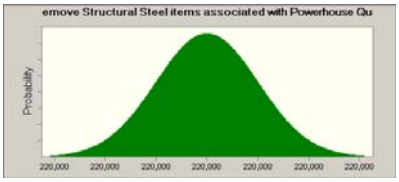
Minimum	$270.00	(=Q41)
Likeliest	$350.00	(=R41)
Maximum	$1,000.00	(=S41)



Assumption: 29 Remove Structural Steel items associated with Powerhouse Quantity **Cell: L42**

Normal distribution with parameters:

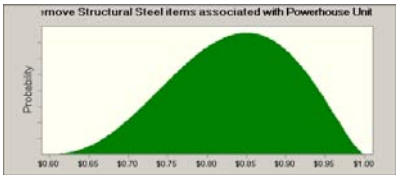
Mean	220,000	(=L42)
Std. Dev.	0	(=0.000001)



Assumption: 29 Remove Structural Steel items associated with Powerhouse Unit Price **Cell: R42**

BetaPERT distribution with parameters:

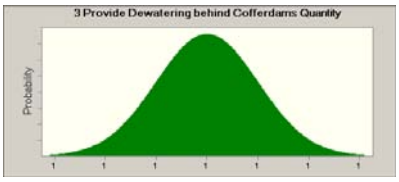
Minimum	$0.60	(=Q42)
Likeliest	$0.85	(=R42)
Maximum	$1.00	(=S42)



Assumption: 3 Provide Dewatering behind Cofferdams Quantity **Cell: L16**

Normal distribution with parameters:

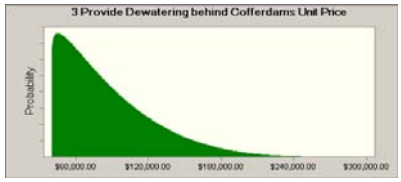
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



Assumption: 3 Provide Dewatering behind Cofferdams Unit Price **Cell: R16**

BetaPERT distribution with parameters:

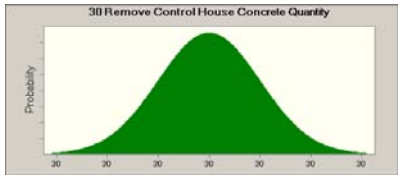
Minimum	$40,000.00	(=Q16)
Likeliest	$45,000.00	(=R16)
Maximum	$300,000.00	(=S16)



Assumption: 30 Remove Control House Concrete Quantity **Cell: L43**

Normal distribution with parameters:

Mean	30	(=L43)
Std. Dev.	0	(=0.000001)



Assumption: 30 Remove Control House Concrete Unit Price **Cell: R43**

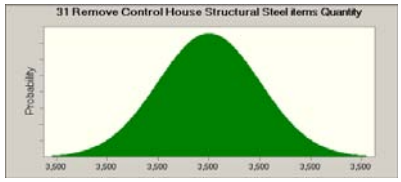
BetaPERT distribution with parameters:

Minimum	$170.00	(=Q43)
Likeliest	$215.00	(=R43)
Maximum	$380.00	(=S43)

Assumption: 31 Remove Control House Structural Steel items Quantity **Cell: L44**

Normal distribution with parameters:

Mean	3,500	(=L44)
Std. Dev.	0	(=0.000001)



Assumption: 31 Remove Control House Structural Steel items Unit Price **Cell: R44**

BetaPERT distribution with parameters:

Minimum	$0.60	(=Q44)
Likeliest	$0.85	(=R44)
Maximum	$1.00	(=S44)

Assumption: 32 Remove Shop Building Quantity **Cell: L45**

Normal distribution with parameters:

Mean	3,600	(=L45)
Std. Dev.	0	(=0.000001)

Assumption: 32 Remove Shop Building Unit Price **Cell: R45**

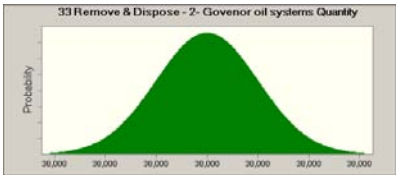
BetaPERT distribution with parameters:

Minimum	$55.00	(=Q45)
Likeliest	$60.00	(=R45)
Maximum	$65.00	(=S45)

Assumption: 33 Remove & Dispose - 2- Govenor oil systems Quantity **Cell: L46**

Normal distribution with parameters:

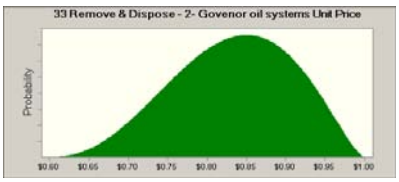
Mean	38,000	(=L46)
Std. Dev.	0	(=0.000001)



Assumption: 33 Remove & Dispose - 2- Govenor oil systems Unit Price **Cell: R46**

BetaPERT distribution with parameters:

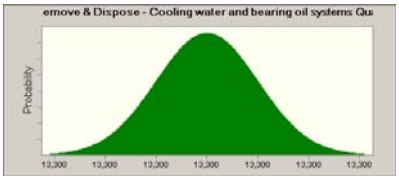
Minimum	$0.60	(=Q46)
Likeliest	$0.85	(=R46)
Maximum	$1.00	(=S46)



Assumption: 34 Remove & Dispose - Cooling water and bearing oil systems Quantity Cell: L47

Normal distribution with parameters:

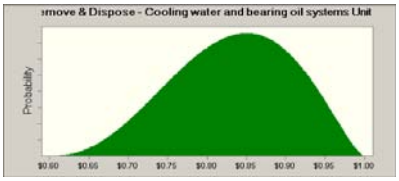
Mean	13,300	(=L47)
Std. Dev.	0	(=0.000001)



Assumption: 34 Remove & Dispose - Cooling water and bearing oil systems Unit Price Cell: R47

BetaPERT distribution with parameters:

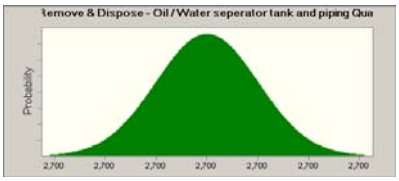
Minimum	$0.60	(=Q47)
Likeliest	$0.85	(=R47)
Maximum	$1.00	(=S47)



Assumption: 35 Remove & Dispose - Oil / Water seperator tank and piping Quantity Cell: L48

Normal distribution with parameters:

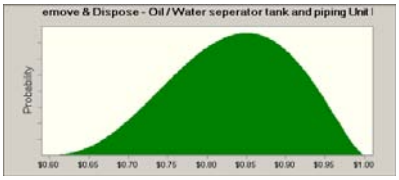
Mean	2,700	(=L48)
Std. Dev.	0	(=0.000001)



Assumption: 35 Remove & Dispose - Oil / Water seperator tank and piping Unit Price **Cell: R48**

BetaPERT distribution with parameters:

Minimum	$0.60	(=Q48)
Likeliest	$0.85	(=R48)
Maximum	$1.00	(=S48)



Assumption: 36 Remove & Dispose - 12 - Cast Iron Columns Quantity **Cell: L49**

Normal distribution with parameters:

Mean	54,000	(=L49)
Std. Dev.	0	(=0.000001)

Assumption: 36 Remove & Dispose - 12 - Cast Iron Columns Unit Price **Cell: R49**

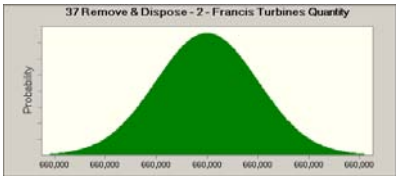
BetaPERT distribution with parameters:

Minimum	$0.60	(=Q49)
Likeliest	$0.85	(=R49)
Maximum	$1.00	(=S49)

Assumption: 37 Remove & Dispose - 2 - Francis Turbines Quantity **Cell: L50**

Normal distribution with parameters:

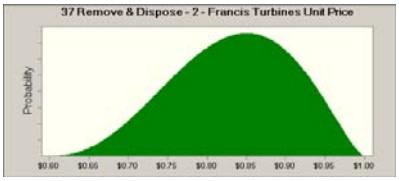
Mean	660,000	(=L50)
Std. Dev.	0	(=0.000001)



Assumption: 37 Remove & Dispose - 2 - Francis Turbines Unit Price **Cell: R50**

BetaPERT distribution with parameters:

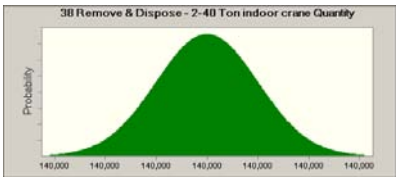
Minimum	$0.60	(=Q50)
Likeliest	$0.85	(=R50)
Maximum	$1.00	(=S50)



Assumption: 38 Remove & Dispose - 2-40 Ton indoor crane Quantity **Cell: L51**

Normal distribution with parameters:

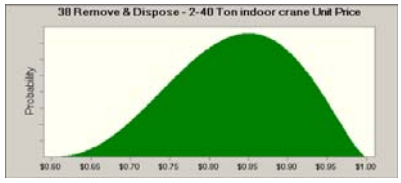
Mean	140,000	(=L51)
Std. Dev.	0	(=0.000001)



Assumption: 38 Remove & Dispose - 2-40 Ton indoor crane Unit Price **Cell: R51**

BetaPERT distribution with parameters:

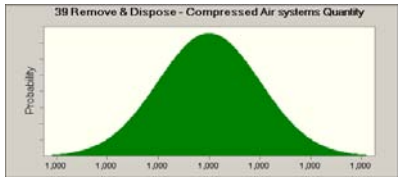
Minimum	$0.60	(=Q51)
Likeliest	$0.85	(=R51)
Maximum	$1.00	(=S51)



Assumption: 39 Remove & Dispose - Compressed Air systems Quantity **Cell: L52**

Normal distribution with parameters:

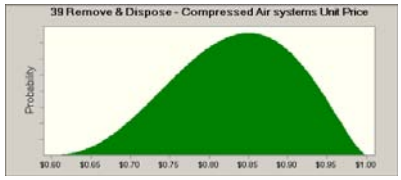
Mean	1,000	(=L52)
Std. Dev.	0	(=0.000001)



Assumption: 39 Remove & Dispose - Compressed Air systems Unit Price **Cell: R52**

BetaPERT distribution with parameters:

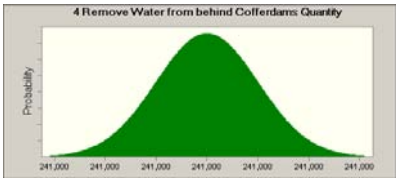
Minimum	$0.60	(=Q52)
Likeliest	$0.85	(=R52)
Maximum	$1.00	(=S52)



Assumption: 4 Remove Water from behind Cofferdams Quantity **Cell: L17**

Normal distribution with parameters:

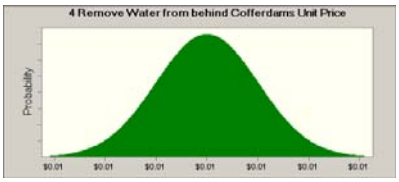
Mean	241,000	(=L17)
Std. Dev.	0	(=0.000001)



Assumption: 4 Remove Water from behind Cofferdams Unit Price **Cell: R17**

Normal distribution with parameters:

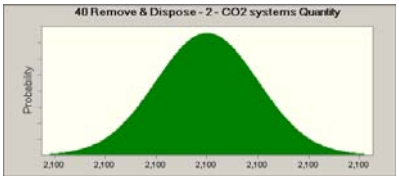
Mean	$0.01	(=R17)
Std. Dev.	$0.00	(=0.000001)



Assumption: 40 Remove & Dispose - 2 - CO2 systems Quantity **Cell: L53**

Normal distribution with parameters:

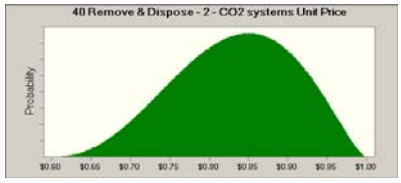
Mean	2,100	(=L53)
Std. Dev.	0	(=0.000001)



Assumption: 40 Remove & Dispose - 2 - CO2 systems Unit Price **Cell: R53**

BetaPERT distribution with parameters:

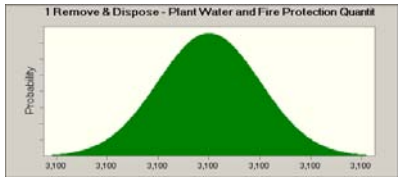
Minimum	$0.60	(=Q53)
Likeliest	$0.85	(=R53)
Maximum	$1.00	(=S53)



Assumption: 41 Remove & Dispose - Plant Water and Fire Protection Quantity **Cell: L54**

Normal distribution with parameters:

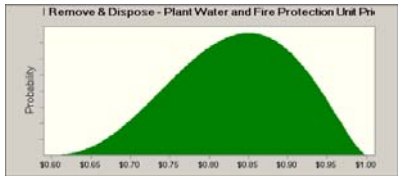
Mean	3,100	(=L54)
Std. Dev.	0	(=0.000001)



Assumption: 41 Remove & Dispose - Plant Water and Fire Protection Unit Price **Cell: R54**

BetaPERT distribution with parameters:

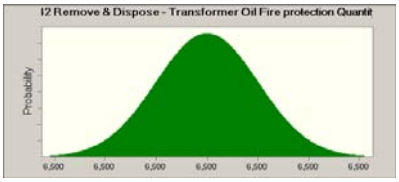
Minimum	$0.60	(=Q54)
Likeliest	$0.85	(=R54)
Maximum	$1.00	(=S54)



Assumption: 42 Remove & Dispose - Transformer Oil Fire protection Quantity **Cell: L55**

Normal distribution with parameters:

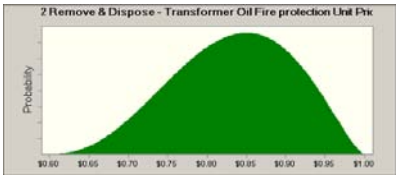
Mean	6,500	(=L55)
Std. Dev.	0	(=0.000001)



Assumption: 42 Remove & Dispose - Transformer Oil Fire protection Unit Price **Cell: R55**

BetaPERT distribution with parameters:

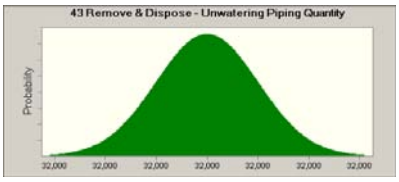
Minimum	$0.60	(=Q55)
Likeliest	$0.85	(=R55)
Maximum	$1.00	(=S55)



Assumption: 43 Remove & Dispose - Unwatering Piping Quantity **Cell: L56**

Normal distribution with parameters:

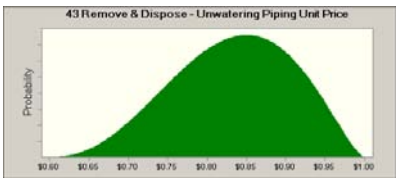
Mean	32,000	(=L56)
Std. Dev.	0	(=0.000001)



Assumption: 43 Remove & Dispose - Unwatering Piping Unit Price **Cell: R56**

BetaPERT distribution with parameters:

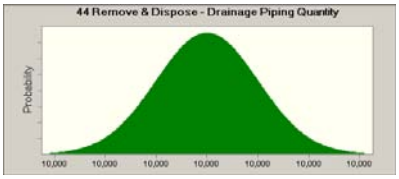
Minimum	$0.60	(=Q56)
Likeliest	$0.85	(=R56)
Maximum	$1.00	(=S56)



Assumption: 44 Remove & Dispose - Drainage Piping Quantity **Cell: L57**

Normal distribution with parameters:

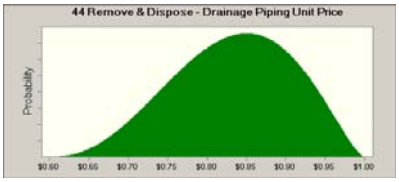
Mean	10,000	(=L57)
Std. Dev.	0	(=0.000001)



Assumption: 44 Remove & Dispose - Drainage Piping Unit Price **Cell: R57**

BetaPERT distribution with parameters:

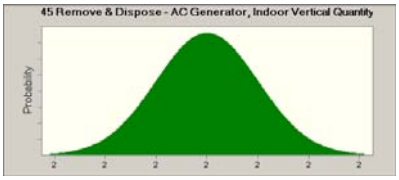
Minimum	$0.60	(=Q57)
Likeliest	$0.85	(=R57)
Maximum	$1.00	(=S57)



Assumption: 45 Remove & Dispose - AC Generator, Indoor Vertical Quantity **Cell: L58**

Normal distribution with parameters:

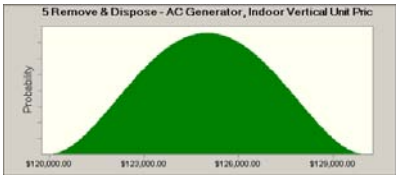
Mean	2	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 45 Remove & Dispose - AC Generator, Indoor Vertical Unit Price **Cell: R58**

BetaPERT distribution with parameters:

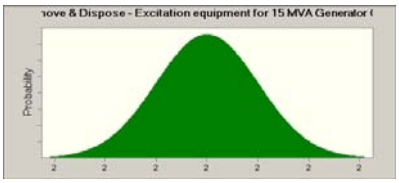
Minimum	$120,000.00	(=Q58)
Likeliest	$125,000.00	(=R58)
Maximum	$130,000.00	(=S58)



Assumption: 46 Remove & Dispose - Excitation equipment for 15 MVA Generator Quantity **Cell: L59**

Normal distribution with parameters:

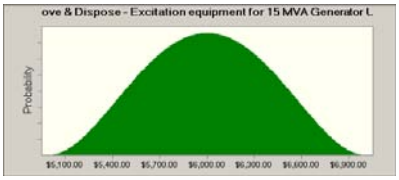
Mean	2	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 46 Remove & Dispose - Excitation equipment for 15 MVA Generator Unit Price **Cell: R59**

BetaPERT distribution with parameters:

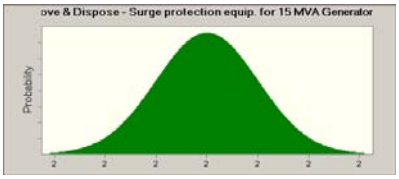
Minimum	$5,000.00	(=Q59)
Likeliest	$6,000.00	(=R59)
Maximum	$7,000.00	(=S59)



Assumption: 47 Remove & Dispose - Surge protection equip. for 15 MVA Generator Quantity **Cell: L60**

Normal distribution with parameters:

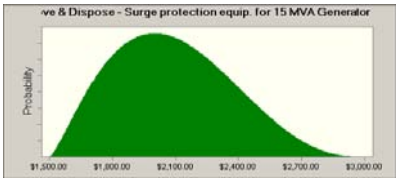
Mean	2	(=L60)
Std. Dev.	0	(=0.000001)



Assumption: 47 Remove & Dispose - Surge protection equip. for 15 MVA Generator Unit Price **Cell: R60**

BetaPERT distribution with parameters:

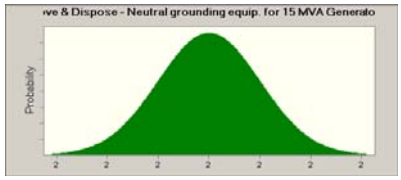
Minimum	$1,500.00	(=Q60)
Likeliest	$2,000.00	(=R60)
Maximum	$3,000.00	(=S60)



Assumption: 48 Remove & Dispose - Neutral grounding equip. for 15 MVA Generator Cell L61

Normal distribution with parameters:

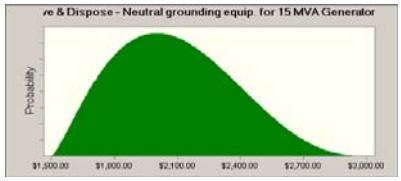
Mean	2	(=L61)
Std. Dev.	0	(=0.000001)



Assumption: 48 Remove & Dispose - Neutral grounding equip. for 15 MVA Generator Cell R61

BetaPERT distribution with parameters:

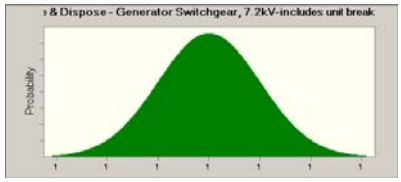
Minimum	$1,500.00	(=Q61)
Likeliest	$2,000.00	(=R61)
Maximum	$3,000.00	(=S61)



Assumption: 49 Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breaker Cell L62

Normal distribution with parameters:

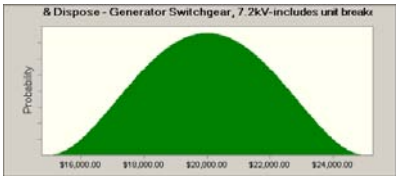
Mean	1	(=L62)
Std. Dev.	0	(=0.000001)



Assumption: 49 Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers **Cells R62**

BetaPERT distribution with parameters:

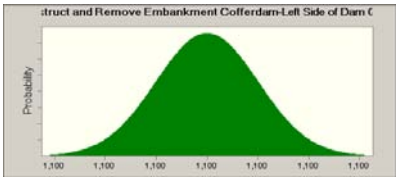
Minimum	$15,000.00	(=Q62)
Likeliest	$20,000.00	(=R62)
Maximum	$25,000.00	(=S62)



Assumption: 5 Construct and Remove Embankment Cofferdam-Left Side of Dam Quantity **Cell L18**

Normal distribution with parameters:

Mean	1,100	(=L18)
Std. Dev.	0	(=0.000001)



Assumption: 5 Construct and Remove Embankment Cofferdam-Left Side of Dam Unit Price **Cell R18**

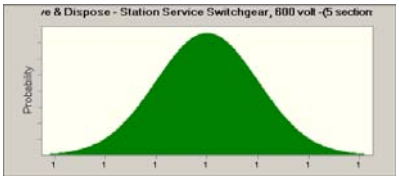
BetaPERT distribution with parameters:

Minimum	$70.00	(=Q18)
Likeliest	$85.00	(=R18)
Maximum	$130.00	(=S18)

Assumption: 50 Remove & Dispose - Station Service Switchgear, 600 volt -(5 sections) Cell: L63

Normal distribution with parameters:

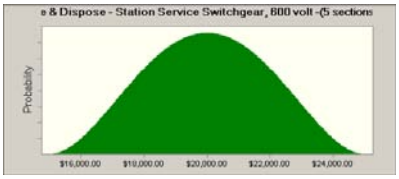
Mean	1	(=L63)
Std. Dev.	0	(=0.000001)



Assumption: 50 Remove & Dispose - Station Service Switchgear, 600 volt -(5 sections) Cell: R63

BetaPERT distribution with parameters:

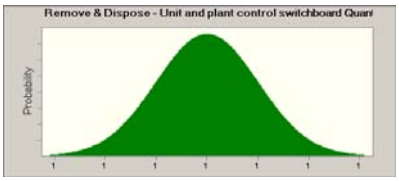
Minimum	$15,000.00	(=Q63)
Likeliest	$20,000.00	(=R63)
Maximum	$25,000.00	(=S63)



Assumption: 51 Remove & Dispose - Unit and plant control switchboard Quantity Cell: L64

Normal distribution with parameters:

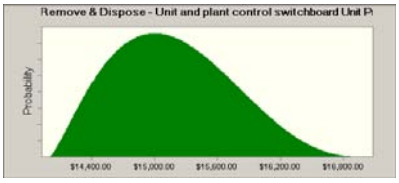
Mean	1	(=L64)
Std. Dev.	0	(=0.000001)



Assumption: 51 Remove & Dispose - Unit and plant control switchboard Unit Price **Cell: R64**

BetaPERT distribution with parameters:

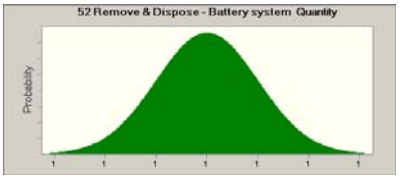
Minimum	$14,000.00	(=Q64)
Likeliest	$15,000.00	(=R64)
Maximum	$17,000.00	(=S64)



Assumption: 52 Remove & Dispose - Battery system Quantity **Cell: L65**

Normal distribution with parameters:

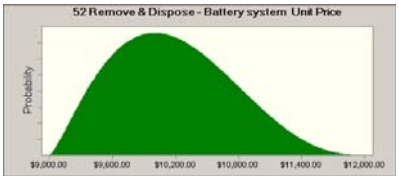
Mean	1	(=L65)
Std. Dev.	0	(=0.000001)



Assumption: 52 Remove & Dispose - Battery system Unit Price **Cell: R65**

BetaPERT distribution with parameters:

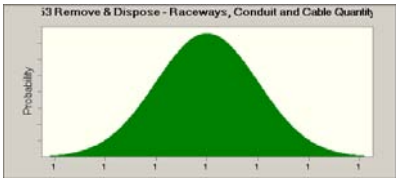
Minimum	$9,000.00	(=Q65)
Likeliest	$10,000.00	(=R65)
Maximum	$12,000.00	(=S65)



Assumption: 53 Remove & Dispose - Raceways, Conduit and Cable Quantity **Cell: L66**

Normal distribution with parameters:

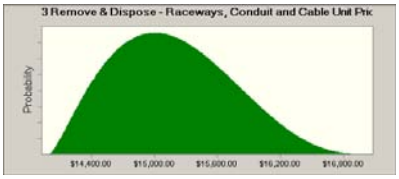
Mean	1	(=L66)
Std. Dev.	0	(=0.000001)



Assumption: 53 Remove & Dispose - Raceways, Conduit and Cable Unit Price **Cell: R66**

BetaPERT distribution with parameters:

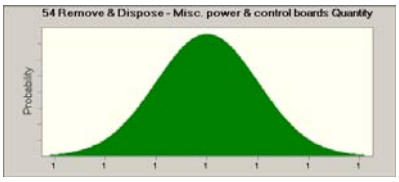
Minimum	$14,000.00	(=Q66)
Likeliest	$15,000.00	(=R66)
Maximum	$17,000.00	(=S66)



Assumption: 54 Remove & Dispose - Misc. power & control boards Quantity **Cell: L67**

Normal distribution with parameters:

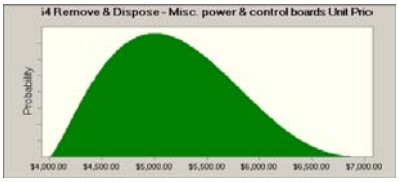
Mean	1	(=L67)
Std. Dev.	0	(=0.000001)



Assumption: 54 Remove & Dispose - Misc. power & control boards Unit Price **Cell: R67**

BetaPERT distribution with parameters:

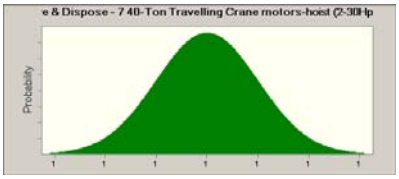
Minimum	$4,000.00	(=Q67)
Likeliest	$5,000.00	(=R67)
Maximum	$7,000.00	(=S67)



Assumption: 55 Remove & Dispose - 7 40-Ton Travelling Crane motors-hoist (2-30Hp) **Cell: L68**

Normal distribution with parameters:

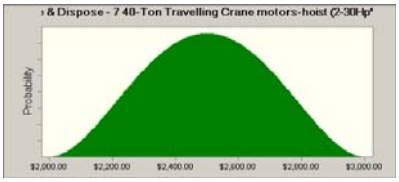
Mean	1	(=L68)
Std. Dev.	0	(=0.000001)



Assumption: 55 Remove & Dispose - 7 40-Ton Travelling Crane motors-hoist (2-30Hp) **Cell: R68**

BetaPERT distribution with parameters:

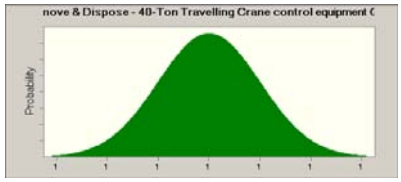
Minimum	$2,000.00	(=Q68)
Likeliest	$2,500.00	(=R68)
Maximum	$3,000.00	(=S68)



Assumption: 56 Remove & Dispose - 40-Ton Travelling Crane control equipment Quantity **Cell: L69**

Normal distribution with parameters:

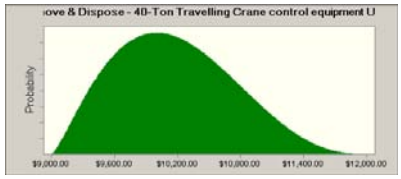
Mean	1	(=L69)
Std. Dev.	0	(=0.000001)



Assumption: 56 Remove & Dispose - 40-Ton Travelling Crane control equipment Unit Price **Cell: R69**

BetaPERT distribution with parameters:

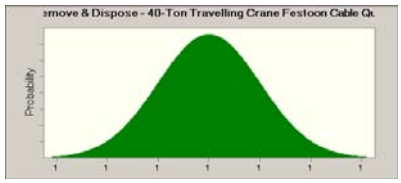
Minimum	$9,000.00	(=Q69)
Likeliest	$10,000.00	(=R69)
Maximum	$12,000.00	(=S69)



Assumption: 57 Remove & Dispose - 40-Ton Travelling Crane Festoon Cable Quantity **Cell: L70**

Normal distribution with parameters:

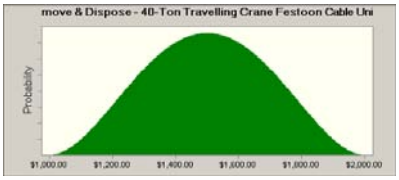
Mean	1	(=L70)
Std. Dev.	0	(=0.000001)



Assumption: 57 Remove & Dispose - 40-Ton Travelling Crane Festoon Cable Unit Pri **Cell: R70**

BetaPERT distribution with parameters:

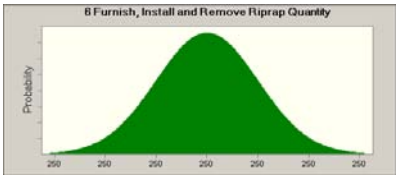
Minimum	$1,000.00	(=Q70)
Likeliest	$1,500.00	(=R70)
Maximum	$2,000.00	(=S70)



Assumption: 6 Furnish, Install and Remove Riprap Quantity **Cell: L19**

Normal distribution with parameters:

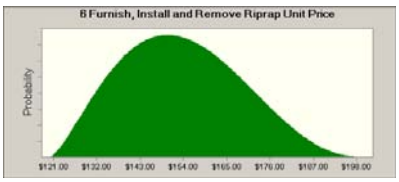
Mean	250	(=L19)
Std. Dev.	0	(=0.000001)



Assumption: 6 Furnish, Install and Remove Riprap Unit Price **Cell: R19**

BetaPERT distribution with parameters:

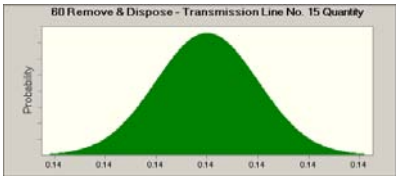
Minimum	$120.00	(=Q19)
Likeliest	$150.00	(=R19)
Maximum	$200.00	(=S19)



Assumption: 60 Remove & Dispose - Transmission Line No. 15 Quantity **Cell: L73**

Normal distribution with parameters:

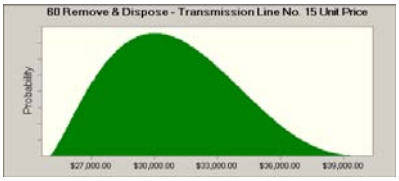
Mean	0.14	(=L73)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose - Transmission Line No. 15 Unit Price **Cell: R73**

BetaPERT distribution with parameters:

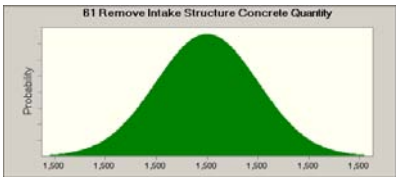
Minimum	$25,000.00	(=Q73)
Likeliest	$30,000.00	(=R73)
Maximum	$40,000.00	(=S73)



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

Normal distribution with parameters:

Mean	1,500	(=L74)
Std. Dev.	0	(=0.000001)



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

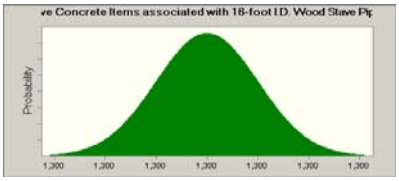
BetaPERT distribution with parameters:

Minimum	$170.00	(=Q74)
Likeliest	$215.00	(=R74)
Maximum	$380.00	(=S74)

Assumption: 62 Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe Qu **Cell: L75**

Normal distribution with parameters:

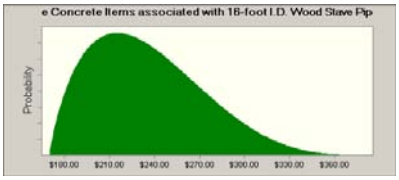
Mean	1,300	(=L75)
Std. Dev.	0	(=0.000001)



Assumption: 62 Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe Unit **Cell: R75**

BetaPERT distribution with parameters:

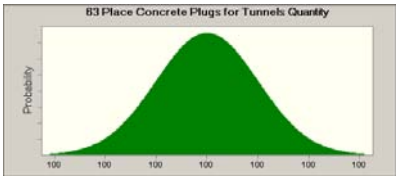
Minimum	$170.00	(=Q75)
Likeliest	$215.00	(=R75)
Maximum	$380.00	(=S75)



Assumption: 63 Place Concrete Plugs for Tunnels Quantity **Cell: L76**

Normal distribution with parameters:

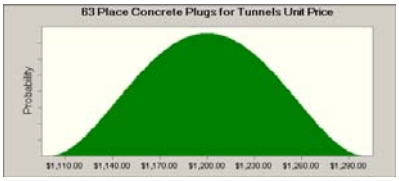
Mean	100	(=L76)
Std. Dev.	0	(=0.000001)



Assumption: 63 Place Concrete Plugs for Tunnels Unit Price **Cell: R76**

BetaPERT distribution with parameters:

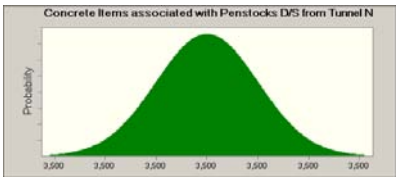
Minimum	$1,100.00	(=Q76)
Likeliest	$1,200.00	(=R76)
Maximum	$1,300.00	(=S76)



Assumption: 64 Remove Concrete Items associated with Penstocks D/S from Tunnel N: 2 **Cell: L77**

Normal distribution with parameters:

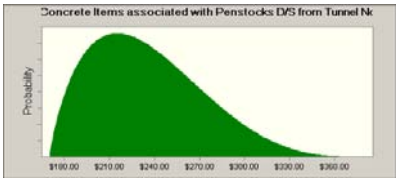
Mean	3,500	(=L77)
Std. Dev.	0	(=0.000001)



Assumption: 64 Remove Concrete Items associated with Penstocks D/S from Tunnel Nd **Cell: R77**

BetaPERT distribution with parameters:

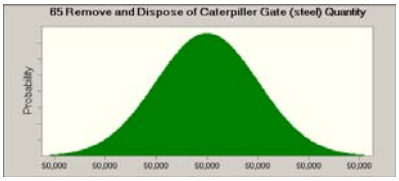
Minimum	$170.00	(=Q77)
Likeliest	$215.00	(=R77)
Maximum	$380.00	(=S77)



Assumption: 65 Remove and Dispose of Caterpiller Gate (steel) Quantity **Cell: L78**

Normal distribution with parameters:

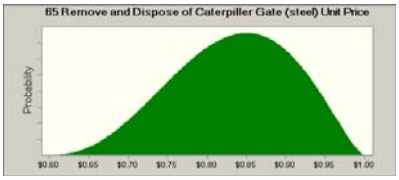
Mean	50,000	(=L78)
Std. Dev.	0	(=0.000001)



Assumption: 65 Remove and Dispose of Caterpiller Gate (steel) Unit Price **Cell: R78**

BetaPERT distribution with parameters:

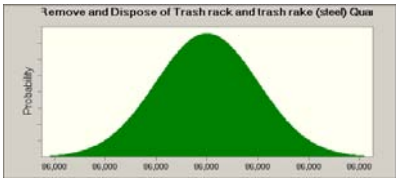
Minimum	$0.60	(=Q78)
Likeliest	$0.85	(=R78)
Maximum	$1.00	(=S78)



Assumption: 66 Remove and Dispose of Trash rack and trash rake (steel) Quantity Cell: L79

Normal distribution with parameters:

Mean	86,000	(=L79)
Std. Dev.	0	(=0.000001)



Assumption: 66 Remove and Dispose of Trash rack and trash rake (steel) Unit Price Cell: R79

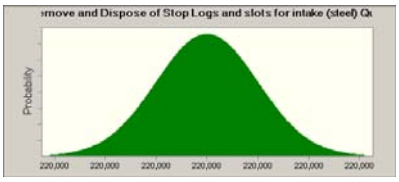
BetaPERT distribution with parameters:

Minimum	$0.60	(=Q79)
Likeliest	$0.75	(=R79)
Maximum	$0.85	(=S79)

Assumption: 67 Remove and Dispose of Stop Logs and slots for intake (steel) Quantity Cell: L80

Normal distribution with parameters:

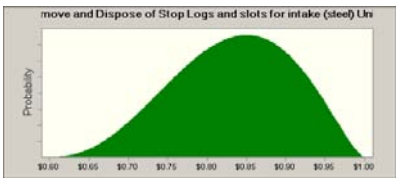
Mean	220,000	(=L80)
Std. Dev.	0	(=0.000001)



Assumption: 67 Remove and Dispose of Stop Logs and slots for intake (steel) Unit Price Cell: R80

BetaPERT distribution with parameters:

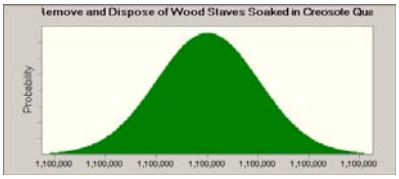
Minimum	$0.60	(=Q80)
Likeliest	$0.85	(=R80)
Maximum	$1.00	(=S80)



Assumption: 68 Remove and Dispose of Wood Staves Soaked in Creosote Quantity Cell: L81

Normal distribution with parameters:

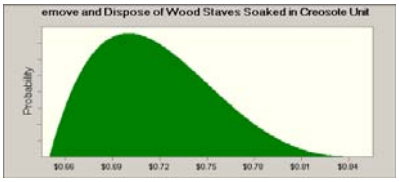
Mean	1,100,000	(=L81)
Std. Dev.	0	(=0.000001)



Assumption: 68 Remove and Dispose of Wood Staves Soaked in Creosote Unit Price Cell: R81

BetaPERT distribution with parameters:

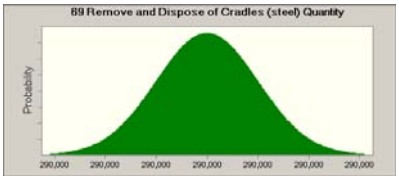
Minimum	$0.65	(=Q81)
Likeliest	$0.70	(=R81)
Maximum	$0.85	(=S81)



Assumption: 69 Remove and Dispose of Cradles (steel) Quantity **Cell: L82**

Normal distribution with parameters:

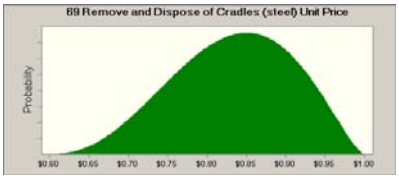
Mean	290,000	(=L82)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove and Dispose of Cradles (steel) Unit Price **Cell: R82**

BetaPERT distribution with parameters:

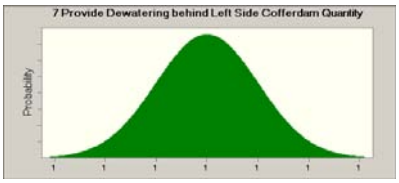
Minimum	$0.60	(=Q82)
Likeliest	$0.85	(=R82)
Maximum	$1.00	(=S82)



Assumption: 7 Provide Dewatering behind Left Side Cofferdam Quantity **Cell: L20**

Normal distribution with parameters:

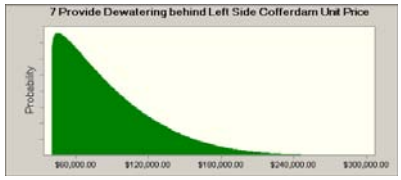
Mean	1	(=L20)
Std. Dev.	0	(=0.000001)



Assumption: 7 Provide Dewatering behind Left Side Cofferdam Unit Price **Cell: R20**

BetaPERT distribution with parameters:

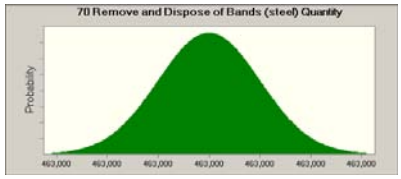
Minimum	$40,000.00	(=Q20)
Likeliest	$45,000.00	(=R20)
Maximum	$300,000.00	(=S20)



Assumption: 70 Remove and Dispose of Bands (steel) Quantity **Cell: L83**

Normal distribution with parameters:

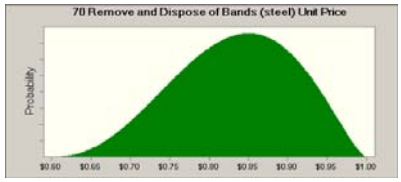
Mean	463,000	(=L83)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove and Dispose of Bands (steel) Unit Price **Cell: R83**

BetaPERT distribution with parameters:

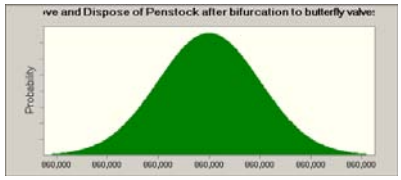
Minimum	$0.60	(=Q83)
Likeliest	$0.85	(=R83)
Maximum	$1.00	(=S83)



Assumption: 71 Remove and Dispose of Penstock after bifurcation to butterfly valves **Cell: L84**

Normal distribution with parameters:

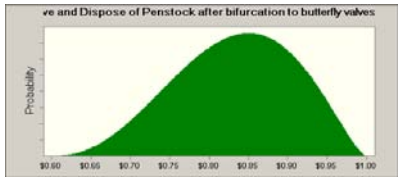
Mean	860,000	(=L84)
Std. Dev.	0	(=0.000001)



Assumption: 71 Remove and Dispose of Penstock after bifurcation to butterfly valves **Cell: R84**

BetaPERT distribution with parameters:

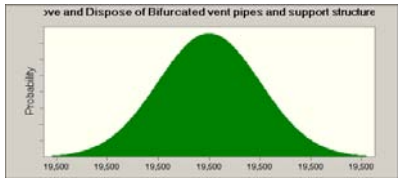
Minimum	$0.60	(=Q84)
Likeliest	$0.85	(=R84)
Maximum	$1.00	(=S84)



Assumption: 72 Remove and Dispose of Bifurcated vent pipes and support structure **Cell: L85**

Normal distribution with parameters:

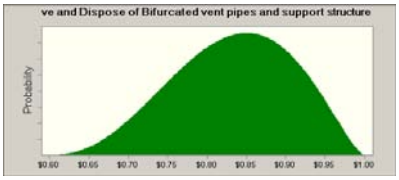
Mean	19,500	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 72 Remove and Dispose of Bifurcated vent pipes and support structure Unit Cell: R85

BetaPERT distribution with parameters:

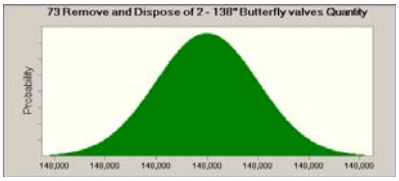
Minimum	$0.60	(=Q85)
Likeliest	$0.85	(=R85)
Maximum	$1.00	(=S85)



Assumption: 73 Remove and Dispose of 2 - 138" Butterfly valves Quantity Cell: L86

Normal distribution with parameters:

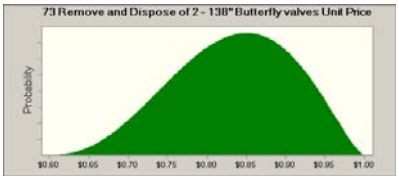
Mean	148,000	(=L86)
Std. Dev.	0	(=0.000001)



Assumption: 73 Remove and Dispose of 2 - 138" Butterfly valves Unit Price Cell: R86

BetaPERT distribution with parameters:

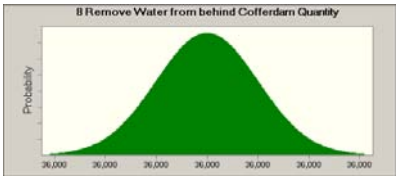
Minimum	$0.60	(=Q86)
Likeliest	$0.85	(=R86)
Maximum	$1.00	(=S86)



Assumption: 8 Remove Water from behind Cofferdam Quantity **Cell: L21**

Normal distribution with parameters:

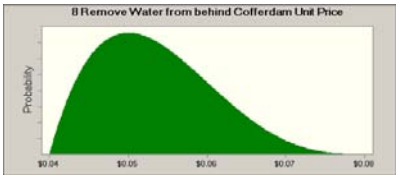
Mean	36,000	(=L21)
Std. Dev.	0	(=0.000001)



Assumption: 8 Remove Water from behind Cofferdam Unit Price **Cell: R21**

BetaPERT distribution with parameters:

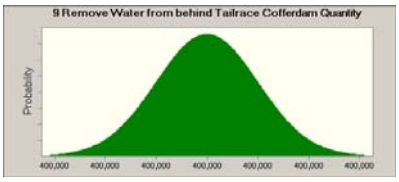
Minimum	$0.04	(=Q21)
Likeliest	$0.05	(=R21)
Maximum	$0.08	(=S21)



Assumption: 9 Remove Water from behind Tailrace Cofferdam Quantity **Cell: L22**

Normal distribution with parameters:

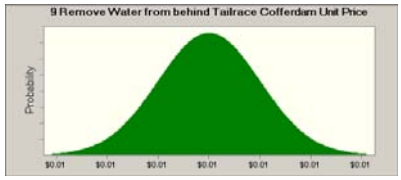
Mean	400,000	(=L22)
Std. Dev.	0	(=0.000001)



Assumption: 9 Remove Water from behind Tailrace Cofferdam Unit Price **Cell: R22**

Normal distribution with parameters:

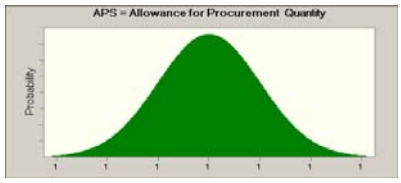
Mean	$0.01	(=R22)
Std. Dev.	$0.00	(=0.000001)



Assumption: APS = Allowance for Procurement Quantity **Cell: L95**

Normal distribution with parameters:

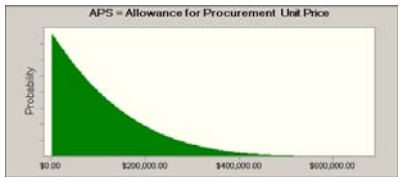
Mean	1	(=L95)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R95**

BetaPERT distribution with parameters:

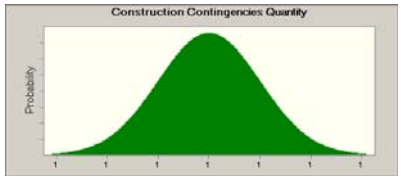
Minimum	$0.00	(=Q95)
Likeliest	$0.00	(=R95)
Maximum	$671,016.00	(=S95)



Assumption: Construction Contingencies Quantity **Cell: L98**

Normal distribution with parameters:

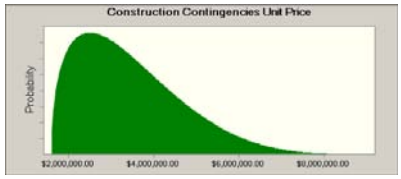
Mean	1	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: Construction Contingencies Unit Price **Cell: R98**

BetaPERT distribution with parameters:

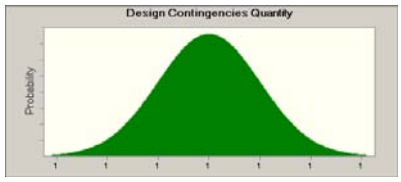
Minimum	$1,600,000.00	(=Q98)
Likeliest	$2,500,000.00	(=R98)
Maximum	$9,000,000.00	(=S98)



Assumption: Design Contingencies Quantity **Cell: L94**

Normal distribution with parameters:

Mean	1	(=L94)
Std. Dev.	0	(=0.000001)



Assumption: Design Contingencies Unit Price **Cell: R94**

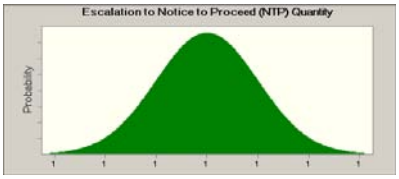
BetaPERT distribution with parameters:

Minimum	$683,568.00	(=Q94)
Likeliest	$1,097,054.00	(=R94)
Maximum	$4,154,392.00	(=S94)

Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L91**

Normal distribution with parameters:

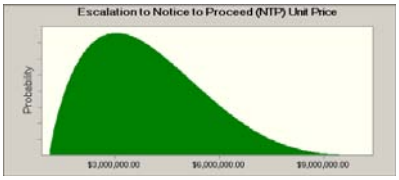
Mean	1	(=L91)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R91**

BetaPERT distribution with parameters:

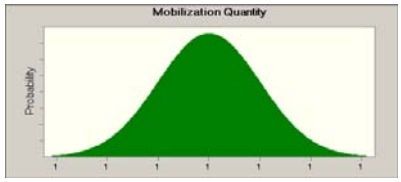
Minimum	$1,136,602.00	(=Q91)
Likeliest	$3,046,036.00	(=R91)
Maximum	$10,162,062.00	(=S91)



Assumption: Mobilization Quantity **Cell: L89**

Normal distribution with parameters:

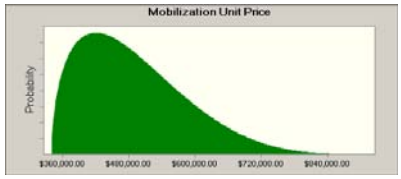
Mean	1	(=L89)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R89**

BetaPERT distribution with parameters:

Minimum	$340,000.00	(=Q89)
Likeliest	$420,000.00	(=R89)
Maximum	$910,000.00	(=S89)



Assumption: Non-Contract Cost Quantity **Cell: L100**

Normal distribution with parameters:

Mean	1	(=L100)
Std. Dev.	0	(=0.000001)

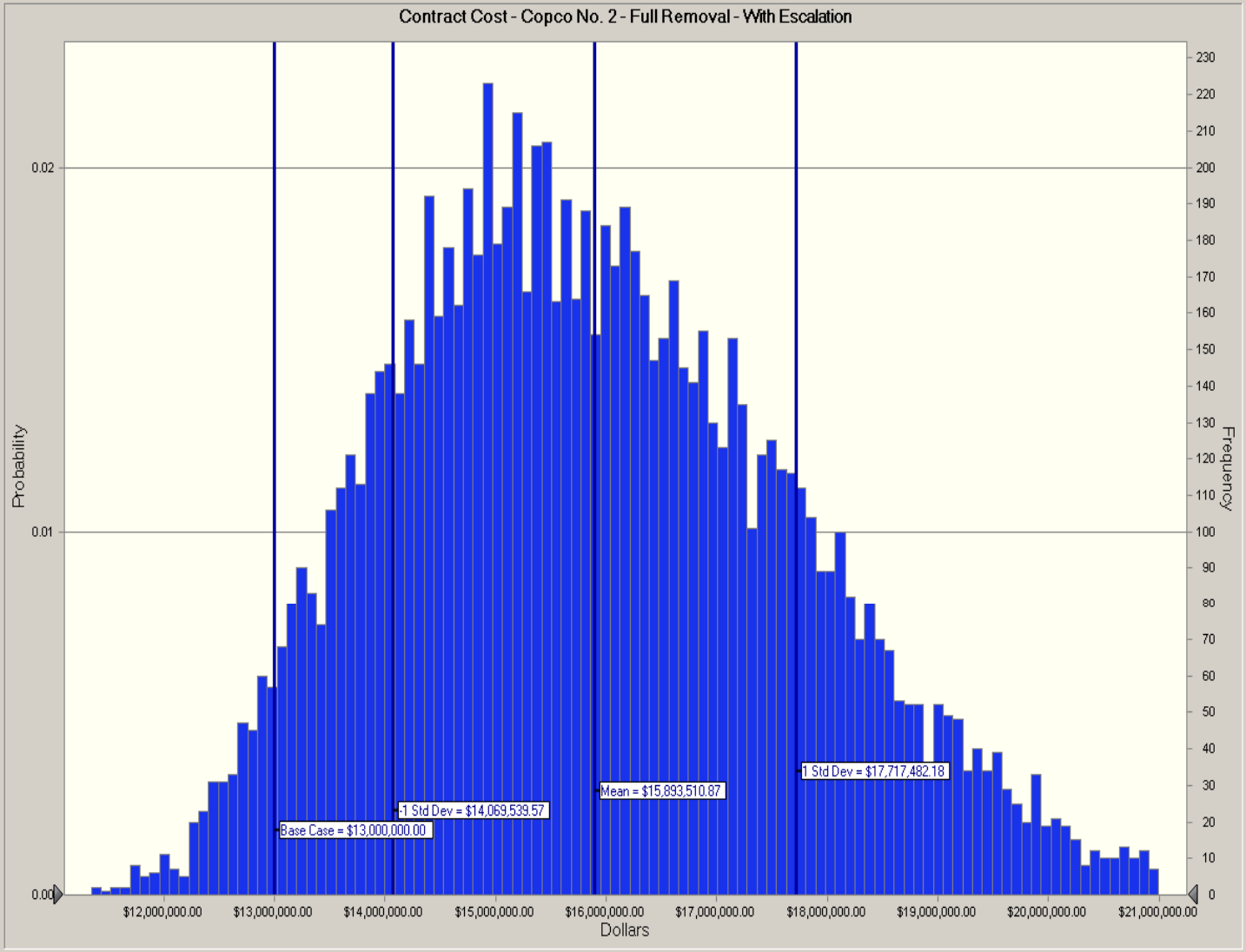
Assumption: Non-Contract Cost Unit Price **Cell: R100**

BetaPERT distribution with parameters:

Minimum	$5,500,000.00	(=Q100)
Likeliest	$8,500,000.00	(=R100)
Maximum	$26,000,000.00	(=S100)

End of Assumptions

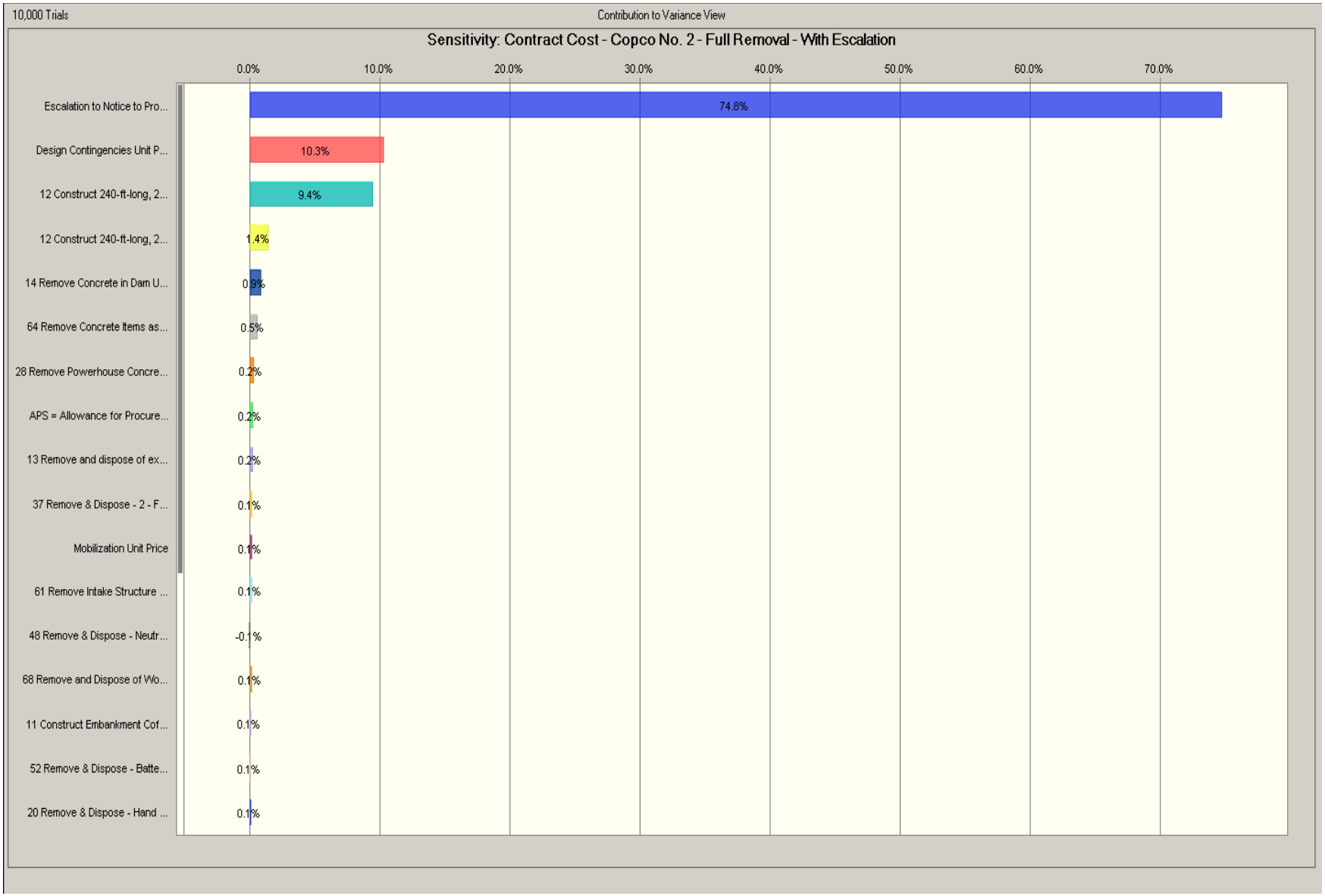
10,000 Trials | Split View | 9,952 Displayed



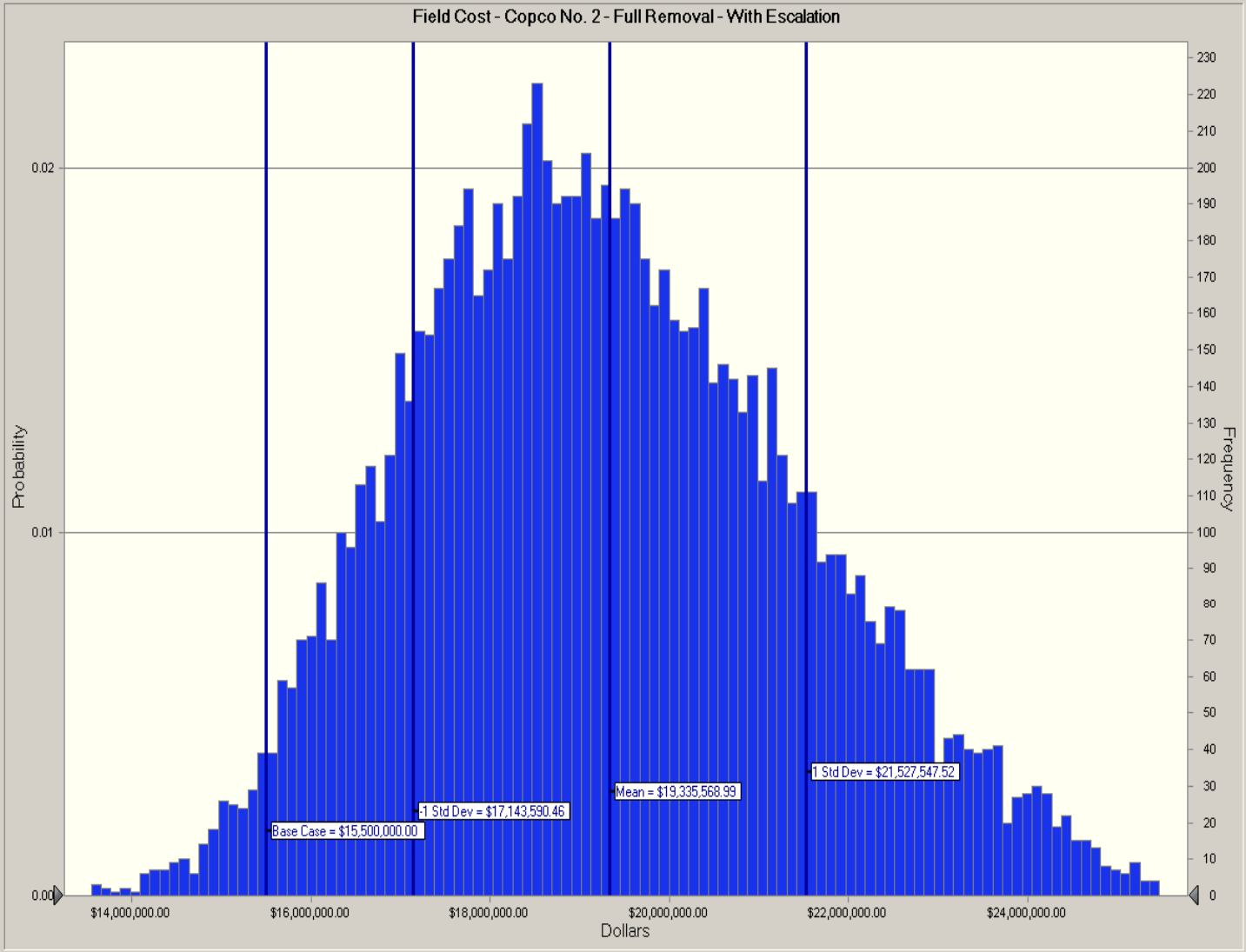
Statistic	Forecast values
Trials	10,000
Mean	$15,893,510.87
Median	$15,732,288.47
Mode	---
Standard Deviation	$1,823,971.31
Variance	$3,326,871,333,287.6
Skewness	0.3964
Kurtosis	2.84
Coeff. of Variability	0.1148
Minimum	$11,342,441.45
Maximum	$22,813,757.17
Mean Std. Error	$18,239.71

Percentile	Forecast values
0%	$11,342,441.45
10%	$13,640,753.26
20%	$14,288,131.00
30%	$14,798,788.08
40%	$15,253,020.43
50%	$15,731,934.56
60%	$16,230,472.55
70%	$16,794,134.43
80%	$17,468,218.55
90%	$18,358,651.26
100%	$22,813,757.17

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Copco No. 2 - Full Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Escalation to Notice to Pro...
74.8%
Design Contingencies Unit P...
10.3%
12 Construct 240-ft-long, 2...
9.4%
12 Construct 240-ft-long, 2...
1.4%
14 Remove Concrete in Dam U...
0.9%
64 Remove Concrete Items as...
0.5%
28 Remove Powerhouse Concre...
0.2%
APS = Allowance for Procure...
0.2%
13 Remove and dispose of ex...
0.2%
37 Remove & Dispose - 2 - F...
0.1%
Mobilization Unit Price
0.1%
61 Remove Intake Structure ...
0.1%
48 Remove & Dispose - Neutr...
-0.1%
68 Remove and Dispose of Wo...
0.1%
11 Construct Embankment Cof...
0.1%
52 Remove & Dispose - Batte...
0.1%
20 Remove & Dispose - Hand ...
0.1%

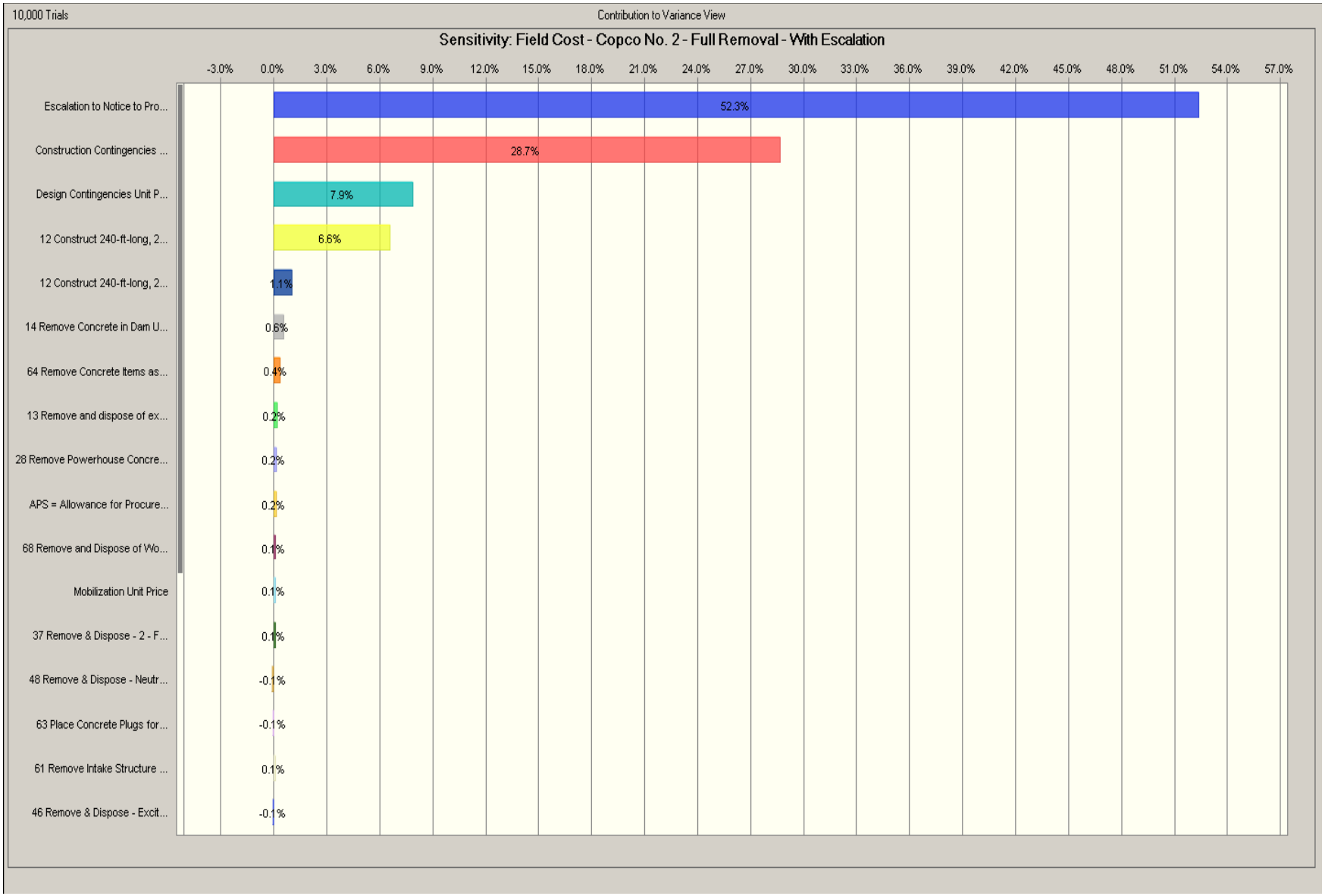
10,000 Trials | Split View | 9,942 Displayed



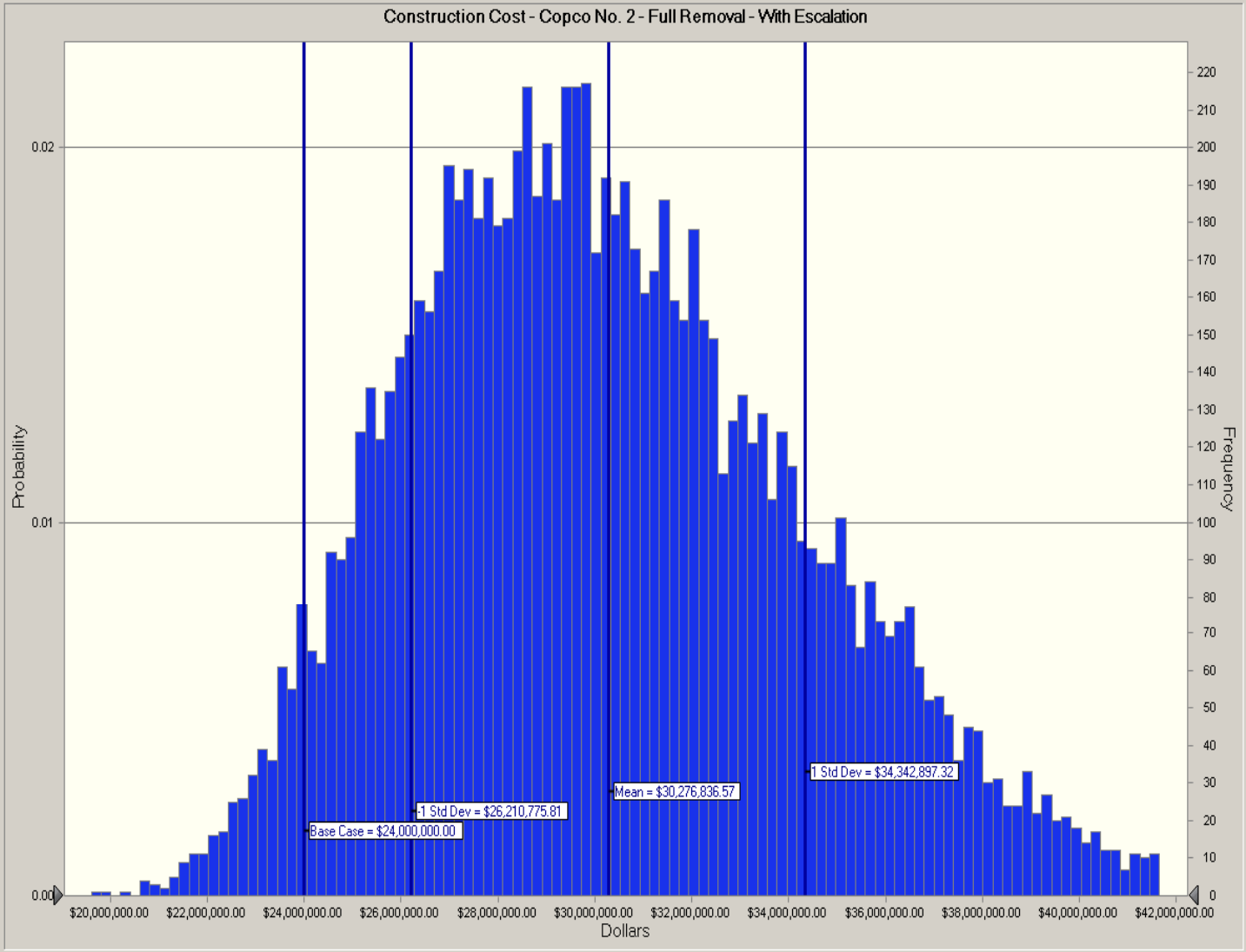
Statistic	Forecast values
Trials	10,000
Mean	$19,335,568.99
Median	$19,151,240.09
Mode	---
Standard Deviation	$2,191,978.53
Variance	$4,804,769,888,090.4
Skewness	0.3803
Kurtosis	2.92
Coeff. of Variability	0.1134
Minimum	$13,547,597.36
Maximum	$27,683,965.73
Mean Std. Error	$21,919.79

Percentile	Forecast values
0%	$13,547,597.36
10%	$16,615,926.69
20%	$17,429,404.48
30%	$18,046,141.40
40%	$18,590,021.91
50%	$19,150,042.77
60%	$19,737,270.05
70%	$20,405,701.80
80%	$21,196,522.40
90%	$22,313,891.28
100%	$27,683,965.73

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - Copco No. 2 - Full Removal - With Escalation
-3.0% 0.0% 3.0% 6.0% 9.0% 12.0% 15.0% 18.0% 21.0% 24.0% 27.0% 30.0% 33.0% 36.0% 39.0% 42.0% 45.0% 48.0% 51.0% 54.0% 57.0%
Escalation to Notice to Pro... 52.3%
Construction Contingencies ... 28.7%
Design Contingencies Unit P... 7.9%
12 Construct 240-ft-long, 2... 6.6%
12 Construct 240-ft-long, 2... 1.1%
14 Remove Concrete in Dam U... 0.6%
64 Remove Concrete Items as... 0.4%
13 Remove and dispose of ex... 0.2%
28 Remove Powerhouse Concre... 0.2%
APS = Allowance for Procure... 0.2%
68 Remove and Dispose of Wo... 0.1%
Mobilization Unit Price 0.1%
37 Remove & Dispose - 2 - F... 0.1%
48 Remove & Dispose - Neutr... -0.1%
63 Place Concrete Plugs for... -0.1%
61 Remove Intake Structure ... 0.1%
46 Remove & Dispose - Excit... -0.1%

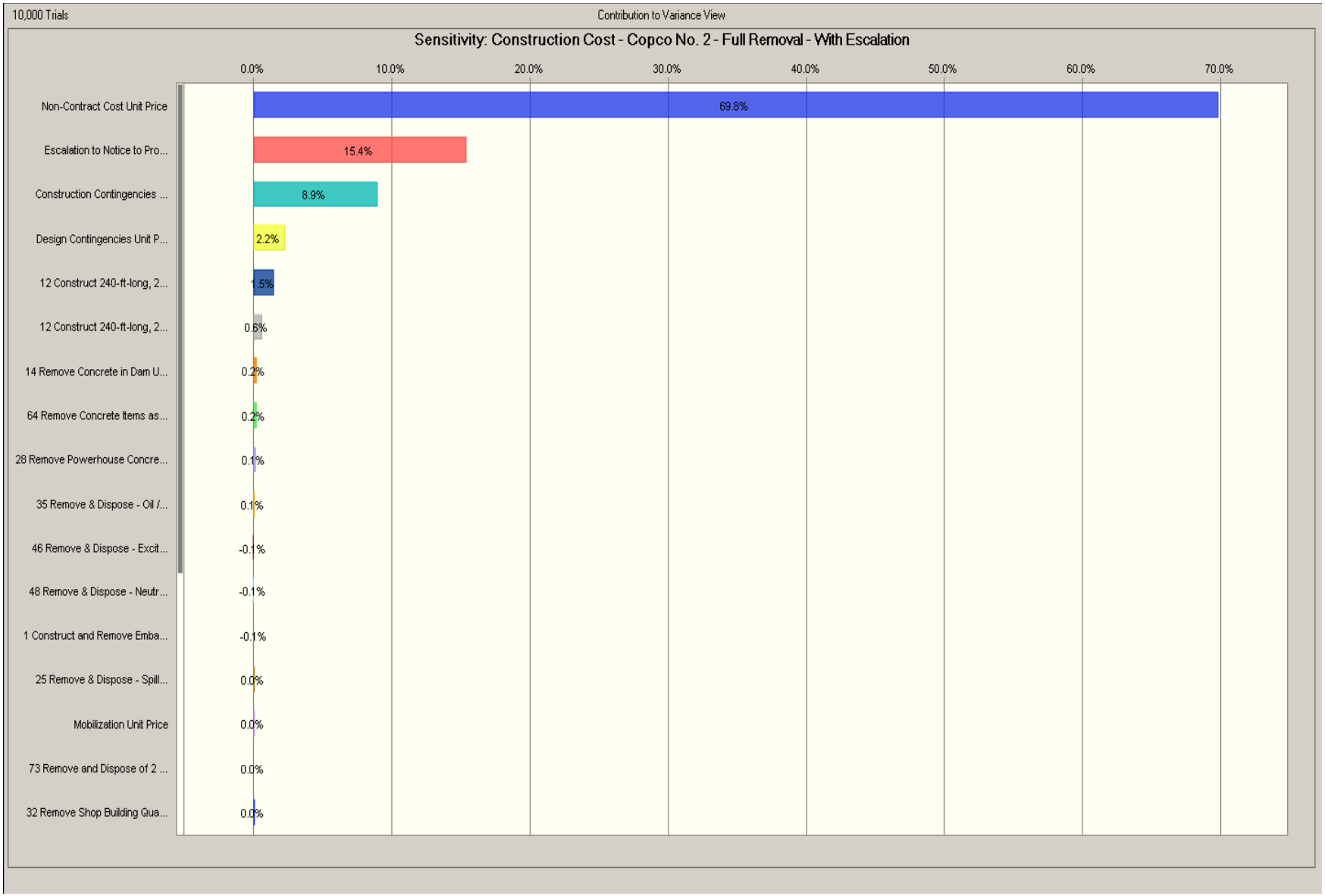
10,000 Trials | Split View | 9,939 Displayed



Statistic	Forecast values
Trials	10,000
Mean	$30,276,836.57
Median	$29,852,759.55
Mode	---
Standard Deviation	$4,066,060.76
Variance	$16,532,850,088,294.
Skewness	0.4595
Kurtosis	2.95
Coeff. of Variability	0.1343
Minimum	$19,600,022.02
Maximum	$46,617,455.61
Mean Std. Error	$40,660.61

Percentile	Forecast values
0%	$19,600,022.02
10%	$25,314,965.30
20%	$26,732,187.90
30%	$27,814,772.61
40%	$28,975,999.65
50%	$29,851,421.66
60%	$30,950,921.89
70%	$32,156,784.61
80%	$33,724,473.97
90%	$35,886,502.51
100%	$46,617,455.61

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Copco No. 2 - Full Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
Non-Contract Cost Unit Price
69.8%
Escalation to Notice to Pro...
15.4%
Construction Contingencies ...
8.9%
Design Contingencies Unit P...
2.2%
12 Construct 240-ft-long, 2...
1.5%
12 Construct 240-ft-long, 2...
0.6%
14 Remove Concrete in Dam U...
0.2%
64 Remove Concrete Items as...
0.2%
28 Remove Powerhouse Concre...
0.1%
35 Remove & Dispose - Oil /...
0.1%
46 Remove & Dispose - Excit...
-0.1%
48 Remove & Dispose - Neutr...
-0.1%
1 Construct and Remove Emba...
-0.1%
25 Remove & Dispose - Spill...
0.0%
Mobilization Unit Price
0.0%
73 Remove and Dispose of 2 ...
0.0%
32 Remove Shop Building Qua...
0.0%