BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial 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 - Partial\Feasibility Estimates\Copco 2\[Copco 2 - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]Copco 2 - 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	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	0	0	0	GAL				$0.00	$0.00	$0.00
	10	Provide Dewatering behind Tailrace Cofferdam	8130	0	0	0	LS				$0.00	$0.00	$0.00
	11	Construct Embankment Cofferdam across Tailrace	8130	0	0	0	CY				$0.00	$0.00	$0.00
	12	Construct 240-ft-long, 2-span concrete Bridge	8130	0	0	0	SF				$0.00	$0.00	$0.00
	13	Remove and dispose of existing bridge	8130	0	0	0	LS				$0.00	$0.00	$0.00
	14	Remove Concrete in Dam	8130	4,200	4,200	4,200	CY	$270.00	$315.00	$500.00	$1,134,000.00	$1,323,000.00	$2,100,000.00
	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	0	0	0	CY				$0.00	$0.00	$0.00
	18	Right Abutment Removal - Remove Hand Placed Riprap	8313	0	0	0	SF				$0.00	$0.00	$0.00
	19	Right Abutment Removal - Gunite Curtain Wall	8313	0	0	0	CY				$0.00	$0.00	$0.00
	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	0	0	0	SF				$0.00	$0.00	$0.00
	28	Remove Powerhouse Concrete down to spring-line of turbine	8130	0	0	0	CY				$0.00	$0.00	$0.00
	29	Remove Structural Steel items associated with Powerhouse	8130	0	0	0	LBS				$0.00	$0.00	$0.00
	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	0	0	0	SF				$0.00	$0.00	$0.00
	33	Remove & Dispose - 2- Govenor oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	34	Remove & Dispose - Cooling water and bearing oil systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	35	Remove & Dispose - Oil / Water seperator tank and piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	36	Remove & Dispose - 12 - Cast Iron Columns	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	37	Remove & Dispose - 2 - Francis Turbines	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	38	Remove & Dispose - 2-40 Ton indoor crane	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	39	Remove & Dispose - Compressed Air systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	40	Remove & Dispose - 2 - CO2 systems	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	41	Remove & Dispose - Plant Water and Fire Protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	42	Remove & Dispose - Transformer Oil Fire protection	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	43	Remove & Dispose - Unwatering Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	44	Remove & Dispose - Drainage Piping	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	44A	Remove Petroleum Products from Mechanical Equipment	8420	3,300	3,300	3,300	GAL	$9.00	$10.00	$12.00	$29,700.00	$33,000.00	$39,600.00
	44B	Remove Petroleum Products at or near the Power House	8420	2,000	2,000	2,000	GAL	$9.00	$10.00	$12.00	$18,000.00	$20,000.00	$24,000.00
	45	Remove & Dispose - AC Generator, Indoor Vertical	8430	0	0	0	EA				$0.00	$0.00	$0.00
	46	Remove & Dispose - Excitation equipment for 15 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	47	Remove & Dispose - Surge protection equip. for 15 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	48	Remove & Dispose - Neutral grounding equip. for 15 MVA Generator	8430	0	0	0	EA				$0.00	$0.00	$0.00
	49	Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers	8430	0	0	0	EA				$0.00	$0.00	$0.00
	50	Remove & Dispose - Station Service Switchgear, 600 volt -(5 sections)	8430	0	0	0	EA				$0.00	$0.00	$0.00
	51	Remove & Dispose - Unit and plant control switchboard	8430	0	0	0	EA				$0.00	$0.00	$0.00
	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	0	0	0	EA				$0.00	$0.00	$0.00

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Klamath River Dams Removal
Partial 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 - Partial\Feasibility Estimates\Copco 2\[Copco 2 - Partial Removal Crystal Ball - with Escalation - 2011-04.xls]Copco 2 - 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
	54	Remove & Dispose - Misc. power & control boards	8430	0	0	0	EA				$0.00	$0.00	$0.00
	55	Remove & Dispose - 7 40-Ton Travelling Crane motors-hoist (2-30Hp*),	8430	0	0	0	EA				$0.00	$0.00	$0.00
	56	Remove & Dispose - 40-Ton Travelling Crane control equipment	8430	0	0	0	EA				$0.00	$0.00	$0.00
	57	Remove & Dispose - 40-Ton Travelling Crane Festoon Cable	8430	0	0	0	EA				$0.00	$0.00	$0.00
	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
	60A	Remove Oil from Oil-filled Step-up Transformers	8430	23,000	23,000	23,000	GAL	$9.00	$10.00	$12.00	$207,000.00	$230,000.00	$276,000.00
	61	Remove Intake Structure Concrete	8130	0	0	0	CY				$0.00	$0.00	$0.00
	62	Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe	8130	0	0	0	CY				$0.00	$0.00	$0.00
	63	Place Concrete Plugs for Tunnels	8130	64	64	64	CY	$1,100.00	$1,200.00	$1,300.00	$70,400.00	$76,800.00	$83,200.00
	64	Remove Concrete Items associated with Penstocks D/S from Tunnel No. 2	8130	0	0	0	CY				$0.00	$0.00	$0.00
	65	Remove and Dispose of Caterpiller Gate (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	66	Remove and Dispose of Trash rack and trash rake (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	67	Remove and Dispose of Stop Logs and slots for intake (steel)	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	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	0	0	0	LBS				$0.00	$0.00	$0.00
	72	Remove and Dispose of Bifurcated vent pipes and support structure	8420	0	0	0	LBS				$0.00	$0.00	$0.00
	73	Remove and Dispose of 2 - 138" Butterfly valves	8420	0	0	0	LBS				$0.00	$0.00	$0.00
		Subtotal 1									$3,253,780.00	$3,872,090.00	$5,798,490.00
		Mobilization (MPL ~ 5%; MP ~ 5%; MPH ~ 5%)		1	1	1	ls	$165,000.00	$195,000.00	$290,000.00	$165,000.00	$195,000.00	$290,000.00
		Subtotal 1 w/ mobilization											
		Escalation to Notice to Proceed (NTP)		1	1	1	ls	$548,854.00	$1,398,739.00	$3,254,254.00	$548,854.00	$1,398,739.00	$3,254,254.00
		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	$332,366.00	$534,171.00	$1,442,373.00	$332,366.00	$534,171.00	$1,442,373.00
		APS = Allowance for Procurement		1	1	1	ls	$0.00	$0.00	$214,883.00	$0.00	$0.00	$214,883.00
		Strategies (if applicable) (MPL ~ 0%; MP ~ 0%; MPH ~ 2%)											
		CONTRACT COST									**$4,300,000.00**	**$6,000,000.00**	**$11,000,000.00**
		Construction Contingencies (MPL ~ 18%; MP ~ 20%; MPH ~ 25%)		1	1	1	ls	$800,000.00	$1,200,000.00	$2,500,000.00	$800,000.00	$1,200,000.00	$2,500,000.00
		FIELD COST									**$5,100,000.00**	**$7,200,000.00**	**$13,500,000.00**
		Non-Contract Cost (MPL ~ 62%; MP ~ 65%; MPH ~ 71%)		1	1	1	ls	$3,200,000.00	$4,800,000.00	$9,500,000.00	$3,200,000.00	$4,800,000.00	$9,500,000.00
		CONSTRUCTION COST									**$8,300,000.00**	**$12,000,000.00**	**$23,000,000.00**

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 06-09-11
DATE PREPARED	1/20/2011	PEER REVIEW: See Group Worksheets	DATE PREPARED	06/09/11	PEER REVIEW 6-9-11

Crystal Ball Report - Full
Simulation started on 6/9/2011 at 9:02:30
Simulation stopped on 6/9/2011 at 9:02:56

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)	25.88
Trials/second (average)	386
Random numbers per sec	27,053
Crystal Ball data:	
Assumptions	70
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	3

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

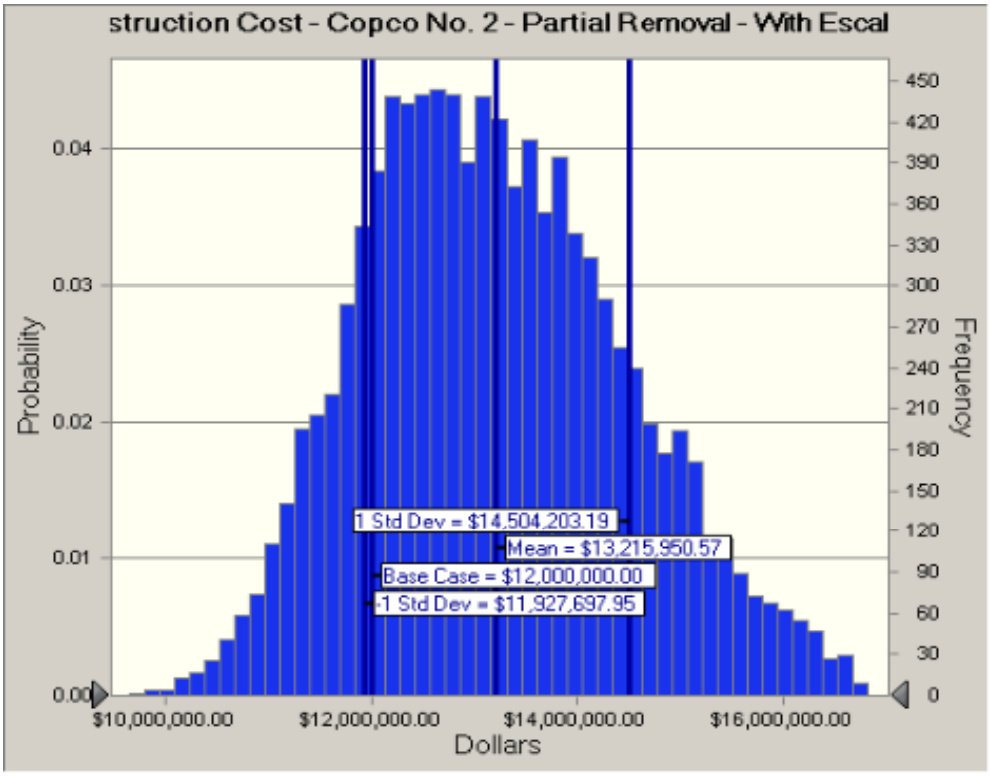
DATE	PEER REVIEWER(S)	CODE
6/9/11	Signature DAN MAY Printed Name	8170
	Signature Printed Name	
Author Initials	PEER REVIEW NOT REQUIRED	

Forecasts

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

Forecast: Construction Cost - Copco No. 2 - Partial Removal - With Escalation **Cell: U104**

Summary:
Entire range is from $9,652,055.69 to $18,089,119.59
Base case is $12,000,000.00
After 10,000 trials, the std. error of the mean is $12,882.53



Forecast: Construction Cost - Copco No. 2 - Partial Removal - With Escalation (cont'd) **Cell: U104**

Statistics:	Forecast values
Trials	10,000
Mean	$13,215,950.57
Median	$13,112,875.88
Mode	---
Standard Deviation	$1,288,252.62
Variance	$1,659,594,814,394.06
Skewness	0.3438
Kurtosis	2.80
Coeff. of Variability	0.0975
Minimum	$9,652,055.69
Maximum	$18,089,119.59
Range Width	$8,437,063.90
Mean Std. Error	$12,882.53

Percentiles:	Forecast values
0%	$9,652,055.69
10%	$11,625,740.65
20%	$12,092,799.23
30%	$12,433,622.17
40%	$12,768,305.15
50%	$13,112,807.18
60%	$13,475,653.62
70%	$13,862,536.42
80%	$14,319,750.10
90%	$14,983,335.12
100%	$18,089,119.59

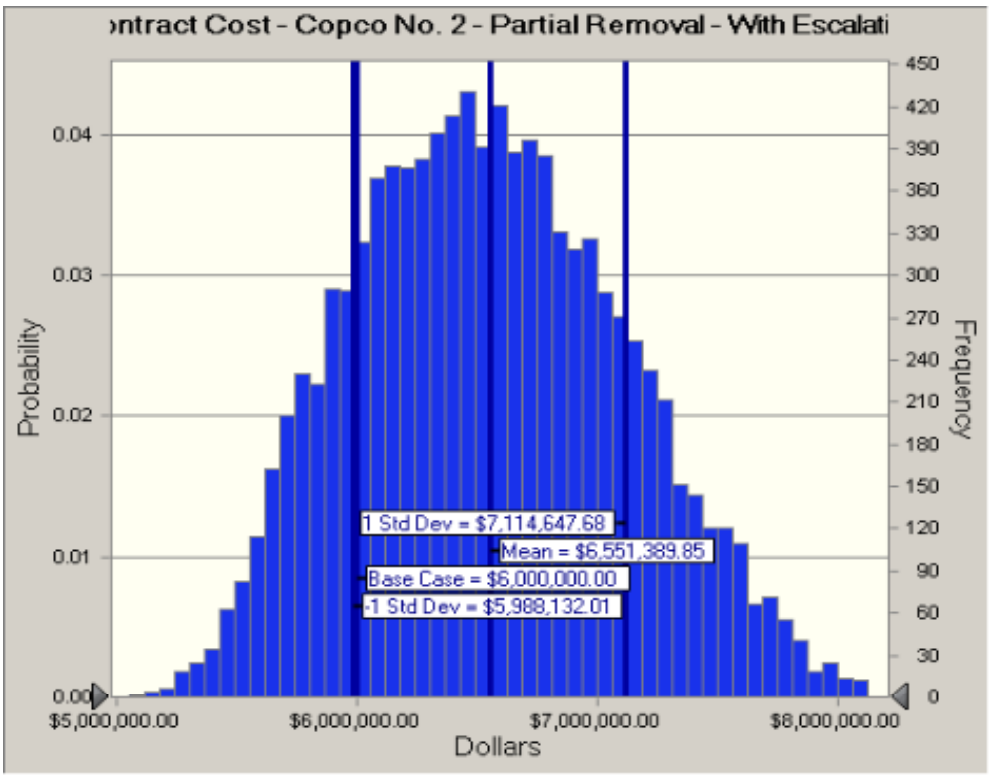
Forecast: Contract Cost - Copco No. 2 - Partial Removal - With Escalation **Cell: U100**

Summary:

Entire range is from $5,052,210.87 to $8,717,284.66

Base case is $6,000,000.00

After 10,000 trials, the std. error of the mean is $5,632.58



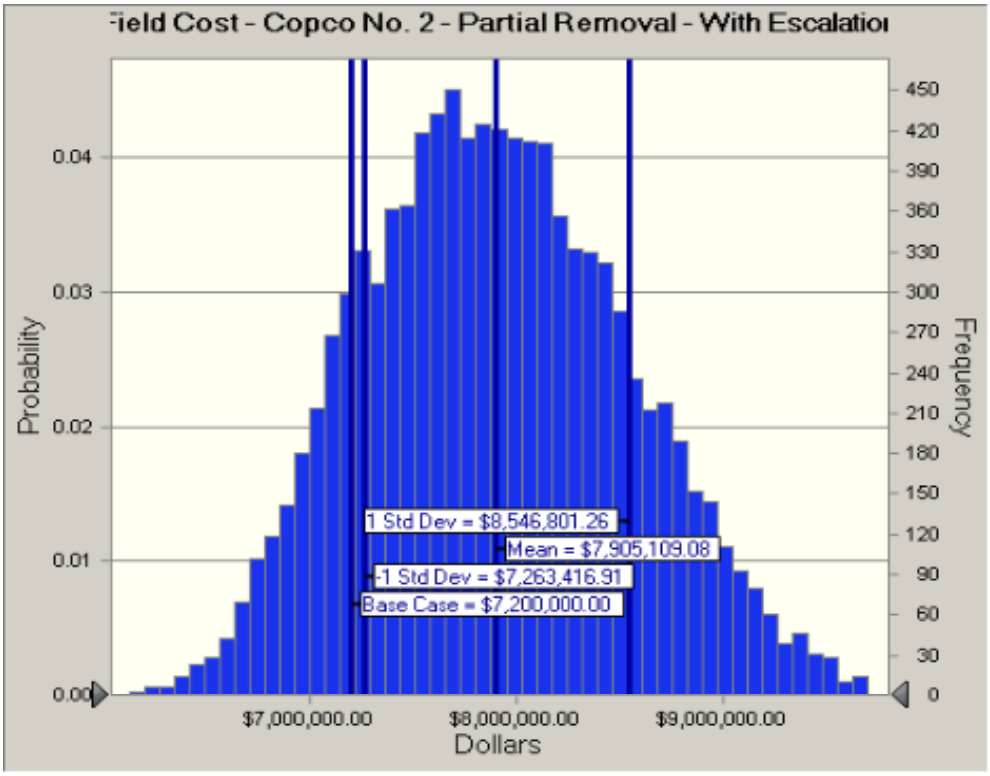
Forecast: Contract Cost - Copco No. 2 - Partial Removal - With Escalation (cont'd) Cell: U100

Statistics:	Forecast values
Trials	10,000
Mean	$6,551,389.85
Median	$6,522,352.01
Mode	---
Standard Deviation	$563,257.83
Variance	$317,259,388,481.60
Skewness	0.2380
Kurtosis	2.63
Coeff. of Variability	0.0860
Minimum	$5,052,210.87
Maximum	$8,717,284.66
Range Width	$3,665,073.79
Mean Std. Error	$5,632.58

Percentiles:	Forecast values
0%	$5,052,210.87
10%	$5,822,760.46
20%	$6,041,874.95
30%	$6,211,815.01
40%	$6,373,461.09
50%	$6,522,330.95
60%	$6,681,388.67
70%	$6,847,228.50
80%	$7,046,174.11
90%	$7,300,733.61
100%	$8,717,284.66

Forecast: Field Cost - Copco No. 2 - Partial Removal - With Escalation **Cell: U102**

Summary:
Entire range is from $6,128,829.44 to $10,264,761.92
Base case is $7,200,000.00
After 10,000 trials, the std. error of the mean is $6,416.92



Forecast: Field Cost - Copco No. 2 - Partial Removal - With Escalation (cont'd) **Cell: U102**

Statistics:	Forecast values
Trials	10,000
Mean	$7,905,109.08
Median	$7,874,360.68
Mode	---
Standard Deviation	$641,692.17
Variance	$411,768,845,734.85
Skewness	0.2355
Kurtosis	2.75
Coeff. of Variability	0.0812
Minimum	$6,128,829.44
Maximum	$10,264,761.92
Range Width	$4,135,932.47
Mean Std. Error	$6,416.92

Percentiles:	Forecast values
0%	$6,128,829.44
10%	$7,095,883.70
20%	$7,331,046.27
30%	$7,537,449.50
40%	$7,704,660.45
50%	$7,874,246.12
60%	$8,050,816.01
70%	$8,237,002.20
80%	$8,458,251.36
90%	$8,763,811.61
100%	$10,264,761.92

End of Forecasts

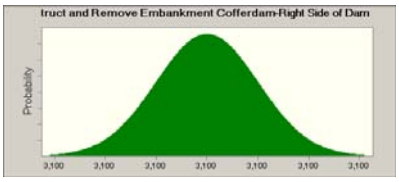
Assumptions

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

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

Normal distribution with parameters:

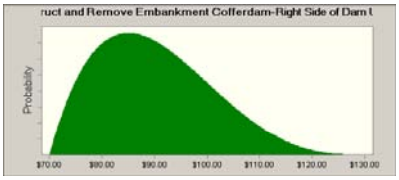
Mean	3,100	(=L14)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

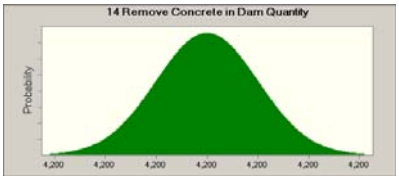
Minimum	$70.00	(=Q14)
Likeliest	$85.00	(=R14)
Maximum	$130.00	(=S14)



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

Normal distribution with parameters:

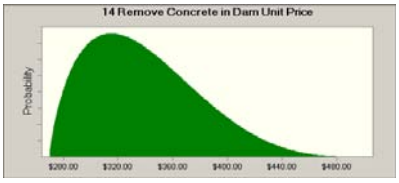
Mean	4,200	(=L27)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

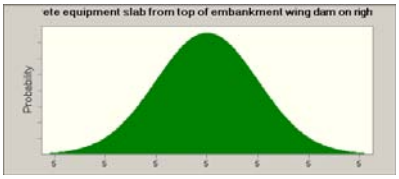
Minimum	$270.00	(=Q27)
Likeliest	$315.00	(=R27)
Maximum	$500.00	(=S27)



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

Normal distribution with parameters:

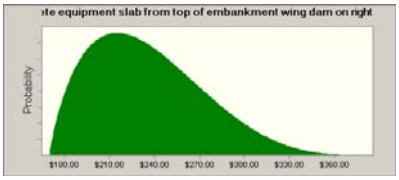
Mean	5	(=L28)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

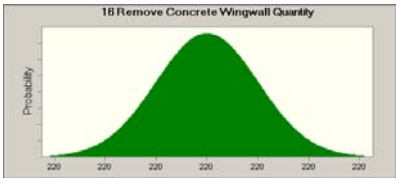
Minimum	$170.00	(=Q28)
Likeliest	$215.00	(=R28)
Maximum	$380.00	(=S28)



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**

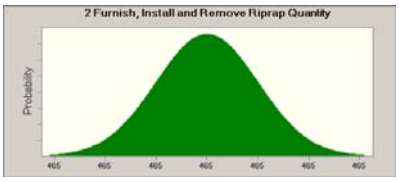
BetaPERT distribution with parameters:

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

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

Normal distribution with parameters:

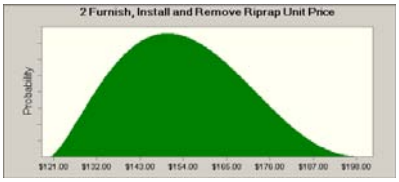
Mean	465	(=L15)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

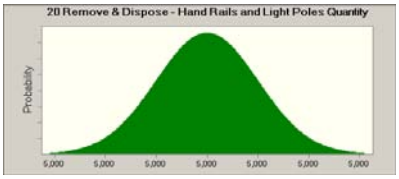
Minimum	$120.00	(=Q15)
Likeliest	$150.00	(=R15)
Maximum	$200.00	(=S15)



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**

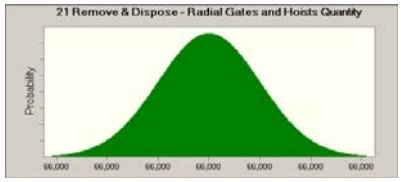
BetaPERT distribution with parameters:

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:

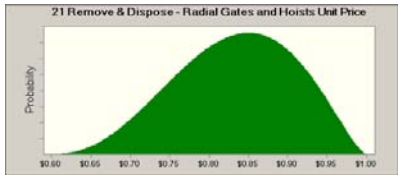
Mean	66,000	(=L34)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

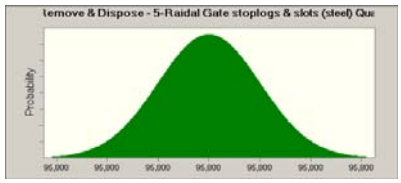
Minimum	$0.60	(=Q34)
Likeliest	$0.85	(=R34)
Maximum	$1.00	(=S34)



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

Normal distribution with parameters:

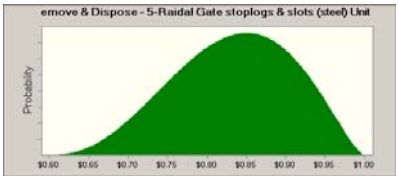
Mean	95,800	(=L35)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

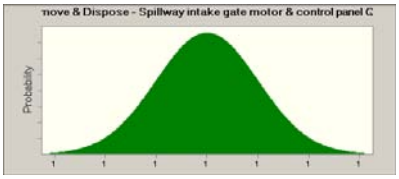
Minimum	$0.60	(=Q35)
Likeliest	$0.85	(=R35)
Maximum	$1.00	(=S35)



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

Normal distribution with parameters:

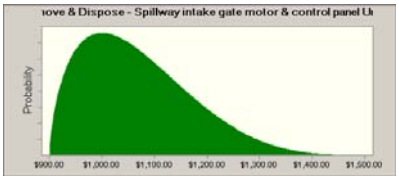
Mean	1	(=L36)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

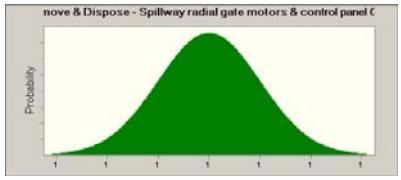
Minimum	$900.00	(=Q36)
Likeliest	$1,000.00	(=R36)
Maximum	$1,500.00	(=S36)



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

Normal distribution with parameters:

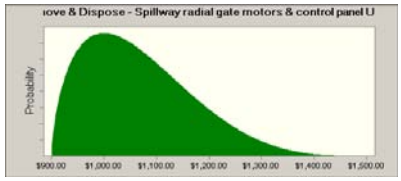
Mean	1	(=L37)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

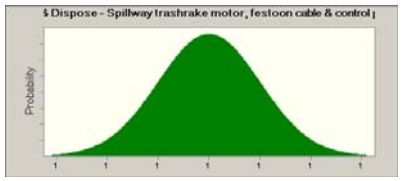
Minimum	$900.00	(=Q37)
Likeliest	$1,000.00	(=R37)
Maximum	$1,500.00	(=S37)



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

Normal distribution with parameters:

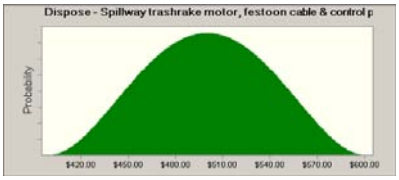
Mean	1	(=L38)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

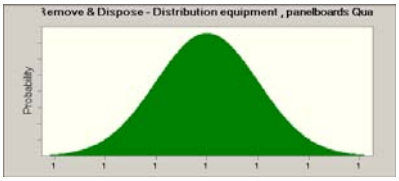
Minimum	$400.00	(=Q38)
Likeliest	$500.00	(=R38)
Maximum	$600.00	(=S38)



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

Normal distribution with parameters:

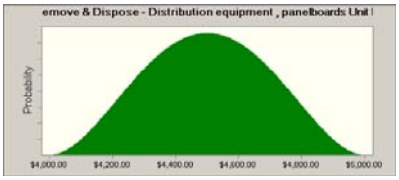
Mean	1	(=L39)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

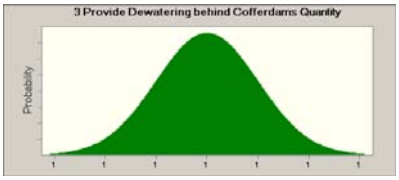
Minimum	$4,000.00	(=Q39)
Likeliest	$4,500.00	(=R39)
Maximum	$5,000.00	(=S39)



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

Normal distribution with parameters:

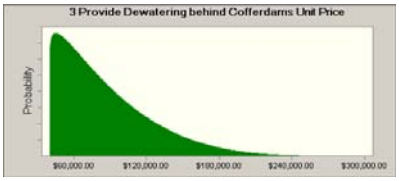
Mean	1	(=L16)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

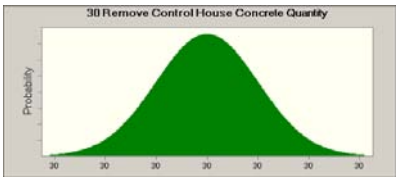
Minimum	$40,000.00	(=Q16)
Likeliest	$45,000.00	(=R16)
Maximum	$300,000.00	(=S16)



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**

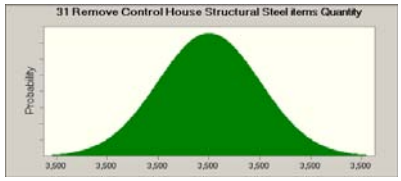
BetaPERT distribution with parameters:

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**

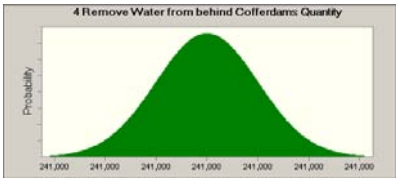
BetaPERT distribution with parameters:

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

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

Normal distribution with parameters:

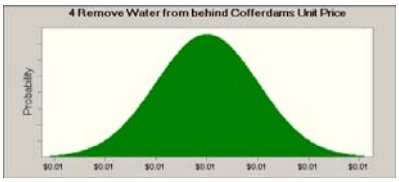
Mean	241,000	(=L17)
Std. Dev.	0	(=0.000001)



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

Normal distribution with parameters:

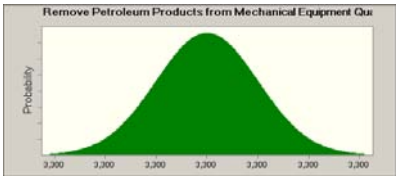
Mean	$0.01	(=R17)
Std. Dev.	$0.00	(=0.000001)



Assumption: 44A Remove Petroleum Products from Mechanical Equipment Quantity **Cell: L58**

Normal distribution with parameters:

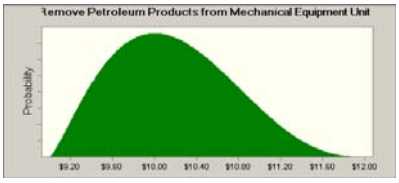
Mean	3,300	(=L58)
Std. Dev.	0	(=0.000001)



Assumption: 44A Remove Petroleum Products from Mechanical Equipment Unit Price Cell: R58

BetaPERT distribution with parameters:

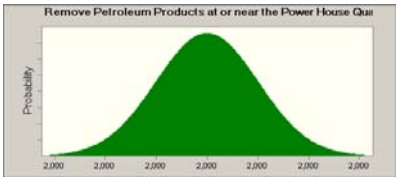
Minimum	$9.00	(=Q58)
Likeliest	$10.00	(=R58)
Maximum	$12.00	(=S58)



Assumption: 44B Remove Petroleum Products at or near the Power House Quantity Cell: L59

Normal distribution with parameters:

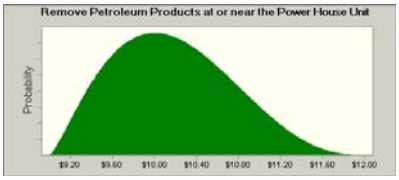
Mean	2,000	(=L59)
Std. Dev.	0	(=0.000001)



Assumption: 44B Remove Petroleum Products at or near the Power House Unit Price Cell: R59

BetaPERT distribution with parameters:

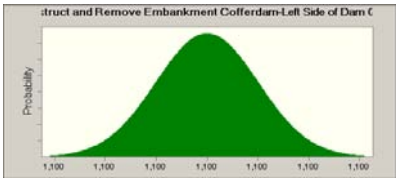
Minimum	$9.00	(=Q59)
Likeliest	$10.00	(=R59)
Maximum	$12.00	(=S59)



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

Normal distribution with parameters:

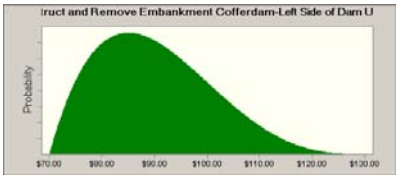
Mean	1,100	(=L18)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

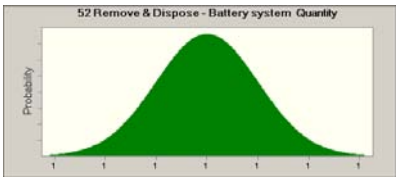
Minimum	$70.00	(=Q18)
Likeliest	$85.00	(=R18)
Maximum	$130.00	(=S18)



Assumption: 52 Remove & Dispose - Battery system Quantity **Cell: L67**

Normal distribution with parameters:

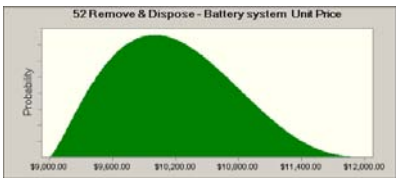
Mean	1	(=L67)
Std. Dev.	0	(=0.000001)



Assumption: 52 Remove & Dispose - Battery system Unit Price **Cell: R67**

BetaPERT distribution with parameters:

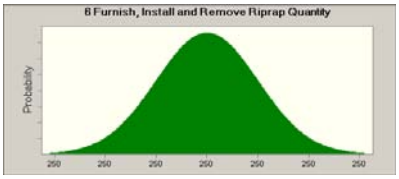
Minimum	$9,000.00	(=Q67)
Likeliest	$10,000.00	(=R67)
Maximum	$12,000.00	(=S67)



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

Normal distribution with parameters:

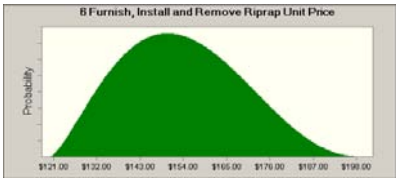
Mean	250	(=L19)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

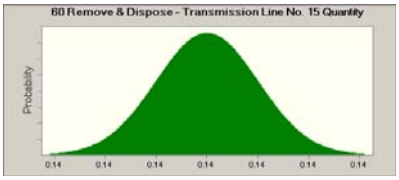
Minimum	$120.00	(=Q19)
Likeliest	$150.00	(=R19)
Maximum	$200.00	(=S19)



Assumption: 60 Remove & Dispose - Transmission Line No. 15 Quantity **Cell: L75**

Normal distribution with parameters:

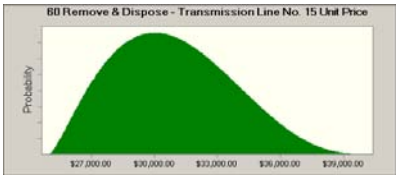
Mean	0.14	(=L75)
Std. Dev.	0.00	(=0.000001)



Assumption: 60 Remove & Dispose - Transmission Line No. 15 Unit Price **Cell: R75**

BetaPERT distribution with parameters:

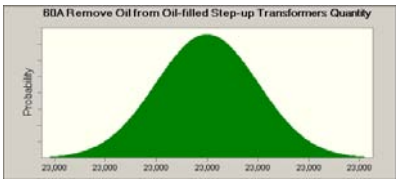
Minimum	$25,000.00	(=Q75)
Likeliest	$30,000.00	(=R75)
Maximum	$40,000.00	(=S75)



Assumption: 60A Remove Oil from Oil-filled Step-up Transformers Quantity **Cell: L76**

Normal distribution with parameters:

Mean	23,000	(=L76)
Std. Dev.	0	(=0.000001)



Assumption: 60A Remove Oil from Oil-filled Step-up Transformers Unit Price **Cell: R76**

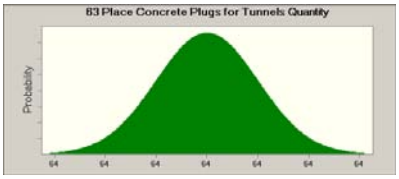
BetaPERT distribution with parameters:

Minimum	$9.00	(=Q76)
Likeliest	$10.00	(=R76)
Maximum	$12.00	(=S76)

Assumption: 63 Place Concrete Plugs for Tunnels Quantity **Cell: L79**

Normal distribution with parameters:

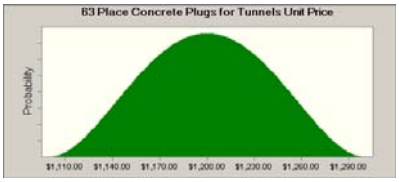
Mean	64	(=L79)
Std. Dev.	0	(=0.000001)



Assumption: 63 Place Concrete Plugs for Tunnels Unit Price **Cell: R79**

BetaPERT distribution with parameters:

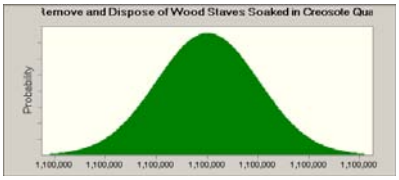
Minimum	$1,100.00	(=Q79)
Likeliest	$1,200.00	(=R79)
Maximum	$1,300.00	(=S79)



Assumption: 68 Remove and Dispose of Wood Staves Soaked in Creosote Quantity Cell: L84

Normal distribution with parameters:

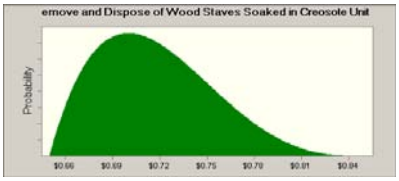
Mean	1,100,000	(=L84)
Std. Dev.	0	(=0.000001)



Assumption: 68 Remove and Dispose of Wood Staves Soaked in Creosote Unit Price Cell: R84

BetaPERT distribution with parameters:

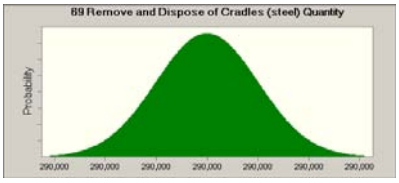
Minimum	$0.65	(=Q84)
Likeliest	$0.70	(=R84)
Maximum	$0.85	(=S84)



Assumption: 69 Remove and Dispose of Cradles (steel) Quantity Cell: L85

Normal distribution with parameters:

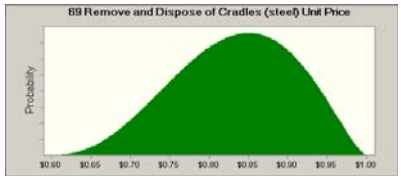
Mean	290,000	(=L85)
Std. Dev.	0	(=0.000001)



Assumption: 69 Remove and Dispose of Cradles (steel) Unit Price **Cell: R85**

BetaPERT distribution with parameters:

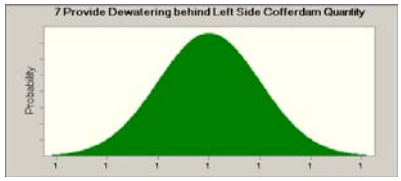
Minimum	$0.60	(=Q85)
Likeliest	$0.85	(=R85)
Maximum	$1.00	(=S85)



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

Normal distribution with parameters:

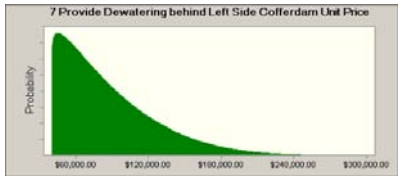
Mean	1	(=L20)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

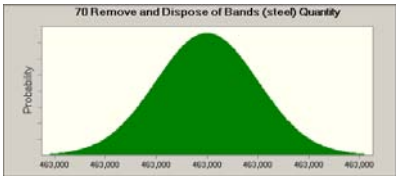
Minimum	$40,000.00	(=Q20)
Likeliest	$45,000.00	(=R20)
Maximum	$300,000.00	(=S20)



Assumption: 70 Remove and Dispose of Bands (steel) Quantity **Cell: L86**

Normal distribution with parameters:

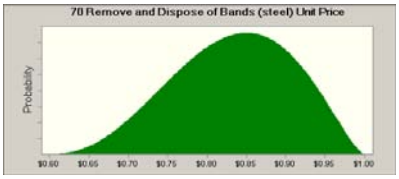
Mean	463,000	(=L86)
Std. Dev.	0	(=0.000001)



Assumption: 70 Remove and Dispose of Bands (steel) Unit Price **Cell: R86**

BetaPERT distribution with parameters:

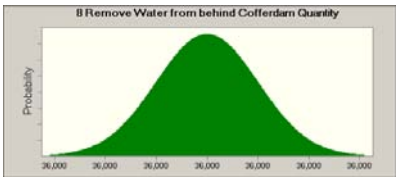
Minimum	$0.60	(=Q86)
Likeliest	$0.85	(=R86)
Maximum	$1.00	(=S86)



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

Normal distribution with parameters:

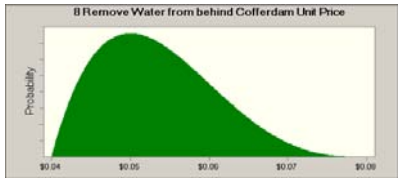
Mean	36,000	(=L21)
Std. Dev.	0	(=0.000001)



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

BetaPERT distribution with parameters:

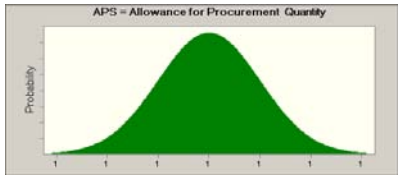
Minimum	$0.04	(=Q21)
Likeliest	$0.05	(=R21)
Maximum	$0.08	(=S21)



Assumption: APS = Allowance for Procurement Quantity **Cell: L98**

Normal distribution with parameters:

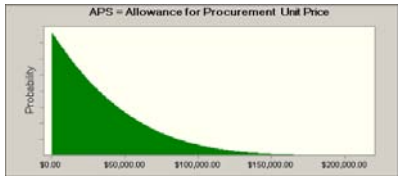
Mean	1	(=L98)
Std. Dev.	0	(=0.000001)



Assumption: APS = Allowance for Procurement Unit Price **Cell: R98**

BetaPERT distribution with parameters:

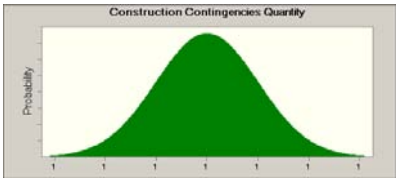
Minimum	$0.00	(=Q98)
Likeliest	$0.00	(=R98)
Maximum	$214,883.00	(=S98)



Assumption: Construction Contingencies Quantity **Cell: L101**

Normal distribution with parameters:

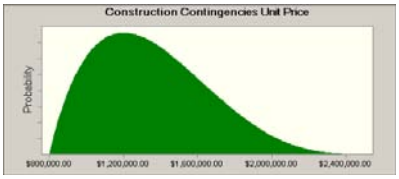
Mean	1	(=L101)
Std. Dev.	0	(=0.000001)



Assumption: Construction Contingencies Unit Price **Cell: R101**

BetaPERT distribution with parameters:

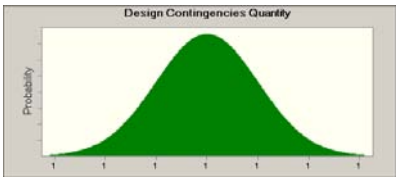
Minimum	$800,000.00	(=Q101)
Likeliest	$1,200,000.00	(=R101)
Maximum	$2,500,000.00	(=S101)



Assumption: Design Contingencies Quantity **Cell: L97**

Normal distribution with parameters:

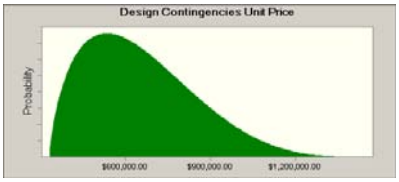
Mean	1	(=L97)
Std. Dev.	0	(=0.000001)



Assumption: Design Contingencies Unit Price **Cell: R97**

BetaPERT distribution with parameters:

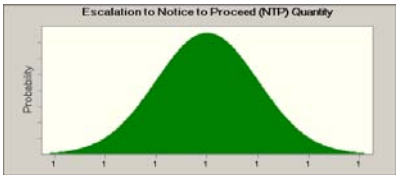
Minimum	$332,366.00	(=Q97)
Likeliest	$534,171.00	(=R97)
Maximum	$1,442,373.00	(=S97)



Assumption: Escalation to Notice to Proceed (NTP) Quantity **Cell: L94**

Normal distribution with parameters:

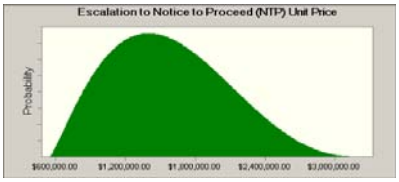
Mean	1	(=L94)
Std. Dev.	0	(=0.000001)



Assumption: Escalation to Notice to Proceed (NTP) Unit Price **Cell: R94**

BetaPERT distribution with parameters:

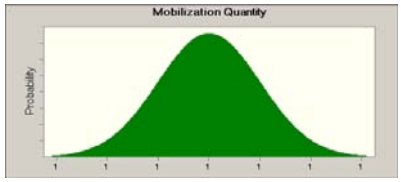
Minimum	$548,854.00	(=Q94)
Likeliest	$1,398,739.00	(=R94)
Maximum	$3,254,254.00	(=S94)



Assumption: Mobilization Quantity **Cell: L92**

Normal distribution with parameters:

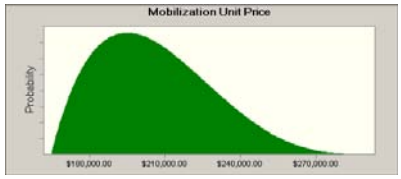
Mean	1	(=L92)
Std. Dev.	0	(=0.000001)



Assumption: Mobilization Unit Price **Cell: R92**

BetaPERT distribution with parameters:

Minimum	$165,000.00	(=Q92)
Likeliest	$195,000.00	(=R92)
Maximum	$290,000.00	(=S92)



Assumption: Non-Contract Cost Quantity **Cell: L103**

Normal distribution with parameters:

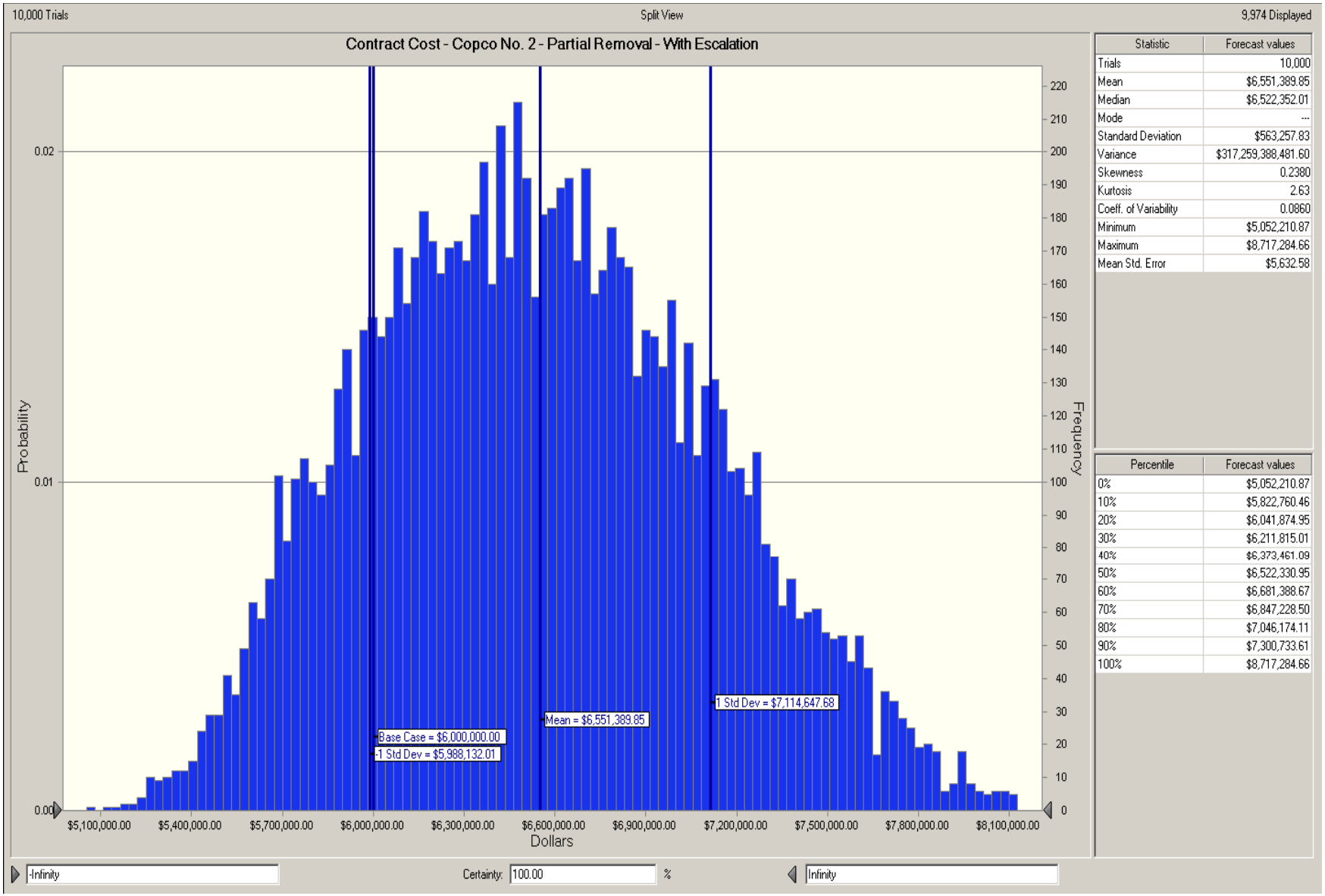
Mean	1	(=L103)
Std. Dev.	0	(=0.000001)

Assumption: Non-Contract Cost Unit Price **Cell: R103**

BetaPERT distribution with parameters:

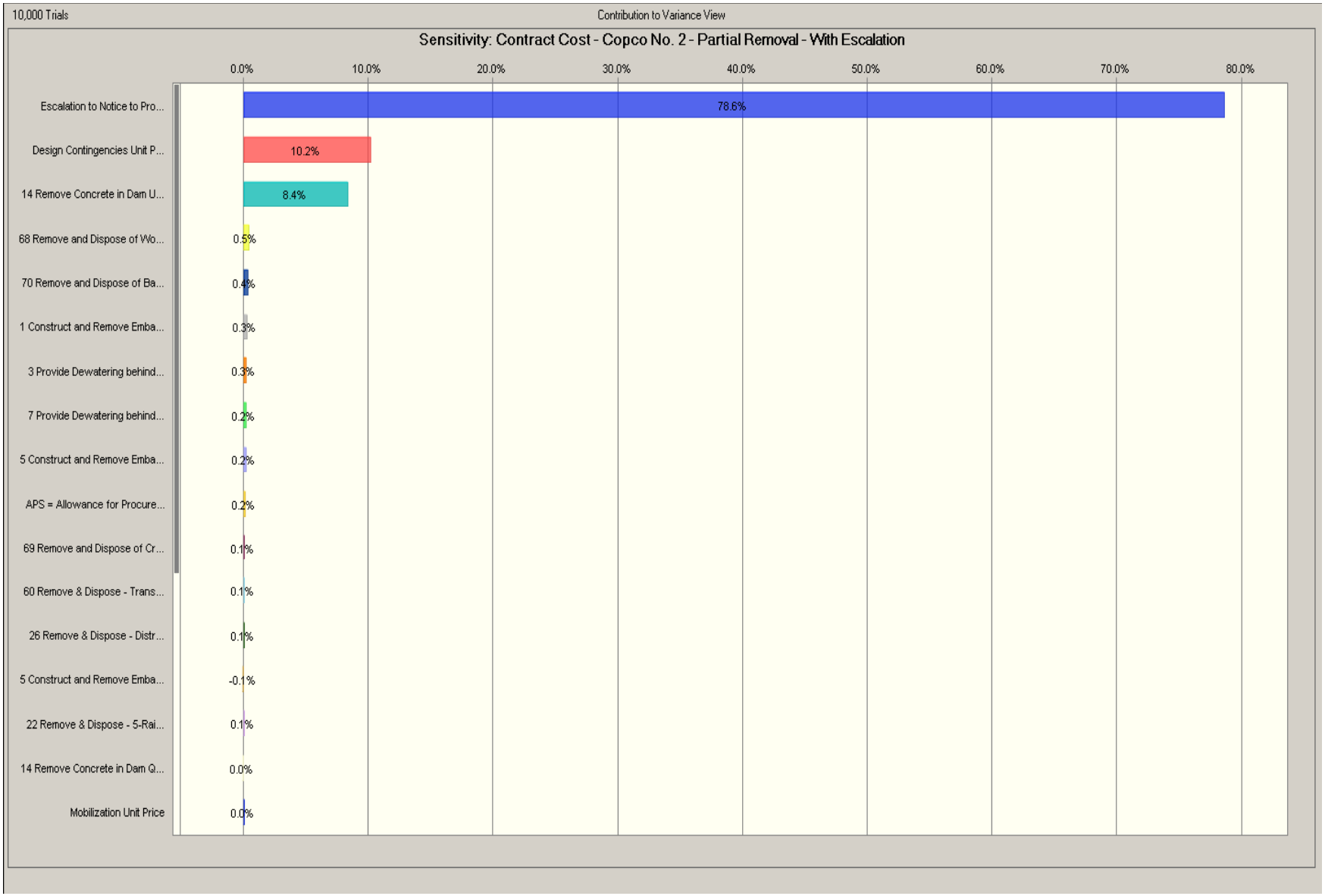
Minimum	$3,200,000.00	(=Q103)
Likeliest	$4,800,000.00	(=R103)
Maximum	$9,500,000.00	(=S103)

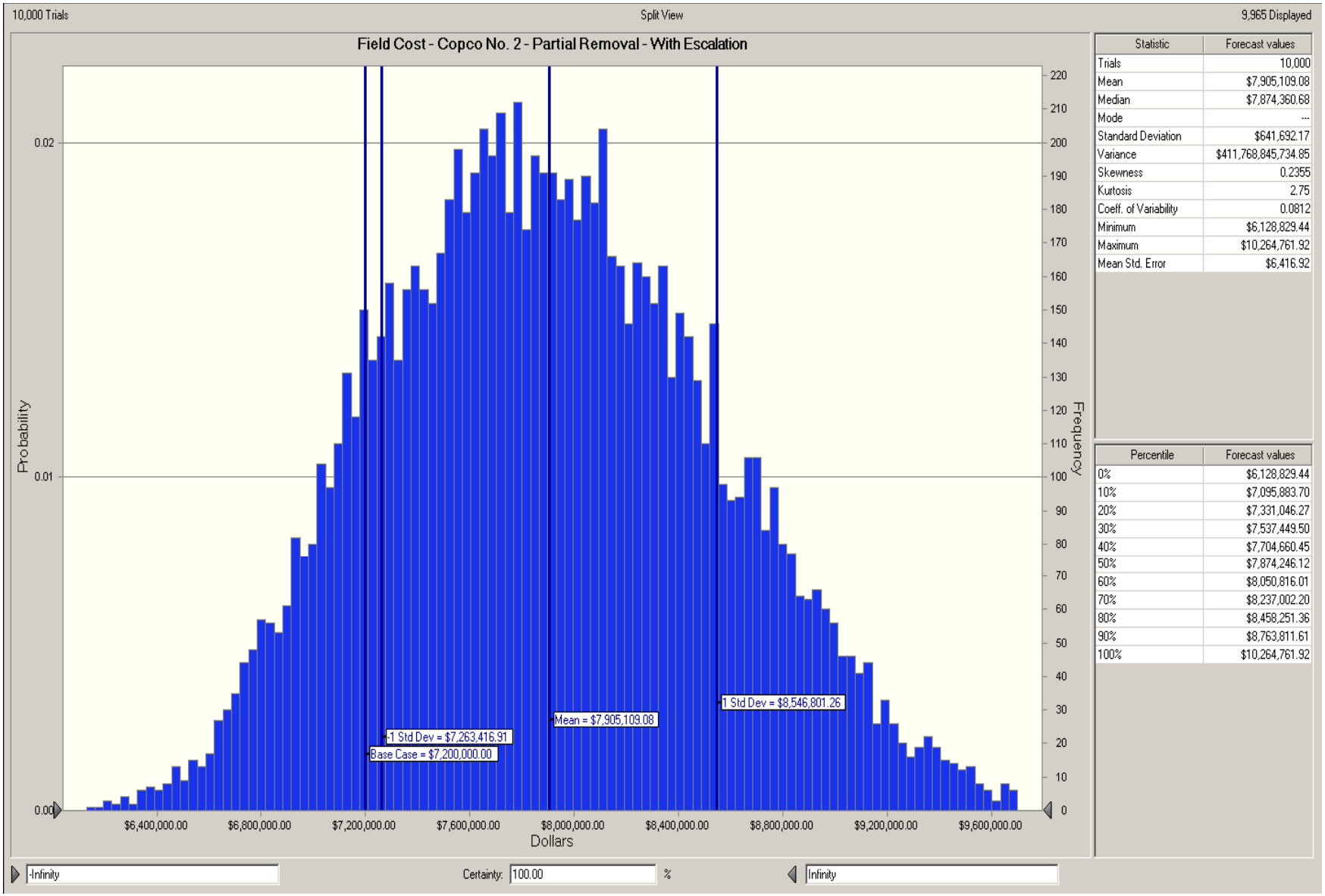
End of Assumptions



Statistic	Forecast values
Trials	10,000
Mean	$6,551,389.85
Median	$6,522,352.01
Mode	---
Standard Deviation	$563,257.83
Variance	$317,259,388,481.60
Skewness	0.2380
Kurtosis	2.63
Coeff. of Variability	0.0860
Minimum	$5,052,210.87
Maximum	$8,717,284.66
Mean Std. Error	$5,632.58

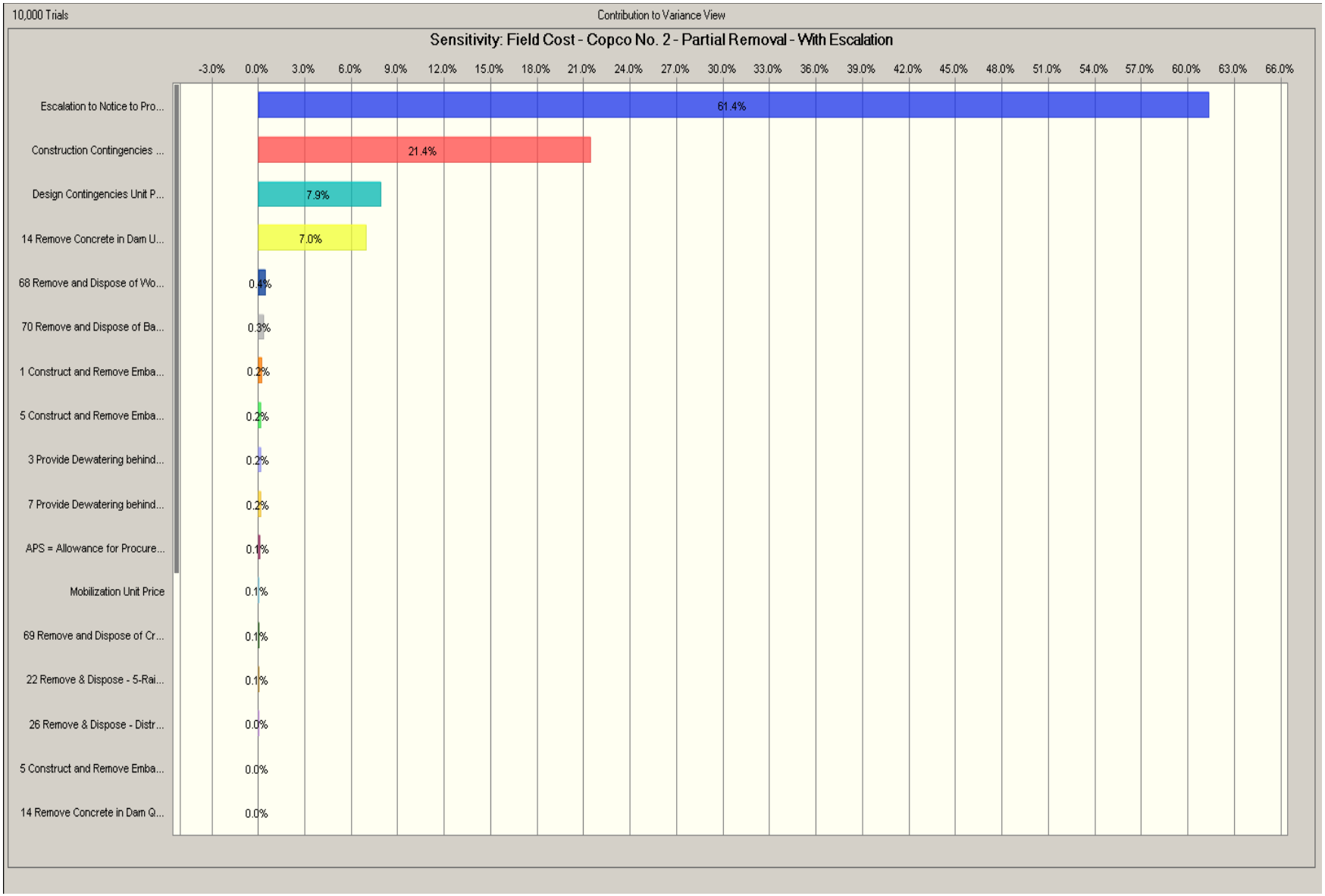
Percentile	Forecast values
0%	$5,052,210.87
10%	$5,822,760.46
20%	$6,041,874.95
30%	$6,211,815.01
40%	$6,373,461.09
50%	$6,522,330.95
60%	$6,681,388.67
70%	$6,847,228.50
80%	$7,046,174.11
90%	$7,300,733.61
100%	$8,717,284.66


10,000 Trials
Contribution to Variance View
Sensitivity: Contract Cost - Copco No. 2 - Partial Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
Escalation to Notice to Pro...
78.6%
Design Contingencies Unit P...
10.2%
14 Remove Concrete in Dam U...
8.4%
68 Remove and Dispose of Wo...
0.5%
70 Remove and Dispose of Ba...
0.4%
1 Construct and Remove Emba...
0.3%
3 Provide Dewatering behind...
0.3%
7 Provide Dewatering behind...
0.2%
5 Construct and Remove Emba...
0.2%
APS = Allowance for Procure...
0.2%
69 Remove and Dispose of Cr...
0.1%
60 Remove & Dispose - Trans...
0.1%
26 Remove & Dispose - Distr...
0.1%
5 Construct and Remove Emba...
-0.1%
22 Remove & Dispose - 5-Rai...
0.1%
14 Remove Concrete in Dam Q...
0.0%
Mobilization Unit Price
0.0%

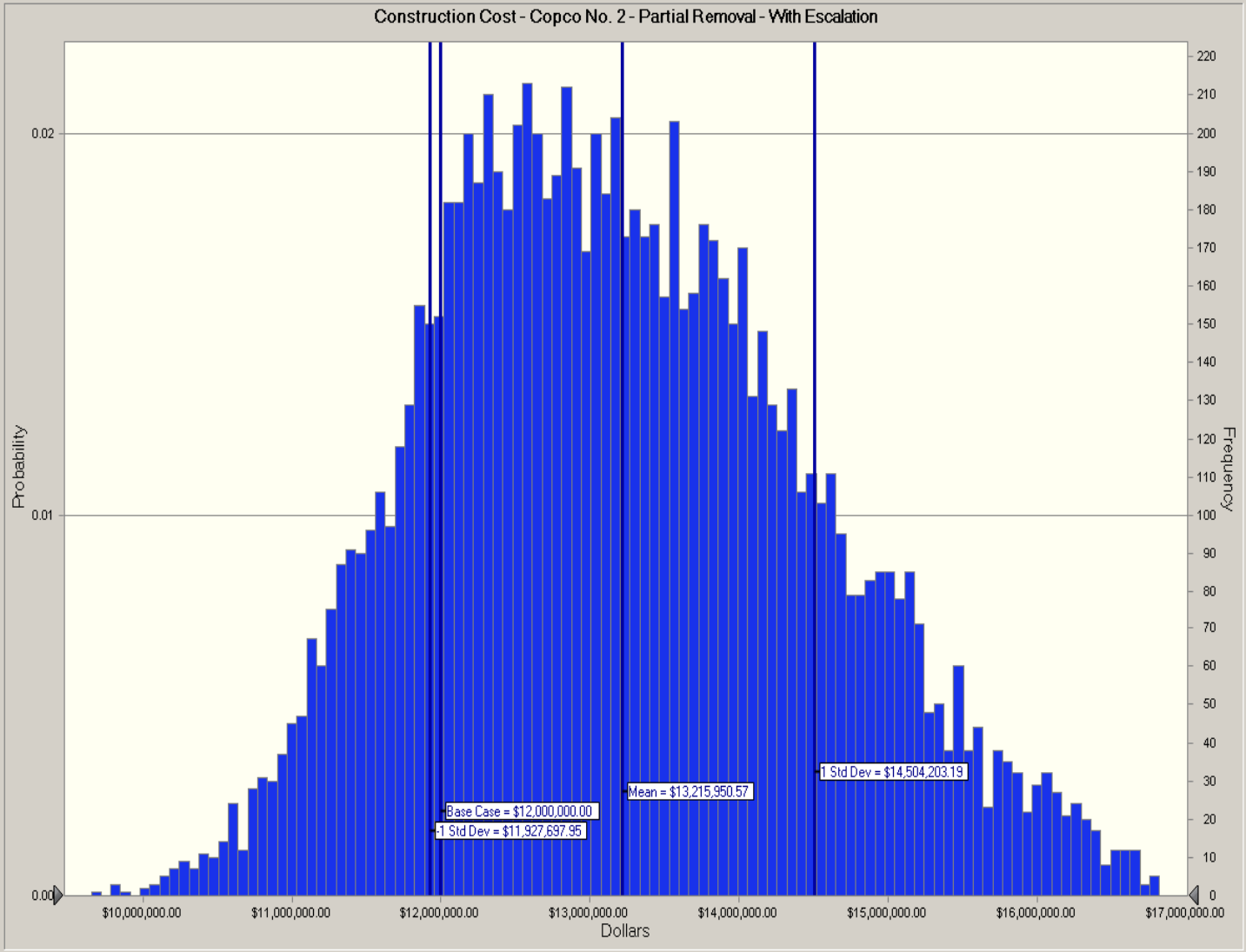


Statistic	Forecast values
Trials	10,000
Mean	$7,905,109.08
Median	$7,874,360.68
Mode	---
Standard Deviation	$641,692.17
Variance	$411,768,845,734.85
Skewness	0.2355
Kurtosis	2.75
Coeff. of Variability	0.0812
Minimum	$6,128,829.44
Maximum	$10,264,761.92
Mean Std. Error	$6,416.92

Percentile	Forecast values
0%	$6,128,829.44
10%	$7,095,883.70
20%	$7,331,046.27
30%	$7,537,449.50
40%	$7,704,660.45
50%	$7,874,246.12
60%	$8,050,816.01
70%	$8,237,002.20
80%	$8,458,251.36
90%	$8,763,811.61
100%	$10,264,761.92


10,000 Trials
Contribution to Variance View
Sensitivity: Field Cost - Copco No. 2 - 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% 63.0% 66.0%
Escalation to Notice to Pro... 61.4%
Construction Contingencies ... 21.4%
Design Contingencies Unit P... 7.9%
14 Remove Concrete in Dam U... 7.0%
68 Remove and Dispose of Wo... 0.4%
70 Remove and Dispose of Ba... 0.3%
1 Construct and Remove Emba... 0.2%
5 Construct and Remove Emba... 0.2%
3 Provide Dewatering behind... 0.2%
7 Provide Dewatering behind... 0.2%
APS = Allowance for Procure... 0.1%
Mobilization Unit Price 0.1%
69 Remove and Dispose of Cr... 0.1%
22 Remove & Dispose - 5-Rai... 0.1%
26 Remove & Dispose - Distr... 0.0%
5 Construct and Remove Emba... 0.0%
14 Remove Concrete in Dam Q... 0.0%

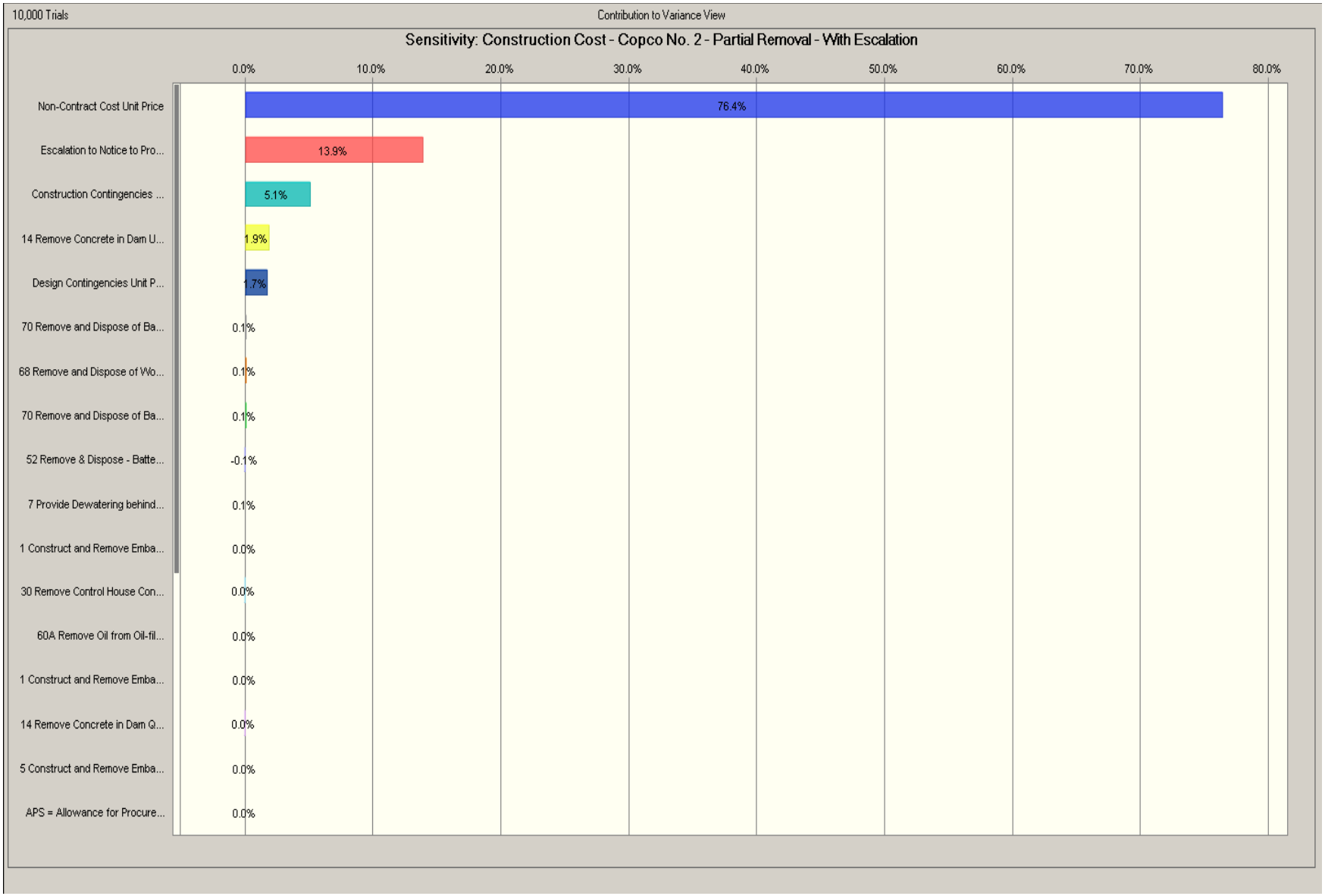
10,000 Trials | Split View | 9,966 Displayed



Statistic	Forecast values
Trials	10,000
Mean	$13,215,950.57
Median	$13,112,875.88
Mode	---
Standard Deviation	$1,288,252.62
Variance	$1,659,594,814,394.0
Skewness	0.3438
Kurtosis	2.80
Coeff. of Variability	0.0975
Minimum	$9,652,055.69
Maximum	$18,089,119.59
Mean Std. Error	$12,882.53

Percentile	Forecast values
0%	$9,652,055.69
10%	$11,625,740.65
20%	$12,092,799.23
30%	$12,433,622.17
40%	$12,768,305.15
50%	$13,112,807.18
60%	$13,475,653.62
70%	$13,862,536.42
80%	$14,319,750.10
90%	$14,983,335.12
100%	$18,089,119.59

-Infinity | Certainty: 100.00 % | Infinity


10,000 Trials
Contribution to Variance View
Sensitivity: Construction Cost - Copco No. 2 - Partial Removal - With Escalation
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
Non-Contract Cost Unit Price
76.4%
Escalation to Notice to Pro...
13.9%
Construction Contingencies ...
5.1%
14 Remove Concrete in Dam U...
1.9%
Design Contingencies Unit P...
1.7%
70 Remove and Dispose of Ba...
0.1%
68 Remove and Dispose of Wo...
0.1%
70 Remove and Dispose of Ba...
0.1%
52 Remove & Dispose - Batte...
-0.1%
7 Provide Dewatering behind...
0.1%
1 Construct and Remove Emba...
0.0%
30 Remove Control House Con...
0.0%
60A Remove Oil from Oil-fil...
0.0%
1 Construct and Remove Emba...
0.0%
14 Remove Concrete in Dam Q...
0.0%
5 Construct and Remove Emba...
0.0%
APS = Allowance for Procure...
0.0%