Attachment C5

Cost Estimate Worksheets

Temperance Flat Reservoir at RM 286 (Chapter 5)

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__1__ OF __2____

FEATURE: 31-May-05

RM286 Dam
Elev. 1200
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1200_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Diversion and care of river					
		Upstream Cofferdam (Crest @ El. 850)		197,100	CY	$20.00	$3,942,000
		Excavation for Left Abutment Diversion Tunnel		147,600	CY	$140.00	$20,664,000
		Concrete Liner for Left Abutment Diversion Tunnel		25,620	CY	$245.00	$6,276,900
		Rock Bolts - Left Abt. Div. Tunnel		1,600	Bolts	$600.00	$960,000
		Total Drilling - Left Abt. Div. Tunnel		36,800	LF	$20.00	$736,000
		Excavation for Right Abutment Diversion Tunnel		77,700	CY	$140.00	$10,878,000
		Concrete Liner for Right Abutment Diversion Tunnel		17,200	CY	$245.00	$4,214,000
		Rock Bolts - Right Abt. Div. Tunnel		1,800	Bolts	$500.00	$900,000
		Total Drilling - Right Abt. Div. Tunnel		32,400	LF	$20.00	$648,000
		Downstream Cofferdam (Crest @ El. 770)		13,000	CY	$22.00	$286,000
	2	Excavation, all classes, for dam foundation		249,800	CY	$6.00	$1,498,800
	3	RCC in dam		1,329,030	CY	$38.00	$50,503,140
	4	Concrete facing elements (Assume 2 ft thick)		41,220	CY	$110.00	$4,534,200
	5	Concrete cap on top of dam		860	CY	$250.00	$215,000
	6	Leveling concrete in dam foundation (1 ft thick)		9,990	CY	$190.00	$1,898,100
	7	Concrete in spillway crest		2,300	CY	$200.00	$460,000
	8	Concrete in spillway training walls		300	CY	$350.00	$105,000
	9	Concrete in Outlet Works Intake Structure		3,110	CY	$265.00	$824,150
	10	Excavation of Outlet Shaft and Gate Structure		11,010	CY	$280.00	$3,082,800
	11	Temp. Supports - Rock Bolts		390	Bolts	$380.00	$148,200
	12	Total Drilling for Rock Bolts		4,680	LF	$20.00	$93,600
	13	Concrete in Outlet Shaft and Gate Structure		5,390	CY	$440.00	$2,371,600
		Subtotal					$115,239,490

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__2___ OF __2___

FEATURE: 31-May-05

RM286 Dam
Elev. 1200
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1200_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	14	Furnishing and Handling Cement		279,744	TONS	$90.00	$25,176,960
	15	Furnishing and Handling Reinforcement		14,398,500	LBS	$0.60	$8,639,100
	16	Grout Hole Drillilng (2" Diam, 40 % height)		10,300	LF	$36.00	$370,800
	17	Foundation Grouting (Assume 1 sack / LF)		10,300	Sacks	$32.00	$329,600
	18	Set up for Drain Holes in Gallery (10' O.C.)		100	Holes	$200.00	$20,000
	19	Drilling Drain Holes (4" diam, 20 % dam height)		19,000	LF	$55.00	$1,045,000
	20	Outlet Works Trashracks		495,000	LBS	$2.50	$1,237,500
	21	Intake Structure Bulkhead and Seats		96,000	LBS	$5.00	$480,000
	22	Gate Chamber Fixed Wheel Gates		1,682,000	LBS	$5.00	$8,410,000
		Subtotal pg 1					$115,239,490
		Subtotal pg 2					$45,708,960
		Mobilization					$8,000,000
		Subtotal 1 (Subtotals from pgs 1 and 2 + Mobilization) July 2003 dollars					**$168,948,450**
		Escalation for July 2003 to July 2004 dollars (2.5% +/-)					$4,200,000
		Subtotal 2 (Subtotal 1 + Escalation)					**$173,148,450**
		Unlisted Items (15% +/-)					$26,851,550
		Contract Cost					**$200,000,000**
		Contingencies (25% +/-)					$50,000,000
		Field Cost					**$250,000,000**

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__1__ OF __2____

FEATURE: 31-May-05

RM286 Dam
Elev. 1300
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1300_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	**Diversion and care of river**					
		Upstream Cofferdam (Crest @ El. 850)		197,100	CY	$20.00	$3,942,000
		Excavation for Left Abutment Diversion Tunnel		147,600	CY	$140.00	$20,664,000
		Concrete Liner for Left Abutment Diversion Tunnel		25,620	CY	$245.00	$6,276,900
		Rock Bolts - Left Abt. Div. Tunnel		1,600	Bolts	$600.00	$960,000
		Total Drilling - Left Abt. Div. Tunnel		36,800	LF	$20.00	$736,000
		Excavation for Right Abutment Diversion Tunnel		76,340	CY	$140.00	$10,687,600
		Concrete Liner for Right Abutment Diversion Tunnel		16,900	CY	$245.00	$4,140,500
		Rock Bolts - Right Abt. Div. Tunnel		1,770	Bolts	$500.00	$885,000
		Total Drilling - Right Abt. Div. Tunnel		31,860	LF	$20.00	$637,200
		Downstream Cofferdam (Crest @ El. 770)		15,920	CY	$22.00	$350,240
	2	Excavation, all classes, for dam foundation		361,100	CY	$6.00	$2,166,600
	3	RCC in dam		1,922,165	CY	$35.00	$67,275,775
	4	Concrete facing elements (Assume 2 ft thick)		61,780	CY	$90.00	$5,560,200
	5	Concrete cap on top of dam		1,440	CY	$250.00	$360,000
	6	Leveling concrete in dam foundation (1 ft thick)		16,100	CY	$185.00	$2,978,500
	7	Concrete in spillway crest		2,300	CY	$200.00	$460,000
	8	Concrete in spillway training walls		340	CY	$350.00	$119,000
	9	Concrete in Outlet Works Intake Structure		3,110	CY	$265.00	$824,150
	10	Excavation of Outlet Shaft and Gate Structure		11,010	CY	$280.00	$3,082,800
	11	Temp. Supports - Rock Bolts		192	Bolts	$380.00	$72,960
	12	Total Drilling for Rock Bolts		2,310	LF	$20.00	$46,200
	13	Concrete in Outlet Shaft and Gate Structure		5,910	CY	$480.00	$2,836,800
		Subtotal					$135,062,425

QUANTITIES		PRICES	
BY S. Higinbotham Larry K. Nuss	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__2___ OF __2___

FEATURE: 31-May-05

RM286 Dam
Elev. 1300
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1300_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	14	Furnishing and Handling Cement		399,011	TONS	$90.00	$35,910,990
	15	Furnishing and Handling Reinforcement		8,341,500	LBS	$0.60	$5,004,900
	16	Grout Hole Drillilng (2" diam, 40% height)		24,700	LF	$34.00	$839,800
	17	Foundation Grouting (Assume 1 sack / LF)		24,700	Sacks	$28.00	$691,600
	18	Set up for Drain Holes in Gallery (10' O.C.)		190	Holes	$200.00	$38,000
	19	Drilling Drain Holes (4" diam, 20% dam height)		13,300	LF	$57.00	$758,100
	20	Outlet Works Trashracks		495,000	LBS	$2.50	$1,237,500
	21	Intake Structure Bulkhead and Seats		96,000	LBS	$5.00	$480,000
	22	Gate Chamber Fixed Wheel Gates		1,682,000	LBS	$5.00	$8,410,000
		Subtotal pg 1					$135,062,425
		Subtotal pg 2					$53,370,890
		Mobilization					$9,400,000
		Subtotal 1 (Subtotals from pgs 1 and 2 + Mobilization) July 2003 dollars					**$197,833,315**
		Escalation for July 2003 to July 2004 dollars (2.5% +/-)					$4,900,000
		Subtotal 2 (Subtotal 1 + Escalation)					**$202,733,315**
		Unlisted Items (15% +/-)					$27,266,685
		Contract Cost					**$230,000,000**
		Contingencies (25% +/-)					$60,000,000
		Field Cost					**$290,000,000**

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__1__ OF __2____

FEATURE: 31-May-05

RM286 Dam
Elev. 1400
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1400_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	**Diversion and care of river**					
		Upstream Cofferdam (Crest @ El. 850)		197,100	CY	$20.00	$3,942,000
		Excavation for Left Abutment Diversion Tunnel		147,600	CY	$140.00	$20,664,000
		Concrete Liner for Left Abutment Diversion Tunnel		25,620	CY	$245.00	$6,276,900
		Rock Bolts - Left Abt. Div. Tunnel		1,600	Bolts	$600.00	$960,000
		Total Drilling - Left Abt. Div. Tunnel		36,800	LF	$20.00	$736,000
		Excavation for Right Abutment Diversion Tunnel		77,700	CY	$140.00	$10,878,000
		Concrete Liner for Right Abutment Diversion Tunnel		17,200	CY	$245.00	$4,214,000
		Rock Bolts - Right Abt. Div. Tunnel		1,800	Bolts	$500.00	$900,000
		Total Drilling - Right Abt. Div. Tunnel		32,400	LF	$20.00	$648,000
		Downstream Cofferdam (Crest @ El. 770)		15,920	CY	$22.00	$350,240
	2	Excavation, all classes, for dam foundation		519,750	CY	$6.00	$3,118,500
	3	RCC in dam		3,680,310	CY	$33.00	$121,450,230
	4	Concrete facing elements (Assume 2 ft thick)		69,580	CY	$85.00	$5,914,300
	5	Concrete cap on top of dam		1,780	CY	$250.00	$445,000
	6	Leveling concrete in dam foundation (1 ft thick)		20,790	CY	$180.00	$3,742,200
	7	Concrete in spillway crest		2,300	CY	$200.00	$460,000
	8	Concrete in spillway training walls		450	CY	$350.00	$157,500
	9	Concrete in Outlet Works Intake Structure		3,110	CY	$265.00	$824,150
	10	Excavation of Outlet Shaft and Gate Structure		11,010	CY	$280.00	$3,082,800
	11	Temp. Supports - Rock Bolts		390	Bolts	$380.00	$148,200
	12	Total Drilling for Rock Bolts		4,680	LF	$20.00	$93,600
	13	Concrete in Outlet Shaft and Gate Structure		6,420	CY	$480.00	$3,081,600
		Subtotal					$192,087,220

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

CODE:D-8170

ESTIMATE WORKSHEET

SHEET__2___ OF __2___

FEATURE: 31-May-05

RM286 Dam
Elev. 1400
Concrete Gravity Dam (RCC)

PROJECT:
Upper San Joaquin River Basin

REGION: **MP Region**

PRICE LEVEL: **Appraisal**

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[RM286@1400_RCC_6-26-04.xls]Page

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	14	Furnishing and Handling Cement		733,423	TONS	$90.00	$66,008,070
	15	Furnishing and Handling Reinforcement		18,969,000	LBS	$0.60	$11,381,400
	16	Grout Hole Drillilng (2" Diam, 40 % height)		33,200	LF	$33.00	$1,095,600
	17	Foundation Grouting (Assume 1 sack / LF)		33,200	Sacks	$25.00	$830,000
	18	Set up for Drain Holes in Gallery (10' O.C/)		165	Holes	$200.00	$33,000
	19	Drilling Drain Holes (4" diam, 20 % dam height)		52,950	LF	$52.00	$2,753,400
	20	Outlet Works Trashracks		495,000	LBS	$2.50	$1,237,500
	21	Intake Structure Bulkhead and Seats		96,000	LBS	$5.00	$480,000
	22	Gate Chamber Fixed Wheel Gates		1,682,000	LBS	$5.00	$8,410,000
		Subtotal pg 1					$192,087,220
		Subtotal pg 2					$92,228,970
		Mobilization					$14,000,000
		Subtotal 1 (Subtotals from pgs 1 and 2 + Mobilization) July 2003 dollars					**$298,316,190**
		Escalation for July 2003 to July 2004 dollars (2.5% +/-)					$7,500,000
		Subtotal 2 (Subtotal 1 + Escalation)					**$305,816,190**
		Unlisted Items (15% +/-)					$44,183,810
		Contract Cost					**$350,000,000**
		Contingencies (25% +/-)					$90,000,000
		Field Cost					**$440,000,000**

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** R. Baumgarten	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE PREPARED** 05/31/05	**PEER REVIEW** Dan Donaldson

TF286_ADJ COSTS_1

RESERVOIR CONTRACT COST FOR VARIOUS TF286 STORAGE SIZES

Description	Amount
1275 Foot RCC Dam, excluding Powerhouse	
1200 Foot RCC Dam (reference TF286_1200_RCC_2)	$200,000,000
1300 Foot RCC Dam (reference TF286_1300_RCC_2)	$230,000,000
Average Contract Costs for RM286 1275 Foot RCC Dam, excluding Powerhouse (Jul-2004 costs)	**$220,000,000**

Dementions to Determine Attribuatble Costs for 180MW PH and OW at RM286				
OW Portion of 300" (25') dia. Pipe, 456 ft	$7,187,472	OW		
PH Portion of 300" (25') dia. Pipe, 194 ft	$3,057,828	PH		
360" dia. pipe	$2,342,130	OW		
96" dia. pipe	$807,360	OW		
120" dia. pipe	$297,620	OW		
Ring follower gates	$7,560,000	OW		
Fixed cone valves	$4,335,000	OW		
Spherical valves	$12,750,000	PH		
Total Pipes and Valves Cost	**$38,337,410**			
Allocation of Pipe and Valves Costs Between 180MW PH and OW (Jul-2004 costs, from above)				
Cost of Valves and Pipes Allocated to PH	$15,807,828			
Cost of Valves and Pipes Allocated to OW	$22,529,582			
Adjustment of Pipe and Valve Allocation, scaling for capacity	**Capacity (MW)**		**% to PH**	**(% to OW)**
(adjustment factor equivalent to sqrt of ratio of generating capacities)	**180**		**41%**	**59%**
	40		**19%**	**81%**
	60		**24%**	**76%**
	80		**27%**	**73%**
For 1200 Foot RCC Dam with 40MW Powerhouse, Jul-2003 costs				
Steel pipe, from Phase 1 est. for 1200 Foot RCC Dam	$17,602,965			
Valves, from Phase 1 est. for 1200 Foot RCC Dam	$13,330,000			
Subtotal, pipe and valves	$30,932,965			
Portion of pipes and valves attributable to O.W.	$24,920,332			
Portion of pipes and valves attributable to 40MW PH	$6,012,633			
For 1400 Foot RCC Dam with 60MW Powerhouse, Jul-2003 costs				
Steel pipe, from Phase 1 est. for 1400 Foot RCC Dam	$28,601,115			
Valves, from Phase 1 est. for 1400 Foot RCC Dam	$25,537,000			
Subtotal, pipe and valves	$54,138,115			
Portion of pipes and valves attributable to O.W.	$41,249,925			
Portion of pipes and valves attributable to 60MW PH	$12,888,190			

CONTRACT COST FOR OUTLET WORKS AT RM286

Description	Amount
River Outlet Works at RM 286 (1200 Foot Option)	
RM286 OW component, 2003 prices, from Phase 1 est. for RCC el. 1200	$8,548,850
Pipes and valves attributable to O.W. (from above)	$24,920,332
Subtotal	$33,469,182
Mobilization (5%)	$1,650,000
Subtotal	$35,119,182
Unlisted items (~15%)	$4,880,818
Contract Cost for 1200 Foot Option River Outlet Works at RM289 (Jul-2003 costs)	**$40,000,000**
River Outlet Works at RM 286 (1275 and 1300 Foot Options)	
OW Cost for 1200 Foot Option (from above)	$40,000,000
OW Cost for 1400 Foot Option (from below)	$61,000,000
Average Contract Cost for 1275 and 1300 Foot Options River Outlet Works at RM289 (Jul-2003 costs)	**$51,000,000**
River Outlet Works at RM 286 (1400 Foot Option)	
RM286 OW component, 2003 prices, from Phase 1 est. for RCC el. 1400	$9,609,600
Pipes and valves attributable to O.W. (from above)	$41,249,925
Subtotal	$50,859,525
Mobilization (5%)	$2,500,000
Subtotal	$53,359,525
Unlisted items (~15%)	$7,640,475
Contract Cost for 1400 Foot Option River Outlet Works at RM289 (Jul-2003 costs)	**$61,000,000**

CONTRACT COST FOR NEW POWERHOUSE AT RM286

Description	Amount
180MW Powerhouse, including OW and transmission at RM286	
Contract Cost (TF286_PH(180MW)+OW_1)	$145,000,000
Construction Cost (Includes 25% contingencies and feature indirect costs, See Table C-1)	**$230,000,000**
Outlet Works (1400' Option) Construction Cost (Includes 30% Contingency, 7% Price escalation, and 25% feature indirect costs. See	$105,000,000
Construction Cost for 180MW Powerhouse w/o OW and Transmission Line (Jul-2004 costs)	**$125,000,000**
150MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.91
Adjusted Construction Cost for 150MW Powerhouse w/o OW and Transmission Line (Jul-2004 costs)	**$115,000,000**
160MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.94
Adjusted Construction Cost for 160MW Powerhouse w/o OW and Transmission Line (Jul-2004 costs)	**$120,000,000**
170MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.97
Adjusted Construction Cost for 170MW Powerhouse w/o OW and Transmission Line (Jul-2004 costs)	**$120,000,000**

NOTE: Contract Costs (in Table C-1) for RM286 PH (w/o OW and transmission) are calculated from the Construction Costs above

Description	Amount
40MW Powerhouse at RM286	
RM286 PH (40MW), 2003 prices, from Ph1 est. for CFRD el. 1200	$87,763,065
less portion of pipes and valves attributable to O.W., from below	-$24,920,332
subtotal	$62,842,733
Mobilization (5%)	$3,100,000
Subtotal	$65,942,733
Unlisted items (~15%)	$10,057,267
Contract Cost for 40MW Powerhouse at RM286 (Jul-2003 costs)	**$76,000,000**
50MW Powerhouse at RM286	
40MW Powerhouse (see above)	$76,000,000
60MW Powerhouse (see below)	$92,000,000
Average Contract Cost for 50MW Powerhouse at RM286 (Jul-2003 costs)	**$84,000,000**
60MW Powerhouse at RM286	
RM286 PH (60MW), 2003 prices, from Ph1 est. for CFRD el. 1400	$117,688,115
less portion of pipes and valves attributable to O.W., from below	-$41,249,925
subtotal	$76,438,190
Mobilization (5%)	$3,800,000
Subtotal	$80,238,190
Unlisted items (~15%)	$11,761,810
Contract Cost for 60MW Powerhouse at RM286 (Jul-2003 costs)	**$92,000,000**

CONTRACT COST FOR NEW POWERHOUSE AT MILLERTON LAKE

180MW Contrat Cost (from MILL LK_NEW PH_1) $115,000,000

Description	Amount
170MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.97
Adjusted Contract Cost for 170MW Powerhouse at Millerton Lake (Jul-2004 costs)	**$110,000,000**
185MW Powerhouse	
Conversion Factor (square root of MW ratio)	1.01
Adjusted Contract Cost for 185MW Powerhouse at Millerton Lake (Jul-2004 costs)	**$115,000,000**
200MW Powerhouse	
Conversion Factor (square root of MW ratio)	1.05
Adjusted Contract Cost for 200MW Powerhouse at Millerton Lake (Jul-2004 costs)	**$120,000,000**

CONTRACT COST FOR MODIFICATIONS TO KERCKHOFF NO. 2 DIVERSION INTAKE

Description	Amount
Kerckhoff No. 2 Diversion Intake (1275 and 1300 Foot Options)	
1200 Foot Option Cost (KER_PH2_DIV TNL_5)	$20,000,000
1400 Foot Option Cost (KER_PH2_DIV TNL_7)	$29,000,000
1275 Foot Option Interpolated Contract Cost (Jul-2004 costs)	**$23,000,000**
1300 Foot Option Interpolated Contract Cost (Jul-2004 costs)	**$25,000,000**

CONTRACT COST FOR KERCKHOFF NO. 2 TURBINE REPLACEMENT

186MW Turbine Replacement Cost (KER_PH2_TURB RPLC_1) $49,000,000

Description	Amount
140MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.88
Adjusted Contract Cost for 140MW Powerhouse Turbine Replacement (Jul-2004 costs)	**$43,000,000**
155MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.93
Adjusted Contract Cost for 155MW Powerhouse Turbine Replacement (Jul-2004 costs)	**$45,000,000**
160MW Powerhouse	
Conversion Factor (square root of MW ratio)	0.94
Adjusted Contract Cost for 160MW Powerhouse Turbine Replacement (Jul-2004 costs)	**$45,000,000**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET__1_ OF __1 __

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Switchyard

REVISION

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Additional Items - Nov 04\[RM 286 Powerplant - D8440latest.xls]Switchyard&T-Line

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL	D8120				
		Assume switchyard structures covered under					
		unlisted items.					
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power	D8440	2	EA	$2,800,000.00	$5,600,000.00
		transformer					
		200 MVA; 115-6.9kV, 3-phase		200	mva	$14,000.00	$2,800,000.00
	2	115-kV disconnect switches,	D8440	4	EA	$40,000.00	$160,000.00
		1200 amp, 3-phase					
	3	115-kV circuit breakers, 2000 amp	D8440	2	EA	$250,000.00	$500,000.00
	4	**Construct Transmission Line**	D8440	2	MILES	$250,000.00	$500,000.00
		115-kV H-frame wood-pole					
		1431 AWG conductor					
		Sheet Subtotal					**$9,560,000.00**

QUANTITIES		**PRICES**	
BY Lisa Gamuciello	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 11/1/2004	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET__1S_ OF __1 __

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Switchyard

REVISION

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Additional Items - Nov 04\[RM 286 Powerplant -

PLANT ACCOUNT	PAY ITEM	DESCRIPTION		CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Subtotal (from Sheet 1 of 1)						**$9,560,000.00**
		Mobilization	+/-	5%				$480,000.00
		Subtotal w/ mobilization						$10,040,000.00
		Unlisted Items	+/-	15%				$1,460,000.00
		CONTRACT COST						**$11,500,000.00**
		Contingencies	+/-	25%				$3,000,000.00
		FIELD COST						**$14,500,000.00**

QUANTITIES		PRICES	
BY Lisa Gamuciello	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 11/1/2004	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Summary Sheet

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Powerplant RM 286 with ROW					
		Cofferdam for Powerplant - Civil/Structural Subtotal					$4,765,500.00
		Powerplant - Civil/Structural Subtotal					$35,768,460.00
		Powerplant - Mechanical Subtotal					$53,785,910.00
		Powerplant - Electrical Subtotal					$12,315,000.00
		Switchyard & Transmission Line Subtotal					$14,560,000.00
		Subtotal					$121,194,870.00
		Mobilization +/-	5%				$6,100,000.00
		Subtotal w/Mobilization					$127,294,870.00
		Unlisted Items +/-	15%				$17,705,130.00
		CONTRACT COST					**$145,000,000.00**
		Contingencies +/-	25%				$40,000,000.00
		FIELD COST					**$185,000,000.00**

QUANTITIES		**PRICES**	
BY	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Cofferdam for Powerplant

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Construct/Remove Cellular Cofferdam					
		Assume construct from shore without barge.					
		Assume circular cellular cofferdam.					
		Length= 400 feet, 32-ft dia. cells, 40 ft high					
		Top of cofferdam - El. 740, Bottom of cofferdam - El. 700					
	1	Furnish and install sheet pile walls	D8120	1,200	TONS	$2,200.00	$2,640,000.00
		Arbed AS 500-12, 30 psf					
	2	Backfill cells with free-draining granular material	D8120	26,100	CY	$30.00	$783,000.00
	3	Unwater behind cofferdam	D8120	1	LS	Included in Pay Item 4	
		Assume sumps and surface pumps					
	4	Operate unwatering pumps	D8120	6	MOS	$55,000.00	$330,000.00
		Remove Cofferdam					
	5	Remove and stockpile granular material	D8120	26,100	CY	$25.00	$652,500.00
	6	Extract and salvage sheet pile cutoff wall	D8120	1,200	TONS	$300.00	$360,000.00
		Cofferdam for Powerplant - Civil/Structural Subtotal					**$4,765,500.00**

QUANTITIES		PRICES	
BY M. R. O'Shea	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 6/14/04	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Civil

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Access Road					
	1	Clearing and Grubbing	D8140	4	AC	$4,000.00	$16,000.00
	2	Excavation	D8140	32,000	CY	$8.00	$256,000.00
	3	Compacted embankment	D8140	5,000	CY	$10.00	$50,000.00
	4	Gravel surfacing	D8140	1,700	CY	$25.00	$42,500.00
	5	24" dia corrugated metal pipe	D8140	1,000	LF	$65.00	$65,000.00
	6	Metal Beam Guard Rail	D8140	4,000	LF	$30.00	$120,000.00
	6a	Concrete for 200-foot long, 16-foot clear width bridge	D8140	250	CY	$900.00	$225,000.00
	6b	Reinforcement for bridge	D8140	70,000	LBS	$1.00	$70,000.00
	6c	AASHTO Type IV, 100-foot long beams	D8140	6	EA	$20,000.00	$120,000.00
		Powerplant Site					
	7	Rock excavation to Service Yard El. 708.0	D8120	556,700	CY	$11.00	$6,123,700.00
		Dewatering During Construction:					
		Assume no groundwater flows into excavation.					
		Structural Excavation and Backfill					
		Assume all rock excavation.					
		Assume stockpile rock for later use as riprap or rockfill.					
	8	Excavation of rock for structures (drill & shoot)	D8120	120,000	CY	$15.00	$1,800,000.00
	9	Furnish backfill for structures (assume local borrow)	D8120	Unlisted Item	CY	Included in Unlisted Items	
	10	Place and compact backfill around structures	D8120	Unlisted Item	CY	Included in Unlisted Items	
	11	Rock Exc. for manifold pipe to edge of Service Yard	D8120	32,000	CY	$20.00	$640,000.00
	12	Furnish, place, & compact backfill for manifold pipe trench	D8120	Unlisted Item	CY	Included in Unlisted Items	
		(assume local borrow)					
		Sheet Subtotal					**$9,528,200.00**

QUANTITIES		PRICES	
BY M. R. O'Shea	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Structural

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL					
		Construct Building Structure					
	13	Furnish, form, and place reinforced concrete	D8120	43,800	CY	$350.00	$15,330,000.00
	14	Furnish and place concrete reinforcement.	D8120	4,818,000	LBS	$0.80	$3,854,400.00
		Assume 110 #/CY					
	15	Furnish and handle cement (.282T/CY)	D8120	12,352	TONS	$110.00	$1,358,720.00
		Furnish & install precast, prestressed double tees for roof					
	16	8DT 24B+2 = 8' wide & 20" deep - 68' Span	D8120	48	EA	$35,000.00	$1,680,000.00
		Structural Steel					
	17	Included in Unlisted Items	D8120	Unlisted Item	LBS	Included in Unlisted Items	
		Miscellaneous Metalwork					
	18	Included in Unlisted Items	D8120	Unlisted Item	LBS	Included in Unlisted Items	
		Manifold Pipe Encasement					
	19	Furnish, form, and place reinforced concrete	D8120	7,525	CY	$400.00	$3,010,000.00
	20	Furnish and place concrete reinforcement.	D8120	940,625	LBS	$0.80	$752,500.00
		Assume 125 #/CY					
	21	Furnish and handle cement (.282T/CY)	D8120	2,122	TONS	$120.00	$254,640.00
		Sheet 4 Subtotal					**$26,240,260.00**
		Sheet 3 Subtotal					**$9,528,200.00**
		Powerplant - Civil/Structural Subtotal (Sheets 3 and 4)					**$35,768,460.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Upper San Joaquin River Basin Powerplant at RM 286 Appraisal Level Quantity Estimates Powerplant - Mechanical	Upper San Joaquin River Basin REGION MP — PRICE LEVEL: Appraisal FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Furnish and install the following:					
	1	Steel Pipe for ROW and Penstock	D8420				
		Steel plate used for pipe fabrication:					
		ASTM A36: Sy = 36 kpsi Sa = 18 kpsi					
		(All pipe sizes are inside diameters)					
	a	300" Dia., 2 7/16" wall, L= 650 ft., 7,881 lbs/ft		5,122,650	LBS	$2.00	$10,245,300.00
	b	360" Dia., 2 7/8" wall, L= 105 ft., 11,153 lbs/ft		1,171,065	LBS	$2.00	$2,342,130.00
	c	96" Dia.,13/16" wall, L= 480 ft., 841 lbs/ft		403,680	LBS	$2.00	$807,360.00
	d	120" Dia., 1" wall, L= 115 ft., 1,294 lbs/ft		148,810	LBS	$2.00	$297,620.00
	2	Valves	D8420				
	a	96" Dia. Ring Follower Gate					
		140,000 lbs. each					
		6 gates = 840,000 lbs.		840,000	LBS	$9.00	$7,560,000.00
	b	84" Dia. Fixed Cone Valve					
		85,000 lbs. each					
		6 valves = 510,000 lbs.		510,000	LBS	$8.50	$4,335,000.00
	c	96" Dia. Spherical Valve					
		250,000 lbs. each					
		6 valves = 1,500,000 lbs.		1,500,000	LBS	$8.50	$12,750,000.00
	3	Turbine Weight - 4 units	D8420				
		CF3 18-8 stainless Runner, 6.2' outlet dia.					
		Turbine-Vertical Francis, 68,000 Hp					
		360 rpm, 520 ft. Design Head		880,000	LBS	$13.00	$11,440,000.00
		220,000 lbs each unit x 4 units = 880,000					
	4	Digital Governor - 4 units					
		130,000 ft-lb capacity		104,000	LBS	$11.50	$1,196,000.00
		26,000 lbs each unit x 4 units = 104,000					
		Sheet Subtotal					**$50,973,410.00**

QUANTITIES		PRICES	
BY	CHECKED	BY D. Donaldson	CHECKED
DATE PREPARED		DATE PREPARED 05/31/05	PEER REVIEW

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Mechanical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	5	CO2 High Pressure Fire Extinguishing System:	D-8410	2	EA	$40,000.00	$80,000.00
		10 - 100# Storage Cylinders w/ control panel					
		and appurtenances and 700 lbs. of					
		sch. 80 carbon steel pipe, valves & fittings					
	6	Fire Suppression System:	D-8410	1	LS	$60,000.00	$60,000.00
		8 Fire hose reels w/ 75 feet of hose					
		24 - Portable hand-held 20# extinguishers					
		2,200 lbs. of sch. 40 carbon steel pipe, valves & fittings					
		1 - Fire pump, split-case, 500 gpm @ 300 ft of head					
	7	Unit Cooling Water System:	D-8410	1	LS	$250,000.00	$250,000.00
		5 - Cooling water pumps, end-suction type, 150 gpm					
		2 - 8-inch automatic, self-cleaning strainers					
		14,000 lbs. of sch. 40 carbon steel pipe, valves & fittings					
		1,200 lbs. of ductile iron, mechanical joint pipe & fittings					
	8	Lubricating Oil System:	D-8410	1	LS	$45,000.00	$45,000.00
		2- 500 gal carbon steel storage tanks					
		1 - 10 gpm @ 100 psi oil pump					
		1 - lube oil filter					
		2,700 lbs. of sch. 40 carbon steel pipe, valves & fittings					
	9	Compressed Air System:	D-8410	1	LS	$70,000.00	$70,000.00
		2 - 100 cfm @ 125 psi rotary screw air compressors					
		1 - 250 gal. carbon steel air receiver					
		1 - 100 cfm air dryer					
		700 lbs. of sch. 40 carbon steel pipe, valves & fittings					
	10	Service Water System:	D-8410	1	LS	$100,000.00	$100,000.00
		1 - Service water pump, 75 gpm @ 200 ft. of head					
		1 - Hydropneumatic Tank, 300 gal.					
		1,500 lbs. of type K copper tubing, valves & fittings					
	11	Gravity Drainage System:	D-8410	1	LS	$200,000.00	$200,000.00
		54 - Floor drains, cast iron					
		14,000 lbs. of cast iron hub & spigot, service weight					
		soil pipe					
		Sheet Subtotal					**$805,000.00**

QUANTITIES		**PRICES**	
BY	**CHECKED** Rick Frisz, D8420	**BY** D. Donaldson	**CHECKED**
DATE PREPARED		**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Mechanical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
	12	Plant Unwatering System:	D-8410	1	EA	$70,000.00	$70,000.00
		2 - Vertical turbine type sump pump, 500 gpm @ 50 ft hd					
		1 - Drainage jet type drainage pump					
		1,500 lbs. of type K copper tube, valves & fittings					
		3,800 lbs. of ductile iron, mechanical joint pipe & fittings					
	13	Domestic Water and Sanitary Waste System:	D-8410	1	EA	$60,000.00	$60,000.00
		2 - Water Closets					
		1 - Urinal					
		2 - Lavatories & accessories					
		1 - Duplex Sewage Ejector					
		2,800 lbs. of cast iron hub & spigot service weight					
		sewer pipe					
		300 lbs. of type K copper tubing, valves & fittings					
	14	150-Ton overhead crane, 63'-0" span, one required	D-8410	210,000	LBS	$6.00	$1,260,000.00
	15	Electric traction elevator, overhead, geared,	D-8410	1	UNIT	$400,000.00	$400,000.00
		capacity = 3500 pounds, passenger elevator,					
		travel = 58 feet, landings = 5, speed = 200 ft/min					
	16	Bulkhead gates, lifting beam, and guides	D-8410				
		(assumes one set of two bulkheads for isolation of 1					
		turbine, assumes four sets of guides for four units)					
		a. Structural steel A36:					
		1. Bulkhead gates = 8,000 #/gate x 2 = 16,000#		42,500	LBS	$4.00	$170,000.00
		2. Guides (excluding S.S) = 25,000#					
		3. Lifting frame = 1,500#					
		b. Embedded anchor bolts,steel = 2,500#		2,500	LBS	$4.00	$10,000.00
		c. Stainless steel for guides = 2,500#		2,500	LBS	$15.00	$37,500.00
		Sheet Subtotal					**$2,007,500.00**

QUANTITIES		**PRICES**	
BY	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Mechanical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical (cont)					
		Cost of HVAC items assumed covered under					
		"Unlisted Items."					
		Cost of monorail hois for bulkhead gate assumed					
		covered under "Unlisted Items."					
		Sheet 5 Subtotal					$50,973,410.00
		Sheet 6 Subtotal					$805,000.00
		Sheet 7 Subtotal					$2,007,500.00
		Powerplant - Mechanical Subtotal					**$53,785,910.00**

QUANTITIES		**PRICES**	
BY	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Powerplant - Electrical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Furnishing, installing, & testing 42,700 KVA, 60	D-8430	4	EA	$2,000,000.00	$8,000,000.00
		cycle, 360 RPM, 90 percent power factor, 3					
		phase, 13,800 Volt, vertical-shaft, water-cooled					
		AC generator including static excitation system					
	2	Furnishing and installing 15 KV, 2000 amperes,	D-8430	400	LF	$1,200.00	$480,000.00
		non-segregated phase bus					
	3	Furnishing and installing generator neutral	D-8430	4	EA	$25,000.00	$100,000.00
		grounding equipment					
	4	Furnishing and installing generator metal-clad	D-8430	4	EA	$500,000.00	$2,000,000.00
		switchgear, 15 KV, 2000 amperes					
	5	Furnishing and installing Duplex control	D-8430	1	EA	$1,000,000.00	$1,000,000.00
		switchboard for operation of four generators, and					
		switchyard controls and protection					
	6	Furnishing and installing indoor double-ended	D-8430	2	EA	$100,000.00	$200,000.00
		secondary unit substation with two dry type					
		transformer 13.8 KV-480Y277 V; 1,500 KVA					
	7	Furnishing and installing plant battery system	D-8430	1	LS	$55,000.00	$55,000.00
		125 VDC, 200 ampere-hour, with battery charger					
	8	Furnishing and installing lighting system	D-8430	1	LS	$30,000.00	$30,000.00
	9	Furnishing and installing 3 phase, 480 volt,	D-8430	6	EA	$75,000.00	$450,000.00
		distribution panels include:					
		1 - 225 Amp frame, 225 amp trip					
		2 - 100 Amp frame, 100 amp trip					
		4 - 100 Amp frame, 60 amp trip					
		4 - 100 Amp frame, 20 amp trip					
		4 - 100 Amp frame, 15 amp trip					
		Powerplant - Electrical Subtotal					**$12,315,000.00**

QUANTITIES		PRICES	
BY Richard Noi	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED June 10,2004	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
Powerplant at RM 286
Appraisal Level Quantity Estimates

Switchyard

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		STRUCTURAL	D8120				
		Assume switchyard structures covered under					
		unlisted items.					
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power	D8440	2	EA	$1,200,000.00	$2,400,000.00
		transformer					
		200 MVA; 230-6.9kV, 3-phase					
	2	230-kV disconnect switches,	D8440	4	EA	$60,000.00	$240,000.00
		1200 amp, 3-phase					
	3	230-kV circuit breakers,	D8440	2	EA	$600,000.00	$1,200,000.00
	4	**Construct Transmission Line**	D8440	20	MILES	$500,000.00	$10,000,000.00
		230-kV H-frame wood-pole					
		1431 AWG conductor					
		New Bay in Existing Switchyard					
		Furnish and Install:					
	5	230-kV disconnect switches,	D8440	2	EA	$60,000.00	$120,000.00
		1200 amp, 3-phase					
	6	230-kV circuit breaker,	D8440	1	EA	$600,000.00	$600,000.00
		1200 amp, 3-phase					
		Sheet Subtotal					**$14,560,000.00**

QUANTITIES		PRICES	
BY Lisa Gamuciello	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 6/10/2004	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Upper San Joaquin River Basin Powerplant at RM 286 Appraisal Level Quantity Estimates Switchyard	**PROJECT:** Upper San Joaquin River Basin
	REGION MP **PRICE LEVEL:** Appraisal
	FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 1 - July04\[Powerplant - RM 286 v2.xls]Powerplant-

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	7	**SCADA**	D8440	Unlisted Item	LS	Included in Unlisted Items	
		Sheet 11 Subtotal					$0.00
		Sheet 10 Subtotal					$14,560,000.00
		Switchyard & Transmission Line Subtotal					**$14,560,000.00**

QUANTITIES		**PRICES**	
BY Lisa Gamuciello	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 6/10/2004	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

CODE:D-8170 **ESTIMATE WORKSHEET** SHEET__1__ OF __1__

FEATURE: 31-May-05

Redinger Dam Decommissioning
Spillway Gates and Hoist Removal
Outlet Works Gates and Hoist Removal
Concrete Pier Removal to EL 1373
Concrete Plug

PROJECT: Upper San Joaquin River Basin

DIVISION:

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[Redinger Dam Decommissioning_8-4-04.xls]Page 1

PLANT ACCT.	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Spillway Gates and Hoists					
		Remove 4 - 40' x 30' Radial Gates		480,000	LBS	$2.00	$960,000
		Remove 4 Gate Hoists		120,000	LBS	$2.00	$240,000
	2	Outlet Works Gates and Hoists					
		Remove 2 - 8' x 17' 8" Fixed Wheel Gates		90,750	LBS	$2.00	$181,500
		Remove 2 Gate Hoists		32,000	LBS	$2.00	$64,000
		Remove Trashracks		640,000	LBS	$2.00	$1,280,000
		Remove Trashrack Rake		1	LS	$30,000.00	$30,000
	3	Sluiceway					
		Weld 2 - 5' x 6'- 6" Slide Gates in Open Position		1	LS	$10,000.00	$10,000
	4	Remove Reinforced Concrete					
		Concrete from Spillway Hoist Decks		260	CY	$350.00	$91,000
		Concrete from Piers		1,385	CY	$350.00	$484,750
		Concrete from Chute Walls		1,500	CY	$350.00	$525,000
	5	Concrete Plug					
		Rock Excavation		65	CY	$125.00	$8,125
		Reinforced Concrete		130	CY	$900.00	$117,000
		SUBTOTAL					**$3,991,375.00**
		Mobilization (+/-)	5%				$200,000.00
		Subtotal w/ mobilization					$4,191,375.00
		Unlisted Items (+/-)	15%				$608,625.00
		CONTRACT COST					**$4,800,000.00**
		Contingencies (+/-)	25%				$1,200,000.00
		FIELD COST					**$6,000,000.00**

QUANTITIES		PRICES	
BY S. Higinbotham	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**APPROVED**	**DATE** 05/31/05	**PRICE LEVEL** Appraisal

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Summary Sheet 1 of 1

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Powerplant - Civil/Structural Subtotal					$10,052,580.00
		Powerplant - Mechanical Subtotal					$18,868,020.00
		Powerplant - Electrical Subtotal					$11,994,970.00
		Subtotal					**$40,915,570.00**
		Mobilization	+/- 5%				$2,000,000.00
		Subtotal w/ mobilization					$42,915,570.00
		Unlisted Items	+/- 15%				$6,084,430.00
		CONTRACT COST					**$49,000,000.00**
		Contingencies	+/- 25%				$13,000,000.00
		FIELD COST					**$62,000,000.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Powerplant - Civil/Structural

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		All undergraound work is unlined, self supporting, and excavated in granite. Water problems will be minimal.					
	1	**Construct Surge Adit**					
		Construct 1,700-ft long, 20.00-ft finished diameter and 23.00-ft excavated diameter adit. Adit will be					
		excavated by drill and blast and driven uphill.					
		Excavation (26,200 CY, approx 16 CY/LF)	D-8140	1,700	LF	$3,300.00	$5,610,000.00
	2	**Construct Surge Riser**					
		Construct 129-ft deep, 20.00-ft finished diameter, 20.7-ft excavated diameter, tunnel. Shaft will be					
		excavated by raise boring.					
		Excavation 1,600 CY, approx 13 CY/LF)	D-8140	129	LF	$5,300.00	$683,700.00
	3	**Construct Surge tank**					
		Construct 550-ft deep, 91.00-ft finished diameter, 95.00-ft excavated diameter shaft. Shaft will be					
		excavated by raise boring and slash down method. Slashing down will be by drill and blast.					
		Excavation (144,000 CY, approx 262 CY/LF)	D-8140	550	LF	$5,500.00	$3,025,000.00
		Construct shaft plug of unreinforced concrete (3 ksi)	D-8140	500	CY	$400.00	$200,000.00
		Cementitious materials	D-8140	118	Tons	$160.00	$18,880.00
		Excavate shaft top (surge tank) @ 115 ft diameter	D-8140	16,000	CY	$30.00	$480,000.00
		by drill and blast in granite					
		Rock excavation (and removal) within existing plant	D-8120	350	CY	$100.00	$35,000.00
		for new ring follower gate (guard valve)					
		Blasting will be permissible.					
		Powerplant - Civil/Structural Subtotal					**$10,052,580.00**

QUANTITIES		**PRICES**	
BY Bill Thompson Mike O'Shea	**CHECKED** Kevin Atwater	**BY** D. Donaldson	**CHECKED**
DATE PREPARED 8/19/04	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET__3__ OF __6__

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Powerplant - Mechanical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Remove - Turbine Weight - 1 unit	D-8420	890,000	LBS	$0.50	$445,000.00
		Turbine-Vertical Francis, 210,000 hp					
		180 rpm, 421 ft. Design Head					
		Reuse draft tube					
	2	Install Turbine Weight - 1 unit	D-8420	682,540	LBS	$13.00	$8,873,020.00
		CF3 18-8 stainless Runner, 10.5' outlet dia.					
		Turbine-Vertical Francis, 249,424 hp					
		240 rpm, 604 ft. Design Head					
		Gross Head Range, 845 - 457 feet					
	3	Remove second stage concrete to remove	D-8420	300	CY	$500.00	$150,000.00
		old turbine					
		Furnish and Install the following:	D-8420				
		144" Dia. Ring-follower gate		400,000	LBS	$10.00	$4,000,000.00
		Gate leaf slided on wheels on each side.					
		Includes hydraulic operating system.					
		400,000 lbs					
		New gate chamber will be needed.					
		Sheet Subtotal					**$13,468,020.00**

QUANTITIES		**PRICES**	
BY Dave Hulse	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET__4_ OF __ __

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Powerplant - Mechanical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	400 Ton Overhead Crane, 85'-0" span, 32' long	D8410	1	LS	$5,400,000.00	$5,400,000.00
		a. Crane: 600,000 lbs (includes 50 T aux.)					
		b. Trolley: 300,000 lbs					
		c. Rail: 32 ft x 2 = 64 ft of 175# rail = 4000#					
		OTHER D-8410 MECHANICAL EQUIPMENT:					
		DRAFT TUBE BULKHEAD GATES AND GUIDES,					
		INTAKE TRASHRACK, HEATING/VENTILATING, AND					
		PLANT EQUIPMENT ASSUMED TO BE SATISFACTORY					
		AND WILL NOT REQUIRE REPLACEMENT.					
		ASSUMED EXISTING OVERHEAD CRANE WOULD					
		NEED TO BE REPLACED DUE TO HEAVIER					
		ROTOR AND SHAFT FOR 182 MW UNIT					
		Sheet 4 Subtotal					**$5,400,000.00**
		Sheet 3 Subtotal					**$13,468,020.00**
		Powerplant - Mechanical Subtotal					**$18,868,020.00**

QUANTITIES		PRICES	
BY Wayne Delzer	**CHECKED**	**BY** D. Donaldson	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET__5__ OF __6__

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Powerplant - Electrical

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Furnishing, installing, & testing 182,300 KVA, 60	D-8430	1	LS	$8,360,000	$8,360,000.00
		cycle, 240 RPM, 90 percent power factor, 3					
		phase, 13,800 Volt, vertical-shaft, water-cooled					
		AC generator including static excitation system					
		Cost curves: 1992 [200 mva and 175 mva avg.]				6,860,500	
		Index number: 1992 - 2004	262			1.218605	
			215				
	2	Furnishing and installing 15 KV, 10,000 amperes,	D-8430	100	LF	$1,500.00	$150,000.00
		Isolated phase bus					
	3	Furnishing and installing generator neutral	D-8430	1	Each	$20,000.00	$20,000.00
		grounding equipment					
	4	Furnishing and installing SF6 generator circuit	D-8430	1	Each	$175,000.00	$175,000.00
		breaker switchgear, 15 KV, 10,000 amperes	reduce if puffer-type breaker allowed				
	5	Furnishing and installing Duplex control	D-8430	1	Each	$250,000.00	$250,000.00
		switchboard for operation of one generator, and					
		switchyard controls and protection					
	6	Furnishing and installing indoor	D-8430	1	Each	$90,000.00	$90,000.00
		unit substation with a dry type					
		transformer 13.8 KV-480Y277 V; 1,500 KVA					
	7	Furnishing and installing plant battery system	D-8430	1	LS	$3,400.00	$3,400.00
		125 VDC, 100 ampere-hour, with battery charger	batts	25	ea	$100.00	
			charger	1	ea	$400.00	
			rack	1	ls	$500.00	
	8	Furnishing and installing lighting system	D-8430	1	LS	$83,400.00	$83,400.00
		lighting control panelboard		1	ea	$5,000.00	
		overhead lighting:	**	10,000	ft2	$7.50	
		emergency lighting units		4	ea	$650.00	
		exit lighting		4	ea	$200.00	
		** The square footage is major guess - correct with actual floorplan info					
		The cost per square foot is a mid-point value from the electrical D50					
		industrial lighting tables. Means elect. Pages 336 - 347.					
		Sheet Subtotal					**$9,131,800.00**

QUANTITIES		PRICES	
BY Richard Noi	**CHECKED**	**BY** Larry Pedde	**CHECKED**
DATE PREPARED	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Upper San Joaquin River Basin
K2 Turbine Replacement
Appraisal Level Quantity Estimates

Switchyard

PROJECT:
Upper San Joaquin River Basin

REGION MP **PRICE LEVEL:** Appraisal

FILE: E:\US_Bureau_Reclamation\IDIQ_01CS20210B\Upper_San_Joaquin_FR-EIS-EIR_(Phase_2)\Reclamation products\TSC products\Cost worksheets\Group 2 - Sept 04\[K2 Turbine Replacement - Qty

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	9	Furnishing and installing 3 phase, 480 volt,	D-8430	1	LS	$13,170.00	$13,170.00
		distribution panels include:					
		Main panelboard enclosure: 225A lugs		1	ea.	$2,400.00	
		Main panelboard enclosure: 100A lugs		1	ea.	$2,250.00	
		225 Amp frame, 225 amp trip		1	ea.	$1,100.00	
		100 Amp frame, 100 amp trip		2	ea.	$530.00	
		100 Amp frame, 60 amp trip		4	ea.	$530.00	
		100 Amp frame, 20 amp trip		4	ea.	$530.00	
		100 Amp frame, 15 amp trip		4	ea.	$530.00	
		M: 16400 800 0170/0190 820 0280/0420					
	10	Furnishing and installing spherical valve control board	D-8430	1	Each	$50,000.00	$50,000.00
		typical price for a control board - uncertain					
		of adequacy of application here - not enough info					
		ELECTRICAL					
		Switchyard					
		Furnish and Install:					
	1	Oil-filled, conservator-type power transformer	D8440	1	LS	$2,800,000	$2,800,000.00
		200 MVA; 115-13.8 kV, 3-phase		200	MVA	$14,000.00	
		Means: 16300 800 1080	14700				
		coulee - db - 2000	7430	large unit			
		tracey - db - 2003	21715	small unit			
	2	**SCADA**	D8440	Assume covered by unlisted items.			
		STRUCTURAL	D8120	Assume covered by unlisted items.			
		Sheet 6 Subtotal					**$2,863,170.00**
		Sheet 5 Subtotal					**$9,131,800.00**
		Powerplant - Electrical Subtotal					**$11,994,970.00**

QUANTITIES		PRICES	
BY Lisa Gamuciello	**CHECKED**	**BY** Larry Pedde	**CHECKED**
DATE PREPARED 8/18/04	**PEER REVIEW**	**DATE PREPARED** 05/31/05	**PEER REVIEW**

AUXILIARY MECHANICAL SYSTEMS FOR RM286 POWERHOUSE

1. 150-Ton Overhead Crane
   a. Span = Approx. 63 ft.
   b. Heaviest load expected to be lifted is the rotor and shaft, approximately 250,000 lbs.

2. Electric Traction Elevator
   a. Passenger elevator
   b. Capacity = 3,500 lbs., typical size for passenger elevator
   c. Travel = 58 ft., approximated from drawing
   d. Landings = 5 (assumes elevator stops at each floor shown on drawing)
   e. Speed = 200 ft/min., typical speed for elevator

3. Bulkhead Gates, lifting beam, and guides
   a. Design head = 62.5 ft. [776.0 (Max TWS) – 713.5 (Invert)]
   b. Approx gate dimensions 10 ft wide x 7 ft high
   c. Two gates required, to isolate 1 turbine draft tube.
   d. Four sets of embedded guides, one for each turbine unit.
   e. One lifting beam provided.
   f. Material used is structural steel A36, except sealing surfaces of guides are stainless steel, and embedded anchor bolts are steel.

4. Powerplant Auxiliary Mechanical Systems
   a. Includes the necessary auxiliary mechanical systems for operation of the turbine/generating equipment and for plant maintenance activities.
   b. Systems provided include the following:
      i) Unit Cooling Water System – This system supplies cooling water for the main turbine/generating units and associated equipment.
      ii) Lubricating Oil System – This system stores and filters lubricating oil for use by the turbine/generator bearings.
      iii) Compressed Air System – This system provides compressed air for service hose outlets located throughout the plant for maintenance and repair, for operation of the plant sewage ejectors and for operation of any air operated control valves.
      iv) Service Water System – This system provides service water to hose outlets located throughout the plant for maintenance and repair. Irrigation water for the landscape features on the exterior of the plant is also provided from the service water system.
      v) Fire Suppression System – This system provides a water-based fire suppression system within the plant and a CO2 fire extinguishing system for the main unit generators.
      vi) Domestic Water and Sanitary Waste System – This system within the interior of the plant provides domestic water to the restrooms and collects sewage to be discharged from the plant.
      vii) Gravity Drainage System – This system conveys wastewater collected by plant floor drains through an embedded piping system to the plant drainage sump.
      viii) Plant Unwatering System – This system is provided to empty the plant sump of water from the gravity drainage system and water drained from the main unit penstock and draft tubes.
   c. All of these systems will be provided in accordance with the applicable industry codes and standards.

5. HVAC
   a. Cost included in unlisted items.