

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Diversion and Care	PROJECT: Klamath River Northern California/Southern Oregon		
	WOID: AF652	ESTIMATE LEVEL: Feasibility	
	REGION: MP	UNIT PRICE LEVEL: July-2010	
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xls\Rec Fac Removal		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	1	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir for Dam Removal. Barge is used for removal of existing closure gates and installation of new roller gate. Barge is located on reservoir for approximately 1 week.	86-68130	1	ls		\$210,000.00
	2	Furnish, Install, and Remove Temporary Air Vent Hose from Barge to Diversion Tunnel Intake Structure. Installation requires a dive depth of approximately 150 feet. Air vent consists of 12-inch diameter HDPE pipe.	86-68130	150	lf		DELETED
	3	Remove Reinforced Concrete Ring. Located just downstream of closure gate and upstream of flap gate. Tunnel work	86-68130	31	cy	\$1,800.00	\$55,800.00
	4	Remove Reinforced Concrete Stoplog Structure. Located at downstream end of diversion tunnel.	86-68130	3	cy	\$380.00	\$1,140.00
	6	Remove Water from behind Tailrace Cofferdam. Unwatering of tailrace for removal of the powerhouse in the dry. Assume 3 inch portable trash pump operating for 1 day.	86-68130	300,000	gals		DELETED
	6	Provide Dewatering behind Tailrace Cofferdam for removal of Powerhouse in the dry. Assume 3 inch portable trash pump operating for approximately 3 months.	86-68130	1	ls		DELETED
SUBTOTAL THIS SHEET							\$266,940.00

QUANTITIES		PRICES	
BY Rick Benik	CHECKED Jonathan East	BY Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 02/19/11	PEER REVIEW / DATE Tom Hepler P.E. 2/19/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
	8	Construct 240-ft-long, 2-span concrete Bridge. 31-ft deck width (two 12-ft lanes, two 2-ft shoulders, additional width for jersey barriers along each side). To be constructed near existing bridge, which is to be kept in service until new bridge is ready for service. Design loading is HS-20 truck. Cost is based on unit cost per ft2 of deck for similar concrete bridge at Upper San Joaquin priced out in 2009.	86-68130	7,440	ft2	\$600.00	\$4,464,000.00
	9	Remove and dispose of existing bridge. Bridge is approximately 227 feet long. Consists of 9 spans @ about 25 feet (steel girders) with reinforced concrete decking (about 16 feet wide). Piers appear to be timber posts, supported on 4 or 5 pile bents. Rails along both sides are timber with concrete wheel guards. Assume wood is pressure-treated. Assume girders contain paint with heavy metals.	86-68130	1	ls		\$800,000.00
SUBTOTAL THIS SHEET							\$5,264,000.00

QUANTITIES		PRICES	
BY Stephen Latham	CHECKED Rick Benik	BY <i>Craig A. Grush</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE Tom Hepler, P.E. 1/7/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

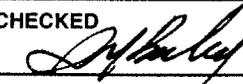
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL	86-68420				
		All items are necessary for the removal of Iron Gate Dam.					
	11	Remove 1 - 9' dia. hinged blind flange and associated metal work, including 5' of pipe spool. This will require installing and removing all fasteners on the blind flange. It assumed that these fasteners are on-site (Assume contains paint with heavy metals) Tunnel work		19,000	lbs	\$3.00	\$57,000.00
	12	Remove 18" plug valve and 7' of 18" drainage pipe Weight of plug valve used: 2,000 lbs Tunnel work		2,900	lbs	\$3.00	\$8,700.00
	13	Furnish, install and remove 1 - 16.5'x18' roller gate, stem, and operator Total roller gate weight approximately: 75,900 lbs. Installation and removal requires a dive depth of approximately 150 feet.		110,000	lbs	\$18.00	\$1,980,000.00
DIVERSION AND CARE SUBTOTAL							\$9,576,640.00

QUANTITIES		PRICES	
BY T. J. Turnage	CHECKED M. Gulsvig	BY Craig A. Gush, P.E.	CHECKED 
DATE PREPARED 02/22/11	PEER REVIEW / DATE Dan Drake 3/3/11	DATE PREPARED 06/08/11	PEER REVIEW / DATE DCD 6/10/11

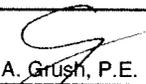
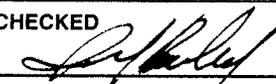
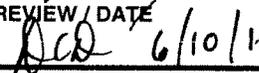
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	14	Remove Concrete in Observation Platform, Crest Wall and Wall Extension. Observation Platform is reinforced concrete slab located on right abutment. Buried crest wall on left abutment consists of unreinforced controlled low strength material. Reinforced extension on right abutment includes reinforced concrete wall and stairs to trash gate.	86-68130	580	yd3	\$380.00	\$220,400.00
		Items are associated with the Diversion Tunnel.					
		All concrete is reinforced concrete.					
	15	Remove Concrete in Diversion Tunnel Intake Structure. Remove concrete upstream of Sta. 3+00. Concrete removal requires a dive depth of 160 feet.	86-68130	530	yd3	\$380.00	\$201,400.00
	16	Remove Concrete in Diversion Tunnel Gate Tower. Remove concrete down to elev. 2254.	86-68130	410	yd3	\$380.00	\$155,800.00
	17	Remove Steel Footbridge to Gate Tower. This bridge provides access from the dam crest to the gate tower for the diversion tunnel. Assume contains paint with heavy metals.	86-68130	13,000	lbs	\$1.00	\$13,000.00
	18	Remove Concrete in Diversion Tunnel Footbridge Abutment. Includes stairs over sheetpile wall.	86-68130	20	yd3	\$380.00	\$7,600.00
	19	Place Concrete Plugs for Diversion Tunnel. There will be 3 plugs total. Two placed vertically and one horiz. Plugs will be 2 feet thick, reinforced concrete, 3,000 psi min. Location of plugs and info about openings is as follows: Upstream portal; vertical plug, 15.5-ft-wide by 16.5-ft-high, horseshoe shape, at Sta. 3+01.0. Downstream portal; vertical plug, 15.5-ft-wide by 16.5-ft-high, horseshoe shape, at Sta. 12+68.5. Gate tower; horizontal plug at elev. 2254, 15.5-ft by 7.5-ft, reinf. concrete, rectangular shape.	86-68130	43	yd3	\$1,300.00	\$55,900.00
SUBTOTAL THIS SHEET							\$654,100.00

QUANTITIES		PRICES	
BY Rose Reynolds, Stephen Latham	CHECKED Sheena Barnes, Jonathan East	BY Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 02/19/11	PEER REVIEW / DATE Rick Benik P.E. 2/22/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE DCD 6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
	21	Upstream Riprap Assume max size 250 lbs, ave. 100 lbs. to waste area by truck	86-68313	80,000	yd3	\$17.00	\$1,360,000.00
	22	Downstream Riprap Assume max size 2500 lbs, ave. 500 lbs. to waste area by truck	86-68313	30,000	yd3	\$17.00	\$510,000.00
	23	Miscellaneous Excavation Consists of finer earth fill materials 300,000 cy to spillway chute by truck remainder to waste area by truck	86-68313	925,000	yd3	\$17.00	\$15,725,000.00
	24	Cutoff Wall Concrete Demolition The 2 concrete cutoff walls are embedded in the Zone III core but do not appear to be anchored into bedrock.	86-68313	1,500	yd3	\$380.00	\$570,000.00
	25	Earth Fill Crest Raise Treat as miscellaneous excavation to waste area by truck	86-68313	13,000	yd3	\$17.00	\$221,000.00
	26	Sheetpile Crest Raise Remove sheetpile wall crest raise Total height 13', embedded 9', type CS55.	86-68313	800	lin ft	\$300.00	\$240,000.00
		Monitoring Well Removal					
	27	Remove 5 monitoring wells assume 150 length, 6" diameter remove as excavation progresses	86-68313	5	each	\$2,200.00	\$11,000.00
		SUBTOTAL THIS SHEET					\$18,637,000.00

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY  Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 10/04/11	PEER REVIEW / DATE Daniel W. Osmun 1/7/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE  6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following equipment of the Spillway Structure:					
	28	Trash Sluice Gate- 10 ft. W x 9 ft. H Total gate weight approximately: 3500 lbs. Total gate hoist weight approximately: 1000 lbs Total weight approximately:	86-68420	4,500	lbs	\$1.00	\$4,500.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
		Remove and dispose of the following equipment of the Diversion Tunnel:					
	29	Intake structure Trash Racks- 4 rack each 10 ft. W x 33 ft. H Each rack weights approximately: 18,000 lbs Total weight approximately:	86-68420	72,000	lbs	\$0.85	\$61,200.00
		Trash rack removal requires a dive depth of 150 feet. (Assume contains asbestos)					
	30	Sluice and Diversion Tunnel Gate Gate Hoist- 2-10-in. Dia. Hydraulic cylinders Gate hoist weight approx: 10,000 lbs ea. Framework- I-Beam framework securing hoists Total framework weight approx: 8,000 lbs Total weight approximately:	86-68420	28,000	lbs	\$1.00	\$28,000.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	31	Hoist Stem- 6-in. Dia. Sch. 160 x 150 ft. Stem weight is 50 lbs/ft. (Assume contains paint with heavy metals & petroleum products)	86-68420	7,500	lbs	\$1.00	\$7,500.00
		SUBTOTAL THIS SHEET					\$101,200.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Gustaf, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 02/22/11	PEER REVIEW / DATE Dan Drake 3/3/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	32	Air Vent Pipe- 8-in. Dia. Sch 40. x 160 ft. Near Sluice Gate Pipe weight is 29 lbs/ft. (Assume contains paint with heavy metals) Tunnel work	86-68420	4,650	lbs	\$3.00	\$13,950.00
	33	Transition Gate Structure Flap Gate- 96-in. Dia. With 4 ft. pipe Total weight approximately: (Assume contains paint with heavy metals) Tunnel work	86-68420	8,000	lbs		DELETED
	34	Air Vent Pipe- 12-in. Dia Sch. 40 x 560 ft. From Gate to Outlet Works Pipe weight is 54 lbs/ft. (Assume contains paint with heavy metals) Tunnel work	86-68420	30,250	lbs	\$3.00	\$90,750.00
	35	Outlet Works Stop Logs (steel) Total logs weight approximately: 2,310 lbs Total guide weight approximately: 360 lbs Total weight approximately: (Assume contains paint with heavy metals)	86-68420	2,670	lbs	\$1.00	\$2,670.00
SUBTOTAL THIS SHEET							\$107,370.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Grash, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 02/22/11	PEER REVIEW / DATE Dan Drake 3/3/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at the Diversion Tunnel Gate Intake Structure:					
	36	Hydraulic Pump motor (10 HP est) & control panel Total weight approximately: 250 lbs.	86-68430	1	EA	\$400.00	\$400.00
	37	Distribution equipment , Junction Boxes Total weight approximately: 200 lbs.	86-68430	1	EA	\$2,000.00	\$2,000.00
	38	Power Cable and 4"Conduit from Penstock Structure (3 conductor 6 AWG est.) Total weight approximately: 10,400 lbs.	86-68430	800	feet	\$40.00	\$32,000.00
		DAM SUBTOTAL					\$19,613,370.00

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 11/18/10	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Powerhouse, Switchyard, and Transmission Line	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	40	Turbine Unit 25,000 hp, 158 ft. of head, 180 RPM D3 is calculated at 8.85 ft. Turbine weight calculated approx: (Assume contains paint with heavy metals, petroleum products, and/or asbestos)	86-68420	344,058	lbs		DELETED
	41	Draft Tube Bulkheads- 3-Bulkhead approx. 10 ft. W. x 10 ft. H Bulkhead weight approximately: 3000 lbs each 3-Framework weight approx: 2500 lbs each Total bulkhead weight approx: (Assume contains paint with heavy metals and/or asbestos)	86-68420	16,500	lbs		DELETED
		Remove and dispose of the following equipment of the Powerhouse Structure:					
	42	Crane- No Crane at Site, but embedded rails still exist Above Ground Steel Rails-200 ft. length Crane is presently used at J. C. Boyle (Assume contains paint with heavy metals & petroleum products)	86-68420	24,000	lbs		DELETED
	43	Governor- Accumulator tank for air over oil cylinders Governor control panel cabinet Pump for Oil Total weight approximately: (Assume contains paint with heavy metals, petroleum products, and/or asbestos)	86-68420	20,310	lbs		DELETED
SUBTOTAL THIS SHEET							

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	44	Bearing Oil System and Cooling Water System- Steel Piping of various sizes Valves of various sizes Total weight approximately:	86-68420	9,182	lbs		DELETED
		(Assume contains paint with heavy metals & petroleum products)					
	45	CO2 System- Various sizes of piping and valves Total weight approximately:	86-68420	2,568	lbs		DELETED
		(Assume contains paint with heavy metals & petroleum products)					
	46	Plant Water and Fire Protection System- Various sizes of piping and valves Total weight approximately:	86-68420	9,182	lbs		DELETED
		(Assume contains paint with heavy metals)					
	47	Sump Pumps- 2 Powerhouse water removal sump pumps Sump weight approximately: 1000 lbs each Total weight approximately:	86-68420	2,000	lbs		DELETED
		(Assume contains petroleum products and/or asbestos)					
	48	Pumps- 4 Large pumps near outlet Pump weight approximately: 3000 lbs each 4 Pump Suction Inlet Bulkhead gates approx. 10 ft. H. x 10 ft. W. Bulkhead weight approximately: 2500 lbs each Total weight approximately:	86-68420	22,000	lbs		DELETED
		(Assume contains paint with heavy metals & petroleum products)					
SUBTOTAL THIS SHEET							

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE DCB 6/10/11

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		MECHANICAL					
	49	Exposed Piping around the plant- Various sizes of piping and valves Total weight approximately: (Assume contains paint with heavy metals & petroleum products)	86-68420	10,294	lbs		DELETED
	50	Unwatering Piping- Various sizes of piping and valves Total weight approximately: (Assume contains paint with heavy metals)	86-68420	10,294	lbs		DELETED
	51	Drainage Piping- Various sizes of piping and valves Total weight approximately: (Assume contains paint with heavy metals)	86-68420	9,518	lbs		DELETED
	52	Transformer Oil and Fire Protection- Various sizes of piping and valves Total weight approximately: (Assume contains paint with heavy metals & petroleum products)	86-68420	9,182	lbs		DELETED
	53	Compressed Air System- Various sizes of piping and valves Total weight approximately: (Assume contains paint with heavy metals & petroleum products)	86-68420	1,450	lbs		DELETED
	53A	Remove Petroleum Products from Mechanical Equipment. Includes quantities for the following equipment: From Item 42, unit bearing oil system, DTE heavy oil, 275 gal. From Item 41, unit governor oil sump and accumulator tank, hydraulic oil, 800 gal. The remaining items contain petroleum products in amounts too small to be considered for this level of estimate.	86-68420	1,100	gal	\$12.00	\$13,200.00
SUBTOTAL THIS SHEET							\$13,200.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY <i>[Signature]</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

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		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	54	AC Generator, Outdoor Horizontal 18.975 MVA (18 MW); 0.95PF, 6,600V, 180 RPM, 3 Ph, including rotating exciter Total weight approximately: 387,600 lbs. Stator: 124,600 lbs., Rotor: 189,300 lbs. Exciter Assembly: 17,000 lbs. Heaviest lift: 186,700 lbs.	86-68430	1	EA		DELETED
	55	Excitation equipment for 18.975 MVA Generator (2 sections) Total weight approximately: 1,000 lbs.	86-68430	1	EA		DELETED
	56	Surge protection equip. for 18.975 MVA Generator Total weight approximately: 800 lbs.	86-68430	1	EA		DELETED
	57	Neutral grounding equip. for 18.975 MVA Generator includes transformer Total weight approximately: 500 lbs.	86-68430	1	EA		DELETED
	58	Station Service Switchgear, 600-volt (6 sections) (400 lbs each section), 3 ft x 3ft x 90 inches high Total weight approximately: 2,000 lbs.	86-68430	1	EA		DELETED
	59	Unit and plant control switchboard 6 cubicles (400 lbs each), 2ft x 2ft x 90 in. high Total weight approximately: 2,000 lbs.	86-68430	1	EA		DELETED
		SUBTOTAL THIS SHEET					

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY <i>C. Gush</i> Craig A. Gush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Powerhouse, Switchyard, and Transmission Line	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	60	Battery system - assume 60 batteries, charger, racks and supports. Total weight approximately: 2,500 lbs.	86-68430	1	EA	\$12,000.00	\$12,000.00
	61	Raceways, Bus, Conduit and Cable (approx. 3000 lin. Ft. power & control cable, 1000 lin. Ft. conduit, 100 lin. Ft. cabletray, 40 lin. Ft. non-segregated phase bus) Total weight approximately: 9,000 lbs.	86-68430	1	EA		DELETED
	62	Misc. power & control boards 10 boards (60 lbs each) 3ft x 2 ft x 9 in Total weight approximately: 500 lbs.	86-68430	1	EA		DELETED
	63	Transformer (3 phase, 275 kVA, 6600/480V est.) in power house Total weight approximately: 2,000 lbs.	86-68430	1	EA		DELETED
	64	Governor Oil Pump Motors (10 hp and 20 hp est.) Total weight approximately: 450 lbs.	86-68430	2	EA		DELETED
	65	Vertical Motors, outdoor, (480V, 100 HP est.) Outdoor for fish water pumps Total weight approximately: 2,000 lbs.	86-68430	4	EA	\$700.00	\$2,800.00
SUBTOTAL THIS SHEET							\$14,800.00

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY <i>[Signature]</i> Craig A. Gush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

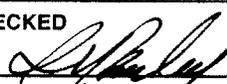
FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Powerhouse, Switchyard, and Transmission Line	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment in the Powerplant:					
	66	Transformer (3 phase, 300 kVA, 6600/480V est.) Outdoor for fish water pumps Total weight approximately: 2,900 lbs.	86-68430	1	EA	\$13,000.00	\$13,000.00
		Remove and dispose of the following equipment in switchyard/powerplant deck:					
	67	Step-up Transformer, outdoor, oil-filled, 3-phase, 18,947 kVA, 6,600/69,000 volt Total weight approximately: 58,000 lbs.	86-68430	1	EA	\$120,000.00	\$120,000.00
	68	Lattice steel structure, with 69-kV disconnect switches and insulators	86-68430	1	EA	\$6,000.00	\$6,000.00
	69	Generator Switchgear, outdoor, 7.2kV-includes unit breaker (5 Sections @ 2,400 lbs each section 3 ft x 7.5 ft x 95 inches high), 20 ft. non-seg. bus Total weight approximately: 12,000 lbs.	86-68430	1	EA	\$40,000.00	\$40,000.00
	70	Single Phase Pole Transformers. (25 kVA est.) Total weight approximately: 1050 lbs.	86-68430	3	EA	\$3,000.00	\$9,000.00
POWERHOUSE, SWITCHYARD, & TRANS LINE SUBTOTAL							\$216,000.00

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY <i>Craig A. Grish</i> , P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>Dcd</i> 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Penstock	PROJECT: Klamath River Northern California/Southern Oregon
	WOID: AF652 ESTIMATE LEVEL: Feasibility REGION: MP UNIT PRICE LEVEL: July-2010 FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	71	Remove Concrete in Penstock Intake Structure.	86-68130	460	yd3	\$380.00	\$174,800.00
	72	Remove Concrete in Penstock Encasement. Encasement runs through embankment from intake structure to penstock anchor No. 1.	86-68130	840	yd3	\$380.00	\$319,200.00
	73	Remove Concrete in 3 Penstock Anchors and 7 Penstock Supports	86-68130	1,900	yd3	\$380.00	\$722,000.00
	74	Remove Steel Footbridge to Intake Structure. This bridge provides access from the left abutment to the penstock intake structure. Assume contains paint with heavy metals.	86-68130	11,000	lbs	\$1.00	\$11,000.00
	75	Remove Concrete in Intake Structure Footbridge Abutment.	86-68130	5	yd3	\$380.00	\$1,900.00
SUBTOTAL THIS SHEET							\$1,228,900.00

QUANTITIES		PRICES	
BY Rose Reynolds, Stephen Latham	CHECKED Jonathan East, Sheena Barnes	BY Craig A. Grish, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE Rick Benik 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Penstock	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following equipment of the Power Conduit (Penstock):					
	76	Intake Structure-					
		Wheel Gate- 16.75 ft. H. x 22.33 ft. W. Gate weight approximately: 30,000 lbs					
		Wheel Gate Hoist- 2-6-in. Dia. Hydraulic Cylinders <i>Wheel gate hoist weight approx: 10,000 lbs</i>					
		Framework- I-Beam framework securing hoists Total framework weight approx: 10,000 lbs					
		Trash rack- 17.5 ft. W. x 45.75 ft. H. Trasrack weight approximately: 44,400 lbs					
		Stop logs- Total logs weight approximately: 29,250 lbs <i>Total guide weight approximately: 3,600 lbs</i>					
		Slide Gate- 30-in. W. x 42-in. H. <i>Slide Gate weight approximately: 3,240 lbs</i>					
		Sluice Gate- 12-in. W. x 12-in. H. Sluice Gate weight approximately: 1,140 lbs					
		Total weight approximately:	86-68420	131,630	lbs	\$1.00	\$131,630.00
		(Assume contains paint with heavy metals, petroleum products, and/or asbestos)					
	77	Gate Hoist Stem- 6-in. Sch 160 x 40 ft. Stem weight 45 lbs/ft.	86-68420	1,800	lbs	\$1.00	\$1,800.00
		(Assume contains paint with heavy metals & petroleum products)					
		SUBTOTAL THIS SHEET					\$133,430.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Gush, P.E.	CHECKED
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Penstock	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	78	Water fill line- 12-in. Dia. STD x 27 ft Pipe weight 50 lbs/ft. (Assume contains paint with heavy metals)	86-68420	1,350	lbs	\$1.00	\$1,350.00
	79	Air Vent- 12-in. Dia. STD x 32 ft. Pipe weight 50 lbs/ft. (Assume contains paint with heavy metals)	86-68420	1,600	lbs	\$1.00	\$1,600.00
		Power Conduit (Penstock) Continued:					
	80	Gage Wells- 10-in. Dia. STD x 32 ft. weights 41 lbs/ft. 12-in. Dia. STD x 26 ft. weights 50 lbs/ft. (Assume contains paint with heavy metals)	86-68420	1,312	lbs	\$1.00	\$1,312.00
			86-68420	1,300	lbs	\$1.00	\$1,300.00
	81	Penstock Vent- 46-in. Dia. 0.25-in. Thick x 60 ft. Pipe weight 124 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)	86-68420	7,440	lbs	\$1.00	\$7,440.00
	82	Penstock- 12-ft. Dia. 0.25-in. Thick x 698 ft. Pipe weight 386 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)	86-68420	294,428	lbs	\$1.00	\$294,428.00
	83	Bypass Outlet- 96-in. Dia. 0.25-in. Thick x 50 ft. Pipe weight 257 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)	86-68420	12,850	lbs	\$1.00	\$12,850.00
	84	Outlet Valve on bypass outlet- 66-in. Dia. Assumed to be a Fixed Cone Valve with controls Valve weight approximately: (Assume contains paint with heavy metals, petroleum products, and/or asbestos)	86-68420	18,000	lbs	\$1.00	\$18,000.00
SUBTOTAL THIS SHEET							\$338,280.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Grish, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Penstock	PROJECT: Klamath River Northern California/Southern Oregon								
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REGION:	MP	UNIT PRICE LEVEL:	July-2010						
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at the Penstock Intake Structure:					
	85	Overhead Trolley Crane Motor (4hp est)& controls Total weight approximately: 500 lbs.	86-68430	1	EA	\$1,300.00	\$1,300.00
	86	Distribution equipment , Junction Boxes Total weight approximately: 200 lbs.	86-68430	1	EA	\$3,000.00	\$3,000.00
	87	Power Cable and Conduit 1800 ft. 4" Conduit with 3 conductor 6 AWG est. 1200 ft. 1.5" Conduit with 3 conductor 12 AWG est. Total weight approximately: 11,000 lbs.	86-68430	1	EA	\$75,000.00	\$75,000.00
PENSTOCK SUBTOTAL							\$1,779,910.00

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY <i>[Signature]</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

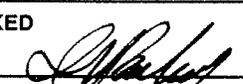
FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Reservoir Vegetative Restoration	PROJECT: Klamath River Northern California/Southern Oregon								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">WOID:</td> <td style="width:25%;">AF652</td> <td style="width:25%;">ESTIMATE LEVEL:</td> <td style="width:25%;">Feasibility</td> </tr> <tr> <td>REGION:</td> <td>MP</td> <td>UNIT PRICE LEVEL:</td> <td>July-2010</td> </tr> </table>		WOID:	AF652	ESTIMATE LEVEL:	Feasibility	REGION:	MP	UNIT PRICE LEVEL:	July-2010
WOID:	AF652	ESTIMATE LEVEL:	Feasibility						
REGION:	MP	UNIT PRICE LEVEL:	July-2010						
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	91	SPRING AERIAL SEEDING:	86-68220	825	Acres	\$15,000.00	\$12,375,000.00
		Idaho fescue (Festuca idahoensis)	3300	lbs	PLS		
		Blue wildrye (Elymus glaucus)	3300	lbs	PLS		
		Small fescue (Vulpia microstachys)	3300	lbs	PLS		
		Bluebunch wheatgrass (Pseudoroegneria spicata)	4950	lbs	PLS		
		Sandberg bluegrass (Poa secunda)	413	lbs	PLS		
		Spike bentgrass (Agrostis exarata)	206	lbs	PLS		
		Western needlegrass (Achnatherum occidentale)	3300	lbs	PLS		
		California brome (Bromus carinatus)	6600	lbs	PLS		
		Squirreltail (Elymus elymoides)	3300	lbs	PLS		
		Wood mulch	1650000	lbs			
		Tackifier	99000	lbs			
	92	FALL GROUND SEEDING:	86-68220	619	Acres	\$4,000.00	\$2,476,000.00
		Idaho fescue (Festuca idahoensis)	2475	lbs	PLS		
		Blue wildrye (Elymus glaucus)	2475	lbs	PLS		
		Small fescue (Vulpia microstachys)	2475	lbs	PLS		
		Bluebunch wheatgrass (Pseudoroegneria spicata)	3713	lbs	PLS		
		Sandberg bluegrass (Poa secunda)	309	lbs	PLS		
		Spike bentgrass (Agrostis exarata)	155	lbs	PLS		
		Western needlegrass (Achnatherum occidentale)	2475	lbs	PLS		
		California brome (Bromus carinatus)	4950	lbs	PLS		
		Squirreltail (Elymus elymoides)	2475	lbs	PLS		
		Wood mulch	190385	lbs			
		Tackifier	11423	lbs			
		SUBTOTAL THIS SHEET					\$14,851,000.00

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 02/03/11	PEER REVIEW / DATE 02/28/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE DCD 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Reservoir Vegetative Restoration	PROJECT: Klamath River Northern California/Southern Oregon		
	WOID: AF652	ESTIMATE LEVEL: Feasibility	
	REGION: MP	UNIT PRICE LEVEL: July-2010	
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		WATER AND ENVIRONMENTAL					
	93	RIPARIAN POLE PLANTING: (1,000 ea/acre)	86-68220	50	Acres	\$10,000.00	\$500,000.00
		Narrowleaf willow (<i>Salix exigua</i>)	35000	cutting			
		Arroyo willow (<i>Salix lasiolepis</i>)	10000	cutting			
		Shining willow (<i>Salix lucida</i>)	5000	cutting			
		Herbivore screen	50000	each			
		Chemical herbivore deterrent	1000	gal			
	94	WEED MANAGEMENT:	86-68220	619	Acres	\$2,000.00	\$1,238,000.00
		Herbicide, post-emergent	1238	lbs AI			
		MAINTENANCE TREATMENTS ON 10% OF THE RESTORATION AREAS PER YEAR OVER 4 YEARS, POST-RESTORATION					
	95	FALL GROUND SEEDING:	86-68220	330	Acres	\$4,000.00	\$1,320,000.00
		Idaho fescue (<i>Festuca idahoensis</i>)	1320	lbs PLS			
		Blue wildrye (<i>Elymus glaucus</i>)	1320	lbs PLS			
		Small fescue (<i>Vulpia microstachys</i>)	1320	lbs PLS			
		Bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>)	1980	lbs PLS			
		Sandberg bluegrass (<i>Poa secunda</i>)	165	lbs PLS			
		Spike bentgrass (<i>Agrostis exarata</i>)	82.5	lbs PLS			
		Western needlegrass (<i>Achnatherum occidentale</i>)	1320	lbs PLS			
		California brome (<i>Bromus carinatus</i>)	2640	lbs PLS			
		Squirreltail (<i>Elymus elymoides</i>)	1320	lbs PLS			
		Wood mulch	660000	lbs			
		Tackifier	39600	lbs			
	96	WEED MANAGEMENT:	86-68220	330	Acres	\$2,000.00	\$660,000.00
		Herbicide, post-emergent	31	lbs AI			
		RESERVOIR VEGETATIVE RESTORATION SUBTOTAL					\$19,219,000.00

QUANTITIES		PRICES	
BY O'Meara, Scott A	CHECKED Greimann, Blair P	BY Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 04/12/11	PEER REVIEW / DATE 04/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE  / 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Road Improvements	PROJECT: Klamath River Northern California/Southern Oregon
	WOID: AF652 ESTIMATE LEVEL: Feasibility
	REGION: MP UNIT PRICE LEVEL: July-2010
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		These quantities represent the work required to prepare a disposal site and remove the earth fill embankment and concrete cutoff walls of Iron Gate Dam to original ground surface.					
		General Sitework					
	97	Clear and Grub Disposal Area Estimated haul distance 1 1/4 mile. Disposed fill estimated to be 20' deep and traffic compacted (15% bulking factor).	86-68313	29	acre	\$7,000.00	\$203,000.00
		Prepare Haul Road - 1.25 mi 2 way traffic - off road dumps or scrapers					
	98	Rock Excavation for Haul Road Widening hard basalt rock	86-68313	17,000	yd3	\$45.00	\$765,000.00
	99	Clear and grub, 40' width for 1 mile	86-68313	5	acre	\$7,000.00	\$35,000.00
	100	4' thick gravel surfacing	86-68313	5,300	ton	\$80.00	\$424,000.00
		300,000 cubic yards to be disposed of in spillway chute. Filling to start in stilling basin for access to chute.					
		ROAD IMPROVEMENTS SUBTOTAL					\$1,427,000.00

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY <i>[Signature]</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE Daniel W. Osmun 1/7/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Fish Spawning Facility	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	101	Remove Building No. 2. <i>Located just north of the Powerhouse.</i> <i>Single story, hip roof, prefab metal structure on concrete slab.</i> <i>Office, lockers, and shop. 20 ft x 40 ft.</i>	86-8130	800	ft2	\$65.00	\$52,000.00
	102	Remove Building No. 3. <i>Located between circular holding ponds.</i> <i>Single story, hip roof, prefab metal structure on concrete walls.</i> <i>Houses fish facility dope tank and holding tanks. 22.67 ft x 48 ft.</i>	86-68130	1,088	ft2	\$65.00	\$70,720.00
	103	Remove Concrete in Fish Ladder. <i>Includes diffusion pools 1 thru 4, ladder pools 5 thru 20, and retaining wall (which serves as a support for part of the fish ladder, and which is the left wall of the tunnel outlet structure).</i>	86-68130	950	yd3	\$380.00	\$361,000.00
	104	Remove Concrete in Holding Ponds #1 thru #6. <i>Includes 6 circular ponds.</i>	86-68130	420	yd3	\$380.00	\$159,600.00
	105	Remove Concrete in Fish Facility Items. <i>Includes holding tank between pool 20 and Bldg. No. 3, tanks around & housed by Bldg. No. 3, ramp to Bldg. No. 3, flumes (to holding ponds), and gate basins #1 thru #6.</i>	86-68130	380	yd3	\$380.00	\$144,400.00
	106	Remove Miscellaneous Metalwork in Fish Facilities. <i>Includes steel and aluminum mechanical sweep (in 12-ft-wide holding tank), fish basket (in dope tank), rotating sweeps & stationary sweeps (in circular ponds), frames, gratings, handrail, and ladders.</i> <i>Assume contains paint with heavy metals.</i>	86-68130	12,000	lbs	\$1.00	\$12,000.00
SUBTOTAL THIS SHEET							\$799,720.00

QUANTITIES		PRICES	
BY Rose Reynolds, Stephen Latham	CHECKED Jonathan East, Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED
DATE PREPARED 01/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE DCD 6/10/11

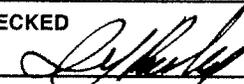
FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Fish Spawning Facility	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		CIVIL					
		Concrete and Structural Steel Items:					
	107	Remove Concrete associated with 30"-dia. Water Supply Line. <i>Includes intake structure and 4 water supply line anchors (all on upstream side of dam).</i>	86-68130	68	yd3	\$380.00	\$25,840.00
	108	Remove Concrete in Aerator Structure. <i>Located southeast of powerhouse, across the road, and up the slope. Supplies air for the 30"-dia. water supply line. Includes anchor blocks, thrust blocks, pipe supports, and aerator box.</i>	86-68130	50	yd3	\$380.00	\$19,000.00
	109	Remove Wood in Aerator Structure. <i>Consists of lumber pressure-treated with chromated copper arsenate. Volume of lumber approximately 200 ft3. Assumed to weigh 30 lbs/ft3.</i>	86-68130	6,000	lbs	\$0.85	\$5,100.00
	110	Remove Structural Steel in Aerator Structure. <i>Includes three 6 in WF beams, each about 13 ft long, misc. angles & connection hardware, walkway supports, ladders, cages, and guardrails for landings & steps. Assume contains paint with heavy metals.</i>	86-68130	2,500	lbs	\$1.00	\$2,500.00
	111	Remove Asphalt Pavement. <i>Located around powerhouse and fish facility ponds and tanks.</i>	86-68130	39,000	ft2	\$7.00	\$273,000.00
	112	Remove Restroom Building near Aerator Structure. <i>Metal building.</i>	86-68130	340	ft2	\$65.00	\$22,100.00
	113	Remove Storage Shed near Aerator Structure. <i>Metal building.</i>	86-68130	90	ft2	\$65.00	\$5,850.00
SUBTOTAL THIS SHEET							\$353,390.00

QUANTITIES		PRICES	
BY Rose Reynolds, Stephen Latham	CHECKED Jonathan East, Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 10/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE Rick Benik 6/10/11

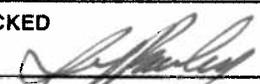
FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Fish Spawning Facility	PROJECT: Klamath River Northern California/Southern Oregon
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		GEOTECHNICAL					
		Fish Hatchery Berm Removal					
	114	Toe Drain Pipe <i>30" diameter RCP dispose of off site</i>	86-68313	260	lin ft	\$25.00	\$6,500.00
	115	Toe Drain Manhole <i>48" diameter precast concrete dispose of off site</i>	86-68313	25	lin ft	\$55.00	\$1,375.00
	116	Berm Removal <i>to be removed concurrent with dam constructed with random fill to waste area by truck</i>	86-68313	53,000	yd3	\$17.00	\$901,000.00
SUBTOTAL THIS SHEET							\$908,875.00

QUANTITIES		PRICES	
BY Randy Kuzniakowski	CHECKED Tuti Tierney	BY Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE Daniel W. Osmun 1/7/11	DATE PREPARED 11/18/10	PEER REVIEW / DATE  6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Fish Spawning Facility	PROJECT: Klamath River Northern California/Southern Oregon <hr/> WOID: AF652 ESTIMATE LEVEL: Feasibility <hr/> REGION: MP UNIT PRICE LEVEL: July-2010 <hr/> FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
		Remove and dispose of the following equipment of the Fish Structures:					
	117	Intake Structures Trashracks- 8.5ft. W. x 10.75 ft. H.					
		Trashracks weight approximately: (Assume contains asbestos)	86-68420	5,000	lbs	\$0.85	\$4,250.00
	118	Pipe Conduit- 30-in. Dia. X 0.25-in Thick x 960 ft.	86-68420	76,640	lbs	\$1.00	\$76,640.00
		Pipe Weight 80 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)					
	119	Sluice Gate Valve- 30-in. H. x 30-in. W.					
		Gate weight Approximately: 3,000 lbs (Assume contains paint with heavy metals & petroleum products)	86-68420	3,000	lbs	\$1.00	\$3,000.00
SUBTOTAL THIS SHEET							\$83,890.00

QUANTITIES		PRICES	
BY M. Guilsvig	CHECKED T. J. Turnage	BY Craig A. Brush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE  6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	120	Sluice Gate Stem- 2-in. Dia. Sch. 160 x 45 ft. Pipe weight 8 lbs/ft. (Assume contains paint with heavy metals)	86-68420	360	lbs	\$1.00	\$360.00
	121	Butterfly Valve- 30-in. Dia. Valve weight approximately: 2435 lbs (Assume contains paint with heavy metals & petroleum products)	86-68420	2,435	lbs	\$1.00	\$2,435.00
	122	Piping- 30-in. Dia. x 0.25 Thickness x 90 ft. Pipe weight 80 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)	86-68420	7,200	lbs	\$1.00	\$7,200.00
	123	Piping- 24-in. Dia. x 0.25 Thickness x 248 ft. Pipe weight 64 lbs/ft. (Assume contains paint with heavy metals and/or asbestos)	86-68420	15,872	lbs	\$1.00	\$15,872.00
	124	Piping- 20-in. Dia. x 0.25 Thickness x 85 ft. Pipe weight 53 lbs/ft. (Assume contains paint with heavy metals)	86-68420	4,505	lbs	\$1.00	\$4,505.00
	125	Piping- 18-in. Dia. x 0.25 Thickness x 432 ft. Pipe weight 48 lbs/ft. (Assume contains paint with heavy metals)	86-68420	29,088	lbs	\$1.00	\$29,088.00
	126	Piping- 16-in. Dia. x 0.25 Thickness x 166 ft. Pipe weight 42 lbs/ft. (Assume contains paint with heavy metals)	86-68420	6,972	lbs	\$1.00	\$6,972.00
SUBTOTAL THIS SHEET							\$66,432.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY <i>Craig A. Grush, P.E.</i>	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

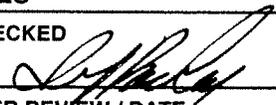
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	127	Piping- 12-in. Dia. x 0.25 Thickness x 64 ft. Pipe weight 34 lbs/ft. (Assume contains paint with heavy metals)	86-68420	2,176	lbs	\$1.00	\$2,176.00
	128	Piping- 10-in. Dia. x 0.25 Thickness x 69 ft. Pipe weight 28 lbs/ft. (Assume contains paint with heavy metals)	86-68420	1,932	lbs	\$1.00	\$1,932.00
	129	Piping- 8-in. Dia. x 0.25 Thickness x 30 ft. Pipe weight 23 lbs/ft. (Assume contains paint with heavy metals)	86-68420	3,588	lbs	\$1.00	\$3,588.00
	130	Piping- 3-in. Dia. STD x 64 ft. Pipe weight 8 lbs/ft. (Assume contains paint with heavy metals)	86-68420	1,088	lbs	\$1.00	\$1,088.00
	131	Gate Valves- 24-in. Dia. Gate Valve- 1 total 24-in. Gate Valve weight approx: 3,800 lbs 18-in. Dia. Gate Valve- 7 total 18-in. Gate Valve weight approx: 1748 lbs ea 16-in. Dia. Gate Valve- 2 total 16-in. Gate Valve weight approx: 1465 lbs ea 12-in. Dia. Gate Valve- 1 total 12-in. Gate Valve weight approx: 722 lbs 8-in. Dia. Gate Valve- 6 total 8-in. Gate Valve weight approx: 339 lbs ea 3-in. Dia. Gate Valve- 1 total 3 -in. Gate Valve weight approx: 70 lbs Total weight approximately: (Assume contains paint with heavy metals & petroleum products)	86-68420	21,792	lbs	\$1.00	\$21,792.00
SUBTOTAL THIS SHEET							\$30,576.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY <i>[Signature]</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

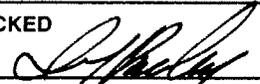
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	132	Basin #1-					
		Slide Gate- 2-18-in. manually operated					
		Slide Gate weight approximately: 490 lbs ea					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 1500 lbs					
		Total guide weight approximately: 400 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	2,880	lbs	\$1.00	\$2,880.00
	133	Basin #2-					
		Slide Gate- 4-18-in. manually operated					
		Slide Gate weight approximately: 490 lbs ea					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 1500 lbs					
		Total guide weight approximately: 400 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	3,860	lbs	\$1.00	\$3,860.00
	134	Basin #3-					
		Slide Gate- 2-18-in. manually operated					
		Slide Gate weight approximately: 490 lbs ea					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 1500 lbs					
		Total guide weight approximately: 400 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	2,880	lbs	\$1.00	\$2,880.00
SUBTOTAL THIS SHEET							\$9,620.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE DCC 6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High Fish Spawning Facility	PROJECT: Klamath River Northern California/Southern Oregon		
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MECHANICAL					
	135	Basin #4-					
		Slide Gates-					
		24-in. Slide Gate manually operated					
		24-in. Slide Gate weight approx: 700 lbs					
		2-18-in. Slide Gate manually operated					
		18-in. Slide Gate weight approx: 490 lbs ea					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 1500 lbs					
		Total guide weight approximately: 400 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	3,580	lbs	\$1.00	\$3,580.00
	136	Basin #5-					
		Slide Gate- 18-in. manually operated					
		Slide Gate weight approximately: 490 lbs					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 750 lbs					
		Total guide weight approximately: 200 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	1,440	lbs	\$1.00	\$1,440.00
	137	Basin #6-					
		Slide Gate- 18-in. manually operated					
		Slide Gate weight approximately: 490 lbs					
		(Assume contains paint with heavy metals & petroleum products)					
		Stop logs-					
		Total logs weight approximately: 750 lbs					
		Total guide weight approximately: 200 lbs					
		(Assume contains paint with heavy metals)					
		Total weight approximately:	86-68420	1,440	lbs	\$1.00	\$1,440.00
SUBTOTAL THIS SHEET							\$6,460.00

QUANTITIES		PRICES	
BY M. Gulsvig	CHECKED T. J. Turnage	BY Craig A. Brush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE R. Frisz 1/12/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE  6/10/11

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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ELECTRICAL					
		Remove and dispose of the following equipment at the Fish Facilities:					
	139	Misc: motors, control panels, cables and conduit Total weight approximately: 800 lbs.	86-68430	1	EA	\$2,000.00	\$2,000.00
		FISH SPAWNING FACILITY SUBTOTAL					\$2,268,363.00

QUANTITIES		PRICES	
BY D. Berk	CHECKED T. Griess	BY <i>Craig A. Grush</i> Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE L. Rossi 1/10/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

FEATURE:				PROJECT:			
Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High				Klamath River Northern California/Southern Oregon			
WOID:		AF652		ESTIMATE LEVEL:		Feasibility	
REGION:		MP		UNIT PRICE LEVEL:		July-2010	
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Wanaka Springs					
	140	Concrete total	BLM	28	CY	\$400.00	\$11,200.00
		1 Dock Pier 25'x5'x5' (23 CY)					
		1 Concrete table base (2 CY)					
		3 Concrete fire rings/garbage bases (1 CY)					
		3 Concrete sign bases (2 CY)					
	141	Double pipe railings	BLM	60	LF	\$45.00	\$2,700.00
	142	Wood picnic tables to be removed and hauled away	BLM	5	EA	\$120.00	\$600.00
	143	25'X5' Wooden floating dock	BLM	125	SF	\$25.00	\$3,125.00
	144	Rip and reseed site and access road	BLM	2.5	ACRE	\$30,000.00	\$75,000.00
	145	Signs to be removed and hauled away	BLM	3	EA	\$350.00	\$1,050.00
	146	15'x5' Gangplank with railings	BLM	75	SF	\$25.00	\$1,875.00
		Juniper Point					
	147	Concrete total	BLM	19	CY	\$400.00	\$7,600.00
		1 Dock abutment 25'x4'x3' (11 CY)					
		15 Concrete fire rings (5 CY)					
		1 Picnic table base (2 CY)					
		4 Sign bases (1 CY)					
	148	2, 4'x4' Concrete toilet vaults	BLM	32	SF	\$120.00	\$3,840.00
	149	Wood picnic tables to be removed and hauled away	BLM	8	EA	\$120.00	\$960.00
	150	Signs to be removed and hauled away	BLM	4	EA	\$350.00	\$1,400.00
	151	Dock pipe railing	BLM	50	LF	\$45.00	\$2,250.00
	152	50'x5' Composite dock with poly floats	BLM	250	SF	\$25.00	\$6,250.00
	153	20'x5' Composite gangplank with railings	BLM	100	SF	\$25.00	\$2,500.00
	154	Bury 3' dia boulders on site	BLM	50	EA	Included in regrade item	
	155	Regrade to natural contour, rip and reseed	BLM	2	ACRE	\$30,000.00	\$60,000.00
		SUBTOTAL THIS SHEET					\$180,350.00

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY Craig A. Grush, P.E.	CHECKED <i>[Signature]</i>
DATE PREPARED 01/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE <i>[Signature]</i> 6/10/11

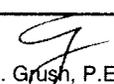
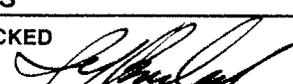
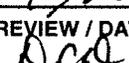
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PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Camp Creek					
	156	Concrete total	BLM	110	CY	\$400.00	\$44,000.00
		80'x25'x1' Boat ramp (75 CY)					
		Main dock platform piers 25'x4'x3' (11 CY)					
		15 Fire ring bases (6 CY)					
		Step/dock abutment 8'x6'x5' (9 CY)					
		6 Sign bases (2 CY)					
		1 Block foundation sign base (3 CY)					
		2 Picnic table bases (4 CY)					
	157	180'Lx16"Wx8'D Earth jetty to remove and/or regrade	BLM	855	CY	\$30.00	\$25,650.00
	158	Well house 10'x16' concrete block building	BLM	160	SF	\$120.00	\$19,200.00
	159	2, 20'x5' Composite decking gangplanks w/ aluminum frame railings	BLM	200	SF	\$25.00	\$5,000.00
	160	2, 20'x5' Floating composite w/ aluminum frame docks	BLM	200	SF	\$25.00	\$5,000.00
	161	Concrete block double toilet bldg 10'x16'	BLM	160	SF	\$120.00	\$19,200.00
	162	Dump stations and approx. 2000 gal buried concrete tank	BLM	1	EA	\$6,000.00	\$6,000.00
	163	Power poles and lines	BLM	3	POLES	\$2,000.00	\$6,000.00
	164	Remove waterlines and 3 faucets and regrade	BLM	600	LF	\$6.00	\$3,600.00
	165	Recycle/bury approx. 3' dia. boulders	BLM	75	EA	Included in regrade item	
	166	Steel pipe/plank picnic tables to be removed and hauled away	BLM	5	EA	\$120.00	\$600.00
	167	Relocate concrete tables	BLM	12	EA	\$120.00	\$1,440.00
	168	Regrade, rip and reseed	BLM	4	ACRE	\$30,000.00	\$120,000.00
	169	Signs to be removed and hauled away	BLM	7	EA	\$350.00	\$2,450.00
		Dutch Creek					
	170	50'x4'x3' Dock concrete abutment	BLM	22	CY	\$400.00	\$8,800.00
	171	Double pipe railing	BLM	100	LF	\$45.00	\$4,500.00
SUBTOTAL THIS SHEET							\$271,440.00

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY  Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/06/11	PEER REVIEW / DATE  6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Dam & Powerplant Removal Most Probable High	PROJECT: Klamath River Northern California/Southern Oregon		
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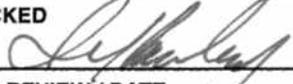
PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mirror Cove					
	172	Concrete total		89	CY	\$400.00	\$35,600.00
		80'x25'x0.5' Boat ramp (37 CY)					
		2 Concrete boat dock abutments: 6'x8'x1.5' and 6'x30'x5' (36 CY)					
		12 Fire ring foundations (4 CY)					
		2 Sets of concrete stairs (9 CY)					
		7 Sign foundations (3 CY)					
	173	10'x16' Toilet vault		160	SF	\$120.00	\$19,200.00
	174	2, 30'x5' Composite gangplanks w/aluminum frame and railings		300	SF	\$25.00	\$7,500.00
	175	Double pipe railings on dock		80	LF	\$45.00	\$3,600.00
	176	Bury 3' dia. boulders on site		120	EA	Included in regrade item	
	177	Regrade site, rip and reseed		3	ACRE	\$30,000.00	\$90,000.00
	178	Signs to be removed and hauled away		7	EA	\$350.00	\$2,450.00
		Overlook Point					
	179	1 Concrete picnic table base		1	CY	\$400.00	\$400.00
	180	Steel frame table to be removed and hauled away		1	EA	\$120.00	\$120.00
	181	Regrade steep access road and site to natural contours, rip and reseed		0.5	ACRE	\$30,000.00	\$15,000.00
		Long Gulch					
	182	80'x25'x4" Concrete boat ramp to be removed		25	CY	\$400.00	\$10,000.00
	183	Remove picnic tables (steel frame with planks) & haul away		2	EA	\$120.00	\$240.00
	184	Regrade ramp area to natural contours, rip, reseed		0.05	ACRE	\$30,000.00	\$1,500.00
		RECREATIONAL FACILITIES REMOVAL SUBTOTAL					\$637,400.00

QUANTITIES		PRICES	
BY Renee Snyder (BLM)	CHECKED Sheena Barnes	BY  Craig A. Grush, P.E.	CHECKED 
DATE PREPARED 01/04/11	PEER REVIEW / DATE Rick Benik P.E. 1/6/11	DATE PREPARED 06/08/11	PEER REVIEW / DATE  6/10/11

FEATURE: Klamath River Dams Removal Partial Removal Option Iron Gate Reservoir Most Probable High SUMMARY	PROJECT: Klamath River Northern California/Southern Oregon		
	WOID: AF652	ESTIMATE LEVEL: Feasibility	
	REGION: MP	UNIT PRICE LEVEL: July-2010	
	FILE: C:\Estimating\Klamath\Klamath River Dams\Removal - Partial\Feasibility Estimates\Iron Gate\Klamath Dams Removal - Iron Gate - Partial Removal Option - MPH Feas Est - 4-2011.xlsx\Rec Fac Removal		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sediment Removal (assumes by natural erosion)		839,100	CY	\$0.00	\$0.00
		Diversion and Care					\$9,576,640.00
		Dam Removal					\$19,613,370.00
		Powerhouse/Switchyard/Transmission Line Removal					\$216,000.00
		Penstock Removal					\$1,779,910.00
		Reservoir Vegetative Restoration					\$19,219,000.00
		Road Improvements					\$1,427,000.00
		Fish Spawning Facility Removal					\$2,268,363.00
		Recreational Facilities to be Removed					\$637,400.00
		Subtotal					\$54,737,683.00
		Mobilization	5%	+/-			\$2,700,000.00
		Subtotal 1 with Mobilization					\$57,437,683.00
		Escalation to Notice to Proceed (NTP), from July 2010 to July 2020 (assumes 4.375%/yr compounding over 10 years)					\$30,700,034.00
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					\$88,137,717.00
		Design Contingencies	15%	+/-			\$14,835,116.00
		Allowance for Procurement Strategies (APS)	2%	+/-			\$2,027,167.00
		Type of solicitation assumed is: Competitive RFP					
		CONTRACT COST					\$105,000,000.00
		Construction Contingencies	25%	+/-			\$25,000,000.00
		FIELD COST					\$130,000,000.00
		Non-Contract Costs: (Environmental & Cultural Resources Mitigation ~ 45%, Design Data Collection ~ 2%, Engineering Design ~ 6%, Permitting ~ 4%, Procurement ~ 2%, Construction Management ~ 11%, and Closeout ~ 1%)	71%	+/-			\$90,000,000.00
		CONSTRUCTION COST					\$220,000,000.00

Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

QUANTITIES		PRICES	
BY Refer to Previous Sheets	CHECKED Refer to Previous Sheets	BY  Craig A. Grush, P.E.	CHECKED 
DATE PREPARED	PEER REVIEW / DATE Refer to Previous Sheets	DATE PREPARED 06/06/11	PEER REVIEW / DATE  Dec 6/10/11