

US EPA ARCHIVE DOCUMENT



PNG Cost Estimates

Kevin Armstrong

to:

Diana Engeman

10/02/2012 05:33 PM

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From: Kevin Armstrong <Kevin.G.Armstrong@us.mwhglobal.com>

To: Diana Engeman/R7/USEPA/US@EPA,

1 Attachment



Appendix I-PNG Cost estimates (rev 10-02-2012).pdf

Diana,

Attached are the updated cost estimated with the 7% value used as requested.

The cost estimate on the hydraulic control option did go up from what was listed in the July 30, 2012 memo based on some recent changes (increased monitoring requirements from the City and construction of a masonry building primarily).

Let me know if you have any questions or needed edits. I will be on vacation the rest of this week and early next week, but should be able to respond to emails next week (I will be in the field for work).

The ARAR tables we discussed are underway.

Let me know if you need anything else.

Thanks,

Kevin

Kevin G. Armstrong

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Superfund

TABLE I-1

CONTINUED OPERATION OF THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments	
DIRECT COSTS						
Direct Capital Costs						
Well Installation & Development						
Mobilization	1	lump	\$5,000	\$ 5,000	(Note "M" references are from Means Environmental)	
Install 6" Groundwater Extraction Well	1	well	\$2,200	\$ 2,200		
			Subtotal	\$ 7,200		
Trenching & Lateral Hookups						
Vaults, Valves, Fitting, Gauges, and Installation	1	wells	\$2,000	\$ 2,000		
Trenching & Backfilling	222	yd ³	\$7	\$ 1,700		
Laterals (electrical and water)	500	LF	\$14	\$ 6,900		
			Subtotal	\$ 10,600		
Remedial System Building & Components						
Reestablish control system	1	lump	\$3,500	\$ 3,500		
			Subtotal	\$ 3,500		
Direct Annual Costs						
System OM&M						
Electricity	3,267	kwh	\$0.06	\$ 200	M 33-42-0101	
Water treatment chemical for scale control	1	lump	\$1,000	\$ 1,000		
Parts replacement	1	lump	\$2,000	\$ 2,000		
			Subtotal	\$ 3,200		
GW Monitoring						
Semi-annual groundwater monitoring	2	events	\$4,195	\$ 8,400	16 samples w/ QA for PAHs, BTEX per event	
Purge Water Analytical and Disposal	2	events	\$500	\$ 1,000		
Well Maintenance & Repairs	2	events	\$500	\$ 1,000		
			Subtotal	\$ 10,400		
Contingency	20%			\$ 7,000		
			TOTAL	\$ 41,900		
INDIRECT COSTS						
Indirect Capital Costs						
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	10 days for installation and startup Crew of 2 for 5 days	
Design and Health and Safety Plan	1	lump	\$45,000	\$ 45,000		
Bid Preparation, Selection	1	lump	\$20,000	\$ 20,000		
Renew City of Dubuque wastewater discharge permit	1	lump	\$3,000	\$ 3,000		
Construction oversight	1	lump	\$10,000	\$ 10,000		
Overall system cleaning/rehabilitation/startup	40	hr/person	\$80	\$ 6,400		
Wastewater discharge permit application	1	lump	\$4,000	\$ 4,000		
Construction completion report	1	lump	\$25,000	\$ 25,000		
			Subtotal	\$ 116,400		
Indirect Annual Costs						
Weekly maintenance for scale/biofouling control	624	hours	\$80	\$ 50,000	Crew of 1 for 12 hours/week Crew of 2 for 3 days per event, 2 events.	
Field Time and Supplies (GW monitoring)	48	hr/person	\$100	\$ 9,600		
Project Management	1	lump	\$5,000	\$ 5,000		
System and Monitoring Report Preparation	2	events	\$9,000	\$ 18,000		
			Subtotal	\$ 82,600		
Five-Year Review Costs						
ROR	7%	# Events	6	Each \$12,000	Every 5 years for 30 years.	
			Subtotal	\$ 26,100		
Project Close-out Costs						
ROR	7%	Year	30	Cost \$6,000	includes 51 wells @ \$500 per well	
Project Management	7%	30	\$30,000	\$4,000		
Bid Preparation & Selection	7%	30	\$37,500	\$5,000		
Removal of wells, laterals & remedial building	7%	30	\$40,000	\$5,300		
Close-out Report	7%	30				
			Subtotal	\$ 15,100		
Contingency	20%			\$ 48,100		
			TOTAL	\$ 288,300		
NET PRESENT VALUE OF ANNUAL COSTS						
ROR	7%	Years	29	Annual \$ 96,200	System O&M + GW Monitoring + Indirect Annual (1st yr costs listed previously. This line for remaining 29)	
			PV	\$ 1,181,200		
			TOTAL COST (30 years)	\$ 1,511,000	Total costs rounded to nearest \$,1000.	

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data. Assume 3% annual inflation.
ROR = Rate of Return

TABLE I-2

**ADDITIONAL EXCAVATION
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA**

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments
DIRECT COSTS					
Direct Capital Costs					
Soil Excavation					
(Note "M" references are from Means Environmental)					
Mobilization	1	lump.	\$5,000	\$ 5,000	
Shoring	3,000	SF	\$9	\$ 27,400	M 17-03-0904
Kerper Boulevard demolition	290	CY	\$42	\$ 12,100	M 17-02-0209
Excavation and backfill	48,000	CY	\$14	\$ 695,100	M 17-03-0266, M 17-03-0423, & M 17-03-0428
Confirmatory soil sampling	50	samples	\$150	\$ 7,500	
Contaminated soil, thermal desorption	5,000	CY	\$120	\$ 600,000	
Reconstruction of Kerper Boulevard	1,800	SY	\$23	\$ 41,600	M 18-01-0301
Miscellaneous site work	1	lump	\$10,000	\$ 10,000	
			Subtotal	\$ 1,398,700	
Direct Annual Costs					
GW Monitoring					
Semi-annual groundwater monitoring	2	events	\$4,195	\$ 8,400	16 samples w/ QA for PAHs, BTEX per event
Purge Water Analytical and Disposal	2	events	\$500	\$ 1,000	
Well Maintenance & Repairs	2	events	\$500	\$ 1,000	
			Subtotal	\$ 10,400	
Contingency	20%			\$ 281,900	
TOTAL-DIRECT COSTS			TOTAL	\$ 1,691,000	
INDIRECT COSTS					
Indirect Capital Costs					
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	
Design and Health and Safety Plan	1	lump	\$45,000	\$ 45,000	
Bid Preparation, Selection	1	lump	\$20,000	\$ 20,000	
Construction oversight and confirmatory sampling	1	lump	\$30,000	\$ 30,000	30 days for excavation and backfill
Construction completion report	1	lump	\$25,000	\$ 25,000	
			Subtotal	\$ 123,000	
Indirect Annual Costs					
Field Time and Supplies (GW monitoring)	48	hr/person	\$100	\$ 9,600	Crew of 2 for 3 days per event; 2 events.
Project Management	1	lump	\$5,000	\$ 5,000	
Monitoring Report Preparation	2	events	\$7,000	\$ 14,000	
			Subtotal	\$ 28,600	
Five-Year Review Costs	ROR	# Events	Each	NPV	
	7%	6	\$12,000	\$26,100	Every 5 years for 30 years.
			Subtotal	\$ 26,100	
Project Close-out Costs					
Project Close-out Costs	ROR	Year	Cost	NPV	
Project Management	7%	30	\$6,000	\$800	
Removal of wells	7%	30	\$21,000	\$2,800	42 wells @ \$500 per well
Close-Out Report	7%	30	\$40,000	\$5,300	
			Subtotal	\$ 8,900	
Contingency	20%			37,400	
TOTAL-INDIRECT COSTS			TOTAL	\$ 224,000	
NET PRESENT VALUE OF ANNUAL COSTS	ROR	Years	Annual	PV	
(Annual Costs includes all direct and indirect)	7%	29	\$ 39,000	478,900	Groundwater Monitoring + Indirect Annual (1st yr costs listed previously. This line for remaining 29)
TOTAL COST (30 years)				\$ 2,394,000	Total costs rounded to nearest \$,1000.

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data. Assume 3% annual inflation. ROR = Rate of Return

TABLE I-3
IN-SITU SOLIDIFICATION
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments
DIRECT COSTS					
Direct Capital Costs					
Insitu stabilization	1	lump	\$2,400,000	\$ 2,400,000	Quote from vendor
Reconstruction of Kerper Boulevard	1,800	SY	\$23	\$ 41,600	M 18-01-0301
			Subtotal	\$ 2,441,600	
Direct Annual Costs					
GW Monitoring					
Semi-annual groundwater monitoring	2	events	\$4,195	\$ 8,400	16 samples w/ QA for PAHs, BTEX per event
Purge Water Analytical and Disposal	2	events	\$500	\$ 1,000	
Well Maintenance & Repairs	2	events	\$500	\$ 1,000	
			Subtotal	\$ 10,400	
Contingency	20%			\$ 490,400	
TOTAL-DIRECT COSTS			TOTAL	\$ 2,942,400	
INDIRECT COSTS					
Indirect Capital Costs					
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	
Design and Health and Safety Plan	1	lump	\$45,000	\$ 45,000	
Bid Preparation, Selection	1	lump	\$20,000	\$ 20,000	
Construction Oversight	1	lump	\$85,000	\$ 85,000	17 weeks
Construction Completion Report	1	lump	\$25,000	\$ 25,000	
			Subtotal	\$ 178,000	
Indirect Annual Costs					
Field Time and Supplies (GW monitoring)	48	hr/person	\$100	\$ 9,600	Crew of 2 for 3 days per event; 2 events.
Project Management	1	lump	\$5,000	\$ 5,000	
Monitoring Report Preparation	2	events	\$7,000	\$ 14,000	
			Subtotal	\$ 28,600	
Five-Year Review Costs	ROR	# Events	Each	NPV	
	7%	6	\$12,000	\$26,000	Every 5 years for 30 years.
			Subtotal	\$ 26,000	
Project Close-out Costs					
Project Management	ROR	Year	Cost	NPV	
Project Management	7%	30	\$6,000	\$800	
Removal of wells	7%	30	\$21,000	\$2,800	42 wells @ \$500 per well
Close-Out Report	7%	30	\$40,000	\$5,300	
			Subtotal	\$ 8,900	
Contingency	20%			48,300	
TOTAL-INDIRECT COSTS			TOTAL	\$ 289,800	
NET PRESENT VALUE OF ANNUAL COSTS					
(Annual Costs includes all direct and indirect)	ROR	Years	Annual	PV	
	7%	29	\$ 39,000	478,900	Groundwater Monitoring + Indirect Annual (1st yr costs listed previously. This line for remaining 29)
TOTAL COST (30 years)				\$ 3,711,000	Total costs rounded to nearest \$,1000.

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data.

ROR = Rate of Return.

TABLE I-4

**IN-SITU THERMAL TREATMENT
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA**

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments
DIRECT COSTS					
Direct Capital Costs					
Insitu thermal treatment	1	lump	\$2,250,000	\$ 2,250,000	Quote from vendor
			Subtotal	\$ 2,250,000	
Direct Annual Costs					
GW Monitoring					
Semi-annual groundwater monitoring	2	events	\$4,195	\$ 8,400	16 samples w/ QA for PAHs, BTEX per event
Purge Water Analytical and Disposal	2	events	\$500	\$ 1,000	
Well Maintenance & Repairs	2	events	\$500	\$ 1,000	
			Subtotal	\$ 10,400	
Contingency	20%			\$ 452,100	
TOTAL-DIRECT COSTS			TOTAL	\$ 2,712,500	
INDIRECT COSTS					
Indirect Capital Costs					
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	
Design and Health and Safety Plan	1	lump	\$45,000	\$ 45,000	
Bid Preparation, Selection	1	lump	\$20,000	\$ 20,000	
Construction Oversight	1	lump	\$30,000	\$ 30,000	assume 30 days for installation & startup
Construction Completion Report	1	lump	\$25,000	\$ 25,000	
			Subtotal	\$ 123,000	
Indirect Annual Costs					
Field Time and Supplies (GW monitoring)	48	hr/person	\$100	\$ 9,600	Crew of 2 for 3 days per event; 2 events.
Project Management	1	lump	\$5,000	\$ 5,000	
Monitoring Report Preparation	2	events	\$7,000	\$ 14,000	
			Subtotal	\$ 28,600	
Five-Year Review Costs	ROR	# Events	Each	NPV	
	7%	6	\$12,000	\$26,000	Every 5 years for 30 years.
			Subtotal	\$ 26,000	
Project Close-out Costs					
Project Close-out Costs	ROR	Year	Cost	NPV	
Project Management	7%	30	\$6,000	\$800	50 wells @ \$500 per well
Removal of wells	7%	30	\$25,000	\$3,300	
Close-Out Report	7%	30	\$40,000	\$5,300	
			Subtotal	\$ 9,400	
Contingency	20%			37,400	
TOTAL-INDIRECT COSTS			TOTAL	\$ 224,400	
Net Present Value of Annual & Close-out Costs	ROR	Years	Annual	PV	
(Annual Costs includes all direct and indirect)	7%	29	\$ 39,000	478,800	Groundwater Monitoring + Indirect Annual (1st yr costs listed previously, This line for remaining 29)
TOTAL COST (30 years)				\$ 3,416,000	Total costs rounded to nearest \$,1000.

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data.
ROR = Rate of Return.

TABLE I-5
MONITORED NATURAL ATTENUATION
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments
DIRECT COSTS					
Direct Capital Costs					
Well Installation & Development					
Mobilization	1	lump	\$5,000	\$ 5,000	(Note "M" references are from Means Environmental)
Install Monitoring Well	2	well	\$1,800	\$ 3,600	
			Subtotal	\$ 8,600	
Direct Annual Costs					
GW Monitoring					
Semi-annual groundwater monitoring	2	events	\$9,417	\$ 18,900	19 smpls w/ QA for PAHs/BTEX/MNA param Per Event
Purge Water Analytical and Disposal	2	events	\$500	\$ 1,000	
Well Maintenance & Repairs	2	events	\$500	\$ 1,000	
			Subtotal	\$ 20,900	
Contingency	20%			\$ 5,900	
TOTAL-DIRECT COSTS			TOTAL	\$ 35,400	
INDIRECT COSTS					
Indirect Capital Costs					
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	2 days for installation
Design	1	lump	\$40,000	\$ 40,000	
Oversight, monitoring well installation	1	lump	\$2,000	\$ 2,000	
			Subtotal	\$ 45,000	
Indirect Annual Costs					
Field Time and Supplies (GW monitoring)	64	hr/person	\$100	\$ 12,800	Crew of 2 for 4 days per event; 2 events
Project Management	1	lump	\$5,000	\$ 5,000	
Monitoring Report Preparation	2	events	\$9,000	\$ 18,000	
			Subtotal	\$ 35,800	
Five-Year Review Costs	ROR	# Events	Each	NPV	Every 5 years for 30 years.
	7%	6	\$12,000	\$26,100	
			Subtotal	\$ 26,100	
Project Close-out Costs					
Project Close-out Costs	ROR	Year	Cost	NPV	52 wells @ \$500 per well
Project Management	7%	30	\$6,000	\$800	
Removal of wells	7%	30	\$26,000	\$3,500	
Close-Out Report	7%	30	\$40,000	\$5,300	
			Subtotal	\$ 9,600	
Contingency	20%			\$ 23,300	
TOTAL-INDIRECT COSTS			TOTAL	\$ 139,800	
NET PRESENT VALUE OF ANNUAL COSTS					
Projected for 30 years total (29 additional)	ROR	Years	Per Year	NPV	Annual Groundwater Monitoring + Indirect Ann.
(Annual Costs includes all direct and indirect)	7%	29	\$ 28,350	348,100	
TOTAL COST (30 years)				\$ 523,000	Total costs rounded to nearest \$,1000.

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data. Assume 3% annual inflation. ROR = Rate of Return

TABLE I-6

GROUNDWATER EXTRACTION / HYDRAULIC CONTROL
PNG FORMER MANUFACTURED GAS PLANT SITE - DUBUQUE, IOWA

Item/Description	Estimated Quantity	Unit	Unit Cost	Total Cost	Comments
DIRECT COSTS					
Direct Capital Costs					
Well Installation & Development					
Mobilization	1	lump	\$8,500	\$ 8,500	(Note "M" references are from Means Environmental)
Install 2" Monitoring Well	2	well	\$1,800	\$ 3,600	
Install 6" Groundwater Extraction Well	2	well	\$3,500	\$ 7,000	One extraction well already in place
			Subtotal	\$ 19,100	
Trenching & Lateral Hookups					
Vaults, Valves, Fitting, Gauges, and Installation	3	wells	\$2,000	\$ 6,000	
Directional Bore under Kerper Blvd	1	lump	\$7,000	\$ 7,000	
Trenching & Backfilling	150	yd^3	\$7	\$ 1,200	4' deep x 2' wide x 450' long, for laying laterals, M 17-03-0255
Laterals (electrical and water)	450	LF	\$14	\$ 6,200	M 33-26-0302 & M 20-02-0506
			Subtotal	\$ 20,400	
Remedial System Building & Components					
Control Panel	1	lump	\$8,650	\$ 8,650	Vendor Quote
Oil Water Separator	1	lump	\$12,100	\$ 14,100	Vendor Quote
Monitoring and Valving Equipment	1	lump	\$14,500	\$ 14,500	
Masonry Building/Equipment	1	lump	\$25,000	\$ 25,000	
			Subtotal	\$ 62,250	
Direct Annual Costs					
System OM&M					
Electricity	16,337	kwh	\$0.06	\$1,000	M 33-42-0101
Water treatment chemical for scale control	1	lump	\$5,000	\$ 5,000	
Parts replacement/non-routine maintenance	1	lump	\$5,000	\$ 5,000	
			Subtotal	\$ 11,000	
GW Monitoring					
Semi-annual groundwater monitoring	2	events	\$9,417	\$ 18,900	19 smpls w/ QA for PAHs/BTEX/MNA param Per Event
Well Maintenance & Repairs	2	events	\$500	\$ 1,000	
			Subtotal	\$ 19,900	
Contingency	20%			\$ 26,600	
TOTAL-DIRECT COSTS			TOTAL	\$ 159,250	
INDIRECT COSTS					
Indirect Capital Costs					
Implementation of Environmental Covenants	1	lump	\$3,000	\$ 3,000	
Design and Health and Safety Plan	1	lump	\$45,000	\$ 45,000	
Bid Preparation, Selection	1	lump	\$20,000	\$ 20,000	
Renew City of Dubuque wastewater discharge permit	1	lump	\$3,000	\$ 3,000	
Construction oversight	1	lump	\$25,000	\$ 25,000	25 days for installation and startup
System Startup	50	hr/person	\$95	\$ 9,500	Crew of 2 for 5 days
Wastewater discharge permit application	1	lump	\$4,000	\$ 4,000	
Construction completion report	1	lump	\$25,000	\$ 25,000	
			Subtotal	\$ 134,500	
Indirect Annual Costs					
Monthly maintenance for scale/biofouling control	144	hours	\$100	\$ 14,400	Crew of 1 for 12 hours/month
Monthly water effluent monitoring	12	events	\$228	\$ 2,800	1 sample for PAHs, BTEX per event
Field Time and Supplies (GW monitoring)	64	hr/person	\$100	\$ 12,800	Crew of 2 for 4 days per event; 2 events
Project Management	1	lump	\$5,000	\$ 5,000	
System and Monitoring Report Preparation	4	events	\$9,000	\$ 36,000	
			Subtotal	\$ 71,000	
Five-Year Review Costs					
ROR	7%	# Events	Each	NPV	
		6	\$12,000	\$26,100	Every 5 years for 30 years.
			Subtotal	\$ 26,100	
Project Close-out Costs					
ROR	7%	Year	Cost	NPV	
Project Management	7%	30	\$6,000	\$800	
Bid Preparation & Selection	7%	30	\$30,000	\$4,000	
Removal of wells, laterals & remedial building.	7%	30	\$33,000	\$4,400	includes 42 wells @ \$500 per well
Close-out Report	7%	30	\$40,000	\$5,300	
			Subtotal	\$ 14,500	
Contingency	20%			\$ 49,300	
TOTAL-INDIRECT COSTS			TOTAL	\$ 295,400	
NET PRESENT VALUE OF ANNUAL COSTS					
ROR	7%	Years	Annual	NPV	
(Annual Costs includes all direct and indirect)		29	\$ 101,900	\$ 1,251,100	System O&M + GW Monitoring + Indirect Annual (1st yr costs listed previously. This line for remaining 29)
TOTAL COST (30 years)				\$ 1,706,000	Total costs rounded to nearest \$.1000.

Notes:

Unit costs based on previous projects, subcontractor bids or Means Heavy Construction (1999) or Environmental Remediation (2002) Cost Data. Assume 3% annual inflation.
ROR = Rate of Return