

Table 1 - Worker Time and Cost - Initial Exposure Assessment

Cost = Burden Hours* WorkerWage

Hours = (W_{≥AL} / WPA) * WT

Variables

W_{≥AL} = # of workers at or above the action level

WPA = workers per area

IEA = # of initial exposure assessments

WT = hours of worker time

Wage Rate = \$ per hour

	W _{≥AL}		WPA		IEA (rounded)		WT		Burden Hours (rounded)		Wage Rate		Item 12 Costs (rounded)
New													
General Industry	0	/	4	=	0	*	0.50	=	0		\$23.92	=	\$0
Construction	0	/	4	=	0	*	0.50	=	0		\$29.63	=	\$0
Hydraulic Fracturing	0	/	4	=	0	*	0.50	=	0		\$29.56	=	\$0
Existing													
General Industry	175,801	/	4	=	43,950	*	0.50	=	21,975		\$23.92	=	\$525,642
Construction	850,690	/	4	=	212,673	*	0.50	=	106,337		\$29.63	=	\$3,150,765
Hydraulic Fracturing	15,399	/	4	=	3,850	*	0.50	=	1,925		\$29.56	=	\$56,903
Total	1,041,890				260,473				130,237				\$3,733,310

Table 2 - Contract Costs for Industrial Hygienist and Laboratory to Conduct Analysis - Initial Exposure Assessment

Cost = Burden Hours * WorkerWage

Hours = (GIW_≥AL / WPA * IHPBZ) + (GIW_≥AL / WPA * LABSHP)

Hours = (CW_≥AL / WPA * IHPBZ) + (CW_≥AL / WPA * LABSHP)

Hours = (HF_≥AL / WPA * IHPBZ) + (HF_≥AL / WPA * LABSHP)

Variables

GIW_≥AL = # of workers at or above the action level in general industry/maritime

CW_≥AL = # of workers at or above the action level in construction

HF_≥AL = # of workers at or above the action level in hydraulic fracturing

WPA = workers per area

IHPBZ = direct cost per sample including outside contractor industrial hygienist (IH) fees and PBZ (Source: PEA Table V-8)

LABSHP = direct cost per sample for lab fees and shipping (Source: PEA Table V-8)

	GIW _≥ AL	CW _≥ AL	HF _≥ AL	Total		WPA		Total EA Samples (rounded)	IHPBZ		IHPBZ Costs (Total EA Samples x IHPBZ) (rounded)	LABSHP	LABSHIP Costs (Total EA Samples x LABSHP) (rounded)	Direct Costs Per Sample	Total Costs (IHPBZ + LABSHP)
Small	21,532	293,098	3,468	318,098	/	4	=	79,525 *	\$250.00	=	\$19,881,250	\$133.38	\$10,607,045	\$383.38	\$30,488,295
Medium	117,848	477,981	8,463	604,292	/	4	=	151,073 *	\$83.33	=	\$12,588,913	\$133.38	\$20,150,117	\$216.71	\$32,739,030
Large	36,420	79,611	3,468	119,499	/	4	=	29,875 *	\$62.50	=	\$1,867,188	\$133.38	\$3,984,728	\$195.88	\$5,851,916
Total	175,801	850,690	15,399	1,041,890				260,473			\$34,337,351		\$34,741,890		\$69,079,241

Table 3 - Worker Time and Cost - Periodic and Additional Exposure Assessment

Cost = Burden Hours* WorkerWage

Hours = ((GIW_≥AL - GIW>PEL) / WPA * AAEA) * AEF * WT

Hours = ((GIW>PEL / WPA) * AAEA * AEF * WT)

Hours = (CW_≥AL<PEL / WPA) * AAEA * AEF * WT)

Variables

GIW_≥AL = # of workers at or above action level in general industry/maritime

GIW>PEL = # of respirator users above PEL in general industry/maritime

CW_≥AL<PEL = # of workers at or above the action level and at or below the PEL in construction

HF_≥AL = # of workers at or above action level in hydraulic fracturing

HF>PEL = # of respirator users above PEL in hydraulic fracturing

WPA = workers per area

AAEA = # of annual exposure assessments per year

PEA = # of periodic exposure assessments

AEA = # of additional exposure assessments

AEAF = 1.15 additional exposure assessment factor (1 + .15)

PAEA = # of periodic and additional assessments; (PEA + AEA)

WT = hours of worker's time

Wage Rate = \$ per hour

	Workers		WPA	(rounded)	AAEA	PEA* (rounded)	AEAF	AEA* (rounded)	PAEA (rounded)	WT	Burden Hours (rounded)	Wage Rate	Item 12 Costs (rounded)
<i>General Industry</i>													
(GIW _≥ AL - GIW>PEL)	163,879	/	4	40,970	* 2	= 81,940	* 1.15	= 12,291	94,231	* 0.50	= 47,116	* \$23.92	= \$1,127,015
GIW > PEL	11,922	/	4	2,981	* 4	= 11,924	* 1.15	= 1,789	13,713	* 0.50	= 6,857	* \$23.92	= \$164,019
Subtotal						93,864			107,944		53,973		\$1,291,034
<i>Construction</i>													
CW _≥ AL<PEL	202,883	/	4	50,721	* 2	= 101,442	* 1.15	= 15,216	116,658	* 0.50	= 58,329	* \$29.63	= \$1,728,288
CW > PEL	N/A	/	4	N/A	* 4	= 0	* 1.15	= 0	0	* 0.50	= 0	* \$29.63	= \$0
Subtotal						101,442			116,658		58,329		\$1,728,288
<i>Hydraulic Fracturing</i>													
HF _≥ AL - HF>PEL	13,507	/	4	3,377	* 2	= 6,754	* 1.15	= 1,013	7,767	* 0.50	= 3,884	* \$29.56	= \$114,811
HF > PEL	1,892	/	4	473	* 4	= 1,892	* 1.15	= 284	2,176	* 0.50	= 1,088	* \$29.56	= \$32,161
Subtotal						8,646			9,943		4,972		\$146,972
Total						203,952		30,593	234,545		117,274		\$3,166,294

* Shaded columns show subtotals not included in formula.

Table 4 - Contract Costs for Industrial Hygienist and Laboratory To Perform Assessment - Periodic and Additional Exposure Assessment

Cost = (GIW>AL - GIW>PEL / WPA * AEA * AEA * AEA * IHPBZ * LABSHIP)
 Cost = (GIW>PEL / WPA * AEA * AEA * AEA * IHPBZ * LABSHIP)
 Cost = (CW>AL<PEL / WPA * AEA * AEA * AEA * IHPBZ * LABSHIP)
 Cost = (HFW>AL - HFW>PEL / WPA * AEA * AEA * AEA * IHPBZ * LABSHIP)
 Cost = (HFW>PEL / WPA * AEA * AEA * AEA * IHPBZ * LABSHIP)

Variables

GIW>AL = # of workers at or above the action level in general industry/maritime
 GIW>PEL = # of respirator users (above PEL) in general industry/maritime
 CW>AL<PEL = # of workers at or above the action level and at or below the PEL in construction
 HFW>AL = # of workers at or above the action level in hydraulic fracturing
 HFW>PEL = # of respirator users (above PEL) in hydraulic fracturing
 WPA = workers per area
 AEA = # of annual exposure assessments
 AEA = 1.15 additional exposure assessment factor (1 +.15)
 IHPBZ = direct cost per sample including outside contractor industrial hygienist (IH) fees and PBZ (Source: PEA Table V-8)
 LABSHIP = direct cost per sample for lab fees and shipping (Source: PEA Table V-8)

	Workers		WPA		(rounded)	AEA		Total Periodic EA	AEAF	Total EA Samples (rounded)	IHPBZ	IHPBZ Costs (rounded)	LABSHIP	LABSHIP Costs (Total EA Samples x LABSHIP) (rounded)								
General Industry Above AL and Below PEL = (GIW>AL - GIW>PEL)																						
Small	21,532.00	-	1,512.00	/	4	=	5,005	*	2	=	10,010	*	1.15	=	11,512	*	\$250.00	=	\$2,878,000	\$133.38	\$1,535,471	
Medium	117,848.00	-	8,361.00	/	4	=	27,372	*	2	=	54,744	*	1.15	=	62,956	*	\$83.33	=	\$5,246,123	\$133.38	\$8,397,071	
Large	36,420.00	-	2,049.00	/	4	=	8,593	*	2	=	17,186	*	1.15	=	19,764	*	\$62.50	=	\$1,235,250	\$133.38	\$2,636,122	
Sub-total	175,801.00		11,922.00				40,970				81,940				94,232				\$9,359,373		\$12,568,664	
General Industry Above PEL (GIW>PEL)																						
Small	N/A		1,512.00	-	/	4	=	378	*	4	=	1,512	*	1.15	=	1,739	*	\$250.00	=	\$434,750	\$133.38	\$231,948
Medium	N/A		8,361.00	-	/	4	=	2,090	*	4	=	8,360	*	1.15	=	9,614	*	\$83.33	=	\$801,135	\$133.38	\$1,282,315
Large	N/A		2,049.00	-	/	4	=	512	*	4	=	2,048	*	1.15	=	2,355	*	\$62.50	=	\$147,188	\$133.38	\$314,110
Sub-total			11,922.00				2,980				11,920				13,708				\$1,383,073		\$1,828,373	
Construction Above AL and Below PEL (CW>AL<PEL)																						
Small	68,344.00		N/A	-	/	4	=	17,086	*	2	=	34,172	*	1.15	=	39,298	*	\$250.00	=	\$9,824,500	\$133.38	\$5,241,567
Medium	114,846.00		N/A	-	/	4	=	28,712	*	2	=	57,424	*	1.15	=	66,038	*	\$83.33	=	\$5,502,947	\$133.38	\$8,808,148
Large	19,692.00		N/A	-	/	4	=	4,923	*	2	=	9,846	*	1.15	=	11,323	*	\$62.50	=	\$707,688	\$133.38	\$1,510,262
Sub-total	202,882.00						50,721				101,442				116,659				\$16,035,135		\$15,559,977	
Hydraulic Fracturing Above AL and Below PEL (HFW>AL - GIW>PEL)																						
Small	3,468.00	-	426.00	/	4	=	761	*	2	=	1,522	*	1.15	=	1,750	*	\$250.00	=	\$437,500	\$133.38	\$233,415	
Medium	8,463.00	-	1,040.00	/	4	=	1,856	*	2	=	3,712	*	1.15	=	4,269	*	\$83.33	=	\$355,736	\$133.38	\$569,399	
Large	3,468.00	-	426.00	/	4	=	761	*	2	=	1,522	*	1.15	=	1,750	*	\$62.50	=	\$109,375	\$133.38	\$233,415	
Sub-total	15,399.00		1,892.00				3,378				6,756				7,769				\$902,611		\$1,036,229	
Hydraulic Fracturing Above PEL (HFW>PEL)																						
Small	N/A		426.00	-	/	4	=	107	*	4	=	428	*	1.15	=	492	*	\$250.00	=	\$123,000	\$133.38	\$65,623
Medium	N/A		1,040.00	-	/	4	=	260	*	4	=	1,040	*	1.15	=	1,196	*	\$83.33	=	\$99,663	\$133.38	\$159,522
Large	N/A		426.00	-	/	4	=	107	*	4	=	428	*	1.15	=	492	*	\$62.50	=	\$30,750	\$133.38	\$65,623
Sub-total			1,892.00				474				1,896				2,180				\$253,413		\$290,768	
																			Total IH fees/PBZ sample costs		Total lab fees and shipping costs	
																			\$27,933,605		\$31,284,011	

Table 5 - Human Resources Manager Time to Notify Workers of Exposure Assessment Results

Cost = Burden Hours* HRWage

Hours = (IEA + PAEA) * HRT

Variables

IEA = # of initial exposure assessments

PAEA = # of periodic and additional exposure assessments

EA = total number of exposure assessments

HRT = hours of human resources manager time to prepare notification of monitoring results

Wage Rate = \$ per hour

	IEA	PAEA	EA	HRT	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
General Industry	43,950	+ 107,944	= 151,894 *	0.08	= 12,152 *	\$68.41	= \$831,318
Construction	212,673	+ 116,658	= 329,331 *	0.08	= 26,346 *	\$69.12	= \$1,821,036
Hydraulic Fracturing	3,850	+ 9,943	= 13,793 *	0.08	= 1,103 *	\$72.53	\$80,001
Total	260,473	234,545	495,018		39,601		\$2,732,355

Table 6 - Supervisor Time and Cost, Development of Written Access Control Plan

Cost = Burden Hours* SupeWage

Hours = (CONSFTE * PWA /AWCV * ST)

Hours = (HFFTE * PWA /AWCV * ST)

Variables

CONSFTE = # of at risk FTE in construction (source: ERG, "Program Costs" spreadsheet, "Exposure Control Plan Costs")

HFFTE = # of at risk FTE in hydraulic fracturing (source: Appendix A, Table A-13)

PWA = percentage written access control plan rather than regulated area: construction (25%); hydraulic fracturing (100%)

AWCV = average # of workers covered by plan: construction (8); hydraulic fracturing (32)

ST = hours of supervisor's time to develop plan (4)

Wage Rate = \$ per hour

		PWA	(rounded)	AWCV	Written Plans (rounded)	ST	Burden Hours	Wage Rate	Item 12 Cost (rounded)
CONSFTE	265,710 *	0.25 =	66,428 /	8 =	8,304 *	4.00 =	33,216 *	\$43.12 =	\$1,432,274
HFFTE	15,399 *	1.00 =	15,399 /	32 =	481 *	4.00 =	1,924 *	\$42.77 =	\$82,289
Total					8,785		35,140		\$1,514,563

Table 7 - Supervisor Time and Cost, Implementation of Written Access Control Plan

Cost = Burden Hours * SupeWage

Hours = (CONSRU * PWA / AWCV * JPYR * ST)

Hours = (HFRU * PWA / AWCV * JPYR * ST)

Variables

CONSRU = # FTE in construction using respirators (source: ERG "Silica Program Costs," "Exposure Control Plan Costs" spreadsheet)

HFRU = # FTE in hydraulic fracturing using respirators (source: ERG "Silica Program Costs," "Exposure Control Plan Costs" spreadsheet)

PWA = percentage written access control plan rather than regulated area: construction (25%); hydraulic fracturing (100%)

AWCV = average # of workers covered by plan: construction (8); hydraulic fracturing (32)

JPYR = # of jobs per year (=150 working days per year/avg. job length of 10 days (15))

ST = hours of supervisor's time to revise plan for specific job (.25) and communicate plan provisions (.1)

Wage Rate = \$ per hour

		PWA		AWCV	Written Plans (rounded)	JPYR	Jobs Implementing a Plan (rounded)	ST	Burden Hours	Wage Rate	Item 12 Cost (rounded)
CONSRU	90,736 *	0.25 =	22,684 /	8 =	2,836 *	15.00 =	42,540 *	0.35 =	14,889 *	\$43.12 =	\$642,014
HFRU	2,714 *	1.00 =	2,714 /	32 =	85 *	15.00 =	1,275 *	0.35 =	446 *	\$42.77 =	\$19,075
Total					2,921		43,815		15,335		\$661,089

Table 8: Human Resources Manager Time and Cost to Establish and Revise Respiratory Protection Plan - General Industry

Cost = Burden Hours* HRWage

Establish Program Hours = ESTB * PERCOMP * HRT

Revise Program Hours = ESTB * PERCOMP * UPDAT * HRT

Variables

ESTB = # of establishments with respirator users (source: PEA Table V-7 and PEA spreadsheet -

Program Costs, GI_Respirators, Respirator Unit Costs)

PERCOMP = percentage of establishments without programs in compliance (50 %)

HRT = hours human resources manager time

UPDAT = percentage of establishments updating program after first year (20%)

Wage Rate = \$ per hour

New Programs												
	ESTB		PERCOMP		Programs		HRT		Burden Hours		Wage Rate	Item 12 Cost (rounded)
> 500 workers	342	*	0.50	=	171	*	8	=	1,368	*	\$68.41	\$93,585
< 500 workers	2,846	*	0.50	=	1,423	*	4	=	5,692	*	\$68.41	\$389,390
	3,188				1,594				7,060			\$482,975

Revise Program (After first year)												
	ESTB		PERCOMP		UPDAT		Programs (rounded)		HRT	Burden Hours	Wage Rate	Item 12 Cost (rounded)
> 500 workers	342	*	0.50	=	171	0.20	34	*	4	136	\$68.41	\$9,304
> 500 workers	2,846	*	0.50	=	1,423	0.20	285	*	2	570	\$68.41	\$38,994
	3,188									706		\$48,298

Table 8a: Human Resources Manager Time and Cost to Establish and Revise Respiratory Protection Plan - Hydraulic Fracturing

Cost = Burden Hours* HRWage

Establish Program Hours = ESTB * PERCOMP * HRT

Revise Program Hours = ESTB * PERCOMP * UPDAT * HRT

Variables

ESTB = # of establishments with respirator users (source: PEA Table V-7 and PEA spreadsheet -

Program Costs, HF_Respirators, Respirator Unit Costs)

PERCOMP = percentage of establishments without programs in compliance

HRT = hours human resources manager time

UPDAT = percentage of establishments updating program after first year (20%)

Wage Rate = \$ per hour

New Programs													
	ESTB	*	PERCOMP	=	Programs (rounded)	*	HRT	=	Burden Hours	*	Wage Rate	=	Item 12 Cost (rounded)
Large (500+)	71	*	0.05	=	4	*	8	=	32	*	\$72.53	=	\$2,321.00
Medium (20-499)	260	*	0.20	=	52	*	4	=	208	*	\$72.53	=	\$15,086.00
Small (<20)	213	*	0.30	=	64	*	4	=	256	*	\$72.53	=	\$18,568.00
	544				120				496				\$35,975.00

Revise Program (After first year)													
	ESTB	*	PERCOMP	=	Programs (rounded)	UPDAT	=	Programs (rounded)	*	HRT	Burden Hours	Wage Rate	Item 12 Cost (rounded)
Large (500+)	71	*	0.05	=	4	0.20	=	1	*	4	4	\$72.53	\$290.00
Medium (20-499)	260	*	0.20	=	52	0.20	=	10	*	2	136	\$72.53	\$9,864.00
Small (<20)	213	*	0.30	=	64	0.20	=	13	*	2	26	\$72.53	\$1,886.00
	544										166		\$12,040.00

Table 9: Human Resources Manger Time and Cost to Establish and Revise Respiratory Protection Plan - Construction

Cost = Burden Hours* HRWage

Establish Program Hours = ESTB * PERCOMP * HRT

Revise Program Hours = ESTB * PERCOMP * UPDAT * HRT

Variables

ESTB = # of establishments with respirator users (source: PEA Table V-46 and PEA spreadsheet, Construction Respirator Unit Costs)

HRT = hours human resources manager time

PERCOMP = percentage of establishments without programs in compliance (44 %)

UPDAT = percentage of establishments updating program after first year (20%)

Wage Rate = \$ per hour

	ESTB		PERCOMP		Programs (rounded)		HRT		Burden Hours		Wage Rate		Item 12 Cost (rounded)
> 500 workers	4,596 *		0.44 =		2,022 *		8.00 =		16,176 *		\$69.12 =		\$1,118,085
< 500 workers	99,710 *		0.44 =		43,872 *		4.00 =		175,488 *		\$69.12 =		\$12,129,731
Total	104,306				45,894				191,664				\$13,247,816

Combined Totals (w/GI and HF) -->					47,608				199,220				\$13,766,766
---	--	--	--	--	---------------	--	--	--	----------------	--	--	--	---------------------

Revise Program (After first year)

	ESTB		PERCOMP		UPDAT		Programs (rounded)		HRT		Burden Hours		Wage Rate		Item 12 Cost
> 500 workers	4,596 *		0.44 *		0.20 =		404 *		4.00 *		1,616 *		\$69.12 =		\$111,698
< 500 workers	99,710 *		0.44 *		0.20 =		8,774 *		2.00 *		17,548 *		\$69.12 =		\$1,212,918
Total	104,306						9,178				19,164				\$1,324,616

Table 10: Supervisor and Worker Time and Cost to Complete Qualitative Fit-Testing

Cost = Burden Hours* WorkerWage or SupeWage

Hours = (RU * PERCOMP * WT)

Hours = (RU * PERCOMP * ST)

Variables

RU = # of respirator users

PERCOMP = percentage establishments without programs in compliance

WT = hours of worker time

ST = hours of supervisor time

Wage Rate = \$ per hour

	RU	PERCOMP	Responses (rounded)	WT/ST	Burden Hours (rounded)	Wage Rate	Item 12 Costs (rounded)
<i>General Industry</i>							
Worker	11,922 *	0.50 =	5,961 *	1.00 =	5,961 *	\$23.92 =	\$142,587
Supervisor	11,922 *	0.50 =	5,961 *	0.25 =	1,490 *	\$34.09 =	\$50,794
Total			11,922		7,451		\$193,381
<i>Construction</i>							
Worker	314,777 *	0.44 =	138,502 *	1.00 =	138,502 *	\$29.63 =	\$4,103,814
Supervisor	314,777 *	0.44 =	138,502 *	0.25 =	34,626 *	\$43.12 =	\$1,493,073
Total			277,004		173,128		\$5,596,887
<i>Hydraulic Fracturing</i>							
<i>Worker</i>							
Small (<20)	426 *	0.30 =	128 *	1.00 =	128 *	\$29.56 =	\$3,784
Medium (20-499)	1,040 *	0.20 =	208 *	1.00 =	208 *	\$29.56 =	\$6,148
Large (500+)	426 *	0.05 =	21 *	1.00 =	21 *	\$29.56 =	\$621
Subtotal			357		357		\$10,553
<i>Supervisor</i>							
Small (<20)	426 *	0.30 =	128 *	0.25 =	32 *	\$42.77 =	\$1,369
Medium (20-499)	1,040 *	0.20 =	208 *	0.25 =	52 *	\$42.77 =	\$2,224
Large (500+)	426 *	0.05 =	21 *	0.25 =	5 *	\$42.77 =	\$214
Subtotal			357		89		\$3,807
Total			714		446		\$14,360
Combined Totals ->			289,640		181,025		\$5,804,628
Number of Fit-Tests	146,355						

Table 11 - Clerical Time and Cost to Establish and Maintain Fit Test Records

Hours = Fit Tests * Clerical Time

Cost = Burden Hours* ClerWage

Wage Rate = \$ per hour

	Fit Tests		Clerical Time		Burden Hours (rounded)		Wage Rate		Item 12 Costs (rounded)
General Ind.	5,961								
Construction	138,502								
Hydraulic Fracturing	357								
Total	144,820	*	0.08	=	11,586	*	19.01	=	\$220,250

Table 12 - Medical Surveillance, Worker Time and Cost to Complete Initial Medical Examination, Existing Workers

Cost = Burden Hours* WorkerWage

Hours = W>PELRU * PERHSCR * (EXAM + TRVL)

Variables (Sources: PEA Tables V-10, V-12, V-39 and V-40 and supporting ERG "Program Costs" spreadsheets, "Medical Surveillance" and "Sur

W>PELRU = # of workers above PEL and wearing respirators

PERHSCR = percentage of medical examinations (on-site or off-site)

INIT-EXST = # of existing workers completing initial medical examination

EXAM = hours of worker time to complete initial medical examination (2 hours), including:

- complete occupational health history survey, including medical questionnaire for respirator use
- physical examination by knowledgeable HCP, including follow-up evaluation for respirator use, if needed
- chest x-ray
- pulmonary function test
- dermal TB test
- other necessary tests

TRVL = hours of worker travel time to off-site location

Wage Rate = \$ per hour

	W>PELRU	PERHSCR	INIT-EXST (rounded)	EXAM	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>								
<i>(On-site)</i>								
Small	1,821 *	0.20 =	364 *	2.00 +	0.00 =	728 *	\$23.92 =	\$17,414
Medium	10,165 *	0.75 =	7,624 *	2.00 +	0.00 =	15,248 *	\$23.92 =	\$364,732
Large	3,186 *	1.00 =	3,186 *	2.00 +	0.00 =	6,372 *	\$23.92 =	\$152,418
			11,174			22,348		\$534,564
<i>General Industry</i>								
<i>(Off-site)</i>								
Small	1,821 *	0.80 =	1,457 *	2.00 +	1.00 =	4,371 *	\$23.92 =	\$104,554
Medium	10,165 *	0.25 =	2,541 *	2.00 +	1.00 =	7,623 *	\$23.92 =	\$182,342
Large	3,186 *	0.00 =	0 *	2.00 +	1.00 =	0 *	\$23.92 =	\$0
			3,998			11,994		\$286,896
	Subtotal General Industry ->		15,172			34,342		\$821,460
<i>Construction</i>								
<i>(On-site)</i>								
Small	117,685 *	0.20 =	23,537 *	2.00 +	0.00 =	47,074 *	\$29.63 =	\$1,394,951
Medium	188,297 *	0.75 =	141,223 *	2.00 +	0.00 =	282,446 *	\$29.63 =	\$8,369,764
Large	30,262 *	1.00 =	30,262 *	2.00 +	0.00 =	60,524 *	\$29.63 =	\$1,793,517
			195,022			390,044		\$11,558,232
<i>Construction</i>								
<i>(Off-site)</i>								
Small	117,685 *	0.80 =	94,148 *	2.00 +	1.50 =	329,518 *	\$29.63 =	\$9,763,618
Medium	188,297 *	0.25 =	47,074 *	2.00 +	1.50 =	164,759 *	\$29.63 =	\$4,881,809
Large	30,262 *	0.00 =	0 *	2.00 +	1.50 =	0 *	\$29.63 =	\$0
			141,222			494,277		\$14,645,427
	Subtotal Construction ->		336,244			884,321		\$26,203,659
<i>Hydraulic Fracturing</i>								
<i>(On-site)</i>								
Small	426 *	0.20 =	85 *	2.00 +	0.00 =	170 *	\$29.56 =	\$5,025
Medium	1,040 *	0.75 =	780 *	2.00 +	0.00 =	1,560 *	\$29.56 =	\$46,114
Large	426 *	1.00 =	426 *	2.00 +	0.00 =	852 *	\$29.56 =	\$25,185
			1,291			2,582		\$76,324
<i>Hydraulic Fracturing</i>								
<i>(Off-site)</i>								
Small	426 *	0.80 =	341 *	2.00 +	1.00 =	1,023 *	\$29.56 =	\$30,240
Medium	1,040 *	0.25 =	260 *	2.00 +	1.00 =	780 *	\$29.56 =	\$23,057
Large	426 *	0.00 =	0 *	2.00 +	1.00 =	0 *	\$29.56 =	\$0
			601			1,803		\$53,297
	Subtotal Hydraulic Fract. ->		1,892			4,385		\$129,621
	Total ->		353,308			923,048		\$27,154,740

Table 13 - Medical Surveillance, Worker Time and Cost for Complete Initial Medical Examination, New Workers

Cost = Burden Hours * WorkerWage

Hours = (W>PELRU * SEP * PERNEW) * (PERHSCR * (EXAM + TRVL))

Variables (Sources: PEA Tables V-10, V-12, V-39 and V-40 and supporting ERG "Program Costs" spreadsheets, "Medical Surveillance" and "Surveillance Costs")

W>PELRU = # of workers above PEL and wearing respirators

SEP = separations rate (layoffs, quits and retirements)

PERNEW = percentage of new workers requiring initial medical examination

PERHSCR = percentage of medical examinations (onsite or offsite)

INIT-NEW = # of new workers completing initial medical examination

EXAM = hours of worker time to complete initial medical examination (2 hours), including:

- complete occupational health history survey, including medical questionnaire for respirator use
- physical examination by knowledgeable HCP, including follow-up evaluation for respirator use, if needed
- chest x-ray
- pulmonary function test
- dermal TB test
- other necessary tests

TRVL = hours of worker travel time to off-site location

Wage Rate = \$ per hour

	W>PELRU	SEP	PERNEW	(rounded)	PERHSCR	INIT-NEW	EXAM	TRVL	Burden	Wage	Item 12 Cost
						(rounded)			Hours	Rate	(rounded)
General Industry											
(On-site)											
Small	1,821.00*	0.272*	0.75	371*	0.10=	37*	2.00+	0.00=	74*	\$23.92=	\$1,770
Medium	10,165.00*	0.272*	0.75	2,074*	0.50=	1,037*	2.00+	0.00=	2,074*	\$23.92=	\$49,610
Large	3,186.00*	0.272*	0.75	650*	0.90=	585*	2.00+	0.00=	1,170*	\$23.92=	\$27,986
									3,318		\$79,366
General Industry											
(Off-site)											
Small	1,821.00*	0.272*	0.75	371*	0.90=	334*	2.00+	1.00=	1,002*	\$23.92=	\$23,968
Medium	10,165.00*	0.272*	0.75	2,074*	0.50=	1,037*	2.00+	1.00=	3,111*	\$23.92=	\$74,415
Large	3,186.00*	0.272*	0.75	650*	0.10=	65*	2.00+	1.00=	195*	\$23.92=	\$4,664
									4,308		\$103,047
				3,095		3,095			7,626		\$182,413
Construction											
(On-site)											
Small	117,685.00*	0.64*	0.40	30,127*	0.10=	3,013*	2.00+	0.00=	6,026*	\$29.63=	\$178,569
Medium	188,297.00*	0.64*	0.40	48,204*	0.50=	24,102*	2.00+	0.00=	48,204*	\$29.63=	\$1,428,436
Large	30,262.00*	0.64*	0.40	7,747*	0.90=	6,972*	2.00+	0.00=	13,944*	\$29.63=	\$413,205
									68,174		\$2,020,210
Construction											
(Off-site)											
Small	117,685.00*	0.64*	0.40	30,127*	0.90=	27,114*	2.00+	1.50=	94,899*	\$29.63=	\$2,811,857
Medium	188,297.00*	0.64*	0.40	48,204*	0.50=	24,102*	2.00+	1.50=	84,357*	\$29.63=	\$2,499,498
Large	30,262.00*	0.64*	0.40	7,747*	0.10=	775*	2.00+	1.50=	2,713*	\$29.63=	\$80,371
									181,969		\$5,391,726
				86,078		86,078			250,143		\$7,411,936
Hydraulic Fracturing											
(On-site)											
Small	426*	0.272*	0.40	46*	0.10=	5*	2.00+	0.00=	10*	\$29.56=	\$296
Medium	1,040*	0.272*	0.40	113*	0.50=	57*	2.00+	0.00=	114*	\$29.56=	\$3,370
Large	426*	0.272*	0.40	46*	0.90=	41*	2.00+	0.00=	82*	\$29.56=	\$2,424
									206		\$6,090
Hydraulic Fracturing											
(Off-site)											
Small	426*	0.272*	0.40	46*	0.90=	41*	2.00+	1.00=	123*	\$29.56=	\$3,636
Medium	1,040*	0.272*	0.40	113*	0.50=	57*	2.00+	1.00=	171*	\$29.56=	\$5,055
Large	426*	0.272*	0.40	46*	0.10=	5*	2.00+	1.00=	15*	\$29.56=	\$443
									309		\$9,134
				205		206			515		\$15,224
Total ->				89,378		89,379			258,284		\$7,609,573
Current and New Combined -->						442,687			1,181,332		\$34,764,313

Table 14 - Medical Surveillance, Initial Medical Examination Costs

Cost = (INIT-EXST + INIT-NEW) * COST

Variables (PEA Tables V-10, V-12, V-39 and V-40 and supporting ERG "Program Costs" spreadsheets, "Medical Surveill:

INIT-EXST = existing workers completing initial medical examination

INIT-NEW = new workers completing initial medical examination

COST = total direct costs for initial medical examination (\$312.82), including:

Complete occupational health history survey - \$33.33

Physical examination by knowledgeable HCP -\$100.00

Chest-xray classified by a NIOSH-certified B Reader - \$118.80

Pulmonary function test - \$54.69

Other necessary tests - \$60.00; assumed required by 10 percent of workers or \$6.00/worker

			COST		Item 13 Costs (rounded)
Existing Workers	353,308.00	*	\$312.82	=	\$110,521,809
New Workers	89,379.00	*	\$312.82	=	\$27,959,539
					\$138,481,348

Table 15 - Worker Time and Cost for Return Reading of TB Test During Initial Medical Examination, Existing Workers

Cost = Burden Hours* WorkerWage

Hours = (INIT-EXST * (READ+TRVL))

Variables (Sources: see initial medical exam tables)

INIT-EXST = # of existing workers completing initial medical examination

READ = hours of worker time for return reading (5 minutes (.08 hours))

*Note: Worker time to complete initial dermal TB test is included in the cost for initial medical examinations.

TRVL = hours of worker travel time to off-site location for return reading (general industry - 1 hour; construction - 1.5 hours)

Wage Rate = \$ per hour

	INIT-EXST	READ	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>						
(On-site)						
Small	364 *	0.08 +	0.00 =	29 *	\$23.92 =	\$694
Medium	7,624 *	0.08 +	0.00 =	610 *	\$23.92 =	\$14,591
Large	3,186 *	0.08 +	0.00 =	255 *	\$23.92 =	\$6,100
	11,174			894		\$21,385
<i>General Industry</i>						
(Off-site)						
Small	1,457 *	0.08 +	1.00 =	1,574 *	\$23.92 =	\$37,650
Medium	2,541 *	0.08 +	1.00 =	2,744 *	\$23.92 =	\$65,636
Large	0 *	0.08 +	1.00 =	0 *	\$23.92 =	\$0
	3,998			4,318		\$103,286
Subtotal	15,172			5,212		\$124,671
<i>Construction</i>						
(On-site)						
Small	23,537 *	0.08 +	0.00 =	1,883 *	\$29.63 =	\$55,793
Medium	141,223 *	0.08 +	0.00 =	11,298 *	\$29.63 =	\$334,760
Large	30,262 *	0.08 +	0.00 =	2,421 *	\$29.63 =	\$71,734
	195,022			15,602		\$462,287
<i>Construction</i>						
(Off-site)						
Small	94,148 *	0.08	1.50 =	148,754 *	\$29.63 =	\$4,407,581
Medium	47,074 *	0.08	1.50 =	74,377 *	\$29.63 =	\$2,203,791
Large	0 *	0.08	1.50 =	0 *	\$29.63 =	\$0
	141,222			223,131		\$6,611,372
Subtotal	336,244			238,733		\$7,073,659
<i>Hydraulic Fract.</i>						
(On-site)						
Small	85 *	0.08 +	0.00 =	7 *	\$29.56 =	\$207
Medium	780 *	0.08 +	0.00 =	62 *	\$29.56 =	\$1,833
Large	426 *	0.08 +	0.00 =	34 *	\$29.56 =	\$1,005
	1,291			103		\$3,045
<i>Hydraulic Fract.</i>						
(Off-site)						
Small	341 *	0.08 +	1.00 =	368 *	\$29.56 =	\$10,878
Medium	260 *	0.08 +	1.00 =	281 *	\$29.56 =	\$8,306
Large	0 *	0.08 +	1.00 =	0 *	\$29.56 =	\$0
	601			649		\$19,184
Subtotal	1,892			752		\$22,229
Total	353,308			244,697		\$7,220,559

Table 16 - Worker Time and Cost for Return Reading of TB Test During Initial Medical Examination, New Workers

Cost = Burden Hours* WorkerWage
 Hours = (INIT-NEW * (READ+TRVL))

Variables (Sources: see initial medical exam tables)

INIT-NEW = new workers completing initial medical examination

READ = hours of worker time for return reading (5 minutes (.08 hours))

*Note: Worker time to complete initial dermal TB test is included in the cost for initial medical examinations.

TRVL = hours of worker travel time to off-site location for return reading

Wage Rate = \$ per hour

	INIT-NEW	READ	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>						
(On-site)						
Small	37 *	0.08 +	0.00 =	3 *	\$23.92 =	\$72
Medium	1,037 *	0.08 +	0.00 =	83 *	\$23.92 =	\$1,985
Large	585 *	0.08 +	0.00 =	47 *	\$23.92 =	\$1,124
				133		\$3,181
(Off-site)						
Current						
Small	334 *	0.08 +	1.00 =	361 *	\$23.92 =	\$8,635
Medium	1,037 *	0.08 +	1.00 =	1,120 *	\$23.92 =	\$26,790
Large	65 *	0.08 +	1.00 =	70 *	\$23.92 =	\$1,674
				1,551		\$37,099
Subtotal	3,095			1,684		\$40,280
<i>Construction</i>						
(On-site)						
Small	3,013 *	0.08 +	0.00 =	241 *	\$29.63 =	\$7,142
Medium	24,102 *	0.08 +	0.00 =	1,928 *	\$29.63 =	\$57,133
Large	6,972 *	0.08 +	0.00 =	558 *	\$29.63 =	\$16,535
				2,727		\$80,810
(Off-site)						
Current						
Small	27,114 *	0.08 +	1.50 =	42,840 *	\$29.63 =	\$1,269,349
Medium	24,102 *	0.08 +	1.50 =	38,081 *	\$29.63 =	\$1,128,340
Large	775 *	0.08 +	1.50 =	1,225 *	\$29.63 =	\$36,297
				82,146		\$2,433,986
Subtotal	86,078			84,873		\$2,514,796
<i>Hydraulic Fract.</i>						
(On-site)						
Small	5 *	0.08 +	0.00 =	1 *	\$29.56 =	\$30
Medium	57 *	0.08 +	0.00 =	5 *	\$29.56 =	\$148
Large	41 *	0.08 +	0.00 =	3 *	\$29.56 =	\$89
	103			9		\$267
(Off-site)						
<i>Hydraulic Fract.</i>						
(Off-site)						
Small	41 *	0.08 +	1.00 =	44 *	\$29.56 =	\$1,301
Medium	57 *	0.08 +	1.00 =	62 *	\$29.56 =	\$1,833
Large	5 *	0.08 +	1.00 =	5 *	\$29.56 =	\$148
	103			111		\$3,282
Subtotal	206			120		\$3,549
Total	89,173			86,677		\$2,558,625

Existing and New Combined -->

331,374

\$9,779,184

Table 17 - Contract Cost for PLHCP to Conduct the Dermal TB Test

Cost = TBINIT * COST

Cost = TBTRI * COST

Variables (Sources: see initial medical exam tables)

TBINIT = new and existing workers completing initial dermal TB test, all industries

TBTRI = workers completing periodic dermal TB test, all industries

TEST = direct cost for dermal TB test (\$15.00)

Initial Test (Year 1) (Tables 15 and 16)				
	TBINIT		TEST	Item 13 Costs (rounded)
	442,481 *		\$15.00 =	\$6,637,215
Periodic Test (Year 3) (Table 20)				
	TBTRI		TEST	Item 13 Costs (rounded)
	87,521 *		\$15.00 =	\$1,312,815

Table 18 - Medical Surveillance, Worker Time and Cost to Complete Periodic Medical Examination (Year 3 after implementation)

Cost = Burden Hours* WorkerWage
 Hours = TRI *(EXAMYR3 + TRVL)

Variables (Sources: PEA Tables V-10 and V39 and supporting ERG spreadsheets)

- INIT-EXST = existing workers completing initial medical examination
- INIT-NEW = new workers completing initial medical examination
- INIT- # of total (existing and new) workers completing initial medical examination
- TRI = # of workers completing periodic (triennial) medical examinations
- EXAMYR3 = hours of worker time to complete periodic exam (2 hours; source, PEA Tables V10 & V39), including:
 - complete occupational health history survey, including medical questionnaire for respirator use
 - physical examination by knowledgeable PLHCP, including follow-up evaluation for respirator use, if needed
 - chest x-ray
 - pulmonary function test
 - other necessary tests, including periodic dermal TB test, if recommended
- TRVL = hours of worker travel time to off-site location
- Wage Rate = \$ per hour

	INIT-EXST (Year 1)	INIT-NEW (Year 1)	INIT (Year 1)	TRI (Year 3)	EXAM YR3	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>									
On-site									
Small	364 +	37 =	401 =	401.00					
Medium	7,624 +	1,037 =	8,661 =	8,661					
Large	3,186 +	585 =	3,771 =	3,771					
Subtotal			12,833	12,833 *	2.00 +	0.00 =	25,666 *	\$23.92 =	\$613,931
<i>General Industry</i>									
Off-site									
Small	1,457 +	334 =	1,791 =	1,791					
Medium	2,541 +	1,037 =	3,578 =	3,578					
Large	0 +	65 =	65 =	65					
Subtotal			5,434	5,434 *	2.00 +	1.00 =	16,302 *	\$23.92 =	\$389,944
Total			18,267.00	18,267.00			41,968		\$1,003,875
<i>Construction</i>									
On-site									
Small	23,537 +	3,013 =	26,550.00 =	26,550.00					
Medium	141,223 +	24,102 =	165,325.00 =	165,325.00					
Large	30,262 +	6,972 =	37,234.00 =	37,234.00					
Subtotal			229,109.00	229,109.00 *	2.00 +	0.00 =	458,218 *	\$29.63 =	\$13,578,442
<i>Construction</i>									
Off-site									
Small	94,148 +	27,114 =	121,262.00 =	121,262.00					
Medium	47,074 +	24,102.00 =	71,176.00 =	71,176.00					
Large	0 +	775 =	775.00 =	775.00					
Subtotal			193,213.00	193,213.00 *	2.00 +	1.50 =	676,246 *	\$29.63 =	\$20,037,169
Total			422,322.00	422,322.00			1,134,464		\$33,615,611
<i>Hydraulic Fract.</i>									
On-site									
Small	85 +	5 =	90.00 =	90.00					
Medium	780 +	57 =	837.00 =	837.00					
Large	426 +	41 =	467.00 =	467.00					
Subtotal			1,394.00	1,394.00 *	2.00 +	0.00 =	2,788 *	\$29.56 =	\$82,413
<i>Hydraulic Fract.</i>									
Off-site									
Small	341 +	41 =	382.00 =	382.00					
Medium	260 +	57.00 =	317.00 =	317.00					
Large	0 +	5 =	5.00 =	5.00					
Subtotal			704.00	704.00 *	2.00 +	1.00 =	2,112 *	\$29.56 =	\$62,431
Total			2,098.00	2,098.00			4,900		\$144,844
Total ->			442,687.00	442,687.00			1,181,332		\$34,764,330

Table 19 - Medical Surveillance, Contract Cost for a PLHCP to Conduct Periodic Medical Examination (Year 3 after implementation)

Cost = (TRI * TRICOST)

Variables (Sources: PEA Tables V-10 and V39 and supporting ERG spreadsheets)

TRI = # workers completing periodic (triennial) medical examinations

TRICOST = Total direct costs for triennial medical examinations (\$312.82), including:

Complete occupational health history survey - \$33.33

Physical examination by knowledgeable PLHCP -\$100.00

Chest-xray classified by a NIOSH-certified B Reader - \$118.80

Pulmonary function test - \$54.69

Other necessary tests - \$60.00; assumed required by 10 percent of workers or \$6.00/worker

TRI		TRICOST		Item 13 - Direct Costs for Triennial Medical Screenings
442,687*	*	\$312.82	=	\$138,481,347

Table 20 - Medical Surveillance, Worker Time and Cost to Complete TB Testing During Periodic Medical Examination (Year 3 after implementation)

Cost = Burden Hours* WorkerWage

Return Read Hours = (TRI * PERTEST) * (READ + TRVL)

Variables (Sources: PEA Tables V-10 and V39 and supporting ERG spreadsheets)

TRI = # of workers completing periodic (triennial) medical examinations (Table 19)

PERTEST = percentage of workers recommended for periodic testing

TBTRI = # of workers completing TB test in third year

READ = hours of worker time for return reading (5 minutes (.08 hours))

*Note: Worker time for the dermal TB test is included in the cost for periodic health screening.

TRVL = hours of worker travel time to off-site location for return reading

Wage Rate = \$ per hour

	TRI		PERTEST	TBTRI (TRI * PERTEST) (Year 3) (rounded)	READ	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>									
<i>(On-site)</i>									
Small	401	*	0.15 =	60	*	0.08 + 0.00 =	5	* \$23.92 =	\$120
Medium	8,661	*	0.15 =	1,299	*	0.08 + 0.00 =	104	* \$23.92 =	\$2,488
Large	3,771	*	0.15 =	566	*	0.08 + 0.00 =	45	* \$23.92 =	\$1,076
				1,925			154		\$3,684
<i>General Industry</i>									
<i>(Off-site)</i>									
Small	1,791	*	0.15 =	269	*	0.08 + 1.00 =	291	* \$23.92 =	\$6,961
Medium	3,578	*	0.15 =	537	*	0.08 + 1.00 =	580	* \$23.92 =	\$13,874
Large	65	*	0.15 =	10	*	0.08 + 1.00 =	11	* \$23.92 =	\$263
				816			882		\$21,098
Total				2,741			1,036		\$24,782
<i>Construction</i>									
<i>(On-site)</i>									
Small	26,550	*	0.20 =	5,310	*	0.08 + 0.00 =	425	* \$29.63 =	\$12,594
Medium	165,325	*	0.20 =	33,065	*	0.08 + 0.00 =	2,645	* \$29.63 =	\$78,380
Large	37,234	*	0.20 =	7,447	*	0.08 + 0.00 =	596	* \$29.63 =	\$17,661
				45,822			3,666		\$108,635
<i>Construction</i>									
<i>(Off-site)</i>									
Small	121,262	*	0.20 =	24,252	*	0.08 + 1.50 =	38,318	* \$29.63 =	\$1,135,362
Medium	71,176	*	0.20 =	14,235	*	0.08 + 1.50 =	22,491	* \$29.63 =	\$666,408
Large	775	*	0.20 =	155	*	0.08 + 1.50 =	245	* \$29.63 =	\$7,259
				38,642			61,054		\$1,809,029
Total				84,464			64,720		\$1,917,664
<i>Hydraulic Fract.</i>									
<i>On-site</i>									
Small	90.00	*	0.15 =	14	*	0.08 + 0.00 =	1	* \$29.56 =	\$30
Medium	837.00	*	0.15 =	126	*	0.08 + 0.00 =	10	* \$29.56 =	\$296
Large	467.00	*	0.15 =	70	*	0.08 + 0.00 =	6	* \$29.56 =	\$177
				210			17		\$503
<i>Hydraulic Fract.</i>									
<i>Off-site</i>									
Small	382.00	*	0.15 =	57	*	0.08 + 1.00 =	62	* \$29.56 =	\$1,833
Medium	317.00	*	0.15 =	48	*	0.08 + 1.00 =	52	* \$29.56 =	\$1,537
Large	5.00	*	0.15 =	1	*	0.08 + 1.00 =	1	* \$29.56 =	\$30
				106			115		\$3,400
Total				316			132		\$3,903
Total ->				87,521			65,888		\$1,946,349

Table 21: Human Resources Manager Time and Cost to Provide Information to the PLHCP

Cost = Burden Hours * HRWage

Year 1 Hours = (INIT * HRT) + (PUL * HRT)

Year 3 Hours = (TRI * HRT) + (PUL * HRT)

Variables

INIT = # of total workers (new and existing) completing initial medical examination

PUL - # of estimated new silica cases per year/cases referred to pulmonary specialist

TRI = # of workers completing periodic medical examination

HRT = hours of human resources manager time to provide information to the PLHCP

HRWage = human resources manager wage rate

Wage Rate = \$ per hour

Type of Examination	INIT/PU L		HRT	Burden Hours (rounded)	HRWage Rate		Item 12 Cost (rounded)
<i>Year 1</i>							
Initial							
General Industry	18,267 *		0.25 =	4,567 *	\$68.41 =		\$312,428
Construction	422,322 *		0.25 =	105,581 *	\$69.12 =		\$7,297,759
Hydraulic Fracturing	2,098 *		0.25 =	525 *	\$72.53 =		\$38,078
Additional/Pulmonary Function Examination							
General Industry	61 *		0.08 =	5 *	\$68.41 =		\$342
Construction	396 *		0.08 =	32 *	\$69.12 =		\$2,212
Hydraulic Fracturing	10 *		0.08 =	1	\$72.53 =		\$73
Total	443,154			110,711			\$7,650,892
<i>Year 3</i>							
Type of Examination	TRI		HRT	Burden Hours	HRWage Rate		Item 12 Cost
<i>Year 3</i>							
Periodic							
General Industry	18,267 *		0.08 =	1,461 *	\$68.41 =		\$99,947
Construction	422,322 *		0.08 =	33,786 *	\$69.12 =		\$2,335,288
Hydraulic Fracturing	2,098 *		0.08 =	168 *	\$72.53 =		\$12,173
Additional/Pulmonary Function Examination	-						
General Industry	-						
Construction	-						
Hydraulic Fracturing	-						
Total				35,415			\$2,447,408

Table 22: Worker and Human Resources Manager Time and Cost to Provide PLHCP's Written Medical Opinion to Worker

Cost = Burden Hours* HRWage

Year 1 Hours = (INIT*HRT) + (PUL*HRT)

Year 3 Hours = (TRI*HRT) + (PUL*HRT)

Variables

INIT = # of total workers (new and existing) completing initial medical examination

PUL - # of estimated new silica cases per year/cases referred to pulmonary specialist

TRI = # of workers completing periodic medical examination

HRT = hours of human resources manager time to provide written medical opinion to worker

Wage Rate = \$ per hour

Type of Examination	INIT/PUL	HRT	Burden Hours (rounded)	HRWage	Item 12 Cost (rounded)
<i>Year 1</i>					
General Industry					
Initial	18,267				
Additional/Pulmonary Function Examination	61				
Subtotal	18,328 *	0.08 =	1,466 *	\$68.41 =	\$100,289
Construction					
Initial	422,322				
Additional/Pulmonary Function Examination	396				
Subtotal	422,718 *	0.08 =	33,817 *	\$69.12 =	\$2,337,431
Hydraulic Fracturing					
Initial	2,098				
Additional/Pulmonary Function Examination	10				
Subtotal	2,108 *	0.08 =	169 *	\$72.53	\$12,258
Total	443,154		35,452		\$2,449,978

Type of Examination	TRI	HRT	Burden Hours (rounded)	HRWage	Item 12 Cost (rounded)
<i>Year 3</i>					
Periodic					
General Industry	18,267 *	0.08 =	1,461 *	\$68.41 =	\$99,947
Construction	422,322 *	0.08 =	33,786 *	\$69.12 =	\$2,335,288
Hydraulic Fracturing	2,098 *	0.08 =	168 *	\$72.53	\$12,185
Additional/Pulmonary Function Examination					
General Industry	-				
Construction	-				
Hydraulic Fracturing	-				
Total					

Table 23 - Medical Surveillance, Worker Time and Cost to Complete Pulmonary Specialist Exam

Cost = Burden Hours* WorkerWage

Hours = PUL * DIST * PERSCR * WT * TRVL

Variables (Sources: PEA p. V-52, PEA p. 186 and Tables V-10 and V39; supporting ERG "Program Costs" spreadsheets, Medical Surveillance and "Surveillance Costs")

PUL - # of estimated new silica cases per year/cases referred to pulmonary specialist

DIST - percentage of distributed cases among industries in proportion to the number of at-risk workers

PERHSCR = percentage of medical examinations (onsite or offsite)

WT - hours of worker time

TRVL - hours of worker travel time

Wage Rate = \$ per hour

	PUL	DIST	(rounded)	PERHSCR	(rounded)	WT	TRVL	Burden Hours (rounded)	Wage Rate	Item 12 Cost (rounded)
<i>General Industry</i>	61									
(On-site)										
Small	*	0.12	= 7 *	0.20	= 1 *	1 *	0	= 1 *	\$23.92	= \$24
Medium	*	0.67	= 41 *	0.75	= 31 *	1 *	0	= 31 *	\$23.92	= \$742
Large	*	0.21	= 13 *	1.00	= 13 *	1 *	0	= 13 *	\$23.92	= \$311
(Off-site)										
Small			= 7 *	0.80	= 6 *	1 *	1	= 12 *	\$23.92	= \$287
Medium			= 41 *	0.25	= 10 *	1 *	1	= 20 *	\$23.92	= \$478
Large			= 13 *	0.00	= 0 *	1 *	1	= 0 *	\$23.92	= \$0
<i>Construction</i>	396									
(On-site)										
Small	*	0.35	= 139 *	0.20	= 28 *	1 *	0	= 28 *	\$29.63	= \$830
Medium	*	0.56	= 222 *	0.75	= 167 *	1 *	0	= 167 *	\$29.63	= \$4,948
Large	*	0.09	= 36 *	1.00	= 36 *	1 *	0	= 36 *	\$29.63	= \$1,067
(Off-site)										
Small			= 139 *	0.80	= 111 *	1 *	2	= 278 *	\$29.63	= \$8,237
Medium			= 222 *	0.25	= 56 *	1 *	2	= 140 *	\$29.63	= \$4,148
Large			= 36 *	0.00	= 0 *	1 *	2	= 0 *	\$29.63	= \$0
<i>Hydraulic Fract</i>	10									
(On-site)										
Small	*	0.23	= 2 *	0.20	= 1 *	1 *	0	= 1 *	\$29.56	= \$30
Medium	*	0.55	= 6 *	0.75	= 5 *	1 *	0	= 5 *	\$29.56	= \$148
Large	*	0.23	= 2 *	1.00	= 2 *	1 *	0	= 2 *	\$29.56	= \$59
(Off-site)										
Small			= 2 *	0.80	= 2 *	1 *	1	= 4 *	\$29.56	= \$118
Medium			= 6 *	0.25	= 2 *	1 *	1	= 4 *	\$29.56	= \$118
Large			= 2 *	0.00	= 0 *	1 *	1	= 0 *	\$29.56	= \$0
	467							742		\$21,545

Table 24 - Medical Surveillance, Contract Cost for a PLHCP to Complete Pulmonary Specialist Exam

$COST = PUL * EXAMCOST$

Variables (Sources: PEA Tables V-10 and V-39 and supporting ERG spreadsheets)
PUL - # of estimated new silica cases per year/cases referred to pulmonary specialist
EXAMCOST - direct cost for examination by a pulmonary speciliast (\$190.28)
Wage Rate = \$ per hour

	PUL		EXAMCOST		Item 13 Cost (rounded)
	467	*	190.28	=	\$88,861

Table 25: Recordkeeping, HR Manager Time and Cost to Establish and Maintain Records for Exposure Monitoring Data

Cost = Burden Hours* HRWage

Hours = EA * HRT

Variables

EA = total number of exposure assessments

HRT = hours of human resources manager time to establish and maintain records

Wage Rate = \$ per hour

	EA		HRT		Burden Hours (rounded)		HRWage		Item 12 Costs (rounded)
<i>General Industry</i>									
Initial	43,950								
Periodic	93,864								
Additional	14,080								
Subtotal	151,894	*	0.17	=	25,822	*	\$68.41	=	\$1,766,483
<i>Construction</i>									
Initial	212,673								
Periodic	101,442								
Additional	15,216								
Subtotal	329,331	*	0.17	=	55,986	*	\$69.12	=	\$3,869,752
<i>Hydraulic Fract.</i>									
Initial	3,850								
Periodic	8,646								
Additional	1,297								
Subtotal	13,793	*	0.17	=	2,345	*	\$72.53	=	\$170,083
Total	495,018				84,153				\$5,806,318

Table 26: HR Manager Time and Cost to Establish and Maintain Record for Medical Surveillance

Cost = Burden Hours* HRWage
 Hours = (INIT+PUL+TRI) * HRT

Variables

INIT = # of total workers (new and existing) completing initial medical examination
 PUL - # of estimated new silica cases per year/cases referred to pulmonary specialist
 TRI = # of workers completing periodic medical examination
 HRT - hours of human resources manager time to establish and maintain records for initial and periodic examinations
 Wage Rate = \$ per hour

Type of Examination	INIT/TRI/PUL		HRT		Burden Hours (rounded)		HRWage		Item 12 Cost (rounded)
<i>Year 1</i>									
General Industry									
Initial	18,267 *		0.25 =		4,567 *		\$68.41 =		\$312,428
Periodic	0 *		0.08 =		0 *		\$68.41 =		\$0
Additional	61 *		0.08 =		5 *		\$68.41 =		\$342
Subtotal	18,328				4,572				\$312,770
Construction									
Initial	422,322 *		0.25 =		105,581 *		\$69.12 =		\$7,297,759
Periodic	0 *		0.08 =		0 *		\$69.12 =		\$0
Additional	396 *		0.08 =		32 *		\$69.12 =		\$2,212
Subtotal	422,718				105,613				\$7,299,971
Hydraulic Fracturing									
Initial	2,098 *		0.25 =		525		\$72.53 =		\$38,078
Periodic	0 *		0.08 =		0		\$72.53 =		\$0
Additional	10 *		0.08 =		1		\$72.53 =		\$73
Subtotal	2,108				526				\$38,151
Total	443,154				110,711				\$7,650,892

<i>Year 3</i>									
General Industry									
Initial (new employees only)	3,095 *		0.25 =		774 *		\$68.41 =		\$52,949
Periodic	18,267 *		0.08 =		1,461 *		\$68.41 =		\$99,947
Additional	-								
Construction									
Initial (new employees only)	86,078 *		0.25 =		21,520 *		\$69.12 =		\$1,487,462
Periodic	422,322 *		0.08 =		33,786 *		\$69.12 =		\$2,335,288
Additional	-								
Hydraulic Fracturing									
Initial (new employees only)	206 *		0.25 =		52 *		\$72.53 =		\$3,772
Periodic	2,098 *		0.08 =		168 *		\$72.53 =		\$12,185
Additional	-								
Total	528,971				56,987				\$3,938,654