



40-8964

August 15, 2016

CERTIFIED MAIL #7015 1520 0000 2613 1181

Ms. Andrea Kock, Deputy Director
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Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
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NRC License SUA-1548, 2016-2017 Gas Hills ISR Project Surety

Dear Ms. Kock:

Pursuant to License SUA-1548 Condition 9.5, Power Resources, Inc. d/b/a/ Cameco Resources (Cameco) is herein submitting for your review the 2016-2017 Surety Estimate for the Gas Hills ISR Project. Going forward, all correspondence for the Gas Hills ISR Project will be handled by Smith Ranch-Highland personnel.

Please contact me at 307-358-6541, ext. 476 or Kenneth_Garoutte@cameco.com if you have questions.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ken Garoutte'.

Ken Garoutte
Safety, Health, Environment, Quality (SHEQ) Manager

KG/vg

Attachments: CD – 2016-2017 Surety Estimate (excel and pdf format)

cc: File GH 4.3.3.3
Doug Mandeville, NRC Project Manager, via email
Document Control Desk, NRC, U.S Nuclear Regulatory Commission, Washington, D.C. 20555-0001 - CERTIFIED
MAIL # 7015 1520 0000 2613 1136

ec: Cameco-Casper

NM5520

Appendix B

2016-17 RECLAMATION SURETY BOND ESTIMATE

WDEQ Permit No. 687 Annual Report / NRC SUA-1548

Gas Hills ISR Project - Cameco Resources

Bond Calculation Changes

I BLDGS

	Surety Change for 15/16 to 16/17	\$441,223.00
Notes:	Decrease Building Demolition (App. K)	\$0.04
	Decrease Concrete Floor Demolition (App. K)	\$5.54
	Decrease Concrete Footing Demolition (App. K)	\$6.30
	Decrease Concrete Disposal On-Site (App. K)	\$0.45
	Net Decrease	\$441,223.00

II Well Abandonment

	Increase Drill Hole Abandonment	\$3,765.00
	Increase Operator/Laborer Costs*	\$0.55
	Net Increase	\$3,765.00

III Miscellaneous Reclamation

	Surety Change for 15/16 to 16/17	\$27,089.90
Notes:	Decrease Ripping Costs (GL 12a)(Cat D8)	\$25.63
	Decrease ripping costs (one-way, 1000', 0%)(GL12a)	\$0.15
	Decrease Culvert Removal Costs (App. J)	\$42.65
	Decrease Surface water station removal (App. N)	\$817.17
	Decrease Air Mon. Station Removal (App. O)	\$282.74
	Net Decrease	\$27,089.90

	2015/16 Surety Calculation	\$2,834,243.00
	2016/17 Proposed Surety Calculation	\$2,300,013.09
	Net decrease + contingency	-\$534,229.91

Appendix B

2016-17 RECLAMATION SURETY BOND ESTIMATE

WDEQ Permit No. 687 Annual Report / NRC SUA-1548

Gas Hills ISR Project - Cameco Resources

Total Restoration and Reclamation Cost Estimate

I.	Building Demolition and Disposal Cost		\$1,451,719
II.	Well & Drill Hole Abandonment		\$324,742
III.	Miscellaneous Surface Reclamation Cost		\$223,550
	Subtotal Restoration and Reclamation Cost Estimate		\$2,000,011
	Contractor Profit & Overhead (10%)¹	See Master Costs	
	Contingency (15%)²	15%	\$300,002
		TOTAL³	\$2,300,013

¹, Per WDEQ/LQD Guideline No. 12, Section 12(b)

², Per WDEQ/LQD Guideline No. 12, Section 12(a) and (c-h), Section 13 and NRC License Condition 9.5 (SUA-1548)

³, Costs reflect both WDEQ & NRC requirements. No salvage value assumed.

2016-17 RECLAMATION SURETY BOND ESTIMATE
WDEQ Permit No. 687 Annual Report / NRC SUA-1548
Gas Hills ISR Project - Cameco Resources

Part I. Building Demolition and Disposal

Building & Other Miscellaneous Demolition and Disposal	Carol Shop	Tire Shop	Change House	Air Comp Building	Water Treat Building	BaCl Building
I. Demolition Costs						
A. Building (Tanks)						
Volume of Building (ft ³)	1,977,851	54,560	18,600	6,240	6,600	6,600
Demolition Cost	\$0.293	\$0.293	\$0.293	\$0.293	\$0.293	\$0.293
Subtotal Building Demolition Costs	\$578,719	\$15,964	\$5,442	\$1,826	\$1,931	\$1,931
B. Concrete Floor						
Area of Concrete Floor (ft ²)	56,985	2,480	1,860	520	600	864
Demolition Cost	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84	\$0.84
Subtotal Concrete Floor Demolition Costs	\$47,639	\$2,073	\$1,555	\$435	\$502	\$722
C. Concrete Footing						
Length of Concrete Footing (ft)	1,221	204	184	48	60	48
Demolition Cost	\$17.24	\$17.24	\$17.24	\$17.24	\$17.24	\$17.24
Subtotal Concrete Footing Demolition Costs	\$21,046	\$3,516	\$3,172	\$827	\$1,034	\$827
Subtotal Demolition Costs per Building	\$647,404	\$21,553	\$10,169	\$3,088	\$3,467	\$3,480
Total Demolition Costs	\$689,161					
II. Disposal Costs						
A. Building						
Volume of Building (cy)	48,838	2,021	689	231	244	244
Off-Site County Landfill						
Percentage (%)	100	100	100	100	100	100
Total Volume for Disposal - Incl 33% Factor (cy)	16,117	667	227	76	81	81
Disposal Cost - Landfill (cy)	\$42.17	\$42.17	\$42.17	\$42.17	\$42.17	\$42.17
Subtotal County Facility Off-Site Disposal Costs	\$679,585	\$28,119	\$9,586	\$3,216	\$3,401	\$3,401
B. Concrete Floor						
Area of Concrete Floor (ft ²)	56,985	2,480	1,860	520	600	864
Average Thickness of Concrete Floor (ft)	0.75	0.75	0.75	0.75	0.75	0.75
Volume of Concrete Floor (ft ³)	42,739	1,860	1,395	390	450	648
Volume of Concrete Floor (cy)	1,583	69	52	14	17	24
1 On-Site Concrete Disposal						
Percentage (%)	100	100	100	100	100	100
Volume for Disposal (cy)	1,583	69	52	14	17	24
Concrete Disposal On Site (cy)	\$9.49	\$9.49	\$9.49	\$9.49	\$9.49	\$9.49
Subtotal County Facility Off-Site Disposal Costs	\$15,027	\$654	\$490	\$137	\$158	\$228
Subtotal Concrete Floor Disposal Costs	\$15,027	\$654	\$490	\$137	\$158	\$228
C. Concrete Footing						
Length of Concrete Footing (ft)	1,221	204	184	48	60	48
Average Depth of Concrete Footing (ft)	4	4	4	4	4	4
Average Width of Concrete Footing (ft)	0.75	0.75	0.75	0.75	0.75	0.75
Volume of Concrete Footing (ft ³)	3663	612	552	144	180	144
Volume of Concrete Footing (cy)	136	23	20	5	7	5
Concrete Disposal On Site (cy)	\$9.49	\$9.49	\$9.49	\$9.49	\$9.49	\$9.49
Subtotal Concrete Footing Disposal Costs	\$1,288	\$215	\$194	\$51	\$63	\$51
Subtotal Disposal Costs per Building	\$710,927	\$29,642	\$10,760	\$3,541	\$3,780	\$3,908
Total Disposal Costs	\$762,558					

TOTAL BUILDING & OTHER MISCELLANEOUS DEMOLITION AND DISPOSAL COSTS

\$1,451,719

Appendix B

2016-17 RECLAMATION SURETY BOND ESTIMATE

WDEQ Permit No. 687 Annual Report / NRC SUA-1548

Gas Hills ISR Project - Cameco Resources

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Gas Hills ISR Project - Cameco Resources

Part II - Well and Drill Hole Abandonment

	Water Wells	Misc Wells
I. Well Abandonment		
A. Sealing Costs		
Total # of Wells per Wellfield	2	54
Well Average Depth (ft)	1600	451
<u>Well Abandonment (Sealing) Costs (\$/ft)</u>	\$3.30	\$3.30
Subtotal Sealing Costs per Wellfield	\$10,560	\$80,368
B. Casing Removal and Disposal Costs		
Total # of Wells per Wellfield	2	54
Total # of Wells for Casing Removal and Disposal	2	54
<u>Remove and Dispose Casing (\$/well)</u>	\$33	\$33
Subtotal Casing Removal and Disposal Costs per Wellfield	\$99	\$1,881
Subtotal Well Abandonment Costs per Wellfield	\$10,659	\$82,249
C. Incidental Costs		
1 <u>Remove Pump, Wiring, and Drop Pipe</u>	\$0.44	\$0.44
Subtotal Removal of Pump, Wiring, and Drop Pipe	\$1,056.00	\$0.00
2 <u>Monitoring Well Concrete Pedestal Disposal</u>	\$110	\$110
Subtotal Monitoring Well Concrete Pedestal Disposal	\$0	\$5,940
Subtotal Incidental Costs	\$1,056.00	\$5,940.00
	Subtotal Well Abandonment Costs	\$22,275
	Total Well Abandonment Costs	\$190,832
II. Waste Disposal Well Abandonment		
A. Well Sealing		
	DDW #1	DDW #2
Total Depth of Well (feet)	3794	5389
<u>Sealing cost per foot (in UIC permit)</u>	\$14.03	\$14.03
Subtotal Plugging Costs per Well (in UIC permit)	\$53,230	\$75,608
B. Pump Dismantling and Decontamination		
Number of Persons	2	2
Number of Pumps	2	2
Pumps/Day	0.5	0.5
Number of Days	4	4
<u>\$/Day/Person</u>	\$297.68	\$297.68
Subtotal Dismantling and Decon Costs per Well	\$2,381.47	\$2,381.47

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Part II - Well and Drill Hole Abandonment

	Water Wells	Misc Wells
C. Tubing String Disposal (C&D Landfill)		
Length of Tubing String (ft)	3400	5100
Diameter of Tubing String (inches)	2.875	2.875
Volume of Tubing String (ft ³)	79	119
<u>Transportation and Disposal Unit Cost (\$/ft³)</u>	\$1.56	\$1.56
Subtotal Tubing String Disposal Costs per Well	\$123.64	\$185.47
	\$55,734.93	\$78,174.60
Total Waste Disposal Well Abandonment Costs	\$133,910	
Total Well Abandonment	\$324,742	

2016-17 RECLAMATION SURETY BOND ESTIMATE
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Gas Hills ISR Project - Cameco Resources

Part III. Miscellaneous Surface Reclamation

I. Carol Shop/Office Area

Assumptions	
Surface grade	0%
Surface Area (acres)	21.00
A. Ripping Overburden with Cat 140 Blade	
Overburden Surface Area (acres)	21.00
<u>Ripping Cost (per acre)</u>	\$265.94
Subtotal Ripping Overburden Costs	\$5,585
B. Topsoil Application	
Area of surface disturbance (ft ²)	21.00
Average thickness of topsoil (ft)	0.5
Average haul distance (ft)	500
Surface grade (%)	0%
Volume of Topsoil (cy)	16940
<u>Moving Materials (0% Grade)</u>	\$0.95
Subtotal Topsoil Application Costs	\$16,044
C. Discing/Seeding	
Surface Area (acres)	21.00
<u>Discing/Seeding Unit Cost (\$/acre)</u>	\$330
Subtotal Discing/Seeding Costs	\$6,930
Total Carol Shop/Office Area Reclamation	\$28,559

II. Carol Shop Road

Assumptions	
Surface grade	0%
Length of Road (ft)	26400
Width of Road (ft)	50
Area of road (acres)	30.30
Culverts (per 20' Section)	40
A. Ripping Overburden with Dozer	
Overburden Surface Area (acres)	30.30
<u>Ripping Cost (per acre)</u>	\$265.94
Subtotal Ripping Overburden Costs	\$8,059

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Part III. Miscellaneous Surface Reclamation

B.	Gravel Road Base Removal	
	Average haul distance (ft)	1000
	Gravel Road Base Width (ft)	66
	Gravel Road Base Area (acres)	1498464
	Average Road Base Depth (ft)	0.5
	Volume of Road Base (cy)	27749
	<u>Moving Materials (0% Grade)</u>	\$0.95
	Subtotal Gravel Road Base Removal Costs	\$26,281
C.	Topsoil Application	
	Average haul distance (ft)	1000
	Topsoil Surface Area (ft ²)	1498464
	Depth of Topsoil (ft)	0.5
	Volume of Topsoil (cy)	27749
	<u>Moving Materials (0% Grade)</u>	\$0.95
	Subtotal Topsoil Application Costs	\$26,281
D.	Discing/Seeding	
	Surface Area (acres)	34.4
	<u>Discing/Seeding Unit Cost (\$/acre)</u>	\$330
	Subtotal Discing/Seeding Costs	\$11,352
E.	Culvert Removal	
	Culverts (per 20' Section)	20
	<u>Culvert Removal Unit Cost</u>	\$102
	Fill Removal/Drainage Reestablishment	\$500
	Subtotal Culvert Removal	\$12,048.20
	Total AML Road Reclamation	\$85,110.79

IV. Waste Disposal Injection Well Pads and Access Road

	Assumptions	
	Surface grade	0%
	Surface Area (acres)	3.00
	Length of Road (ft)	1000
	Width of Road (ft)	20
	Area of road (acres)	0.46
	Quantity	2
A.	Ripping Overburden with Dozer	
	Overburden Surface Area (acres)	3.00
	<u>Ripping Cost (per acre)</u>	\$265.94
	Subtotal Ripping Overburden Costs	\$1,596

**2016-17 RECLAMATION SURETY BOND ESTIMATE
WDEQ Permit No. 687 Annual Report / NRC SUA-1548
Gas Hills ISR Project - Cameco Resources**

Part III. Miscellaneous Surface Reclamation

C. Discing/Seeding	
Surface Area (acres)	1.00
<u>Discing/Seeding Unit Cost (\$/acre)</u>	\$330.00
Subtotal Discing/Seeding Costs	\$660
Total Water Supply Wells and Access Road	\$2,720
VI. Removal of Monitoring Stations	
A. Surface Water Monitoring Stations	3
<u>Removal Unit Cost</u>	\$2,083.75
Subtotal Surface Water Monitoring Stations	\$6,251
B. Air Quality Monitoring Stations	5
<u>Removal Unit Cost</u>	\$807.62
Subtotal Air Quality Monitoring Stations	\$4,038
Total Removal of Monitoring Stations	\$10,289
Total Miscellaneous Surface Reclamation	\$223,550.45

2016-17 RECLAMATION SURETY BOND ESTIMATE
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2013 Rate**	2014 Rate**	2014 Rate**	2015 Rate**
Rate (\$)	Rate (\$)	Rate (\$)	Rate (\$)
2013 Rate**	2014 Rate**	2014 Rate**	2015 Rate**
Rate (\$)	Rate (\$)	Rate (\$)	Rate (\$)

2014 Rate**	2015 Rate**
Rate (\$)	Rate (\$)

*Includes additional 40% net benefits based on Infoline USA cost data for Surface Metal and Industrial Mineral Mines - Western U.S. (Table 5)
 **Mountain States Employers Council, 2013 Survey, Mining Industry Compensation & Benefits
 ***http://www.unifundofminers.com/

Utility Costs	Rate (\$)	Profit & Overhead	Units	Source	Date
Electrical Costs	\$0.071	included	kWhr	Actual Costs-2014	
Kilowatt to Horsepower	0.746	included	Kwh/Hp	N/A	
Efficiency - Downhole Pumps	80%	included	Percent	N/A	
Efficiency - Surface Pumps	90%	included	Percent	N/A	
Natural Gas - Satellite	\$0.00	included	Percent	N/A	
Natural Gas - DDW	\$0.00	included	year	Actual Costs	2012
Propane - Satellite	\$36.54	included	year	Actual Costs	2012
Propane - DDW	\$0.00	included	year	Actual Costs	2012

Chemical & Material Costs	Rate (\$)	Profit & Overhead	Units	Source	Date
Antiscalant for RO (Hyperosec)	\$2.5000	included	pond	Actual Costs	2014
Antiscalant for RO (ScafoTru)	\$4.5777	included	pond	Actual Costs	2014
Sodium Tripolyphosphate	\$0.0000	included	pond		2014
EDTA's Tetrasodium Dihydrate	\$0.0000	included	pond		2014
Sodium Sulfide	\$0.0000	included	pond		2014
Hydrochloric Acid	\$0.2000	included	pond	Actual Costs	2014
Densim Chloride	\$0.0000	included	pond		2014

Analytical Costs	Rate (\$)	Profit & Overhead	Units	Source*	Date
Guideline 4 (former Guideline 8) Parameters	\$35.00	included	analysis	Quoted cost (JML)	2015
Excursion Parameters (XC)	\$30.00	included	analysis	Fee Schedule	2013
Restoration Program Parameters (RCL + U + S)	\$50.00	included	analysis	Fee Schedule	2013
Soil Sampling/Monitoring	\$35.00	included	analysis	Actual Costs	2013
Other (Redox, Bioassay, etc.)	\$620.00	included	month	Quoted cost (JML)	2015

*All quotes, fee schedules and actual costs based on Energy Laboratories, Inc., Casper, WY

Equipment Costs	Rate (\$)	Profit & Overhead*	Units	Source	Date
Bamfil 1200XP Tractor Mounted Brush Chopper	\$34.33	\$37.36	hour	Equipment Watch	2014
Boikal S150 Skid Steer Loader	\$22.72	\$24.69	hour	Equipment Watch	2014
Cat 320C L. Fronthoe - 1.25 cu yd bucket	\$29.44	\$36.38	hour	Equipment Watch	2014
Cat 416E Backhoe	\$27.17	\$29.39	hour	Equipment Watch	2014
Cat 924H Loader - 2.4 cu yd bucket	\$42.89	\$47.18	hour	Equipment Watch	2014
Concrete Jawz Laboratory - CP-60	\$18.51	\$20.36	hour	Equipment Watch	2013
GERL DL-2 Rough Terrain Lift Truck	\$36.78	\$51.46	hour	Equipment Watch	2014
Mamhit JLG 600S	\$29.15	\$43.04	hour	Equipment Watch	2014
MIT Unit	\$30.09	\$33.10	hour	Equipment Watch	2013

Pick-up Truck 3/4 ton 4x4	\$20.13	\$22.14	hour	Equipment Watch	2014
Pulling Unit***	\$35.32	\$38.85	hour	Equipment Watch	2013

*Includes additional 10% Profit & Overhead per WDEQ/QD Guideline No. 12, Section 12(h)

**Equipment Watch Rental Rate Blue Book Volume 1 (1st Half 2013)

***1 3/4 Ton 4x4 Truck with Hook

Quoted Costs	Rate (\$)	Profit & Overhead	Units	Source
Deep Disposal Well - Plug & Abandonment Costs	\$14.03	included	foot	2014 quote plus 3%
DDW MIT	\$17.05	included	well	Avs Actual Costs - 2015
Well Replacements (Restoration)	\$15.000	included	well	Actual Costs-2014
Bathole Refurbishment	\$3.530	included	bathole	Estimated Costs-2014
Header House Refurbishment (Typical Washfields)	\$10.000	included	header house	Estimated Costs-2014

WDEQ/QD Guideline No. 12 Costs	Appendix	Rate (\$)	Profit & Overhead*	Units	Source	Date
Moving Materials: One-Way Distance 300 feet, 0% grade	Cat 637E	\$0.721	\$0.79	bcy	Guideline 12/12a	Feb/May 2016
Moving Materials: One-Way Distance 1,000 feet, 0% grade	Cat 637E	\$0.861	\$0.95	bcy	Guideline 12/12a	Feb/May 2016
Moving Materials: One-Way Distance 2,000 feet, 0% grade	Cat 637E	\$1.115	\$1.23	bcy	Guideline 12/12a	Feb/May 2016
Moving Materials: One-Way Distance 150 feet, 0% grade	Appendix E	\$0.286	\$0.26	bcy	Guideline 12	May 2016
Grading/Spreading Costs	Appendix G	\$54.33	\$59.76	acre	Guideline 12	May 2016
Fencing Removal	Appendix H	\$0.35	\$0.42	foot	Guideline 12	May 2016
Ripping Operating Costs (Asphalt)	Appendix I	\$592.58	\$631.84	acre	Guideline 12	May 2016
Ripping Operating Costs (Overburden)	Cat D8	\$241.76	\$263.94	acre	Guideline 12a	Feb 2016
Building Demolition - Mixtures of Types	Appendix K	\$0.266	\$0.29	R2	Guideline 12	May 2016
Building Demo Disposal (Average)	Appendix K	\$9.71	\$10.68	cy	Guideline 12	May 2016
Concrete (Foot) Demolition - 6" Thick with Rebar	Appendix K	\$0.76	\$0.84	R2	Guideline 12	May 2016
Concrete (Foot) Demolition - 2" Thick, 2" Wide	Appendix K	\$15.67	\$17.24	linear foot	Guideline 12	May 2016
Concrete Disposal On-Site	Appendix K	\$0.63	\$0.69	cy	Guideline 12	May 2016
Drill Hole Abandonment: Wet Exploration Hole >25 holes	Appendix L	\$3.00	\$3.30	foot	Guideline 12	May 2016
Well Abandonment: Monitor, Production, and Injection Wells	Appendix L	\$2.50	\$2.75	foot	Guideline 12	May 2016
Scattered Wells >25	Appendix L	\$3.00	\$3.30	foot	Guideline 12	May 2016
Mobilization	Appendix L	\$1,100.00	\$1,100.00	location	Guideline 12	May 2016
Incidental Costs: Small Site Grading and Seeding (<1000 sq. ft.)	Appendix L	\$0	\$55.00	site	Guideline 12	May 2016
Incidental Costs: Capping	Appendix L	\$10	\$11.00	cach	Guideline 12	May 2016
Incidental Costs: Site Location	Appendix L	\$10	\$11.00	site	Guideline 12	May 2016
Incidental Costs: Remove Pump, Wiring, and Drop Pipe	Appendix L	\$0.40	\$0.44	foot	Guideline 12	May 2016
Incidental Costs: Remove and Dispose Casing (top few feet)	Appendix L	\$30.00	\$33.00	well	Guideline 12	May 2016
Incidental Costs: Monitoring Well Concrete Pedestal Disposal	Appendix L	\$100.00	\$110.00	each	Guideline 12	May 2016

Monitor Well Inventory - UPDATED
 Application for Permit to Mine No. 687
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Organized by Location

Well Name (see Map 2 = Plate D6-1)	WSEO Permit #	Assoc. Mine Unit	Location				Ground Elev. feet amsl	Top of Casing Elev. [1] feet amsl	Total Depth Drilled feet bgs	Completion Interval feet bgs	Completion Interval Stratigraphy	Status as of 9/25/08 [2]	Comments	Sample d Oct. 2006?
			QQ	SECT	TWN N	RNG W								
Vaca MW-3A		5	SWNW	22	33	89	6847.1		153.3	135-153	70 Sand, interbedded siltstone, sandstone, & silt	Active Permitted	Upgraded Sep. 2008	Y
PIX MO 97-1	P106684W	5	NESW	22	33	89	6875.3		185	150-180	60 Sand	Active Permitted	Upgraded Sep. 2008	Y
PIX MP 97-1	P106866W	5	NESW	22	33	89	6874.4		245	215-235	50 Sand	Active Permitted	Upgraded Sep. 2008	Y
PRI #1	P92914W	4	SENE	28	33	89	nm		289	233-278	50 Sand, East Canyon	Active Permitted	Upgraded Sep. 2008	Y
WSL96MP1	P103591W	4	NWSE	28	33	89	6795.0		300	260-275	60 Sand, ore zone	Active Permitted	Upgraded Sep. 2008	Y
PIX MU 97-1	P106685W	5	NESW	22	33	89	6874.7		310	265-295	East Canyon	Active Permitted	Upgraded Sep. 2008	Y
GW-10A	P45371W	5	SESE	21	33	89	6810.5		312	245-295	50 Sand	Active Permitted	Upgraded Sep. 2008	Y
BS 96 M-1	P103564W	2	NENW	32	33	89	6825.0		320	255-305	70 Sand, not ore bearing	Active Permitted	Upgraded Sep. 2008	Y
GW-11		5	SENE	22	33	89	6902.0		329.9	unknown	Wind River Fm.	Active Permitted	Upgraded Sep. 2008	Y
PEACH M1	P103585W	3	SWNE	3	32	90	6707.0		340	260-320	30-40 Sand, no ore	Active Permitted	Upgraded Sep. 2008	Y
MO-3 [= West Muskrat MO-3]	P112334W	1	NWNE	2	32	90	6779.2		345	310-330	arkosic sandstone, above lower production zone, mineralization	Active Permitted	Upgraded Sep. 2008	Y
BUMD 97-1	P106688W	4	NENW	34	33	89	7000.5		370	348-368	90 Sand, upper split	Active Permitted	Upgraded Sep. 2008	Y
BSMP-1	P112331W	2	NENW	32	33	89	6843.4		376	335-354.6	70 Sand, ore bearing	Active Permitted	Upgraded Sep. 2008	Y

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			QQ	SECT	TWN N	RNG W								
MONITOR WELL GW 8	P45389W		NENE	27	33	89	7040.0		500	90-250		Inactive Permitted		
P-1 [= Muskrat P-1 = East Muskrat P-1]	P82824W	1	NWSE	31	33	89	6845.0		500	435-454.3	70 Sand, ore bearing	Active Permitted	Upgraded Sep. 2008	Y
PCHM097-1	P105801W	3	SENE	10	32	90	6935.8		513	490-510	70 Sand	Active Permitted	Upgraded Sep. 2008	Y
MU-1 [= WEST MUSKRAT MU-1]	P85349W	1	SWNE	2	32	90	6815.0		600	574-594	Clovelly Fm	Active Permitted	Upgraded Sep. 2008	Y
BUMP 97-1	P106687W	4	NENW	34	33	89	7001.4		620	585-615	60 Sand	Active Permitted	Upgraded Sep. 2008	Y
MONITOR WELL GW 7	P45388W		NESE	27	33	89	7062.1		660	105-121		Inactive Permitted		
BUMU 97-1	P106689W	4	NENW	34	33	89	7001.4		720	695-715	East Canyon conglomerate	Active Permitted	Upgraded Sep. 2008	Y
PCHMP 97-1	P106602W	3	SENE	10	32	90	6936.7		802	615-635	30-40 Sand	Active Permitted	Upgraded Sep. 2008	Y
WEST MUSKRAT M-1	P85350W	1	NWNE	2	32	90						Inactive Permitted		
WEST MUSKRAT M-2	P85351W	1	SWNE	2	32	90						Inactive Permitted		
PEACH #1	P38619W	3	NESE	3	32	90						Inactive Permitted		
PEACH #2	P38620W	3	NESE	3	32	90						Inactive Permitted		
PEACH #3	P38621W	3	NESE	3	32	90						Inactive Permitted		
PEACH #4	P38622W	3	NESE	3	32	90						Inactive Permitted		
PEACH #5	P38623W	3	NESE	3	32	90						Inactive Permitted		
PEACH #6	P38624W	3	SESE	3	32	90						Inactive Permitted		
PEACH #7	P38625W	3	SESE	3	32	90						Inactive Permitted		
PEACH #9	P38627W	3	NENE	3	32	90						Inactive Permitted		
PEACH #8	P38628W	3	NWNE	10	32	90						Inactive Permitted		
East Muskrat MP-1	P82825W	1	NWSE	31	33	89	6849.0					Active Permitted	Upgraded Sep. 2008	Y
BS12-1025P	P31496W	2	SWNE	32	33	89						Inactive Permitted		

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			QQ	SECT	TWN N	RNG W								
PEACH PIEZOMETER D [= PD = PO]	P45240W	3	NWNE	10	32	90	--	--	--	--	Plugged & Abandoned 9/19/08	P&A by Cameco 9/19/08; WSEO form dated 9/25/2008	Y	
Peach Piezometer PG	P45242W	3	NWSE	10	32	90	--	--	--	--	P&A	P&A by PRI 5/29/1998; WSEO letter dated 9/22/1998		
PEACH PIEZOMETER A	P45237W	3	NWSW	11	32	90	--	--	--	--	Plugged & Abandoned 9/16/08	P&A by Cameco 9/16/08; WSEO form dated 9/25/2008		
HBMP 97-1	P105691W		SENE	11	32	90	--	--	--	--	Plugged & Abandoned 9/19/08	P&A by Cameco 9/19/08; WSEO form dated 9/25/2008		
Peach MU-12-1	P106603W	3	SENE	12	32	90	--	--	--	--	P&A	P&A by PRI 6/1998; WSEO letter dated 9/22/1998		
Well 9-1 [Peach Area]		3	NE	3	33	89	--	--	--	--	Plugged & Abandoned 9/19/08	Wells cited in 3/5/08 ltr. From M. Moxley/WDEQ; P&A by Cameco 9/18/08; WSEO form dated 9/25/2008.		
Well 14-1 [Peach Area]		3	SE	3	33	89	--	--	--	--	unknown	Wells cited in 3/5/08 ltr. From M. Moxley/WDEQ; Could not locate in field Sep. 2008.		
GW-10		5	SESE	21	33	89	--	--	--	--	P&A	P&A by PRI 5/1998		
Vece MW-1		5	NESW	22	33	89	--	--	--	--	Plugged & Abandoned 9/19/08	P&A by Cameco 9/19/08; WSEO form dated 9/25/2008	Y	
Vece MW-2		5	NWSW	22	33	89	--	--	--	--	P&A	P&A by PRI 5/1998; WSEO letter dated 9/22/1998		
GW-5A		4	SESW	27	33	89	--	--	--	--	Plugged & Abandoned 9/12/08	P&A by Cameco 9/12/08; WSEO form dated 9/25/2008	Y	
MONITOR WELL GW 9	P45370W	4	NESE	28	33	89	--	--	--	--	Plugged & Abandoned 9/12/08	P&A by Cameco 9/12/08; WSEO form dated 9/25/2008	Y	
TVAMW-3		4	SWSE	28	33	89	--	--	--	--	P&A	P&A by PRI 6/1998		
MUSKRAT P 4	P46774W	1	NESW	31	33	89	--	--	--	--	Inactive Permitted	Could not locate in field Sep. 2008.		
P1 [= MUSKRAT P1] = East Muskrat P1]	P46776W	1	NWSE	31	33	89	--	--	--	--	Inactive Permitted	Could not locate in field Sep. 2008.		
MUSKRAT P 3	P46773W	1	SESW	31	33	89	--	--	--	--	Plugged & Abandoned 9/17/08	P&A by Cameco 9/17/08; WSEO form dated 9/25/2008		
MUSKRAT P 2	P46775W	1	SWSE	31	33	89	--	--	--	--	Inactive Permitted	Could not locate in field Sep. 2008.		
TVAMW-2		4	NENW	34	33	89	--	--	--	--	P&A	P&A by PRI 6/1998		
TVAMW-1		4	NWSW	34	33	89	--	--	--	--	P&A	P&A by Pathfinder Mines		

Carol Shop Bond Calculations

Shop Dimensions

Surface Area

Old Building				High Bay			
High Bay	Height	Width	Length	Ends	6720	ft ²	
Dimensions	ft	ft	ft	Front	19650	ft ²	
Front	50	67.2	233	Back			
Back				Office	1936	ft ²	
Office	22		88	Warehouse	4567.5	ft ²	
Warehouse	31.5		145	Subtotal Walls	32873.5	ft ²	
Warehouse	Height	Width	Length				
	ft	ft	ft	Auto/Office			
Dimensions	12	77.8	145	End	1672.7	ft ²	
Office Space				Front	5332	ft ²	
	Height	Width	Length	Warehouse			
	ft	ft	ft	End	933.8	ft ²	
Dimensions	21.5	77.8	88	Front	1740	ft ²	
Addition				Subtotal Walls	9678.3	ft ²	
High Bay	Height	Width	Length	Roof			
	ft	ft	ft	High Bay	26331	ft ²	
Dimensions	50	67.2	160	Addition	30850.5	ft ²	
Auto Shop	Height	Width	Length	Subtotal Roof	57181.5	ft ²	
	ft	ft	ft	Office			
Dimensions	21.5	77.8	160	First Floor			
Roof				Long wall	2350	ft ²	
High Bay	Height	Width	Length	Interior walls	640	ft ²	
	ft	ft	ft	Second Floor			
2 Required		33.5	393	Long Wall	1560	ft ²	
Addition		78.5	393	Interior Walls	5460	ft ²	
				Surface Area	109753.3	ft ²	
Building Volume							
High Bay				Building Material Volume	ft ³		
	1320480	ft ³	48907	Assume 8" wall	73200	ft ³	2711
			yrds ³	Assume 6" wall	54900	ft ³	2033
Office/ Warehouse							
	657371.1	ft ³	24347				
			yrds ³				
Total Carol Shop							
	1977851	ft ³	73254				
			yrds ³				

Change House Bond Calculations

Change House Dimensions

Length ft	Width ft	Height ft
62	30	10

Surface Area	
Front and Back	2 req.
1240 ft ²	

Internal Walls

4 walls	Length ft	Width ft	Height ft
	30		10

Sides	2req.
600 ft ²	

2 walls 8" Block	Length ft	Width ft	Height ft
	30		10

Roof	1860 ft ²
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Total Surfa 3700 ft²

Building Volume

18600 ft³ 689 yrds³

Building Internals

8" walls	2468 ft ³	91 yrds ³
6" walls	1850 ft ³	69 yrds ³

Internal Walls

Wall One	396 ft ³	15 yrds ³
Wall Two	600 ft ³	22 yrds ³

Building Material Volume

Total 8"	3464 ft ³	128 yrds ³
Total 6"	2846 ft ³	105 yrds ³

Water Treatment Building

Water Treatment Building Dimensions

Length ft	Width ft	Height ft
22	25	12

Surface Area	
Front and Back	2 req.
528 ft ²	
Sides	2req.
600 ft ²	
Roof	
550 ft ²	

Building Volume

6600 ft³ 244 yds³

Total Surfa 1678 ft²

Building Material Volume

8" walls	1119 ft ³	41 yds ³
6" walls	839 ft ³	31 yds ³

Appendix B

2016-17 RECLAMATION SURETY BOND ESTIMATE
WDEQ Permit No. 687 Annual Report / NRC SUA-1548
Gas Hills ISR Project - Cameco Resources

Chipped Pipe Volume Calculations

Pipe Diam Inches	Spec	OD	ID	Wall Thickness	Area of steel in Crossecti on (ft ²)	Volume of steel per Linear Foot (ft ³)
4.00	N80	4.500	3.826	0.337	0.0306	0.0306

GROUNDWATER RESTORATION UNIT COSTS

Wellfield Pumping

Equipment	
Wellfield Pump Sizes	5 hp
Wellfield Pump Flow Rate	25 gpm
kW to HP Conversion Factor	0.746
Cost of Electricity	\$0.0711 kWhr
Efficiency	80%
<hr/>	
Wellfield Pumping Cost	\$0.22 per kgal

Satellite Pumping

Equipment	
Satellite Pump Sizes	60 hp
Satellite Pump Flow Rate	75 gpm
kW to HP Conversion Factor	0.746
Cost of Electricity	\$0.0711 kWhr
Efficiency	90%
<hr/>	
Satellite Pumping Cost	\$0.79 per kgal

Deep Disposal Well Injection

Equipment	
Deep Disposal Well Pump Size	75 hp
Deep Disposal Well Flow Rate	75 gpm
kW to HP Conversion Factor	0.746
Cost of Electricity	\$0.0711 kWhr
Efficiency	90%
Reagent	
Antiscalant Cost (Scaletrol)	\$4.5177 per lb
Density of Water	8.34 lbs/gal
Specific Gravity (Scaletrol)	1.284
Antiscalant Cost (Scaletrol)	\$48.38 per gal
Antiscalant Dose (ScaleTrol)	0.0000048 gal/gal
<hr/>	
Deep Disposal Well Cost	\$1.21 per kgal

Total Groundwater Sweep Costs

\$2.22 per kgal

Reverse Osmosis

Equipment	
System Capacity	250 gpm
Unit Pump	60 hp
Injection Pump	60 hp
Waste Pump	15 hp
kW to HP Conversion Factor	0.746
Cost of Electricity	\$0.0711 kWhr
Efficiency	90%
Reagents	
Tripolyphosphate Usage Rate	0.00000130 lb/gal
Tripolyphosphate Cost	\$0.0000 per lb
EDTA Usage Rate	0.00000315 lb/gal
EDTA Cost	\$0.0000 per lb
Antiscalant Cost (Hypersperse)	\$2.5000 per lb
Density of Water	8.34 lbs/gal
Specific Gravity (Hypersperse)	1.124
Antiscalant Cost (Hypersperse)	\$23.4354 per gal

Antiscalant Dose (Hypersperse)	0.0000036 gal/gal
Sodium Sulfide Usage Rate	0.00017 lb/gal
Sodium Sulfide Cost	\$0.0000 per lb
<hr/>	
RO Cost (without Reductant)	\$0.61 per kgal
RO Cost (with Reductant)	\$0.61 per kgal

MIT Costs for Production Wells

Equipment	
Pulling Unit Hours	4 hrs/day
Pulling Unit Cost	\$38.85 \$/hour
MIT Unit Hours	8 hrs/day
MIT Unit Cost	\$33.10 \$/hour
Labor	
Required Hours	8 hrs/day
Required Laborers	1.5 per day
Labor Cost	\$32.88 \$/hour
Productivity	4 wells/day
<hr/>	
MIT Cost for Production Wells	\$203.68 per well

MIT Costs for Injection Wells

Equipment	
Pulling Unit Hours	0 hrs/day
Pulling Unit Cost	\$38.85 \$/hour
MIT Unit Hours	8 hrs/day
MIT Unit Cost	\$33.10 \$/hour
Labor	
Required Hours	8 hrs/day
Required Laborers	1 per day
Labor Cost	\$32.88 \$/hour
Productivity	4 wells/day
<hr/>	
MIT Cost for Injection Wells	\$131.95 per well

Booster Pump Operating Cost

Equipment	
Wellfield Pump Sizes	40 hp
Number of Pumps Running (avg.)	2 per year
Hours Running	24 per day
kW to HP Conversion Factor	0.746
Cost of Electricity	\$0.0711 kWhr
Efficiency	90%
<hr/>	
Booster Pump Operating Costs	\$41,300.95 per year

WELL ABANDONMENT UNIT COSTS

Removal of Contaminated Soil Around Wells

Equipment	
Cat 416 Backhoe Time	0.25 hours
Cat 416 Backhoe Cost	\$29.89 per hour
Labor	
Radiation Technician	0.25 hours
Radiation Technician Cost	\$35.74 per hour
Operator	0.25 hours
Operator Cost	\$37.16 per hour
Disposal	
ByProduct Disposal	0.37 cubic yard

Disposal Cost (incl. Transport)	\$156.73 per cubic yard
Removal of Contaminated Soil Cost	\$83.69 per well

DDW Pump Dismantling and Disposal

Labor	
Number of Laborers	2 per day
Number of Pumps Dismantled	0.5 per day
Hours Per Day	8 hours
Laborers Cost	\$32.88
Disposal	
Volume of DDW Pump	240 ft ³
ByProduct Disposal	\$7.32 per ft ³
DDW Pump Dismanteling and Disposal	\$2,809.67 per pump

WELLFIELD RECLAMATION COSTS

Wellfield Piping Removal

Equipment	
Trackhoe	1 per day
Trackhoe Cost	\$76.38 per hour
Loader	1 per day
Loader Cost	\$47.18 per hour
Pickup Truck	1 per day
Pickup Cost	\$22.14 per hour
Chipper Cost	\$37.76 per hour
Labor	
Backhoe Operator	\$37.16 per hour
Loader Operator	\$37.16 per hour
Laborer	\$32.88 per hour
Hours Per Day	8 per day
Productivity	1500 ft/day
Piping Removal Cost	\$1.55 per foot of pipe

Piping Reduction

2" Pipe	0.0107
3" Pipe	0.0233
4" Pipe	0.0385
6" Pipe	0.0834
8" Pipe	0.1413
10" Pipe	0.2196
12" Pipe	0.3088
14" Pipe	0.3723
16" Pipe	0.4864
20" Pipe	0.7200

Production Pump Volume

Length	66 inches
Diameter	3.8 inches
Cubic Inch to Cubic Foot Conversion	0.0006
Production Pump Volume	0.43 cubic feet

Trunk Line Removal

Equipment	
Trackhoe	1 per day
Trackhoe Cost	\$76.38 per hour

	Loader	1 per day
	Loader Cost	\$47.18 per hour
	Pickup Truck	1 per day
	Pickup Cost	\$22.14 per hour
	Chipper Cost	\$52.72 per hour
Labor		
	Trackhoe Operator	\$37.16 per hour
	Loader Operator	\$37.16 per hour
	Laborer	\$32.88 per hour
	Hours Per Day	8 per day
Productivity		750 ft/day
Buried Piping Removal Cost		\$3.26 per foot of pipe

Removal of Well Head Covers

	Volume of Well Head Cover (ft ³)	1.86 cubic feet
	<u>Demolition Cost</u>	\$0.293 per cubic ft
	Decontamination	
	Acid Usage	4.1 pounds per wellhead cover
	Acid Cost	\$0.2200 per lbs
Labor		
	Radiation Tech	\$35.74 per hour
	Operator	\$37.16 per hour
Productivity		10 wellheads per hour
Disposal		
	Void space	10%
	<u>Transportation and Disposal Cost</u>	\$1.56 per ft ³
Removal of Well Head Cover Cost		\$11.93 per well

Header House Decontamination

	Decontamination	
	Acid Usage	20 pounds per header house
	Acid Cost	\$0.22 per pound
Labor		
	Radiation Tech	\$35.74 per hour
	Number of Operators	2 per day
	Operator	\$37.16 per hour
	Hours Per Day	8 per day
Productivity		1 header house per day
Header House Decontamination Cost		\$ 634.77 per header house

Header House Heating

	Heater Power Usage	12.5 kW
	Days Used	180 days per year
	Electricity Cost	\$0.0711 kWhr
Header House Heating Cost		\$3,839 per year

WELLFIELD AND SATELLITE AND SURFACE RECLAMATION

Wellfield Road Reclamation

	Gravel Road Base	
	Average Depth	0.25 feet
	Average Width	10 feet
	<u>Material Moved (0% Grade)</u>	\$0.95 bcy
	Cubic Yard to Cubic Feet Conversion	0.04

Scarification of Road	
Scarification Costs	\$55 per acre
Average Width	25 feet
Acre to Sq. Foot Conversion	2.29568E-05
Grading Cost	\$60 per acre
Topsoil Depth	0.67 feet
<u>Discing/Seeding Costs</u>	\$330 per acre
Linear Feet for Unit Cost	1000 feet
<hr/>	
Wellfield Road Reclamation Cost	\$930.40 per 1000 feet

EQUIPMENT COSTS

Tank Removal

Equipment	
Loader	\$47.18 per hour
Trackhoe	\$76.38 per hour
Manlift	\$43.04 per hour
Pickup	\$22.14 per hour
Lift Truck	\$51.46 per hour
Labor	
Number of Operators	4
Operator Cost	\$37.16 per hour
Hours Per Day	8 per day
Productivity	25 ft ³ /day
<hr/>	
Tank Removal Cost	\$124 per ft ³

Pipe Removal

Equipment	
Manlift	\$43.04 per hour
Pickup	\$22.14 per hour
Lift Truck	\$51.46 per hour
Chipper	\$37.76 per hour
Labor	
Number of Operators	4
Operator Cost	\$37.16 per hour
Hours Per Day	8 per day
Productivity	300 ft/day
<hr/>	
Pipe Removal Cost (Inside Buildings)	\$8.08 per ft

Pump Removal

Equipment	
Truck	\$22.14 per hour
Skid Steer	\$24.99 per hour
Labor	
Number of Operators	2
Operator Cost	\$37.16 per hour
Hours Per Day	8 per day
Productivity	10 ft ³ /day
<hr/>	
Pump Removal	\$97.17 per ft ³

Dryer Removal

Equipment	
Truck	\$22.14 per hour
Lift Truck	\$51.46 per hour

Labor		
Number of Operators		4
Operator Cost		\$37.16 per hour
Hours Per Day		8 per day
Productivity		125 ft ³ /day
Dryer Removal Cost		\$14.22 per ft³

RO and Degasser Removal

Equipment		
Truck		\$22.14 per hour
Lift Truck		\$51.46 per hour
Labor		
Number of Operators		2
Operator Cost		\$37.16 per hour
Hours Per Day		8 per day
Productivity		250 ft ³ /day
RO and Degasser Removal Cost		\$4.73 per ft³

BUILDING COSTS

Acid Wash Walls

Acid		
Acid Usage		0.05 per square foot
Acid Cost		\$0.22 per pound
Equipment		
Manlift		\$43.04 per hour
Labor		
Laborer		2 people
Laborer Cost		\$32.88 per hour
Productivity		125 square feet per hour
Acid Wash Walls Cost		\$0.88 per square foot

Acid Wash Floors

Acid		
Acid Usage		0.05 per square foot
Acid Cost		\$0.22 per pound
Labor		
Laborer		2 people
Laborer Cost		\$32.88 per hour
Productivity		125 square feet per hour
Acid Wash Floors Cost		\$0.54 per square foot

Electrical Power

*Pumping Costs for Operating DDWs, RO, and Wellfield are included in GW Rest Costs (Based on SRH Act):

Satellite - Typical		
Miscellaneous Pumps, Fans, Sumps, etc.		22.5 HP
Lighting		35.0625 kW (per square ft)
kW to HP Conversion Factor		0.746
Electricity Cost		\$0.0711 per kWhr
Efficiency Factor		90%
Operating Hours Per Year		8760 hours
Satellite 2 Power Cost		\$31,247 per year

DDW - Typical

Miscellaneous Pumps, Fans, Sumps, etc.	2 HP
Lighting	0.49 kW
Heating	12.5 kW
kW to HP Conversion Factor	0.746 kW/hp
Electricity Cost	\$0.0597 per kWhr
Efficiency Factor	90%
Operating Hours Per Year	8760 hours
DDW Electrical Cost	\$4,225 per year

MISCELLANEOUS RECLAMATION AND RESTORATION COSTS

Liner and Subsoil Removal Costs

Equipment	
Trackhoe Cost	\$ 76.38 per hour
Loader Cost	\$ 47.18 per hour
Labor	
Operator	37.16 per hour
Productivity	40 cubic yards/hour
Total Removal	\$ 4.02 per cubic yard