

FIVE-YEAR REVIEW REPORT
KENNECOTT NORTH ZONE SUPERFUND SITE

APPENDIX D: PERMIT COMPLIANCE SUMMARIES
AND OTHER SITE DOCUMENTATION



Douglas Bacon <dbacon@utah.gov>

Arthur Step-back Repository

4 messages

Douglas Bacon <dbacon@utah.gov>

Fri, Apr 5, 2013 at 11:36 AM

To: Tom Nannini - Kennecott Utah Copper Corporation <ktnannin@kennecott.com>

Cc: Larry Elkin - Kennecott Utah Copper LLC <klelkin@kennecott.com>, Kelly Payne - Kennecott Utah Copper LLC <kelly.payne@kennecott.com>, Rebecca Thomas - US EPA Region 8 RPM <thomas.rebecca@epa.gov>

Good morning Tom, hope all is well with you and yours.

Though we do not have a requirement currently for a annual monitoring/inspection report for Kennecott's operations at the Arthur Step-back Repository, I was wondering if you might be able to provide a summary of water collection activities at the ASR. I am currently doing a Five Year Review for the North Zone operable units and such a summary for the ASR would be useful to include. If its not too much to ask perhaps the summary could cover at least the past 5 years if not operations at the ASR since 2002? This is the first FYR since the North Zone ROD was signed in 2002.

I will be coordinating with Kelly's assigned staff addressing the completion of the pending site operation and maintenance (O&M) plans to discuss the inclusion of maintenance requirements and annual reporting. I think the current draft of the ASR O&M plan has reporting requirements covered, but its been a while since I have reviewed it.

As noted above, the requested summary is not required currently under an existing agreement or work plan. My request is not intended to create a significant work load. If the summary could just cover leachate management activities that would be great. If there have been any leachate management issues, that would be great to include. Is this a reasonable and do able request?

On another note, I was out with Larry yesterday inspecting the ASR. We noted meteoric water pooling on the western end of the ASR. Are you planning to go out in the near future to draw the water off of the liner with the temporary sump pumps and hoses staged out there? If so, could you provide me the time frame for such?

Thanks for your help, let me know if you have any questions.

Have a great weekend,
Doug

Nannini, Tom (KUCC) <KTNANNIN@kennecott.com>

Fri, Apr 5, 2013 at 5:32 PM

To: Douglas Bacon <dbacon@utah.gov>

Cc: "Elkin, Larry (KUCC)" <LARRY.ELKIN@riotinto.com>, "Payne, Kelly (KUCC)" <paynek@kennecott.com>, Rebecca Thomas - US EPA Region 8 RPM <thomas.rebecca@epa.gov>

Doug,

I will put together a table that outlines leachate pumping since 2002. The collected meteoric water is typically pumped in early spring. The current plan is to start in the next few weeks. This water is pumped into the leachate collection pipeline to PS#4.

Thanks

Tom Nannini

From: Douglas Bacon [mailto:dbacon@utah.gov]
Sent: Friday, April 05, 2013 11:36 AM
To: Nannini, Tom (KUCC)
Cc: Elkin, Larry (KUCC); Payne, Kelly (KUCC); Rebecca Thomas - US EPA Region 8 RPM
Subject: Arthur Step-back Repository

[Quoted text hidden]

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Douglas Bacon <dbacon@utah.gov>
To: "Nannini, Tom (KUCC)" <KTNANNIN@kennebecott.com>

Fri, Apr 5, 2013 at 5:58 PM

Thanks Tom for the info and assistance with the summary.

Have a great weekend,
Doug

[Quoted text hidden]

Nannini, Tom (KUCC) <KTNANNIN@kennebecott.com>

Wed, Apr 10, 2013 at 4:47 PM

To: Douglas Bacon <dbacon@utah.gov>
Cc: "Elkin, Larry (KUCC)" <LARRY.ELKIN@riotinto.com>, "Payne, Kelly (KUCC)" <paynek@kennebecott.com>, Rebecca Thomas - US EPA Region 8 RPM <thomas.rebecca@epa.gov>

Doug,

Please find attached a spreadsheet that summarizes the Arthur StepBack Repository pumping from the five primary and five secondary leachate collection sumps since 2002. If you have any questions, please let me know.

Thanks

Tom Nannini

From: Douglas Bacon [mailto:dbacon@utah.gov]
Sent: Friday, April 05, 2013 11:36 AM
To: Nannini, Tom (KUCC)
Cc: Elkin, Larry (KUCC); Payne, Kelly (KUCC); Rebecca Thomas - US EPA Region 8 RPM
Subject: Arthur Step-back Repository

Good morning Tom, hope all is well with you and yours.

[Quoted text hidden]

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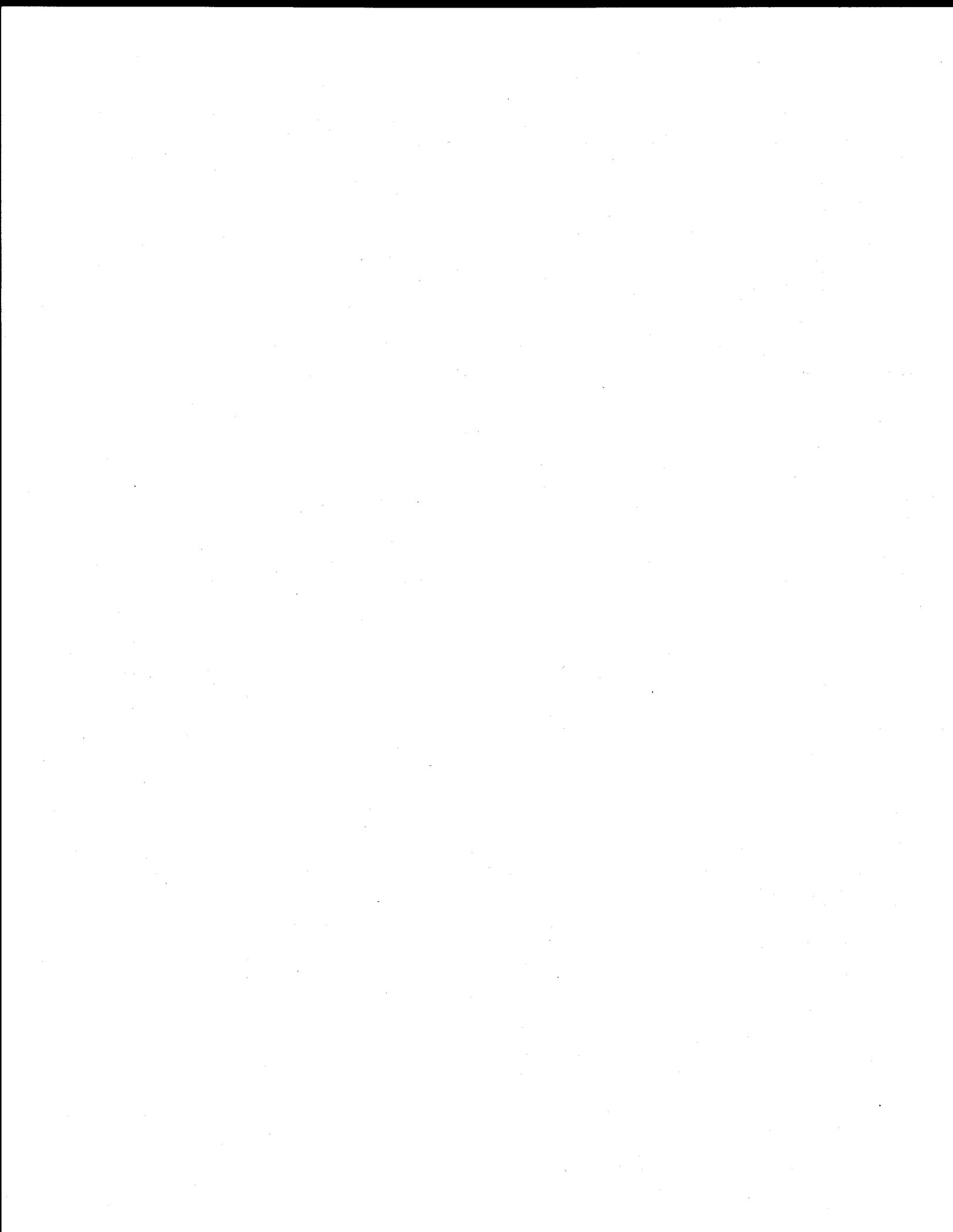
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04102013 ASR DERR.xlsx

19K

Date	#1 primary - 505PP01		#1 secondary - 505PP02		#2 primary - 505PP03		#2 secondary - 505PP04		#3 primary - 505PP05		#3 secondary - 505PP06		#4 primary - 505PP07		#4 secondary - 505PP08		#5 primary - 505PP09		#5 secondary - 505PP10	
	cumulative hours pumped	cumulative gallons pumped*																		
3/15/2002	924.5	1386750	54.4	22848	5345.9	8018850	72.0	30240	4497.5	6746250	98.1	41202	11557.8	17336700	145.0	60900	4024.5	6036750	75.5	31710
7/23/2002	924.5	1386750	54.4	22848	5378.5	8067750	72.0	30240	4508.5	6762750	98.1	41202	11572.5	17358750	145.0	60900	4089.5	6134250	75.5	31710
9/19/2002	924.5	1386750	54.4	22848	5496.1	8244150	72.0	30240	4527.5	6791250	98.1	41202	11601.5	17402250	145.0	60900	4124.5	6186750	75.5	31710
12/16/2002	950.5	1425750	54.4	22848	5496.1	8244150	72.0	30240	4544.6	6816900	98.1	41202	11654.7	17482050	145.0	60900	4167.0	6250500	75.5	31710
6/5/2003	1889.5	2834250	73.1	30702	5578.5	8367750	72.0	30240	4612.5	6918750	98.1	41202	11789.7	17684550	145.0	60900	4254.5	6381750	75.5	31710
10/16/2003	2101.6	3152400	73.1	30702	5661.9	8492850	72.0	30240	4670.1	7005150	98.1	41202	11852.4	17778600	145.0	60900	4319.5	6479250	75.5	31710
10/21/2003	2103.6	3155400	73.1	30702	5661.9	8492850	72.0	30240	4672.3	7008450	98.1	41202	11891.5	17837250	145.0	60900	4319.6	6479400	75.5	31710
11/20/2003	2136.4	3204600	73.1	30702	5668.2	8502300	72.0	30240	4681.1	7021650	98.1	41202	11891.5	17837250	145.0	60900	4330.5	6495750	75.5	31710
2/18/2004	2885.0	4327500	73.1	30702	6272.9	9409350	72.0	30240	5407.5	8111250	98.1	41202	11891.5	17837250	145.0	60900	4368.4	6552600	75.5	31710
3/10/2004	2980.0	4470000	73.1	30702	6391.1	9586650	72.0	30240	5414.5	8121750	98.1	41202	11891.5	17837250	145.0	60900	4379.0	6568500	75.5	31710
3/11/2004	2986.5	4479750	73.1	30702	6392.1	9588150	72.0	30240	5415.2	8122800	102.2	42924	11891.5	17837250	145.0	60900	4380.6	6570900	80.1	33642
3/15/2004	3013.5	4520250	73.1	30702	6392.3	9588450	72.0	30240	5415.5	8123250	102.2	42924	11891.5	17837250	145.0	60900	4380.9	6571350	80.1	33642
3/24/2004	3060.0	4590000	73.1	30702	6394.5	9591750	72.0	30240	5417.6	8126400	102.2	42924	11891.5	17837250	145.0	60900	4385.5	6578250	80.1	33642
4/5/2004	3101.5	4652250	73.1	30702	6396.7	9595050	72.0	30240	5422.0	8133000	102.2	42924	11891.5	17837250	145.0	60900	4392.3	6588450	80.1	33642
5/1/2004	3168.6	4752900	73.1	30702	6400.9	9601350	72.0	30240	5430.6	8145900	103.5	43470	11891.5	17837250	146.2	61404	4406.3	6609450	80.1	33642
5/18/2004	3201.4	4802100	73.5	30870	6404.2	9606300	72.0	30240	5435.6	8153400	106.3	44646	11891.5	17837250	147.1	61782	4411.3	6616950	81.9	34398
7/20/2004	3301.4	4952100	73.5	30870	6412.8	9619200	72.0	30240	5452.6	8178900	106.3	44646	11891.5	17837250	147.1	61782	4411.3	6616950	81.9	34398
8/4/2004	3315.1	4972650	73.5	30870	6415.0	9622500	72.0	30240	5457.0	8185500	110.2	46284	11908.4	17862600	148.9	62538	4448.3	6672450	81.9	34398
8/27/2004	3335.5	5003250	73.5	30870	6418.6	9627900	72.0	30240	5461.9	8192850	110.2	46284	11922.4	17883600	148.9	62538	4453.5	6680250	81.9	34398
10/1/2004	3362.3	5043450	73.5	30870	6423.0	9634500	72.0	30240	5468.2	8202300	110.2	46284	11934.0	17901000	148.9	62538	4465.0	6697500	81.9	34398
1/27/2005	3432.0	5148000	73.5	30870	6504.8	9757200	72.0	30240	5651.6	8477400	110.2	46284	12120.1	18180150	149.0	62580	4495.1	6742650	92.6	38892
2/16/2005	3472.3	5208450	73.5	30870	6508.3	9762450	72.0	30240	5654.7	8482050	110.2	46284	12125.3	18187950	148.9	62538	4495.1	6742650	92.6	38892
3/28/2005	3661.9	5492850	73.5	30870	6510.5	9765750	80.2	33684	5661.5	8492250	110.2	46284	12147.2	18220800	148.9	62538	4495.1	6742650	92.6	38892
3/1/2006	3877.9	5816850	73.5	30870	6704.8	10057200	84.7	35574	5951.2	8926800	118.5	49770	12544.6	18816900	170.3	71526	4677.1	7015650	101.5	42630
3/2/2006	3878.4	5817600	73.5	30870	6705.4	10058100	84.7	35574	5961.8	8942700	118.5	49770	12546.6	18819900	170.3	71526	4678.0	7017000	101.5	42630
3/6/2006	3878.4	5817600	73.5	30870	6707.5	10061250	84.7	35574	5964.0	8946000	118.5	49770	12546.6	18819900	170.3	71526	4678.8	7018200	101.5	42630
3/31/2006	3885.1	5827650	73.5	30870	6720.2	10080300	84.7	35574	5964.0	8946000	118.5	49770	12560.2	18840300	170.3	71526	4775.0	7162500	101.5	42630
4/17/2006	3892.0	5838000	73.5	30870	6728.5	10092750	84.7	35574	5964.0	8946000	118.5	49770	12576.4	18864600	170.3	71526	4779.8	7169700	101.5	42630
6/30/2006	3899.9	5849850	73.5	30870	6786.6	10179900	84.7	35574	5964.0	8946000	118.5	49770	12648.5	18972750	170.3	71526	4784.0	7176000	101.5	42630
10/13/2006	3899.9	5849850	73.5	30870	6860.8	10291200	84.7	35574	5964.0	8946000	118.5	49770	12719.7	19079550	170.3	71526	4784.0	7176000	101.5	42630
12/1/2006	3899.9	5849850	73.5	30870	8444.5	12666750	84.7	35574	5964.0	8946000	118.5	49770	12988.6	19482900	170.3	71526	5532.0	8298000	101.5	42630
3/29/2007	3899.9	5849850	73.5	30870	9460.2	14190300	84.7	35574	5964.0	8946000	118.5	49770	13325.0	19987500	170.3	71526	5739.0	8608500	101.5	42630
4/2/2007	3899.9	5849850	73.5	30870	10115.5	15173250	84.7	35574	5964.0	8946000	118.5	49770	13458.5	20187750	170.3	71526	5739.0	8608500	101.5	42630
6/19/2007	3899.9	5849850	73.5	30870	11578.5	17367750	84.7	35574	5964.0	8946000	118.5	49770	13587.5	20381250	170.3	71526	5897.5	8846250	101.5	42630
9/5/2007	3899.9	5849850	73.5	30870	12259.9	18389850	84.7	35574	5964.0	8946000	118.5	49770	13859.3	20788950	170.3	71526	5897.7	8846550	101.5	42630
11/13/2007	3899.9	5849850	73.5	30870	12259.9	18389850	84.7	35574	5964.0	8946000	118.5	49770	14245.9	21368850	170.3	71526	6015.8	9023700	101.5	42630
4/4/2008	3899.9	5849850	73.5	30870	12259.9	18389850	84.7	35574	5964.0	8946000	118.5	49770	14589.5	21884250	170.3	71526	6045.8	9068700	101.5	42630
7/18/2008	3899.9	5849850	73.5	30870	12259.9	18389850	84.7	35574	5964.0	8946000	118.5	49770	14589.5	21884250	170.3	71526	6224.8	9337200	101.5	42630
12/23/2008	3899.9	5849850	73.5	30870	13589.5	20384250	84.7	35574	5964.0	8946000	118.5	49770	14589.5	21884250	170.3	71526	6349.5	9524250	101.5	42630
1/20/2009	3899.9	5849850	73.5	30870	13899.6	20849400	84.7	35574	5964.0	8946000	118.5	49770	14789.3	22183950	170.3	71526	6349.5	9524250	101.5	42630
5/27/2009	3899.9	5849850	73.5	30870	14025.8	21038700	84.7	35574	5964.0	8946000	118.5	49770	14957.5	22436250	170.3	71526	6623.8	9935700	101.5	42630
8/14/2009	3899.9	5849850	73.5	30870	14195.6	21293400	84.7	35574	5964.0	8946000	118.5	49770	15459.7	23189550	170.3	71526	7125.8	10688700	101.5	42630
12/7/2009	3899.9	5849850	73.5	30870	14589.2	21883800	84.7	35574	5964.0	8946000	118.5	49770	15859.5	23789250	170.3	71526	7264.5	10896750	101.5	42630
3/10/2010	3899.9	5849850	73.5	30870	14879.2	22318800	84.7	35574	5964.0	8946000	118.5	49770	15859.5	23789250	170.3	71526	7849.4	11774100	101.5	42630
5/20/2010	3899.9	5849850	73.5	30870	15275.6	22913400	84.7	35574	5964.0	8946000	118.5	49770	15978.5	23967750	170.3	71526	8245.8	12368700	101.5	42630
8/25/2010	3899.9	5849850	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16054.6	24081900	170.3	71526	8586.6	12879900	101.5	42630
11/11/2010	3920.5	5880750	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16054.6	24081900	170.3	71526	8586.6	12879900	101.5	42630
2/11/2011	3955.1	5932650	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16054.6	24081900	170.3	71526	8586.6	12879900	101.5	42630
5/23/2011	3978.2	5967300	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16207.9	24311850	170.3	71526	8586.6	12879900	101.5	42630
8/12/2011	4012.2	6018300	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16257.5	24386250	170.3	71526	8586.6	12879900	101.5	42630
11/22/2011	4114.5	6171750	73.5	30870	15801.5	23702250	84.7	35574	5964.0	8946000	118.5	49770	16257.5	24386250	170.3	71526	8586.6	128799		





Douglas Bacon <dbacon@utah.gov>

reclamation seed mixes

1 message

Neville, Ann (KUCC) <Ann.Neville@riotinto.com>

Wed, Mar 27, 2013 at 2:00 PM

To: "dbacon@utah.gov" <dbacon@utah.gov>

Cc: "Lindsay, Thiess (KUCC)" <lindsayt@kenecott.com>, "Payne, Kelly (KUCC)" <paynek@kenecott.com>, "Elkin, Larry (KUCC)" <LARRY.ELKIN@riotinto.com>

Dear Doug,

As per your inquiry this March this email is to inform you Kennecott's reclamation seed mixes does not contain seeds of palatable plants which can uptake selenium. Please find attached a few examples of seed mixes used on the property.

Additionally, KUC has a weed management program which has identified plants which have been known to uptake Selenium such as: White Top (Hoary Cress) and Dyers Woad. See below excerpt from our annual weed report for an example of treatments. Also, in 2012 we worked with Tooele to map and treat a number of weeds on KUC properties (see attached 'weed points').

Please let me know if you have any questions.

All the best,

Ann

Senior Advisor Biological Resources

Rio Tinto Kennecott Utah Copper LLC

801 569 7474 office

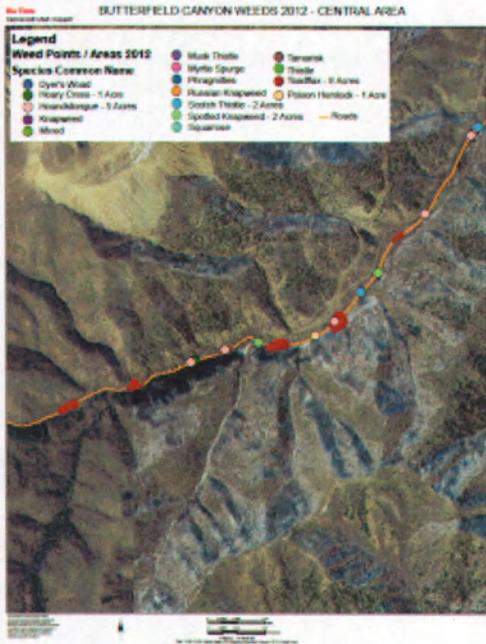
801 891 6842 cell

From: 2012 Weed Report KUC

LARK GATE

In 2011, the area north of the gate was sprayed for myrtle spurge and scotch thistle. This year we monitored the treated area in early September, where we found much less spurge and thistle. We did not treat it due to potential construction in the area. If it is not paved or constructed upon, it should be treated again next year.

BUTTERFIELD/MIDDLE CANYONS



Approximate mapped acres using mapping measurements:

- Whitetop: 12 acres
- Spotted knapweed: 5 acres
- Houndstongue: 16 acres
- Scotch Thistle: 5



In July, we mapped all the weed areas in Butterfield Canyon. In addition to the known areas of whitetop and scotch thistle, we found several patches of spotted knapweed. We contacted Salt Lake County Weed Department, who sprayed all the knapweed locations and most of the large whitetop patches.

In June, we collaborated with Tooele County to treat Middle Canyon. We started at the bottom picnic table area that had a large field of scotch thistle and sprayed along the road all the way to the top near the south rim of the mine. Middle Canyon is in good condition, and required fairly minor spot treatment. We used Escort and Milestone on houndstongue, scotch thistle, stinging nettle, and knapweed (possible diffuse or spotted). Tooele County treated the White Pine project area with the water tunnel halfway up Middle Canyon.

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9 attachments

 **Original Tailings Seed mix (pre-2010).PDF**
23K

 **Bingham Canyon Seed Mix with Contact info.pdf**
120K

 **Tailings seed mix.pdf**

54K

 **Tooele Co weed points.pdf**
1732K

 **image001.emz**
907K

 **image003.emz**
898K

 **image005.emz**
850K

 **oledata.mso**
9385K

 **image009.emz**
4K

Typical seed mixes to be used in the reclamation program are described below.

INITIAL RECLAMATION SEED MIX (First Seeding)

- Rangeland drill seeding:
Seed: Annual rye, cereal rye, or similar species, at 20 lbs/acre.
Fertilizer: 16-16-8 at 250 lbs/acre.
- Hydroseeding or Broadcast Seeding:
Mulch: 1,400 lbs/acre.
Tackifier: 100 lbs/acre.
Seed: Annual rye, cereal rye, rye cultivar, or similar species at 30 lbs/acre.
Fertilizer: 16-16-8 at 250 lbs/acre.

SECOND RECLAMATION SEED MIX (Second Seeding)

SPECIES	LBS/ACRE, PLS*
• GRASSES	
Thickspike wheatgrass	2.0
Intermediate wheatgrass	2.0
Western wheatgrass	2.0
Slender wheatgrass	1.5
Pubescent wheatgrass	2.0
Indian ricegrass	1.0
• FORBS	
Yarrow	0.1
Pacific aster	0.1
Utah sweetvetch	1.0
Lewis flax	0.5
'Ranger' alfalfa	1.5
Yellow sweet clover	1.5
Rocky Mountain penstemon	0.2
• SHRUBS	
Antelope bitterbrush	2.0
Stansbury cliffrose	0.1
Basin big sagebrush	2.0
Rubber rabbitbrush	0.5
 TOTAL SEED	 20.0**
FERTILIZER 16-16-8	250

* PLS = pounds per acre of Pure Live Seed.

Attn: Vicky Peacey

Table 4-3 Seed Mix for the Capped Lower Bingham Canyon Dump Face

Common Name (1)	Species Name	PLS lb/acre
SEED SPECIES ON ALL CAPPED AREAS		
Grasses		
Kentucky Bluegrass	Poa pratensis	8.5
Sheep Fescue	Festuca ovina	0.5
Great Basin Wildrye	Leymus cinereus	2.0
Slender Wheatgrass	Agropyron trachycaulum (Elymus trachycaulis)	1.0
Western Wheatgrass	Agropyron smithii (Pascopyrum smithii)	1.5
Bluebunch Wheatgrass	Agropyron spicatum (Pseudoroegneria spicata)	2.0
Legumes		
Wild Lupine	Lupinus perennis	1.5
Mountain Lupine	Lupinus alpestris	4.0
American Vetch	Vicia americana	2.5
Forbs		
Milfoil Yarrow	Achillea millefolium	0.6
Small Burnett	Sanguisorba minor	1.6
Wasatch Penstemon	Penstemon Cyananthus	2.2
Rocky Mountain Penstemon	Penstemon strictus	0.2
Trees/shrubs		
Rubber Rabbitbrush	Chrysothamnus nauseosus	0.3
Mountain Big Sagebrush	Artemisia tridentata (vasicifera)	1.5
Fourwing Saltbush	Atriplex canescens	0.2
TOTAL SEED		19.0

\$ 241.65 per acre

granite
SEED
 1697 W. 2100 N.
 LEHI, UT 84043
 (801) 768-4422

Typical seed mixes and soil amendments to be used in the reclamation program are outlined below:

North Tailings Seed Mix (uncovered – seed applied direct to tailings)

SPECIES	PLS LBS/ACRE (DRILLED RATE)	APPLICATION METHOD
Tall wheatgrass (<i>Elytrigia elongata</i>) 'Alkar'	4.0	Drill
Smooth brome (<i>Bromus inermis</i>) 'Manchar'	3.0	Drill
Slender wheatgrass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>) 'Pryor'	3.0	Drill
Sheep fescue (<i>Festuca ovina</i>) 'Covar or Marco Polo'	0.75	Drill
Bottlebrush squirreltail (<i>Elymus elymoides</i>)	1.5	Drill
Fourwing saltbush (<i>Atriplex canescens</i>)	1.0	Drill
Sand dropseed (<i>Sporobolus cryptandrus</i>)	0.5	Broadcast
Sand sage (<i>Artemisia filifolia</i>)	0.50	Broadcast
Barley (<i>Hordeum vulgare</i>)	15.0	Drill
Cereal rye (<i>Secale cereale</i>)	15.0	Drill
TOTAL	44.25	

Notes: Broadcast seeding may be done initially or within the following year
Seed mix developed in partnership with Granite Seed Company, Golder Associates and Kennecott Utah Copper

Soil amendments: 2:1 Ratio, Woodchip and Biosolids @ 30 tons/acre total
16-16-8 Fertilizer @ 100 lbs/acre (secondary application as needed)

North Tailings Seed Mix (covered – seed applied to growth media cover)

SPECIES	PLS LBS/ACRE (DRILLED RATE)	APPLICATION METHOD
Tall wheatgrass (<i>Elytrigia elongata</i>) 'Alkar'	2.0	Drill
Crested wheatgrass (<i>Agropyron desertorum</i>) 'Hycrest'	1.25	Drill
Western wheatgrass (<i>Pascopyrum smithii</i>) 'Arriba'	2.0	Drill
Russian wildrye (<i>Psathyrostachys juncea</i>) 'Bozoisky'	2.0	Drill
Indian ricegrass (<i>Achnatherum hymenoides</i>) 'Nezpar/Rimrock'	1.25	Drill
Blue grama (<i>Bouteloua gracilis</i>) 'Alma/Lovington/Hachita'	0.50	Drill
Falcata alfalfa (<i>Medicago sativa</i> spp. <i>falcata</i>)	0.25	Broadcast
Fourwing saltbush (<i>Atriplex canescens</i>)	1.0	Drill
Shadscale (<i>Atriplex confertifolia</i>)	0.5	Drill
Nevada ephedra (<i>Ephedra nevadensis</i>)	0.5	Drill
Rubber rabbitbrush (<i>Ericameria nauseosa</i>)	0.5	Broadcast
Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>)	0.5	Broadcast
Barley (<i>Hordeum vulgare</i>)	15.0	Drill
Cereal rye (<i>Secale cereale</i>)	15.0	Drill
TOTAL	42.25	

Notes: Broadcast seeding may be done initially or within the following year
Seed mix developed in partnership with Granite Seed Company, Golder Associates and Kennecott Utah Copper

Soil amendments: Straw Mulch @ 10 to 20 tons/acre
18-18-18 Fertilizer @ 200 lbs/acre (primary)
18-18-18 Fertilizer @ 100 lbs/acre (secondary application as needed)

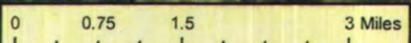
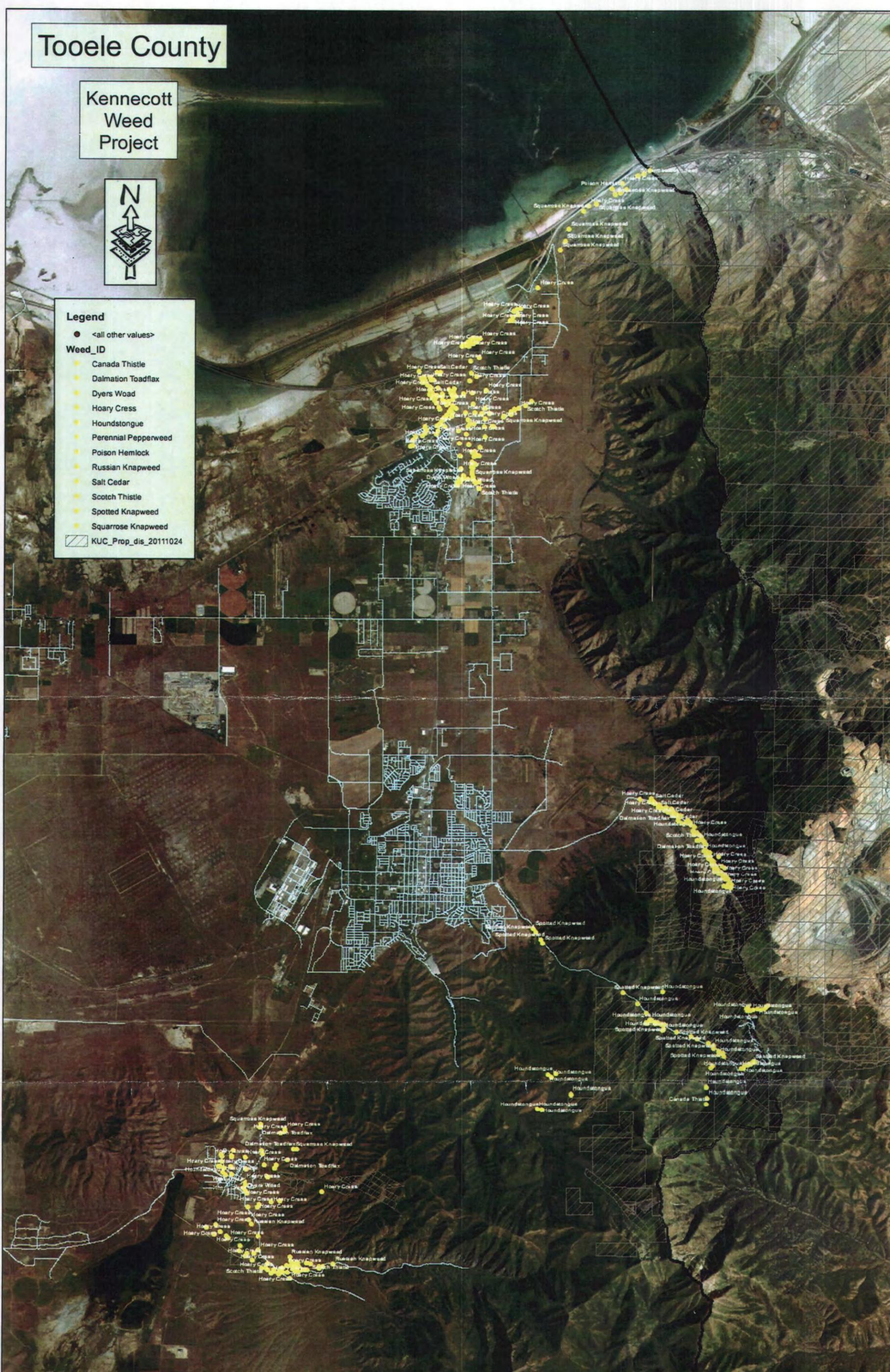
Tooele County

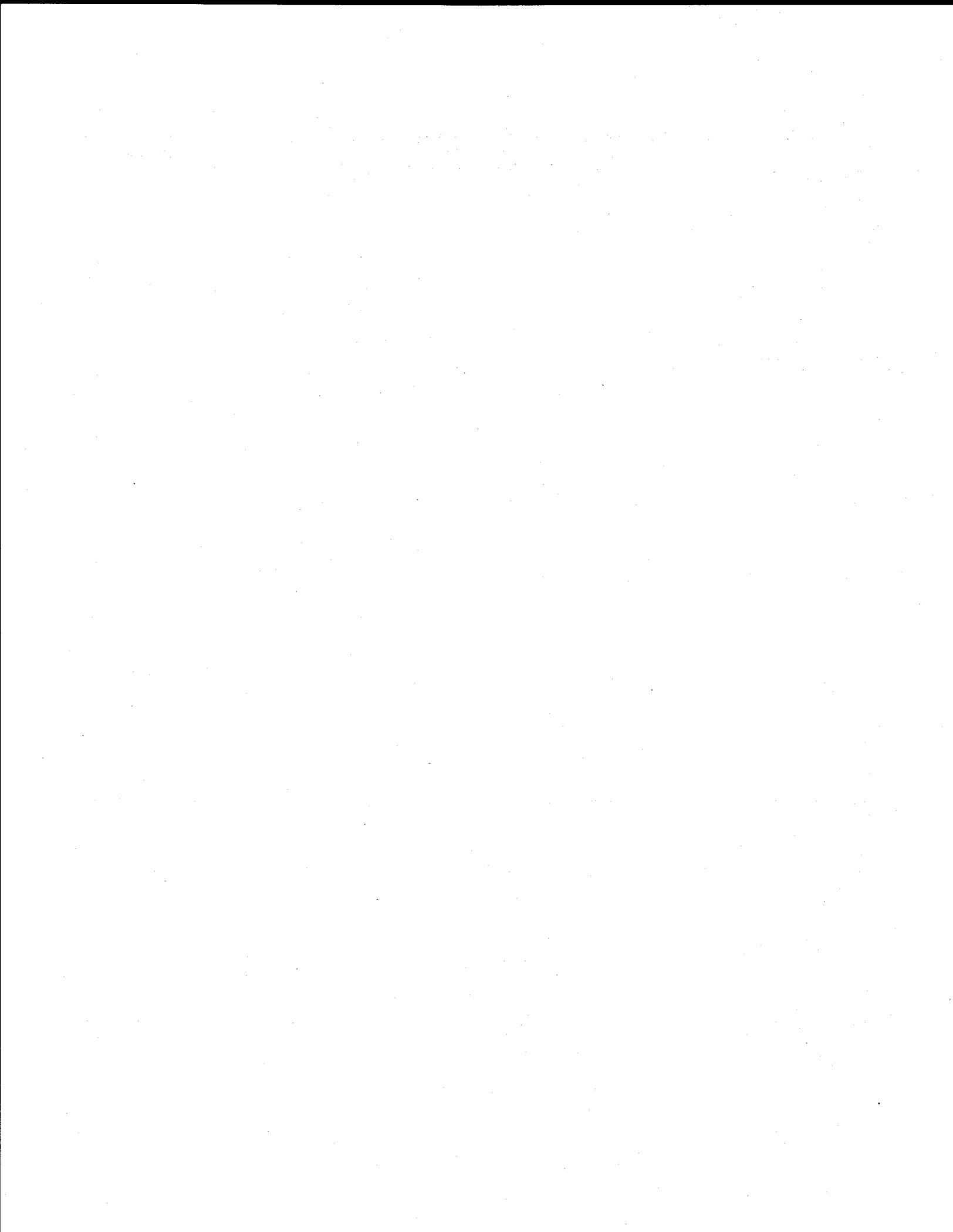
Kennecott Weed Project



Legend

- <all other values>
- Weed_ID
 - Canada Thistle
 - Dalmatian Toadflax
 - Dyers Wood
 - Hoary Cress
 - Houndstongue
 - Perennial Pepperweed
 - Poison Hemlock
 - Russian Knapweed
 - Salt Cedar
 - Scotch Thistle
 - Spotted Knapweed
 - Squarrose Knapweed
- ▨ KUC_Prop_dis_20111024





MEMORANDUM

TO: Douglas Bacon, Utah Division of Environmental Response and Remediation
FROM: Jeremiah R. Marsigli, Environmental Scientist III
DATE: March 26, 2013
SUBJECT: Summary of five year air quality compliance history for Kennecott Copper

Introduction:

Kennecott Utah Copper has several Title V Operating Permits and Approval Orders issued by UDAQ. Below is a summary of permits and associated compliance history during the last five years.

Issued permits and compliance history:

Site ID 10572 - Power plant, lab, and tailings impoundments operations.

Title V Operating Permit 3500346002, issued August 2, 2009 with no revisions to date. No compliance actions issues within the previous five year period.

Approval Order DAQE-AN105720026-11, issued November 22, 2011. No compliance actions issues within the previous five year period.

Site ID 10346 - Smelter and refinery operations.

Title V Operating Permit 3500030002, last revised December 27, 2010. No compliance actions issued within the previous five year period.

Approval Order DAQE-AN0103460049-11, issued May 3, 2011. No compliance actions issued within the previous five year period.

Approval Order DAQE-AN103460052-13, issued March 18, 2003. No compliance actions issued within the previous five year period.

Site ID 10571 (previously 10347) - Mine and Copperton concentrator.

Approval Order DAQE-AN0105710028-11, issued June 27, 2011. A Compliance Advisory (DAQC-760-12) and subsequent Early Settlement Agreement (DAQC-961-12) issued in 2012 for exceeding the 20% opacity limit on active waste dump slopes (a violation of Condition II.B.3.g of DAQE-AN010571-28-11).

Additional information:

In addition to the above listed permits, Kennecott Utah Copper has been issued several experimental and other Approval Orders that have either expired or are superseded by the permits listed above. There were no compliance actions issued for any of these permits.





Douglas Bacon <dbacon@utah.gov>

Kennecott compliance with DOGM requirements for north zone operable units...

Leslie Heppler <lheppler@utah.gov>
To: Douglas Bacon <dbacon@utah.gov>

Thu, Feb 28, 2013 at 8:23 AM

Hi Doug - Please find attached a map "for those who prefer spacial"...it is an older map...so the bond numbers are out of date ...I will add it to the list of thing for our new GIS person.

Here is the updated numbers -

M0350002 - Board Contract
M0350009 - \$ 3,873,446
M0350011 - \$27,727,237
M0350015 - \$23,904,400
M0450004 - \$ 134,905

Keep in mind those our OGM boundary lines...which really are not correct, Smelting and refining are exempt by rule R-647-1-106. Give me a call and I can follow help explain the rules. thx-lah

[Quoted text hidden]

Utah Division of Oil, Gas & Mining
Office hours - Mon thru Fri 8-5
(801) 538-5340
Leslie Heppler
lheppler@utah.gov
Direct line (801) 538-5257 (Mon -Thur)

0KennecottPermit.pdf
4662K



Douglas Bacon <dbacon@utah.gov>

Kennecott compliance with DOGM requirements for north zone operable units...

Leslie Heppler <lheppler@utah.gov>
To: Douglas Bacon <dbacon@utah.gov>

Thu, Feb 28, 2013 at 8:49 AM

All are in compliance and they are also updating their permits and ...ya might have even noticed that they have topsoiled the north edge of the north tailings impoundment (It is a final slope and I feel the vegetation is a huge improvement from the polymer that was used for dust suppression).

They is no requirement for reclamation until closure.

[Quoted text hidden]

Kennecott Mines

Map Produced
Feb. 2008

Bingham Mine - M350002
Bond - Board contract
23,000 Acres*

Barneys Canyon - M350009
Bond - \$3,631,000
963 Acres*

Copperton Concentrator - M35011
Bond \$23,904,400
756 Acres*

North Tailing
Impoundment - M350015
Bond \$20,374,600
3334 Acres*

Pine Canyon - M450004
Bond \$120,800
131 Acres*

*Acreage amounts
indicate disturbed
area

NAIP Imagery 2006



1:100,000

1 inch equals 1.6 miles



Map Produced by Dan Smith
N:\gis\kennecott\kennecott2008.pdf





Douglas Bacon <dbacon@utah.gov>

KUC facilities

3/1/2013

John Hoggan <JHoggan@slco.org>
To: "dbacon@utah.gov" <dbacon@utah.gov>
Cc: Dorothy Adams <DGAdams@slco.org>

Wed, Feb 20, 2013 at 3:01 PM

Doug,

Since 2008, there have been no adverse occurrences or complaints (that I am aware of) associated with the KUC facilities we permitted over this time period. KUC elected to and successfully closed out their biopad on the mine site in 2010. In 2011, KUC relocated their tire monofill within the mine footprint. These are the only items that may be of note.

John Hoggan, MST, LEHS
Salt Lake Valley Health Department
788 E Woodoak Lane, #120
Murray, UT 84107
Ph: (385) 468-3914
Fax: (385)468-3863

Douglas Bacon <dbacon@utah.gov>
To: John Hoggan <JHoggan@slco.org>
Cc: Dorothy Adams <DGAdams@slco.org>

Wed, Feb 20, 2013 at 4:50 PM

Hi John,

Thank you for the information John. I forgot one thing while talking with you all this afternoon. As this is the first five year review for the Kennecott North Zone operable units, we are actually reviewing activities since the ROD was completed in 2002. Could you amend your summary to include the time frame from 2002 to 2012? Thanks for your consideration.

-Doug
[Quoted text hidden]

John Hoggan <JHoggan@slco.org>
To: Douglas Bacon <dbacon@utah.gov>

Thu, Feb 21, 2013 at 7:44 AM

Cc: Heather Edwards <HEdwards@slco.org>, Dorothy Adams <DGAdams@slco.org>

I have only been with SLVHD since 2008. Prior to that, Mary Pat was the KUC inspector and she retired two years ago. Heather's research will be the best way to i.d. any items of interest for the time frame 2002-2008.

From: Douglas Bacon [mailto:dbacon@utah.gov]

Sent: Wednesday, February 20, 2013 4:50 PM

To: John Hoggan

Cc: Dorothy Adams

Subject: Re: KUC facilities

[Quoted text hidden]



Douglas Bacon <dbacon@utah.gov>

Request information

Jeannine Maxfield <JMaxfield@slco.org>
To: "dbacon@utah.gov" <dbacon@utah.gov>

Fri, Mar 29, 2013 at 11:39 AM

The permit number for Kennecott Utah Copper Tailing Impoundment Landfill is 35-011805



MEMORANDUM

TO: Douglas Bacon, Utah Division of Environmental Response and Remediation
FROM: Edward Hickey, Utah Division of Water Quality
DATE: February 19, 2013
SUBJECT: Summary of Compliance Performance for Kennecott North Zone Ground Water Discharge Permits

Introduction

On December 27, 2012 Mr. Douglas Bacon (Project Manager – Kennecott North Zone, Div. of Environmental Response & Remediation, DERR) contacted me requesting an assessment of Kennecott Utah Copper LLC's (KUC) compliance with the Groundwater Protection Permit limitations for KUC's operations on the North End. Mr. Bacon requested the summary of compliance performance and issues cover the time frame since 2002 to 2012.

The permit compliance information is intended to support the five year review, by the CERCLA authorities (U.S. Environmental Protection Agency Region 8 and DERR), that is evaluating the response actions implemented by KUC to address mining influences in the North Zone. Under a 1995 Memorandum of Understanding the CERCLA authorities and KUC agreed to use State authorities as appropriate to manage active operations which might contribute to mining waste issues being addressed under CERCLA selected remedies. In some cases the CERCLA authorities selected remedies in the North Zone which rely on KUC's continue compliance with State of Utah regulatory permits in conjunction with other response actions required under CERCLA.

Permit Compliance Summary

There are three Groundwater Protection Permits which regulate potential discharges to the shallow and principal aquifers underlying KUC's milling, smelting and waste management facilities at their North Zone operations. The following summaries are provided in response to your inquiry.

North Concentrator, # UGW350015 (permit expires March 2014):

This permit is compliant with groundwater discharge permit limits and there are no permit-required source assessments or corrective actions. Facilities that are covered under this permit include the Power Plant (electrical generation) and Magna process water containment and pump facilities that route process water for the ore concentrating (Copperton Concentrator) and smelting (Outokumpu Smelter) operations. Historically the permit covered the milling operations located in the North Zone including the Bonneville Crushing Mill and the Magna Flotation Mill and Filter Plant. These historical mills have been demolished and their footprints reclaimed (2007 to 2008).

The operational facilities still permitted (Power Plant, Magna process water containment and distribution infrastucture) have been compliant with ground water parameters through 2012. Monitoring wells are sampled semi-annually. Recent changes have included,

- Boron was added as a compliance parameter in 2009 (based on the presence of the coal pile used for fuel at the Power Plant), and is monitored semi-annually. Boron is a component of coal and fly ash and could indicate releases from the Power Plant process water containment structures to ground water. In 2012, one monitoring well had non-compliant levels of boron. However, this permit compliance limit is arbitrary and was developed without a full term accelerated monitoring program. Because samples are still being collected in a larger area to develop a statistical background level, there is no ongoing source assessment or corrective action required by this discharge permit.
- Kennecott recently replaced the Magna Process Water Reservoir, an integral component of the water circuit that recycles water from the Tailings Impoundment to the Copperton Concentrator. The old reservoir, a single concrete-lined basin with minimal leak detection control, was replaced with Best Available Technology in 2011. The replacement Magna Reservoir consists of two reservoirs located adjacent to each other. The reservoirs have dual flexible membrane liners and leak detection.

Between 2002 and 2007, Pump Station #3 had regular spills to the ground caused by frigid weather affecting the pump and piping components. Arsenic was the typical contaminant to exceed reportable quantities (RQ), as shown in the following examples.

Date	Contaminant	Release volume (lbs)	RQ (lbs)
9/22/06	Arsenic	3.7	1.0
9/17/2007	Arsenic	1.2	1.0

Kennecott upgraded the equipment and there have been no further reportable incidences. Other than spill event cleanup, there were no corrective actions required by the UGW350015 permit based on the non-sensitive location of the incidents.

Tailings Impoundment, #UGW350011 (permit expires January 2016):

This permit is compliant with groundwater discharge permit limits and there are no permit-required source assessments or corrective actions. Facilities that are covered under this permit include the Magna Tailings Impoundment (South Tailings and North Tailings Impoundments), and Diving Board Tailings.

The Tailings Impoundment has operated since 1906, used for the storage of tailings from concentrators processing ore from the Bingham Canyon mine, and has undergone numerous changes and expansions to accommodate the volume of mill tailings. The original 1,350-acre impoundment has since expanded to approximately 9500 acres with a height of over 220 feet, storing 1.5 billion tons of tailings. The current discharge into the North Impoundment is approximately 170,000 tons per day of tailings from the Copperton Concentrator and other mine sources.

The compliance monitoring well network is comprised of 29 wells in 14 locations. Most locations contain nested or paired wells (i.e. one well is screened in the upper shallow aquifer and one is screened in the lower confined aquifer). The perimeter of the South and North Impoundment is approximately 14 miles long. The 14 well locations equate to a frequency of about one well location per mile of embankment. In addition, a water quality summary and analysis is required to assess long term changes to water quality over the life of the overall Tailings Impoundment. The water quality of interstitial waters within the tailings (i.e. waters that are decanted from the top of the impoundment and other

outflows such as seeps) and characterization of inflows provide information that will assist in predicting potential impacts from the impoundment as well as track changes over time. Kennecott provides an annual report that compiles the results of the sampling and analysis.

KUC has largely been compliant with the permit because of the liberal compliance limits and low quality of the receiving saline groundwater aquifers. Several wells around the perimeter of the current North tailings storage area have exhibited increasing TDS, chloride, and sulfate near the toe ditch. The toe ditch is designed to collect water seepage from tailings deposition, which is collected for re-use at the mine.

Monitoring wells NET1380 and NET1381 had source assessments in 2007 and 2009 that were completed to DWQ's satisfaction. KUC attributes the elevated chloride and TDS to the influence of the Great Salt Lake on shallow groundwater. DWQ believes that drainage of the toe ditch process water into the shallow aquifer is the cause. While this issue remains under study, it is a fact that the Tailings Impoundment is operating as designed with seepage to the shallow aquifer. The monitoring program and the source assessments did not show any change in dissolved metals or other tailings components that might have been expected to degrade the environment. The natural clay liner underneath the impoundment and upward hydraulic gradient of the Principal Aquifer appear to adequately minimize effects to deeper saline aquifers.

The Diving Board Tailings area is a small earthen impoundment originally designed to retain tailing discharges resulting from emergency shutdowns at the North Zone mills. Due to the relocation of the Copperton Mill tailings pipeline, the Diving Board is no longer used for the disposal of tailings. It is currently designated as the capture area for the Magna Reservoir in the unlikely event of a catastrophic failure. Dissolved arsenic levels in the shallow groundwater (underlying this facility) have exceeded the Utah Ground Water Quality Standard, likely due to historical operations in this area. Between 2005 and 2008, a source assessment was conducted to determine the cause of elevated arsenic in the shallow aquifer. Measurements of arsenic in ground water pumped from NED604A demonstrated that the well is seasonally cyclical with respect to non-compliant levels of arsenic, and that the non-compliant events may have been, at times, driven by historical tailings discharges of and inadvertent spills of process water from the Pump Station #3A. The source assessment determined that the "elevated arsenic in well NED604A has minimal risk of impact to human health, ecosystem, wildlife, or groundwater resources." The levels are stable and there is no current net increase in dissolved arsenic. The Diving Board Tailings impoundment has returned to the regular sampling frequency. An upward hydraulic gradient in the area has protected the Principal Aquifer from arsenic degradation.

Kennecott and DWQ have been collecting water samples from the Arthur Stepback Repository monitoring wells since 1997. The Arthur Stepback Repository is not specifically covered by this permit, but the monitoring wells downgradient of the facility are monitored by DWQ. Compliance limits were developed for the wells in the 2011 #UGW350011 permit renewal. The wells are compliant with the permit compliance limits. The Arthur Stepback Repository could be added to the facilities the permit specifically covers. However, right now Kennecott manages the facility as a corrective action management unit under their CERCLA authorizations for its use.

Smelter, #UGW350008 (permit expires October 1, 2013):

Facilities that are covered under this permit include the smelter, acid plants, acid tank farm and associated infrastructure. This permit is compliant with groundwater discharge limits. There is one active Corrective Action project.

Three different smelters designed to process copper ore concentrates have operated continuously at this location since 1906; the current smelter is the Outokumpu Smelter. The ore concentrates are melted in a high-temperature process to burn off sulfur and further separate valuable metals from non-economic minerals. The products produced are copper anodes, precious metals, and sulfuric acid (from the off-gases in the furnaces). By-products produced by the smelter include slag, flue dusts, As/Cd cake, stack gases, and process water. The ground water monitoring well network at the northern perimeter of the Outokumpu smelter provides information on ground water quality, but is not used as a formal compliance mechanism under this permit. The monitoring well data is used to assess the of overall best management practices at the smelter to determine if water quality parameters are improving over time with the implementation of BMP for smelter facilities.

The groundwater under the overall smelting facility is degraded from 100 years of smelting operations. Ground water contaminated with arsenic, selenium, and sulfate has been identified and plume boundaries delineated (CERCLA remedial investigation, 2000). Since KUC's response actions addressing the impacted aquifer are proceeding under the oversight of the CERCLA authorities, the Ground Water Quality Discharge Permit does not require additional corrective action measures at this time.

There is a corrective action project in progress by KUC under the auspices of this permit. The corrective action is directly resulting from a sulfuric acid release to groundwater from KUC's operating acid tank farm. In September 2009, Kennecott reported to the National Response Center (NRC) and DERR that the Rail/Truck Loading Station at the Acid Tank Farm Facility (east of the Smelter and immediately southwest of the Praxair Facility) had a release of sulfuric acid to underlying soils and groundwater. An existing groundwater recovery trench was re-activated and has been effective in capturing the low pH water and elevated dissolved metals and limiting migration of a plume. The corrective action is intended to prevent the migration of the low pH water (with elevated concentrations of selenium) into a wetland environment that the CERCLA authorities are overseeing a response action to protect avian receptors and localized groundwater upwells.

Further Information

Monitoring and reporting is current for all of the North End groundwater discharge permits. There are no known compliance issues that have not been addressed.

The Utah Division of Water Quality collects split samples from random wells on an annual basis. The DWQ laboratory results corroborate KUC results submitted in their periodic monitoring reports.



Douglas Bacon <dbacon@utah.gov>

Permit compliance review - North Zone and Pine Canyon

Kim Shelley <kshelley@utah.gov>

Tue, Jan 8, 2013 at 11:56 AM

To: Douglas Bacon <dbacon@utah.gov>

Cc: John Kennington <jkennington@utah.gov>

Hi Doug,

Below is the UPDES compliance summary response for KUC:

Outfall	Receiving Water	Notes
002	C-7 Ditch	This outfall did not discharge during the time-frame of September 2002-December 2012.
004	I-80 Culvert to GSL	All parameters were below the effluent limits in the UPDES permit.
007	C-7 Ditch	This outfall did not discharge during the time-frame of September 2002-December 2012.
008	GSL	All parameters were below the effluent limits in the UPDES permit.
009	Pine Canyon Creek, Tooele County	Effluent limit violations for the following parameters occurred on 6/30/11: Cu, TSS, Zn. This was due to construction activity in the tunnel.
011	Ritter-Utah Salt Lake Canals	All parameters were below the effluent limits in the UPDES permit.
012	GSL	Effluent limit violations for As occurred during the month of March 2004. The TSS effluent limit was violated during the following months: 2/05, 4/05, 9/06, 4/07, 1/08, 11/08, 3/09, 6/12. None of these violations met the criteria necessitating a formal enforcement action.

No formal enforcement actions were taken against Kennecott during the time-frame of September 2002 to December 2012. KUC has maintained a good compliance history with its UPDES Permit over the last 10 years.

If you need additional information, please let me know.

Thanks,

Kim

On Thu, Dec 27, 2012 at 12:33 PM, Douglas Bacon <dbacon@utah.gov> wrote:

[Quoted text hidden]