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May 28, 2014

Mr. James R. Deutsch  
Director – Reclamation Division  
Public Service Commission  
600 E. Boulevard Ave., Dept. 408  
Bismarck, ND 58505-0480

RE: Request for Variance to Policy Memorandum No. 20  
Permit No. KRGC-8404  
Gascoyne Mine Area

Dear Mr. Deutsch:

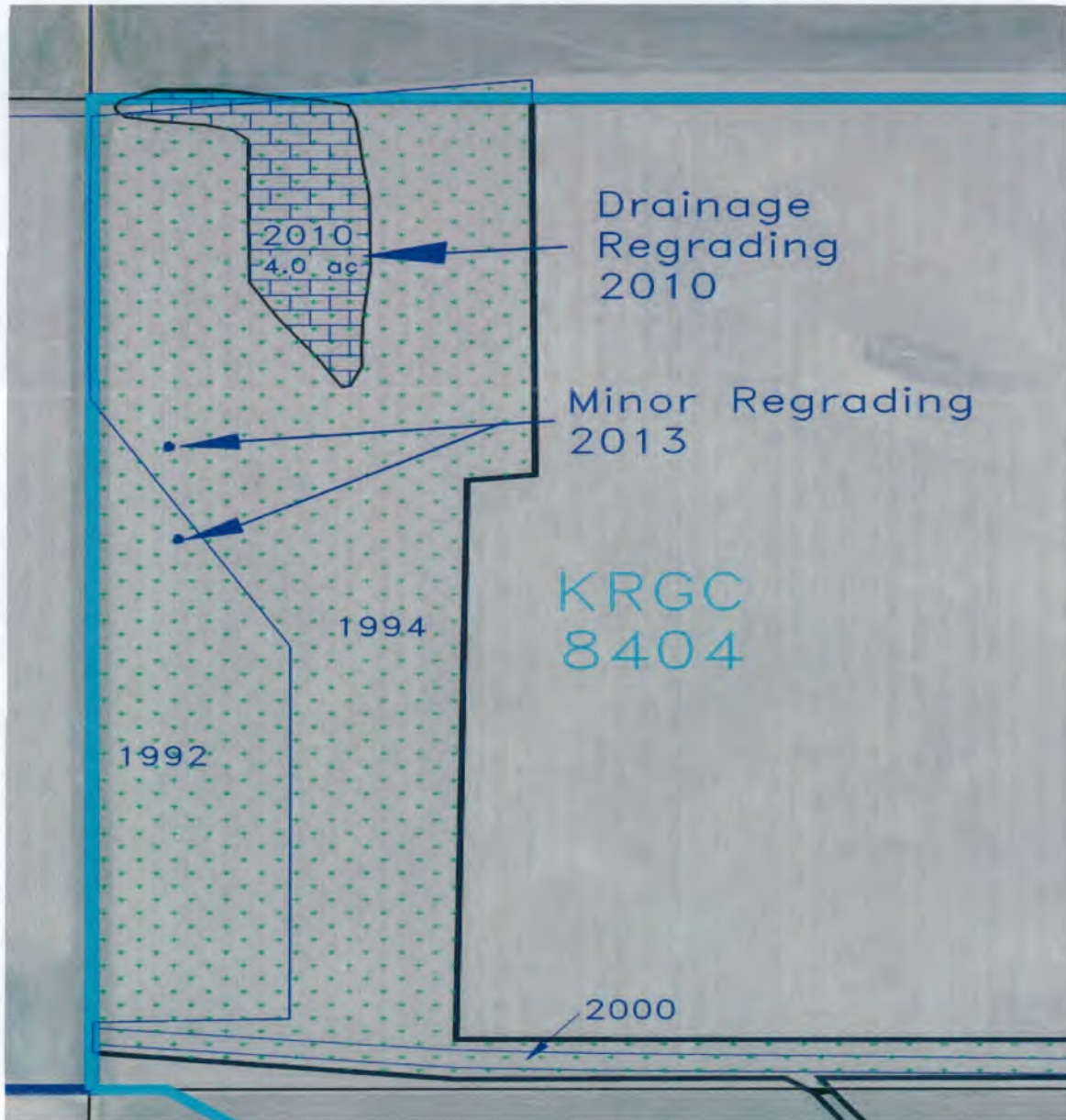
In response to your letter dated December 23, 2013, Knife River Corporation is requesting a variance from Policy Memorandum No. 20 for the area regraded in 2010 in the NW1/4 of Section 33.

Following the PSC's concern with ponding in the NW1/4 of Section 33, Knife River repaired this area in 2010. Following a detailed topographic survey of the area, it was determined to provide drainage a maximum grade of 0.4% grade would need to be employed. This design was presented to the PSC for approval, and included maximum cuts and fills of less than 2 feet.

The topsoil was bladed out of the area to be repaired, followed by shallow cuts and fills to provide drainage. A small amount of additional fill material was required and was brought in from the drainage work being completed simultaneously in Section 28. The existing topsoil was then respread over the repaired area. The work was completed by Wilson Construction in the fall of 2010.

The total disturbed area was reported as 4.0 acres on the 2010 annual map, although a small portion of the disturbance repair was located within Section 28, leaving 3.8 acres within Section 33, or 5.9% of the total 64.4 acres disturbed within Permit 8404.

In 2013, during the field inspection for KRGC 8404 (Bond Release 2), Schumacher (lease holder) stated that he seen no variation in yields between the repaired area and the adjacent areas during harvest. He did request KR fill two very small depression areas to enhance farming practices. Each area was not holding water and was less than 0.1 acres each. With Allen Andersen's permission, KR followed up by hauling in a few yards of topsoil from Section 26 to fill these small areas. These regarded areas are depicted on the following drawing.



Your letter calls for an alternate sampling method to demonstrate reclamation success for at least one year on the repaired areas near the northwest corner of Section 33. We believe a sampling program is unwarranted if consideration is given to the relatively minor influence repair area yields would have on revegetation success. The repair area constitutes only roughly 7 percent of the reclaimed cropland in the NW $\frac{1}{4}$  of Section 33. In both 2007 and 2010, 30 samples were acquired from the approximately 57 acres of reclaimed cropland, but none were collected from the area affected by repairs in 2010. Seven percent of 30 samples equates to about 2 samples. We can simulate the influence of the repair area by adding hypothetical yields for 2 samples to the existing 30-sample datasets for the reclaimed area in 2007 and 2010. An examination of the 2007 data presented in the bond release application demonstrates that even under hypothetical worst case conditions in the repair area - no yield - the standard would still be achieved. If 2

samples with 0 #/ac yield are added to the 30 existing samples from 2007, the yield of the reclaimed area is marginally reduced from 20.8 to 19.5 bu/ac, remaining well above the standard of 16.8 bu/ac. This is confirmed by the accompanying data table. The table also illustrates that for 2010, an assumption of zero yield for the two samples representing the repair area results in the same outcome with the aid of statistics. Sample adequacy remains intact for both years.

2007 NW33 Flatz Cleaned Grain Yields	
Sampled 7/31 & 8/1/07	
Sample	Yield (bu/ac) <sup>1</sup>
1	21.1
2	24.2
3	20.4
4	29.9
5	20.7
6	28.6
7	18.2
8	16.5
9	20.3
10	20.8
11	12.2
12	18.8
13	16.9
14	21.9
15	21.8
16	17.8
17	24.7
18	19.6
19	24.0
20	21.4
21	20.7
22	19.3
23	18.1
24	28.3
25	24.3
26	20.2
27	14.0
28	16.1
29	17.9
30	23.7
31	0.0
32	0.0
Mean	19.5
2007 Adjusted Yield Standard: 16.8 bu/ac	
Sample adequacy: $n=t^2s^2/d^2$	
$t^2_{(.90,31)}$	1.715
$s^2$	43.3
$d^2$	3.8
n	19.6
<sup>1</sup> where bu/ac = g/453.6*13939/60	

2010 NW33 Flatz Cleaned Grain Yields	
Sampled 8/19-20/10	
Sample	Yield (bu/ac) <sup>1</sup>
1	37.8
2	57.4
3	31.7
4	58.2
5	34.6
6	35.5
7	46.0
8	25.8
9	33.2
10	36.1
11	46.3
12	44.8
13	53.1
14	42.9
15	46.3
16	37.9
17	48.8
18	35.3
19	46.9
20	33.6
21	57.8
22	40.3
23	44.4
24	41.4
25	46.7
26	50.2
27	34.9
28	40.2
29	25.0
30	26.0
31	0.0
32	0.0
Mean	38.7
2010 Adjusted Yield Standard: 40.6 bu/ac	
Sample adequacy: $n=t^2s^2/d^2$	
$t^2_{(.90,31)}$	1.712
$s^2$	181.0
$d^2$	15.0
n	20.7
<sup>1</sup> where bu/ac = g/453.6*13939/60	

**STATISTICAL ANALYSIS OF RECLAMATION SUCCESS FOR 2010 DATA**  
**Reclaimed Area Actual Yield vs. Adjusted Technical Standard**

	Reclaimed Area Yield	Adjusted Technical Standard
Mean	38.7	40.6
Sample Size	32	
df	31	
Sq Root of Sample	5.7	
Variance	181.0	
Std. Deviation	13.5	

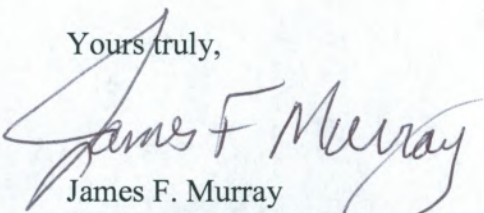
$$t_{calc} = \frac{|38.7 - 40.6|}{13.5/\sqrt{32}} = \frac{1.9}{2.4} = 0.791$$

$t_{table}$  for 31 df: 1.309

Since  $t_{calc}$  is less than  $t_{table}$ , the reclaimed yield is statistically equal to or greater than the adjusted standard.

This approach satisfies the revegetation success standards without prolonging the bond release process as shown in the above table.

Yours truly,

  
 James F. Murray  
 Engineering Service Manager