Section 4.2.4 - Reclamation Costs - (Worst Case)

In accordance with Section 69-05.2-12-07 of the North Dakota Administrative Code, estimated costs for the following three items have been determined:

1. Backfilling and Grading
2. Replacing Suitable Plant Growth Material
3. Revegetation

The reclamation costs for NAFK-8405, -8705, and -9503 have been calculated by utilizing the methods and procedures as outlined by the Public Service Commission's "Guideline for estimating reclamation costs for establishing performance bond amounts for permit areas" dated December 31, 1985 and as revised on October 28, 1998. The following is a summary of the reclamation costs calculations.

Worst Case Reclamation Liability

The worst case reclamation liability was determined by utilizing the pits which need the greatest volume of material to backfill, in conjunction with the area over which the removal of suitable plant growth material is the largest. This would take place 4th Quarter, 2016.

By utilizing the Reclamation Schedule - Section 4.2.2, it was determined that the worst case situation will require the inclusion of SPGM respread and revegetation costs under the mining disturbance category over the area indicated. Also included as part of the worst case situation are the associated active support structures. The Worst Case Bond Plan Map, Section 4.2.4b, of this permit revision depicts the disturbance areas associated with the worst case reclamation liability situation.

Certain general assumptions are made when determining the reclamation costs for each of the three operations. They are as follows:

1. Reclamation work will be completed by utilizing a 992G Loader, 777D trucks, 657E push-pull tractor-scrapers, D11N and D9R bulldozers, 16H motor graders, and a water wagon. The projected operating cost per hour for each piece of equipment was based on July, 2010 values.

2. Table of Equipment Costs:

	Equipment	Cost Per Hour
a)	657E push-pull tractor-scraper	$ 316.72
b)	D11N bulldozer	$ 318.65
c)	D9R bulldozer	$ 189.98
d)	16H motor grader	$ 143.56
e)	Water wagon	$ 143.56
f)	992G loader	$ 279.67
g)	777D trucks	$ 233.02

The scraper-truck breakeven haul distance was calculated at 4,400 feet. The truck-FEL fleet was utilized where haul distances exceed 4,400 feet.

3. Support Equipment Usage:

Equipment	Process	Cost Factor
a) 16G motor grader	Final grading	1 hr./6 scraper hrs.
	SPGM respread	1 hr./6 scraper hrs.
	Loader/Truck fleet	1 hr./loader hr.
b) Water wagon	SPGM respread	1 hr./12 scraper/truck hrs.
c) D9R Dozer	SPGM Respread	1 hr/loader hr.

4. Backfilling and Grading (General):

Backfilling and grading volumetrics were calculated using the typical cross-sectional area multiplied by the pit length.

a) Average pit width is: 180' (9503), 450’ (9503 Tavis), 180’ (9503 South), 160’ (8405)
b) Average angle of repose is: 35º
c) Average highwall angle is: 55º
d) The overburden will swell 5-10 percent after being removed from above the coal.

5. Normal Spoils:

Additional assumptions:

a) The normal spoil regrade costs were based on grading the area occupied by four spoil peaks from the open pit.

b) The spoil peaks will be regraded utilizing D-11N bulldozers and 657E push-pull scrapers.

c) The average push distances for the D-11N bulldozers and haul distance for the 657E scrapers were based on cross-sections (refer to Section 4.2.4a).

6. Open Pit and Spoil Placement Areas:

a) The balance of cut and fill material for the backfilling of the open pit is depicted in Section 4.2.4a.

b) The material located in the deferred reclamation area will be utilized to backfill a portion of the open pit.

c) The average push or haul distance will be determined by utilizing the centroids of the cut areas and fill location of the open pit.

7. Pit Slope Ramps (down to pit bottom):

The average slope of the pit ramp to access the active pit will be 8%. Bulldozers will be utilized to regrade the pit ramps.

Assumptions for Associated Disturbance

Associated disturbance includes all vegetation disturbance caused by the construction of facilities in support of the mining operation. Support facilities include haulroads, ponds, stockpiles, scraper trails, buildings, diversions, and any other facility not occurring within the mining disturbance area which has been constructed for the specific purpose of supporting mining operations. There are approximately 2,700 acres of associated disturbance within the permits. The following assumptions were used in calculating the volumes for reclaiming the associated disturbance areas under the worst case conditions.

1. Stockpiles were removed, as a part of SPGM respreading.

2. Topsoil thickness was estimated at 12 inches.

3. Subsoil thickness ranged from 12-36 inches, depending on the spoil characteristics of the area.

4. Pond costs were based on regrading fill material with D-11N class dozer or 657E scrapers. The amount of fill material required was based on the pond's detail design drawings.

5. Diversion costs were calculated on the length of the diversion times the average cross-sectional area. Diversions are designed with 3:1 side slopes, a 16 ft. bottom, and 3 ft. deep. Area = 75 $ft.^2$

6. For the purpose of worst case bonding, the haulage roads and dragline deadhead route were divided into three groups: roads built of subsoil, roads built of ashcrete, and roads built of spoil. Dragline deadhead routes and other access roads were assumed to have been built of subsoil. The Worst Case Bonding Plan Map, Section 4.2.4b, shows the location of the different types of roads. Assumptions for calculation of reclamation costs for haulage roads and the deadhead route are as follows:

   - Final reclamation of roads built with ashcrete will be accomplished by placing the fly ash/soil mixture in spoil regrade or the ditch bottoms and

respreading a forty-eight inch total suitable plant growth material thickness.

Haulage Road Width	200	feet (for SPGM respread)
Gravel Surface Width	70	feet (for gravel removal)
Deadhead Route Width	200	feet
Gravel Removal	1.30	$yd.^3$/ft. of haul road
Haul Road Length	160,000	feet
Average Road Base Width	100	feet
Average Depth	3	feet
Push Distance	100	feet

7. The assumptions for the calculation of the reclamation costs of the cable belt route are as follows:

Cable Belt Route Width	30	feet
Gravel Removal	1.11	$yd.^3$/ft. of route

The cut/fill $yd.^3$/ft. of conveyor route is based on approximately 88,000 $yd.^3$ of cut/fill over the 16,000 feet of conveyor not on an elevated surface. Gravel can be hauled to the pit, the remote truck dump, or a pond for disposal.

8. Respread of topsoil/subsoil was estimated using a 657E class scraper, a 992G loader and 777D trucks.

9. Support equipment costs were estimated using a 16H class motor grader, a 10,000 gallon water truck, and a D9 bulldozer.

10. The average haulage distance for SPGM will be determined by utilizing a haulage road or existing route between the centroids of the respread area and stockpile whenever possible.

11. Reclamation of county and township roads are accounted for as follows:

- Gravel is assumed to be $31,500/mile.
- Culverts are assumed to be $5,000/mile.
- Respreading topsoil in road ditches not located in worst case reclamation area - 6" with 20' wide ditches - assume 5,000' haul.
- Grading cost for public roadway construction - assume 40’wide by 3.5’ deep and a 1000' haul.

12. Structures located within the permit that will need to be disassembled and removed:

a) Drive House, NW¼, Section 8: 50' x 50' building constructed of 56 tons of steel. Run of Belt: Belting, concrete sleepers, line stands, and wire ropes will be given away or disposed of in accordance with North Dakota solid waste regulations.

15,200'/16 ft. between linestands = 1,000 linestands x 550#/linestand = 275 tons

Wire rope – 15,200 (4 runs)(7#/ft.) = 213 tons

Bridge Structure, W½, Section 34 (8405): 800' of bridging steel crossing U.S. Highway 83 and the DMVW Railroad and will require approximately 135 tons of steel to be dismantled and removed.

Total Disassembly = 56 tons + 275 tons + 213 tons + 135 tons = 679 tons

Assume 35% of erection costs: $700 x .35 = $250/ton

679 tons x $250/ton = $169,750

b) Demolition of the heat enclosure building in Section 25 (9503): Use 20% of installation cost or $52,000.

c) Demolition of the heat enclosure building in Section 22 (8405): Use 20% of installation cost or $240,000.

d) Demolition of bridge structure located in Sections 22/23, T146N, R82W is estimated at $50,000. The reconstruction of the section of Highway 200 is estimated at $300,000. This includes the construction and removal of a temporary bypass. The additional hours/costs associated with dozing the concrete from the bridge structure out of the right-of-way and filling the subcut is calculated in the earthworks section in following spreadsheets. The concrete from the bridge will be buried in the subcut adjacent to the bridge location.

e) Demolition of the bridge structure located in Sections 5/6, T145N, R82W is estimated at $50,000. Falkirk also calculated additional costs for hauling the concrete to the existing Riverdale Pit. The hours/costs associated with hauling the concrete to the pit and the reconstruction of the county road are calculated in the earthworks section in following spreadsheets. The embankments were constructed of subsoil. They are a subsoil stockpile for future reclamation. Therefore, the costs associated with the removal of the embankment were figured in to the respread of subsoil on the surrounding associated disturbance areas.

f) No costs are included for removal of the HWY 83 bridge. The Bridge is property of the NDDOT and will remain post-mining.

EARTHWORK CALCULATIONS

D11 DOZER

PIT RAMP CALCULATIONS:

Spoil Angle	**35**	degrees
Ramp Width	**70**	ft.
Ramp Slope	**8.0%**	

Riverdale - (9503) 101 Pits	Depth of OB To Top Seam	Area at Pit Bottom	Volume (cy)
Ramp R1	**50**	7,070	81,833
Ramp R2	**75**	13,283	230,613
Ramp R3	**40**	5,085	47,084
Total			359,530
Riverdale - (9503) Tavis (Riv 4th Addition)			
Ramp 1	**80**	14,740	272,966
Total			272,966
Riverdale South - (9503)			
Ramp 1	**31**	3,542	25,420
Ramp 2	**31**	3,542	25,420
Total			50,841
East - (8405) 102 Pits			
Ramp 1	**75**	13,283	230,613
Ramp 2	**80**	14,740	272,966
Ramp 3	**80**	14,740	272,966
Ramp 4	**80**	14,740	272,966
Total			1,049,510
Overall Total			**1,732,847**

ASSOCIATED DISTURBANCE

Miscellaneous Projects:

D11 Dozer	C.Y.	Push (ft.)	Hours	Length
Ramps	**1,732,847**	**300**	2,476	
Scraper Access Road (ss)	**11,305**	**100**	6	
Access Road (ss)	**39,897**	**100**	21	
Cable Belt (ss)	**73,000**	**100**	39	
Haulroad Subsoil	**1,461,468**	**100**	777	160,000
HWY 200 Bridge (concrete out of row)	**8,000**	**200**	8	
Gravel Pits (8705)	**193,000**	**400**	359	
Dragline Rebuild Site (8705)	**150,000**	**300**	214	
TOTALS	3,669,517		3,901	
AVERAGE		219		

Ponds:

D11 Dozer	C.Y.	Push (ft.)	Hours
P-E07-01	**5,000**	**200**	5
P-E07-02 (PW)	**60,000**	**200**	59
P-E12-01	**10,000**	**200**	10
P-E12-02	**50,000**	**200**	49
P-E12-03	**15,000**	**200**	15
P-E12-04	**20,000**	**200**	20
P-E12-05	**10,000**	**200**	10
P-E12-06	**60,000**	**200**	59
P-E13-01	**58,000**	**200**	57
P-E13-02	**8,000**	**200**	8
P-E13-06	**35,000**	**200**	35
P-E14-01	**26,000**	**200**	26
P-E15-01	**44,000**	**200**	43
P-E15-02	**10,000**	**200**	10
P-E16-01	**100,000**	**250**	121
P-E18-01	**20,000**	**200**	20
P-E18-02	**10,000**	**200**	10
P-E23-01	**20,000**	**200**	20
P-E26-01	**16,800**	**300**	24
P-E34-01	**10,300**	**250**	12
P-E34-02	**10,000**	**250**	12
P-E34-03	**9,800**	**250**	12
P-E34-04	**11,200**	**150**	9
P-E34-05	**10,200**	**250**	12
P-E34-07	**12,800**	**200**	13
P-E34-08	**1,500**	**75**	1
P-E35-01	**10,600**	**250**	13
P-E35-02	**11,500**	**100**	6
P-R01-01	**65,000**	**200**	64
P-R01-02	**65,000**	**250**	79
P-R01-03	**5,000**	**150**	4
P-R01-04	**25,000**	**150**	19
P-R4-01	**50,000**	**200**	49
P-R4-02	**35,000**	**250**	42
P-R4-03	**45,000**	**150**	34
P-R4-04	**10,000**	**150**	8
P-R6-01	**65,000**	**150**	49
P-R07-06 (PW)	**60,000**	**200**	59
P-R9-01	**20,000**	**125**	13
P-R9-02	**20,000**	**175**	17
P-R12-08	**45,000**	**175**	39
P-R13-02	**16,000**	**300**	23
P-R14-01	**9,000**	**100**	5
P-R15-01	**220,000**	**200**	217
P-R19-02	**108,100**	**300**	154
P-R21-02	**160,000**	**300**	229
P-R25-03	**20,700**	**300**	30
P-R25-04	**32,300**	**300**	46
P-R33-02	**55,000**	**250**	66
P-R36-02	**25,000**	**200**	25
P-R36-03	**11,500**	**200**	11
P-R36-04	**5,000**	**200**	5
P-W04-01	**10,000**	**300**	14
P-W04-02	**2,500**	**150**	2
P-W04-03	**10,000**	**150**	8
P-W05-01	**11,100**	**200**	11
P-W05-02	**4,200**	**150**	3

Ponds:

D11 Dozer	C.Y.	Push (ft.)	Hours
P-W05-03	**4,200**	**200**	4
P-W05-04	**3,200**	**200**	3
P-W05-05	**14,500**	**250**	18
P-W06-02	**30,000**	**300**	43
P-W06-03	**4,900**	**200**	5
P-W06-04	**20,000**	**100**	11
P-W06-05	**6,000**	**250**	7
P-W06-06	**15,000**	**300**	21
P-W06-07	**19,300**	**350**	32
P-W08-02	**9,000**	**200**	9
P-W08-03	**9,000**	**200**	9
P-W22-01	**13,000**	**300**	19
P-W28-01	**2,100**	**250**	3
P-W27-01	**3,400**	**100**	2
P-W29-04	**11,200**	**200**	11
P-W30-03	**10,000**	**250**	12
P-W31-03	**26,400**	**250**	32
P-W32-01	**3,000**	**200**	3
P-W32-02	**6,000**	**400**	11
P-W33-01	**9,700**	**350**	16
P-W33-02	**5,600**	**350**	9
TOTALS	2,101,600		2,293
AVERAGE		218	

Diversions:

D11 Dozer	C.Y.	Push (ft.)	Hours
D-E23-01	**7,500**	**75**	3.1
D-E23-02	**770**	**75**	0.3
D-E23-03	**660**	**75**	0.3
D-E23-04	**880**	**75**	0.4
D-E26-01	**1,500**	**75**	0.6
D-E26-02	**2,500**	**75**	1.0
D-E34-02	**1,330**	**75**	0.6
D-E34-03	**4,270**	**75**	1.8
D-E34-04	**2,050**	**75**	0.9
D-E34-05	**2,270**	**75**	0.9
D-E34-06	**2,470**	**75**	1.0
D-E34-07	**7,050**	**75**	2.9
D-E34-08	**4,560**	**75**	1.9
D-E35-01	**4,000**	**75**	1.7
D-E35-02	**2,140**	**75**	0.9
D-W22-03	**3,889**	**75**	1.6
D-W22-01	**7,778**	**75**	3.2
D-W31-03	**8,444**	**75**	3.5
TOTALS	64,061		26.8
AVERAGE		75	

GRAND TOTAL DOZER	5,835,178	217	6,221

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EARTHWORK CALCULATIONS

657E SCRAPER

Ponds\ Diversions:	C.Y.	Haul (ft.)	Hours	Length
P-E34-06	**34,100**	**1,900**	99	
P-E34-07	**5,500**	**600**	9	
P-R13-01	**42,000**	**1,500**	106	
P-R13-02	**50,000**	**800**	103	
D-R13-01	**12,500**	**1,200**	26	
D-R13-02	**3,900**	**1,201**	8	
P-R14-01	**35,700**	**1,000**	80	
D-R14-01	**5,800**	**1,000**	17	
P-R14-02	**14,700**	**1,000**	23	
D-R18-01	**3,800**	**1,200**	11	
P-R36-01	**100,000**	**1,900**	186	
P-W04-10	**6,200**	**500**	16	
P-W05-05	**14,500**	**2,600**	30	
P-W06-01	**14,800**	**800**	30	
P-W06-02	**30,000**	**1,500**	62	
P-W06-06	**31,900**	**1,000**	53	
P-W06-07	**19,300**	**1,000**	40	
P-W28-01	**284,000**	**1,000**	583	
P-W29-02	**26,500**	**600**	44	
Legal Drain Diversion	**216,000**	**3,000**	651	
TOTALS	951,200	1,617	2,178	

Miscellaneous Projects:	C.Y.	Haul (ft.)	Hours	Length	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
Haulroad Gravel	**210,000**	**4,500**	826		966.5	217	331.9	651.8	3.0
Haulroad Grading (8405)	**525,000**	**1,800**	1,481						-
Haulroad Grading (8705)	**520,000**	**3,000**	1,567		966.5	538	399.8	1,614.1	3.0
Haulroad Grading (9503)	**500,000**	**2,500**	1,353						-
Cable Belt Cut/Fill	**87,000**	**2,600**	241						-
Cable Belt Gravel Disposal	**20,000**	**6,500**	103		966.5	21	272.2	82.8	4.0
HWY 200 Bridge (Subcut Fill)	**250,000**	**1,500**	633						-
Riverdale Bridge Removal	**2,000**	**34,000**	44						-
DL Deadhead Route Grading (ss)	**260,000**	**1,000**	534						-
Dragline Rebuild Site Gravel	**7,500**	**1,600**	20						-
Dragline Rebulid Site Grading	**20,000**	**500**	32						-
Dragline Rebuild Site Concrete	**850**	**1,600**	2		Misc Pro				-
TOTAL	2,402,350	2,407	6,836	0		776		2,349	

Public Road Reconstruction (Grading)

NAFK-9503									
Construct E-W S22/27 - 1 mile	**27,000**	**1,000**	55.5						
Construct N-S S14/15 - 1 mile	**27,000**	**1,000**	55.5						
Remove E-W between S26/35 &S25/36 - 2 mile	**54,756**	**1,000**	112.5						
Construct N-S S22/23 - 1 mile	**27,000**	**1,000**	55.5						
Construct N-S S26/27 - 1 mile	**27,000**	**1,000**	55.5						
Construct E-W S35&S36/4 - 0.5 mile	**13,500**	**1,000**	27.7						
Gravel	**5,000**	**1,000**	10.3						
NAFK-8705									
N-S between S32/5 & S33/4 - 1 miles	**27,000**	**1,000**	55.5						
N-S between S5/6 (8705) & S7/8 (9503)- .5 miles	**27,378**	**1,000**	56.2						
NAFK-8405									
Construct E-W S12/13 - .5 miles	**13,500**	**1,000**	27.7						
Remove E-W between S22/27 - 1.75 miles	**47,250**	**1,000**	97.1						
TOTALS	296,383	1,000	609						
GRAND TOTAL SCRAPER	3,649,933	2,087	9,623						

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Mining Disturbance

Backfill Open Pit:

NAFK - 9503				
101 Riv Pit - 10,000 ft.		C.Y.	Haul/Push (ft.)	Hours
Spoil Side				
	Grading - D11N Dozer	**1,791,481**	**300**	2,560
	Scrapers	**442,222**	**500**	697
Highwall Side				
	D11N Dozer	**2,400,000**	**250**	2,902
TOTAL		4,633,703		

NAFK - 8405 (NE)				
102 Pits NE Mine Area - 1,700 ft.	**A-A'**	C.Y.	Haul/Push (ft.)	Hours
Spoil Side -				
	Grading - D11N Dozer	**290,574**	**350**	478
	657E Scraper	**148,215**	**620**	251
Highwall Side				
	D11N Dozer	**411,967**	**150**	313
TOTAL		850,756		

NAFK - 8405 (NE)				
102 Pits NE Mine Area - 10,000 ft.	**B-B'**	C.Y.	Haul/Push (ft.)	Hours
Spoil Side -				
	Grading - D11N Dozer	**714,074**	**350**	1,175
	657E Scraper	**1,622,593**	**800**	3,023
Highwall Side				
	D11N Dozer	**4,408,148**	**400**	8,200
TOTAL		6,744,815		

NAFK - 8405 (NE)				
102 Pits NE Mine Area - 3,000 ft.	**C-C'**	C.Y.	Haul/Push (ft.)	Hours
Spoil Side -				
	Grading - D11N Dozer	**232,111**	**220**	250
	Grading - D11N Dozer	**566,444**	**100**	685
Highwall Side				
	D11N Dozer	**196,111**	**300**	280
Stock Pile		**2,000,000**	**7,000**	
	777D Trucks			8,277
	992G Loader			2,069
TOTAL		2,994,666		

NAFK - 9503 (Riv South)				
195 M Pits - 1,900 ft.		C.Y.	Haul/Push (ft.)	Hours
Spoil Side -				
	Grading - D11N Dozer	**171,563**	**250**	207
Highwall Side				
	D11N Dozer	**80,785**	**100**	43
TOTAL		252,348		

NAFK - 9503 (Riv 4th Tavis)				
NW Pits - 1650'		C.Y.	Haul/Push (ft.)	Hours
Spoil Side				
	Grading - D11N Dozer	**676,000**	**300**	966
Highwall Side				
	D11N Dozer	**494,000**	**250**	597
Stock Pile		**2,000,000**	**6,000**	
	777D Trucks			8,277
	992G Loader			2,069
TOTAL		3,170,000		

Summary	657E SCRAPER	D11N DOZER	992G LOADER	777D Trucks
Pit Grading Spoil	3,971	6,322		
Pit Grading Highwall	0	12,335		
Stock Pile			4,139	16,555
Total	3,971	18,656	4,139	16,555

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SPGM RESPREAD HOURS SUMMARY
Mining Disturbance Area

Machine type: **657E** **Equation:** 1 (1=PSC,0=Falkirk)

Land owner, legal description	Topsoil area (acres)	Subsoil area (acres)	Soil Depth (in.)	Volume (cu yds)	Stockpile Location	Haul Dist.	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
NAFK - 9503 (T145N R83W)														
Section 1 - T145N R84W	**163**	**0.0**	**12**	262,973.3	**Section 2**	**2,000**	395	0.84	792					-
		40.0	**24**	129,066.7	**Section 2**	**2,000**	395	0.84	389					-
		123.0	**36**	595,320.0	**Section 2**	**2,000**	395	0.84	1,793					-
														-
Section 4 - T144 R83W	**152.5**	**69.1**	**12**	357,514.7	**Section 4**	**1,750**	429	0.84	991					-
		49.2	**24**	158,752.0	**Section 4**	**1,750**	429	0.84	440					-
		34.2	**36**	165,528.0	**Section 4**	**1,750**	429	0.84	459					-
														-
														-
Section 9 - T144 R83W	**16.2**	**16.2**	**12**	52,272.0	**Section 4**	**750**	656	0.84	95					-
														-
Section 15 - T145 R83W	**232.1**		**12**	374,454.7	**TS-297/293**	**6,000**				966.5	387	284.8	1,549.7	4.0
		117.7	**24**	379,778.7	**SS-170**	**16,950**				854.4	444	142.4	2,667.0	6.0
		114.4	**36**	553,696.0	**SS-158/178/182**	**18,600**				792.0	699	132.0	4,194.7	6.0
														-
Section 22 - T145 R83W	**393.9**		**12**	635,492.0	**TS-389/361/295**	**15,500**				910.2	698	151.7	4,189.1	6.0
		230.6	**24**	744,069.3	**SS-160/180**	**19,300**				769.2	967	128.2	5,804.0	6.0
		163.3	**36**	790,372.0	**SS-154/156/172**	**19,000**				778.8	1,015	129.8	6,089.2	6.0
														-
Section 26 - T145 R83W	**43.2**		**12**	69,696.0	**TS-455**	**3,000**	395	0.84	210					-
		8.5	**12**	13,713.3	**SS-210**	**3,000**	395	0.84	41					-
		34.7	**36**	167,948.0	**SS-210**	**3,000**	395	0.84	506					-
														-
														-
Section 27 - T145 R83W	**391.2**		**12**	631,136.0	**TS-317/319/375**	**22,500**				749.4	842	124.9	5,053.1	6.0
		31.9	**24**	102,930.7	**Section 30**	**22,000**				749.4	137	124.9	824.1	6.0
		359.3	**36**	1,739,012.0	**SS-210/186/172/174/New**	**22,500**				749.4	2,321	124.9	13,923.2	6.0
														-
Section 34 - T145N R83W	**247.9**		**12**	399,945.3	**TS-375/377**	**10,500**				966.5	414	201.0	2,069.1	5.0
		21.6	**24**	69,696.0	**SS-186**	**10,500**				966.5	72	201.0	360.6	5.0
		226.3	**36**	1,095,292.0	**SS-187**	**10,500**				966.5	1,133	201.0	5,666.3	5.0
														-
Section 35 - T145N R83W	**396.9**	**27.3**	**12**	684,376.0	**Section 36**	**3,000**	395	0.84	2,062					-
		111.5	**24**	359,773.3	**Section 36**	**3,000**	395	0.84	1,084					-
		258.1	**36**	1,249,204.0	**Section 36**	**3,000**	395	0.84	3,764					-
														-
Section 36 - T145N R83W	**89.4**		**12**	144,232.0	**TS-501**	**1,650**	445	0.84	386					-
		89.4	**12**	144,232.0	**SS-244**	**1,350**	498	0.84	345					-
														-
Section 36 - T146N R84W	**19.4**	**0**	**12**	31,298.7	**Section 36**	**3,000**	395	0.84	94					-
		19.4	**24**	62,597.3	**Section 36**	**3,000**	395	0.84	189					-
														-
TOTALS	**1982.7** Acres			12,164,372 C.Y.				TS AND SS HOURS =	13,642 Scraper Hours		9,131 Loader Hours		52,390 Truck Hours	

Revision 20
Riverdale 4th Addition
Technical Review Response (2)
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SPGM RESPREAD HOURS SUMMARY
Mining Disturbance Area

Machine type: **657E** **Equation:** 1 (1=PSC,0=Falkirk)

Land owner, legal description	Topsoil area (acres)	Subsoil area (acres)	Soil Depth (in.)	Volume (cu yds)	Stockpile Location	Haul Dist.	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
NAFK - 8405 (T146N, R82W)														
Section 11	**122.3**		**12**	197,310.7	**SPGM Storage Area (Sec. 14)**	**8,100**				966.5	204	238.2	1,020.8	5.0
		114.0	**12**	183,920.0	**SS-224**	**10,000**				966.5	190	207.6	951.5	5.0
		8.3	**24**	26,781.3	**SS-224**	**10,000**				966.5	28	207.6	138.5	5.0
														-
Section 12	**353.5**		**12**	570,313.3	**TS Piles-Sec. 13/18**	**7,600**				966.5	590	247.6	2,360.3	4.0
		348.2	**12**	561,762.7	**SS-232/234**	**6,200**				966.5	581	279.3	2,325.0	4.0
		5.3	**24**	17,101.3	**SS-232/234**	**6,200**				966.5	18	279.3	70.8	4.0
														-
Section 13	**11.4**		**12**	18,392.0	**SPGM Storage Area (Sec. 14)**	**5,400**				966.5	19	301.8	76.1	4.0
		9.7	**12**	15,649.3	**SS-224**	**9,800**				966.5	16	210.3	81.0	5.0
		1.7	**24**	5,485.3	**SS-224**	**9,800**				966.5	6	210.3	28.4	5.0
														-
Section 14	**332.6**		**12**	536,594.7	**TS - 199**	**16,000**				890.4	603	148.4	3,615.9	6.0
		18.5	**12**	29,846.7	**SS - 132**	**16,000**				890.4	34	148.4	201.1	6.0
		314.1	**24**	1,013,496.0	**SS - 132**	**16,000**				890.4	1,138	148.4	6,829.5	6.0
														-
														-
Section 15	**203.2**		**12**	327,829.3	**TS Piles - Sect 34**	**16,000**				890.4	368	148.4	2,209.1	6.0
		172.6	**12**	278,461.3	**SS Piles - Sect 34**	**16,000**				890.4	313	148.4	1,876.4	6.0
		30.6	**24**	98,736.0	**SS Piles - Sect 34**	**16,000**				890.4	111	148.4	665.3	6.0

NAFK 8705 (T146N, R82W)

- **No mining disturbances**

TOTALS	**1,023.0**	Acres	3,881,680	C.Y.	TS AND SS HOURS =	0	4,218		22,450
Overall Totals	**3,005.7**		16,046,052	C.Y.	Scraper TS and SS Hours =	13,642	Loader Hrs.=	13,349	Truck Hrs.=	74,840

Revision 20
Riverdale 4th Addition
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June, 2011

SPGM RESPREAD HOURS SUMMARY
Associated Disturbance Area

13 Machine type: **657E**

Land owner, legal description	Stockpiles, Misc. Topsoil Area (acres)	Stockpiles, Misc. Subsoil Area (acres)	Ponds & Diversions Topsoil Area (acres)	Ponds & Diversions Subsoil Area (acres)	Roads & Trails Topsoil Area (acres)	Roads & Trails Subsoil Area (acres)	Soil depth (in.)	Volume (cu yds)	Stockpile Location	Haul Distance	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
NAFK-9503																		
Section 1 - T145 R84W																		-
Ponds			**11.7**				**12**	18,876	**SPGM Storage Areas (Section 1/36)**	**1500**	470	0.84	48					-
Ponds				**7.7**			**24**	24,845	**SPGM Storage Areas (Section 1/36)**	**1500**	470	0.84	63					-
Ponds				**4.0**			**36**	19,360	**SPGM Storage Areas (Section 1/36)**	**1500**	470	0.84	49					-
Haulroads					**5.5**		**12**	8,873	**SPGM Storage Area (Section 1)**	**700**	674	0.63	21					-
Overburden pile	**12.7**	**12.7**					**12**	40,979	**SPGM Storage Area (Section 1)**	**1300**	508	0.84	96					-
																		-
																		-
Section 4 - T144 R83W																		-
Ponds			**18.0**	**6.6**			**12**	39,688	**TS-391/377/375**	**1500**	470	0.84	101					-
Ponds				**11.4**			**24**	36,784	**SPGM Storage Area (Section 4)**	**500**	755	0.63	77					-
Diversions			**1.1**	**1.1**			**12**	3,549	**TS-393**	**2000**	395	0.84	11					-
Overburden pile			**2.1**	**2.1**			**12**	6,776	**SPGM Storage Area (Section 4)**	**500**	755	0.63	14					-
Haulroads					**7.0**		**12**	11,293	**TS-393**	**1000**	579	0.84	23					-
																		-
Section 5 - T144 R83W																		-
Ponds			**9.2**				**12**	14,843	**SPGM Storage Area (Section 5)**	**1000**	579	0.84	30					-
Ponds				**9.2**			**24**	29,685	**SPGM Storage Area (Section 5)**	**1000**	579	0.84	61					-
Diversions			**0.4**	**0.4**			**12**	1,291	**SPGM Storage Area (Section 5)**	**4000**	328	0.84	5					-
Overburden pile	**3.6**	**3.6**					**12**	11,616	**SPGM Storage Area (Section 5)**	**1300**	508	0.84	27					-
																		-
Section 6 - T144 R83W																		-
Ponds			**2.1**				**12**	3,388	**SPGM Storage Area (Section 6)**	**350**	830	0.63	6					-
Ponds				**2.1**			**24**	6,776	**SPGM Storage Area (Section 6)**	**351**	829	0.63	13					-
Overburden pile	**1.2**	**1.2**					**12**	3,872	**SPGM Storage Area (Section 6)**	**350**	830	0.63	7					-
																		-
Section 7 - T145 R82W																		-
Substation	**0.90**						**12**	1,452	**TS-SECT 7**	**2500**	440	0.84	4					-
Borrow Pit	**5.30**						**12**	8,551	**TS-279/HR**	**600**	712	0.63	19					-
Borrow Pit		**5.30**					**36**	25,652	**SS-212**	**800**	639	0.63	64					-
Haulroads					**50.6**		**12**	81,635	**TS-SECT 7**	**2500**	440	0.84	221					-
Subsoil Piles	**2.30**						**12**	3,711	**TS-99/101/279**	**2500**	440	0.84	10					-
Access Trails					**8.6**		**12**	13,875	**TS-SECT 7**	**1000**	579	0.84	29					-
																		-
Section 7 - T145 R83W																		-
Ponds			**7.6**	**7.6**			**12**	24,523	**SPGM Storage Area (Section 7)**	**750**	656	0.63	59					-
Haulroads					**24.3**		**12**	39,204	**SPGM Storage Area (Section 7)**	**1500**	470	0.84	99					-
																		-
Section 8 - T145 R83W																		-
Haulroads					**24.3**		**12**	39,204	**TS Storage Area (Section 8)**	**1500**	470	0.84	99					-
																		-
Section 9 - T145 R83W																		-
Haulroads					**24.5**		**12**	39,527	**TS Storage Area (Section 9)**	**1500**	470	0.84	100					-
																		-
Section 9 - T144 R83W																		-
Ponds			**6.3**	**6.3**			**12**	20,328	**SPGM Storage Area (Section 9)**	**1300**	508	0.84	48					-
Diversions			**1.5**	**1.5**			**12**	4,840	**SPGM Storage Area (Section 9)**	**1100**	554	0.84	10					-
Overburden pile			**1.4**	**1.4**			**12**	4,517	**SPGM Storage Area (Section 9)**	**500**	755	0.63	9					-
SPGM Piles							**12**	0	**SPGM Storage Area (Section 9)**	**200**	919	0.63	0					-
																		-
Section 10 - T145 R83W																		-
Ponds			**8.7**				**12**	14,036	**TS-R-10-01**	**800**	639	0.63	35					-
Haulroads					**26.1**		**12**	42,108	**TS Storage Area (Section 10)**	**1500**	470	0.84	107					-
																		-
Section 11 - T145 R83W																		-
Haulroads					**25.1**		**12**	40,495	**TS Storage Area (Section 11)**	**1500**	470	0.84	103					-
																		-
Section 12 - T145 R83W																		-
Haulroads					**24.4**		**12**	39,365	**TS Storage Area (Section 12)**	**1500**	470	0.84	100					-
																		-
Section 12 - T145 R84W																		-
Haulroads					**17.5**		**12**	28,233	**TS Storage Area (Section 12)**	**1000**	579	0.84	58					-
Ponds			**16.2**	**16.2**			**12**	52,272	**SPGM Storage Area (Section 12)**	**800**	639	0.63	130					-
Overburden pile	**57.9**	**57.9**					**12**	186,824	**SPGM Storage Area (Section 12)**	**500**	755	0.63	393					-
																		-
Section 13 - T145N R83W																		-
Ponds			**42.3**				**12**	68,244	**SPGM-R14-01/TS-385/299/399**	**1000**	579	0.84	140					-
Diversions			**2.4**				**12**	3,872	**TS-385/TS-299**	**1600**	453	0.84	10					-
Borrow Pit	**25.4**						**24**	81,957	**TS-417**	**800**	639	0.63	204					-
Subsoil Piles	**21.60**						**12**	34,848	**TS-293/TS-299**	**1200**	530	0.84	78					-
Haulroads					**26.0**		**12**	41,947	**TS-293**	**3500**	359	0.84	139					-
Overburden pile	**4.10**						**24**	13,229	**TS-385**	**1000**	579	0.84	27					-
																		-

Revision 20
Riverdale 4th Addition
Technical Review Response (2)
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SPGM RESPREAD HOURS SUMMARY
Associated Disturbance Area

13 Machine type: **657E**

Land owner, legal description	Stockpiles, Misc. Topsoil Area (acres)	Stockpiles, Misc. Subsoil Area (acres)	Ponds & Diversions Topsoil Area (acres)	Ponds & Diversions Subsoil Area (acres)	Roads & Trails Topsoil Area (acres)	Roads & Trails Subsoil Area (acres)	Soil depth (in.)	Volume (cu yds)	Stockpile Location	Haul Distance	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
Section 14 - T145N R83W																		-
Ponds			**10.8**				**12**	17,424	**TS-399**	**1000**	579	0.84	36					-
Subsoil Piles	**2.60**						**12**	4,195	**TS-400**	**2000**	395	0.84	13					-
Diversions			**4.0**				**12**	6,453	**TS-400**	**2000**	395	0.84	19					-
Haulroads					**26.4**		**12**	42,592	**TS-389**	**4500**				966.5	44	331.9	132.2	3.0
																		-
Section 15 - T145N R83W																		-
Ponds			**35.4**				**12**	57,112	**TS - 463**	**1000**	579	0.84	117					-
Ponds				**35.4**			**12**	57,112	**SS - 216**	**1000**	579	0.84	117					-
Subsoil Piles	**6.90**						**12**	11,132	**TS - 463**	**850**	623	0.63	28					-
Haulroads					**13.6**		**12**	21,941	**TS - 465**	**3500**	359	0.84	73					-
																		-
Section 15 - T145N R83W																		-
Ponds			**7.3**				**12**	11,777	**SPGM Storage Area (Section 21)**	**1300**	508	0.84	28					-
Ponds				**7.3**			**12**	11,777	**SPGM Storage Area (Section 21)**	**1300**	508	0.84	28					-
																		-
Section 18 - T145N R82W																		-
Diversions			**0.5**				**12**	807	**TS-293**	**1000**	579	0.84	2					-
Borrow Pits	**35.50**						**12**	57,273	**TS-291/323/289**	**1200**	530	0.84	129					-
Haulroads					**42.8**		**12**	69,051	**TS-293**	**3000**	395	0.84	208					-
																		-
Section 19 - T145N R82W																		-
Ponds			**35.5**				**12**	57,273	**TS-295**	**1200**	530	0.84	129					-
Ponds				**35.5**			**12**	57,273	**SS-178**	**1200**	530	0.84	129					-
Subsoil Piles	**14.70**						**12**	23,716	**TS-295/361**	**800**	639	0.63	59					-
Haulroads					**6**		**12**	9,680	**TS-293**	**1000**	579	0.84	20					-
																		-
Section 21 - T145N R83W																		-
Ponds			**15.5**				**12**	25,007	**SPGM Storage Area (Section 21)**	**1700**	437	0.84	68					-
Ponds				**15.5**			**12**	25,007	**SPGM Storage Area (Section 21)**	**1700**	437	0.84	68					-
Overburden Piles	**2.00**						**12**	3,227	**SPGM Storage Area (Section 21)**	**475**	767	0.63	7					-
																		-
																		-
Section 22 - T145N R83W																		-
Haulroads					**32.4**		**12**	52,272	**TS - 461**	**5200**				966.5	54	307.8	216.3	4.0
																		-
Section 23 - T145N R83W																		-
Subsoil Piles	**7.10**						**12**	11,455	**TS-441/449**	**1000**	579	0.84	24					-
Haulroads					**24.1**		**12**	38,881	**TS-449**	**900**	608	0.63	102					-
																		-
Section 24 - T145N R83W																		-
Subsoil Piles	**8.90**						**12**	14,359	**TS-297**	**600**	712	0.63	32					-
Haulroads					**38.3**		**12**	61,791	**TS-359/387/441/449**	**1000**	579	0.84	127					-
Haulroads						**30.0**	**12**	48,400	**SS-182**	**2200**	372	0.84	155					-
Access Trails					**0.6**		**12**	968	**TS-361**	**500**	755	0.63	2					-
																		-
Section 25 - T145N R83W																		-
Ponds			**21.9**				**12**	35,332	**TS-375/377**	**2100**	383	0.84	110					-
Heat Enclosure Pad	**5.70**						**12**	9,196	**TS-375/377**	**2100**	383	0.84	29					-
Subsoil Piles	**16.50**						**12**	26,620	**TS-303**	**2700**	421	0.84	75					-
Haulroads					**20.0**		**12**	32,267	**TS-375/377**	**2500**	440	0.84	87					-
Haulroads						**2.7**	**12**	4,356	**SS-180**	**1000**	579	0.84	9					-
Access Trails					**2.9**		**12**	4,679	**TS-303**	**2200**	372	0.84	15					-
Overburden pile	**4.10**						**48**	26,459	**TS-301**	**3000**	395	0.84	80					-
																		-
Section 26 - T145N R83W																		-
Subsoil Piles	**9.90**						**12**	15,972	**TS-303**	**2700**	421	0.84	45					-
Haulroads					**20.5**		**12**	33,073	**TS-377/375**	**4000**	328	0.84	120					-
																		-
Section 27 - T145N R83W																		-
Haulroads					**18.1**		**12**	29,201	**TS-377/375**	**8800**				966.5	30	225.6	151.1	5.0
Subsoil Piles	**3.5**						**12**	5,647	**TS-455**	**4000**	328	0.84	20					-
																		-
Section 30 - T145N R82W																		-
Subsoil Piles	**33.7**						**12**	54,369	**TS-301/307/311**	**1000**	579	0.84	112					-
Access Trails					**2.0**		**12**	3,227	**TS-303**	**2300**	361	0.84	11					-
																		-
Section 33 - T146 R84W																		-
Ponds			**0.7**	**0.7**			**12**	2,259	**SPGM Storage Area (Section 33)**	**400**	803	0.63	4					-
Overburden pile	**1.2**	**1.2**					**12**	3,872	**SPGM Storage Area (Section 33)**	**300**	858	0.63	7					-
																		-
Section 34 - T145 R83W																		-
Subsoil Piles	**5.0**						**12**	8,067	**TS Storage Area (Section 35)**	**600**	712	0.63	18					-
Diversions			**0.2**				**12**	323	**TS Storage Area (Section 5)**	**4700**				966.5	0	324.8	1.0	3.0
Haulroads					**10.2**		**12**	16,456	**TS Storage Area (Section 35)**	**1500**	470	0.84	42					-
																		-
Section 35 - T145 R83W																		-
Subsoil Piles	**5.0**						**12**	8,067	**TS Storage Area (Section 35)**	**600**	712	0.63	18					-
Haulroads					**16.1**		**12**	25,975	**TS Storage Area (Section 35)**	**1500**	470	0.84	66					-

Revision 20
Riverdale 4th Addition
Technical Review Response (2)
June, 2011

SPGM RESPREAD HOURS SUMMARY
Associated Disturbance Area

13 Machine type: **657E**

Land owner, legal description	Stockpiles, Misc. Topsoil Area (acres)	Stockpiles, Misc. Subsoil Area (acres)	Ponds & Diversions Topsoil Area (acres)	Ponds & Diversions Subsoil Area (acres)	Roads & Trails Topsoil Area (acres)	Roads & Trails Subsoil Area (acres)	Soil depth (in.)	Volume (cu yds)	Stockpile Location	Haul Distance	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
																		-
Section 36 - T145 R83W																		-
Ponds			**10.0**				**12**	16,133	**TS-391/393/501**	**1500**	470	0.84	41					-
Ponds				**6.4**			**12**	10,325	**SS-254**	**1500**	470	0.84	26					-
Subsoil Piles	**14.8**						**12**	23,877	**TS-391/393/501**	**600**	712	0.63	53					-
Overburden pile	**3.0**	**3.0**					**12**	9,680	**TS-254/391**	**250**	888	0.63	17					-
Haulroads					**5.8**		**12**	9,357	**TS-393/501**	**1500**	470	0.84	24					-
																		-
Section 36 - T146 R84W																		-
Ponds			**3.4**	**3.4**			**12**	10,971	**TS-391/377/375**	**1500**	470	0.84	28					-
Subsoil Piles	**1.2**						**12**	1,936	**TS-392**	**600**	712	0.63	4					-
Overburden pile	**2.4**	**2.4**					**12**	7,744	**TS-391**	**250**	888	0.63	14					-
																		-
																		-
NAFK-8705																		-
																		-
Section 3, T145 N, R82W																		-
Gravel Pit	**18.4**						**12**	29,685	**TS-47/51**	**700**	674	0.63	70					-
Dragline DH Route					**2.5**		**12**	4,033	**TS-451**	**600**	712	0.63	9					-
Haul Road					**11.0**		**12**	17,747	**TS-45**	**1600**	453	0.84	47					-
Subsoil Piles	**3.5**						**12**	5,647	**TS-47/51**	**800**	639	0.63	14					-
																		-
Section 4, T145 N, R82W								0										-
Diversions			**0.6**				**12**	968	**TS-419**	**1300**	508	0.84	2					-
Ponds			**16.6**				**12**	26,781	**TS-9/197/263**	**2500**	440	0.84	72					-
Dragline DH Route					**7.9**		**12**	12,745	**TS-191**	**800**	639	0.63	32					-
Subsoil Piles	**5.9**						**12**	9,519	**TS-197**	**500**	755	0.63	20					-
Haul Road					**42.5**		**12**	68,567	**TS-45/419**	**2100**	383	0.84	213					-
Cablebelt	**6.3**						**12**	10,164	**TS-197**	**2500**	440	0.84	28					-
Access Trails					**1.8**		**12**	2,904	**TS-137**	**600**	712	0.63	6					-
								0										-
Section 5, T145 N, R82W																		-
Ponds			**12.9**				**12**	20,812	**TS-5/49/63**	**500**	755	0.63	44					-
Subsoil Piles	**14.5**						**12**	23,393	**TS-39**	**500**	755	0.63	49					-
Haul Road					**5.7**		**12**	9,196	**TS-5/39**	**500**	755	0.63	19					-
Haul Road						**2.5**	**12**	4,033	**SS-12**	**1500**	470	0.84	10					-
																		-
Section 6, T145 N, R82W																		-
Ponds			**25.6**				**12**	41,301	**TS-21/23/25/67/85**	**800**	639	0.63	103					-
Ponds				**3.3**			**36**	15,972	**SS-8/18**	**700**	674	0.63	38					-
Subsoil Piles	**37.2**						**12**	60,016	**TS-21/25/35/37**	**700**	674	0.63	141					-
Haul Road					**56.2**		**12**	90,669	**TS-21/35/37/71**	**3700**	346	0.84	312					-
Haul Road						**14.5**	**12**	23,393	**SS-18/20/212**	**6000**				966.5	24	284.8	96.8	4.0
Haul Road						**18.0**	**36**	87,120	**SS-18/20/212**	**3000**	395	0.84	263					-
Access Trails					**11.0**		**12**	17,747	**TS-25/85/105**	**800**	639	0.63	44					-
Access Trails						**1.0**	**12**	1,613	**TS-8**	**500**	755	0.63	3					-
																		-
Section 8, T145 N, R82W																		-
Subsoil Piles	**1.7**						**12**	2,743	**TS-99/101**	**300**	858	0.63	5					-
																		-
Section 22, T146 N, R83W																		-
Ponds			**6.3**				**12**	10,164	**TS-235**	**800**	639	0.63	25					-
Diversion			**1.7**				**12**	2,743	**TS-235**	**900**	608	0.63	7					-
Dragline Storage					**24.2**		**12**	39,043	**TS-211**	**1600**	453	0.84	103					-
																		-
Section 25, T146N, R83W																		-
Haul Road					**12.2**		**12**	19,683	**TS Storage Area (Section 25)**	**2500**	440	0.84	53					-
																		-
Section 27, T146N, R83W																		-
Ponds			**4.9**				**12**	7,905	**TS-209**	**600**	712	0.63	18					-
Diversions			**0.2**				**12**	323	**TS-209**	**300**	858	0.63	1					-
																		-
Section 28, T146N, R82W																		-
Ponds			**8.8**				**12**	14,197	**TS-435**	**800**	639	0.63	35					-
Overburden	**0.6**						**12**	968	**TS-435**	**300**	858	0.63	2					-
Overburden		**0.6**					**12**	968	**SS-196**	**150**	952	0.63	2					-
Subsoil Piles	**0.8**						**12**	1,291	**TS-435**	**300**	858	0.63	2					-
Haul Roads					**7.8**		**12**	12,584	**TS - 451**	**8500**				966.5	13	231.1	65.1	5.0
																		-
Section 29, T146N, R82W																		-
Ponds			**11.7**				**12**	18,876	**TS-109/121**	**1500**	470	0.84	48					-
Subsoil Piles	**5.3**						**12**	8,551	**TS-121/151**	**700**	674	0.63	20					-
																		-
Section 30, T146N, R82W																		-
Ponds			**1.4**				**12**	2,259	**TS-151**	**600**	712	0.63	5					-
Haul Roads					**8.4**		**12**	13,552	**TS Storage Area (Section 25)**	**2400**	351	0.84	46					-
Subsoil Piles	**2.2**						**12**	3,549	**TS-151**	**600**	712	0.63	8					-
																		-

Revision 20
Riverdale 4th Addition
Technical Review Response (2)
June, 2011

SPGM RESPREAD HOURS SUMMARY
Associated Disturbance Area

13 Machine type: **657E**

Land owner, legal description	Stockpiles, Misc. Topsoil Area (acres)	Stockpiles, Misc. Subsoil Area (acres)	Ponds & Diversions Topsoil Area (acres)	Ponds & Diversions Subsoil Area (acres)	Roads & Trails Topsoil Area (acres)	Roads & Trails Subsoil Area (acres)	Soil depth (in.)	Volume (cu yds)	Stockpile Location	Haul Distance	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
Section 31, T146N, R82W																		-
Ponds			**5.6**				**12**	9,035	**S1/2 Section 6**	**6000**				966.5	9	284.8	37.4	4.0
Ponds				**5.6**			**12**	9,035	**S1/2 Section 6**	**6000**				966.5	9	284.8	37.4	4.0
Diversions			**1.7**				**12**	2,743	**S1/2 Section 6**	**6000**				966.5	3	284.8	11.4	4.0
Haul Roads					**12.1**		**12**	19,521	**TS Storage Area (Section 31)**	**2000**	395	0.84	58.8					-
																		-
Section 32, T146N, R82W																		-
Ponds			**27.6**				**12**	44,528	**S1/2 Section 6**	**7000**				966.5	46	260.1	184.3	4.0
Diversions			**4.0**				**12**	6,453	**TS-123**	**2000**	395	0.84	19					-
Subsoil Piles	**18.7**						**12**	30,169	**S1/2 Section 6**	**7000**				966.5	31	260.1	124.9	4.0
								0										-
Section 33, T146N, R82W								0										-
Ponds			**31.2**				**12**	50,336	**TS-439**	**2500**	440	0.84	136					-
Ponds				**31.2**			**12**	50,336	**SS-128**	**3500**	359	0.84	167					-
Diversions			**0.4**				**12**	645	**TS-123**	**2000**	395	0.84	2					-
Haul Roads					**24.9**		**12**	40,172	**TS-419**	**3700**	346	0.84	138					-
Cablebelt	**1.4**						**12**	2,259	**TS-439**	**200**	919	0.63	4					-
																		-
Section 34, T146N, R82W																		-
Haul Roads					**7.2**		**12**	11,616	**TS-451**	**1500**	470	0.84	29					-
Cablebelt	**3.2**						**12**	5,163	**TS-451**	**1200**	530	0.84	12					-
																		-
																		-
NAFK-8405																		-
																		-
Section 7																		-
Ponds			**4.3**	**4.3**			**12**	13,875	**TS/SS Section 12**	**750**	656	0.63	34					-
																		-
Section 11																		-
Ponds			**51.6**	**51.6**			**12**	166,496	**TS/SS Section 11**	**750**	656	0.63	403					-
																		-
Section 12																		-
Haul Roads			**0.7**				**12**	1,065	**TS Section 12**	**4000**	328	0.84	4					-
Ponds			**22.3**	**22.3**			**12**	71,955	**TS/SS Section 12**	**650**	692	0.63	165					-
Diversions			**0.6**				**12**	887	**TS Section 12**	**1200**	530	0.84	2					-
																		-
Section 13																		-
Ponds			**11.1**	**11.1**			**12**	35,816	**TS Section 13**	**3200**	380	0.84	112					-
Diversions			**1.2**	**1.2**			**12**	3,872	**TS Section 13**	**3500**	359	0.84	13					-
Haul Road					**4.6**		**12**	7,421	**TS Section 13**	**3500**	359	0.84	25					-
																		-
Section 14																		-
Ponds	**3.3**	**3.3**					**12**	10,648	**TS/SS Section 14**	**850**	623	0.63	27					-
Diversions	**0.3**	**0.3**					**12**	968	**TS Section 14**	**6000**				966.5	1	284.8	4.0	4.0
Subsoil Piles	**3.0**						**12**	4,840	**TS Section 14**	**9500**				966.5	5	214.7	25.0	5.0
Haul Road					**25.6**	**4.6**	**12**	48,723	**TS Section 14**	**8000**				966.5	50	239.9	252.1	5.0
																		-
Section 15																		-
Ponds			**17.9**	**17.9**			**12**	57,757	**TS/SS Section 15**	**750**	656	0.63	140					-
Haul Road					**1.9**	**1.9**	**12**	6,131	**TS Section 15**	**500**	755	0.63	13					-
																		-
Section 16																		-
Ponds			**14.60**	**14.60**			**12**	47,109	**TS/SS Section 16**	**750**	656	0.63	114					-
Diversion			**0.70**				**12**	1,129	**TS Section 16**	**500**	755	0.63	2					-
																		-
Section 18																		-
Ponds			**2.50**				**12**	4,033	**TS Section 18**	**2000**	395	0.84	12					-
Diversion			**1.20**				**12**	1,936	**TS Section 18**	**2000**	395	0.84	6					-
Subsoil Piles	**14.6**						**12**	23,555	**TS Section 18**	**500**	755	0.63	50					-
																		-
Section 22																		-
Heat Enclosure Pad	**9.7**						**12**	15,649	**TS-475**	**1700**	437	0.84	43					-
Heat Enclosure Pad		**6.4**					**12**	10,325	**SS-224**	**1700**	437	0.84	28					-
Heat Enclosure Pad		**3.3**					**24**	10,648	**SS-224**	**1700**	437	0.84	29					-
Haul Road					**20.2**		**12**	32,589	**TS-249/269/475**	**1500**	470	0.84	83					-
Haul Road						**5.9**	**12**	9,519	**SS-224**	**1300**	508	0.84	22					-
Haul Road						**14.3**	**24**	46,141	**SS-224**	**1000**	579	0.84	95					-
																		-
Section 23																		-
Ponds			**16.0**				**12**	25,813	**TS-201**	**1000**	579	0.84	53					-
Ponds				**16.0**			**12**	25,813	**SS-240**	**1000**	579	0.84	53					-
Subsoil Piles	**16.2**						**12**	26,136	**TS-475/277**	**1200**	530	0.84	59					-
Haul Road					**18.0**		**12**	29,040	**TS-201**	**1200**	530	0.84	65					-
Haul Road						**15.2**	**12**	24,523	**SS-224**	**1300**	508	0.84	57					-
Haul Road						**2.8**	**24**	9,035	**SS-224**	**1000**	579	0.84	19					-
Overburden	**39.0**						**12**	62,920	**TS-277**	**2200**	372	0.84	202					-
Overburden		**31.8**					**12**	51,304	**SS-224**	**1200**	530	0.84	115					-
Overburden		**7.2**					**24**	23,232	**SS-224**	**1200**	530	0.84	52					-
																		-

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Riverdale 4th Addition
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June, 2011

SPGM RESPREAD HOURS SUMMARY
Associated Disturbance Area

13 Machine type: **657E**

Land owner, legal description	Stockpiles, Misc. Topsoil Area (acres)	Stockpiles, Misc. Subsoil Area (acres)	Ponds & Diversions Topsoil Area (acres)	Ponds & Diversions Subsoil Area (acres)	Roads & Trails Topsoil Area (acres)	Roads & Trails Subsoil Area (acres)	Soil depth (in.)	Volume (cu yds)	Stockpile Location	Haul Distance	Production (cu yds/hr)	Efficiency Factor	Scraper Hours	Loader Production	Loader Hours	Truck Prod/trk	Truck Hours	Number of Trucks
Section 26																		-
Ponds			**3.5**				**12**	5,647	**TS-199**	**700**	674	0.63	13					-
Ponds				**3.5**			**12**	5,647	**SS-132**	**600**	712	0.63	13					-
Diversions			**1.3**				**12**	2,097	**TS-199**	**700**	674	0.63	5					-
Subsoil Piles	**10.2**						**12**	16,456	**TS-199**	**500**	755	0.63	35					-
																		-
Section 27																		-
Diversions			**0.9**				**12**	1,452	**TS-231**	**400**	803	0.63	3					-
Haul Road					**27.0**		**12**	43,560	**TS-231**	**1000**	579	0.84	89					-
Haul Road						**27.0**	**12**	43,560	**SS-132**	**3000**	395	0.84	131					-
Cablebelt	**14.3**						**12**	23,071	**TS-231**	**1800**	422	0.84	65					-
Cablebelt		**14.3**					**12**	23,071	**SS-132**	**1800**	422	0.84	65					-
																		-
Section 34																		-
Ponds			**26.0**				**12**	41,947	**SE1/4 Section 34**	**1500**	470	0.84	106					-
Diversions			**3.8**				**12**	6,131	**SE1/4 Section 34**	**1500**	470	0.84	16					-
Subsoil Piles	**20.1**						**12**	32,428	**SE1/4 Section 34**	**600**	712	0.63	72					-
Haul Road					**50.2**		**12**	80,989	**SE1/4 Section 34**	**1800**	422	0.84	228					-
Haul Road						**28.0**	**12**	45,173	**SE1/4 Section 34**	**1800**	422	0.84	127					-
Cablebelt	**9.7**						**12**	15,649	**SE1/4 Section 34**	**1800**	422	0.84	44					-
Cablebelt		**9.7**					**12**	15,649	**SE1/4 Section 34**	**1800**	422	0.84	44					-
Access Roads					**10.0**		**12**	16,133	**SE1/4 Section 34**	**1600**	453	0.84	42					-
																		-
Section 35																		-
Ponds			**1.3**				**12**	2,097	**TS-199**	**700**	674	0.63	5					-
Diversions			**0.8**				**12**	1,291	**TS-199**	**500**	755	0.63	3					-
Subsoil Piles	**7.4**						**12**	11,939	**TS-199**	**500**	755	0.63	25					-
Haul Road					**2.2**		**12**	3,549	**TS-333**	**1000**	579	0.84	7					-
>>>TOTALS (ACRES):	586.2 TS Stockpiles		619.6 TS Ponds/Div.		938.8 TS Roads		TOTAL	4,844,211 CY					11,461 **Scraper hrs**		321 **Loader hrs**		1,339 **Truck hrs**	

TOPSOIL PILES (for seeding calcs) **586.2**

GRAND TOTAL 2,731 Acres 11,461 Hours

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EARTHMOVING HOURS SUMMARY

ACTIVITY	Scraper 657E	Dozer D11	Loader 992G	Trucks 777D	Dozer D9R
SPGM respread (mining dist.)	13,642	0	13,349	74,840	13,349
SPGM respread (assoc. dist.)	11,461	0	321	1,339	321
Normal spoil regrading	0	0	0	0	0
Final pit grading (spoil side)	3,971	6,322	0	0	0
Final pit grading (highwall)	0	12,335	0	0	0
Final pit grading (stock pile)	0	0	4,139	16,555	0
Pit ramp and road/belt grading	6,836	3,901	776	2,349	776
Pond and diversion grading	2,178	2,323	0	0	0
Regrading of Public Roads	609	0	0	0	0
TOTAL HOURS:	38,697 657E	24,880 D11	18,585 992G	95,082 777D	14,446 D9R

EARTHMOVING COST SUMMARY

	Scraper-657E	Dozer-D11N	Loader-992K	Trucks-777D	Dozer-D9R	Grader-16H	Water-Wagon
Total equipment hours:	38,697	24,880	18,585	95,082	14,446	25,034	11,148
x Total est. hourly cost:	**$316.72**	**$318.65**	**$279.67**	**$233.02**	**$189.98**	**$143.56**	**$143.56**
= Total equipment cost:	$12,256,244	$7,928,110	$5,197,615	$22,156,003	$2,744,479	$3,593,936	$1,600,447
TOTAL EARTHMOVING COST:	$55,476,835						

*Obtain values from EQUIP.WKS (Hourly Equipment Cost Estimating Form)

Breakdown of costs	Scraper-657E	Dozer-D11N	Loader-992G	Trucks-777D	Dozer-D9R	Grader-16G	Water-Wagon	Total
Mining Disturbance	$5,578,347	$5,944,876	$3,733,309	$17,439,145	$2,536,039	$2,337,796	$1,106,041	$38,675,552
Associated Disturbance	$6,677,897	$1,983,234	$1,464,306	$4,716,859	$208,440	$1,256,140	$494,407	$16,801,282
Total	$12,256,244	$7,928,110	$5,197,615	$22,156,003	$2,744,479	$3,593,936	$1,600,447	$55,476,835

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SEED COST SUMMARY

Pre-Cropland Seed Mix

Species	lbs./acre	x $/lb.	= $/acre
Russian Wildrye	**4.0**	**$3.25**	**$13.00**
Intermediate Wheatgrass - Oahe	**7.0**	**$1.25**	**$8.75**
Pubescent Wheatgrass - Mandan 759	**7.0**	**$1.30**	**$9.10**
Alfalfa - Ladak	**3.0**	**$2.25**	**$6.75**
	Total Per-Acre Cost =		$37.60

Fish and Wildlife Seed Mix

Species	lbs./acre	x $/lb.	= $/acre
Western Wheatgrass - Rosanna	**4.0**	**$2.50**	**$10.00**
Thickspike Wheatgrass - Critana	**6.0**	**$4.00**	**$24.00**
Slender Wheatgrass - Primar	**2.0**	**$1.50**	**$3.00**
Green Needlegrass - Lodorm	**6.0**	**$2.50**	**$15.00**
	20 Total Per-Acre Cost =		$52.00

Rangeland Seed Mix

Species	lbs./acre	x $/lb.	= $/acre
WARM SEASON GRASSES----------			
Blue Grama	**1.0**	**$7.50**	**$7.50**
Sideoats Grama	**4.0**	**$6.75**	**$27.00**
Switchgrass	**2.0**	**$1.50**	**$3.00**
Big Bluestem	**3.0**	**$3.75**	**$11.25**
COOL SEASON GRASSES----------			
Western Wheatgrass	**2.0**	**$2.50**	**$5.00**
Green Needlegrass - Lodorm	**3.0**	**$2.50**	**$7.50**
	Total Per-Acre Cost =		$61.25

TREE COST SUMMARY

Windbreak Location	Length **ft.**	Trees, shrubs $/ft.	Fabric $/ft.	= $
Sections 26 (9503)	**19,290**	**$0.20**	**$0.50**	**$13,503**
Sections 29 (8705)	**17,100**	**$0.20**	**$0.50**	**$11,970**
	Total Cost =			$25,473

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REVEGETATION COST SUMMARY

<10% slope acreage:	5,737	acres
>10% slope acreage:	**0**	acres
Pasture/pre-crop acreage:	**5302**	acres
Fish and Wildlife Acreage:	**260**	acres
Rangeland acreage:	**175**	acres
Total acreage (worst-case):	5737	acres
Pasture/pre-crop seed cost:	$37.60	per acre
Fish and Wildlife seed cost:	$52.00	per acre
Rangeland seed cost:	$61.25	per acre
Fertilizer cost:	**$0.30**	per lb.
Acres requiring rock picking:	5737	acres
Farm Work Rates:		
Deep chiseling:	**$8.01**	per acre
Regular drilling (w/o fert.):	**$9.53**	per acre
Dry fertilizer application:	**$4.54**	per acre

Cost Summary:	
Seed bed preparation:	$91,898.89
+ Rock picking:	$286,825.50
+ Seeding: pasture/pre-crop:	$249,860.17
+ Fish and Wildlife:	$15,997.80
+ Rangeland:	$13,220.38
+ Fertilizer:	$129,300.94
+ Mulch: <10% slopes:	$573,651.00
+ Mulch: >10% slopes:	$0.00
+Windbreaks	$25,473.00
TOTAL REVEGETATION COST	$1,386,228

Revision 20
Riverdale 4th Addition
Technical Review Response (2)
June, 2011

FINAL COST SUMMARY

Bond Amount Subtotal:		
Total Earthmoving Cost:		$55,476,835
+ Demolition of Section 22 Heat Enclosure (NAFK-8405)		$240,000
+ Demolition of Section 25 Heat Enclosure (NAFK-9503)		$52,000
+ Total Revegetation Costs		$1,386,228
+ Culvert and Gravel for Public Road Reconstruction		$374,125
+ 1% Add-on For Pumping & Misc. Costs		$575,292
+ Cable Belt Structural Teardown		$169,750
+ Riverdale Haul Road Bridge Demolition (Sec 5/6, T145N, R82W)		$50,000
+ Highway 200 Demolition (NAFK-8405)		$50,000
+ Highway 200 Road Replacement at Bridge Removal Site (NAFK-8405)		$300,000
SUBTOTAL:		$58,674,229
Engineering and Design Costs:		
Base Map & Control		
	Permitted acreage =	48,968
	x $10.00/acre =	$489,675
Design Map & Quantities		
	Graded acreage =	5,737
	x $25.00/acre =	$143,413
As-Built Map for Permit Area:	Permitted acreage =	48,968
	x $5.00/acre =	$244,840
Final Quantities		
	Graded acreage =	5,737
	x $10.00/acre =	$57,365
Total Engineering and Design Cost =		$935,293
Supervision and Administration Costs:		
10% of first $200,000 of BOND SUBTOTAL (line 132):		$20,000
+ 1% of amount of BOND SUBTOTAL over $200,000:		$584,742
Total Supervision and Administration Cost =		$604,742
+ Total Engineering and Design Cost:		$935,293
Total Engineering, Supervision, & Administration Cost:		$1,540,035
TOTAL AMOUNT (SUBTOTAL + ADMINISTRATIVE COST) =		**$60,214,264**