NORTH DAKOTA PUBLIC SERVICE COMMISSION
RECLAMATION DIVISION
Updated February 2024

Policy Memorandum No. 16 to Mine Operators
RECLAMATION COST ESTIMATING GUIDELINES

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Assumptions to be Used for Developing Reclamation Costs for Mining Permit Performance Bond Amounts

The reclamation costs for setting the amount of the performance bond must be developed assuming that the bond would be forfeited at the time when the reclamation liabilities are the greatest. This condition is most likely to occur at the stage in the mining sequence when the area where suitable plant growth material has been removed is largest and the volume of material to backfill the open pit area(s) is the greatest. This will probably occur when the pit length is the longest and contains the greatest thickness of overburden.

This "worst case" assumption will be determined by a review of the operation plans, pit layout and overburden isopach maps, and the coal seam(s) thickness. Factors affecting the worst case assumption are the pit width, highwall angle and angle of repose of the spoil material. Other factors may include multiple seam mining methods and pre-benching which will affect the overburden depth and pit width considerations.

Earth-moving cost for the worst case reclamation cost estimate will be determined differently for small and large mines. Mines are considered small if the amount of suitable plant growth material, overburden and spoil to be moved is 500,000 cubic yards or less. Earth-moving costs for small mines will be determined on a per cubic yard basis. The per cubic yard rate will be based on contractor bids for Abandoned Mined Lands projects and other small contractor projects. This rate will be reviewed every July 1 and updated at that time if necessary. The current rate is included in the Appendix.

For large mines, earth-moving costs will be determined using the type of equipment used by large mines. Hourly rates will be calculated for the equipment based on standard and variable assumptions. The variable assumptions will be updated July 1 of each year. Total hours of equipment work will be determined based on standard and variable production factors, with standard rates for support equipment.

If contemporaneous reclamation is proposed and no final pit is planned within the permit area during the permit term, the postmining topography for the open pit area will be determined by a balance of the cut and fill within the disturbed area. The disturbed area for grading purposes will include the following: 1) the open pit area, 2) the area occupied by 4 spoil ridges from open pit or more if an exemption from the 4 spoil ridge requirement of NDAC Section 69-05.2-21-01(2) is requested and approved (it must be noted that rough grading costs for the 4 or more spoil ridges will also be included), 3) the area where suitable plant growth material is normally removed ahead of mining, and 4) the areas behind the spoil ridges that have been graded but not respread. The areas included in items 3 and 4 above will be determined based on mining and reclamation schedules in the permit as well as actual conditions noted at the mine. Should an overburden stockpile exist in the mining plan, the cost of transporting this material to the disturbed area must be included. To the extent possible, the postmining topography of open pit and adjoining disturbed areas will have to be graded to provide drainage that will complement the surrounding undisturbed and reclaimed areas. In some instances there may be no choice but to create an impoundment in the area. It also must be pointed out that this procedure will be used only for reclamation cost determinations for a possible bond forfeiture. If mining should cease in a permit area prior to a planned final pit, the operator must backfill the open pit area to meet all applicable grading requirements contained in NDAC Chapter 69-05.2-21.

If contemporaneous reclamation is proposed and a final pit is planned within the permit area during the permit term, grading costs will normally be calculated for backfilling the final pit according to the reclamation plan. However, in no instance will the area behind the final pit be

less than that discussed in the paragraph above. Also, the reclamation plan must be in compliance with backfilling and grading requirements of NDAC Chapter 69-05.2-21.

If area wide reclamation and a final pit is proposed within the permit area, grading costs will be calculated for the entire area to be mined in accordance with the mining and reclamation plan. It will normally be assumed that box cut spoil material and other spoil material from the mined areas between the box cut and final cut will be needed to backfill the final pit area. If the reclamation plan indicates that rough grading of spoil ridges will occur as mining progresses, these costs will not be included for such areas except for the last 4 spoil ridges (or as otherwise indicated in the reclamation plan) from the final pit. The postmining topography to be achieved will be based on the postmining topographic map contained in the permit.

For mining operations that use draglines, a determination will be made on a site specific basis if additional costs are needed for the ends of the worst-case pit. If appropriate, costs will be determined for backfilling open endwall areas (the end of the pit where dragline stripping begins) and for hauling excess pit end spoil (the end of the pit where dragline stripping ends) into the open pit area. Also, for operations that use scrapers or truck/shovel for pre-benching operations, additional grading costs will be included if the site specific plans for such operations indicate there may be shortage of fill material in an area and/or an excess of material in another.

Suitable plant growth material respreading costs will be determined for the entire area proposed to be mined during the permit term if area wide reclamation is proposed. If contemporaneous reclamation is proposed, the area for determining respread costs must include the open pit area and the area occupied by the number of spoil ridges discussed above, the area where suitable plant growth material is normally removed ahead of mining and the areas behind the spoil ridges that have been graded but not respread. The areas ahead of dragline stripping and regrade areas behind spoil ridges may vary from those indicated above and will be based on operation and reclamation plans for the mine. The areas will be determined based on mining and reclamation schedules in the permit as well as actual conditions noted at the mine.

The thickness of suitable plant growth materials to be respread will be based on the soil removal plans contained in the permit (including plans to save other suitable strata to provide the four-foot non-toxic cover if applicable). Haul distances for suitable plant growth material respreading will be determined from designated stockpile locations using existing haul roads where possible. Respread areas will be separated by land ownership boundaries. The total volume of suitable plant growth material to be respread will be no less than the current inventory listed for the permit area on the annual map. The comparison of suitable plant growth material quantities to the inventory quantity will be reviewed at the midterm review and the permit renewal.

Reclamation costs for all mining related disturbances existing at the time of the worst case condition discussed above will also be determined. These include sedimentation ponds, diversions, access and haul roads, suitable plant growth material stockpile areas, structures and facilities and any other mining related disturbance. Each of these is discussed in more detail in the following.

Reclamation costs for sedimentation ponds will be determined based on construction and reclamation plans contained in the permit. The costs for each pond will vary depending on whether it is an embankment pond, dugout pond or combination dugout and embankment pond. Other factors include haul distance to dispose of embankment material and accumulated sediment, haul distance to obtain fill for a dugout pond, and embankment construction material (either subsoil or overburden type material). Soil replacement will be based on the amount of material to be removed.

Determination of reclamation costs for diversions will be based on construction procedures. These costs will vary depending on construction by removing topsoil only, or being cut into subsoil or overburden type material.

Reclamation costs for access and haul roads will also be based on construction methods. The cost will vary based on the use of subsoil or overburden type material for construction. Costs will be included, as appropriate, for the removal and disposal of road surfacing materials, grading to blend into the adjoining lands, and soil replacement. Separate costs will be determined for the removal of any underpass, overpass, culverts over six feet in diameter, or other significant structure.

Costs for the dismantling and/or demolition of support facilities and structures will be determined unless they will remain as an approved industrial use. Costs for any grading and soil replacement will also be determined for the areas where such facilities are located. The costs for special equipment needed to remove facilities and structures will be taken from the most current listing in the "Contractors' Equipment Cost Guide" published by Dataquest Incorporated. The total hourly cost will be the published monthly rate for Combined Ownership and Repair Expenses divided by 176 hours plus the labor cost and the profit and overhead of 15 percent of that total.

Reclamation costs for any other mining related disturbances will be determined based on the specific type of disturbances proposed in the permit.

Revegetation costs will be determined for all disturbed areas included under the worst case condition. In addition to the cost of normal seeding, costs for the planting of trees and shrubs will be determined as appropriate. Any other special reclamation condition will be reviewed on a case by case basis.

For large mines, estimated costs for removing water from the final pit to be backfilled, monitoring well removal and plugging, special stabilization measures for drainageways, and replacement of fences will also be added. This additional amount will be determined by multiplying the total of all other reclamation costs (excluding administrative and mobilization) by one percent. For small mines, five percent of all other reclamation costs will be added to cover miscellaneous costs.

EQUIPMENT LISTING FOR LARGE MINES

The following equipment is common to existing large mine fleets and large contractors. This equipment list will be used for developing reclamation costs for mines where the total earthmoving quantity is 500,000 cubic yards or more.

1. Caterpillar 657G (P-P) wheel scraper
2. Caterpillar 637G (P-P) wheel scraper
3. Caterpillar D11R track dozer with a U-blade and ripper
4. Caterpillar D10T track dozer with a U-blade and ripper
5. Caterpillar D9T track dozer with a U-blade and ripper
6. Caterpillar 993K wheel loader with 19 cubic yard bucket
7. Caterpillar 777F end dump truck (100 ton)
8. Caterpillar 16M motor grader
9. Water Wagon

EQUIPMENT ESTIMATED OWNING AND OPERATING COSTS

I. Standard assumptions applied to machines utilized:

A. Ownership Period----------7 years

B. Ownership Usage
   1) Annual usage for mine reclamation----------3,000 hours/year
   2) Life usage for ----------20,000 hours

C. Fuel Costs — Price per gallon to be obtained from North Dakota State Fleet Services, Rack price at Mandan Refinery for No. 2 Ultra Low Sulfur Diesel.

D. Wages & Benefits — Use Group III scale from the contract agreement between Operating Engineers and Associated General Contractors for Heavy Industrial (same as Davis-Bacon Wage Rates).

E. Sales Tax percentage — State of North Dakota Sales Tax

F. Fuel Consumption Rate — Use the low end of the medium range table listed in the Cat Handbook.

G. Profit and Overhead — Add 15% to the total of the hourly owning and operating costs of all equipment.

II. Components furnished by local Supplier/Dealer

A. Delivered Price: Current list price delivered minus five (5) percent of a typically equipped piece of reclamation equipment.

B. Residual Value Percentage at replacement, based on original delivered price.

III. Variable components

A. Percent rate of interest: Prime Rate plus 2 points
B. Insurance Rate percent: Determined as 0.75%
*C. Lube oils, filters, grease
D. Tires obtained from average of local suppliers
*E. Repair reserve
*F. Special wear items

* Obtained from the latest printing of the Cost Reference Guide for Construction Equipment provided by the Office of Surface Mining.

NOTE:
1. Adjustments to these figures will be made annually on July 1
2. The owning and operating costs for a water wagon are assumed to be the same as those for a motor grader.

LABOR RATE HEAVY EQUIPMENT OPERATOR
USING
Operating Engineers Local #49

CURRENT AS OF JULY 1, 2009
(This rate will be updated annually on July 1)

Hourly Rate for Labor - Group III	25.05
Health & Welfare and apprentice program/Hour - Group III	14.90
Insurance - Assumed 1% of Hr. Labor	0.25
Social Security - 7.65% of Hr. Labor	1.92
*Workers Compensation - 1.47% of Hr. Labor	0.37
($575.91) / ($25.05X 2080 Hr. X 0.75) = 0.0147 or 1.47%	
*Unemployment - 5.98% of Hr. Labor	1.50
($2,336.82) / ($25.05X 2080 Hr. X 0.75) = 0.0598 or 5.98%	
Total Hourly Operator Cost	$43.99

*Based on 40 hour week for 9 months of the year

RECLAMATION EQUIPMENT RATE DETERMINATION
ESTIMATING FORM
OCTOBER 1998

Hourly Owning and Operating Cost Estimate **Date:** _____

	(1)	(2)
Machine Designation	_____	_____
Estimated Ownership Period (years)	_____	_____
Estimated Usage (hours/current year)	_____	_____
Ownership Usage (total hours)	_____	_____

Owning Costs

1.	a.	Delivered price (including attachments less discounts)	_____	_____
	b.	Less tire replacement cost if desired (standard size)	_____	_____
	c.	Delivered price less tires	_____	_____
2.		Less residual value at replacement(____%) (Percent of delivered price)	_____	_____
3.	a.	Value to be recovered through work (Line 1c less line 2)	_____	_____
	b.	Cost per hour: Value (1)_____ (2)_____ Hours	_____	_____

4. Interest Costs $\frac{N+1}{2N} \times$ Del. Price x % Simple Int. $\frac{\text{Rate}}{\text{Hours/Year}} =$

(1) ___+1___ x ___ x ___ % (2) ___+1___ x ___ x ___ % = _____ _____

_____ _____
_____Hours/Yrs. _____Hours/Yrs.

5. Insurance Costs $\frac{N+1}{2N}$ x Del. Price x Insurance = Rate / _____Hours/Year

N = No. Yrs. (1) (2)

(1) ___+1___ x x % (2) ___+1___ x x % = _____ _____

_____ _____

_____Hours/Yrs. _____Hours/Yrs.

6. $\frac{\text{(Percent ND Sales Tax) x Purchase Price}}{\text{Total Hrs. Ownership}}$ _____ _____

7. Hourly Owning Cost
(add lines 3b, 4, 5, and 6) _____ _____

Operating Costs

8. Fuel: Unit Price X Consumption (GPH)

(1) ____ x ____ = (2) ____ x ____ = _____ _____

9. Lube oils, filter, grease:
Cost Reference Guide discounted 45% _____ _____

10. a. Tires: Replacement Cost - Life in Hours

$\frac{\text{Cost}}{\text{Life}}$ (1) _____ (2) _____ _____ _____

b. Undercarriage

Included in Repair Reserve for crawler tractors

11. Repair Reserve (Overhaul and Repair)

Cost Reference Guide discounted 45% _____ _____

12. Special Wear Items: Cost - Per Hour

Cost Reference Guide discounted 45% _____ _____

		(1)	(2)
13.	Total Hourly Operating Costs (Add lines 8, 9, 10a, (or 10b), 11, and 12	_____	_____
14.	Machine Owning Cost (From line 7)	_____	_____
15.	Total Owning, Operating Cost, (Add 13, 14)	_____	_____
16.	Operators Hourly Wage (Include fringes - Group 4)	_____	_____
17.	Total Hourly Rate (Include operator wages, add 15, 16)	_____	_____
18.	Overhead and Profit @ 15%	_____	_____
19.	Total Estimated Hourly Equipment Cost	_____	_____

PRODUCTION FACTORS

DOZER MATERIAL HANDLING

I. Standard Assumptions and Correction Factors*

A.	U-type dozer blade	
B.	Material Weight	0.74
C.	Average Operator	0.75
D.	Material (Loose Spoils or Highwall)	1.10
E.	Dozing Technique (Slot Dozing)	1.20
F.	Job Efficiency (50 minutes/hour)	0.84
G.	Grade Correction	1.15
H.	Traction	1.00

II. Variables affecting production

A. Type of machine utilized

B. Distance of dozer push

1) Use 50-foot increments (rounded up to the next increment with a minimum 75 foot push distance)

2) Push Distance: "is the average distance from center of mass of the spoil or overburden source to the center of mass in the open pit"

NOTE: Variables will allow for case-by-case basis at each mine site.

* Correction factors obtained from the most recent publication of the Cat Performance Handbook.

SCRAPER MATERIAL HANDLING

I. Standard Assumptions and Corrections Factors*

A. Use Push-Pull Production Curve data except where push cats are used

1) Use 6% rolling resistance curve for all haul distances greater than 2500 feet.

2) Use 10% rolling resistance curve for haul distances 2500 feet and less.

B.	Job Efficiency (50 Minutes/Hour)	0.84

C. All material originates from stockpiles when considering topsoil-subsoil replacement/respread.

D. If push cats are used, use the recommendations set forth in the Cat Performance Handbook.

E. Maneuver Time Correction Factor 0.75

Used only for pond reclamation **for haul distances under 1000 feet**.

II. Variables affecting production

A. Haulage distance, rounded up to the next 100 foot.

B. Volume of material handled and/or depth of topsoil-subsoil to be replaced or respread.

NOTE: Variables will allow for case-by-case basis at each mine site.

* Correction factors are to be used with the most recent publication of the Cat Performance Handbook.

WHEEL LOADER AND TRUCK FLEET MATERIAL HANDLING

I. Standard Assumptions and Corrections Factors*

A. Refer to the loader/truck fleet productivity table on page 13 for standard assumptions and conditions. The travel times are based on graphs found in the CPH. It is recommended the loader/truck fleet not be used for haul distances under 2,500 feet.

B. All material originates for stockpiles when considering Suitable Plant Growth Material respread.

C. Support facilities will be evaluated on a case by-case basis.

D. Use of wheel loader/truck must be evaluated on a case-by-case basis and a minimum of 3,000 hours of fleet production must be used.

E. Production will be based on the wheel loader up to the maximum fractional number of trucks required to meet the production of the wheel loader. Production will be based on the total truck production when the maximum number of trucks mobilized will not utilize the maximum wheel loader production. The truck costs will be based on this formula.

II. Variables affection production

A. Haulage distance, rounded up to the next 100 foot increment

B. Volume of material handled and/or depth of suitable plant material respread

C. Maximum number of trucks to mobilize must be evaluated on a mine by mine case. Suggested Criteria: Calculate the weighted average haul distance for haul distances above the scraper-truck breakeven haul distance or a selected minimum haul distance. "Round up" the number of trucks needed for this average haul distance and use as the maximum number of trucks to mobilize.

* Correction factors are to be used with the most recent publication of the Cat Performance Handbook.

SUPPORT EQUIPMENT

I. Standard Assumptions and Correction Factors

A.	Type of Equipment	Process	Cost Factor
	1) Motor Grader:	Final Grading	1 hr per 6 scraper hrs
		SPGM Respread	1 hr per 6 scraper hrs
		Loader/Truck Fleet	1 hr per wheel loader/truck fleet
	2) Water Wagon:	SPGM Respread	1 hr per 12 scraper/truck hrs
	3) Dozer (D9R):	SPGM Respread	1 hr per wheel loader/truck fleet

Caterpillar 993K Loader and Caterpillar 777F Truck Fleet Productivity

Date: 11-Jan-24

Assumptions And Conditions:

Material:	Stockpiled Topsoil, Subsoil, and Overburden	
Material Density:	2,900 LB/BCY	
Swell Factor:	15%	
Job Efficiency:	0.84	
Rolling Resistance = 10% for 2500 feet and less. (If used)		
Rolling Resistance = 6% for > 2500 feet.		
Truck Maneuver Time:	0.70	CPH 50 (8-5)
Truck Dump Time:	1.10	CPH 50 (8-5)
Bucket Fill Factor:	100%	CPH 50 (20-5)
Loader Cycle Time:	0.65	CPH 50 (20-5)

Calculations:

Bucket Size:	19 LCY	Check Bucket Size: 19 LCY X 2,900/1.15 = 47,913 Pounds < 60,000 Pouns (Rated Capacity of 993K)
Bucket Capacity:	16.52 BCY	(Bucket Size x Bucket Fill Factor/(Swell Factor + 1))
Truck Payload:	66.08 BCY	(4 Cycles @ 16.52 BCY Per Cycle)

Check Weight Capacity: 66.08 BCY x 1.45 = 95.82 Tons < 100 Tons OK

Check Volume Capacity: 66.08 BCY x 1.15 = 75.99 LCY < 78.8 LCY OK

Load Time (Assumes FEL spots hauler with full bucket) = Dump Time + 3 Passes @ 0.65 Min. = 0.10 + (3x 0.65) = 2.05 Minutes

Adjusted Truck Productivity = Trips Per Hour x Payload x Efficiency Factor

Maximum Adjusted FEL Productivity = -Maximum Number of Trucks/Hr. X BCY/Truck X Efficiency Factor = 1211.1 BCY/Hr.

Equipment Rates:

Unit	Rate
Loader - 993K	1 Per Fleet
Grader - 16M	1 Hr. Per Fleet
Water-Wagon	1 Hr. Per 12 Truck Hrs.
Dozer - D9R	1 Per Fleet
Truck - 777F	Varies

Travel Time Equations:

Loaded Travel Time = (A X Travel Distance) + B	A =	0.000821	B =	0.036788
Empty Travel Time = (A X Travel Distance) + B	A =	0.000379	B =	-0.010756

											3 Truck Maximum		4 Truck Maximum		5 Truck Maximum		6 Truck Maximum	
One-Way Distance (Ft.)	Load Time (Min.)	Maneuver Time (Min.)	Travel Time Loaded (Min.)	Dump Time (Min.)	Travel Time Empty (Min.)	Total Cycle Time (Min.)	Trips Per Hour	Payload (BCY)	Efficiency Factor (50 min/hr.)	Adjusted Truck Productivity (BCY/Hr.)	Adjusted FEL Productivity (BCY/Hr.)	Number of Trucks Required	Adjusted FEL Productivity (BCY/Hr.)	Number of Trucks Required	Adjusted FEL Productivity (BCY/Hr.)	Number of Trucks Required	Adjusted FEL Productivity (BCY/Hr.)	Number of Trucks Required
2500	2.05	0.70	2.09	1.10	0.94	6.88	8.72	66.08	0.84	484.0	1211.1	2.50	1211.1	2.50	1211.1	2.50	1211.1	2.50
3000	2.05	0.70	2.50	1.10	1.13	7.48	8.02	66.08	0.84	445.2	1211.1	2.72	1211.1	2.72	1211.1	2.72	1211.1	2.72
3500	2.05	0.70	2.91	1.10	1.32	8.08	7.43	66.08	0.84	412.4	1211.1	2.94	1211.1	2.94	1211.1	2.94	1211.1	2.94
4000	2.05	0.70	3.32	1.10	1.51	8.68	6.91	66.08	0.84	383.6	1150.8	3	1211.1	3.16	1211.1	3.16	1211.1	3.16
4500	2.05	0.70	3.73	1.10	1.69	9.28	6.47	66.08	0.84	359.1	1077.3	3	1211.1	3.37	1211.1	3.37	1211.1	3.37
5000	2.05	0.70	4.14	1.10	1.88	9.88	6.07	66.08	0.84	336.9	1010.7	3	1211.1	3.59	1211.1	3.59	1211.1	3.59
5500	2.05	0.70	4.55	1.10	2.07	10.48	5.73	66.08	0.84	318.1	954.3	3	1211.1	3.81	1211.1	3.81	1211.1	3.81
6000	2.05	0.70	4.96	1.10	2.26	11.08	5.42	66.08	0.84	300.8	902.4	3	1203.2	4	1211.1	4.03	1211.1	4.03
6500	2.05	0.70	5.37	1.10	2.45	11.68	5.14	66.08	0.84	285.3	855.9	3	1141.2	4	1211.1	4.25	1211.1	4.25
7000	2.05	0.70	5.78	1.10	2.64	12.28	4.89	66.08	0.84	271.4	814.2	3	1085.6	4	1211.1	4.46	1211.1	4.46
7500	2.05	0.70	6.19	1.10	2.83	12.88	4.66	66.08	0.84	258.7	776.1	3	1034.8	4	1211.1	4.68	1211.1	4.68
8000	2.05	0.70	6.60	1.10	3.02	13.48	4.45	66.08	0.84	247.0	741.0	3	988.0	4	1211.1	4.90	1211.1	4.90
8500	2.05	0.70	7.02	1.10	3.21	14.08	4.26	66.08	0.84	236.5	709.5	3	946.0	4	1182.5	5	1211.1	5.12
9000	2.05	0.70	7.43	1.10	3.40	14.68	4.09	66.08	0.84	227.0	681.0	3	908.0	4	1135.0	5	1211.1	5.34
9500	2.05	0.70	7.84	1.10	3.59	15.28	3.93	66.08	0.84	218.1	654.3	3	872.4	4	1090.5	5	1211.1	5.55
10000	2.05	0.70	8.25	1.10	3.78	15.88	3.78	66.08	0.84	209.8	629.4	3	839.2	4	1049.0	5	1211.1	5.77
10500	2.05	0.70	8.66	1.10	3.97	16.48	3.64	66.08	0.84	202.0	606.0	3	808.0	4	1010.0	5	1212.0	6
11000	2.05	0.70	9.07	1.10	4.16	17.08	3.51	66.08	0.84	194.8	584.4	3	779.2	4	974.0	5	1168.8	6
11500	2.05	0.70	9.48	1.10	4.35	17.68	3.39	66.08	0.84	188.2	564.6	3	752.8	4	941.0	5	1129.2	6
12000	2.05	0.70	9.89	1.10	4.54	18.28	3.28	66.08	0.84	182.1	546.3	3	728.4	4	910.5	5	1092.6	6
12500	2.05	0.70	10.30	1.10	4.73	18.88	3.18	66.08	0.84	176.5	529.5	3	706.0	4	882.5	5	1059.0	6
13000	2.05	0.70	10.71	1.10	4.92	19.48	3.08	66.08	0.84	171.0	513.0	3	684.0	4	855.0	5	1026.0	6
13500	2.05	0.70	11.12	1.10	5.11	20.08	2.99	66.08	0.84	166.0	498.0	3	664.0	4	830.0	5	996.0	6
14000	2.05	0.70	11.53	1.10	5.30	20.68	2.90	66.08	0.84	161.0	483.0	3	644.0	4	805.0	5	966.0	6
14500	2.05	0.70	11.94	1.10	5.48	21.28	2.82	66.08	0.84	156.5	469.5	3	626.0	4	782.5	5	939.0	6
15000	2.05	0.70	12.35	1.10	5.67	21.88	2.74	66.08	0.84	152.1	456.3	3	608.4	4	760.5	5	912.6	6
15500	2.05	0.70	12.76	1.10	5.86	22.48	2.67	66.08	0.84	148.2	444.6	3	592.8	4	741.0	5	889.2	6
16000	2.05	0.70	13.17	1.10	6.05	23.08	2.60	66.08	0.84	144.3	432.9	3	577.2	4	721.5	5	865.8	6
16500	2.05	0.70	13.58	1.10	6.24	23.68	2.53	66.08	0.84	140.4	421.2	3	561.6	4	702.0	5	842.4	6
17000	2.05	0.70	13.99	1.10	6.43	24.28	2.47	66.08	0.84	137.1	411.3	3	548.4	4	685.5	5	822.6	6
17500	2.05	0.70	14.40	1.10	6.62	24.88	2.41	66.08	0.84	133.8	401.4	3	535.2	4	669.0	5	802.8	6
18000	2.05	0.70	14.81	1.10	6.81	25.48	2.35	66.08	0.84	130.4	391.2	3	521.6	4	652.0	5	782.4	6
18500	2.05	0.70	15.23	1.10	7.00	26.08	2.30	66.08	0.84	127.7	383.1	3	510.8	4	638.5	5	766.2	6
19000	2.05	0.70	15.64	1.10	7.19	26.68	2.25	66.08	0.84	124.9	374.7	3	499.6	4	624.5	5	749.4	6
19500	2.05	0.70	16.05	1.10	7.38	27.28	2.20	66.08	0.84	122.1	366.3	3	488.4	4	610.5	5	732.6	6
20000	2.05	0.70	16.46	1.10	7.57	27.88	2.15	66.08	0.84	119.3	357.9	3	477.2	4	596.5	5	715.8	6

REVEGETATION FACTORS

I. The basis for cost estimations to the Commission are obtained from the North Dakota Crop and Livestock Reporting Service publication "Custom Farm Work Rates". Rates are updated every 3 years for the State of North Dakota and are established for various regions of the State. Minor adjustments to the published rates as set forth below are to be used for determining costs.

A. Tillage or Seed Bed preparation: Published custom farm work rate for deep chiseling time 2.0.

B. Rockpicking: Assume cost of $50.00/acre.

C. Seeding:

1) Pasture/Pre-crop mixture: Published custom farm work rate for small grains plus seed cost.

2) Rangeland mixture: Published custom farm work rate for small grains time 1.5 plus seed cost

3) Seed: Cost per acre determined by averaging price quotations from Chesak Seed Co. and/or Hubbard feeds, Inc. based on the mixtures contained in the permit application.

D. Fertilizer: Cost per acre for application rate of 60#/acre of 11-52-0. Quote is provided by Agrilliance-Agronomy Center for bagged fertilizer.

E. Mulching:

1) Postmining slopes of 0 to 10 percent: Assume $100.00/acre

2) Postmining slopes of 10 percent or greater: Assume $150.00/acre

F. Tree Planting: The costs for planting trees and shrubs on reclaimed lands will be determined by data provided from the Natural Resource Conservation Services.

ADMINISTRATION, ENGINEERING AND MOBILIZATION COSTS

Administrative and engineering costs will be added to the reclamation costs for each bond area to cover the additional costs the Commission would incur for preparation of specifications for the reclamation plan and direct field supervision and survey costs in the event of a bond forfeiture. These costs will be determined as follows:

1. Preparation of a pre-reclamation topographic map of the permit or bond area for design purposes. The cost of flying, ground control and developing the contour map will be set at $10.00 per acre for the total bond area.

2. Preparation of plans and specifications for the reclamation plan for disturbed areas (including associated disturbances requiring soil respread) based on the "Estimated Worst Case Basis" established by the permit. The cost of this design will be set at $25.00 per acre for these areas.

3. Preparation of a final topographic map of the entire bond area will be set at a cost of $5.00 per acre.

4. The comparison of the final topographic map to the pre-reclamation topographic map to compute the final quantities of earthwork moved for areas to be reclaimed based on the worst case scenario (same area as in item 2 above) will be set at $10.00 per acre.

5. The direct field supervision and survey costs will be determined based on the following:

    a) If the reclamation costs determined by the "Estimated Worst Case Basis" are less than $200,000, the direct field supervision and survey costs will be 10 percent of those costs.

    b) If the reclamation costs determined by the "Estimated Worst Case Basis" are more than $200,000, the direct field supervision and survey costs will be $20,000 for the first $200,000 plus 1% of the amount over $200,000.

For permit areas where the earthmoving and revegetation reclamation costs are less than $250,000, a contractor mobilization and demobilization cost of $5000 will be added. For permit areas where the earthmoving and revegetation reclamation costs are over $250,000, it is assumed that these costs will be insignificant in relation to the other costs and no additional amount will be added.