CHAPTER 24

BONDING

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CHAPTER 24

BONDING

Introduction

The purpose of this chapter is to provide a reclamation cost estimate in accordance with 30 CFR, Subchapter J, with supporting documentation, for determination of a reclamation performance bond for disturbed lands at Peabody Western Coal Company's (PWCC) Black Mesa Mining Complex, including both the Kayenta and Black Mesa Mines. This document provides information regarding reclamation requirements for all disturbed lands within the Kayenta Mine AZ-0002A and AZ-0001D permit boundary and the Black Mesa Mine area proposed as permanent program permit boundary. To facilitate review of reclamation and bonding requirements for the two separate operations, reclamation requirements and costs are broken out for each mine, as well as for the overall Black Mesa Complex. Reclamation costs and the corresponding amount of bond required were determined for a "worst-case" scenario assuming that, in the unlikely event of bond forfeiture, reclamation would occur at the point in time within the five-year permit term (2010 through 2014) when reclamation liabilities would be the highest. This condition would most likely occur at the stage in the mining sequence when the area from which topsoil (suitable plant growth material) has been removed is largest and the volume of material to backfill existing open pit areas is greatest. These conditions typically occur when the sum of all pit lengths is the greatest and the overburden is the thickest.

It was determined from the Mine Plan Map (Drawing No. 85210), Jurisdictional Permit and Affected Lands Map (Drawing No. 85360), and the Bonding Map (Drawing No. 89800) that the highest liability, or worse case, will occur in the year 2010. This determination was based on pit length, pit location, amount of box cut spoil, and disturbance ahead of mining (see Table 24-2-1 in Attachment 24-2). In addition, based on OSM's request, Peabody has included the existing J-16, J19-RA Pond, and N-11 mining disturbance areas in the bond calculations, even though these areas will probably be completely reclaimed by the worst-case year.

The reclamation calculations, costs, and backup documentation for all disturbed lands and facilities are provided in the following attachments:

Attachment 24-1	Cost Input and Summary Tables
Attachment 24-2	Areas/Volume Input Tables
Attachment 24-3	Mine Area (Category I) Worksheets
Attachment 24-4	Maintenance Area (Category II & IIA) Worksheets
Attachment 24-5	Facilities Area (Category V) Worksheets
Attachment 24-6	Exploration Bonds

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The Bonding Map (Drawing No. 89800) included with this chapter shows the various mining areas and the estimated mining disturbance areas in the year 2010. In addition, this map shows the location of the open pit in 2010 and associated support facilities.

Reclamation Area Categories

Table 24-2-2 summarizes the areas associated with each category of disturbance shown on Drawing No. 89800 (i.e., Category I to Category VI). The Permanent Program regulation requires a reclamation bond for Category I, II, IIA, V, VII, VIII, and the current mining support facilities. Categories III and IV are Interim Program or pre-law affected lands and no bond was required. Category VI includes portions of reclaimed areas where Termination of Jurisdiction, (TOJ), or complete Bond Release has been approved and the land has been released back to the residents. Category VII assumes Phase 1 Bond Release only and Category VIII assumes Phase 1 and 2 Bond Release only. Following is a description of each category.

Category I, 2010 "Worst Case" Year Disturbance - Permanent Program Regulations Area -
Included in this category are four spoil piles, open pit and box cut areas (where applicable), areas ahead of mining that have been stripped of topsoil, ramps, and miscellaneous disturbance areas in and around the open pit. Estimated costs to reclaim Category I lands come under the headings of:

a) Cast/blast highwall
b) Doze highwall material into the open pit
c) Doze first two (adjacent) spoils into the open pit
d) Doze back two spoils to blend with surrounding topography
e) Backfill and grade all ramps
f) Miscellaneous grading
g) Grade terraces
h) Grade drainages/downdrains
i) Load, haul, and place riprap
h) Haul and place suitable material
i) Haul and place topsoil
j) Revegetation

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Category II, Permanent Program Regulations Area (Revegetated except for the mine support facilities disturbance areas) - Included in this category is the pre-2010 mining disturbance (area presently bonded). It is assumed that reclamation, including backfilling/grading, topsoil distribution, and revegetation, will be current from the edge of the AZ-0001D and AZ-0002A permit revegetated disturbance line to the edge of the fourth spoil pile in the Category I area. Estimated additional reclamation costs in this area would then be limited to remedial work required during a "worst case" bond release application review and is listed as Revegetation Maintenance Pre-2010 and in Attachment 24-4, Worksheets 24-4-1 through 24-4-3

The areas surrounding the support facilities in Category II have been subdivided to define the areas which are permanent program revegetated areas and are being held for bond release. These reclaimed areas are classified as Category IIA areas (see Table 24-2-2 and Drawing No. 89800). The mine support facilities areas in Category II, including roads, ramps, ponds, facilities, etc., have not been included in Category IIA (as much as practicable) to reduce "double bonding" of these facilities. The bond cost for the mining support facilities under the Category IIA classification is calculated in Attachment 24-4 or 24-5.

The remaining areas in Category IIA are areas where PWCC has or will have the reclamation completed by the "worst case" year. These areas have not had permanent program reclamation liability release approved by the regulatory authorities; however, PWCC completed backfilling and grading, topsoil replacement, surface stabilization, and revegetation for these lands, and some of these lands have been revegetated since 1986. This bond estimate, therefore, assumes these lands will not require placement or grading of spoil to change the surface topography. The permanent program permit incorporates several periodic monitoring and reporting mechanisms to assure that PWCC complies with the requirements of the permanent program. These include the annual "Surface Stabilization Report" (1991 to 2007), the annual "Minesoil Reconstruction and Revegetation Activities Report" (1986 to 1998) for the Black Mesa and Kayenta Mines, the "Annual Reclamation Report" (1998 to present), and frequent inspections by OSMRE, BIA, BLM, the Navajo Nation, and the Hopi Tribe.

Since PWCC has, or will have, effectively completed the majority of required reclamation work for these lands prior to the "worst case" year, the "worst case" bond estimate for the Category II and IIA lands reflects the following assumptions:

1. Since implementation of the Surface Stabilization Plan (see Chapter 26), the backfilling and grading requirements are being achieved in accordance with the permanent program permit requirements. Typically, none of the permanent program lands will require regrading; however, to be conservative and provide a "worst case" liability estimate, this estimate assumes 50 percent of the area will require surface manipulation including grading to blend the surface area with surrounding topography and promote effective drainage, backfilling and grading surface cracks and potentially unstable features, grading and blending of drainage control structures, and grading of excessive erosion areas. The remaining 50 percent of Category IIA area is assumed to include flatter, stable, interior reclaimed lands which are suitable to comply with permanent program backfilling and grading requirements without further surface manipulation.
2. The 50 percent of the area requiring surface topography manipulation above will require new or repaired drainage channels. This estimate includes additional bond money to reconstruct or repair the Surface Stabilization structures as required within this area.
3. The Minesoil Reconstruction program monitors, samples, and reports on an annual basis the existence of four feet or more of suitable plant growth material on all permanent program lands. No additional money is required for topsoil haulage and spreading. Adequate topsoil on-site is available to redistribute

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during the miscellaneous grading phase described above to leave a minimum of four feet of suitable plant growth material within the dozer's grading distance.

4. This estimate assumes dozer-ripping of 50 percent of the Category II and IIA lands and complete reclamation/revegetation of this surface area. This is conservative; however, it assures adequate bond money is available for surface soil mechanical manipulation, surface protection measures, and permanent revegetation of the area.

Category III, Interim Program Regulations Area - Included in this category are lands disturbed and reclaimed during the period 12-17-77 through 7-6-90 for the Kayenta Mine and 12-17-77 through the present for the Black Mesa Mine. Due to the status of the permitting process and the regulatory requirements during this time, reclamation bonds were not required to be submitted for these lands.

Category IV, Area Disturbed Prior to 12-17-77 - Lands in this category were disturbed prior to OSMRE law regulating coal mining and, therefore, reclamation bonds were not required to be posted.

Category V, Lands Under Major Facility Areas - Permanent Program Regulations Area - This area includes the major permanent program facilities areas. The bond costs for these areas are calculated in Attachment 24-5.

Category VI, Bond Release/ TOJ - Interim Program and Permanent Programs Regulation Area - This includes areas where bonding or reclamation liability has been approved and the land has been released back to the residents for grazing. No future bonding costs are included for these lands.

Category VII & Category VIII Bond Release - Permanent Programs Regulation Area - Category VII is Phase 1 Bond Release only and Category VIII is Phase 1 and Phase 2 Bond Release only.

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Reclamation Cost Categories

PWCC's experience in reclaiming mined land has shown, for the purpose of estimating bonding costs, reclamation activities can be grouped into the following categories:

Direct Costs

1. Backfilling and grading/surface stabilization
2. Suitable material and topsoil replacement
3. Revegetation
4. Exploration drilling
5. Mine support/facility reclamation
6. Reclamation maintenance prior to final bond release or TOJ

Indirect Costs

1. Estimated inflation adjustment
2. Mobilization and demobilization
3. Contingencies
4. Engineering redesign fee
5. Contractor profit and overhead
6. Reclamation management fee
7. Arizona/ Tribal Tax

The following assumptions are reflected in this reclamation bond estimate:

1. The reclamation bond is based on the cost of having a third-party contractor engaged by OSMRE complete the required reclamation work.
2. The reclamation bond is based on those conditions that define the point in the planned mining operation that presents the greatest estimated reclamation costs for that permit term. Calculating the bond in this manner assures the availability of adequate reclamation funds if, and regardless of when, a forfeiture might occur during the permit term.
3. The reclamation bond is based on OSMRE's third-party contractor adherence to the approved mining and reclamation plans, permit conditions, and performance standards.

Direct Reclamation Costs

Backfilling and Grading. The first major activity in the reclamation of mined lands is backfilling and grading of any open pits. Although this process is discussed in detail in the Backfilling and Grading Plan, found in Chapter 21 and the Surface Stabilization Plan in Chapter 26, an unplanned cessation of mining will usually cause some deviation from the original plan. Early cessation would generally affect the projected postmining topographic configuration, location and configuration of postmining drainages, and the resulting

volumetric calculations. In all cases, the bond reclamation calculations reflect completion of backfilling and grading to eliminate highwalls, establish a stable configuration, and reestablish effective drainage consistent with the approved permit.

The first step is the determination of volumes. Overburden/coal boreholes were located in the 2010 open pit areas and used to determine average overburden depths for each pit. Depth values calculated from the boreholes were used in conjunction with range diagrams for each pit area to develop a representative range diagram for each pit. These representative range diagrams formed the basis for subsequent pit volume calculations. Graphical representations of the representative range diagrams are provided at the beginning of every set of applicable pit area worksheets (see Attachment 24-3). As shown on these diagrams, some pit areas employ alternating spoil and highwall benches for stripping.

Postmine slopes were then superimposed on the range diagrams. Regraded spoil slopes were established at a minimum slope of 10h:1v and a maximum slope of 4h:1v. Regraded highwall slopes would be reduced to a minimum slope of 5h:1v and a maximum slope of 3.5h:1v. Slopes were adjusted within these ranges using a digitizer to check areas in order to obtain a cut/fill balance for each pit area. A swell factor of 25 percent for highwall material was utilized based on studies discussed in Chapter 21. This produced a final topography that could not only be revegetated, but would also allow drainage to flow through and from pit areas without impounding water. It was also assumed that in all cases there would be four standing spoils behind the open pit. This is a very conservative estimate because, in most cases, reclamation grading is current to within two spoil piles. It was assumed that the two adjacent spoils would be dozed into the open pit and the two back (furthest from the pit) spoils would be graded into the adjacent troughs created by the spoil and blended into the surrounding topography (see the representative range diagrams in Attachment 24-3).

Highwall reduction would be accomplished by drilling and shooting the highwall (see Worksheet 24-3-2 for each active pit area) and then dozing the blasted material into the open pit. The first three rows of blastholes could be drilled with a larger diameter hole and blasted, achieving a cast of approximately 25 percent of the blasted material into the open pit. See Table 24-2-3 in Attachment 24-2 for a summary of highwall reduction and spoil grading volumes.

The premining and postmining topography maps were compared for material movement. Due to the fact that the topographic highs and lows will generally be located in the same area after mining as they were prior to mining, it is anticipated that tracked dozers rather than tractor scrapers would be effective in backfilling the final pits.

Ramp grading estimates are a part of this document. The number of ramps for each pit area (N-6, J-19, etc.) in 2010 were estimated from the Mine Plan Map (Drawing No. 85210). Total ramp lengths were estimated using the average pit depths previously determined and ramp grades ranging from 9 to 12 percent. A standard ramp length of 1,000 feet from the open pit (within the 4 spoil pile limit) and width of 100 feet were used in the

ramp backfilling volumetric calculations. Additional ramp grading requirements were based on remaining ramp lengths beyond the 1,000 foot limit. Please refer to Figure 24-1 and Worksheets 24-2-4 and 24-3-6 for ramp grading volumes and calculation details for each active pit area.

In addition to the area disturbed by highwall reduction, adjacent spoil piles, etc., there is some disturbance around the pit areas that cannot be calculated by a length times width calculation, (see Drawing No. 89800, Category I areas). It is for this reason a miscellaneous grading category has been included in the backfilling and grading calculations. This will cover additional disturbance at in the advance topsoil removal area, around the pit ends, truck dumped spoil areas, etc. An estimated grading time of one acre per shift has been assigned to this category. Please refer to Table 24-2-5 for a summary of miscellaneous grading areas and Worksheets 24-3-7 for corresponding grading calculations.

The Surface Stabilization Plan, as presented in Chapter 26, discusses in detail the measures to be taken to assure stable postmining landforms. Costs have been included in this bond estimate to complete surface stabilization activities. Drainage channels will be created in conjunction with backfilling and grading operations. The additional work required is for construction of terraces, downdrains, and riprap placement. Worksheets for each mining area (Attachment 24-3, Worksheets 24-3-8 through 24-3-10) present calculations for these activities. Table 24-2-6 in Attachment 24-2 summarizes requirements for the reclamation channels, downdrains, and terraces for each pit area.

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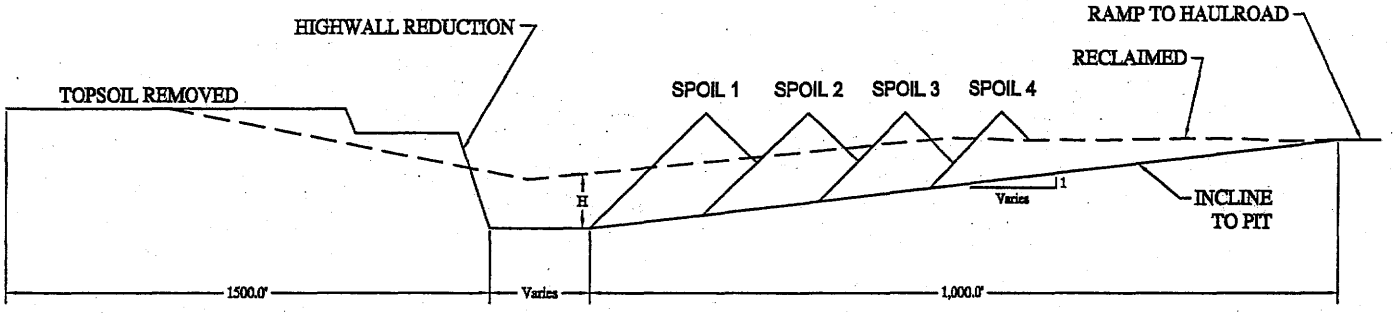
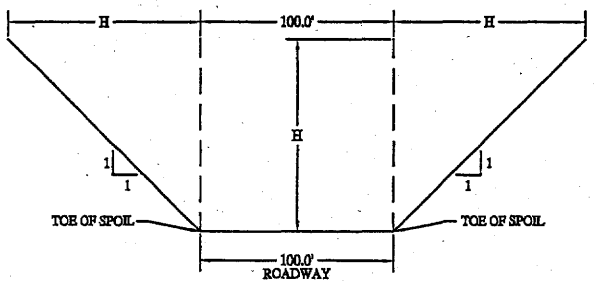
FIGURE 24-1
TYPICAL RAMP GRADING PLAN

(NOT TO SCALE)



RAMP INCLINE GRADING - TYPICAL PROFILE

(NOT TO SCALE)

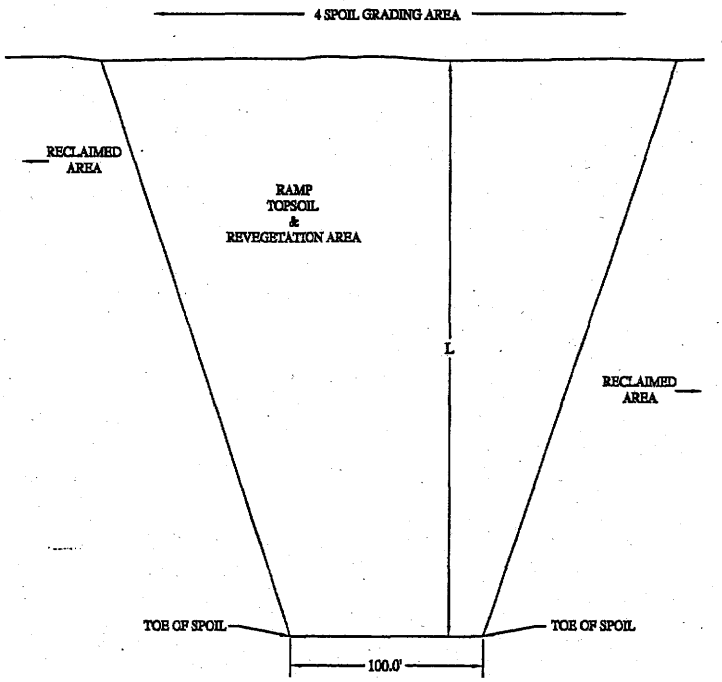


TYPICAL CROSS-SECTION

(NOT TO SCALE)

A : 100 H + H^2

H : SCALED HEIGHT FROM TYPICAL RANGE DIAGRAMS



TYPICAL PLAN VIEW IN RECLAIMED AREA

(NOT TO SCALE)

A : (100 + 3H) L

H : GRADING HEIGHT AT THE EDGE OF THE 4 SPOIL AREA

NOTE: ASSUME SPOIL IS GRADED TO MINIMUM 3:1 SLOPE

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AutoCAD: FIG24-Worksheet.dwg

Suitable Material and Topsoil Replacement. The second major activity in the reclamation sequence is the replacement of suitable material and topsoil. Tractor scrapers would be used to recover, haul, and place both suitable material and topsoil. It is anticipated that in and around the mining disturbance areas, portions of the disturbed area may contain unsuitable plant growth material. Unsuitable material uncovered in the highwall reduction process which cannot be covered by grading or mixed, will be buried. The spoil sampling program as discussed here, in Chapter 8, Soils Resources and Overburden, and in Chapter 22, Minesoil Reconstruction, addresses this problem. It was assumed that suitable material within the topsoil stripping area ahead of each pit could be salvaged and spread to a depth of 2.4 feet on regraded areas. The 1.6 feet of topsoil would then be redistributed.

Areas for topsoil replacement include areas ahead of mining, pit areas, graded spoil areas, ramp areas, and all facility areas. Once the areas to be topsoiled were located on the Bonding Map, Drawing No. 89800, distances from topsoil stockpiles existing or projected to exist in 2010 were measured. Weighted average topsoil haul distances were then calculated for each pit area as shown on Table 24-2-7, Attachment 24-2. Except as noted, an average grade of 2.5 percent was assumed for topsoil hauls. It was assumed that each Permanent Program mining area would receive an average of 1.6 feet of topsoil and 2.4 feet of suitable material over the graded spoils, for a total of 48 inches of suitable plant growth material. The and N-6 areas were assumed to Initial Program areas and only will require 1.0 feet of topsoil. Topsoil and suitable material replacement calculations are provided by Worksheets 24-3-11 and 24-3-12.

A regraded spoil sampling program has been used at Kayenta Mine since 1986 to determine the topsoil redistribution thickness. The N-11, N-14, J-16, J-19 and J-21 pit area regraded spoil sampling data indicate 70 percent of all 1997/1998 sample sites consisted entirely of suitable material (PWCC, 1998a and PWCC, 1999a). An average topsoil redistribution depth of 1.6 feet was needed at Kayenta Mine in 1997 and 1998 based upon a total of 287 sample points. These values are based on approved site-specific soil and spoil suitability standards for Black Mesa and Kayenta Mines.

Suitable, near surface, and deep overburden is available throughout the leasehold as evidenced by a cursory overview of core data presented in Chapter 8, Chapter 22, and Volume 12, Appendix B of the PAP. Overburden data from the deep coreholes over the entire lease was analyzed to determine the quantity of suitable material in each pit area. The percentage of suitable overburden ranged from 32 percent in the J-7 and J-16 pits to 52 percent in the N-11 area. The suitable overburden percentage for the entire Black Mesa leasehold was 38 percent.

Premine overburden quality was compared to postmine spoil quality in the J-21 area. About 36 percent of the premine overburden strata had suitable chemical and physical characteristics. Fifty-eight percent of the final graded spoil sampled from 1986 through 1989 was determined to be suitable. Higher percentages of suitable material in the spoil suggest physical mixing and dilution of overburden has occurred during the

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dragline spoiling and final grading operations. Similar partial dilution and mixing phenomenon is described by Dollhopf et. al., 1981.

The required redistribution depth of topsoil and/or suitable spoil for the Black Mesa leasehold will likely be similar to the 1.6 foot thickness determined for the 5 Kayenta Mine pit areas during 1997 and 1998. Based, however, on the 03/12/90 bond adjustment, the bond cost calculations for topsoil/suitable spoil redistribution is conservatively based upon the 4.0 foot replacement depth. It was determined, therefore, that all Permanent Program graded spoil areas would require the 1.6 feet of topsoil, plus an additional 2.4 feet of suitable plant growth material. The volume of material needed for these areas is shown on Table 24-2-7.

For areas assumed to already be revegetated (i.e., Category II and IIA), verification of four feet or more of suitable plant growth material is discussed in the annual "Minesoil Reconstruction and Revegetation Activities Report" (1986 to 1998) and the "Annual Reclamation Report" (1999 to present) for the Black Mesa and Kayenta Mines submitted to OSMRE.

Revegetation and Reclamation Maintenance. After the topsoil has been replaced, the seedbed must be prepared prior to seeding. This is accomplished by ripping and discing the seedbed on the contour. Seeding is accomplished using a rangeland drill or broadcast seeder. It is assumed that 100 percent of the area would have to be mulched with hay or straw. Shrubs and trees are also planted in designated reclamation areas (Chapter 23). All costs, including fencing, are shown on Table 24-1-3, Attachment 24-1. It was assumed that all reclamation would be complete up to the fourth spoil pile (see Attachment 24-3, Worksheets 24-3-13 and 24-3-14; Attachment 24-4, Worksheet 24-4-7; and Attachment 24-5, Worksheets 24-5-6, 24-5-13, 24-5-18, 24-5-25, 24-5-31, 24-5-37, and 24-5-42). An incremental revegetation maintenance cost of 50 percent was also included to cover potential revegetation failure for seeded areas and consequent reseeding requirements. This revegetation maintenance cost has been included for all permanent program regulation lands disturbed and reclaimed from 1984 through 2010 (i.e., Category II and IIA lands).

Based on PWCC's experience, recordkeeping, monitoring, and reporting, there has been only a limited amount of permanent program final reclaimed lands requiring reseeding; therefore, the 50 percent revegetation maintenance fee is conservative. The "Annual Vegetation Monitoring Reports" (PWCC 1993 to 1999) and the "Annual Reclamation Report" (PWCC 2000 to present) for the Black Mesa and Kayenta Mines submitted to OSMRE contain the existing established perennial species seedling density. As an example, the data for the 1992 to 1994 years includes seedling density data from 16 reclaimed J-21 sites. Chapter 23 of the AZ-0001D permit states that greater than 0.75 seedling/ft^2 is an excellent stand and reseeding will be considered for stands with less than 0.5 seedlings/ft^2. In all 16 sites above, none were less than 0.5/ft^2 and most were greater than 1/ft^2. In 1998, seven reclaimed sites in the J-21 area were sampled for seedling density. The values ranged from 0.71 to 1.99 seedlings/ft^2 with six of the seven sites having greater than 0.75 seedlings/ ft^2.

In addition, the annual reclamation reports for the Black Mesa Complex have included various categories for revegetation since the 1992 reporting year. These include REV (newly seeded), RES (reseeded sites), and INS (newly seeded or reseeded sites which were also interseeded). The text, tables and maps reflect these categories.

Finally, various annual vegetation monitoring reports include cover data for the J-21 area for lands reclaimed from 1986 to the present indicating the percentage of cover at or approaching the cover density required for bond release. In particular, a significant portion of the J-21 reclaimed area was sampled in 1998 to provide a data set supporting a Phase 2 bond release request. The reclaimed area cover was sufficient to meet the cover success standard (1998 Annual Vegetation Monitoring Report, PWCC). The J-21 area is representative of current and future permanent program reclamation management practices. All of the above data and reports indicate that reseeding of 50 percent of the permanent program lands would be a conservative estimate.

Exploration Drilling. An exploration drilling program is generally conducted in advance of the mining areas, generally within the areas to be mined. The activities of this program within the permit area are regulated and inspected by the OSMRE. All exploration activities outside of the permit area are regulated and inspected by the Bureau of Land Management (BLM). The reclamation plans provided for exploration are bonded via prospecting bonds outside the permit area and reclamation bonds inside the permit area. Chapter 4, Attachment 4-1 and 4-1, and Attachment 24-6 includes copies of the current exploration bond calculations. The holes are located in active mining areas where the holes will be mined through with the mining and reclamation activities. All other exploration/reclamation bonds have been released or the project was cancelled. Copies of the reclamation bonds are included in Chapter 3, Attachment 10.

Facility Reclamation. The facilities, buildings, structures, and miscellaneous support infrastructure (ie: roads, powerlines, conveyors, etc.) that would have to be demolished, disposed of, and associated areas reclaimed if mining operations were to cease in the year 2010 are identified in Attachment 24-5. The following and Chapter 6 discuss reclamation of these structures and associated disturbance areas. Worksheets 24-5-1 through 24-5-16 summarize relevant demolition volumes, reclamation areas and activities, and related costs.

Structure Demolition. This bond reclamation cost estimate assumes that all PWCC controlled structures within the Black Mesa Complex, excluding the Black Mesa Pipeline Company's facilities but including all Black Mesa Mine, Kayenta Mine, and Joint Facilities, would have to be demolished and the resulting demolition debris disposed of. It also assumes that no salvage value be attached to any of the structures. With the suspension of activities at the Black Mesa Mine in 2006, it was assumed that 100 percent of the Joint Facilities is associated with the Kayenta Mine. This is conservative, since the coal leases allows the Tribes first right

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of ownership after mining activities are completed; therefore, the Tribes could elect to take ownership of the structures and the structures will not need to be demolished.

Means Heavy Construction Cost Data - 2010, was used to estimate demolition and disposal (haul up to 5 miles) costs. It is anticipated the N-9 and J-19 open pits could be approved as locations for all non-hazardous concrete and steel disposal not suitable for recycling. Volume determinations were made from existing maps and/or field measured. The cost per cubic foot includes disposal. Most costs, except where noted, were based on a mixture of construction materials. Demolition debris would be hauled to and placed in the backfill of the nearest open mine pit area (i.e. N-9 or J-19 open pit). All information regarding structure volumes and costs can be found on Worksheets 24-5-1. Expenses were included in both the Black Mesa and Kayenta Mine's disposal costs to include the appropriate design and permitting fees for the N-9 and J-19 disposal areas. Existing facilities will support the contractor's reclamation activities and will be reclaimed as near to the end of the project as possible. In the last year, two portable office trailers and a parts trailer would be mobilized for contractor use.

Facility Areas. After facilities and structures are demolished and the associated demolition debris is removed and disposed of, associated disturbance areas are reclaimed. The concrete footings and foundations in the top three feet will also be hauled to the nearest open pit disposal area. The top one-foot of gravel/scoria surfacing on the parking/storage areas will be buried in a trench. The trench will be excavated adjacent to the area in suitable plant growth material in order to accept the top one-foot of the surfacing which will be pushed into the trench. The material originally excavated from the trench will then be used to cover the surfacing material (gravel) that was pushed in the trench with four foot of suitable material. Once this is accomplished, the entire parking area will be ripped to a depth of three feet. One-foot of suitable growth material from the surrounding area or topsoil stockpiles will then be hauled by scraper to the ripped parking area. The areas, including the borrow areas, will then be revegetated. Please refer to Attachment 24-5 and Worksheets 24-5-1 through 24-5-6 for volumes and hours.

Miscellaneous Utilities. Reclamation of utilities, including sewer lines, phone lines, and water lines is assumed to be included in the powerline, land under facilities, roads, and conveyor reclamation calculations. All underground utilities would either be removed or plugged four feet below the final grade and overlying areas reclaimed in conjunction with adjacent facilities areas.

Conveyor Demolition. The cost associated with demolition of the conveyor system is shown on Worksheet 24-5-8. The demolition cost per cubic foot and disposal cost per cubic yard (assumes 5 mile haul) are based on Means Heavy Construction Cost Data - 2010, for demolition of steel structures. Conveyor lengths were taken from Drawing No. 85210. Dimensions were field measured. It was assumed that all conveyor demolition debris would be hauled to the nearest open pit disposal area for placement in the backfill. The reclamation of the land underneath the conveyor is included in the reclamation of the mine's facilities area.

Powerlines. Powerline demolition was based on the appropriate crew as published in Means. Powerline lengths were taken from Drawing No. 85210 and field surveys where needed. An estimate of daily production was made to arrive at the total cost for removal. Please refer to Worksheet 24-5-9 for costs.

Scoria Pits. It was assumed that a number of scoria pits would exist as disturbed areas within the permit area in 2010. Reclamation of these areas would consist of ripping the pit areas, followed by grading, topsoiling, and seeding. Please refer to Worksheets 24-5-10 through 24-5-13 for scoria pit reclamation calculations and Table 24-2-9 in Attachment 24-2 for disturbance areas.

Landfarm. Currently, PWCC maintains one landfarm areas (i.e., J-16 landfarm) for remediation of minor quantities of petroleum-contaminated soils. Reclamation of the landfarm areas would involve removal of the landfarmed material, with haulage of this material to the nearest pit backfill area for placement in the fill. The limited landfarm areas would then be ripped, graded, topsoiled, and seeded. Please refer to Worksheets 24-5-14 through 24-5-18 for the landfarm reclamation calculations.

Airport. The existing J-3 airport would be reclaimed by digging a trench to accept the runway material; removing the 8 inches of asphalt surfacing, placing it in the trench, and covering it with the excavated material; ripping the subgrade; followed by topsoiling, and revegetation. The reclamation of the land underneath the airport is included in the reclamation of the Joint facilities area. Please refer to Worksheets 24-5-19 through 24-5-20 for the airport reclamation calculations.

Road Reclamation. The three types of roads requiring reclamation within the mine site are primary roads that are to be totally reclaimed, ancillary roads that are to be totally reclaimed, and permanent primary roads that are presently primary haulage roads that will be left for the local residents, and must be narrowed. The three different road categories are differentiated on the Bonding Map (Drawing No. 89800) by of distinct symbols. There are approximately 57 miles of primary roads that will be totally reclaimed, 109 miles of ancillary roads that will be totally reclaimed, and 28 miles of primary haulage roads that will be narrowed as permanent roads for public use.

Permanent Roads. There are approximately 28 miles of primary roads that are currently (or in the future) used by local residents as bus routes and for general access to other areas. These roads will continue to be used by local residents and school districts as primary access routes after mining is completed. These roads will be narrowed to 30 feet to minimize future maintenance requirements consistent with anticipated continued uses. Reclamation will involve dozing approximately one foot of surface material off the edge(s) of the road into ditches or off the road to narrow the road, ripping and grading of the dozed area, and topsoil replacement and revegetation. Refer to Worksheets 24-5-21 through 24-5-25 for permanent road reclamation calculations. The Bonding Map (Drawing No. 89800) shows the location of these roads.

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Primary Roads. There are approximately 57 miles of primary roads that will need to be reclaimed. The reclamation procedures will be much the same as permanent roads except that the entire road surface will be reclaimed. As with the permanent roads, the surfacing material will be pushed into road ditches and buried as part of the cut/fill grading. The culverts and embankments will be removed, topsoil respread, and the area revegetated. Refer to Worksheets 24-5-26 through 24-5-31 for primary road reclamation calculations and the Bonding Map (Drawing No. 89800) for road locations.

Ancillary Roads. In 2010, there will be approximately 109 miles of ancillary roads that PWCC will be responsible for reclaiming. One foot of surface material will be pushed into ditches or off the road, the subgrade will be ripped, and the cut/fills will be graded to cover the surface material. The culverts and embankments will be removed, topsoil respread, and the area revegetated. Numerous roads fall into the ancillary road category, from jeep trails to surfaced roads. The number of uses vary greatly as well. PWCC has identified the roads which are used to support mining activities on the Bonding Map (Drawing No. 89800). Refer to Worksheets 24-5-32 to 24-5-37 for ancillary road reclamation calculations. Other roads that show up on this drawing, aerial photos, or USGS topographic maps were constructed over several years. Most were constructed prior to December, 1977. A majority of these roads were exploration roads that have been reclaimed. All exploration roads are required to be bonded and the reclamation inspected by the OSMRE (inside the permit area) and BLM (outside the permit area). There are numerous other roads either constructed prior to 1977 or even after 1977 that are utilized by local people (i.e., non-mining related roads). These consist of access to home sites, wood gathering areas, ceremonial and cultural resource areas, corrals, grazing areas, water troughs, etc. PWCC is not responsible for reclamation of these roads and these roads will remain to support existing local uses.

Water Storage and Sedimentation Ponds. Most of the water storage and sedimentation ponds will be totally reclaimed while a few ponds will need to be cleaned out, but will remain in place as permanent ponds. Locations for all ponds are shown on Drawing 85405. Sediment deposition was based on annual estimates provided in Chapter 6. Embankment volumes were taken from existing, proposed, and typical designs as shown in Chapter 6. Embankment material and sediment accumulations in the ponds would be dozed into the pond basins or surrounding areas to reestablish effective drainage. Generally, all ponds would be drained prior to reclamation and be allowed to dry-out to facilitate reclamation activities. Any wet sediments would be cleaned out with a dragline while dry sediments would be cleaned out with a dozer. Sediments contained in incised ponds or the incised portions of most of the ponds would not need to be removed to reestablish effective drainage. It is also assumed that sediments meeting topsoil suitability standards could be used to topsoil pond disturbance areas. Please refer to Worksheets 24-5-38 through 24-5-42 in Attachment 24-5 for pond reclamation calculations. Table 24-2-10 in Attachment 24-2 lists all ponds and summarizes the work to be performed at each pond.

Environmental Monitoring Sites. Approximately 7 environmental monitoring sites will exist off-permit and 62 monitoring water wells will exist within the permit area in 2010. Five of the off-permit environmental monitoring sites are conservatively assumed to have concrete structures requiring demolition. Following concrete demolition, both these sites and the remaining two off-permit sites will be reclaimed by grading and seeding the site disturbance areas. Well abandonment procedures will involve: 1) Cutting the well casing off a foot below ground level or even with the ground surface; 2) Filling the well bore from the bottom to 20 feet below ground surface with high solids bentonite cement or cement using a tremie line to assure any bore water is displaced; 3) Grouting the top 20 feet of the well bore with cement; 4) Removing all locking well covers and protective fences; and 5) Scarifying and seeding the ground surface in the immediate vicinity of the well. See Attachment 24-5, Worksheets 24-5-43 through 24-5-45 for the estimated costs to reclaim environmental monitoring sites and monitoring wells.

N-11 Coal Handling Facility. The additional cost to backfill and grade the N-11 Coal Handling Facility is included on Worksheets 24-5-46 and 24-5-47. All other costs associated with reclamation of these facilities are included in the area for the Kayenta Facilities worksheets.

Dragline and Shovel Removal. The additional cost to disassemble and remove the draglines and shovels is included on Worksheet 24-5-50. The cost of these activities was estimated from PWCC experience. This cost is conservative and it will be reevaluated during bonding calculations updates. Currently, used draglines and shovels have a positive salvage value.

Fuel Tax. The additional cost to all equipment operation at the Black Mesa Mine area based on the Navajo fuel tax. Gallons of fuel consumed per hour of operation were calculated from the Cost Reference Guide and then multiplied by the hours of operation for each piece of equipment reported in Table 24-1-5 Direct Cost by Equipment for the Black Mesa Mine. Kayenta Mine has a waiver with the NGS Power Plant for Navajo diesel fuel tax and Navajo Sales Tax.

Indirect Reclamation Costs

The following summarizes the costing approach for the indirect costs associated with reclamation of the Black Mesa Mining Complex.

Mobilization and Demobilization. Once areas and volumes for the various required reclamation activities were determined, the number of shifts, hours per shift, equipment types, operator/operating efficiencies, support equipment, and overall reclamation time span, all of which ultimately affect mobilization and demobilization, had to be determined. The following discussion outlines the considerations utilized in determining equipment fleet requirements.

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Production Shifts. A maximum of two shifts per day was used for this estimate. Using two shifts per day, 5 days per week, 250 days per year, would allow for preventative maintenance and minor equipment repair to occur on 3rd shift, if needed. Shift scheduling was based on eight hours per shift. Actual production time during an eight-hour shift only amounts to approximately seven hours due to lunch, startup, and shutdown. Actual working time is estimated at 50 minutes for each 60 minute scheduled hour. All estimates of production time required to complete a task were, therefore increased by a factor of 1.371 (8/7 x 60/50) to account for the additional equipment time and labor associated with this shift factor.

Equipment Type. The types of equipment selected were based on similar equipment types presently operating at the mine and typical contractor equipment that would be utilized for a project of this magnitude. Whenever possible, Caterpillar equipment was used for reclamation due to widely published information regarding costs and performance. All equipment costs were taken from the Cost Reference Guide (CRG) for Construction Equipment, except as noted. Depreciation costs were adjusted based on operating the equipment two shifts per day. Based on CRG's Appendix 23, Section 8.1, CFC and overhead can be normally accrued during the first shift only. Because the equipment is scheduled two shifts, the CRG costs were reduced by 50 percent. In addition, based on CRG's Appendix 23, Section 8.2, depreciation costs were reduced by 75 percent (i.e., average of 100 and 50 percent). Please see Table 24-1-1 in Attachment 24-1 for a list of all cost factors. Local cost for diesel fuel is approximately $2.98 per gallon; therefore, fuel costs were adjusted to reflect prevailing local costs. Equipment performance was based on the Caterpillar Handbook - Edition No. 31, or as otherwise noted in the worksheets. Operator performance factors were based on generally published and accepted criteria (see individual worksheets).

Operator wages were all based on the Davis-Bacon wage rates for government contracts in Northern Arizona as provided by OSMRE. See Table 24-1-2 in Attachment 24-1 for labor rates.

Reclamation Timeframe. A reasonable timeframe for a job of this magnitude is estimated to be approximately three years from start to finish. With this timeframe in mind, and the overall time per unit of equipment known, it became a matter of sizing the fleet so no one piece of equipment worked over 12,000 hours (3 years x 250 days/year x 2 shifts x 8 hrs/shift). The primary production machines and the support equipment needed for the fleet size and timeframe were then estimated. Mechanic and welder labor rates are included in the field repair labor hourly costs for each piece of equipment utilized. Equipment requirements are summarized by Worksheet 24-5-48.

Mobilization and Demobilization Costs. Mobilization and demobilization costs are based on mobilizing 40 major pieces of off-highway equipment and 28 smaller pieces of on-highway vehicles or smaller support equipment. The guidelines set forth in OSMRE's Reclamation Handbook place a value of mobilization and demobilization at one percent to five percent of the direct costs. PWCC used 1.5 percent, or $2,894,320. This amounts to approximately $50,000 per unit for the major equipment and $4,000 per unit for the small

equipment, plus approximately $782,320 for incidental mobilization and demobilization costs which might be incurred by the contractor, including hook-up, set-up, disconnect and dismantling of the contractor's job site facilities and equipment. This is adequate money to cover a typical crew at a daily rate of approximately $15,646 per day for 25 days at the start-up and 25 days at the shut-down of the project. Based on industry standards, the $2,112,000 will provide enough money for mobilizing/demobilizing of a contractor an average distance of 500 to 1000 miles. In addition, due to the size of the mine site, an interior mobilization time for each piece of equipment to travel from one job to the next was estimated (see Attachment 24-5, Worksheet 24-5-49).

Contingencies. Based on Table 4 in OSMRE's 1987 Handbook, a contingency factor of 1.5 percent of the direct cost was retrieved; however, PWCC is using 2.0 percent to provide for unforeseen reclamation circumstances or natural disasters/weather delays.

Engineering Redesign Fee. The reclamation plan as submitted is based on a planned life-of-mine operation. If mining should cease before the planned date, some projects may need to be re-engineered or field engineered. To account for these costs, Graph 1, OSMRE 1987 Handbook was used to estimate these fees. This was estimated at 1.7 percent of the direct costs. PWCC is using 2.0 percent.

Contractor's Profit and Overhead. Profit and overhead for the contractor was estimated using Graph 1, OSMRE April, 2000 Handbook. This was estimated at 10 percent of the direct costs. OSM wants PWCC to use 15 percent. Contractor's overhead includes office maintenance, cleaning, utilities, security, and any other incidental overhead expenses to manage the project.

Reclamation Management Fee. This fee represents the cost for management of the entire project, including project inspection and supervision. Usually this is performed by a firm specializing in reclamation oversight activities. This was estimated per Graph 3, OSMRE 1987 Handbook at 1.5 percent of the direct costs. PWCC is using 2.0 percent.

Inflation. Direct costs are based on the "Cost Reference Guide for Construction Equipment" Section 9, *Tractor and Earthmoving Equipment*, updated through December, 2009 and the Davis-Bacon Labor Rates published in March, 2010 (General Decision AZ20100008 and AZ20100012). In addition, PWCC has evaluated and reflected the effect of inflation on direct reclamation costs for the "worst case" year of the five-year term (i.e., 2010) and has included a 2.4 percent inflation factor in the bond calculations. The inflation factor is based on the end of May, 2010 Engineering News Record's Construction Cost Index. It is assumed that the inflation factor will be reviewed and adjusted, as appropriate, on an annual basis or during the next bond calculation update.

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COST SUMMARY

DIRECT COSTS

BACKFILLING AND GRADING (Cat. I)

Highwall Reduction (Blasting)	=	$10,290,821
Backfill and Grade Open Pits	=	$20,712,980
Ramp Grading	=	$5,241,469
General Grading	=	$9,723,160
Surface Stabilization	=	$507,274
Total Backfilling & Grading	=	$46,475,704

SUITABLE MATERIAL AND TOPSOIL REPLACEMENT - PIT AREAS (Cat. I)

Suitable Material Replacement	=	$8,632,966
Topsoil Replacement	=	$22,389,847
Total Suitable Material/Topsoil Replacement	=	$31,022,813

REVEGETATION

Revegetation - Pit Areas(Cat. I)	=	$13,219,378
Revegetation Maint. Pre-2010 Dist.(Cat. II/IIA)	=	$4,841,893
Total Revegetation	=	$18,061,271

MAINTENANCE ACTIVITIES (Cat II and IIA)

Grading at 50%	=	$9,176,619
Surface Ripping at 50%	=	$1,274,632
Total Maintenance Activities	=	$10,451,251

FACILITIES

Structure Demolition	=	$4,962,208
Reclaim Facilities Area	=	$14,563,569
Conveyor	=	$5,671,690
Powerlines	=	$375,576
Scoria Pits	=	$1,080,859
Landfarm Reclamation	=	$34,503
J-3 Airport	=	$20,406
Permanent Roads	=	$4,008,439

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Primary Roads	=	$15,325,876
Ancillary Roads	=	$12,553,808
Water and Sedimentation Ponds	=	$5,400,989
Environmental Monitoring Sites	=	$124,649
Monitoring Wells	=	$62,000
N-11 Coal Handling Facilities	=	$963,073
Dragline and Shovel Removal	=	$1,000,000
Total Facilities	=	$66,147,645

MISCELLANEOUS ITEMS

Interior Mobilization	=	$407,894
Support Equipment	=	$15,489,353
Black Mesa Fuel Tax ($0.18 per gal.)	=	$376,364
Total Miscellaneous	=	$16,273,611
SUBTOTAL DIRECT COSTS PLUS FUEL TAX	=	$188,432,295

To project the 2010 reclamation liability cost an average annual inflation rate of 2.4% was assumed.

Year 2010 Inflation	=	$4,522,375
Total Direct Costs plus Inflation	=	$192,954,670

INDIRECT COSTS

Mobilization and Demobilization (1.5% of Direct Costs)	=	$2,894,320
Contingencies (2.0% of Direct Costs)	=	$3,859,093
Engineering Redesign Fee (2.0% of Direct Costs)	=	$3,859,093
Contractor Profit and Overhead (15.0% of Direct Costs)	=	$28,943,201
Reclamation Management Fee (2.0% of Direct Costs)	=	$3,859,093
SUBTOTAL INDIRECT COSTS	=	$43,414,801

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Total Direct and Indirect Cost with 2010 Inflation	=	$236,369,471
AZ Transaction Privilege Tax (4.0%)	=	$9,454,779
Black Mesa Mine (only) - Navajo Sales Tax (3.00%)	=	$1,149,300
Previously Approved Exploration Bond	=	$1,012,449
TOTAL RECLAMATION LIABILITY	=	$247,985,999

TOTAL RECLAMATION LIABILITY BREAKDOWN BY MINE

		COMBINED	KAYENTA	BLACK MESA
SUBTOTAL DIRECT COSTS PLUS FUEL TAX	=	$188,432,295	$157,891,794	$30,540,501
To project the 2010 reclamation liability cost an average annual inflation rate of 2.4% was assumed.				
Year 2010 Inflation	=	$4,522,375	$3,789,403	$732,972
Total Direct Costs plus Inflation	=	$192,954,670	$161,681,197	$31,273,473
INDIRECT COSTS				
Mobilization and Demobilization (1.5% of Direct Costs)	=	$2,894,320	$2,425,218	$469,102
Contingencies (2.0% of Direct Costs)	=	$3,859,093	$3,233,624	$625,469
Engineering Redesign Fee (2.0% of Direct Costs)	=	$3,859,093	$3,233,624	$625,469
Contractor Profit and Overhead (15.0% of Direct Costs)	=	$28,943,201	$24,252,180	$4,691,021
Reclamation Management Fee (2.0% of Direct Costs)	=	$3,859,093	$3,233,624	$625,469
SUBTOTAL INDIRECT COSTS	=	$43,414,801	$36,378,269	$7,036,531
Total Direct and Indirect Cost with 2010 Inflation	=	$236,369,471	$198,059,466	$38,310,004
AZ Transaction Privilege Tax (4.0%)	=	$9,454,779	$7,922,379	$1,532,400
Black Mesa Mine (only) - Navajo Sales Tax (3.00%)	=	$1,149,300	Exempt	$1,149,300
Previously Approved Exploration Bonds:				
J-21 Phase 2 Exploration			= $457,000	
J-23 Phase 3 Exploration				= $359,970
N-6/ N-11 Phase 1 Exploration			= $62,712	
N-9 Phase 1 Exploration			= $10,229	

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N-10 Phase 1 Exploration				= $31,587
N-9 Phase 2 Exploration			= $90,951	
Total Exploration		= $1,012,449	= $620,892	= $391,557
TOTAL RECLAMATION LIABILITY		= $247,985,999	$206,602,737	$41,383,262

		COMBINED	KAYENTA	BLACK MESA
CURRENT BOND POSTED	=	$293,054,000	$245,192,000	$47,862,000
2010 Bond Required:		$247,985,999	$206,602,737	$41,383,262
ADDITIONAL BOND REQUIRED	=	($45,068,001)	($38,589,263)	($6,478,738)
PROPOSED ADDITIONAL BOND AMOUNT (Due to the J-21 & N-14 Bond Reduction, Reduction in Fuel & Equipment Cost from 2008 vs. 2010, No New Bond is Required.)	=	NONE	NONE	NONE
RESIDUAL BOND AMOUNT (Available to PWCC)	=	$45,068,001	$38,589,263	$6,478,738

Bonding Summary

The reclamation bond will be incrementally reviewed for inflation and adjusted in July, 2011. This document and supporting maps demonstrate that the entire permit area could be reclaimed for $247,985,999. In addition, this bond estimate includes enough money to reclaim both the Black Mesa and Kayenta Mines, even though the current AZ-0001D permit only requires bonding for the Kayenta Mine while the Black Mesa Mine has been mined under the Initial Program regulations and permit. Currently, the Kayenta Mine has $245,192,000 bond submitted to OSMRE and the Black Mesa Mine has an estimated $47,862,000 coal lease bond posted for a total bond of $293,054,000. With approval of PWCC's June, 2010 revised reclamation liability estimate, PWCC will not be required to submit an additional bond. The current bond is adequate until July, 2011 and beyond. An inflation adjustment will be reviewed and posted annually, as required in 2011, and thereafter, during the five-year permit term.

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ATTACHMENT 24-1

COST INPUT AND SUMMARY TABLES

- Major Equipment Costs
- Davis-Bacon Labor Rates
- Revegetation Costs
- Direct Costs by Mine Area
- Direct Costs by Equipment Type
- Direct Costs by Project
- Worksheets Master Summary Table
- Fuel Tax Summary Table

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Table 24-1-1
MAJOR EQUIPMENT COSTS
Black Mesa and Kayenta Mines

Equipment	Econ Hours	Hourly Ownership & Overhaul Expenses (Adjusted for Double Shift)			Overhaul		Field Repair & Fuel Expenses						Total Operating Cost/hr	Total Hourly Cost
		$ Depr	$ CFC	O'Head	$ Labor	$ Parts	$ Labor	$ Parts	$ Fuel (2)	$ Lube	$ Tires	$ GEC		
637G P-P Scraper	17,000	29.45	9.37	11.59	13.15	27.48	19.73	27.69	88.67	15.85	6.48	1.18	$159.60	$250.64
D11R Dozer	15,350	50.93	13.84	14.06	8.99	53.63	10.52	52.24	88.66	18.83	0.00	8.22	$178.47	$319.91
D10T Dozer	15,350	33.74	9.17	11.12	8.99	33.55	10.52	32.67	59.87	12.56	0.00	5.45	$121.07	$217.63
D7R Dozer	12,120	12.32	3.11	3.58	4.71	8.80	5.81	8.53	27.89	4.27	0.00	1.42	$47.92	$80.43
16M Grader	15,850	21.26	6.12	7.59	3.95	13.19	3.29	12.80	28.32	6.58	8.14	1.07	$60.20	$112.31
992G Loader	12,500	62.68	15.46	17.01	5.48	18.39	6.68	20.29	75.43	16.58	29.10	2.65	$150.73	$269.74
988H Loader	12,500	30.86	7.98	8.70	5.48	9.10	6.68	10.04	45.30	9.03	14.40	1.37	$86.82	$148.93
Truck Tractor 6x6 75,000 lbs	9,300	7.97	1.27	1.19	3.20	2.80	4.71	3.14	32.85	3.59	2.61	0.00	$46.90	$63.32
Atlas Copco Pit Viper 271	12,800	36.60	9.16	11.22	45.76	26.92	85.45	46.93	80.17	15.47	0.00	4.69	$232.71	$362.37
769D Dump Truck	15,500	23.84	5.58	4.80	10.96	11.21	8.66	6.83	29.03	7.59	10.55	0.00	$62.66	$119.04
Water Truck 14,000 gal	11,500	28.90	6.61	5.11	9.31	7.74	22.47	14.94	55.89	8.98	12.65	0.00	$114.93	$172.60
Service Truck 6x4 40,000 lbs	10,350	4.46	0.78	0.68	1.53	1.58	2.56	1.97	16.35	1.78	1.31	0.00	$23.97	$32.99
Light Duty Diesel Crew 4x4 3/4 ton	7,000	2.46	0.28	0.23	0.59	0.66	0.75	0.64	5.72	0.61	0.49	0.00	$8.21	$12.42
Welding/Supply Truck 6x4 40,000	10,350	4.46	0.78	0.68	1.53	1.58	2.56	1.97	16.35	1.78	1.31	0.00	$23.97	$32.99
Equipment Trailer 4 axle, 120T (folding gooseneck)	8,800	6.12	1.07	1.16	1.32	2.69	1.64	3.42	0.00	0.80	5.29	0.00	$11.15	$23.50
9225 American (dragline)	15,000	27.77	8.06	5.80	18.63	23.57	28.49	22.76	33.53	8.27	0.00	1.82	$94.87	$178.69
Parts Trailer 8x32 Tandem Cargo	13,500	0.34	0.07	0.07	0.13	0.11	0.33	0.22	0.00	0.05	0.05	0.00	$0.65	$1.36
Office Trailer 8x32 w/Toilet	13,500	0.54	0.11	0.11	0.18	0.18	0.42	0.34	0.00	0.08	0.08	0.00	$0.92	$2.04
Diesel Floodlighting 6 Lights (30 ft)	4,400	1.73	0.22	0.15	0.90	0.85	1.01	0.81	1.98	0.33	0.00	0.00	$4.13	$7.97
3 Shank Ripper D11, 850 hp	8,200	7.82	1.12	1.21	1.32	3.39	2.41	3.42	0.00	0.89	0.00	2.85	$9.57	$24.43
1 Shank Ripper D11, 850 hp	6,000	8.63	1.03	1.06	1.97	4.50	2.41	4.05	0.00	0.77	0.00	3.37	$10.60	$27.78
3 Shank Ripper D10, 574 hp	8,200	5.69	0.82	0.88	1.32	2.47	2.41	2.49	0.00	0.64	0.00	2.07	$7.61	$18.79
2 cy Bucket heavy	3,750	0.97	0.12	0.08	0.44	0.34	0.57	0.30	0.00	0.09	0.00	0.02	$0.98	$2.92

Notes:

1. Cost information from Cost Reference Guide, December, 2009.
2. Fuel costs are adjusted based on the local fuel costs.

Adjustments:

Double Shift Depreciation Multiplier	75%
Double Shift CFC and Overhead Multiplier	50%
Local Fuel Cost (per gallon)	$2.98

Fuel Costs

	BM	Kayenta
Diesel	$3.16	$2.98
Unleaded	$3.01	$2.83

Note: PWCC's delivered average fuel cost January 1, 2010, including applicable taxes and freight

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Table 24-1-2
DAVIS BACON LABOR RATES
Black Mesa and Kayenta Mines

Type	Group	Hourly (1) Base Rate	Hourly Fringe Benefits	Total Hourly Rate
Laborers (2)	1	$ 16.72	$4.35	$ 21.07
	2	$ 17.70	$4.35	$ 22.05
	3	$ 18.46	$4.35	$ 22.81
	4	$ 19.50	$4.35	$ 23.85
	5	$ 20.44	$4.35	$ 24.79
Power Equipment Operators (3)				$ -
	1	$20.89	$9.31	$ 30.20
	2	$24.16	$9.31	$ 33.47
	3	$25.24	$9.31	$ 34.55
	4	$26.27	$9.31	$ 35.58
Truck Drivers (4)				
	1	$13.37	$6.79	$ 20.16
	2	$17.18	$6.79	$ 23.97
	3	$17.58	$6.79	$ 24.37
	4	$18.20	$6.79	$ 24.99
	5	$18.44	$6.79	$ 25.23
	6	$19.02	$6.79	$ 25.81
	7	$20.64	$6.79	$ 27.43

Notes:
1. Reference: Davis Bacon rates for heavy and heavy dams construction projects in Apache and Navajo Counties, Arizona. Last modified March 12,2010(heavy) and March 12, 2010(heavy dams), (General Decision No.s AZ20100008 and AZ20100012).
2. Laborers
   Group 1 - Laborer, general or construction; tool dispatcher or checker;
   Group 2 - Concrete laborer
   Group 3 - Operator and tender of pneumatic and electric tools; concrete vibrating machines
   Group 4 - Driller (jackhammer and/or pavement breaker); grade setter (pipeline); pipe layer
   Group 5 - Drill doctor and/or air tool repairman; scaler (driller); form setter and/or builder; welder and/or pipelayer installing process piping
3. Power Equipment Operators
   Group 1 - Equipment such as: winch truck, self-propelled compactor and tractor smaller than a D-5.
   Group 2 - Equipment such as: screening plant operators, backhoe/loader, drilling equipment and small loaders (3-6 yd^3 capacity).
   Group 3 - Equipment such as: cranes (15-100 tons), motor graders, loaders (6-10 yd^3 capacity), universal equipment (0-10 yd^3 capacity) including backhoes, clamshell and draglines.
   Group 4 - Equipment such as: cranes (100+ tons), universal equipment including backhoes and loaders over 10 cy, and clamshell and draglines.
4. Truck Drivers
   Group 1 - Trucks such as: pickups, station wagons, Vacuum pump truck, etc.
   Group 2 - Trucks such as: 2 or 3 axle Dump or Flattrack, Water Trucks under 2500 gal. Boom "A" frame, Ginpole Winch and similar.
   Group 3 - Field equipment servicemen and trucks such as: 4 axel Dump/Flatrack, Fuel, Redi-Mix under 10.5 cu. Yd,
   Group 4 - Trucks such as: 5 axle Dump or Flattrack, Water Trucks less than 3900 gal., Redi-Mix 10.5 to 14 cu. yd. and similar.
   Group 5 - Trucks such as: 6 axle Dump or Flattrack, Rock truck less than 16 cu yd and similar, Water Trucks over 4000 gal.
   Group 6 - Trucks such as: 7 or 8 axle Dump or Flattrack, Redi-Mix 14 cu yd or over and similar.
   Group 7 - Trucks such as: Off-highway equipment such as Rock Trucks 16 cu yd to 25 cu yd and similar.

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Table 24-1-3
REVEGETATION COSTS
Black Mesa and Kayenta Mines

Spoil Suitability Sampling/Evaluation			
Sampling and Analysis (ac)	$110.00		
Seedbed Preparation			
Disking (ac)	$57.00		
Deep ripping (ac)	$92.00		
Seeding			
Seed costs (ac)	$179.50		
Seeding application cost (ac)	$68.00		
Estimated seed costs per acre based on 2010 prices.			
Mulching/Crimping			
Mulch Material (ac)		$446.00	
Application w/ tub grinder or Haybuster/Crimping (ac)		$95.00	
Fencing			
$4.24/linear foot installed with an average of 29.5 feet of fence per acre = (ac)			$125.00
47" woven wire with one top strand of barbed wire, mixed steel and treated wooden fence posts:			
Total Initial Reclamation Cost per Acre:			$1,172.50

Shrub, Tree and Cultural Species Planting	
Planting of seedlings for wildlife/cultural enhancement (ac)	$375.00
The actual cost per acre of a planting area will be higher.	
The above cost represents costs averaged over entire reclaimed area.	

Reseeding Cost

Estimated 15-20% of acres require reseeding; however, based on "worst case" assumption, 50% of area was assumed reseeding. Reseeding would include (per acre):

Seedbed Preparation (disking only)	$57.00
Seeding	$247.50
Mulching/Crimping	$541.00
Shrub, Tree and Cultural Species Replanting at 50%	$187.50
Reseeding Cost Subtotal	$1,033.00

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SUMMARY TABLES

- Direct Costs by Mine Area
- Direct Costs by Equipment Type
- Direct Costs by Project
- Worksheets Master Summary Table
- Fuel Tax Summary Table

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Table 24-1-4
BLACK MESA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	3,200	-	-	-	$1.36	$4,352	$4,352
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	3,200	-	-	-	$2.04	$6,528	$6,528
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	4,800	-	-	-	$23.50	$112,800	$112,800
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	43,200	-	-	-	$7.97	$344,304	$344,304
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	4,800	$24.37	-	-	$87.69	$420,912	$420,912
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	28,000	$24.37	-	-	$36.79	$1,030,120	$1,030,120
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	9,600	$35.58	-	-	$147.89	$1,419,744	$1,419,744
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	8,800	$25.23	-	-	$197.83	$1,740,904	$1,740,904
				Support Equipment Subtotal		120,000					$6,023,872	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	4	$35.58	-	-	$147.89	$592	$592
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	8	$33.47	-	-	$113.90	$911	$911
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	0	$33.47	-	-	$395.84	$0	$0
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	8	$35.58	-	-	$184.51	$1,476	$1,476
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	12	$27.43	-	-	$146.47	$1,758	$1,758
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	136	$35.58	-	-	$217.19	$29,538	$29,538
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	48	$35.58	-	-	$286.22	$13,739	$13,739
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	44	$35.58	-	-	$355.49	$15,642	$15,642
				Mobilization Subtotal		260					$63,654	
BLACK MESA MINE TOTAL						177,640	hours				$30,164,137	

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Table 24-1-4
KAYENTA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	932	-	-	-	-	$1,292,462	$1,386.53
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,282	$35.58	1,048,055	cy	$355.49	$455,738	$0.43
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,868	$35.58	2,381,296	cy	$355.49	$1,019,545	$0.43
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	477	$35.58	493,370	cy	$355.49	$169,569	$0.34
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	824	$35.58	711,000	cy	$355.49	$293,047	$0.41
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$319.91	2,523	$35.58	230	acres	$355.49	$897,054	$3,900.23
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	76	$33.47	58,580	lineal feet	$113.90	$8,633	$0.15
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	16	$33.47	9,600	lineal feet	$113.90	$1,874	$0.20
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	21,133	cy	$146.47	$16,714	$0.79
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	105	$35.58	4,800	feet	$184.51	$19,374	$4.04
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,191	$35.58	645,850	cy	$286.22	$627,108	$0.97
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,556	$35.58	1,076,416	cy	$286.22	$1,590,238	$1.48
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$860,689	$2,064.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$21,672	$2,064.00
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,103	$35.58	201	acres	$355.49	$392,105	$1,950.77
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	143	$35.58	201	acres	$379.92	$54,329	$270.29
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$207,432	$1,032.00
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	565	$35.58	103	acres	$355.49	$200,852	$1,941.22
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	73	$35.58	498,520	cy	$379.92	$27,734	$0.06
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$106,296	$1,032.00
				J-16 Subtotal		18,849					$8,262,465	
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	4,834	-	-	-	-	$6,706,370	$1,387.33
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	12,120	$35.58	9,908,646	cy	$355.49	$4,308,539	$0.43
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	11,330	$35.58	11,116,111	cy	$355.49	$4,027,702	$0.36
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	2,672	$35.58	2,247,000	cy	$355.49	$949,869	$0.42
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	5,428	$35.58	4,681,434	cy	$355.49	$1,929,600	$0.41
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$319.91	8,349	$35.58	761	acres	$355.49	$2,967,986	$3,900.11
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	215	$33.47	166,170	lineal feet	$113.90	$24,487	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	29	$33.47	16,900	lineal feet	$113.90	$3,300	$0.20
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	185	$35.58	8,450	feet	$184.51	$34,134	$4.04
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	367	$27.43	52,767	cy	$146.47	$53,754	$1.02
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	14,115	$35.58	4,161,626	cy	$286.22	$4,039,995	$0.97
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	31,708	$35.58	6,936,043	cy	$286.22	$9,075,464	$1.31
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,687	acres	-	$5,545,969	$2,064.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	158	acres	-	$326,112	$2,064.00
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,194	$35.58	400	acres	$355.49	$779,945	$1,949.86
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	285	$35.58	400	acres	$379.92	$108,277	$270.69
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	400	acres	-	$412,800	$1,032.00
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	8,102	$35.58	1,477	acres	$355.49	$2,880,180	$1,950.02
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	1,053	$35.58	7,148,680	cy	$379.92	$400,056	$0.06
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,477	acres	-	$1,524,264	$1,032.00
				J-19 Subtotal		102,986					$46,098,804	
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	648	-	-	-	-	$898,075	$1,385.92
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,429	$35.58	1,168,195	cy	$355.49	$507,995	$0.43
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	1,643	$35.58	1,363,556	cy	$355.49	$584,070	$0.43
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	368	$35.58	381,333	cy	$355.49	$130,820	$0.34
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,629	$35.58	1,404,922	cy	$355.49	$579,093	$0.41
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$319.91	2,754	$35.58	251	acres	$355.49	$979,019	$3,900.48
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	201	$33.47	155,620	lineal feet	$113.90	$22,933	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	21	$33.47	12,200	lineal feet	$113.90	$2,392	$0.20
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	134	$35.58	6,100	feet	$184.51	$24,724	$4.05
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	210	$27.43	24,267	cy	$146.47	$30,759	$1.27
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,847	$35.58	839,450	cy	$286.22	$814,868	$0.97
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,396	$35.58	1,399,083	cy	$286.22	$1,830,663	$1.31
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	542	acres	-	$1,118,688	$2,064.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	12	acres	-	$24,768	$2,064.00
				J-21 Single WidthSubtotal		18,280					$7,548,868	

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Table 24-1-4
KAYENTA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	4,456	$35.58	3,603,111	cy	$355.49	$1,584,063	$0.44
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	724	$35.58	644,213	cy	$355.49	$257,375	$0.40
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,357	$35.58	1,170,359	cy	$355.49	$482,400	$0.41
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$319.91	1,898	$35.58	173	acres	$355.49	$674,720	$3,900.12
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	104	$33.47	80,730	lineal feet	$113.90	$11,846	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	22	$33.47	12,670	lineal feet	$113.90	$2,506	$0.20
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	26,650	cy	$146.47	$16,698	$0.63
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	139	$35.58	6,335	feet	$184.51	$25,647	$4.05
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,542	$35.58	662,886	cy	$286.22	$727,571	$1.10
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,191	$35.58	1,104,811	cy	$286.22	$1,771,988	$1.60
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	428	acres	-	$883,392	$2,064.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	154	acres	-	$317,856	$2,064.00
24-4-01	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,465	$35.58	267	acres	$355.49	$520,793	$1,950.54
24-4-02	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	190	$35.58	267	acres	$379.92	$72,185	$270.36
24-4-03	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	267	acres	-	$275,544	$1,032.00
24-4-05	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	4,169	$35.58	760	acres	$355.49	$1,482,038	$1,950.05
24-4-06	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	542	$35.58	3,678,400	cy	$379.92	$205,917	$0.06
24-4-07	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	760	acres	-	$784,320	$1,032.00
				J-21 Double Width Subtotal		23,913					10,096,857	
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
				N-1 Subtotal		874					$458,678	
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$319.91	252	$35.58	46	acres	$355.49	$89,583	$1,947.47
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	33	$35.58	46	acres	$379.92	$12,537	$272.55
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	46	acres	-	$47,473	$1,032.02
				N-2 Subtotal		285					$149,594	
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$319.91	93	$35.58	17	acres	$355.49	$33,061	$1,944.74
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	12	$35.58	17	acres	$379.92	$4,559	$268.18
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	17	acres	-	$17,544	$1,032.00
				N-7/8 Subtotal		105					$55,164	
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$319.91	110	$35.58	20	acres	$355.49	$39,104	$1,914.89
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	20	acres	$379.92	$5,319	$260.46
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$20,640	$1,010.72
				N-10 Subtotal		124					$65,063	
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	6,062	$35.58	5,032,444	cy	$355.49	$2,154,980	$0.43
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,264	$35.58	899,769	cy	$355.49	$449,339	$0.50
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	905	$35.58	780,239	cy	$355.49	$321,718	$0.41
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$319.91	2,984	$35.58	272	acres	$355.49	$1,060,782	$3,899.93
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,146	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,206	$0.20
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,341	$0.63
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,861	$35.58	808,474	cy	$286.22	$818,875	$1.01
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	8,544	$35.58	1,347,456	cy	$286.22	$2,445,464	$1.81
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	522	acres	-	$1,077,408	$2,064.00
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	47	acres	-	$97,009	$2,064.02
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,695	$35.58	309	acres	$355.49	$602,556	$1,950.02
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	220	$35.58	309	acres	$379.92	$83,582	$270.49
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	309	acres	-	$318,888	$1,032.00
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,304	$35.58	420	acres	$355.49	$819,049	$1,950.12
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	299	$35.58	2,032,800	cy	$379.92	$113,596	$0.06
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	420	acres	-	$433,440	$1,032.00
				N-11 Subtotal		27,554					$10,856,259	
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$319.91	543	$35.58	99	acres	$355.49	$193,031	$1,949.81
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	71	$35.58	99	acres	$379.92	$26,974	$272.47
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	99	acres	-	$102,168	$1,032.00
				N-14 Subtotal		614					$322,173	
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$319.91	104	$35.58	19	acres	$355.49	$36,971	$1,945.84
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	91,960	cy	$379.92	$5,319	$0.06
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	19	acres	-	$4,907	$258.26
				N-14E Subtotal		118					$47,197	

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Table 24-1-4
KAYENTA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	1,004	-	-	-	-	$1,393,914	$1,388.36
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	918	$35.58	990,000	cy	$355.49	$326,340	$0.33
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,914	$35.58	2,418,696	cy	$355.49	$1,035,898	$0.43
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,130	$35.58	804,059	cy	$355.49	$401,704	$0.50
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,961	$35.58	1,691,338	cy	$355.49	$697,116	$0.41
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$319.91	5,299	$35.58	483	acres	$355.49	$1,883,742	$3,900.09
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,135	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,164	$0.19
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,379	$0.63
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	5,606	$35.58	1,462,067	cy	$286.22	$1,604,549	$1.10
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	14,194	$35.58	2,436,779	cy	$286.22	$4,062,607	$1.67
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	944	acres	-	$1,948,416	$2,064.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	45	acres	-	$92,881	$2,064.02
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
				N-9 Subtotal		34,316					$13,965,401	
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,524,852	$2,524,852
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	10,266	cy	$379.92	$5,167	$0.50
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$92,394	$92,394
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	8,040	$35.58	5,768,406	cy	$355.49	$2,858,140	$0.50
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	863	$35.58	2,928,200	cy	$379.92	$327,871	$0.11
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	4,081	$35.58	2,928,200	cy	$355.49	$1,450,755	$0.50
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,576	$35.58	1,260,413	cy	$286.22	$1,595,963	$1.27
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	1,005	acres	-	$2,074,321	$2,064.00
				Major Facilities Subtotal		18,574					$10,929,462	
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,569	$35.58	286	acres	$355.49	$557,764	$1,950.22
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	204	$35.58	286	acres	$379.92	$77,504	$270.99
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	286	acres	-	$295,153	$1,032.00
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$26,126	$3.75
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	597	$35.58	294,408	cy	$355.49	$212,228	$0.72
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	220	$35.58	358,841	cy	$355.49	$78,208	$0.22
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	317	$35.58	1,076,522	cy	$379.92	$120,435	$0.11
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	7,809	$35.58	712	acres	$355.49	$2,776,021	$3,898.91
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	13,818	$35.58	1,837,265	cy	$286.22	$3,954,988	$2.15
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	712	acres	-	$1,469,052	$2,063.28
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	90,610	feet	-	$5,501,679	$60.72
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$23,102	$23,102
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	9	acres	-	$18,577	$2,064
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	99	$35.58	9	acres	$355.49	$35,194	$3,910
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637G P-P Scraper	$250.64	54	$35.58	5,000	cy	$286.22	$15,456	$3.09
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	4	$35.58	12,100	cy	$379.92	$1,520	$0.13
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$319.91	5	$35.58	4,033	cy	$355.49	$1,777	$0.44
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	37	$35.58	6,050	cy	$286.22	$10,590	$1.75
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	2.5	acres	-	$5,160	$2,064.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$37,200	$37,200
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637G P-P Scraper	$250.64	2,478	$35.58	659,063	cy	$286.22	$709,253	$1.08
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	714	$35.58	422,795	cy	$355.49	$253,820	$0.60
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	80	$35.58	184,126	cy	$355.49	$28,439	$0.15
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	163	$35.58	552,378	cy	$379.92	$61,927	$0.11
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,504	$35.58	228	acres	$355.49	$890,147	$3,904.15
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	4,518	$35.58	589,203	cy	$286.22	$1,293,142	$2.19
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	228	acres	-	$471,119	$2,066.31
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	175,699	feet	-	$232,950	$1.33
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,460	feet	-	$26,504	$2.31
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	983	$35.58	484,758	cy	$355.49	$349,447	$0.72
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	724	$35.58	714,107	cy	$355.49	$257,375	$0.36
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	631	$35.58	2,142,320	cy	$379.92	$239,730	$0.11
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	12,141	$35.58	1,107	acres	$355.49	$4,316,004	$3,898.83
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	16,217	$35.58	2,856,427	cy	$286.22	$4,641,630	$1.62
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,107	acres	-	$2,283,961	$2,063.20
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	80	$35.58	271,040	cy	$379.92	$30,394	$0.11
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	336	$35.58	271,040	cy	$355.49	$119,445	$0.44
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	725	$35.58	144,554	cy	$286.22	$207,510	$1.44
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	56	acres	-	$115,584	$2,064.00
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	768	$35.58	54,840	cy	$217.19	$166,802	$3.04
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	497	$35.58	356,460	cy	$355.49	$176,679	$0.50
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	674	$35.58	483,867	cy	$355.49	$239,600	$0.50
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	3,539	$35.58	323	acres	$355.49	$1,258,079	$3,894.98
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,824	$35.58	832,635	cy	$286.22	$808,285	$0.97
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	323	acres	-	$665,764	$2,061.19
				Other Facilities Subtotal		75,329					$35,865,320	

Table 24
KAYENTA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	4,800	-	-	-	$1.36	$6,528	$6,528
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	4,800	-	-	-	$2.04	$9,792	$9,792
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	7,200	-	-	-	$23.50	$169,200	$169,200
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	64,800	-	-	-	$7.97	$516,456	$516,456
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	7,200	$24.37	-	-	$87.69	$631,368	$631,368
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	44,000	$24.37	-	-	$36.79	$1,618,760	$1,618,760
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	14,400	$35.58	-	-	$147.89	$2,129,616	$2,129,616
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	15,000	$25.23	-	-	$197.83	$2,967,450	$2,967,450
				Support Equipment Subtotal		183,800					$9,465,482	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	20	$35.58	-	-	$147.89	$2,958	$2,958
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	40	$33.47	-	-	$113.90	$4,556	$4,556
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	16	$33.47	-	-	$395.84	$6,333	$6,333
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	40	$35.58	-	-	$184.51	$7,380	$7,380
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	60	$27.43	-	-	$146.47	$8,788	$8,788
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	206	$35.58	-	-	$217.19	$44,741	$44,741
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	323	$35.58	-	-	$286.22	$92,449	$92,449
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	498	$35.58	-	-	$355.49	$177,034	$177,034
				Mobilization Subtotal		1,203					$344,240	
				Kayenta Mine Total Joint								
KAYENTA MINE TOTAL						506,924	hours				$154,527,028	

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Table 24-1-4
JOINT MINES
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-01	Joint - (KM)	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$401,566	$401,566
24-5-02	Joint - (KM)	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	3	$35.58	2,022	cy	$383.27	$978	$0.48
24-5-02	Joint - (KM)	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$18,198	$18,198
24-5-03	Joint - (KM)	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	2,849	$35.58	2,044,512	cy	$355.49	$1,012,791	$0.50
24-5-04	Joint - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	304	$35.58	1,030,920	cy	$379.92	$115,496	$0.11
24-5-05	Joint - (KM)	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,437	$35.58	1,030,920	cy	$355.49	$510,839	$0.50
24-5-06	Joint - (KM)	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,935	$35.58	437,491	cy	$286.22	$553,836	$1.27
24-5-07	Joint - (KM)	Revegetation	Revegetation	Miscellaneous	-	-	-	354	acres	-	$730,656	$2,064.00
				Major Facilities Subtotal		6,528					$3,344,360	
24-5-19	Joint: J-3 Airport - (KM)	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	20,246	cy	$379.92	$10,258	$0.51
24-5-20	Joint: J-3 Airport - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	90,656	cy	$379.92	$10,148	$0.11
				Other Facilities Subtotal		54					$20,406	
JOINT FACILITIES TOTAL						6,581					3,364,766	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
				N-14E Subtotal		3,004					$977,671	
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,027	-	-	-	-	$750,946	$750,946
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	884	$27.67	1,012,500	cy	$249.62	$220,640	$0.22
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,639	$27.67	2,473,670	cy	$249.62	$409,103	$0.17
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	489	$27.67	822,330	cy	$249.62	$122,051	$0.15
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	0	$249.62	$240,824	$0.29
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$221.95	5,464	$27.67	498	acres	$249.62	$1,363,893	$2,738.74
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	42	$23.94	20,850	cy	$104.28	$4,422	$0.21
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,874	$26.59	1,499,014	cy	$211.52	$607,842	$0.41
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	11,605	$26.59	2,498,357	cy	$211.52	$2,454,747	$0.98
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	968	acres	-	$1,594,058	$1,647.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,223	$27.67	223	acres	$249.62	$305,370	$1,369.37
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	159	$27.67	223	acres	$271.53	$43,175	$193.61
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	223	acres	-	$183,641	$823.50
				N-9 Subtotal		26,591					$8,450,280	
24-4-04	Kayenta	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	83	$26.59	128,000	lineal feet	$85.39	$7,071	$0.06
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	-	-	$1,469,164	N/A
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	13	$27.67	9,777	cy	$274.57	$3,559	$0.36
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$80,170	$80,170
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	5,422	$27.67	3,647,398	cy	$249.62	$1,353,560	$0.37
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	819	$27.67	2,779,544	cy	$271.53	$222,373	$0.08
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	4,132	$27.67	2,779,544	cy	$249.62	$1,031,497	$0.37
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,121	$26.59	1,198,472	cy	$211.52	$448,591	$0.37
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	963	acres	-	$1,586,396	$1,647.00
				Major Facilities Subtotal		12,590					$6,202,382	
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-05	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-06	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0.0	$27.67	0	cy	$271.53	$0	N/A
24-4-07	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	659	$27.67	325,191	cy	$249.62	$164,563	$0.51
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$20,721	$2.98
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	199	$27.67	325,191	cy	$249.62	$49,731	$0.15
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	975,574	cy	$271.53	$78,049	$0.08
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	7,077	$27.67	645	acres	$249.62	$1,766,508	$2,738.74
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	6,261	$26.59	1,664,979	cy	$211.52	$1,324,313	$0.80
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	645	acres	-	$1,062,327	$1,647.00
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	88,166	feet	-	$4,065,969	$46.12
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$12,139	$12,139
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	118	$27.67	11	acres	$249.62	$29,578	$2,738.74
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	17	acres	-	$27,670	$1,647.00
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637E P-P Scraper	$184.93	16	$26.59	3,000	cy	$211.52	$3,416	$1.14
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	4	$27.67	12,100	cy	$271.53	$968	$0.08
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$221.95	94	$27.67	4,033	cy	$249.62	$23,387	$5.80
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12	$26.59	6,050	cy	$211.52	$2,453	$0.41
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$4,118	$1,647.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$57,000	$57,000
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637E P-P Scraper	$184.93	2,478	$26.59	659,063	cy	$211.52	$524,214	$0.80
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	982	$27.67	422,795	cy	$249.62	$245,157	$0.58
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	81	$27.67	184,705	cy	$249.62	$20,141	$0.11
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	163	$27.67	554,116	cy	$271.53	$44,331	$0.08
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	2,512	$27.67	229	acres	$249.62	$627,099	$2,738.74
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,266	$26.59	591,057	cy	$211.52	$479,341	$0.81
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	229	acres	-	$377,119	$1,647.00
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	201,287	feet	-	$228,680	$1.14
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	1,658	$27.67	817,639	cy	$249.62	$413,766	$0.51
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,170	feet	-	$21,020	$1.88
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	829	$27.67	817,639	cy	$249.62	$206,883	$0.25
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	723	$27.67	2,452,916	cy	$271.53	$196,242	$0.08
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	13,901	$27.67	1,267	acres	$249.62	$3,469,989	$2,738.74
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12,298	$26.59	3,270,554	cy	$211.52	$2,601,377	$0.80
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,267	acres	-	$2,086,752	$1,647.00
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	5	$27.67	15,972	cy	$271.53	$1,278	$0.08
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	20	$27.67	15,972	cy	$249.62	$4,939	$0.31
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	21	$26.59	8,518	cy	$211.52	$4,517	$0.53
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$5,435	$1,647.00
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	535	$27.67	384,078	cy	$249.62	$133,624	$0.35
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H-Linkbelt	$88.67	828	$27.67	59,089	cy	$116.34	$96,324	$1.63
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	1,228	$27.67	881,112	cy	$249.62	$306,547	$0.35
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	3,646	$27.67	332	acres	$249.62	$910,029	$2,738.74
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,225	$26.59	857,725	cy	$211.52	$682,229	$0.80
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	332	acres	-	$547,265	$1,647.00

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Table 24-1-4
KAYENTA MINE
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
				Other Facilities Subtotal		**62,346**					**$23,811,726**	
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	14,400	$27.67	-	-	$95.03	$1,368,455	$1,368,455
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	7,200	$21.30	-	-	$58.67	$422,453	$422,453
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	13,200	$21.30	-	-	$145.97	$1,926,837	$1,926,837
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	42,000	$21.30	-	-	$29.33	$1,231,706	$1,231,706
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	7,200	-	-	-	$11.49	$82,710	$82,710
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	4,800	-	-	-	$1.09	$5,232	$5,232
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	4,800	-	-	-	$1.62	$7,764	$7,764
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	64,800	-	-	-	$5.73	$371,434	$371,434
				Support Equipment Subtotal		**180,000**					**$6,224,271**	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	232	$26.59	-	-	$211.52	$49,115	$49,115
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	344	$27.67	-	-	$249.62	$85,971	$85,971
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	34	$26.59	-	-	$85.39	$2,869	$2,869
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	34	$27.67	-	-	$113.01	$3,797	$3,797
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	17	$27.67	-	-	$95.03	$1,597	$1,597
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	DriTech D55SP	$196.78	12	$26.59	-	-	$223.37	$2,680	$2,680
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	50	$23.94	-	-	$104.28	$5,255	$5,255
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	205	$27.67	-	-	$116.34	$23,873	$23,873
				Mobilization Subtotal		**928**					**$175,157**	
KAYENTA MINE TOTAL						**497,538**					**$115,043,672**	
24-5-01	Joint	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$197,133	$197,132.62
24-5-02	Joint	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	2	$27.67	1,155	cy	$274.57	$421	$0.36
24-5-02	Joint	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$9,472	$9,472
24-5-03	Joint	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	1,117	$27.67	751,377	cy	$249.62	$278,838	$0.37
24-5-04	Joint	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	168	$27.67	568,731	cy	$271.53	$45,501	$0.08
24-5-05	Joint	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	846	$27.67	568,731	cy	$249.62	$211,058	$0.37
24-5-06	Joint	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	463	$26.59	241,735	cy	$211.52	$98,022	$0.41
24-5-07	Joint	Revegetation	Revegetation	Miscellaneous	-	-	-	197	acres	-	$323,734	$1,647.00
JOINT FACILITIES (KAYENTA ALLOCATION) TOTAL						**2,595**					**$1,164,179**	
				TOTAL		**500,133 hours**					**$116,207,851**	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,801	acres	-	$4,612,991	$1,647.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	167	acres	-	$274,555	$1,647.00
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,210	$27.67	403	acres	$249.62	$551,764	$1,369.37
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	403	acres	$271.53	$78,011	$193.61
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	403	acres	-	$331,815	$823.50
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	8,127	$27.67	1,482	acres	$249.62	$2,028,800	$1,369.37
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,056	$27.67	7,170,736	cy	$271.53	$286,842	$0.04
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,482	acres	-	$1,220,062	$823.50
				J-19 Subtotal		**86,791**					**$29,751,516**	
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,995	-	-	-	-	$1,455,880	$1,455,880
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	3,572	$27.67	3,594,413	cy	$249.62	$891,681	$0.25
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	3,475	$27.67	4,195,560	cy	$249.62	$867,342	$0.21
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	648	$27.67	1,173,330	cy	$249.62	$161,707	$0.14
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,041	$27.67	2,623,178	cy	$249.62	$759,200	$0.29
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$221.95	2,194	$27.67	200	acres	$249.62	$547,748	$2,738.74
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	201	$26.59	155,620	lineal feet	$85.39	$17,193	$0.11
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	42	$26.59	24,430	lineal feet	$85.39	$3,576	$0.15
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	338	$27.67	15,415	feet	$113.01	$38,226	$2.48
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	445	$23.94	51,350	cy	$104.28	$46,427	$0.90
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,656	$26.59	1,385,673	cy	$211.52	$561,883	$0.41
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	9,536	$26.59	2,309,454	cy	$211.52	$2,017,015	$0.87
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	895	acres	-	$1,473,530	$1,647.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	157	acres	-	$257,756	$1,647.00
24-4-01	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,363	$27.67	431	acres	$249.62	$589,777	$1,369.37
24-4-02	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	307	$27.67	431	acres	$271.53	$83,386	$193.61
24-4-03	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	431	acres	-	$354,675	$823.50
24-4-05	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	14,805	$27.67	2,699	acres	$249.62	$3,695,786	$1,369.37
24-4-06	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,924	$27.67	13,062,652	cy	$271.53	$522,529	$0.04
24-4-07	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	2,699	acres	-	$2,222,540	$823.50
24-6-01	J-21 Single Width	Phase I Exploration Bond	-	-	-	-	-	-	-	-	$284,100	$284,100.00
				J-21 Single Wide Subtotal		**47,543**					**$16,851,956**	
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,891	$27.67	4,943,110	cy	$249.62	$1,220,809	$0.25
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	729	$27.67	883,800	cy	$249.62	$181,895	$0.21
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	89	$23.94	20,850	cy	$104.28	$9,294	$0.45
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5,422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	41	acres	-	$67,362	$1,647.00
				J-21 Double Wide Subtotal		**14,879**					**$4,853,804**	
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	188	acres	$271.53	$36,486	$193.61
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
24-4-05	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-06	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	912,117	cy	$271.53	$36,486	$0.04
24-4-07	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
				N-1 Subtotal		**2,336**					**$899,483**	
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	435	$27.67	79	acres	$249.62	$108,657	$1,369.37
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	57	$27.67	79	acres	$271.53	$15,362	$193.61
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	79	acres	-	$65,343	$823.50
24-4-05	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-06	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	cy	$271.53	$0	N/A
24-4-07	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
				N-2 Subtotal		**492**					**$189,362**	
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$221.95	99	$27.67	18	acres	$249.62	$24,649	$1,369.37
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	13	$27.67	18	acres	$271.53	$3,485	$193.61
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	18	acres	-	$14,823	$823.50
				N-7/8 Subtotal		**112**					**$42,957**	
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$221.95	112	$27.67	20	acres	$249.62	$27,964	$1,369.37
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	15	$27.67	20	acres	$271.53	$3,954	$193.61
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$16,817	$823.50
				N-10 Subtotal		**127**					**$48,734**	
24-3-02	N-11	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	0	-	-	-	-	$0	$0
24-3-03	N-11	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	1,945	$27.67	1,258,110	cy	$249.62	$485,496	$0.39
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	6,668	$27.67	3,774,330	cy	$249.62	$1,664,559	$0.44

Table 24-1-4
JOINT MINES
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	497	$27.67	899,770	cy	$249.62	$124,005	$0.14
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$221.95	7,109	$27.67	648	acres	$249.62	$1,774,704	$2,738.74
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	168	$26.59	129,920	lineal feet	$85.39	$14,354	$0.11
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	19	$26.59	11,300	lineal feet	$85.39	$1,654	$0.15
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	105	$23.94	24,500	cy	$104.28	$10,921	$0.45
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5,422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	40	acres	-	$65,386	$1,647.00
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	511	$27.67	93	acres	$249.62	$127,586	$1,369.37
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	66	$27.67	93	acres	$271.53	$18,039	$193.61
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	93	acres	-	$76,726	$823.50
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	488	$27.67	89	acres	$249.62	$121,874	$1,369.37
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	63	$27.67	430,760	cy	$271.53	$17,231	$0.04
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	89	acres	-	$73,292	$823.50
				N-11 Subtotal		**26,752**					**$7,945,886**	
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	1,027	-	-	-	-	$750,946	$750,946
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	884	$27.67	1,012,500	cy	$249.62	$220,640	$0.22
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,639	$27.67	2,473,670	cy	$249.62	$409,103	$0.17
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	489	$27.67	822,330	cy	$249.62	$122,051	$0.15
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	0	$249.62	$240,824	$0.29
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$221.95	5,464	$27.67	498	acres	$249.62	$1,363,893	$2,738.74
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	42	$23.94	20,850	cy	$104.28	$4,422	$0.21
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,874	$26.59	1,499,014	cy	$211.52	$607,842	$0.41
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	11,605	$26.59	2,498,357	cy	$211.52	$2,454,747	$0.98
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	968	acres	-	$1,594,058	$1,647.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,223	$27.67	223	acres	$249.62	$305,370	$1,369.37
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	159	$27.67	223	acres	$271.53	$43,175	$193.61
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	223	acres	-	$183,641	$823.50
				N-9 Subtotal		**26,591**					**$8,450,280**	
24-3-03	N-14	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	5,606	$27.67	2,820,740	cy	$249.62	$699,753	$0.25
24-3-04	N-14	Backfill Mine Pits	Doze First Two Spoils (Spoil Side)	D11R Dozer	$221.95	4,672	$27.67	2,820,740	cy	$249.62	$583,128	$0.21
24-3-05	N-14	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	132	$27.67	239,260	cy	$249.62	$32,975	$0.14
24-3-06	N-14	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	4,099	$27.67	3,535,600	cy	$249.62	$1,023,273	$0.29
24-3-07	N-14	General Grading	General Grading	D11R Dozer	$221.95	461	$27.67	42	acres	$249.62	$115,027	$2,738.74
24-3-08	N-14	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	48	$26.59	37,410	lineal feet	$85.39	$4,133	$0.11
24-3-09	N-14	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	12	$26.59	6,780	lineal feet	$85.39	$992	$0.15
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	25	$23.94	4,550	cy	$104.28	$2,560	$0.56
24-3-11	N-14	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	560	$26.59	292,321	cy	$211.52	$118,534	$0.41
24-3-12	N-14	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,119	$26.59	487,201	cy	$211.52	$448,303	$0.92
24-3-13	N-14	Revegetation	Revegetation	Miscellaneous	-	-	-	189	acres	-	$310,855	$1,647.00
24-3-14	N-14	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	15	acres	-	$25,034	$1,647.00
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,533	$27.67	280	acres	$249.62	$382,784	$1,369.37
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	199	$27.67	280	acres	$271.53	$54,120	$193.61
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	280	acres	-	$230,195	$823.50
				N-14 Subtotal		**19,629**					**$4,049,870**	
24-3-03	N-14E	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	494	$27.67	497,405	cy	$249.62	$123,393	$0.25
24-3-04	N-14E	Backfill Mine Pits	Doze First Two Spoils (Spoil Side)	D11R Dozer	$221.95	412	$27.67	497,405	cy	$249.62	$102,828	$0.21
24-3-05	N-14E	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	286	$27.67	518,810	cy	$249.62	$71,502	$0.14
24-3-06	N-14E	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	193	$27.67	166,200	cy	$249.62	$48,102	$0.29
24-3-07	N-14E	General Grading	General Grading	D11R Dozer	$221.95	230	$27.67	21	acres	$249.62	$57,514	$2,738.74
24-3-08	N-14E	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	32	$26.59	24,940	lineal feet	$85.39	$2,755	$0.11
24-3-09	N-14E	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	8	$26.59	4,520	lineal feet	$85.39	$662	$0.15
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	104	$27.67	4,750	feet	$113.01	$11,779	$2.48
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	51	$23.94	12,100	cy	$104.28	$5,285	$0.44
24-3-11	N-14E	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	419	$26.59	218,694	cy	$211.52	$88,679	$0.41
24-3-12	N-14E	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	554	$26.59	227,806	cy	$211.52	$117,244	$0.51
24-3-13	N-14E	Revegetation	Revegetation	Miscellaneous	-	-	-	141	acres	-	$232,560	$1,647.00
24-3-14	N-14E	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	19	acres	-	$30,799	$1,647.00
24-4-01	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-02	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-03	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50

SEP 2005
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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	0.1	$27.67	0.02	acres	$249.62	$30	$1,369.37
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0.02	$27.67	106	cy	$271.53	$4	$0.04
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0.02	acres	-	$18	$823.50
				N-14E Subtotal		**3,004**					**$977,671**	
24-4-04	Kayenta	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	83	$26.59	128,000	lineal feet	$85.39	$7,071	$0.06
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,469,164	$1,469,163.96
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	13	$27.67	9,777	cy	$274.57	$3,559	$0.36
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$80,170	$80,170
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	5,422	$27.67	3,647,398	cy	$249.62	$1,353,560	$0.37
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	819	$27.67	2,779,544	cy	$271.53	$222,373	$0.08
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	4,132	$27.67	2,779,544	cy	$249.62	$1,031,497	$0.37
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,121	$26.59	1,198,472	cy	$211.52	$448,591	$0.37
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	963	acres	-	$1,586,396	$1,647.00
				Major Facilities Subtotal		**12,590**					**$6,202,382**	
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-05	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-06	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0.0	$27.67	0	cy	$271.53	$0	N/A
24-4-07	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	659	$27.67	325,191	cy	$249.62	$164,563	$0.51
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$20,721	$2.98
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	199	$27.67	325,191	cy	$249.62	$49,731	$0.15
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	975,574	cy	$271.53	$78,049	$0.08
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	7,077	$27.67	645	acres	$249.62	$1,766,508	$2,738.74
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	6,261	$26.59	1,664,979	cy	$211.52	$1,324,313	$0.80
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	645	acres	-	$1,062,327	$1,647.00
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	88,166	feet	-	$4,065,969	$46.12
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$12,139	$12,139
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	118	$27.67	11	acres	$249.62	$29,578	$2,738.74
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	17	acres	-	$27,670	$1,647.00
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637E P-P Scraper	$184.93	16	$26.59	3,000	cy	$211.52	$3,416	$1.14
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	4	$27.67	12,100	cy	$271.53	$968	$0.08
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$221.95	94	$27.67	4,033	cy	$249.62	$23,387	$5.80
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12	$26.59	6,050	cy	$211.52	$2,453	$0.41
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$4,118	$1,647.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$57,000	$57,000
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637E P-P Scraper	$184.93	2,478	$26.59	659,063	cy	$211.52	$524,214	$0.80
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	982	$27.67	422,795	cy	$249.62	$245,157	$0.58
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	81	$27.67	184,705	cy	$249.62	$20,141	$0.11
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	163	$27.67	554,116	cy	$271.53	$44,331	$0.08
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	2,512	$27.67	229	acres	$249.62	$627,099	$2,738.74
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,266	$26.59	591,057	cy	$211.52	$479,341	$0.81
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	229	acres	-	$377,119	$1,647.00
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	201,287	feet	-	$228,680	$1.14
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	1,658	$27.67	817,639	cy	$249.62	$413,766	$0.51
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,170	feet	-	$21,020	$1.88
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	829	$27.67	817,639	cy	$249.62	$206,883	$0.25
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	723	$27.67	2,452,916	cy	$271.53	$196,242	$0.08
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	13,901	$27.67	1,267	acres	$249.62	$3,469,989	$2,738.74
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12,298	$26.59	3,270,554	cy	$211.52	$2,601,377	$0.80
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,267	acres	-	$2,086,752	$1,647.00
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	5	$27.67	15,972	cy	$271.53	$1,278	$0.08
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	20	$27.67	15,972	cy	$249.62	$4,939	$0.31
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	21	$26.59	8,518	cy	$211.52	$4,517	$0.53
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$5,435	$1,647.00
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	535	$27.67	384,078	cy	$249.62	$133,624	$0.35
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	828	$27.67	59,089	cy	$116.34	$96,324	$1.63
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	1,228	$27.67	881,112	cy	$249.62	$306,547	$0.35
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	3,646	$27.67	332	acres	$249.62	$910,029	$2,738.74
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,225	$26.59	857,725	cy	$211.52	$682,229	$0.80
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	332	acres	-	$547,265	$1,647.00
				Other Facilities Subtotal		**62,346**					**$23,811,726**	
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	14,400	$27.67	-	-	$95.03	$1,368,455	$1,368,455
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	7,200	$21.30	-	-	$58.67	$422,453	$422,453
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	13,200	$21.30	-	-	$145.97	$1,926,837	$1,926,837
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227

Table 24-1-4
JOINT MINES
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	42,000	$21.30	-	-	$29.33	$1,231,706	$1,231,706
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	7,200	-	-	-	$11.49	$82,710	$82,710
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	4,800	-	-	-	$1.09	$5,232	$5,232
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	4,800	-	-	-	$1.62	$7,764	$7,764
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	64,800	-	-	-	$5.73	$371,434	$371,434
				Support Equipment Subtotal		**180,000**					**$6,224,271**	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	232	$26.59	-	-	$211.52	$49,115	$49,115
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	344	$27.67	-	-	$249.62	$85,971	$85,971
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	34	$26.59	-	-	$85.39	$2,869	$2,869
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	34	$27.67	-	-	$113.01	$3,797	$3,797
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	17	$27.67	-	-	$95.03	$1,597	$1,597
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	DrilTech D55SP	$196.78	12	$26.59	-	-	$223.37	$2,680	$2,680
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	50	$23.94	-	-	$104.28	$5,255	$5,255
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	205	$27.67	-	-	$116.34	$23,873	$23,873
				Mobilization Subtotal		**928**					**$175,157**	
KAYENTA MINE TOTAL						497,538					$115,043,672	
24-5-01	Joint	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$328,554	$328,554.36
24-5-02	Joint	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	3	$27.67	1,925	cy	$274.57	$701	$0.36
24-5-02	Joint	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$15,787	$15,787
24-5-03	Joint	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	1,862	$27.67	1,252,295	cy	$249.62	$464,731	$0.37
24-5-04	Joint	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	279	$27.67	947,885	cy	$271.53	$75,834	$0.08
24-5-05	Joint	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	1,409	$27.67	947,885	cy	$249.62	$351,763	$0.37
24-5-06	Joint	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	772	$26.59	402,892	cy	$211.52	$163,371	$0.41
24-5-07	Joint	Revegetation	Revegetation	Miscellaneous	-	-	-	328	acres	-	$539,557	$1,647.00
JOINT FACILITIES TOTAL						4,325					$1,940,297	
				TOTAL		**678,801 hours**					**$142,283,397**	

SEP 2005
APPROVED

SEP 2005
APPROVED

TABLE	AREA		TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-01	J-1/N-6	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-02	J-1/N-6	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	acres	$271.53	$0	N/A
24-4-03	J-1/N-6	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
				J-1 Subtotal		**0**					**$0**	
24-3-02	J-7	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	317	-	-	-	-	$232,424	$232,424
24-3-03	J-7	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	500	$27.67	786,900	cy	$249.62	$124,934	$0.16
24-3-04	J-7	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	747	$27.67	863,140	cy	$249.62	$186,425	$0.22
24-3-05	J-7	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	74	$27.67	177,090	cy	$249.62	$18,470	$0.10
24-3-06	J-7	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	924	$27.67	797,025	cy	$249.62	$230,675	$0.29
24-3-07	J-7	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-08	J-7	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	98	$26.59	75,400	lineal feet	$85.39	$8,330	$0.11
24-3-09	J-7	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	26	$26.59	15,200	lineal feet	$85.39	$2,225	$0.15
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	196	$27.67	8,910	feet	$113.01	$22,095	$2.48
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	211	$23.94	29,700	cy	$104.28	$22,048	$0.74
24-3-11	J-7	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-12	J-7	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	1,645	$26.59	343,240	cy	$211.52	$347,955	$1.01
24-3-13	J-7	Revegetation	Revegetation	Miscellaneous	-	-	-	213	acres	-	$350,403	$1,647.00
24-3-14	J-7	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	31	acres	-	$50,563	$1,647.00
				J-7 Subtotal		**4,738**					**$1,596,547**	
24-3-02	N-6	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	1,928	-	-	-	-	$1,410,110	$1,410,110
24-3-03	N-6	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	4,058	$27.67	4,402,238	cy	$249.62	$1,012,946	$0.23
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,368	$27.67	3,791,230	cy	$249.62	$1,090,443	$0.29
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	567	$27.67	1,026,520	cy	$249.62	$141,474	$0.14
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,394	$27.67	2,927,742	cy	$249.62	$847,347	$0.29
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$221.95	625	$27.67	57	acres	$249.62	$156,108	$2,738.74
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	239	$26.59	185,020	lineal feet	$85.39	$20,441	$0.11
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	49	$26.59	28,800	lineal feet	$85.39	$4,216	$0.15
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	390	$27.67	17,780	feet	$113.01	$44,091	$2.48
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	396	$23.94	59,250	cy	$104.28	$41,322	$0.70
24-3-11	N-6	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	3,782	$26.59	814,279	cy	$211.52	$800,065	$0.98
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	505	acres	-	$831,271	$1,647.00
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
				N-6 Subtotal		**19,799**					**$6,526,817**	
24-4-04	Black Mesa	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	1.9	$26.59	3,000	lineal feet	$85.39	$166	$0.06
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,108,472	$2,108,471.50
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	7	$27.67	5,152	cy	$274.57	$1,876	$0.36
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$42,246	$42,246
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	2,214	$27.67	1,489,494	cy	$249.62	$552,756	$0.37
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	336	$27.67	1,140,304	cy	$271.53	$91,228	$0.08
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	1,695	$27.67	1,140,304	cy	$249.62	$423,170	$0.37
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	878	$26.59	496,377	cy	$211.52	$185,795	$0.37
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	396	acres	-	$651,981	$1,647.00
				Major Facilities Subtotal		**5,133**					**$4,057,689**	
24-5-19	J-3 Airport	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	9,066	cy	$271.53	$7,253	$0.80
24-5-20	J-3 Airport	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	90,656	cy	$271.53	$7,253	$0.08
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	370	$27.67	182,647	cy	$249.62	$92,429	$0.51
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$13,814	$2.98
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	102	$27.67	182,647	cy	$249.62	$25,418	$0.14
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	161	$27.67	547,942	cy	$271.53	$43,837	$0.08
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	3,975	$27.67	362	acres	$249.62	$992,179	$2,738.74
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,310	$26.59	935,154	cy	$211.52	$700,061	$0.75
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	362	acres	-	$596,668	$1,647.00
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	5,244	feet	-	$241,826	$46.12
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Draglines	Miscellaneous	-	-	-	-	-	-	$300,000	N/A
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$8,093	$8,092.90
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	79	$27.67	7	acres	$249.62	$19,719	$2,738.74
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	11	acres	-	$18,446	$1,647.00
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$38,000	$38,000
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	47	$27.67	76,562	cy	$249.62	$11,688	$0.15
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	68	$27.67	229,686	cy	$271.53	$18,376	$0.08
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	1,041	$27.67	95	acres	$249.62	$259,939	$2,738.74
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	939	$26.59	244,999	cy	$211.52	$198,691	$0.81
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	95	acres	-	$156,320	$1,647.00
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	123,901	feet	-	$140,762	$1.14
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	432	$27.67	213,080	cy	$249.62	$107,829	$0.51
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$14,014	$2.78
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	204	$27.67	256,719	cy	$249.62	$51,037	$0.20
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	227	$27.67	770,157	cy	$271.53	$61,615	$0.08

Table 24-1-4
JOINT MINES
Direct Costs by Mine Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	4,365	$27.67	398	acres	$249.62	$1,089,494	$2,738.74
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,861	$26.59	1,026,876	cy	$211.52	$816,770	$0.80
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	398	acres	-	$655,190	$1,647.00
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	105	$27.67	355,014	cy	$271.53	$28,402	$0.08
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	528	$27.67	355,014	cy	$249.62	$131,747	$0.37
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	475	$26.59	189,341	cy	$211.52	$100,400	$0.53
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$120,807	$1,647.00
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	357	$27.67	256,052	cy	$249.62	$89,083	$0.35
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	552	$27.67	39,393	cy	$116.34	$64,216	$1.63
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	819	$27.67	587,408	cy	$249.62	$204,365	$0.35
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	2,430	$27.67	222	acres	$249.62	$606,686	$2,738.74
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,150	$26.59	571,817	cy	$211.52	$454,819	$0.80
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	222	acres	-	$364,843	$1,647.00
				Other Facilities Subtotal		**26,650**					**$8,852,088**	
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	9,600	$27.67	-	-	$95.03	$912,303	$912,303
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	4,800	$21.30	-	-	$58.67	$281,635	$281,635
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	8,800	$21.30	-	-	$145.97	$1,284,558	$1,284,558
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	28,000	$21.30	-	-	$29.33	$821,137	$821,137
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	4,800	-	-	-	$11.49	$55,140	$55,140
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	3,200	-	-	-	$1.09	$3,488	$3,488
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	3,200	-	-	-	$1.62	$5,176	$5,176
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	43,200	-	-	-	$5.73	$247,622	$247,622
				Support Equipment Subtotal		**120,000**					**$4,149,514**	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	155	$26.59	-	-	$211.52	$32,743	$32,743.30
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	230	$27.67	-	-	$249.62	$57,314	$57,313.85
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	22	$26.59	-	-	$85.39	$1,913	$1,912.78
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988F Series II Loader	$85.34	22	$27.67	-	-	$113.01	$2,531	$2,531.46
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	11	$27.67	-	-	$95.03	$1,064	$1,064
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	DrilTech D55SP	$196.78	8	$26.59	-	-	$223.37	$1,787	$1,787.00
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Dump Truck	$80.34	34	$23.94	-	-	$104.28	$3,504	$3,503.65
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	137	$27.67	-	-	$116.34	$15,915	$15,915.28
				Mobilization Subtotal		**619**					**$116,772**	
BLACK MESA MINE TOTAL						176,938					$25,299,427	
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	932	-	-	-	-	$680,894	$680,894
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	1,042	$27.67	1,048,088	cy	$249.62	$260,004	$0.25
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,972	$27.67	2,381,300	cy	$249.62	$492,283	$0.21
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	272	$27.67	493,370	cy	$249.62	$67,996	$0.14
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	824	$27.67	711,000	cy	$249.62	$205,778	$0.29
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$221.95	2,523	$27.67	230	acres	$249.62	$629,910	$2,738.74
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	76	$26.59	58,580	lineal feet	$85.39	$6,472	$0.11
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	16	$26.59	9,600	lineal feet	$85.39	$1,405	$0.15
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	139	$27.67	6,340	feet	$113.01	$15,722	$2.48
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	114	$23.94	21,150	cy	$104.28	$11,899	$0.56
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	1,238	$26.59	645,850	cy	$211.52	$261,889	$0.41
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,381	$26.59	1,076,416	cy	$211.52	$503,632	$0.47
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$686,799	$1,647.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$17,294	$1,647.00
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,103	$27.67	201	acres	$249.62	$275,265	$1,369.37
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	143	$27.67	201	acres	$271.53	$38,918	$193.61
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$165,537	$823.50
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	568	$27.67	103	acres	$249.62	$141,685	$1,369.37
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	74	$27.67	500,780	cy	$271.53	$20,032	$0.04
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$85,205	$823.50
				J-16 Subtotal		**13,418**					**$4,568,617**	
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	6,009	-	-	-	-	$4,391,342	$4,391,342
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	12,240	$27.67	12,316,350	cy	$249.62	$3,055,370	$0.25
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	11,443	$27.67	13,817,220	cy	$249.62	$2,856,414	$0.21
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	1,542	$27.67	2,793,000	cy	$249.62	$384,929	$0.14
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	7,898	$27.67	6,812,151	cy	$249.62	$1,971,573	$0.29
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$221.95	5,354	$27.67	488	acres	$249.62	$1,336,505	$2,738.74
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	215	$26.59	166,170	lineal feet	$85.39	$18,358	$0.11
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	29	$26.59	16,900	lineal feet	$85.39	$2,474	$0.15
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	361	$27.67	16,430	feet	$113.01	$40,743	$2.48
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	380	$23.94	54,750	cy	$104.28	$39,660	$0.72
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	8,316	$26.59	4,337,948	cy	$211.52	$1,759,014	$0.41
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	21,323	$26.59	7,229,913	cy	$211.52	$4,510,293	$0.62

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BLACK MESA MINE

Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-11	J-7	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-11	N-6	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-12	J-7	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	1,645	$26.59	343,240	cy	$211.52	$347,955	$1.01
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	3,782	$26.59	814,279	cy	$211.52	$800,065	$0.98
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	475	$26.59	189,341	cy	$211.52	$100,400	$0.53
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	939	$26.59	244,999	cy	$211.52	$198,691	$0.81
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,861	$26.59	1,026,876	cy	$211.52	$816,770	$0.80
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,310	$26.59	935,154	cy	$211.52	$700,061	$0.75
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	155	$26.59	-	-	$211.52	$32,743	$32,743
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	878	$26.59	496,377	cy	$211.52	$185,795	$0.37
24-5-06	Joint	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	309	$26.59	402,892	cy	$211.52	$65,348	$0.16
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,150	$26.59	571,817	cy	$211.52	$454,819	$0.80
				637E P-P Scraper Subtotal		17,505					$3,702,649	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	34	$23.94	-	-	$104.28	$3,504	$3,504
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	211	$23.94	29,700	cy	$104.28	$22,048	$0.74
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	396	$23.94	59,250	cy	$104.28	$41,322	$0.70
				769D Rear Dump Truck Subtotal		641					$66,873	
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	196	$27.67	8,910	feet	$113.01	$22,095	$2.48
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	390	$27.67	17,780	feet	$113.01	$44,091	$2.48
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	22	$27.67	-	-	$113.01	$2,531	$2,531
				988F Loader Series II Subtotal		608					$68,717	
24-3-03	J-7	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	500	$27.67	786,900	cy	$249.62	$124,934	$0.16
24-3-03	N-6	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	4,058	$27.67	4,402,238	cy	$249.62	$1,014,686	$0.23
24-3-04	J-7	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	747	$27.67	863,140	cy	$249.62	$186,425	$0.22
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,368	$27.67	3,791,230	cy	$249.62	$1,090,443	$0.29
24-3-05	J-7	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	74	$27.67	177,090	cy	$249.62	$18,470	$0.10
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	567	$27.67	1,026,520	cy	$249.62	$141,474	$0.14
24-3-06	J-7	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	924	$27.67	797,025	cy	$249.62	$230,675	$0.29
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,394	$27.67	2,927,742	cy	$249.62	$847,347	$0.29
24-3-07	J-7	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$221.95	625	$27.67	57	acres	$249.62	$156,015	$2,737.11
24-4-01	J-1/N-6	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	528	$27.67	355,014	cy	$249.62	$131,747	$0.37
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	47	$27.67	76,562	cy	$249.62	$11,688	$0.15
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	1,041	$27.67	95	acres	$249.62	$259,939	$2,738.74
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	432	$27.67	213,080	cy	$249.62	$107,829	$0.51
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	204	$27.67	256,719	cy	$249.62	$51,037	$0.20
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	4,365	$27.67	398	acres	$249.62	$1,089,494	$2,738.74
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	2,214	$27.67	1,489,494	cy	$249.62	$552,756	$0.37
24-5-03	Joint	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	745	$27.67	1,252,295	cy	$249.62	$185,892	$0.15
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	370	$27.67	182,647	cy	$249.62	$92,429	$0.51
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	102	$27.67	182,647	cy	$249.62	$25,418	$0.14
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	3,975	$27.67	362	acres	$249.62	$992,179	$2,738.74
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	357	$27.67	256,052	cy	$249.62	$89,083	$0.35
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	819	$27.67	587,408	cy	$249.62	$204,365	$0.35
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	79	$27.67	7	acres	$249.62	$19,719	$2,738.74
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	1,695	$27.67	1,140,304	cy	$249.62	$423,170	$0.37
24-5-05	Joint	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	564	$27.67	947,885	cy	$249.62	$140,705	$0.15
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	2,430	$27.67	222	acres	$249.62	$606,686	$2,738.74
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	230	$27.67	-	-	$249.62	$57,314	$57,314
				D11R Dozer Subtotal		35,454					$8,851,917	
24-4-02	J-1/N-6	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	acres	$271.53	$0	#DIV/0!
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	105	$27.67	355,014	cy	$271.53	$28,402	$0.08
24-5-19	J-3 Airport	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	9,066	cy	$271.53	$7,253	$0.80
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	7	$27.67	5,152	cy	$274.57	$1,876	$0.36
24-5-02	Joint	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	1	$27.67	1,925	cy	$274.57	$280	$0.15
24-5-20	J-3 Airport	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	90,656	cy	$271.53	$7,253	$0.08
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	68	$27.67	229,686	cy	$271.53	$18,376	$0.08
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	227	$27.67	770,157	cy	$271.53	$61,615	$0.08
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	161	$27.67	547,942	cy	$271.53	$43,837	$0.08
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	336	$27.67	1,140,304	cy	$271.53	$91,228	$0.08
24-5-04	Joint	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	112	$27.67	947,885	cy	$271.53	$30,334	$0.03
				D11R Dozer - Ripper Equipped Subtotal		1,070					$290,454	
24-3-08	J-7	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	98	$26.59	75,400	lineal feet	$85.39	$8,330	$0.11

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Table 24-1-5
BLACK MESA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	239	$26.59	185,020	lineal feet	$85.39	$20,441	$0.11
24-3-09	J-7	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	26	$26.59	15,200	lineal feet	$85.39	$2,225	$0.15
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	49	$26.59	28,800	lineal feet	$85.39	$4,216	$0.15
24-4-04	Black Mesa	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	1.9	$26.59	3,000	lineal feet	$85.39	$166	$0.06
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	22	$26.59	-	-	$85.39	$1,913	$1,913
				D7R Dozer Subtotal		437					$37,291	
24-3-02	J-7	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	317	-	-	-	-	$232,424	$232,424
24-3-02	N-6	Highwall Reduction	Cast/Blast Highwall	Drilltech D55SP	$196.78	1,928	-	-	-	-	$1,410,110	$1,410,110
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Drilltech D55SP	$196.78	8	$26.59	-	-	$223.37	$1,787	$1,787
				Drilltech D55SP Subtotal		2,253					$1,644,321	
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	552	$27.67	39,393	cy	$116.34	$64,216	$1.63
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	137	$27.67	-	-	$116.34	$15,915	$15,915
				LS-208H Linkbelt Subtotal		689					$80,131	
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	9,600	$27.67	-	-	$95.03	$912,303	$912,303
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	11	$27.67	-	-	$95.03	$1,064	$1,064
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	4,800	$21.30	-	-	$58.67	$281,635	$281,635
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	8,800	$21.30	-	-	$145.97	$1,284,558	$1,284,558
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	28,000	$21.30	-	-	$29.33	$821,137	$821,137
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	4,800	-	-	-	$11.49	$55,140	$55,140
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	3,200	-	-	-	$1.09	$3,488	$3,488
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	3,200	-	-	-	$1.62	$5,176	$5,176
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	43,200	-	-	-	$5.73	$247,622	$247,622
				Support Equipment Subtotal		120,011					$4,150,578	
24-3-13	J-7	Revegetation	Revegetation	Miscellaneous	-	-	-	213	acres	-	$350,403	$1,647.00
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	505	acres	-	$829,624	$1,642.82
24-3-14	J-7	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	31	acres	-	$50,563	$1,647.00
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-4-03	J-1/N-6	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	#DIV/0!
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,108,472	$2,108,471.50
24-5-01	Joint	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$131,422	$131,421.74
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$120,807	$1,647.00
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$42,246	$42,245.67
24-5-02	Joint	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$6,315	$6,314.80
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	95	acres	-	$156,320	$1,647.00
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$14,014	$2.78
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	398	acres	-	$655,190	$1,647.00
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$13,814	$2.98
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	362	acres	-	$596,668	$1,647.00
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	222	acres	-	$364,843	$1,647.00
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$8,093	$8,092.90
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	11	acres	-	$18,446	$1,647.00
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$38,000	$38,000.00
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	396	acres	-	$651,981	$1,647.00
24-5-07	Joint	Revegetation	Revegetation	Miscellaneous	-	-	-	328	acres	-	$215,823	$658.80
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	5,244	feet	-	$241,826	$46.12
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	123,901	feet	-	$140,762	$1.14
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Dragline	Miscellaneous	-	-	-	-	-	-	$300,000	N/A
				Miscellaneous Subtotal							$7,182,614	
				TOTAL		178,667 hours					$26,075,546	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	1,238	$26.59	645,850	cy	$211.52	$261,889	$0.41
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	8,316	$26.59	4,337,948	cy	$211.52	$1,759,014	$0.41
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,656	$26.59	1,385,673	cy	$211.52	$561,883	$0.41
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-11	N-14	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	560	$26.59	292,321	cy	$211.52	$118,534	$0.41
24-3-11	N-14E	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	419	$26.59	218,694	cy	$211.52	$88,679	$0.41
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,874	$26.59	1,499,014	cy	$211.52	$607,842	$0.41
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,381	$26.59	1,076,416	cy	$211.52	$503,632	$0.47
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	21,323	$26.59	7,229,913	cy	$211.52	$4,510,293	$0.62
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	9536	$26.59	2,309,454	cy	$211.52	$2,017,015	$0.87
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5,422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-12	N-14	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,119	$26.59	487,201	cy	$211.52	$448,303	$0.92
24-3-12	N-14E	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	554	$26.59	227,806	cy	$211.52	$117,244	$0.51
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	11,605	$26.59	2,498,357	cy	$211.52	$2,454,747	$0.98
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	21	$26.59	8,518	cy	$211.52	$4,517	$0.53
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637E P-P Scraper	$184.93	16	$26.59	3,000	cy	$211.52	$3,416	$1.14
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12	$26.59	6,050	cy	$211.52	$2,453	$0.41
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,266	$26.59	591,057	cy	$211.52	$479,341	$0.81
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12,298	$26.59	3,270,554	cy	$211.52	$2,601,377	$0.80
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	6,261	$26.59	1,664,979	cy	$211.52	$1,324,313	$0.80
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637E P-P Scraper	$184.93	2,478	$26.59	659,063	cy	$211.52	$524,214	$0.80
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	232	$26.59	-	-	$211.52	$49,115	$49,115
24-5-06	Joint	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	463	$26.59	402,892	cy	$211.52	$98,022	$0.24
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,121	$26.59	1,198,472	cy	$211.52	$448,591	$0.37
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,225	$26.59	857,725	cy	$211.52	$682,229	$0.80
				637E P-P Scraper Subtotal		108,949					$23,044,943	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	50	$23.94	-	-	$104.28	$5,255	$5,255
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	114	$23.94	21,150	cy	$104.28	$11,899	$0.56
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	380	$23.94	54,750	cy	$104.28	$39,660	$0.72
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	445	$23.94	51,350	cy	$104.28	$46,427	$0.90
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	89	$23.94	20,850	cy	$104.28	$9,294	$0.45
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	105	$23.94	24,500	cy	$104.28	$10,921	$0.45
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	25	$23.94	4,550	cy	$104.28	$2,560	$0.56
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	51	$23.94	12,100	cy	$104.28	$5,285	$0.44
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	42	$23.94	20,850	cy	$104.28	$4,422	$0.21
				769D Rear Dump Truck Subtotal		1,302					$135,724	
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	139	$27.67	6,340	feet	$113.01	$15,722	$2.48
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	361	$27.67	16,430	feet	$113.01	$40,743	$2.48
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	338	$27.67	15,415	feet	$113.01	$38,226	$2.48
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	104	$27.67	4,750	feet	$113.01	$11,779	$2.48
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	34	$27.67	-	-	$113.01	$3,797	$3,797
				988F Loader Series II Subtotal		1,573					$177,718	
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	1,042	$27.67	1,048,088	cy	$249.62	$260,004	$0.25
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	12,240	$27.67	12,316,350	cy	$249.62	$3,055,370	$0.25
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	3,572	$27.67	3,594,413	cy	$249.62	$891,681	$0.25
24-3-03	J-21 Double Width	Backfill Mine Pits	ze First Two Spoils (Highwall Si	D11R Dozer	$221.95	0	$27.67	0	cy	$249.62	$0	N/A
24-3-03	N-11	Backfill Mine Pits	ze First Two Spoils (Highwall Si	D11R Dozer	$221.95	1,945	$27.67	1,258,110	cy	$249.62	$485,496	$0.39
24-3-03	N-14	Backfill Mine Pits	ze First Two Spoils (Highwall Si	D11R Dozer	$221.95	5,606	$27.67	2,820,740	cy	$249.62	$699,753	$0.25
24-3-03	N-14E	Backfill Mine Pits	ze First Two Spoils (Highwall Si	D11R Dozer	$221.95	494	$27.67	497,405	cy	$249.62	$123,393	$0.25
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	884	$27.67	1,012,500	cy	$249.62	$220,640	$0.22
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,972	$27.67	2,381,300	cy	$249.62	$492,283	$0.21
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	11,443	$27.67	13,817,220	cy	$249.62	$2,856,414	$0.21
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	3,475	$27.67	4,195,560	cy	$249.62	$867,342	$0.21
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,891	$27.67	4,943,110	cy	$249.62	$1,220,809	$0.25
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	6,668	$27.67	3,774,330	cy	$249.62	$1,664,559	$0.44
24-3-04	N-14	Backfill Mine Pits	Doze First Two Spoils (Spoil Side	D11R Dozer	$221.95	4672	$27.67	2,820,740	cy	$249.62	$583,128	$0.21
24-3-04	N-14E	Backfill Mine Pits	Doze First Two Spoils (Spoil Side	D11R Dozer	$221.95	412	$27.67	497,405	cy	$249.62	$102,828	$0.21
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,639	$27.67	2,473,670	cy	$249.62	$409,103	$0.17
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	272	$27.67	493,370	cy	$249.62	$67,996	$0.14
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	1,542	$27.67	2,793,000	cy	$249.62	$384,929	$0.14
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	648	$27.67	1,173,330	cy	$249.62	$161,707	$0.14
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	729	$27.67	883,800	cy	$249.62	$181,895	$0.21
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	497	$27.67	899,770	cy	$249.62	$124,005	$0.14
24-3-05	N-14	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	132	$27.67	239,260	cy	$249.62	$32,975	$0.14
24-3-05	N-14E	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	286	$27.67	518,810	cy	$249.62	$71,502	$0.14

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Table 24-1-5
KAYENTA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	489	$27.67	822,330	cy	$249.62	$122,051	$0.15
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	824	$27.67	711,000	cy	$249.62	$205,778	$0.29
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	7,898	$27.67	6,812,151	cy	$249.62	$1,971,573	$0.29
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,041	$27.67	2,623,178	cy	$249.62	$759,200	$0.29
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-06	N-14	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	4,099	$27.67	3,535,600	cy	$249.62	$1,023,273	$0.29
24-3-06	N-14E	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	193	$27.67	166,200	cy	$249.62	$48,102	$0.29
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$221.95	2,523	$27.67	230	acres	$249.62	$629,910	$2,738.74
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$221.95	5,354	$27.67	488	acres	$249.62	$1,336,505	$2,738.74
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$221.95	2,194	$27.67	200	acres	$249.62	$547,748	$2,738.74
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$221.95	7,109	$27.67	648	acres	$249.62	$1,774,704	$2,738.74
24-3-07	N-14	General Grading	General Grading	D11R Dozer	$221.95	461	$27.67	42	acres	$249.62	$115,027	$2,738.74
24-3-07	N-14E	General Grading	General Grading	D11R Dozer	$221.95	230	$27.67	21	acres	$249.62	$57,514	$2,738.74
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$221.95	5,464	$27.67	498	acres	$249.62	$1,363,893	$2,738.74
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,103	$27.67	201	acres	$249.62	$275,265	$1,369.37
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,210	$27.67	403	acres	$249.62	$551,764	$1,369.37
24-4-01	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,363	$27.67	431	acres	$249.62	$589,777	$1,369.37
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,533	$27.67	280	acres	$249.62	$382,784	$1,369.37
24-4-01	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$221.95	112	$27.67	20	acres	$249.62	$27,964	$1,369.37
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	511	$27.67	93	acres	$249.62	$127,586	$1,369.37
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	435	$27.67	79	acres	$249.62	$108,657	$1,369.37
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$221.95	99	$27.67	18	acres	$249.62	$24,649	$1,369.37
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,223	$27.67	223	acres	$249.62	$305,370	$1,369.37
24-4-05	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	14,805	$27.67	2,699	acres	$249.62	$3,695,786	$1,369.37
24-4-05	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	568	$27.67	103	acres	$249.62	$141,685	$1,369.37
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	8,127	$27.67	1,482	acres	$249.62	$2,028,800	$1,369.37
24-4-05	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	488	$27.67	89	acres	$249.62	$121,874	$1,369.37
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$30	$1,369.37
24-4-05	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	20	$27.67	15,972	cy	$249.62	$4,939	$0.31
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$221.95	94	$27.67	4,033	cy	$249.62	$23,387	$5.80
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	81	$27.67	184,705	cy	$249.62	$20,141	$0.11
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	2,512	$27.67	229	acres	$249.62	$627,099	$2,738.74
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	1,658	$27.67	817,639	cy	$249.62	$413,766	$0.51
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	829	$27.67	817,639	cy	$249.62	$206,883	$0.25
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	13,901	$27.67	1,267	acres	$249.62	$3,469,989	$2,738.74
24-5-03	Joint	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	1,117	$27.67	1,252,295	cy	$249.62	$278,838	$0.22
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	5422	$27.67	3,647,398	cy	$249.62	$1,353,560	$0.37
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	659	$27.67	325,191	cy	$249.62	$164,563	$0.51
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	199	$27.67	325,191	cy	$249.62	$49,731	$0.15
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	7,077	$27.67	645	acres	$249.62	$1,766,508	$2,738.74
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	535	$27.67	384,078	cy	$249.62	$133,624	$0.35
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment Into Basin	D11R Dozer	$221.95	1,228	$27.67	881,112	cy	$249.62	$306,547	$0.35
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	118	$27.67	11	acres	$249.62	$29,578	$2,738.74
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	982	$27.67	422,795	cy	$249.62	$245,157	$0.58
24-5-05	Joint	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	846	$27.67	947,885	cy	$249.62	$211,058	$0.22
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	4,132	$27.67	2,779,544	cy	$249.62	$1,031,497	$0.37
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	3,646	$27.67	332	acres	$249.62	$910,029	$2,738.74
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	344	$27.67	-	-	$249.62	$85,971	$85,971
				D11R Dozer Subtotal		189,270					$45,963,533	
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	143	$27.67	201	acres	$271.53	$38,918	$193.61
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	403	acres	$271.53	$78,011	$193.61
24-4-02	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	307	$27.67	431	acres	$271.53	$83,386	$193.61
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	188	acres	$271.53	$36,486	$193.61
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	199	$27.67	280	acres	$271.53	$54,120	$193.61
24-4-02	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	15	$27.67	20	acres	$271.53	$3,954	$193.61
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	66	$27.67	93	acres	$271.53	$18,039	$193.61
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	57	$27.67	79	acres	$271.53	$15,362	$193.61
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	13	$27.67	18	acres	$271.53	$3,485	$193.61
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	159	$27.67	223	acres	$271.53	$43,175	$193.61
24-4-06	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,924	$27.67	13,062,652	cy	$271.53	$522,529	$0.04

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KAYENTA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-06	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	cy	$271.53	$0	N/A
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	74	$27.67	500,780	cy	$271.53	$20,032	$0.04
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,056	$27.67	7,170,736	cy	$271.53	$286,842	$0.04
24-4-06	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	912,117	cy	$271.53	$36,486	$0.04
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	63	$27.67	430,760	cy	$271.53	$17,231	$0.04
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0.0	$27.67	106	cy	$271.53	$4	$0.04
24-4-06	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	cy	$271.53	$0	N/A
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	5	$27.67	15,972	cy	$271.53	$1,278	$0.08
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	4	$27.67	12,100	cy	$271.53	$968	$0.08
24-5-02	Joint	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	2	$27.67	1,925	cy	$274.57	$421	$0.22
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	13	$27.67	9,777	cy	$274.57	$3,559	$0.36
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	163	$27.67	554,116	cy	$271.53	$44,331	$0.08
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	723	$27.67	2,452,916	cy	$271.53	$196,242	$0.08
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	975,574	cy	$271.53	$78,049	$0.08
24-5-04	Joint	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	168	$27.67	947,885	cy	$271.53	$45,501	$0.05
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	819	$27.67	2,779,544	cy	$271.53	$222,373	$0.08
				D11R Dozer - Ripper Equipped Subtotal		6,867					$1,864,497	
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	76	$26.59	58,580	lineal feet	$85.39	$6,472	$0.11
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	215	$26.59	166,170	lineal feet	$85.39	$18,358	$0.11
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	201	$26.59	155,620	lineal feet	$85.39	$17,193	$0.11
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	168	$26.59	129,920	lineal feet	$85.39	$14,354	$0.11
24-3-08	N-14	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	48	$26.59	37,410	lineal feet	$85.39	$4,133	$0.11
24-3-08	N-14E	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	32	$26.59	24,940	lineal feet	$85.39	$2,755	$0.11
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	16	$26.59	9,600	lineal feet	$85.39	$1,405	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	29	$26.59	16,900	lineal feet	$85.39	$2,474	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	42	$26.59	24,430	lineal feet	$85.39	$3,576	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	19	$26.59	11,300	lineal feet	$85.39	$1,654	$0.15
24-3-09	N-14	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	12	$26.59	6,780	lineal feet	$85.39	$992	$0.15
24-3-09	N-14E	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	8	$26.59	4,520	lineal feet	$85.39	$662	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-4-04	Kayenta	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	83	$26.59	128,000	lineal feet	$85.39	$7,071	$0.06
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	34	$26.59	-	-	$85.39	$2,869	$2,869
				D7R Dozer Subtotal		1,149					$98,094	
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	932	-	-	-	-	$680,894	$680,894
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	6,009	-	-	-	-	$4,391,342	$4,391,342
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,995	-	-	-	-	$1,455,880	$1,455,880
24-3-02	N-11	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	0	-	-	-	-	$0	$0
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,027	-	-	-	-	$750,946	$750,946
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Driltech D55SP	$196.78	12	$26.59	-	-	$223.37	$2,680	$2,680
				Driltech D55SP Subtotal		9,975					$7,281,742	
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	828	$27.67	59,089	cy	$116.34	$96,324	$1.63
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	205	$27.67	-	-	$116.34	$23,873	$23,873
				LS-208H Linkbelt Subtotal		1,033					$120,197	
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	14,400	$27.67	-	-	$95.03	$1,368,455	$1,368,455
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	17	$27.67	-	-	$95.03	$1,597	$1,597
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	7,200	$21.30	-	-	$58.67	$422,453	$422,453
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	13,200	$21.30	-	-	$145.97	$1,926,837	$1,926,837
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	42,000	$21.30	-	-	$29.33	$1,231,706	$1,231,706
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	7,200	-	-	-	$11.49	$82,710	$82,710
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	4,800	-	-	-	$1.09	$5,232	$5,232
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	4,800	-	-	-	$1.62	$7,764	$7,764
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	64,800	-	-	-	$5.73	$371,434	$371,434
				Support Equipment Subtotal		180,017					$6,225,868	
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$686,799	$1,647.00
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,801	acres	-	$4,612,991	$1,647.00
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	895	acres	-	$1,473,530	$1,647.00
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-13	N-14	Revegetation	Revegetation	Miscellaneous	-	-	-	189	acres	-	$310,855	$1,647.00
24-3-13	N-14E	Revegetation	Revegetation	Miscellaneous	-	-	-	141	acres	-	$232,560	$1,647.00
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	968	acres	-	$1,594,058	$1,647.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	11	acres	-	$17,294	$1,647.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	167	acres	-	$274,555	$1,647.00
24-3-14	J-21Single Width	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	157	acres	-	$257,756	$1,647.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	41	acres	-	$67,362	$1,647.00

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Table 24-1-5
KAYENTA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	40	acres	-	$65,386	$1,647.00
24-3-14	N-14	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	15	acres	-	$25,034	$1,647.00
24-3-14	N-14E	Revegetation	Revegetation of Topsoil Stockpil	Miscellaneous	-	-	-	19	acres	-	$30,799	$1,647.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$165,537	$823.50
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	403	acres	-	$331,815	$823.50
24-4-03	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	431	acres	-	$354,675	$823.50
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	280	acres	-	$230,195	$823.50
24-4-03	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$16,817	$823.50
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	93	acres	-	$76,726	$823.50
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	79	acres	-	$65,343	$823.50
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	18	acres	-	$14,823	$823.50
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	223	acres	-	$183,641	$823.50
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$85,205	$823.50
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,482	acres	-	$1,220,062	$823.50
24-4-07	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	2,699	acres	-	$2,222,540	$823.50
24-4-07	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-4-07	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	89	acres	-	$73,292	$823.50
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$18	$823.50
24-4-07	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-5-01	Joint	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$197,133	$197,132.62
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,469,164	$1,469,163.96
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$5,435	$1,647.00
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$4,118	$1,647.00
24-5-02	Joint	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$9,472	$9,472.20
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$80,170	$80,169.76
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	229	acres	-	$377,119	$1,647.00
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,170	feet	-	$21,020	$1.88
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,267	acres	-	$2,086,752	$1,647.00
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$20,721	$2.98
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	645	acres	-	$1,062,327	$1,647.00
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	332	acres	-	$547,265	$1,647.00
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$12,139	$12,139.35
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	17	acres	-	$27,670	$1,647.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$57,000	$57,000.00
24-5-07	Joint	Revegetation	Revegetation	Miscellaneous	-	-	-	328	acres	-	$323,734	$988.20
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	963	acres	-	$1,586,396	$1,647.00
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	88,166	feet	-	$4,065,969	$46.12
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	201,287	feet	-	$228,680	$1.14
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	nble and Remove Draglines and	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
				Miscellaneous Subtotal							$31,011,434	
24-6-01	J-21 Single Width	Phase I Exploration Bond	-	-	-	-	-	-	-	-	$284,100	$284,100.00
				TOTAL		500,133	hours				$116,207,851	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-11	J-7	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	1,238	$26.59	645,850	cy	$211.52	$261,889	$0.41
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	8,316	$26.59	4,337,948	cy	$211.52	$1,759,014	$0.41
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,656	$26.59	1,385,673	cy	$211.52	$561,883	$0.41
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,874	$26.59	1,499,014	cy	$211.52	$607,842	$0.41
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	2,563	$26.59	1,337,116	cy	$211.52	$542,193	$0.41
24-3-11	N-14	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	560	$26.59	292,321	cy	$211.52	$118,534	$0.41
24-3-11	N-14E	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	419	$26.59	218,694	cy	$211.52	$88,679	$0.41
24-3-11	N-6	Topsoil/Suitable Material Replacement	Suitable Material Placement	637E P-P Scraper	$184.93	0	$26.59	0	cy	$211.52	$0	N/A
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,381	$26.59	1,076,416	cy	$211.52	$503,632	$0.47
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	21,323	$26.59	7,229,913	cy	$211.52	$4,510,293	$0.62
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	9,536	$26.59	2,309,454	cy	$211.52	$2,017,015	$0.87
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5,422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-12	J-7	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	1,645	$26.59	343,240	cy	$211.52	$347,955	$1.01
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	11,605	$26.59	2,498,357	cy	$211.52	$2,454,747	$0.98
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	5,422	$26.59	2,228,526	cy	$211.52	$1,146,947	$0.51
24-3-12	N-14	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	2,119	$26.59	487,201	cy	$211.52	$448,303	$0.92
24-3-12	N-14E	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	554	$26.59	227,806	cy	$211.52	$117,244	$0.51
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637E P-P Scraper	$184.93	3,782	$26.59	814,279	cy	$211.52	$800,065	$0.98
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	475	$26.59	189,341	cy	$211.52	$100,400	$0.53
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	21	$26.59	8,518	cy	$211.52	$4,517	$0.53
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637E P-P Scraper	$184.93	16	$26.59	3,000	cy	$211.52	$3,416	$1.14
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12	$26.59	6,050	cy	$211.52	$2,453	$0.41
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	939	$26.59	244,999	cy	$211.52	$198,691	$0.81
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,266	$26.59	591,057	cy	$211.52	$479,341	$0.81
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,861	$26.59	1,026,876	cy	$211.52	$816,770	$0.80
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	12,298	$26.59	3,270,554	cy	$211.52	$2,601,377	$0.80
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,310	$26.59	935,154	cy	$211.52	$700,061	$0.75
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	6,261	$26.59	1,664,979	cy	$211.52	$1,324,313	$0.80
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637E P-P Scraper	$184.93	2,478	$26.59	659,063	cy	$211.52	$524,214	$0.80
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	155	$26.59	-	-	$211.52	$32,743	$32,743
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637E P-P Scraper	$184.93	232	$26.59	-	-	$211.52	$49,115	$49,115
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	878	$26.59	496,377	cy	$211.52	$185,795	$0.37
24-5-06	Joint	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	772	$26.59	402,892	cy	$211.52	$163,371	$0.41
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,121	$26.59	1,198,472	cy	$211.52	$448,591	$0.37
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	2,150	$26.59	571,817	cy	$211.52	$454,819	$0.80
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637E P-P Scraper	$184.93	3,225	$26.59	857,725	cy	$211.52	$682,229	$0.80
				637E P-P Scraper Subtotal		126,454					$26,747,593	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	34	$23.94	-	-	$104.28	$3,504	$3,504
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$80.34	50	$23.94	-	-	$104.28	$5,255	$5,255
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	114	$23.94	21,150	cy	$104.28	$11,899	$0.56
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	380	$23.94	54,750	cy	$104.28	$39,660	$0.72
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	445	$23.94	51,350	cy	$104.28	$46,427	$0.90
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	89	$23.94	20,850	cy	$104.28	$9,294	$0.45
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	211	$23.94	29,700	cy	$104.28	$22,048	$0.74
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	42	$23.94	20,850	cy	$104.28	$4,422	$0.21
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	105	$23.94	24,500	cy	$104.28	$10,921	$0.45
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	25	$23.94	4,550	cy	$104.28	$2,560	$0.56
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	51	$23.94	12,100	cy	$104.28	$5,285	$0.44
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$80.34	396	$23.94	59,250	cy	$104.28	$41,322	$0.70
				769D Rear Dump Truck Subtotal		1,943					$202,597	
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	139	$27.67	6,340	feet	$113.01	$15,722	$2.48
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	361	$27.67	16,430	feet	$113.01	$40,743	$2.48
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	338	$27.67	15,415	feet	$113.01	$38,226	$2.48
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	J-7	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	196	$27.67	8,910	feet	$113.01	$22,095	$2.48
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	137	$27.67	6,260	feet	$113.01	$15,524	$2.48
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-14	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	161	$27.67	7,340	feet	$113.01	$18,202	$2.48
24-3-10	N-14E	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	104	$27.67	4,750	feet	$113.01	$11,779	$2.48
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988F Loader Series II	$85.34	390	$27.67	17,780	feet	$113.01	$44,091	$2.48
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	22	$27.67	-	-	$113.01	$2,531	$2,531
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988F Loader Series II	$85.34	34	$27.67	-	-	$113.01	$3,797	$3,797
				988F Loader Series II Subtotal		2,181					$246,435	
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	1,042	$27.67	1,048,088	cy	$249.62	$260,004	$0.25
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	12,240	$27.67	12,316,350	cy	$249.62	$3,055,370	$0.25
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	3,572	$27.67	3,594,413	cy	$249.62	$891,681	$0.25
24-3-03	J-7	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	500	$27.67	786,900	cy	$249.62	$124,934	$0.16
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	884	$27.67	1,012,500	cy	$249.62	$220,640	$0.22
24-3-03	N-6	Backfill Mine Pits	Doze Highwall	D11R Dozer	$221.95	4,058	$27.67	4,402,238	cy	$249.62	$1,012,946	$0.23
24-3-03	N-11	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	1,945	$27.67	1,258,110	cy	$249.62	$485,496	$0.39
24-3-03	N-14	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	5,606	$27.67	2,820,740	cy	$249.62	$699,753	$0.25
24-3-03	N-14E	Backfill Mine Pits	Doze First Two Spoils (Highwall Side)	D11R Dozer	$221.95	494	$27.67	497,405	cy	$249.62	$123,393	$0.25
24-3-03	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,972	$27.67	2,381,300	cy	$249.62	$492,283	$0.21

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Table 24-1-5
JOINT MINES
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	11,443	$27.67	13,817,220	cy	$249.62	$2,856,414	$0.21
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	3,475	$27.67	4,195,560	cy	$249.62	$867,342	$0.21
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,891	$27.67	4,943,110	cy	$249.62	$1,220,809	$0.25
24-3-04	J-7	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	747	$27.67	863,140	cy	$249.62	$186,425	$0.22
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	1,639	$27.67	2,473,670	cy	$249.62	$409,103	$0.17
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	6,668	$27.67	3,774,330	cy	$249.62	$1,664,559	$0.44
24-3-04	N-14	Backfill Mine Pits	Doze First Two Spoils (Spoil Side)	D11R Dozer	$221.95	4,672	$27.67	2,820,740	cy	$249.62	$583,128	$0.21
24-3-04	N-14E	Backfill Mine Pits	Doze First Two Spoils (Spoil Side)	D11R Dozer	$221.95	412	$27.67	497,405	cy	$249.62	$102,828	$0.21
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$221.95	4,368	$27.67	3,791,230	cy	$249.62	$1,090,443	$0.29
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	272	$27.67	493,370	cy	$249.62	$67,996	$0.14
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	1,542	$27.67	2,793,000	cy	$249.62	$384,929	$0.14
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	648	$27.67	1,173,330	cy	$249.62	$161,707	$0.14
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	729	$27.67	883,800	cy	$249.62	$181,895	$0.21
24-3-05	J-7	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	74	$27.67	177,090	cy	$249.62	$18,470	$0.10
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	489	$27.67	822,330	cy	$249.62	$122,051	$0.15
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	497	$27.67	899,770	cy	$249.62	$124,005	$0.14
24-3-05	N-14	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	132	$27.67	239,260	cy	$249.62	$32,975	$0.14
24-3-05	N-14E	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	286	$27.67	518,810	cy	$249.62	$71,502	$0.14
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$221.95	567	$27.67	1,026,520	cy	$249.62	$141,474	$0.14
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	824	$27.67	711,000	cy	$249.62	$205,778	$0.29
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	7,898	$27.67	6,812,151	cy	$249.62	$1,971,573	$0.29
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,041	$27.67	2,623,178	cy	$249.62	$759,200	$0.29
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-06	J-7	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	924	$27.67	797,025	cy	$249.62	$230,675	$0.29
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	0	$249.62	$240,824	$0.29
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	965	$27.67	832,091	cy	$249.62	$240,824	$0.29
24-3-06	N-14	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	4,099	$27.67	3,535,600	cy	$249.62	$1,023,273	$0.29
24-3-06	N-14E	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	193	$27.67	166,200	cy	$249.62	$48,102	$0.29
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$221.95	3,394	$27.67	2,927,742	cy	$249.62	$847,347	$0.29
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$221.95	2,523	$27.67	230	acres	$249.62	$629,910	$2,738.74
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$221.95	5,354	$27.67	488	acres	$249.62	$1,336,505	$2,738.74
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$221.95	2,194	$27.67	200	acres	$249.62	$547,748	$2,738.74
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-07	J-7	General Grading	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$221.95	5,464	$27.67	498	acres	$249.62	$1,363,893	$2,738.74
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$221.95	7,109	$27.67	648	acres	$249.62	$1,774,704	$2,738.74
24-3-07	N-14	General Grading	General Grading	D11R Dozer	$221.95	461	$27.67	42	acres	$249.62	$115,027	$2,738.74
24-3-07	N-14E	General Grading	General Grading	D11R Dozer	$221.95	230	$27.67	21	acres	$249.62	$57,514	$2,738.74
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$221.95	625	$27.67	57	acres	$249.62	$156,108	$2,738.74
24-4-01	J-1/N-6	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,103	$27.67	201	acres	$249.62	$275,265	$1,369.37
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,210	$27.67	403	acres	$249.62	$551,764	$1,369.37
24-4-01	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	2,363	$27.67	431	acres	$249.62	$589,777	$1,369.37
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,533	$27.67	280	acres	$249.62	$382,784	$1,369.37
24-4-01	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	194	$27.67	35	acres	$249.62	$48,496	$1,369.37
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$221.95	112	$27.67	20	acres	$249.62	$27,984	$1,369.37
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	511	$27.67	93	acres	$249.62	$127,586	$1,369.37
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	435	$27.67	79	acres	$249.62	$108,657	$1,369.37
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$221.95	99	$27.67	18	acres	$249.62	$24,649	$1,369.37
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,223	$27.67	223	acres	$249.62	$305,370	$1,369.37
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$221.95	568	$27.67	103	acres	$249.62	$141,685	$1,369.37
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$221.95	8,127	$27.67	1,482	acres	$249.62	$2,028,800	$1,369.37
24-4-05	N-1	General Grading at 50%	General Grading	D11R Dozer	$221.95	1,034	$27.67	188	acres	$249.62	$258,063	$1,369.37
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$221.95	488	$27.67	89	acres	$249.62	$121,874	$1,369.37
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$30	$1,369.37
24-4-05	N-2	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-4-05	J-21 Single Width	General Grading at 50%	General Grading	D11R Dozer	$221.95	14,805	$27.67	2,699	acres	$249.62	$3,695,786	$1,369.37
24-4-05	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$221.95	0	$27.67	0	acres	$249.62	$0	N/A
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	528	$27.67	355,014	cy	$249.62	$131,747	$0.37
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$221.95	20	$27.67	15,972	cy	$249.62	$4,939	$0.31
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$221.95	94	$27.67	4,033	cy	$249.62	$23,387	$5.80
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	47	$27.67	76,562	cy	$249.62	$11,688	$0.15
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$221.95	81	$27.67	184,705	cy	$249.62	$20,141	$0.11
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	1,041	$27.67	95	acres	$249.62	$259,939	$2,738.74
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	2,512	$27.67	229	acres	$249.62	$627,099	$2,738.74
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	432	$27.67	213,080	cy	$249.62	$107,829	$0.51
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	1,658	$27.67	817,639	cy	$249.62	$413,766	$0.51
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	204	$27.67	256,719	cy	$249.62	$51,037	$0.20
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	829	$27.67	817,639	cy	$249.62	$206,883	$0.25
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	4,365	$27.67	398	acres	$249.62	$1,089,494	$2,738.74
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	13,901	$27.67	1,267	acres	$249.62	$3,469,989	$2,738.74
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	2,214	$27.67	1,489,494	cy	$249.62	$552,756	$0.37
24-5-03	Joint	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	1,862	$27.67	1,252,295	cy	$249.62	$464,731	$0.37

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	5,422	$27.67	3,647,398	cy	$249.62	$1,353,560	$0.37
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	370	$27.67	182,647	cy	$249.62	$92,429	$0.51
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$221.95	659	$27.67	325,191	cy	$249.62	$164,563	$0.51
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	102	$27.67	182,647	cy	$249.62	$25,418	$0.14
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$221.95	199	$27.67	325,191	cy	$249.62	$49,731	$0.15
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	3,975	$27.67	362	acres	$249.62	$992,179	$2,738.74
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$221.95	7,077	$27.67	645	acres	$249.62	$1,766,508	$2,738.74
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	357	$27.67	256,052	cy	$249.62	$89,083	$0.35
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$221.95	535	$27.67	384,078	cy	$249.62	$133,624	$0.35
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	819	$27.67	587,408	cy	$249.62	$204,365	$0.35
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$221.95	1,228	$27.67	881,112	cy	$249.62	$306,547	$0.35
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	79	$27.67	7	acres	$249.62	$19,719	$2,738.74
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$221.95	118	$27.67	11	acres	$249.62	$29,578	$2,738.74
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	982	$27.67	422,795	cy	$249.62	$245,157	$0.58
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	1,695	$27.67	1,140,304	cy	$249.62	$423,170	$0.37
24-5-05	Joint	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	1,409	$27.67	947,885	cy	$249.62	$351,763	$0.37
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$221.95	4,132	$27.67	2,779,544	cy	$249.62	$1,031,497	$0.37
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	2,430	$27.67	222	acres	$249.62	$606,686	$2,738.74
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$221.95	3,646	$27.67	332	acres	$249.62	$910,029	$2,738.74
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	230	$27.67	-	-	$249.62	$57,314	$57,314
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$221.95	344	$27.67	-	-	$249.62	$85,971	$85,971
				D11R Dozer Subtotal		224,724					$54,813,803	
24-4-02	J-1/N-6	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	acres	$271.53	$0	N/A
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	143	$27.67	201	acres	$271.53	$38,918	$193.61
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	403	acres	$271.53	$78,011	$193.61
24-4-02	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	307	$27.67	431	acres	$271.53	$83,386	$193.61
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	188	acres	$271.53	$36,486	$193.61
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	199	$27.67	280	acres	$271.53	$54,120	$193.61
24-4-02	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	25	$27.67	35	acres	$271.53	$6,857	$193.61
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	15	$27.67	20	acres	$271.53	$3,954	$193.61
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	66	$27.67	93	acres	$271.53	$18,039	$193.61
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	57	$27.67	79	acres	$271.53	$15,362	$193.61
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	13	$27.67	18	acres	$271.53	$3,485	$193.61
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	159	$27.67	223	acres	$271.53	$43,175	$193.61
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	74	$27.67	500,780	cy	$271.53	$20,032	$0.04
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,056	$27.67	7,170,736	cy	$271.53	$286,842	$0.04
24-4-06	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	134	$27.67	912,117	cy	$271.53	$36,486	$0.04
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	63	$27.67	430,760	cy	$271.53	$17,231	$0.04
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0.0	$27.67	106	cy	$271.53	$4	$0.04
24-4-06	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	cy	$271.53	$0	N/A
24-4-06	J-21 Single Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	1,924	$27.67	13,062,652	cy	$271.53	$522,529	$0.04
24-4-06	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	0	$27.67	0	cy	$271.53	$0	N/A
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	105	$27.67	355,014	cy	$271.53	$28,402	$0.08
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	5	$27.67	15,972	cy	$271.53	$1,278	$0.08
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	4	$27.67	12,100	cy	$271.53	$968	$0.08
24-5-19	J-3 Airport	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	9,066	cy	$271.53	$7,253	$0.80
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	7	$27.67	5,152	cy	$274.57	$1,876	$0.36
24-5-02	Joint	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	3	$27.67	1,925	cy	$274.57	$701	$0.36
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$246.90	13	$27.67	9,777	cy	$274.57	$3,559	$0.36
24-5-20	J-3 Airport	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	27	$27.67	90,656	cy	$271.53	$7,253	$0.08
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	68	$27.67	229,686	cy	$271.53	$18,376	$0.08
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	163	$27.67	554,116	cy	$271.53	$44,331	$0.08
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	227	$27.67	770,157	cy	$271.53	$61,615	$0.08
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	723	$27.67	2,452,916	cy	$271.53	$196,242	$0.08
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	161	$27.67	547,942	cy	$271.53	$43,837	$0.08
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	287	$27.67	975,574	cy	$271.53	$78,049	$0.08
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	336	$27.67	1,140,304	cy	$271.53	$91,228	$0.08
24-5-04	Joint	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	279	$27.67	947,885	cy	$271.53	$75,834	$0.08
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$243.86	819	$27.67	2,779,544	cy	$271.53	$222,373	$0.08
				D11R Dozer - Ripper Equipped Subtotal		7,938					$2,154,952	
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	76	$26.59	58,580	lineal feet	$85.39	$6,472	$0.11
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	215	$26.59	166,170	lineal feet	$85.39	$18,358	$0.11
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	201	$26.59	155,620	lineal feet	$85.39	$17,193	$0.11
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-08	J-7	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	98	$26.59	75,400	lineal feet	$85.39	$8,330	$0.11
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	67	$26.59	52,000	lineal feet	$85.39	$5,745	$0.11
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	168	$26.59	129,920	lineal feet	$85.39	$14,354	$0.11
24-3-08	N-14	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	48	$26.59	37,410	lineal feet	$85.39	$4,133	$0.11
24-3-08	N-14E	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	32	$26.59	24,940	lineal feet	$85.39	$2,755	$0.11
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$58.80	239	$26.59	185,020	lineal feet	$85.39	$20,441	$0.11
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	16	$26.59	9,600	lineal feet	$85.39	$1,405	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	29	$26.59	16,900	lineal feet	$85.39	$2,474	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	42	$26.59	24,430	lineal feet	$85.39	$3,576	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15

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Table 24-1-5
JOINT MINES
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-09	J-7	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	26	$26.59	15,200	lineal feet	$85.39	$2,225	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	15	$26.59	9,000	lineal feet	$85.39	$1,317	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	19	$26.59	11,300	lineal feet	$85.39	$1,654	$0.15
24-3-09	N-14	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	12	$26.59	6,780	lineal feet	$85.39	$992	$0.15
24-3-09	N-14E	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	8	$26.59	4,520	lineal feet	$85.39	$662	$0.15
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$58.80	49	$26.59	28,800	lineal feet	$85.39	$4,216	$0.15
24-4-04	Black Mesa	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	1.9	$26.59	3,000	lineal feet	$85.39	$166	$0.06
24-4-04	Kayenta	Surface Stabilization at 50%	Grade Terraces	D7R Dozer	$58.80	83	$26.59	128,000	lineal feet	$85.39	$7,071	$0.06
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	22	$26.59	-	-	$85.39	$1,913	$1,913
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$58.80	34	$26.59	-	-	$85.39	$2,869	$2,869
				D7R Dozer Subtotal		1,585					$135,385	
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	932	-	-	-	-	$680,894	$680,894
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	6,009	-	-	-	-	$4,391,342	$4,391,342
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,995	-	-	-	-	$1,455,880	$1,455,880
24-3-02	J-7	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	317	-	-	-	-	$232,424	$232,424
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,027	-	-	-	-	$750,946	$750,946
24-3-02	N-11	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	0	-	-	-	-	$0	$0
24-3-02	N-6	Highwall Reduction	Cast/Blast Highwall	Driltech D55SP	$196.78	1,928	-	-	-	-	$1,410,110	$1,410,110
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Driltech D55SP	$196.78	8	$26.59	-	-	$223.37	$1,787	$1,787
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Driltech D55SP	$196.78	12	$26.59	-	-	$223.37	$2,680	$2,680
				Driltech D55SP Subtotal		12,228					$8,926,053	
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	552	$27.67	39,393	cy	$116.34	$64,216	$1.63
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	LS-208H Linkbelt	$88.67	828	$27.67	59,089	cy	$116.34	$96,324	$1.63
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	137	$27.67	-	-	$116.34	$15,915	$15,915
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	LS-208H Linkbelt	$88.67	205	$27.67	-	-	$116.34	$23,873	$23,873
				LS-208H Linkbelt Subtotal		1,722					$200,329	
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	9,600	$27.67	-	-	$95.03	$912,303	$912,303
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16H Grader	$67.36	14,400	$27.67	-	-	$95.03	$1,368,455	$1,368,455
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	11	$27.67	-	-	$95.03	$1,064	$1,064
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16H Grader	$67.36	17	$27.67	-	-	$95.03	$1,597	$1,597
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	4,800	$21.30	-	-	$58.67	$281,635	$281,635
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$37.37	7,200	$21.30	-	-	$58.67	$422,453	$422,453
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	8,800	$21.30	-	-	$145.97	$1,284,558	$1,284,558
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$124.67	13,200	$21.30	-	-	$145.97	$1,926,837	$1,926,837
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	28,000	$21.30	-	-	$29.33	$821,137	$821,137
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$8.03	42,000	$21.30	-	-	$29.33	$1,231,706	$1,231,706
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	4,800	$21.30	-	-	$37.39	$179,485	$179,485
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$16.09	7,200	$21.30	-	-	$37.39	$269,227	$269,227
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	4,800	-	-	-	$11.49	$55,140	$55,140
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$11.49	7,200	-	-	-	$11.49	$82,710	$82,710
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	3,200	-	-	-	$1.09	$3,488	$3,488
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.09	4,800	-	-	-	$1.09	$5,232	$5,232
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	3,200	-	-	-	$1.62	$5,176	$5,176
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$1.62	4,800	-	-	-	$1.62	$7,764	$7,764
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	43,200	-	-	-	$5.73	$247,622	$247,622
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$5.73	64,800	-	-	-	$5.73	$371,434	$371,434
SUPPORT EQUIPMENT TOTAL						300,028					$10,378,448	
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$686,799	$1,647.00
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,801	acres	-	$4,612,991	$1,647.00
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	895	acres	-	$1,473,530	$1,647.00
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-13	J-7	Revegetation	Revegetation	Miscellaneous	-	-	-	213	acres	-	$350,403	$1,647.00
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	968	acres	-	$1,594,058	$1,647.00
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	863	acres	-	$1,421,894	$1,647.00
24-3-13	N-14	Revegetation	Revegetation	Miscellaneous	-	-	-	189	acres	-	$310,855	$1,647.00
24-3-13	N-14E	Revegetation	Revegetation	Miscellaneous	-	-	-	141	acres	-	$232,560	$1,647.00
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	505	acres	-	$831,271	$1,647.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$17,294	$1,647.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	167	acres	-	$274,555	$1,647.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	157	acres	-	$257,756	$1,647.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	41	acres	-	$67,362	$1,647.00
24-3-14	J-7	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	31	acres	-	$50,563	$1,647.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	40	acres	-	$65,386	$1,647.00
24-3-14	N-14	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	15	acres	-	$25,034	$1,647.00
24-3-14	N-14E	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	19	acres	-	$30,799	$1,647.00
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	77	acres	-	$126,984	$1,647.00
24-4-03	J-1/N-6	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$165,537	$823.50
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	403	acres	-	$331,815	$823.50
24-4-03	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	431	acres	-	$354,675	$823.50

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	280	acres	-	$230,195	$823.50
24-4-03	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	35	acres	-	$29,164	$823.50
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$16,817	$823.50
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	93	acres	-	$76,726	$823.50
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	79	acres	-	$65,343	$823.50
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	18	acres	-	$14,823	$823.50
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	223	acres	-	$183,641	$823.50
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$85,205	$823.50
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,482	acres	-	$1,220,062	$823.50
24-4-07	J-21 Single Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	2,699	acres	-	$2,222,540	$823.50
24-4-07	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-4-07	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	188	acres	-	$155,192	$823.50
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	89	acres	-	$73,292	$823.50
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$18	$823.50
24-4-07	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	0	acres	-	$0	N/A
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,108,472	$2,108,471.50
24-5-01	Joint	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$328,554	$328,554.36
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,469,164	$1,469,163.96
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$120,807	$1,647.00
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$5,435	$1,647.00
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$4,118	$1,647.00
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$42,246	$42,245.67
24-5-02	Joint	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$15,787	$15,787.00
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$80,170	$80,169.76
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	95	acres	-	$156,320	$1,647.00
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	229	acres	-	$377,119	$1,647.00
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$14,014	$2.78
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,170	feet	-	$21,020	$1.88
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	398	acres	-	$655,190	$1,647.00
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,267	acres	-	$2,086,752	$1,647.00
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$13,814	$2.98
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$20,721	$2.98
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	362	acres	-	$596,668	$1,647.00
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	645	acres	-	$1,062,327	$1,647.00
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	222	acres	-	$364,843	$1,647.00
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	332	acres	-	$547,265	$1,647.00
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$8,093	$8,092.90
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$12,139	$12,139.35
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	11	acres	-	$18,446	$1,647.00
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	17	acres	-	$27,670	$1,647.00
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$38,000	$38,000.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$57,000	$57,000.00
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	396	acres	-	$651,981	$1,647.00
24-5-07	Joint	Revegetation	Revegetation	Miscellaneous	-	-	-	328	acres	-	$539,557	$1,647.00
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	963	acres	-	$1,586,396	$1,647.00
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	5,244	feet	-	$241,826	$46.12
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	88,166	feet	-	$4,065,969	$46.12
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Draglines	Miscellaneous	-	-	-	-	-	-	$300,000	N/A
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	123,901	feet	-	$140,762	$1.14
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	201,287	feet	-	$228,680	$1.14
				Miscellaneous Subtotal							$38,195,695	
24-6-01	J-21	Phase I Exploration Bond	-	-	-	-	-	-	-	-	$284,100	$284,100.00
				TOTAL		678,801	hours				$142,283,397	

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Table 3-4-1-6
BLACK MESA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	5,866	$35.58	4,870,067	cy	$355.49	$2,085,304	$0.43
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	743	$35.58	528,444	cy	$355.49	$264,129	$0.50
				Backfill Mine Pits Subtotal		6,609					$2,349,433	
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	2,640	$35.58	2,277,133	cy	$355.49	$938,494	$0.41
				Backfill and Grade Ramps Subtotal		2640					$938,494	
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$319.91	3,544	$35.58	323	acres	$355.49	$1,259,857	$3,900.48
				General Grading Subtotal		3,544					$1,259,857	
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	239	$33.47	185,020	lineal feet	$113.90	$27,222	$0.15
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	25	$33.47	14,400	lineal feet	$113.90	$2,848	$0.20
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	199	$27.43	29,800	cy	$146.47	$29,148	$0.98
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	158	$35.58	7,200	feet	$184.51	$29,153	$4.05
				Surface Stabilization Subtotal		621					$88,370	
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,637	$35.58	888,947	cy	$286.22	$1,613,422	$1.81
				Topsoil/Suitable Material Replacement Subtotal		5,637					$1,613,422	
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	551	acres	-	$818,373	$1,485.25
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	58	acres	-	$86,145	$1,485.26
				Revegetation Subtotal		0					$ 904,518	
CATEGORY I TOTAL						19,051					$ 7,154,093	
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,867,603	$1,867,603
				Facilities Demolition Subtotal							$1,867,603	
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	7	$35.58	5,410	cy	$383.27	$2,760	$0.51
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$48,690	$48,690
				Concrete Removal Subtotal		7					$51,450	
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	3,457	$35.58	2,480,112	cy	$355.49	$1,228,929	$0.50
				Surfacing Removal Subtotal		3,457					$1,228,929	
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	372	$35.58	1,263,240	cy	$379.92	$141,330	$0.11
				Surface Ripping Subtotal		372					$141,330	
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,761	$35.58	1,263,240	cy	$355.49	$626,018	$0.50
				Grade Facilities Area Subtotal		1,761					$626,018	
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,423	$35.58	547,601	cy	$286.22	$693,511	$1.27
				Topsoil Replacement Subtotal		2,423					$693,511	
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	433	acres	-	$643,114	$1,485.25
				Revegetation Subtotal							$643,114	
				MAJOR FACILITIES SUBTOTAL		8,020					$5,251,955	
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	2,800	feet	-	$170,011	$60.72
				Conveyors Subtotal							$170,011	
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	107,574	feet	-	$142,626	$1.33
				Powerlines Subtotal							$142,626	
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	105	$35.58	355,014	cy	$379.92	$39,741	$0.11
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	528	$35.58	355,014	cy	$355.49	$187,620	$0.53
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	949	$35.58	189,341	cy	$286.22	$271,623	$1.43
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$108,943	$1,485.25
				Scoria Pits Subtotal		1,581					$607,927	
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	54	$35.58	88,691	cy	$355.49	$19,196	$0.22
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	78	$35.58	266,072	cy	$379.92	$29,634	$0.11
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	1,206	$35.58	110	acres	$355.49	$428,721	$3,897.46
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,176	$35.58	283,810	cy	$286.22	$622,815	$2.19
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	110	acres	-	$163,299	$1,484.54
				Permanent Roads Subtotal		3,514					$1,263,665	

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Table 24-1-6
BLACK MESA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$17,669	$3.51
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	432	$35.58	213,080	cy	$355.49	$153,588	$0.72
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	138	$35.58	172,966	cy	$355.49	$49,058	$0.28
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	153	$35.58	518,898	cy	$379.92	$58,128	$0.11
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,941	$35.58	268	acres	$355.49	$1,045,496	$3,901.10
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,203	$35.58	691,864	cy	$286.22	$1,489,203	$2.15
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	268	acres	-	$398,085	$1,485.39
				Primary Roads Subtotal		8,867					$3,211,226	
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$17,418	$3.75
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	398	$35.58	196,272	cy	$355.49	$141,485	$0.72
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	97	$35.58	174,065	cy	$355.49	$34,483	$0.20
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	154	$35.58	522,194	cy	$379.92	$58,508	$0.11
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	3,788	$35.58	345	acres	$355.49	$1,346,596	$3,903.18
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	6,308	$35.58	891,212	cy	$286.22	$1,805,476	$2.03
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	345	acres	-	$512,787	$1,486.34
				Ancillary Roads Subtotal		10,745					$3,916,752	
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	512	$35.58	36,560	cy	$217.19	$111,201	$3.04
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	331	$35.58	237,640	cy	$355.49	$117,667	$0.50
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	450	$35.58	322,578	cy	$355.49	$159,971	$0.50
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	2,359	$35.58	215	acres	$355.49	$838,601	$3,900.47
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,883	$35.58	555,090	cy	$286.22	$538,952	$0.97
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	215	acres	-	$319,388	$1,485.53
				Water Storage and Sedimentation Ponds Subtotal		5,535					$2,085,780	
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$15,402	$15,402
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	66	$35.58	6	acres	$355.49	$23,462	$3,910
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	6	acres	-	$8,912	$1,485
				Environmental Monitoring Sites Subtotal		66					$47,776	
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$24,800	$38,000
				Monitoring Wells Subtotal							$24,800	
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Draglines	Miscellaneous	-	-	-	-	-	-	$200,000	N/A
				Drag Lines Subtotal							$200,000	
				OTHER FACILITIES SUBTOTAL		30,308					$ 11,670,563	
CATEGORY V TOTAL												
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	3,200	-	-	-	$1.36	$4,352	$4,352
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	3,200	-	-	-	$2.04	$6,528	$6,528
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	4,800	-	-	-	$23.50	$112,800	$112,800
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	43,200	-	-	-	$7.97	$344,304	$344,304
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	4,800	$24.37	-	-	$87.69	$420,912	$420,912
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	28,000	$24.37	-	-	$36.79	$1,030,120	$1,030,120
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	9,600	$35.58	-	-	$147.89	$1,419,744	$1,419,744
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	8,800	$25.23	-	-	$197.83	$1,740,904	$1,740,904
SUPPORT TOTAL						120,000					$ 6,023,872	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	4	$35.58	-	-	$147.89	$592	$592
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	8	$33.47	-	-	$113.90	$911	$911
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	0	$33.47	-	-	$395.84	$0	$0
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	8	$35.58	-	-	$184.51	$1,476	$1,476
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	12	$27.43	-	-	$146.47	$1,758	$1,758
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	136	$35.58	-	-	$217.19	$29,538	$29,538
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	48	$35.58	-	-	$286.22	$13,739	$13,739
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	44	$35.58	-	-	$355.49	$15,642	$15,642
MOBILIZATION TOTAL						260					$63,654	
				TOTAL		177,640	hours				$ 30,164,137	

Table 24-1-5
BLACK MESA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,637	$35.58	888,947	cy	$286.22	$1,613,422	$1.81
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,423	$35.58	547,601	cy	$286.22	$693,511	$1.27
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	48	$35.58	-	-	$286.22	$13,739	$13,739
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	6,308	$35.58	891,212	cy	$286.22	$1,805,476	$2.03
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,176	$35.58	283,810	cy	$286.22	$622,815	$2.19
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,203	$35.58	691,864	cy	$286.22	$1,489,203	$2.15
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	949	$35.58	189,341	cy	$286.22	$271,623	$1.43
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,883	$35.58	555,090	cy	$286.22	$538,952	$0.97
				637G P-P Scraper Subtotal		**24,627**					**$7,048,740**	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	12	$27.43	-	-	$146.47	$1,758	$1,758
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	199	$27.43	29,800	cy	$146.47	$29,148	$0.98
				769D Rear Dump Truck Subtotal		**211**					**$30,905**	
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	158	$35.58	7,200	feet	$184.51	$29,153	$4.05
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	8	$35.58	-	-	$184.51	$1,476	$1,476
				988H Loader Subtotal		**166**					**$30,629**	
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	3,457	$35.58	2,480,112	cy	$355.49	$1,228,929	$0.50
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,761	$35.58	1,263,240	cy	$355.49	$626,018	$0.50
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	398	$35.58	196,272	cy	$355.49	$141,485	$0.72
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	97	$35.58	174,065	cy	$355.49	$34,483	$0.20
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	3,788	$35.58	345	acres	$355.49	$1,346,596	$3,903.18
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	66	$35.58	6	acres	$355.49	$23,462	$3,910
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	54	$35.58	88,691	cy	$355.49	$19,196	$0.22
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	1,206	$35.58	110	acres	$355.49	$428,721	$3,897.46
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	432	$35.58	213,080	cy	$355.49	$153,588	$0.72
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	138	$35.58	172,966	cy	$355.49	$49,058	$0.28
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,941	$35.58	268	acres	$355.49	$1,045,496	$3,901.10
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	528	$35.58	355,014	cy	$355.49	$187,620	$0.53
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	331	$35.58	237,640	cy	$355.49	$117,667	$0.50
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	450	$35.58	322,578	cy	$355.49	$159,971	$0.50
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	2,359	$35.58	215	acres	$355.49	$838,601	$3,900.47
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	5,866	$35.58	4,870,067	cy	$355.49	$2,085,304	$0.43
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	743	$35.58	528,444	cy	$355.49	$264,129	$0.50
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	2,640	$35.58	2,277,133	cy	$355.49	$938,494	$0.41
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$319.91	3,544	$35.58	323	acres	$355.49	$1,259,857	$3,900.48
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	44	$35.58	-	-	$355.49	$15,642	$15,642
				D11R Dozer Subtotal		**30,843**					**$ 10,964,315**	
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	7	$35.58	5,410	cy	$383.27	$2,760	$0.51
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	372	$35.58	1,263,240	cy	$379.92	$141,330	$0.11
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	154	$35.58	522,194	cy	$379.92	$58,508	$0.11
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	78	$35.58	266,072	cy	$379.92	$29,634	$0.11
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	153	$35.58	518,898	cy	$379.92	$58,128	$0.11
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	105	$35.58	355,014	cy	$379.92	$39,741	$0.11
				D11R Dozer - Ripper Equipped Subtotal		**869**					**$11,294,415**	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	8	$33.47	-	-	$113.90	$911	$911
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	239	$33.47	185,020	lineal feet	$113.90	$27,222	$0.15
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	25	$33.47	14,400	lineal feet	$113.90	$2,848	$0.20
				D7R Dozer Subtotal		**272**					**$30,981**	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	0	$33.47	-	-	$395.84	$0	$0
				Atlas Copco Pit Viper 271 Subtotal		**0**					**$0**	
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	136	$35.58	-	-	$217.19	$29,538	$29,538
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	512	$35.58	36,560	cy	$217.19	$111,201	$3.04
				9225 American Subtotal		**648**					**$140,739**	

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Table 24-1-5
BLACK MESA MINE
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	9,600	$35.58	-	-	$147.89	$1,419,744	$1,419,744
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	4	$35.58	-	-	$147.89	$592	$592
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	43,200	-	-	-	$7.97	$344,304	$344,304
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	4,800	-	-	-	$23.50	$112,800	$112,800
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	28,000	$24.37	-	-	$36.79	$1,030,120	$1,030,120
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	3,200	-	-	-	$2.04	$6,528	$6,528
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	3,200	-	-	-	$1.36	$4,352	$4,352
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	4,800	$24.37	-	-	$87.69	$420,912	$420,912
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	8,800	$25.23	-	-	$197.83	$1,740,904	$1,740,904
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
				Support Equipment Subtotal		120,004					$6,024,464	
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,867,603	$1,867,603
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$48,690	$48,690
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	433	acres	-	$643,114	$1,485.25
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$17,418	$3.75
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	345	acres	-	$512,787	$1,486.34
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	2,800	feet	-	$170,011	$60.72
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Draglines	Miscellaneous	-	-	-	-	-	-	$200,000	N/A
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$15,402	$15,402
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	6	acres	-	$8,912	$1,485
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$24,800	$38,000
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	110	acres	-	$163,299	$1,484.54
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	107,574	feet	-	$142,626	$1.33
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$17,669	$3.51
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	268	acres	-	$398,085	$1,485.39
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$108,943	$1,485.25
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	215	acres	-	$319,388	$1,485.53
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	551	acres	-	$818,373	$1,485.25
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	58	acres	-	$86,145	$1,485.26
				Miscellaneous Subtotal		0					$5,563,265	
				TOTAL		177,640	hours				$30,164,137	

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Table 24-1-6
KAYENTA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	932	-	-	-	-	$1,292,462	$1,386.53
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	4,834	-	-	-	-	$6,706,370	$1,387.33
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	648	-	-	-	-	$898,075	$1,385.92
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	1,004	-	-	-	-	$1,393,914	$1,388.36
				Highwall Reduction Subtotal		7,418					$10,290,821	
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,282	$35.58	1,048,055	cy	$355.49	$455,738	$0.43
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,868	$35.58	2,381,296	cy	$355.49	$1,019,545	$0.43
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	477	$35.58	493,370	cy	$355.49	$169,569	$0.34
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	12,120	$35.58	9,908,646	cy	$355.49	$4,308,539	$0.43
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	11,330	$35.58	11,116,111	cy	$355.49	$4,027,702	$0.36
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	2,672	$35.58	2,247,000	cy	$355.49	$949,869	$0.42
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	4,456	$35.58	3,603,111	cy	$355.49	$1,584,063	$0.44
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	724	$35.58	644,213	cy	$355.49	$257,375	$0.40
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,429	$35.58	1,168,195	cy	$355.49	$507,995	$0.43
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	1,643	$35.58	1,363,556	cy	$355.49	$584,070	$0.43
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	368	$35.58	381,333	cy	$355.49	$130,820	$0.34
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	6,062	$35.58	5,032,444	cy	$355.49	$2,154,980	$0.43
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,264	$35.58	899,769	cy	$355.49	$449,339	$0.50
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	918	$35.58	990,000	cy	$355.49	$326,340	$0.33
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,914	$35.58	2,418,696	cy	$355.49	$1,035,898	$0.43
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,130	$35.58	804,059	cy	$355.49	$401,704	$0.50
				Backfill Mine Pits Subtotal		51,657					$18,363,547	
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	824	$35.58	711,000	cy	$355.49	$293,047	$0.41
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	5,428	$35.58	4,681,434	cy	$355.49	$1,929,600	$0.41
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,357	$35.58	1,170,359	cy	$355.49	$482,400	$0.41
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,629	$35.58	1,404,922	cy	$355.49	$579,093	$0.41
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	905	$35.58	780,239	cy	$355.49	$321,718	$0.41
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,961	$35.58	1,691,338	cy	$355.49	$697,116	$0.41
				Backfill and Grade Ramps Subtotal		12,104					$4,302,975	
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$319.91	2,523	$35.58	230	acres	$355.49	$897,054	$3,900.23
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$319.91	8,349	$35.58	761	acres	$355.49	$2,967,986	$3,900.11
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$319.91	1,898	$35.58	173	acres	$355.49	$674,720	$3,900.12
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$319.91	2,754	$35.58	251	acres	$355.49	$979,019	$3,900.48
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$319.91	2,984	$35.58	272	acres	$355.49	$1,060,782	$3,899.93
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$319.91	5,299	$35.58	483	acres	$355.49	$1,883,742	$3,900.09
				General Grading Subtotal		23,807					$8,463,303	
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	76	$33.47	58,580	lineal feet	$113.90	$8,633	$0.15
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	16	$33.47	9,600	lineal feet	$113.90	$1,874	$0.20
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	21,133	cy	$146.47	$16,714	$0.79
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	105	$35.58	4,800	feet	$184.51	$19,374	$4.04
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	215	$33.47	166,170	lineal feet	$113.90	$24,487	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	29	$33.47	16,900	lineal feet	$113.90	$3,300	$0.20
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	185	$35.58	8,450	feet	$184.51	$34,134	$4.04
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	367	$27.43	52,767	cy	$146.47	$53,754	$1.02
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	104	$33.47	80,730	lineal feet	$113.90	$11,846	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	22	$33.47	12,670	lineal feet	$113.90	$2,506	$0.20
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	26,650	cy	$146.47	$16,698	$0.63
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	139	$35.58	6,335	feet	$184.51	$25,647	$4.05
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	201	$33.47	155,620	lineal feet	$113.90	$22,933	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	21	$33.47	12,200	lineal feet	$113.90	$2,392	$0.20
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	134	$35.58	6,100	feet	$184.51	$24,724	$4.05
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	210	$27.43	24,267	cy	$146.47	$30,759	$1.27
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,146	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,206	$0.20
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,341	$0.63
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,135	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,164	$0.19
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,379	$0.63
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
				Surface Stabilization Subtotal		2,885					$418,904	
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,191	$35.58	645,850	cy	$286.22	$627,108	$0.97
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,556	$35.58	1,076,416	cy	$286.22	$1,590,238	$1.48
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	14,115	$35.58	4,161,626	cy	$286.22	$4,039,995	$0.97
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	31,708	$35.58	6,936,043	cy	$286.22	$9,075,464	$1.31
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,542	$35.58	662,886	cy	$286.22	$727,571	$1.10
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,191	$35.58	1,104,811	cy	$286.22	$1,771,988	$1.60
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,847	$35.58	839,450	cy	$286.22	$814,868	$0.97
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,396	$35.58	1,399,083	cy	$286.22	$1,830,663	$1.31
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,861	$35.58	808,474	cy	$286.22	$818,875	$1.01
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	8,544	$35.58	1,347,456	cy	$286.22	$2,445,464	$1.81
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	5,606	$35.58	1,462,067	cy	$286.22	$1,604,549	$1.10
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	14,194	$35.58	2,436,779	cy	$286.22	$4,069,071	$1.67

Table 24-1-6
KAYENTA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
			Topsoil/Suitable Material Replacement Subtotal			102,751					$29,409,391	

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KAYENTA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$860,689	$2,064.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$21,672	$2,064.00
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,687	acres	-	$5,545,969	$2,064.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	158	acres	-	$326,112	$2,064.00
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	428	acres	-	$883,392	$2,064.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	154	acres	-	$317,856	$2,064.00
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	542	acres	-	$1,118,688	$2,064.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	12	acres	-	$24,768	$2,064.00
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	522	acres	-	$1,077,408	$2,064.00
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	47	acres	-	$97,009	$2,064.02
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	944	acres	-	$1,948,416	$2,064.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	45	acres	-	$92,881	$2,064.02
				Revegetation Subtotal							**$12,314,860**	
CATEGORY I TOTAL						**200,623**					**$83,563,801**	
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,103	$35.58	201	acres	$355.49	$392,105	$1,950.77
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,194	$35.58	400	acres	$355.49	$779,945	$1,949.86
24-4-01	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,465	$35.58	267	acres	$355.49	$520,793	$1,950.54
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,569	$35.58	286	acres	$355.49	$557,764	$1,950.22
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$319.91	110	$35.58	20	acres	$355.49	$39,104	$1,914.89
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,695	$35.58	309	acres	$355.49	$602,556	$1,950.02
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$319.91	543	$35.58	99	acres	$355.49	$193,031	$1,949.81
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$319.91	252	$35.58	46	acres	$355.49	$89,583	$1,947.47
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$319.91	93	$35.58	17	acres	$355.49	$33,061	$1,944.74
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
				General Grading at 50% Subtotal		**10,570**					**$3,757,529**	
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	143	$35.58	201	acres	$379.92	$54,329	$270.29
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	285	$35.58	400	acres	$379.92	$108,277	$270.69
24-4-02	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	190	$35.58	267	acres	$379.92	$72,185	$270.36
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	204	$35.58	286	acres	$379.92	$77,504	$270.99
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	20	acres	$379.92	$5,319	$260.46
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	220	$35.58	309	acres	$379.92	$83,582	$270.49
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	71	$35.58	99	acres	$379.92	$26,974	$272.47
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	33	$35.58	46	acres	$379.92	$12,537	$272.55
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	12	$35.58	17	acres	$379.92	$4,559	$268.18
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
				Surface Ripping Subtotal		**1,374**					**$522,010**	
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$207,432	$1,032.00
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	400	acres	-	$412,800	$1,032.00
24-4-03	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	267	acres	-	$275,544	$1,032.00
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	286	acres	-	$295,153	$1,032.00
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$20,640	$1,010.72
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	309	acres	-	$318,888	$1,032.00
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	99	acres	-	$102,168	$1,032.00
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	46	acres	-	$47,473	$1,032.02
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	17	acres	-	$17,544	$1,032.00
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
				Revegetation at 50% Subtotal							**$1,988,666**	
CATEGORY II TOTAL						**11,944**					**$6,268,205**	
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	565	$35.58	103	acres	$355.49	$200,852	$1,941.22
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	8,102	$35.58	1,477	acres	$355.49	$2,880,180	$1,950.02
24-4-05	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	4,169	$35.58	760	acres	$355.49	$1,482,038	$1,950.05
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,304	$35.58	420	acres	$355.49	$819,049	$1,950.12
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$319.91	104	$35.58	19	acres	$355.49	$36,971	$1,945.84
				General Grading at 50% Subtotal		**15,244**					**$5,419,090**	
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	73	$35.58	498,520	cy	$379.92	$27,734	$0.06
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	1,053	$35.58	7,148,680	cy	$379.92	$400,056	$0.06
24-4-06	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	542	$35.58	3,678,400	cy	$379.92	$205,917	$0.06
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	299	$35.58	2,032,800	cy	$379.92	$113,596	$0.06
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	91,960	cy	$379.92	$5,319	$0.06
				Surface Ripping Subtotal		**1,981**					**$752,622**	
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$106,296	$1,032.00
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,477	acres	-	$1,524,264	$1,032.00
24-4-07	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	760	acres	-	$784,320	$1,032.00
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	420	acres	-	$433,440	$1,032.00
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	19	acres	-	$4,907	$258.26
				Revegetation at 50% Subtotal							**$2,853,227**	
CATEGORY IIA TOTAL						**17,225**					**$9,024,938**	

Table 24-1-6
KAYENTA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,524,852	$2,524,852
				Facilities Demolition Subtotal							$2,524,852	
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	10,266	cy	$379.92	$5,167	$0.50
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$92,394	$92,394
				Concrete Removal Subtotal		14					$97,561	
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	8,040	$35.58	5,768,406	cy	$355.49	$2,858,140	$0.50
				Surfacing Removal Subtotal		8,040					$2,858,140	
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	863	$35.58	2,928,200	cy	$379.92	$327,871	$0.11
				Surface Ripping Subtotal		863					$327,871	
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	4,081	$35.58	2,928,200	cy	$355.49	$1,450,755	$0.50
				Grade Facilities Area Subtotal		4,081					$1,450,755	
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,576	$35.58	1,260,413	cy	$286.22	$1,595,963	$1.27
				Topsoil Replacement Subtotal		5,576					$1,595,963	
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	1,005	acres	-	$2,074,321	$2,064.00
				Revegetation Subtotal							$2,074,321	
				MAJOR FACILITIES SUBTOTAL		18,574					$10,929,462	
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	90,610	feet	-	$5,501,679	$60.72
				Conveyors Subtotal							$5,501,679	
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	175,699	feet	-	$232,950	$1.33
				Powerlines Subtotal							$232,950	
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	80	$35.58	271,040	cy	$379.92	$30,394	$0.11
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	336	$35.58	271,040	cy	$355.49	$119,445	$0.44
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	725	$35.58	144,554	cy	$286.22	$207,510	$1.44
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	56	acres	-	$115,584	$2,064.00
				Scoria Pits Subtotal		1,141					$472,932	
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637G P-P Scraper	$250.64	54	$35.58	5,000	cy	$286.22	$15,456	$3.09
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	4	$35.58	12,100	cy	$379.92	$1,520	$0.13
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$319.91	5	$35.58	4,033	cy	$355.49	$1,777	$0.44
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	37	$35.58	6,050	cy	$286.22	$10,590	$1.75
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	2.5	acres	-	$5,160	$2,064.00
				Landfarm Areas Subtotal		100					$34,503	
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	80	$35.58	184,126	cy	$355.49	$28,439	$0.15
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	163	$35.58	552,378	cy	$379.92	$61,927	$0.11
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,504	$35.58	228	acres	$355.49	$890,147	$3,904.15
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	4,518	$35.58	589,203	cy	$286.22	$1,293,142	$2.19
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	228	acres	-	$471,119	$2,066.31
				Permanent Roads Subtotal		7,265					$2,744,774	
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,460	feet	-	$26,504	$2.31
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	983	$35.58	484,758	cy	$355.49	$349,447	$0.72
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	724	$35.58	714,107	cy	$355.49	$257,375	$0.36
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	631	$35.58	2,142,320	cy	$379.92	$239,730	$0.11
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	12,141	$35.58	1,107	acres	$355.49	$4,316,004	$3,898.83
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	16,217	$35.58	2,856,427	cy	$286.22	$4,641,630	$1.62
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,107	acres	-	$2,283,961	$2,063.20
				Primary Roads Subtotal		30,696					$12,114,650	
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$26,126	$3.75
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	597	$35.58	294,408	cy	$355.49	$212,228	$0.72
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	220	$35.58	358,841	cy	$355.49	$78,208	$0.22
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	317	$35.58	1,076,522	cy	$379.92	$120,435	$0.11
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	7,809	$35.58	712	acres	$355.49	$2,776,021	$3,898.91
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	13,818	$35.58	1,837,265	cy	$286.22	$3,954,988	$2.15
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	712	acres	-	$1,469,052	$2,063.28
				Ancillary Roads Subtotal		22,761					$8,637,057	
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	768	$35.58	54,840	cy	$217.19	$166,802	$3.04
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	497	$35.58	356,460	cy	$355.49	$176,679	$0.50
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	674	$35.58	483,867	cy	$355.49	$239,600	$0.50
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	3,539	$35.58	323	acres	$355.49	$1,258,079	$3,894.98
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,824	$35.58	832,635	cy	$286.22	$808,285	$0.97
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	323	acres	-	$665,764	$2,061.19
				Water Storage and Sedimentation Ponds Subtotal		8,302					$3,315,209	
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$23,102	$23,102
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	99	$35.58	9	acres	$355.49	$35,194	$3,910
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	9	acres	-	$18,577	$2,064
				Environmental Monitoring Sites Subtotal		99					$76,873	
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$37,200	$37,200
				Monitoring Wells Subtotal							$37,200	
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637G P-P Scraper	$250.64	2,478	$35.58	659,063	cy	$286.22	$709,253	$1.08
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	714	$35.58	422,795	cy	$355.49	$253,820	$0.60
				N-11 Coal Handling Facility Subtotal		3,192					$963,073	
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
				Kayenta Drag Lines and Shovels Subtotal		-					$800,000	
				OTHER FACILITIES SUBTOTAL		73,556					$34,930,900	
CATEGORY V TOTAL						92,130					$45,860,362	

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KAYENTA MINE
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	4,800	-	-	-	$1.36	$6,528	$6,528
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	4,800	-	-	-	$2.04	$9,792	$9,792
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	7,200	-	-	-	$23.50	$169,200	$169,200
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	64,800	-	-	-	$7.97	$516,456	$516,456
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	7,200	$24.37	-	-	$87.69	$631,368	$631,368
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	44,000	$24.37	-	-	$36.79	$1,618,760	$1,618,760
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	14,400	$35.58	-	-	$147.89	$2,129,616	$2,129,616
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	15,000	$25.23	-	-	$197.83	$2,967,450	$2,967,450
SUPPORT EQUIPMENT TOTAL						183,800					$9,485,482	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	20	$35.58	-	-	$147.89	$2,958	$2,958
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	40	$33.47	-	-	$113.90	$4,556	$4,556
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	16	$33.47	-	-	$395.84	$6,333	$6,333
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	40	$35.58	-	-	$184.51	$7,380	$7,380
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	60	$27.43	-	-	$146.47	$8,788	$8,788
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	206	$35.58	-	-	$217.19	$44,741	$44,741
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	323	$35.58	-	-	$286.22	$92,449	$92,449
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	498	$35.58	-	-	$355.49	$177,034	$177,034
MOBILIZATION TOTAL						1,203					$344,240	
				Kayenta Mine Total Joint								
				TOTAL		506,924	hours				$154,527,028	

JAN 2012
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Table 24-1-6
JOINT MINES
Direct Costs by Project Area

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
CATEGORY I TOTAL						0					$0	
CATEGORY II TOTAL						0					$0	
CATEGORY IIA TOTAL						0					$0	
24-5-19	Joint: J-3 Airport - (KM)	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	20,246	cy	$379.92	$10,258	$0.51
24-5-01	Joint - (KM)	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$401,566	$401,566
				Facilities Demolition Subtotal		27					$411,824	
24-5-02	Joint - (KM)	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	3	$35.58	2,022	cy	$383.27	$978	$0.48
24-5-02	Joint - (KM)	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$18,198	$18,198
				Concrete Removal Subtotal		3					$19,176	
24-5-03	Joint - (KM)	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	2,849	$35.58	2,044,512	cy	$355.49	$1,012,791	$0.50
				Surfacing Removal Subtotal		2,849					$1,012,791	
24-5-04	Joint - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	304	$35.58	1,030,920	cy	$379.92	$115,496	$0.11
24-5-20	Joint: J-3 Airport - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	90,656	cy	$379.92	$10,148	$0.11
				Surface Ripping Subtotal		331					$125,644	
24-5-05	Joint - (KM)	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,437	$35.58	1,030,920	cy	$355.49	$510,839	$0.50
				Grade Facilities Area Subtotal		1,437					$510,839	
24-5-06	Joint - (KM)	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,935	$35.58	437,491	cy	$286.22	$553,836	$1.27
				Topsoil Replacement Subtotal		1,935					$553,836	
24-5-07	Joint - (KM)	Revegetation	Revegetation	Miscellaneous	-	-	-	354	acres	-	$730,656	$2,064.00
				Revegetation Subtotal		0					$730,656	
				MAJOR FACILITIES SUBTOTAL		6,581					$ 3,364,766	
				OTHER FACILITIES SUBTOTAL		0					$0	
CATEGORY V TOTAL						6,581					$3,364,766	
SUPPORT EQUIPMENT TOTAL						0					$0	
MOBILIZATION TOTAL						0					$0	
				TOTAL		6,581	hours				$3,364,766	

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Table 24-1-5
KAYE[illegible]INE
Direct Costs [illegible]ment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	14,400	$35.58	14,400	-	$147.89	$2,129,616	$147.89
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	20	$35.58	20	-	$147.89	$2,958	$147.89
				16M Grader Subtotal		14,420					$2,132,574	
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,191	$35.58	645,850	cy	$286.22	$627,108	$0.97
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,556	$35.58	1,076,416	cy	$286.22	$1,590,238	$1.48
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	14,115	$35.58	4,161,626	cy	$286.22	$4,039,995	$0.97
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	31,708	$35.58	6,936,043	cy	$286.22	$9,075,464	$1.31
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,542	$35.58	662,886	cy	$286.22	$727,571	$1.10
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,191	$35.58	1,104,811	cy	$286.22	$1,771,988	$1.60
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,847	$35.58	839,450	cy	$286.22	$814,868	$0.97
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,396	$35.58	1,399,083	cy	$286.22	$1,830,663	$1.31
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,576	$35.58	1,260,413	cy	$286.22	$1,595,963	$1.27
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	323	$35.58	-	-	$286.22	$92,449	$92,449
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	13,818	$35.58	1,837,265	cy	$286.22	$3,954,988	$2.15
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637G P-P Scraper	$250.64	54	$35.58	5,000	cy	$286.22	$15,456	$3.09
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	37	$35.58	6,050	cy	$286.22	$10,590	$1.75
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637G P-P Scraper	$250.64	2,478	$35.58	659,063	cy	$286.22	$709,253	$1.08
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	4,518	$35.58	589,203	cy	$286.22	$1,293,142	$2.19
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	16,217	$35.58	2,856,427	cy	$286.22	$4,641,630	$1.62
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	725	$35.58	144,554	cy	$286.22	$207,510	$1.44
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,824	$35.58	832,635	cy	$286.22	$808,285	$0.97
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,861	$35.58	808,474	cy	$286.22	$818,875	$1.01
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	8,544	$35.58	1,347,456	cy	$286.22	$2,445,464	$1.81
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	5,606	$35.58	1,462,067	cy	$286.22	$1,604,549	$1.10
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	14,194	$35.58	2,436,779	cy	$286.22	$4,062,607	$1.67
				637G P-P Scraper Subtotal		149,321					$42,738,657	
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	21,133	cy	$146.47	$16,698	$0.79
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	367	$27.43	52,767	cy	$146.47	$53,754	$1.02
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	26,650	cy	$146.47	$16,698	$0.63
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	210	$27.43	24,267	cy	$146.47	$30,759	$1.27
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	60	$27.43	-	-	$146.47	$8,788	$8,788
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,379	$0.63
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,379	$0.63
				769D Rear Dump Truck Subtotal		1,075					$157,455	
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	105	$35.58	4,800	feet	$184.51	$19,374	$4.04
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	185	$35.58	8,450	feet	$184.51	$34,134	$4.04
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	139	$35.58	6,335	feet	$184.51	$25,647	$4.05
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	134	$35.58	6,100	feet	$184.51	$24,724	$4.05
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	40	$35.58	-	-	$184.51	$7,380	$7,380
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	126	$35.58	5,650	feet	$184.51	$23,248	$4.11
				988H Loader Subtotal		853					$157,387	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,282	$35.58	1,048,055	cy	$355.49	$455,738	$0.43
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,868	$35.58	2,381,296	cy	$355.49	$1,019,545	$0.43
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	477	$35.58	493,370	cy	$355.49	$169,569	$0.34
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	824	$35.58	711,000	cy	$355.49	$292,924	$0.41
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$319.91	2,523	$35.58	230	acres	$355.49	$896,901	$3,899.57
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,103	$35.58	201	acres	$355.49	$392,105	$1,950.77
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	565	$35.58	103	acres	$355.49	$200,852	$1,941.22
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	12,120	$35.58	9,908,646	cy	$355.49	$4,308,539	$0.43
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	11,330	$35.58	11,116,111	cy	$355.49	$4,027,702	$0.36
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	2,672	$35.58	2,247,000	cy	$355.49	$949,869	$0.42
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	5,428	$35.58	4,681,434	cy	$355.49	$1,929,600	$0.41
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$319.91	8,349	$35.58	761	acres	$355.49	$2,967,986	$3,900.11
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,194	$35.58	400	acres	$355.49	$779,945	$1,949.86
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	8,102	$35.58	1,477	acres	$355.49	$2,880,180	$1,950.02
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	4,456	$35.58	3,603,111	cy	$355.49	$1,584,063	$0.44
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	724	$35.58	644,213	cy	$355.49	$257,375	$0.40
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,357	$35.58	1,170,359	cy	$355.49	$482,400	$0.41
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$319.91	1,898	$35.58	173	acres	$355.49	$674,720	$3,900.12
24-4-01	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,465	$35.58	267	acres	$355.49	$520,793	$1,950.54
24-4-05	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	4,169	$35.58	760	acres	$355.49	$1,482,038	$1,950.05
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,429	$35.58	1,168,195	cy	$355.49	$507,995	$0.43
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	1,643	$35.58	1,363,556	cy	$355.49	$584,070	$0.43
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	368	$35.58	381,333	cy	$355.49	$130,820	$0.34
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,629	$35.58	1,404,922	cy	$355.49	$579,093	$0.41
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$319.91	2,754	$35.58	251	acres	$355.49	$979,019	$3,900.48
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	8,040	$35.58	5,768,406	cy	$355.49	$2,858,140	$0.50
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	4,081	$35.58	2,928,200	cy	$355.49	$1,450,755	$0.50
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	597	$35.58	294,408	cy	$355.49	$212,228	$0.72
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	220	$35.58	358,841	cy	$355.49	$78,208	$0.22
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	7,809	$35.58	712	acres	$355.49	$2,776,021	$3,898.91
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	99	$35.58	9	acres	$355.49	$35,194	$3,910
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,569	$35.58	286	acres	$355.49	$557,764	$1,950.22
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$319.91	5	$35.58	4,033	cy	$355.49	$1,777	$0.44
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	714	$35.58	422,795	cy	$355.49	$253,820	$0.60
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	80	$35.58	184,126	cy	$355.49	$28,439	$0.15
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,504	$35.58	228	acres	$355.49	$890,147	$3,904.15
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	983	$35.58	484,758	cy	$355.49	$349,447	$0.72
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	724	$35.58	714,107	cy	$355.49	$257,375	$0.36
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	12,141	$35.58	1,107	acres	$355.49	$4,316,004	$3,898.83
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	336	$35.58	271,040	cy	$355.49	$119,445	$0.44
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	497	$35.58	356,460	cy	$355.49	$176,679	$0.50
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	674	$35.58	483,867	cy	$355.49	$239,600	$0.50
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	3,539	$35.58	323	acres	$355.49	$1,258,079	$3,894.98
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$319.91	110	$35.58	20	acres	$355.49	$39,104	$1,914.89
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	6,062	$35.58	5,032,444	cy	$355.49	$2,154,980	$0.43
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,264	$35.58	899,769	cy	$355.49	$449,339	$0.50
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	905	$35.58	780,239	cy	$355.49	$321,718	$0.41
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$319.91	2,984	$35.58	272	acres	$355.49	$1,060,782	$3,899.93
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,695	$35.58	309	acres	$355.49	$602,556	$1,950.02
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,304	$35.58	420	acres	$355.49	$819,049	$1,950.12
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$319.91	543	$35.58	99	acres	$355.49	$193,031	$1,949.81
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$319.91	104	$35.58	19	acres	$355.49	$36,971	$1,945.84
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$319.91	252	$35.58	46	acres	$355.49	$89,583	$1,947.47
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$319.91	93	$35.58	17	acres	$355.49	$33,061	$1,944.74
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	918	$35.58	990,000	cy	$355.49	$326,340	$0.33
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,914	$35.58	2,418,696	cy	$355.49	$1,035,898	$0.43
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,130	$35.58	804,059	cy	$355.49	$401,704	$0.50
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,961	$35.58	1,691,338	cy	$355.49	$697,116	$0.41
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$319.91	5,299	$35.58	483	acres	$355.49	$1,883,742	$3,900.09
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	499	$35.58	-		$355.49	$177,034	$177,034
				D11R Dozer Subtotal		155,935					$55,784,557	

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Table 24-1-5
KAY[illegible] MINE
Direct Cos[illegible]ment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	143	$35.58	201	acres	$379.92	$54,329	$270.29
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	73	$35.58	498,520	cy	$379.92	$27,734	$0.06
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	285	$35.58	400	acres	$379.92	$108,277	$270.69
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	1,053	$35.58	7,148,680	cy	$379.92	$400,056	$0.06
24-4-02	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	190	$35.58	267	acres	$379.92	$72,185	$270.36
24-4-06	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	542	$35.58	3,678,400	cy	$379.92	$205,917	$0.06
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	10,266	cy	$379.92	$5,167	$0.50
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	863	$35.58	2,928,200	cy	$379.92	$327,871	$0.11
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	317	$35.58	1,076,522	cy	$379.92	$120,435	$0.11
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	204	$35.58	286	acres	$379.92	$77,504	$270.99
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	4	$35.58	12,100	cy	$379.92	$1,520	$0.13
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	163	$35.58	552,378	cy	$379.92	$61,927	$0.11
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	631	$35.58	2,142,320	cy	$379.92	$239,730	$0.11
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	80	$35.58	271,040	cy	$379.92	$30,394	$0.11
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	20	acres	$379.92	$5,319	$260.46
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	220	$35.58	309	acres	$379.92	$83,582	$270.49
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	299	$35.58	2,032,800	cy	$379.92	$113,596	$0.06
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	71	$35.58	99	acres	$379.92	$26,974	$272.47
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	91,960	cy	$379.92	$5,319	$0.06
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	33	$35.58	46	acres	$379.92	$12,537	$272.55
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	12	$35.58	17	acres	$379.92	$4,559	$268.18
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
				D11R Dozer - Ripper Equipped Subtotal		5,427					$2,061,674	
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	76	$33.47	58,580	lineal feet	$113.90	$8,656	$0.15
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	16	$33.47	9,600	lineal feet	$113.90	$1,822	$0.19
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	215	$33.47	166,170	lineal feet	$113.90	$24,489	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	29	$33.47	16,900	lineal feet	$113.90	$3,303	$0.20
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	104	$33.47	80,730	lineal feet	$113.90	$11,846	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	22	$33.47	12,670	lineal feet	$113.90	$2,506	$0.20
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	201	$33.47	155,620	lineal feet	$113.90	$22,894	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	21	$33.47	12,200	lineal feet	$113.90	$2,392	$0.20
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	40	$33.47	-	-	$113.90	$4,556	$4,556
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,135	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,164	$0.19
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,135	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,164	$0.19
				D7R Dozer Subtotal		1,098					$125,062	
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	932	-	-	-	-	$1,292,462	$1,386.76
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	4,834	-	-	-	-	$6,706,370	$1,387.33
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	648	-	-	-	-	$898,075	$1,385.92
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	16	$33.47	-	-	$395.84	$6,333	$6,333
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	1,004	-	-	-	-	$1,393,914	$1,388.36
				Atlas Copco Pit Viper 271 Subtotal		7,434					$10,297,154	
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	206	$35.58	-	-	$217.19	$44,741	$44,741
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	768	$35.58	54,840	cy	$217.19	$166,802	$3.04
				9225 American Dragline Subtotal		974					$211,543	
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	4,800	-	-	-	$2.04	$9,792	$9,792
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	4,800	-	-	-	$1.36	$6,528	$6,528
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	7,200	$24.37	-	-	$87.69	$631,368	$631,368
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	15,000	$25.23	-	-	$197.83	$2,967,450	$2,611,356
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	64,800	-	-	-	$7.97	$516,456	$516,456
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	7,200	-	-	-	$23.50	$169,200	$169,200
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	44,000	$24.37	-	-	$36.79	$1,618,760	$1,545,180
				Support Equipment Subtotal		169,400					$7,335,866	

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TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$860,689	$2,064.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$21,672	$2,064.00
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$207,432	$1,032.00
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$106,296	$1,032.00
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,687	acres	-	$5,545,969	$2,064.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	158	acres	-	$326,112	$2,064.00
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	400	acres	-	$412,800	$1,032.00
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,477	acres	-	$1,524,264	$1,032.00
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	428	acres	-	$883,392	$2,064.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	154	acres	-	$317,856	$2,064.00
24-4-03	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	267	acres	-	$275,544	$1,032.00
24-4-07	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	760	acres	-	$784,320	$1,032.00
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	542	acres	-	$1,118,688	$2,064.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	12	acres	-	$24,768	$2,064.00
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,524,852	$2,524,852
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$92,394	$92,394
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	1,005	acres	-	$2,074,321	$2,064.00
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$26,126	$3.75
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	712	acres	-	$1,469,052	$2,063.28
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	90,610	feet	-	$5,501,679	$60.72
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$23,102	$23,102
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	9	acres	-	$18,577	$2,064
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	286	acres	-	$295,153	$1,032.00
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	2.5	acres	-	$5,160	$2,064.00
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$37,200	$37,200
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	228	acres	-	$471,119	$2,066.31
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	175,699	feet	-	$232,950	$1.33
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,460	feet	-	$26,504	$2.31
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,107	acres	-	$2,283,961	$2,063.20
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	56	acres	-	$115,584	$2,064.00
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	323	acres	-	$665,764	$2,061.19
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$20,640	$1,010.72
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	522	acres	-	$1,077,408	$2,064.00
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	47	acres	-	$97,009	$2,064.02
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	309	acres	-	$318,888	$1,032.00
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	420	acres	-	$433,440	$1,032.00
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	99	acres	-	$102,168	$1,032.00
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	19	acres	-	$4,907	$258.26
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	46	acres	-	$47,473	$1,032.02
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	17	acres	-	$17,544	$1,032.00
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	944	acres	-	$1,948,416	$2,064.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	45	acres	-	$92,881	$2,064.02
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
				Miscellaneous Subtotal							$33,525,098	
				Kayenta Mine Total Joint								
				TOTAL		506,924	hours				$154,527,028	

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JOINT MINES
Direct Costs by Equipment Type

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-06	Joint - (KM)	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,935	$35.58	437,491	cy	$286.22	$553,836	$1.27
				637G P-P Scraper Subtotal		1,935					$553,836	
				769D Rear Dump Truck Subtotal		0					$0	
				988H Loader Subtotal		0					$0	
24-5-03	Joint - (KM)	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	2,849	$35.58	2,044,512	cy	$355.49	$1,012,791	$0.50
24-5-05	Joint - (KM)	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,437	$35.58	1,030,920	cy	$355.49	$510,839	$0.50
				D11R Dozer Subtotal		4,286					$1,523,630	
24-5-02	Joint - (KM)	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	3	$35.58	2,022	cy	$383.27	$978	$0.48
24-5-04	Joint - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	304	$35.58	1,030,920	cy	$379.92	$115,496	$0.11
24-5-19	Joint: J-3 Airport - (KM)	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	20,246	cy	$379.92	$10,258	$0.51
24-5-20	Joint: J-3 Airport - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	90,656	cy	$379.92	$10,148	$0.11
				D11R Dozer - Ripper Equipped Subtotal		360					$136,880	
				D7R Dozer Subtotal		0					$0	
				Atlas Copco Pit Viper 271		0					$0	
				9225 American Dragline		0					$0	
SUPPORT EQUIPMENT TOTAL						0					$0	
24-5-01	Joint - (KM)	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$401,566	$401,566
24-5-02	Joint - (KM)	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$18,198	$18,198
24-5-07	Joint - (KM)	Revegetation	Revegetation	Miscellaneous	-	-	-	354	acres	-	$730,656	$2,064.00
				Miscellaneous Subtotal							$1,150,420	
				TOTAL		6,581	hours				$3,364,766	

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Table 24-1-7
WORKSHEET MASTER SUMMARY

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COS	EQUIPMENT HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-02	J-16	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	932	-	-	-	-	$1,292,462	$1,386.53
24-3-03	J-16	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,282	$35.58	1,048,055	cy	$355.49	$455,738	$0.43
24-3-04	J-16	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,868	$35.58	2,381,296	cy	$355.49	$1,019,545	$0.43
24-3-05	J-16	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	477	$35.58	493,370	cy	$355.49	$169,569	$0.34
24-3-06	J-16	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	824	$35.58	711,000	cy	$355.49	$293,047	$0.41
24-3-07	J-16	General Grading	General Grading	D11R Dozer	$319.91	2,523	$35.58	230	acres	$355.49	$897,054	$3,900.23
24-3-08	J-16	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	76	$33.47	58,580	lineal feet	$113.90	$8,633	$0.15
24-3-09	J-16	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	16	$33.47	9,600	lineal feet	$113.90	$1,874	$0.20
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	21,133	cy	$146.47	$16,714	$0.79
24-3-10	J-16	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	105	$35.58	4,800	feet	$184.51	$19,374	$4.04
24-3-11	J-16	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,191	$35.58	645,850	cy	$286.22	$627,108	$0.97
24-3-12	J-16	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,556	$35.58	1,076,416	cy	$286.22	$1,590,238	$1.48
24-3-13	J-16	Revegetation	Revegetation	Miscellaneous	-	-	-	417	acres	-	$860,689	$2,064.00
24-3-14	J-16	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	11	acres	-	$21,672	$2,064.00
24-3-02	J-19	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	4,834	-	-	-	-	$6,706,370	$1,387.33
24-3-03	J-19	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	12,120	$35.58	9,908,646	cy	$355.49	$4,308,539	$0.43
24-3-04	J-19	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	11,330	$35.58	11,116,111	cy	$355.49	$4,027,702	$0.36
24-3-05	J-19	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	2,672	$35.58	2,247,000	cy	$355.49	$949,869	$0.42
24-3-06	J-19	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	5,428	$35.58	4,681,434	cy	$355.49	$1,929,600	$0.41
24-3-07	J-19	General Grading	General Grading	D11R Dozer	$319.91	8,349	$35.58	761	acres	$355.49	$2,967,986	$3,900.11
24-3-08	J-19	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	215	$33.47	166,170	lineal feet	$113.90	$24,487	$0.15
24-3-09	J-19	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	29	$33.47	16,900	lineal feet	$113.90	$3,300	$0.20
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	185	$35.58	8,450	feet	$184.51	$34,134	$4.04
24-3-10	J-19	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	367	$27.43	52,767	cy	$146.47	$53,754	$1.02
24-3-11	J-19	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	14,115	$35.58	4,161,626	cy	$286.22	$4,039,995	$0.97
24-3-12	J-19	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	31,708	$35.58	6,936,043	cy	$286.22	$9,075,464	$1.31
24-3-13	J-19	Revegetation	Revegetation	Miscellaneous	-	-	-	2,687	acres	-	$5,545,969	$2,064.00
24-3-14	J-19	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	158	acres	-	$326,112	$2,064.00
24-3-04	J-21 Double Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	4,456	$35.58	3,603,111	cy	$355.49	$1,584,063	$0.44
24-3-05	J-21 Double Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	724	$35.58	644,213	cy	$355.49	$257,375	$0.40
24-3-06	J-21 Double Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,357	$35.58	1,170,359	cy	$355.49	$482,400	$0.41
24-3-07	J-21 Double Width	General Grading	General Grading	D11R Dozer	$319.91	1,898	$35.58	173	acres	$355.49	$674,720	$3,900.12
24-3-08	J-21 Double Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	104	$33.47	80,730	lineal feet	$113.90	$11,846	$0.15
24-3-09	J-21 Double Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	22	$33.47	12,670	lineal feet	$113.90	$2,506	$0.20
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	114	$27.43	26,650	cy	$146.47	$16,698	$0.63
24-3-10	J-21 Double Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	139	$35.58	6,335	feet	$184.51	$25,647	$4.05
24-3-11	J-21 Double Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,542	$35.58	662,886	cy	$286.22	$727,571	$1.10
24-3-12	J-21 Double Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,191	$35.58	1,104,811	cy	$286.22	$1,771,988	$1.60
24-3-13	J-21 Double Width	Revegetation	Revegetation	Miscellaneous	-	-	-	428	acres	-	$883,392	$2,064.00
24-3-14	J-21 Double Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	154	acres	-	$317,856	$2,064.00
24-3-02	J-21 Single Width	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	648	-	-	-	-	$898,075	$1,385.92
24-3-03	J-21 Single Width	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	1,429	$35.58	1,168,195	cy	$355.49	$507,995	$0.43
24-3-04	J-21 Single Width	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	1,643	$35.58	1,363,556	cy	$355.49	$584,070	$0.43
24-3-05	J-21 Single Width	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	368	$35.58	381,333	cy	$355.49	$130,820	$0.34
24-3-06	J-21 Single Width	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,629	$35.58	1,404,922	cy	$355.49	$579,093	$0.41
24-3-07	J-21 Single Width	General Grading	General Grading	D11R Dozer	$319.91	2,754	$35.58	251	acres	$355.49	$979,019	$3,900.48
24-3-08	J-21 Single Width	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	201	$33.47	155,620	lineal feet	$113.90	$22,933	$0.15
24-3-09	J-21 Single Width	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	21	$33.47	12,200	lineal feet	$113.90	$2,392	$0.20
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	134	$35.58	6,100	feet	$184.51	$24,724	$4.05
24-3-10	J-21 Single Width	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	210	$27.43	24,267	cy	$146.47	$30,759	$1.27
24-3-11	J-21 Single Width	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,847	$35.58	839,450	cy	$286.22	$814,868	$0.97
24-3-12	J-21 Single Width	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	6,396	$35.58	1,399,083	cy	$286.22	$1,830,663	$1.31
24-3-13	J-21 Single Width	Revegetation	Revegetation	Miscellaneous	-	-	-	542	acres	-	$1,118,688	$2,064.00
24-3-14	J-21 Single Width	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	12	acres	-	$24,768	$2,064.00
24-3-04	N-11	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	6,062	$35.58	5,032,444	cy	$355.49	$2,154,980	$0.43
24-3-05	N-11	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,264	$35.58	899,769	cy	$355.49	$449,339	$0.50
24-3-06	N-11	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	905	$35.58	780,239	cy	$355.49	$321,718	$0.41
24-3-07	N-11	General Grading	General Grading	D11R Dozer	$319.91	2,984	$35.58	272	acres	$355.49	$1,060,782	$3,899.93
24-3-08	N-11	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,146	$0.15
24-3-09	N-11	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,206	$0.20
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,341	$0.63
24-3-10	N-11	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-11	N-11	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	2,861	$35.58	808,474	cy	$286.22	$818,875	$1.01
24-3-12	N-11	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	8,544	$35.58	1,347,456	cy	$286.22	$2,445,464	$1.81
24-3-13	N-11	Revegetation	Revegetation	Miscellaneous	-	-	-	522	acres	-	$1,077,408	$2,064.00

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT INIT COS	EQUIPMENT HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-3-14	N-11	Revegetation	Revegetation of Topsoil Stockpile	Miscellaneous	-	-	-	47	acres	-	$97,009	$2,064.02
24-3-04	N-6	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	5,866	$35.58	4,870,067	cy	$355.49	$2,085,304	$0.43
24-3-05	N-6	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	743	$35.58	528,444	cy	$355.49	$264,129	$0.50
24-3-06	N-6	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	2,640	$35.58	2,277,133	cy	$355.49	$938,494	$0.41
24-3-07	N-6	General Grading	General Grading	D11R Dozer	$319.91	3,544	$35.58	323	acres	$355.49	$1,259,857	$3,900.48
24-3-08	N-6	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	239	$33.47	185,020	lineal feet	$113.90	$27,222	$0.15
24-3-09	N-6	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	25	$33.47	14,400	lineal feet	$113.90	$2,848	$0.20
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	199	$27.43	29,800	cy	$146.47	$29,148	$0.98
24-3-10	N-6	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	158	$35.58	7,200	feet	$184.51	$29,153	$4.05
24-3-12	N-6	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	5,637	$35.58	888,947	cy	$286.22	$1,613,422	$1.81
24-3-13	N-6	Revegetation	Revegetation	Miscellaneous	-	-	-	551	acres	-	$818,373	$1,485.25
24-3-14	N-6	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	58	acres	-	$86,145	$1,485.26
24-3-02	N-9	Highwall Reduction	Cast/Blast Highwall	Atlas Copco Pit Viper 271	$362.37	1,004	-	-	-	-	$1,393,914	$1,388.36
24-3-03	N-9	Backfill Mine Pits	Doze Highwall	D11R Dozer	$319.91	918	$35.58	990,000	cy	$355.49	$326,340	$0.33
24-3-04	N-9	Backfill Mine Pits	Doze First Two Spoils	D11R Dozer	$319.91	2,914	$35.58	2,418,696	cy	$355.49	$1,035,898	$0.43
24-3-05	N-9	Backfill Mine Pits	Doze Back Two Spoils	D11R Dozer	$319.91	1,130	$35.58	804,059	cy	$355.49	$401,704	$0.50
24-3-06	N-9	Backfill and Grade Ramps	Backfill/Grade Ramps	D11R Dozer	$319.91	1,961	$35.58	1,691,338	cy	$355.49	$697,116	$0.41
24-3-07	N-9	General Grading	General Grading	D11R Dozer	$319.91	5,299	$35.58	483	acres	$355.49	$1,883,742	$3,900.09
24-3-08	N-9	Surface Stabilization	Grade Terraces	D7R Dozer	$80.43	168	$33.47	129,920	lineal feet	$113.90	$19,135	$0.15
24-3-09	N-9	Surface Stabilization	Grade Drainages/Downdrains	D7R Dozer	$80.43	19	$33.47	11,300	lineal feet	$113.90	$2,164	$0.19
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	769D Rear Dump Truck	$119.04	105	$27.43	24,467	cy	$146.47	$15,379	$0.63
24-3-10	N-9	Surface Stabilization	Load, haul, and place riprap	988H Loader	$148.93	124	$35.58	5,650	feet	$184.51	$22,879	$4.05
24-3-11	N-9	Topsoil/Suitable Material Replacement	Suitable Material Placement	637G P-P Scraper	$250.64	5,606	$35.58	1,462,067	cy	$286.22	$1,604,549	$1.10
24-3-12	N-9	Topsoil/Suitable Material Replacement	Topsoil Replacement	637G P-P Scraper	$250.64	14,194	$35.58	2,436,779	cy	$286.22	$4,062,607	$1.67
24-3-13	N-9	Revegetation	Revegetation	Miscellaneous	-	-	-	944	acres	-	$1,948,416	$2,064.00
24-3-14	N-9	Revegetation	Revegetation of Topsoil Stockpiles	Miscellaneous	-	-	-	45	acres	-	$92,881	$2,064.02
24-4-01	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,103	$35.58	201	acres	$355.49	$392,105	$1,950.77
24-4-02	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	143	$35.58	201	acres	$379.92	$54,329	$270.29
24-4-03	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	201	acres	-	$207,432	$1,032.00
24-4-05	J-16	General Grading at 50%	General Grading	D11R Dozer	$319.91	565	$35.58	103	acres	$355.49	$200,852	$1,941.22
24-4-06	J-16	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	73	$35.58	498,520	cy	$379.92	$27,734	$0.06
24-4-07	J-16	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	103	acres	-	$106,296	$1,032.00
24-4-01	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,194	$35.58	400	acres	$355.49	$779,945	$1,949.86
24-4-02	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	285	$35.58	400	acres	$379.92	$108,277	$270.69
24-4-03	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	400	acres	-	$412,800	$1,032.00
24-4-05	J-19	General Grading at 50%	General Grading	D11R Dozer	$319.91	8,102	$35.58	1,477	acres	$355.49	$2,880,180	$1,950.02
24-4-06	J-19	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	1,053	$35.58	7,148,680	cy	$379.92	$400,056	$0.06
24-4-07	J-19	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	1,477	acres	-	$1,524,264	$1,032.00
24-4-01	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,465	$35.58	267	acres	$355.49	$520,793	$1,950.54
24-4-02	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	190	$35.58	267	acres	$379.92	$72,185	$270.36
24-4-03	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	267	acres	-	$275,544	$1,032.00
24-4-05	J-21 Double Width	General Grading at 50%	General Grading	D11R Dozer	$319.91	4,169	$35.58	760	acres	$355.49	$1,482,038	$1,950.05
24-4-06	J-21 Double Width	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	542	$35.58	3,678,400	cy	$379.92	$205,917	$0.06
24-4-07	J-21 Double Width	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	760	acres	-	$784,320	$1,032.00
24-4-01	Kayenta Facilities	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,569	$35.58	286	acres	$355.49	$557,764	$1,950.22
24-4-02	Kayenta Facilities	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	204	$35.58	286	acres	$379.92	$77,504	$270.99
24-4-03	Kayenta Facilities	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	286	acres	-	$295,153	$1,032.00
24-4-01	N-1	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-02	N-1	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-03	N-1	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
24-4-01	N-10	General Grading at 50%	General Grading	D11R Dozer	$319.91	110	$35.58	20	acres	$355.49	$39,104	$1,914.89
24-4-02	N-10	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	20	acres	$379.92	$5,319	$260.46
24-4-03	N-10	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	20	acres	-	$20,640	$1,010.72
24-4-01	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	1,695	$35.58	309	acres	$355.49	$602,556	$1,950.02
24-4-02	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	220	$35.58	309	acres	$379.92	$83,582	$270.49
24-4-03	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	309	acres	-	$318,888	$1,032.00
24-4-05	N-11	General Grading at 50%	General Grading	D11R Dozer	$319.91	2,304	$35.58	420	acres	$355.49	$819,049	$1,950.12
24-4-06	N-11	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	299	$35.58	2,032,800	cy	$379.92	$113,596	$0.06
24-4-07	N-11	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	420	acres	-	$433,440	$1,032.00
24-4-01	N-14	General Grading at 50%	General Grading	D11R Dozer	$319.91	543	$35.58	99	acres	$355.49	$193,031	$1,949.81
24-4-02	N-14	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	71	$35.58	99	acres	$379.92	$26,974	$272.47
24-4-03	N-14	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	99	acres	-	$102,168	$1,032.00
24-4-05	N-14E	General Grading at 50%	General Grading	D11R Dozer	$319.91	104	$35.58	19	acres	$355.49	$36,971	$1,945.84
24-4-06	N-14E	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	14	$35.58	91,960	cy	$379.92	$5,319	$0.06
24-4-07	N-14E	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	19	acres	-	$4,907	$258.26

Table 24-1-7
WORKSHEET MASTER SUMMARY

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT NIT COS	EQUIPMENT HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-4-01	N-2	General Grading at 50%	General Grading	D11R Dozer	$319.91	252	$35.58	46	acres	$355.49	$89,583	$1,947.47
24-4-02	N-2	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	33	$35.58	46	acres	$379.92	$12,537	$272.55
24-4-03	N-2	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	46	acres	-	$47,473	$1,032.02
24-4-01	N-7/8	General Grading at 50%	General Grading	D11R Dozer	$319.91	93	$35.58	17	acres	$355.49	$33,061	$1,944.74
24-4-02	N-7/8	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	12	$35.58	17	acres	$379.92	$4,559	$268.18
24-4-03	N-7/8	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	17	acres	-	$17,544	$1,032.00
24-4-01	N-9	General Grading at 50%	General Grading	D11R Dozer	$319.91	773	$35.58	141	acres	$355.49	$274,794	$1,948.89
24-4-02	N-9	Surface Ripping at 50%	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	101	$35.58	141	acres	$379.92	$38,372	$272.14
24-4-03	N-9	Revegetation at 50%	Revegetation	Miscellaneous	-	-	-	141	acres	-	$145,512	$1,032.00
24-5-01	Black Mesa	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$1,867,603	$1,867,603
24-5-02	Black Mesa	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	7	$35.58	5,410	cy	$383.27	$2,760	$0.51
24-5-02	Black Mesa	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$48,690	$48,690
24-5-03	Black Mesa	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	3,457	$35.58	2,480,112	cy	$355.49	$1,228,929	$0.50
24-5-04	Black Mesa	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	372	$35.58	1,263,240	cy	$379.92	$141,330	$0.11
24-5-05	Black Mesa	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,761	$35.58	1,263,240	cy	$355.49	$626,018	$0.50
24-5-06	Black Mesa	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,423	$35.58	547,601	cy	$286.22	$693,511	$1.27
24-5-07	Black Mesa	Revegetation	Revegetation	Miscellaneous	-	-	-	433	acres	-	$643,114	$1,485.25
24-5-08	Black Mesa Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	2,800	feet	-	$170,011	$60.72
24-5-09	Black Mesa Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	107,574	feet	-	$142,626	$1.33
24-5-10	Black Mesa Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	105	$35.58	355,014	cy	$379.92	$39,741	$0.11
24-5-11	Black Mesa Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	528	$35.58	355,014	cy	$355.49	$187,620	$0.53
24-5-12	Black Mesa Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	949	$35.58	189,341	cy	$286.22	$271,623	$1.43
24-5-13	Black Mesa Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	73	acres	-	$108,943	$1,485.25
24-5-21	Black Mesa Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	54	$35.58	88,691	cy	$355.49	$19,196	$0.22
24-5-22	Black Mesa Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	78	$35.58	266,072	cy	$379.92	$29,634	$0.11
24-5-23	Black Mesa Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	1,206	$35.58	110	acres	$355.49	$428,721	$3,897.46
24-5-24	Black Mesa Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,176	$35.58	283,810	cy	$286.22	$622,815	$2.19
24-5-25	Black Mesa Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	110	acres	-	$163,299	$1,484.54
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	5,040	feet	-	$17,669	$3.51
24-5-26	Black Mesa Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	432	$35.58	213,080	cy	$355.49	$153,588	$0.72
24-5-27	Black Mesa Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	138	$35.58	172,966	cy	$355.49	$49,058	$0.28
24-5-28	Black Mesa Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	153	$35.58	518,898	cy	$379.92	$58,128	$0.11
24-5-29	Black Mesa Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,941	$35.58	268	acres	$355.49	$1,045,496	$3,901.10
24-5-30	Black Mesa Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,203	$35.58	691,864	cy	$286.22	$1,489,203	$2.15
24-5-31	Black Mesa Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	268	acres	-	$398,085	$1,485.39
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	4,640	feet	-	$17,418	$3.75
24-5-32	Black Mesa Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	398	$35.58	196,272	cy	$355.49	$141,485	$0.72
24-5-33	Black Mesa Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	97	$35.58	174,065	cy	$355.49	$34,483	$0.20
24-5-34	Black Mesa Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	154	$35.58	522,194	cy	$379.92	$58,508	$0.11
24-5-35	Black Mesa Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	3,788	$35.58	345	acres	$355.49	$1,346,596	$3,903.18
24-5-36	Black Mesa Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	6,308	$35.58	891,212	cy	$286.22	$1,805,476	$2.03
24-5-37	Black Mesa Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	345	acres	-	$512,787	$1,486.34
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	512	$35.58	36,560	cy	$217.19	$111,201	$3.04
24-5-38	Black Mesa Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	331	$35.58	237,640	cy	$355.49	$117,667	$0.50
24-5-39	Black Mesa Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	450	$35.58	322,578	cy	$355.49	$159,971	$0.50
24-5-40	Black Mesa Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	2,359	$35.58	215	acres	$355.49	$838,601	$3,900.47
24-5-41	Black Mesa Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,883	$35.58	555,090	cy	$286.22	$538,952	$0.97
24-5-42	Black Mesa Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	215	acres	-	$319,388	$1,485.53
24-5-43	Black Mesa Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Site Reclamation	Concrete Removal/Disposal	-	-	-	-	-	-	$15,402	$15,402
24-5-44	Black Mesa Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	6	acres	-	$8,912	$1,485
24-5-44	Black Mesa Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	66	$35.58	6	acres	$355.49	$23,462	$3,910
24-5-45	Black Mesa Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$24,800	$38,000
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	3,200	-	-	-	$1.36	$4,352	$4,352
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	3,200	-	-	-	$2.04	$6,528	$6,528
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	4,800	-	-	-	$23.50	$112,800	$112,800
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	4,800	$24.37	-	-	$65.57	$314,736	$314,736
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	43,200	-	-	-	$7.97	$344,304	$344,304
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	4,800	$24.37	-	-	$87.69	$420,912	$420,912
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	28,000	$24.37	-	-	$36.79	$1,030,120	$1,030,120
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	9,600	$35.58	-	-	$147.89	$1,419,744	$1,419,744
24-5-48	Black Mesa	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	8,800	$25.23	-	-	$197.83	$1,740,904	$1,740,904
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	4	$35.58	-	-	$147.89	$592	$592
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	8	$33.47	-	-	$113.90	$911	$911

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT NIT COS	EQUIPMENT HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	0	$33.47	-	-	$395.84	$0	$0
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	8	$35.58	-	-	$184.51	$1,431	$1,476
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	12	$27.43	-	-	$146.47	$1,758	$1,758
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	136	$35.58	-	-	$217.19	$29,538	$29,538
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	48	$35.58	-	-	$286.22	$13,739	$13,739
24-5-49	Black Mesa	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	44	$35.58	-	-	$355.49	$15,642	$15,642
24-5-50	Black Mesa Draglines	Dragline Removal	Disassemble and Remove Draglines	Miscellaneous	-	-	-	-	-	-	$200,000	N/A
24-5-01	Joint - (KM)	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$401,566	$401,566
24-5-02	Joint - (KM)	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	3	$35.58	2,022	cy	$383.27	$978	$0.48
24-5-02	Joint - (KM)	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$18,198	$18,198
24-5-03	Joint - (KM)	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	2,849	$35.58	2,044,512	cy	$355.49	$1,012,791	$0.50
24-5-04	Joint - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	304	$35.58	1,030,920	cy	$379.92	$115,496	$0.11
24-5-05	Joint - (KM)	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	1,437	$35.58	1,030,920	cy	$355.49	$510,839	$0.50
24-5-06	Joint - (KM)	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	1,935	$35.58	437,491	cy	$286.22	$553,836	$1.27
24-5-07	Joint - (KM)	Revegetation	Revegetation	Miscellaneous	-	-	-	354	acres	-	$730,656	$2,064.00
24-5-19	Joint: J-3 Airport - (KM)	Asphalt Removal	Asphalt Removal/Disposal	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	20,246	cy	$379.92	$10,258	$0.51
24-5-20	Joint: J-3 Airport - (KM)	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	27	$35.58	90,656	cy	$379.92	$10,148	$0.11
24-5-01	Kayenta	Facilities Demolition	Demolish Facilities	Miscellaneous	-	-	-	-	ls	-	$2,524,852	$2,524,852
24-5-02	Kayenta	Concrete Removal	Concrete Removal	D11R Dozer - Ripper Equipped	$347.69	14	$35.58	10,266	cy	$383.27	$5,212	$0.51
24-5-02	Kayenta	Concrete Removal	Concrete Disposal	Miscellaneous	-	-	-	-	-	-	$92,394	$92,394
24-5-03	Kayenta	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	8,040	$35.58	5,768,406	cy	$355.49	$2,858,140	$0.50
24-5-04	Kayenta	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	863	$35.58	2,928,200	cy	$379.92	$327,871	$0.11
24-5-05	Kayenta	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	4,081	$35.58	2,928,200	cy	$355.49	$1,450,755	$0.50
24-5-06	Kayenta	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	5,576	$35.58	1,260,413	cy	$286.22	$1,595,963	$1.27
24-5-07	Kayenta	Revegetation	Revegetation	Miscellaneous	-	-	-	1,005	acres	-	$2,074,321	$2,064.00
24-5-08	Kayenta Conveyors	Conveyor Demolition	Demolish Conveyor	Miscellaneous	-	-	-	90,610	feet	-	$5,501,679	$60.72
24-5-09	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	175,699	feet	-	$232,950	$1.33
24-5-10	Kayenta Scoria Pits	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	80	$35.58	271,040	cy	$379.92	$30,394	$0.11
24-5-11	Kayenta Scoria Pits	Grade Scoria Pit Area	Scoria Pit Grading	D11R Dozer	$319.91	336	$35.58	271,040	cy	$355.49	$119,445	$0.44
24-5-12	Kayenta Scoria Pits	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	725	$35.58	144,554	cy	$286.22	$207,510	$1.44
24-5-13	Kayenta Scoria Pits	Revegetation	Revegetation	Miscellaneous	-	-	-	56	acres	-	$115,584	$2,064.00
24-5-14	Kayenta Landfarm Areas	Landfarm Removal	Haul Landfarm Material	637G P-P Scraper	$250.64	54	$35.58	5,000	cy	$286.22	$15,456	$3.09
24-5-15	Kayenta Landfarm Areas	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	4	$35.58	12,100	cy	$379.92	$1,520	$0.13
24-5-16	Kayenta Landfarm Areas	Grade Landfarm Area	Landfarm Grading	D11R Dozer	$319.91	5	$35.58	4,033	cy	$355.49	$1,777	$0.44
24-5-17	Kayenta Landfarm Areas	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	37	$35.58	6,050	cy	$286.22	$10,590	$1.75
24-5-18	Kayenta Landfarm Areas	Revegetation	Revegetation	Miscellaneous	-	-	-	2.5	acres	-	$5,160	$2,064.00
24-5-21	Kayenta Permanent Roads	Dozing to Narrow Road	Doze Roads	D11R Dozer	$319.91	80	$35.58	184,126	cy	$355.49	$28,439	$0.15
24-5-22	Kayenta Permanent Roads	Surface Ripping to Narrow Road	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	163	$35.58	552,378	cy	$379.92	$61,927	$0.11
24-5-23	Kayenta Permanent Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	2,504	$35.58	228	acres	$355.49	$890,147	$3,904.15
24-5-24	Kayenta Permanent Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	4,518	$35.58	589,203	cy	$286.22	$1,293,142	$2.19
24-5-25	Kayenta Permanent Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	228	acres	-	$471,119	$2,066.31
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	11,460	feet	-	$26,504	$2.31
24-5-26	Kayenta Primary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	983	$35.58	484,758	cy	$355.49	$349,447	$0.72
24-5-27	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	724	$35.58	714,107	cy	$355.49	$257,375	$0.36
24-5-28	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	631	$35.58	2,142,320	cy	$379.92	$239,730	$0.11
24-5-29	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	12,141	$35.58	1,107	acres	$355.49	$4,316,004	$3,898.83
24-5-30	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	16,217	$35.58	2,856,427	cy	$286.22	$4,641,630	$1.62
24-5-31	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	1,107	acres	-	$2,283,961	$2,063.20
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	Miscellaneous	-	-	-	6,960	feet	-	$26,126	$3.75
24-5-32	Kayenta Ancillary Roads	Culvert Removal	Culvert Removal/Disposal	D11R Dozer	$319.91	597	$35.58	294,408	cy	$355.49	$212,228	$0.72
24-5-33	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	220	$35.58	358,841	cy	$355.49	$78,208	$0.22
24-5-34	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	317	$35.58	1,076,522	cy	$379.92	$120,435	$0.11
24-5-35	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	7,809	$35.58	712	acres	$355.49	$2,776,021	$3,898.91
24-5-36	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	13,818	$35.58	1,837,265	cy	$286.22	$3,954,988	$2.15
24-5-37	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	712	acres	-	$1,469,052	$2,063.28
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	9225 American Dragline	$181.61	768	$35.58	54,840	cy	$217.19	$166,802	$3.04
24-5-38	Kayenta Water Storage and Sedimentation Ponds	Clean Out Sediment	Sediment Removal	D11R Dozer	$319.91	497	$35.58	356,460	cy	$355.49	$176,679	$0.50
24-5-39	Kayenta Water Storage and Sedimentation Ponds	Embankment Removal	Grade Embankment into Basin	D11R Dozer	$319.91	674	$35.58	483,867	cy	$355.49	$239,600	$0.50
24-5-40	Kayenta Water Storage and Sedimentation Ponds	Grade Pond Areas	Grading	D11R Dozer	$319.91	3,539	$35.58	323	acres	$355.49	$1,258,079	$3,894.98
24-5-41	Kayenta Water Storage and Sedimentation Ponds	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	2,824	$35.58	832,635	cy	$286.22	$808,285	$0.97
24-5-42	Kayenta Water Storage and Sedimentation Ponds	Revegetation	Revegetation	Miscellaneous	-	-	-	323	acres	-	$665,764	$2,061.19
24-5-43	Kayenta Environmental Monitoring Sites	Off Permit Environmental Monitoring Sites	Concrete Removal/Disposal	Miscellaneous	-	-	-	-	-	-	$23,102	$23,102
24-5-44	Kayenta Environmental Monitoring Sites	Revegetation	Site Reclamation	Miscellaneous	-	-	-	9	acres	-	$18,577	$2,064
24-5-44	Kayenta Environmental Monitoring Sites	Grade Reclaimed Area	Site Reclamation	D11R Dozer	$319.91	99	$35.58	9	acres	$355.49	$35,194	$3,910
24-5-45	Kayenta Monitoring Wells	Reclaim Monitoring Wells	Well/Site Reclamation	Miscellaneous	-	-	-	-	-	-	$37,200	$37,200

Table 24-1-7
WORKSHEET MASTER SUMMARY

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COS	EQUIPMENT HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-46	Kayenta N-11 Coal Handling Facility	Cut/Fill Earthwork	Cut/Fill Earthwork	637G P-P Scraper	$250.64	2,478	$35.58	659,063	cy	$286.22	$709,253	$1.08
24-5-47	Kayenta N-11 Coal Handling Facility	Grade Facilities Areas	Facilities Area Grading	D11R Dozer	$319.91	714	$35.58	422,795	cy	$355.49	$253,820	$0.60
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Parts Trailer	$1.36	4,800	-	-	-	$1.36	$6,528	$6,528
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Office Trailer	$2.04	4,800	-	-	-	$2.04	$9,792	$9,792
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Equipment Trailer	$23.50	7,200	-	-	-	$23.50	$169,200	$169,200
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Flatbed Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Service Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Welding/Supply Truck	$41.20	7,200	$24.37	-	-	$65.57	$472,104	$472,104
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Diesel Floodlighting	$7.97	64,800	-	-	-	$7.97	$516,456	$516,456
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Truck Tractor	$63.32	7,200	$24.37	-	-	$87.69	$631,368	$631,368
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Light Duty Diesel Crew	$12.42	44,000	$24.37	-	-	$36.79	$1,618,760	$1,618,760
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	16M Grader	$112.31	14,400	$35.58	-	-	$147.89	$2,129,616	$2,129,616
24-5-48	Kayenta	Equipment Scheduling	Equipment Requirements	Water Truck	$172.60	15,000	$25.23	-	-	$197.83	$2,967,450	$2,967,450
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	16M Grader	$112.31	20	$35.58	-	-	$147.89	$2,958	$2,958
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D7R Dozer	$80.43	40	$33.47	-	-	$113.90	$4,556	$4,556
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	Atlas Copco Pit Viper 271	$362.37	16	$33.47	-	-	$395.84	$6,333	$6,333
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	988H Loader	$148.93	40	$35.58	-	-	$184.51	$7,380	$7,380
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	769D Rear Dump Truck	$119.04	60	$27.43	-	-	$146.47	$8,788	$8,788
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	9225 American Dragline	$181.61	206	$35.58	-	-	$217.19	$44,741	$44,741
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	637G P-P Scraper	$250.64	323	$35.58	-	-	$286.22	$92,449	$92,449
24-5-49	Kayenta	On-Site Mobilization	Interior Mobilization Hours	D11R Dozer	$319.91	498	$35.58	-	-	$355.49	$177,034	$177,034
24-5-50	Kayenta Draglines and Shovels	Dragline and Shovel Removal	Disassemble and Remove Draglines and Shovels	Miscellaneous	-	-	-	-	-	-	$800,000	N/A
				TOTAL		691,145	Hours				$188,055,931	

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Table 24-1-8
FUEL TAX SUMMARY TABLE
Black Mesa Mine

Navajo fuel Tax

	Gal/Hr	Wages/Hr	Black Mesa Hours	Black Mesa Total Gallons
637G Scraper	34	$35.58	24,627	847,546
769D Truck	10	$27.43	211	2,026
988H Loader	13	$35.58	166	2,178
D11R Dozer	28	$35.58	30,843	874,857
D11R Ripping	28	$35.58	869	24,649
D7R Dozer	9	$33.47	272	2,327
Atlas Copco Pit Viper 271	20	$33.47	0	0
9225 American Dragline	9	$35.58	648	5,716
16M Grader	9	$35.58	9,604	83,501
Truck tractor	10	$24.37	4,800	46,391
Water Truck	18	$25.23	8,800	162,739
Service Truck	4	$24.37	4,800	19,490
Welding Truck	4	$24.37	4,800	19,490
TOTAL HOURS			90,440	
TOTAL GALLONS				2,090,911

	Black Mesa
Tax per Gallon	$0.18

TOTAL FUEL TAX	$376,364

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Table 24-2-1
MAXIMUM LENGTH OF OPEN PITS WITHIN EACH YEAR (FT)
Black Mesa and Kayenta Mines

Kayenta Mine
Bonding Open Pit Comparison: (2010 vs. 2015)
October 18, 2012

Active Mine Area	Year 2010	2011	2012	2013	2014	"Worst Case" (2010) Pit Lengths	"Worst Case" (2015) Pit Lengths
Black Mesa (Interm Program - AZ-0001 Permit)							
N-6	8,700	8,700	8,700	8,700	8,700	8,700	8,700
Subtotal	8,700	8,700	8,700	8,700	8,700	8,700	8,700
Kayenta (Permanent Program - AZ-0001D Permit)							
J-16	7,700	7,700	7,700	7,700	7,700	7,700	7,700
J-19&J-19 West	32,100	29,850	27,700	23,400	18,100	32,100	27,000
J-21 Single Width	5,200	4,800	10,900	10,900	10,900	5,200	14,000
J-21 Double Width	6,050	6,050	6,050	6,050	6,050	6,050	0
N-9	8,800	7,750	7,400	10,100	11,150	8,800	11,000
N-11	8,450	8,450	8,450	8,450	8,450	8,450	8,450
Subtotal	68,300	64,600	68,200	66,600	62,350	68,300	68,150
Total:	77,000	73,300	76,900	75,300	71,050	77,000	76,850

2010 Notes:
1. Shaded area represents OSM's "worst-case" pit lengths. OSM's estimate includes 5.0 miles of additional pit that will already be backfilled in 2010, (very conservative). OSM Shaded column "Worst Case" pit lengths is utilized for the 2010-2014 Bond Estimate.
2. Lengths measured from annual blocks presented on revised Drawing No. 85210 & 89800.
3. Until Phase 1 Bond or TOJ Release J-16, J19-RA Pond, J-21East, and N-11 pit lengths are included even though PWCC will have completed the Final Pit Backfilling & Grading. Dimensions for these areas are based on 1997 as "worst case" year per 1995-2000 Bond.
4. N-14 and N-14 East Pits, (Permanent Program Area) had Phase 1 Bond Release approval on January 22, 2008.
5. The J-7 Pit is Initial OSM Program Regulations and no bond is required. The final pit was completely reclaimed in 2006.
6. J-21 East, (2,481 Permanent Program Acres) had Phase 1 Bond Release approval on April 5, 2010.

References: Mine Plan Map (Drawing 85210) and Bonding Map (Drawing 89800)

Table 24-2-2
BONDING AREA CATEGORIES
Black Mesa and Kayenta Mines

	Bonding Category (acres)								
Mine Area	I	II	IIA	III	IV	V	VI	VII	VIII
J-1/N-6	551	0	0	3028	263	57	0	0	0
J-7	0	0	0	1397	268	12	0	0	0
J-27	0	0	0	111	199	14	0	0	0
Black Mesa Mine Facilities	0	0	0	320	0	178	0	0	0
Black Mesa Mine Subtotal	551	0	0	4,856	730	261	0	0	0
J-16	417	201	103	1054	0	13	0	0	0
J-19	2687	400	1477	5	0	18	0	6	0
J-21 Single Width	542	0	0	0	0	0	0	0	0
J-21 Double Width	428	267	760	2	0	6	0	2,475	0
N-1	0	141	0	57	1067	2	311	0	0
N-2	0	46	0	53	363	4	701	0	0
N-7/N-8	0	17	0	0	0	0	1,058	0	0
N-9	944	141	0	0	0	7	17	0	0
N-10	0	20	0	198	1	1	0	0	0
N-11	522	309	420	354	0	115	0	0	0
N-14	0	99	0	1048	0	43	0	0	323
N-14E	0	0	19	148	0	0	0	0	173
Kayenta_FAC	0	286	0	51	0	396	0	0	0
Kayenta Mine Subtotal	5,540	1,927	2,779	2,970	1,431	605	2,087	2,481	496
J-3	0	0	0	255	704	168	0	0	0
MCW_FAC	0	0	0	93	0	45	0	0	0
Joint Facilities Subtotal	0	0	0	348	704	213	0	0	0
Total	6,091	1,927	2,779	8,174	2,865	1,079	2,087	2,481	496

Notes:
I = Permanent Program 2010 final pit reclamation area(s)
II = Permanent Program Area - Revegetated except for Mine Support Facilities (7/6/90-12/31/09).
IIA = Permanent Program Area - Reclaimed areas which have minimal or no mine support facilities (e.g. these areas are bonded in Attachment 24-4) and which have not been approved for reclamation liability release (i.e. Phase I, II, or III Bond Release)
III = Interim Program Areas (2/1/82-7/6/90 - Kayenta Mine); (2/1/82 to Present - Black Mesa Mine)
IV = Prelaw Areas disturbed prior to 12/17/77
V = Lands under major facilities areas
Kayenta Mine Facilities include J-28, N-7/N-8 and Silo Areas.
VI = Land Approved for Release

Reference: Bonding Map (Drawing 89800)

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Table 24-2-3
PIT VOLUME SUMMARY (WORST CASE)
Black Mesa and Kayenta Mines

Active Mine Area	Pit Length (ft)	Highwall Reduction (sf)	Highwall Reduction (cy)	Swelled Highwall Reduction (cy)	2 Spoils Into Pit (sf)	2 Spoils Into Pit (cy)	Open Pit (sf)	Open Pit (cy)	2 Spoils To Grade (sf)	2 Spoils To Grade (cy)	4 Spoils Width (ft)
N-6	8,700	0	0	0	15,114	4,870,067	15,369	4,952,233	1,640	528,444	773
J-16	7,700	3,920	1,117,926	1,397,407	8,350	2,381,296	13,250	3,778,704	1,730	493,370	590
J-19*	32,100	8,890	10,569,222	13,211,528	9,350	11,116,111	20,460	24,324,667	1,890	2,247,000	964
J-21 SW*	5,200	6,470	1,246,074	1,557,593	7,080	1,363,556	15,170	2,921,630	1,980	381,333	789
J-21 DW	6,050	0	0	0	16,080	3,603,111	15,645	3,505,639	2,875	644,213	789
N-11	8,450	0	0	0	16,080	5,032,444	15,645	4,896,306	2,875	899,769	1,058
N-9	8,800	3,240	1,056,000	1,320,000	7,421	2,418,696	11,039	3,597,896	2,467	804,059	633

References: Mine Plan Map (Drawing 85210) and Overburden/Interburden Isopachs and Range Diagrams for each active mining area.

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Table 24-2-4
RAMP VOLUME AND GRADING SUMMARY
Black Mesa and Kayenta Mines

Active Mine Area	Number of Ramps	Pit Depth (ft)	Cubic Yards/ Ramp1 (cy)	Total Ramp Volume (cy)	Grading Area Beyond Fourth Spoil Pile Limit: Length (ft)	Height (ft)	Area/Ramp (sf)	Total For Area (acres)
N-6	7	150	325,305	2,277,133	600	70	186,000	30
J-16	2	N/A	355,500	711,000	540	35	110,700	5
J-19	12	200	390,120	4,681,434	600	49	148,200	41
J-21 Single Width	4	170	351,231	1,404,922	560	35	114,800	11
J-21 Double Width	3	200	390,120	1,170,359	600	77	198,600	14
N-11	2	200	390,120	780,239	600	77	198,600	9
N-9	5	160	338,268	1,691,338	600	30	114,000	13
Total	35		2,540,661	12,716,425	4,100	373	1,070,900	122

Notes:
1. Ramp volume based on the formula $V=1/2(wh*l)+2(1/3h^2*l)$, where w=100' width, l=1000' length, and h= 70% of average pit depth.
2. Within four spoil pile limit, ramp surface grading is addressed by spoil grading activities.
3. Ramp grading area beyond fourth spoil pile grading limit based on the formula A=l(w+3h), where l=measured length, w=100' width, and h= 70% of ramp depth at fourth spoil pile limit. If length (l) exceeds 600', grading for the remaining ramp length is covered under one of the road reclamation categories (primary or ancillary roads).

Reference: Mine Plan Map (Drawing 85210)

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Table 24-2-6
SURFACE STABILIZATION SUMMARY
Black Mesa and Kayenta Mines

Active Mine Area	Main Reclamation Channels		Downdrain Channels		Terrace Channels		Total Riprap (cy)	Average Haul Distance (ft)	Average Grade (%)
	Length (ft)	Riprap (cy)	Length (ft)	Riprap (cy)	Length (ft)	Area (ac)			
J-7	6,550	4,367	15,200	25,333	75,400	213	29,700	3,500	3
N-6	8,700	5,800	14,400	24,000	185,020	551	29,800	3,000	2
J-16	7,700	5,133	9,600	16,000	58,580	417	21,133	3,500	-4
J-19	32,100	21,400	16,900	28,167	166,170	2,687	49,567	4,500	1
J-21 Single Width	5,200	3,467	12,200	20,333	155,620	542	23,800	3,300	3
J-21 Double Width	6,050	4,033	12,670	21,117	80,730	428	25,150	1,700	3
N-9	8,800	5,867	12,000	20,000	52,000	944	25,867	2,500	0
N-11	8,450	5,633	11,300	18,833	129,920	522	24,467	2,500	-3
Total	83,550	55,700	104,270	173,783	903,440	6,305	229,483		

NOTE: This is conservative to include this activity. With the new OSM Direction, terraces are minimized.
References: Chapter 26, Surface Stabilization Plan and Bond Map (Drawing 89800)

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Table 24-2-5
FINAL PIT RECLAMATION AREAS (CATEGORY I)
Black Mesa and Kayenta Mines

Active Mine Area	Pit Length[1] (ft)	Highwall Reduction Width (ft)	Four Spoil Widths (ft)	Subtotal Pit Area[2] (ac)	Advance Topsoil Stripping Area[3] (ac)	Miscellanous Grading Area[4] (ac)	Total Pit Area5 (ac)
N-6	8,700	234	773	228	0	323	551
J-16	7,700	270	590	175	12	230	417
J-19	32,100	250	964	1,005	921	761	2,687
J-21 SW	5,200	300	789	148	143	251	542
J-21 DW	6,050	N/A	789	255	0	173	428
N-11	8,450	N/A	1,058	250	0	272	522
N-9	8,800	234	633	205	256	483	944
Total	77,000			2,267	1,332	2,493	6,091

Notes:
1. Pit widths are shown on the 24-3-1 worksheets:
2. The Subtotal Pit Area includes the pit area, highwall reduction area, four spoil grading area and any boxcut areas, and is based on the equation ((Highwall Reduction Width + Pit Width + Four Spoil Widths)*Length)/43,560 sf/ac.
3. The advance topsoil area is determined by the equation: ((1,500' - Highwall Reduction)*Length)/43,560 sf/ac. No grading is required in this area.
4. The Miscellanous Grading Area was determined for each active mine area from the Mine Plan Map.
5. The Total Pit Area includes the categories under "Subtotal Pit Area" (above), the Advance Topsoil Stripping Area and the Miscellaneous Grading Area.

References: Mine Plan Map (Drawing 85210) and Range Diagrams for each active mining area.

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Table 24-2-7
TOPSOIL AND SUITABLE MATERIAL HANDLING SUMMARY
Black Mesa and Kayenta Mines

Mine Area	Topsoil Distribution Area (ac)	Volume (ac-ft)	Volume (cy)	Average Topsoil Haul Distance (ft)	Average Grade (%)	Area Requiring Additional 2.4' (ac)	Additional Volume (ac-ft)	Additional Volume (cy)
N-6	551	551	888,947	3,950	2.5	0	0	0
J-16	417	667	1,076,416	1,400	-4.0	167	400	645,850
J-19	2,687	4,299	6,936,043	1,900	2.5	1,075	2,580	4,161,626
J-21SW	542	867	1,399,083	3,500	2.5	217	520	839,450
J-21DW	428	685	1,104,811	3,500	2.5	171	411	662,886
N-11	522	835	1,347,456	1,200	2.5	209	501	808,474
N-9.	944	1,510	2,436,779	5,300	2.5	378	906	1,462,067

Notes:
1. The topsoil distribution area includes ramp areas that extent beyond the four spoil pile grading limit. These areas will require placement of 1.6' of topsoil (except the N-6 area, which will require only 1' for Initial Program Lands).
2. Average topsoil haul distance and grade measured from Bonding Map.
3. 40% of the Permanent Program regraded areas are conservatively assumed to require 2.4' of additional suitable material. Historically, based on spoil sampling, the average suitable material replacement depth has only been approximately 1.5 ft to 2.0 ft., whereas, this estimate is using a total average replacement depth of approx. 2.5 ft.
   Based on PWCC's experience, suitable material borrow sources assumed to exist on highwall side of pit, with average haul distance of 700'.

References: Bonding Map (Drawing 89800), Table 24.2.4, Ramp Volume and Grading Summary, and Table 24-2-2, Final Pit Reclamation Areas

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Table 24-2-8
FACILITY VOLUMES
Footings, Foundations, Parking, and Storage Areas
Black Mesa and Kayenta Mines

Area	Area (ac)	Concrete Area (ac)	Gravel Surface Area (ac)	Gravel Volume (cy)	Ripping Area[1] (ac)	Ripping Vol[2] (cy)	Trench Vol[3] (cy)	Trench Area[4] (ac)	Borrow Volume: For Concrete[5] (cy)	Borrow Volume: Remaining Facilities Area[6] (cy)	Revegetation: Concrete Borrow Area[7] (ac)	Revegetation: Remaining Facilities Borrow Area[7] (ac)
Black Mesa	261	4.79	256	413,352	261	1,263,240	413,352	64.1	30,911	516,690	6.4	106.8
Kayenta	605	9.09	596	961,401	605	2,928,200	961,401	149.0	58,661	1,201,752	12.12	248.3
Joint	213	1.79	211	340,752	213	1,030,920	340,752	52.8	11,551	425,940	2.39	88.0
Total:	1,079											

Notes:
1. Gravel volume based on 1' depth.
2. Ripping volume based on 3' ripping depth.
3. Trench volume equals gravel disposal volume.
4. Reflects 4' excavation depth; excavated and then replaced for burial of gravel materials.
5. Reflects 4' removal and replacement depth.
6. Reflects 1.25' replacement depth.
7. Reflects 3' borrow depth.

Reference: Bonding Map (Drawing 89800), Category V, Table 24-2-2

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Table 24-2-9
SCORIA PIT RECLAMATION
Black Mesa and Kayenta Mines

Location	Area (ac)	Disturbed %	Disturbed acres	Reclaimed %	Reclaimed acres	Undisturbed %	Undisturbed acres
J-7	150	0	0	0	0	100	150
J-27	167	0	0	0	0	100	167
N-5	98	75	73	0	0	25	24
Black Mesa Total	415		73				
J-19: R#63	26	100	26	0	0	0	0
N-9: R#25	27	100	27	0	0	0	0
N-10	3	100	3	0	0	0	0
Kayenta Total	56		56				

Reference: Bonding Map (Drawing 89800)

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Table 24-2-10
WATER AND SEDIMENTATION PONDS
Black Mesa and Kayenta Mines

Kayenta Mine			
Pond	Sediment Cleanout Required?	Embankment Removal Required?	Topsoil Spreading Required?
J16-A	Y	N	N
J16-D	Y	Y	Y
J16-E	Y	Y	Y
J16-F	Y	Y	Y
J16-G	Y	N	N
J16-L	Y	N	N
J19-A	Y	Y	Y
J19-B	Y	Y	Y
J19-D	Y	Y	Y
J19-E	Y	Y	Y
J19-RA	Y	Y	Y
J19-RB	Y	N	N
J21-A	Y	N	N
J21-A1	Y	Y	Y
J21-C	Y	N	N
J21-C2	Y	Y	Y
J21-D	Y	Y	Y
J21-E	Y	Y	Y
J21-F	Y	Y	Y
J21-F1	Y	Y	Y
J21-G	Y	Y	Y
J21-G1	Y	Y	Y
J21-H	Y	Y	Y
J21-H1	Y	Y	Y
J28-B	Y	Y	Y
J28-C	Y	Y	Y
J28-D	Y	Y	Y
J28-G	Y	Y	Y
J28-SL	Y	Y	Y
J7-JR	Y	N	N
KM-A3	Y	Y	Y
KM-B	Y	Y	Y
KM-C	Y	Y	Y
KM-D	Y	Y	Y
KM-E	Y	Y	Y
KM-E1	Y	Y	Y
KM-FWP	Y	Y	Y
KM-TPB	Y	Y	Y
KM-TPB1	Y	Y	Y
N9-A	N	Y	Y
N9-A1	N	Y	Y
N9-A2	N	Y	Y
N9-B	N	Y	Y
N9-B1	N	Y	Y
N9-B2	N	Y	Y
N9-C	N	Y	Y
N9-C1	N	Y	Y
N9-D	N	Y	Y
N9-E	N	Y	Y
N9-F	N	Y	Y

Kayenta Mine (cont.)			
Pond	Sediment Cleanout Required?	Embankment Removal Required?	Topsoil Spreading Required?
N9-G	N	Y	Y
N9-H	N	Y	Y
N9-I	N	Y	Y
N9-J	N	Y	Y
N9-J1	N	Y	Y
N9-J2	N	Y	Y
N9-J3	N	Y	Y
N10-A	Y	Y	Y
N10-A1	Y	N	N
N10-A2	Y	Y	Y
N10-B	Y	Y	Y
N10-B1	Y	Y	Y
N10-D	Y	N	N
N10-D1	Y	Y	Y
N11-A	Y	N	N
N11-A1	Y	Y	Y
N11-A2	Y	Y	Y
N11-C	Y	Y	Y
N11-E	Y	Y	Y
N11-G	Y	N	N
N11-G1	Y	Y	Y
N12-C	Y	N	N
N12-C1	Y	Y	Y
N12-C2	Y	Y	Y
N12-N	Y	Y	Y
N14-B	Y	Y	Y
N14-C	Y	Y	Y
N14-D	Y	N	N
N14-E	Y	Y	Y
N14-F	Y	N	N
N14-G	Y	N	N
N14-H	Y	N	N
N14-P	Y	Y	Y
N14-Q	Y	Y	Y
N14-T	Y	Y	Y
N1-AC	Y	Y	Y
N1-F	Y	Y	Y
N1-L	Y	Y	Y
N1-M	Y	Y	Y
N1-O	Y	Y	Y
N2-RA	N	N	N
N2-RC	N	N	N
N5-F	Y	Y	Y
TPC-A	Y	Y	Y
TPF-A	Y	Y	Y
TPF-D	Y	N	N
TPF-E	Y	N	N
TS-A	Y	Y	Y
TS-B	Y	Y	Y
WW-6	Y	Y	Y

Notes:
1. Topsoil Volume = 543.0 acre-feet
2. Embankment Volume = 814,500 cy
3. Sediment Volume = 92,300 yd^3 or 10% cleaned out with a dragline
   600,000 yd^3 or 65% excavated with a dozer
   230,800 yd^3 or 25% is assumed in the incised portion of the pond and would not require removal

Total Sediment Volume based on % of pond design capacities.

Reference: Bond Map (Drawing 89800)

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Table 24-2-10
WATER AND SEDIMENTATION PONDS
Black Mesa and Kayenta Mines

Black Mesa Mine			
Pond	Sediment Cleanout Required?	Embankment Removal Required?	Topsoil Spreading Required?
BM-A1	Y	Y	Y
BM-B	Y	Y	Y
BM-FWP	N	Y	Y
BM-SS	Y	Y	Y
BM-T	Y	Y	Y
BM-TW	N	Y	Y
CW-A	N	Y	Y
J1-A	Y	N	N
J1-RA	Y	N	N
J1-RB	Y	N	N
J27-A	Y	Y	Y
J27-RA	Y	Y	Y
J27-RB	Y	Y	Y
J27-RC	Y	Y	Y
J2-A	Y	N	N
J3-A	Y	Y	Y
J3-B	Y	Y	Y
J3-D	Y	N	N
J3-E	Y	N	N
J3-F	Y	Y	Y
J3-G	Y	N	N
J3-H	N	Y	Y
J3-SL	Y	Y	Y
J7-A	Y	Y	Y
J7-B1	Y	Y	Y
J7-CD	Y	Y	Y
J7-DAM	Y	N	N
J7-E	Y	Y	Y
J7-F	Y	Y	Y
J7-G	Y	Y	Y
J7-H	Y	Y	Y
J7-I	Y	Y	Y
J7-J	Y	Y	Y
J7-K	Y	Y	Y
J7-M	Y	Y	Y
J7-R	Y	N	N

Black Mesa Mine			
Pond	Sediment Cleanout Required?	Embankment Removal Required?	Topsoil Spreading Required?
J7-R1	Y	Y	Y
J7-S	Y	Y	Y
J7-T	Y	Y	Y
J7-U	Y	Y	Y
J7-V	Y	Y	Y
MW-A	Y	Y	Y
MW-B	Y	Y	Y
N10-C	Y	Y	Y
N12-M	Y	Y	Y
N5-A	Y	N	N
N5-A2	Y	N	N
N5-D	Y	Y	Y
N5-E	Y	Y	Y
N5-G	Y	Y	Y
N6-C	Y	Y	Y
N6-D	Y	Y	Y
N6-D1	Y	N	N
N6-E	Y	Y	Y
N6-G	Y	Y	Y
N6-H	Y	Y	Y
N6-I	Y	Y	Y
N6-J	Y	Y	Y
N6-K	Y	Y	Y
N6-L	Y	N	N
N6-M	Y	Y	Y
N6-M1	N	Y	Y
WW-2	Y	Y	Y
WW-3	Y	Y	Y
WW-4	Y	Y	Y
WW-5	Y	Y	Y
WW-9	Y	Y	Y
WW-9A	Y	Y	Y
WW-9B	Y	Y	Y
WW-9C	Y	Y	Y

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ATTACHMENT 24-3

MINE AREA (CATEGORY I) WORKSHEETS
(Areas - Black Mesa Mine: N-6:, Kayenta Mine: J-16, J-19, J-21, N-9, N-11)

- Earthwork Quantity Worksheet
- Cast/Blast Highwall Worksheet
- Doze Highwall Worksheet
- Doze First Two Spoils Worksheet
- Doze Back Two Spoils Worksheet
- Backfill/Grade Ramps
- General Grading
- Grade Terraces
- Grade Drainages/Downdrains
- Load, Haul, Place Riprap
- Haul and Place Suitable Material
- Revegetation
- Revegetation of Topsoil Stockpiles

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MINE AREA: N6

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

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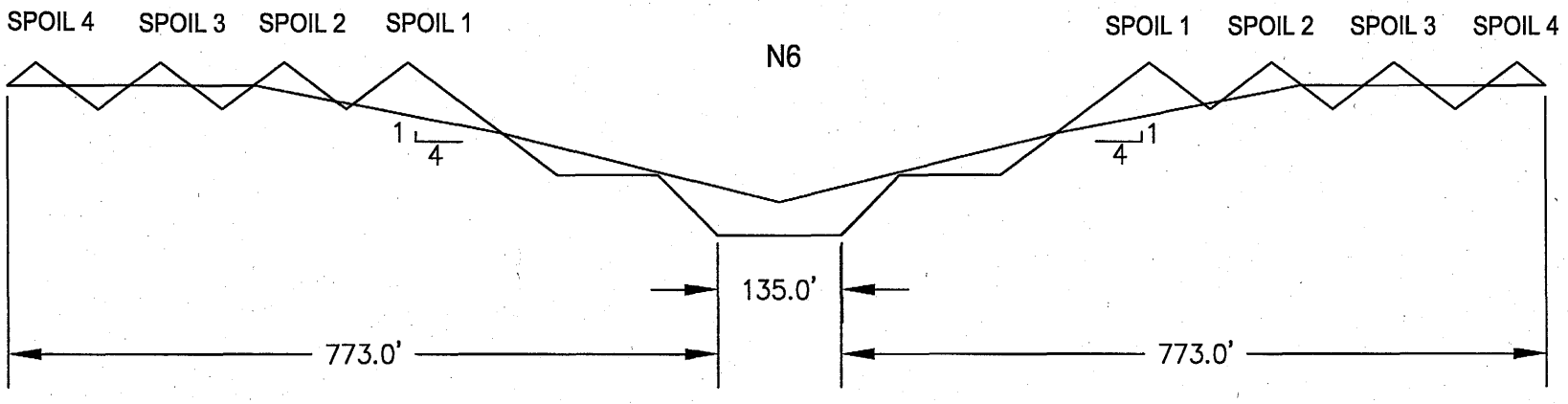


SLOPE REDUCTION

Area = 0

Pit Length = 8,700

Volume = 0

Swelled Volume = 0

SPOIL TO OPEN PIT

Spoil 1,2 = 4,870,067

SPOIL GRADING

Spoil 3,4 = 528,444

SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

AutoCAD: N6FinalSection.dwg

Table:	24-3-04
Mine Area:	N-6
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

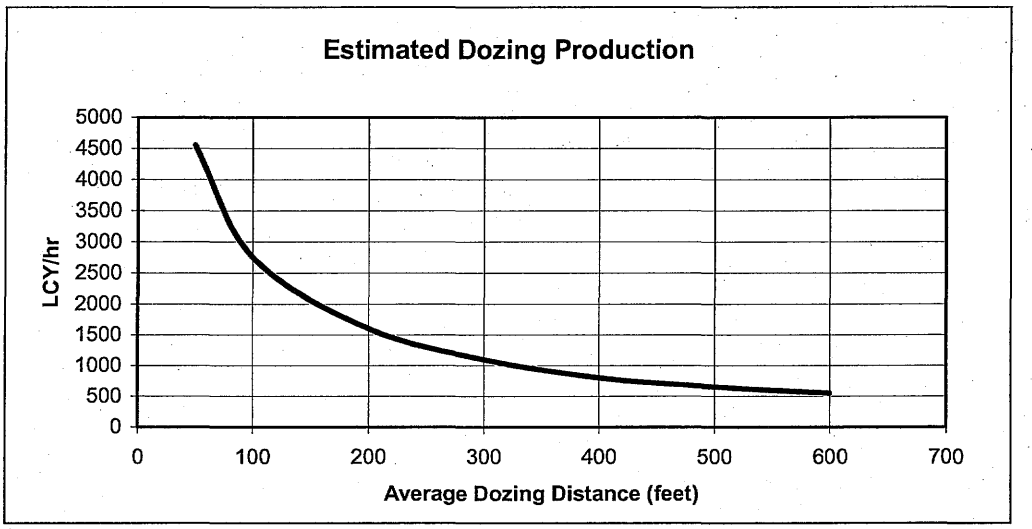
Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
4,870,067

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,139 cy/hr**

Hours Required = 4,870,067 (Volume to be Moved) / 1,139 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **5,866 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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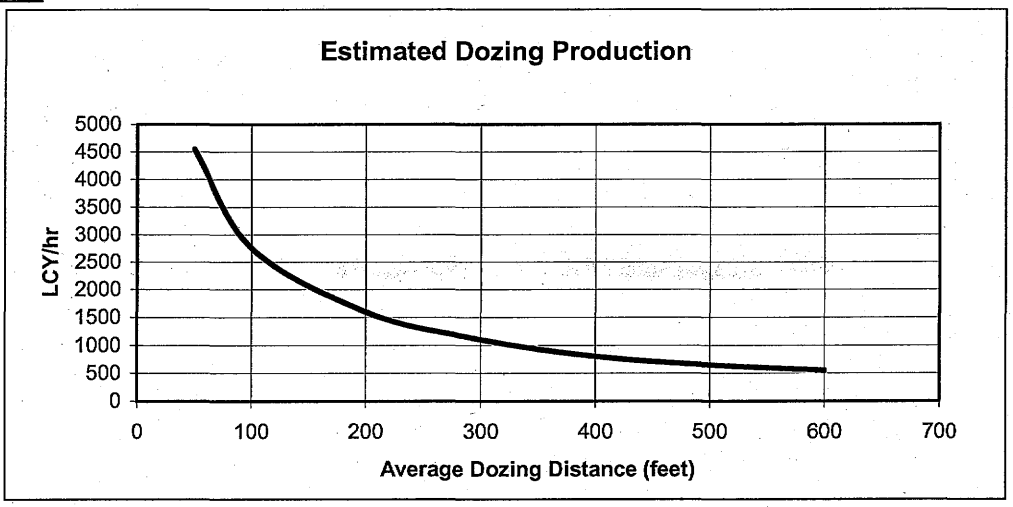
able: 24-3-05
line Area: N-6
roject: Backfill Mine Pits
ask: Doze Back Two Spoils
quipment: D11R Dozer

arthmoving Activity:
oze back two spoil ridges

haracterization of Dozer Used (type, size, etc):
11R, three-shank ripper, U-blade
ower shift transmission (1.0) yes

escription of Dozer Use:
verage dozing distance (feet) 300
ourly production (from chart) 1,100
rade (in percent) -10
rade Correction 1.2
aterial Unit Weight (lb/lcy) 2,800
ensity Correction 0.82



roductivity Adjustment Factors
perator Factor
operator excellent (1) no
operator average (.75) yes
operator poor (.6) no

aterial Factor
ose stockpile (1.2) yes
ard to cut; frozen -
with tilt cylinder (.8) no
without tilt cyliner (.7) no
able controlled blade (.6) no
ard to drift; (.8) no
ock, ripped or blasted (.75) no

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

roduction Method/Blade Factor
ot dozing (1.2) no
de by side dozing (1.2) no
ormal dozing (1.0) yes

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **976 cy/hour**

oor Visibility
e., dust, rain, snow, fog, darkness) (0.8) no

Hours Required = 528,444 (Volume to be Moved) / 976 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **743 hours**

evation Factor
7,500 feet (1.0) yes

uantity of Material to be Moved (cy)
528,444

eferences: Table 24-2-3, Cat Handbook, Ed. 28.

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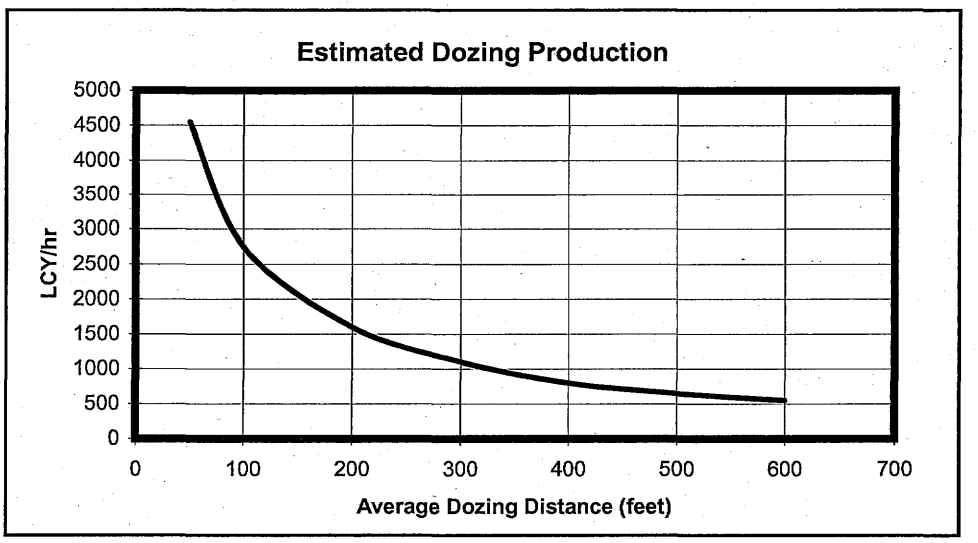
Table:	24-3-06
Mine Area:	N-6
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen - with tilt cylinder (.8)	no
Without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,277,133

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 2,277,133 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,640 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-6
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

323 acres

Hours Required	=	323	/	0.125	x	1.371	=	**3,544 Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

JAN 2012
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Table:	24-3-08
Mine Area:	N-6
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
185,020 lineal feet

Hours Required	=	185,020 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x 1.371 Work Schedule Factor	=	**239 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

JAN 2012
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'able: 24-3-09
'line Area: N-6
'roject: Surface Stabilization
'ask: Grade Drainages/Downdrains
:quipment: D7R Dozer

:arthmoving Activity
;rade drainages and downdrains.

:haracterization of Dozer Used (type, size. etc)
)7R, U-blade

'roduction Rate (lineal ft/hr) 800

)rainages/Downdrains Requirement
14,400 lineal feet

Hours Required	=	14,400 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**25 Hours**

ote: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

.eference: Table 24-2-6

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Table:	24-3-10	Page 1
Mine Area:	N-6	
Project:	Surface Stabilization	
Task:	Load, haul, and place riprap	
Equipment:	988H Loader	
	769D Rear Dump Truck	

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

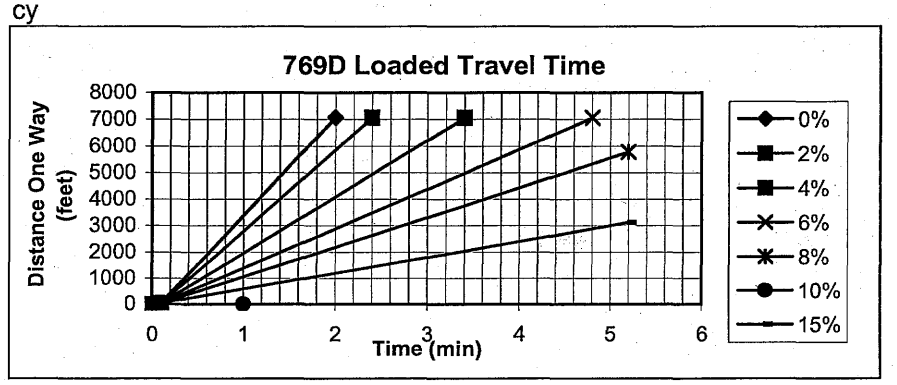
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	3,000
Effective Grade (%)	7

Production Times

Haul Time (min)	2.9
Dump Time (min)	1.1
Turn Time (min)	1.40
Truck/Loader Match (trucks per loader)	3
Riprap Haulage Requirement (cy)	29,800

Placement

Riprap Placement Requirement (ft)	7,200
Placement Rate (ft/shift)	500
Shift (hours)	8



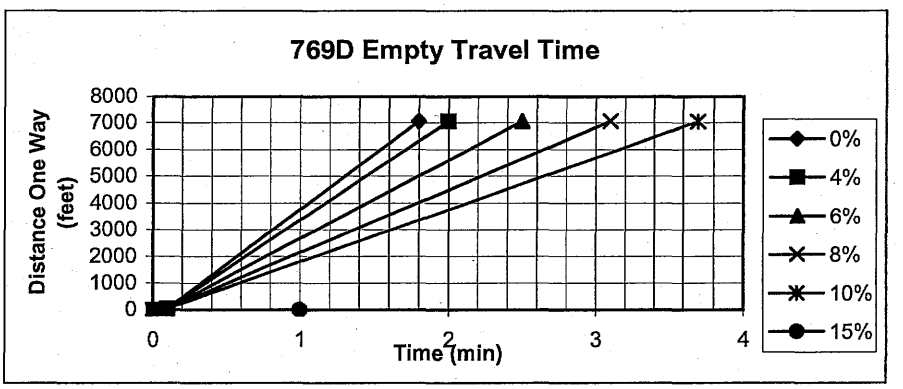


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Table: 24-3-10 (cont.) Page 2
Mine Area: N-6
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	2.9 Haul Time	+	1.1 Dump Time	+	1.40 Return Time	= 7.76 min
Fleet Productivity	=(	3 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	3 Loader/Truck Match	x	7.76 Truck Cycle Time	)x 60 min/hr = 205 cy/hr
Required Fleet Hours	=	29,800 Riprap Haulage Requirement	/	205 Fleet Productivity	x	1.371 Work Schedule Factor	=	**199 hrs**	

Placement Summary

Required Loader Hours	=(	7,200 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **158.0 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-6
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

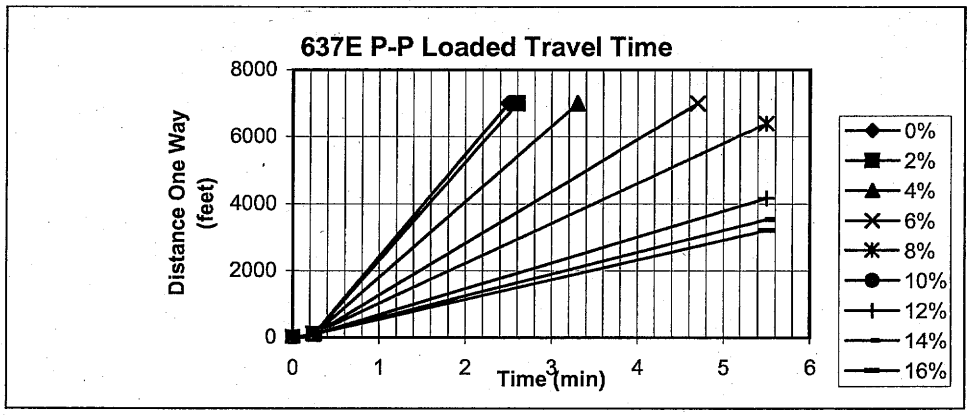
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

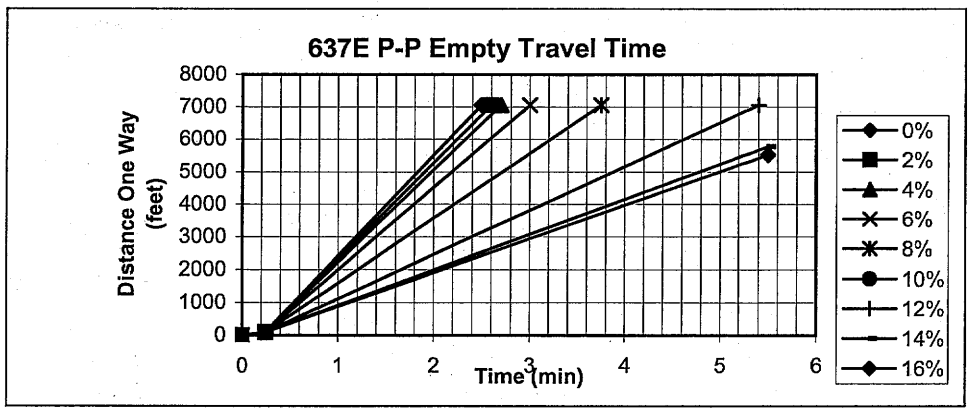
Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved (cy)

0





Cycle Time	=	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.2 (Empty Trip Time)	= 5.2 min
Cycles/Hour	=	60 (min/hr)	/	5.2 (Cycle Time)	=	12 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	11.54 (Cycles/ Hour)	=	**358 cy/hr**			

Hours Required	=	0 (Volume)	/	358 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**0 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	N-6
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

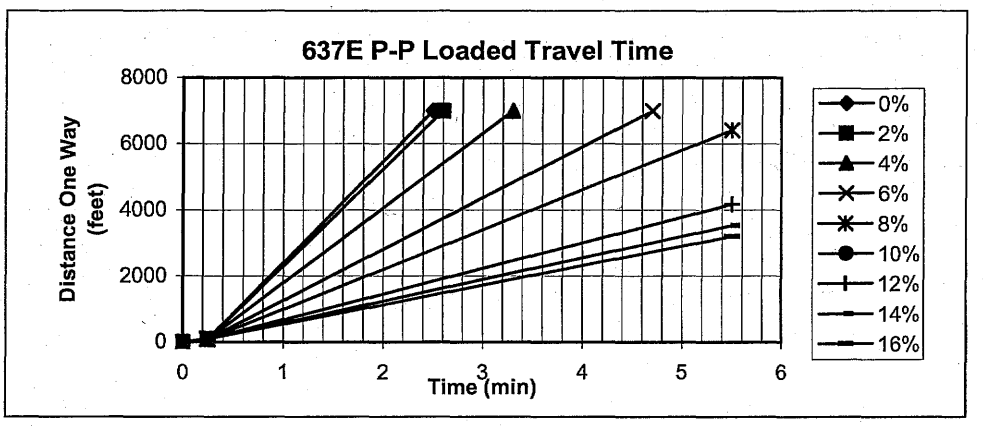
Loaded Distance (ft)	3,000
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,000
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

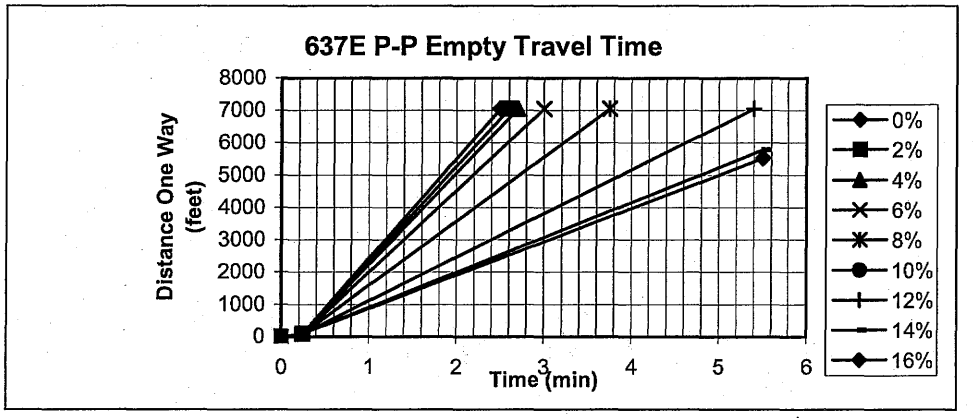
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.8
Loaded Travel Time (from chart)	3.0
Empty Travel Time (from chart)	1.8

Quantity of Material to be Moved (cy)

888,947





Cycle Time	=	2.0 (Load Time)	+	3.0 (Loaded Trip Time)	+	1.8 (Maneuver and Spread Time)	+	1.8 (Empty Trip Time)	= 8.6 min
Cycles/Hour	=	60 (min/hr)	/	8.6 (Cycle Time)	=	7 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	6.98 (Cycles/ Hour)	=	**216 cy/hr**			

Hours Required	=	888,947 (Volume)	/	216 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**5637 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-6
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-6 Mining Area (Category I)

Revegetation Area

Area (acre)	551
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs	=	551 Acres	* (	$1,062.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$0.00 $/Acre for planting trees and shrubs	) =	**$585,438**

Reseeding Costs	=	551 Acres	*	0.5 Failure	*	$845.50 Reseeding Cost	=	**$232,935**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-6
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpiles
Equipment:	Miscellaneous

Revegetation Area Description

N-6 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	58
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 58 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$61,625**

Reseeding Costs = 58 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$24,520**

References: Table 24-1-3 and 24-2-7.

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MINE AREA: N6

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

SEP 2005
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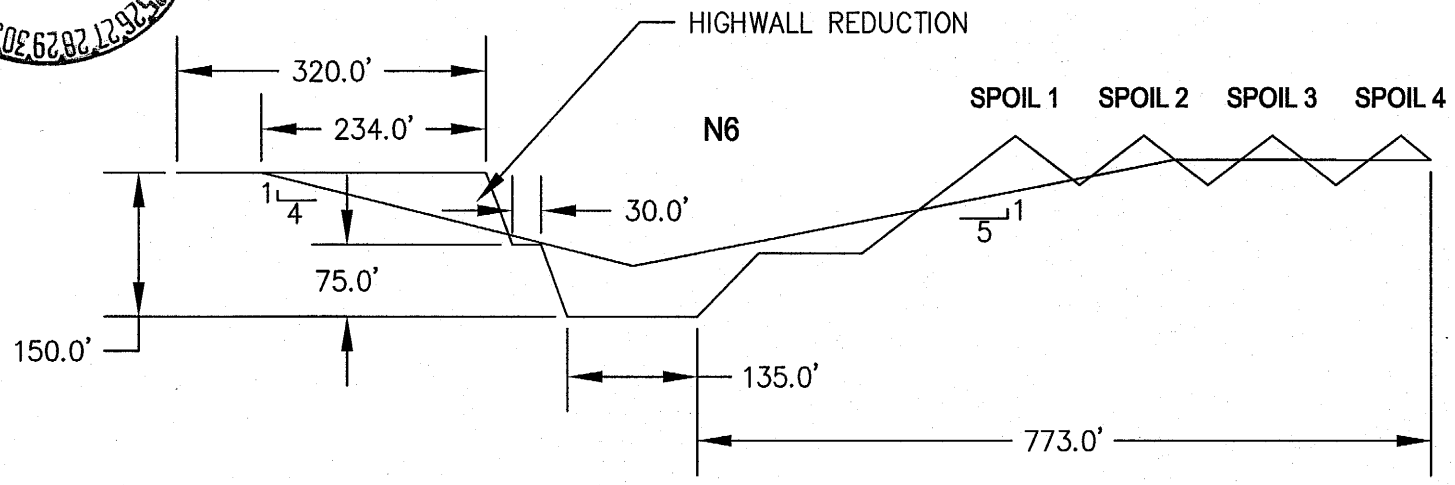


HIGHWALL REDUCTION

Area = 7,502
Pit Length = 16,900
Volume = 4,695,700
Swelled Volume = 5,869,650

SPOIL TO OPEN PIT

Spoil 1,2 = 3,791,230

SPOIL GRADING

Spoil 3,4 = 1,026,520

SCALE

100' 0 100' 200'

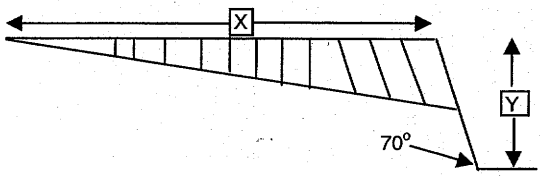
CONTOUR INTERVAL N/A

AutoCAD: N6FinalSection.dwg

Table:	24-3-02	Page 1
Mine Area:	N-6	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Driltech D55SP	

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP



Highwall Reduction Dimensions:

X (feet)	234
Y (feet)	150
Number of Rows	9

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	1,859
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	57	1058
2	42	51	954
3	63	45	849
Total	126	153	2,861

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	1,502
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	38	700
5	105	32	602
6	126	27	504
7	147	22	406
8	168	17	308
9	189	11	210
Total	819	146	2,730

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: N-6
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Driltech D55SP

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,400
Blast 9 7/8"	$1,800
Explosives (per pound)[2]	$0.10
Drill Cost (per hour)	$196.78

Labor Costs

Driller Rate (per hour)	$26.59
Blaster Rate (per hour)	$27.67
Driller/Blaster Helper Rate (per hour)	$13.14

Cast Holes (Rows 1-3)

Total Drill Footage =(16,900 (Pit Length) / 24 (Drill Hole Spacing))x 153 (Total Drillhole Footage (Rows 1-3)) = 107,908 feet

Total Overburden Volume =(16,900 (Pit Length) / 24 (Drill Hole Spacing))x 2,861 (Total Overburden Volume (Rows 1-3)) = 2,014,276 cy

Drilling Time = 107,908 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 987 hours

Drilling Cost = 987 (Drilling Time) x($196.78 (Drill Cost) + $26.59 (Driller Rate) + $13.14 (Driller Helper Rate)
+(1/370 (Bit Life) x $2,400 (Bit Cost))) = **$239,741**

Load and Blast Cost[1] =(987 (Drilling Time) x $27.67 (Blaster Rate) x $13.14 (Blaster Helper Rate)
+(2,014,276 (Total Overburden Volume) x 0.65 (Powder Factor) x $0.10 (Explosive Cost)) = **$489,634**

Blast Holes (Rows 4 and up)

Total Drill Footage =(16,900 (Pit Length) / 24 (Drill Hole Spacing))x 146 (Total Drillhole Footage (Rows 4 and up)) = 102,984 feet

Total Overburden Volume =(16,900 (Pit Length) / 24 (Drill Hole Spacing))x 2,730 (Total Overburden Volume (Rows 4 and up)) = 1,922,375 cy

Drilling Time = 102,984 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 942 hours

Drilling Cost = 942 (Drilling Time) x($196.78 (Drill Cost) + $26.59 (Driller Rate) + $13.14 (Driller Helper Rate)
+(1/170 (Bit Life) x $1,800 (Bit Cost))) = **$232,665**

Load and Blast Cost[1] =(942 (Drilling Time) x $27.67 (Blaster Rate) x $13.14 (Blaster Helper Rate)
+(1,922,375 (Total Overburden Volume) x 0.55 (Powder Factor) x $0.10 (Explosive Cost)) = **$448,071**

Total Cost

$239,741 (Drilling Cost (Cast Holes)) + $489,634 (Load and Blast Cost[1] (Cast Holes)) + $232,665 (Drilling Cost (Blast Holes)) + $448,071 (Load and Blast Cost[1] (Blast Holes)) = **$1,410,110**

Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

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Table:	24-3-03
Mine Area:	N-6
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

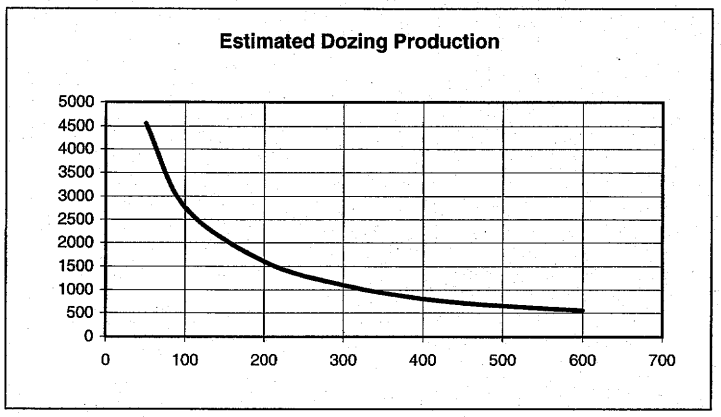
Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	193
Hourly production (from chart)	1,610
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
4,402,238

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.5 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.92**

Net Hourly Production = 1,610 (Normal Hourly Production (see graph above)) x 0.92 (Productivity Adjustment Factor) = **1,488 cy/hr**

Hours Required = 4,402,238 (Volume to be Moved) / 1,488 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,058 Hours**

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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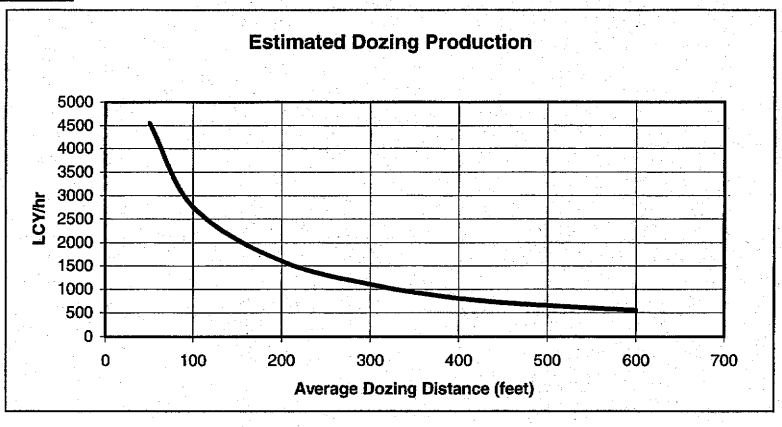
Table:	24-3-04
Mine Area:	N-6
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	285
Hourly production (from chart)	1,150
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
3,791,230

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,150 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,190 cy/hr**

Hours Required = 3,791,230 (Volume to be Moved) / 1,190 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,368 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-05
Mine Area:	N-6
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

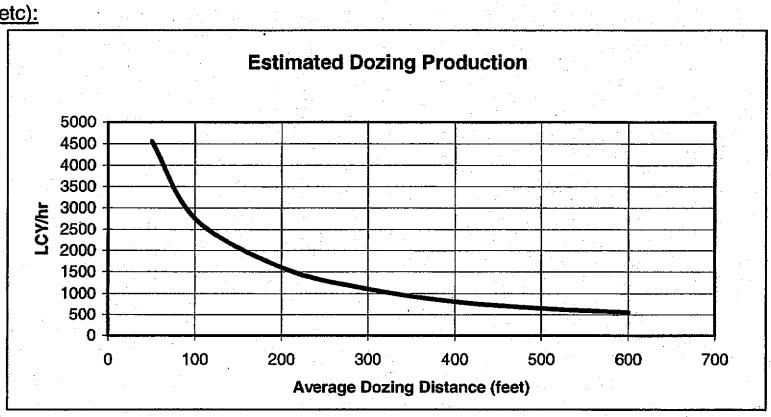
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 1,026,520 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **567 hours**

Quantity of Material to be Moved (cy)
1,026,520

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-6
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

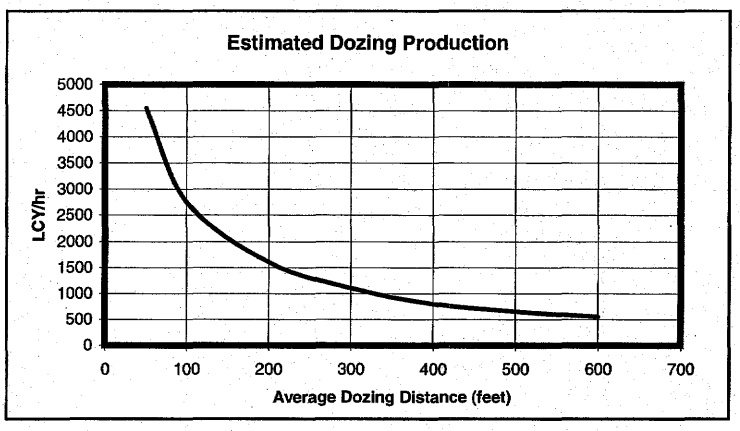
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2927742



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 2,927,742 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3,394 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-6
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

57 acres

Hours Required	=	57 /	0.125 x	1.371	=	625 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	N-6
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
185,020 lineal feet

Hours Required	=	185,020 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**239 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-6
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
28,800 lineal feet

Hours Required	=	28,800 / Drainages/Downdrain Requirement (ft)	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	49 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	N-6
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size, etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

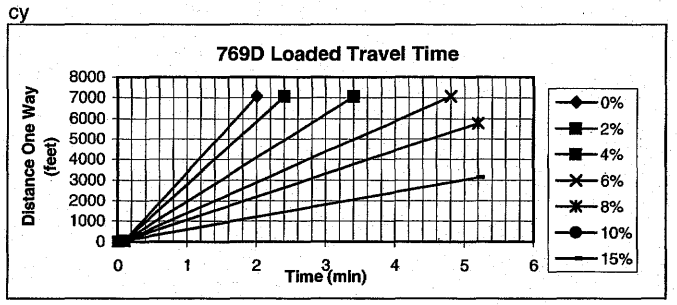
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	3,000
Effective Grade (%)	7

Production Times

Haul Time (min)	2.9
Dump Time (min)	1.1
Return Time (min)	1.40
Truck/Loader Match (trucks per loader)	3
Riprap Haulage Requirement (cy)	59,250

Placement

Riprap Placement Requirement (ft)	17,780
Placement Rate (ft/shift)	500
Shift (hours)	8



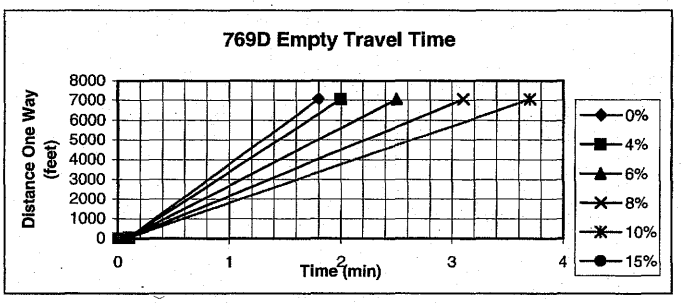


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Table:	24-3-10 (cont.) Page 2
Mine Area:	N-6
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	=	0.59	min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63	cy				
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36	min				

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	2.9 Haul Time	+	1.1 Dump Time	+	1.40 Return Time	=	7.76	min			
Fleet Productivity	=(	3 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	3 Loader/Truck Match	x	7.76 Truck Cycle Time	)x	60 min/hr	=	205	cy/hr	
Required Fleet Hours	=	59,250 Riprap Haulage Requirement	/	205 Fleet Productivity	x	1.371 Work Schedule Factor	=	**396**	**hrs**					

Placement Summary

Required Loader Hours	=(	17,780 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	=	**390.1**	**hrs**			

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-6
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity	31	cy

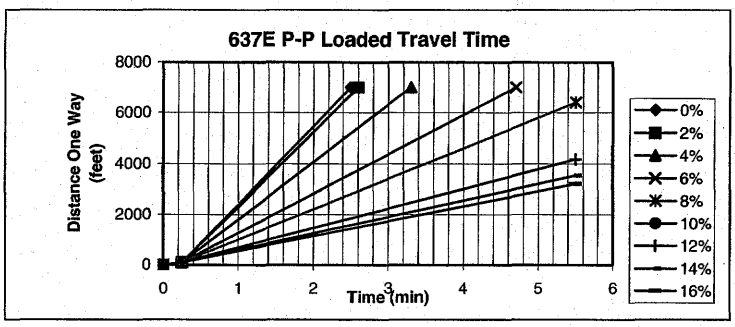
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

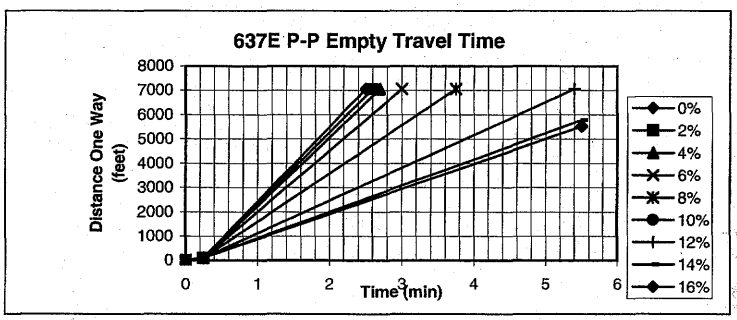
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
0





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required	=	0 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**0 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

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Table:	24-3-12
Mine Area:	N-6
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

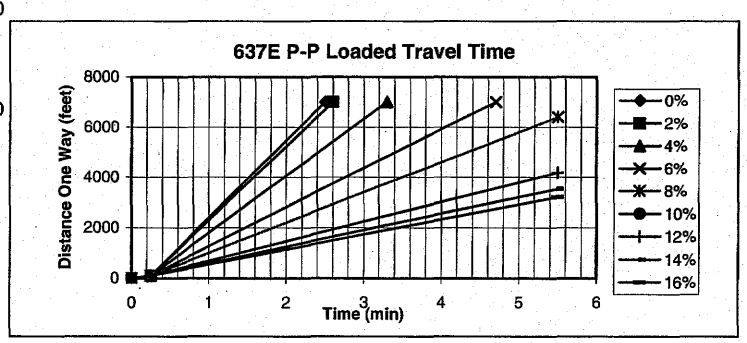
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

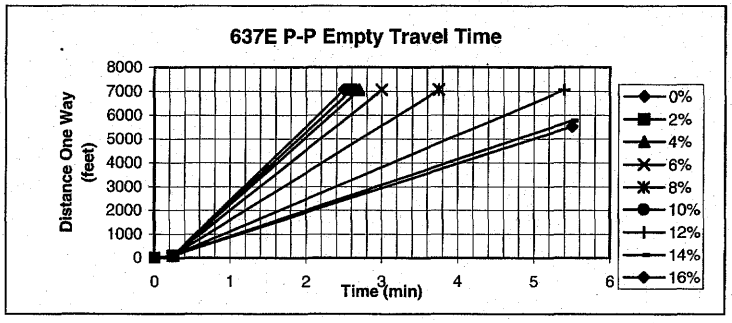
Loaded Distance (ft)	3,950
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,950
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	3.2
Empty Travel Time (from chart)	1.5

Quantity of Material to be Moved (cy)
814,279





Cycle Time =	1.0 (Load Time)	+	3.2 (Loaded Trip Time)	+	0.6 (Maneuver and Spread Time)	+	1.5 (Empty Trip Time)	=	6.3 min
Cycles/Hour =	60 (min/hr)	/	6.3 (Cycle Time)	=	10 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	9.52 (Cycles/ Hour)	=	**295 cy/hr**				

Hours Required =	814,279 (Volume)	/	295 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**3782.455 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-6
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-6 Mining Area (Category I)

Revegetation Area

Area (acre)	505
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=	505 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	) =	**$626,355**

Reseeding Costs	=	505 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	=	**$204,916**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-6
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpiles
Equipment:	Miscellaneous

Revegetation Area Description
N-6 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	77
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=	77 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	) =	**$95,681**

Reseeding Costs	=	77 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	=	**$31,303**

References: Table 24-1-3 and 24-2-7.

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ATTACHMENT 24-3

MINE AREA (CATEGORY I) WORKSHEETS
(Areas - Black Mesa Mine: N-6:, Kayenta Mine: J-16, J-19, J-21, N-9, N-11)

- Earthwork Quantity Worksheet
- Cast/Blast Highwall Worksheet
- Doze Highwall Worksheet
- Doze First Two Spoils Worksheet
- Doze Back Two Spoils Worksheet
- Backfill/Grade Ramps
- General Grading
- Grade Terraces
- Grade Drainages/Downdrains
- Load, Haul, Place Riprap
- Haul and Place Suitable Material
- Revegetation
- Revegetation of Topsoil Stockpiles

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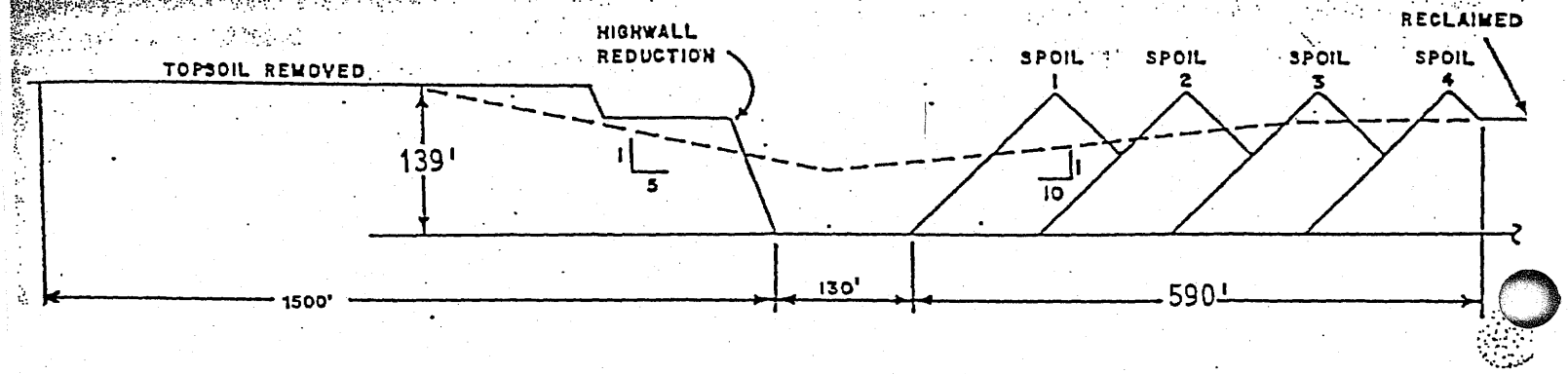
Mine Area J-16

Project Open Pit Backfilling

Date Open Pit Backfilling

WORKSHEET NO. J-16-1

EARTHWORK QUANTITY WORKSHEET



Highwall Reduction

Area = 3,920 sq. ft. (digitized area)
Pit Length = 7,700 ft.
Volume = 1,117,900 cu. yd. (for drilling and shooting)
Volume (including 25% swell) = 1,397,400 cu. yd. (for dozing)

Spoil to Open Pit

Spoil 1, 2 = 8,350 sq. ft. x 7,700 ft. = 2,381,300 cu. yd.

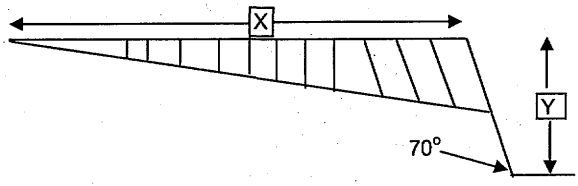
Spoil Grading

Spoil 3, 4 = 1,730 sq. ft. x 7,700 ft. = 493,400 cu. yd.

JAN 2012
APPROVED

Revised 07/19/96

Table:	24-3-02	Page 1
Mine Area:	J-16	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Atlas Copco Pit Viper 271	



Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271

Highwall Reduction Dimensions:

X (feet)	270
Y (feet)	139
Number of Rows	10

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1] (single hole sequence)	1,766

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	53	989
2	42	49	906
3	63	44	822
Total	126	146	2,717

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2] (single hole sequence)	1,768

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	37	694
5	105	33	616
6	126	29	538
7	147	25	459
8	168	20	381
9	189	16	302
10	210	12	224
Total	1,029	172	3,214

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

JAN 2012
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Table: 24-3-02 (co Page 2
Mine Area: J-16
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Atlas Copco Pit Viper 27

Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,905
Blast 9 7/8"	$2,175
Explosives (per pound)[2]	$0.19
Drill Cost (per hour)	$362.37

Labor Costs

Driller Rate (per hour)	$33.47
Blaster Rate (per hour)	$34.55
Driller/Blaster Helper Rate (per hour)	$21.07

Cast Holes (Rows 1-3)

Total Drill Footage =(7,700 (Pit Length) / 24 (Drill Hole Spacing))x 146 (Total Drillhole Footage (Rows 1-3)) = 46,707 feet

Total Overburden Volume =(7,700 (Pit Length) / 24 (Drill Hole Spacing))x 2,717 (Total Overburden Volume (Rows 1-3)) = 871,860 cy

Drilling Time = 46,707 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 427 hours

Drilling Cost = 427 (Drilling Time) x($362.37 (Drill Cost) + $33.47 (Driller Rate) + $21.07 (Driller Helper Rate)
+(1/370 (Bit Life) x $2,905 (Bit Cost))= **$181,387**

Load and Blast Cost[1] =(427 (Drilling Time) x $34.55 (Blaster Rate) x $21.07 (Blaster Helper Rate))
+(871,860 (Total Overburden Volume) x 0.65 (Powder Factor) x $0.19 (Explosive Cost))= **$418,541**

Blast Holes (Rows 4 and up)

Total Drill Footage =(7,700 (Pit Length) / 24 (Drill Hole Spacing))x 172 (Total Drillhole Footage (Rows 4 and up)) = 55,248 feet

Total Overburden Volume =(7,700 (Pit Length) / 24 (Drill Hole Spacing))x 3,214 (Total Overburden Volume (Rows 4 and up)) = 1,031,287 cy

Drilling Time = 55,248 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 505 hours

Drilling Cost = 505 (Drilling Time) x($362.37 (Drill Cost) + $33.47 (Driller Rate) + $21.07 (Driller Helper Rate)
+(1/170 (Bit Life) x $2,175 (Bit Cost))= **$217,052**

Load and Blast Cost[1] =(505 (Drilling Time) x $34.55 (Blaster Rate) x $21.07 (Blaster Helper Rate))
+(1,031,287 (Total Overburden Volume) x 0.55 (Powder Factor) x $0.19 (Explosive Cost))= **$475,481**

Total Cost

$181,387 (Drilling Cost (Cast Holes)) + $418,541 (Load and Blast Cost[1] (Cast Holes)) + $217,052 (Drilling Cost (Blast Holes)) + $475,481 (Load and Blast Cost[1] (Blast Holes)) = **$1,292,462**

Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

JAN 2012
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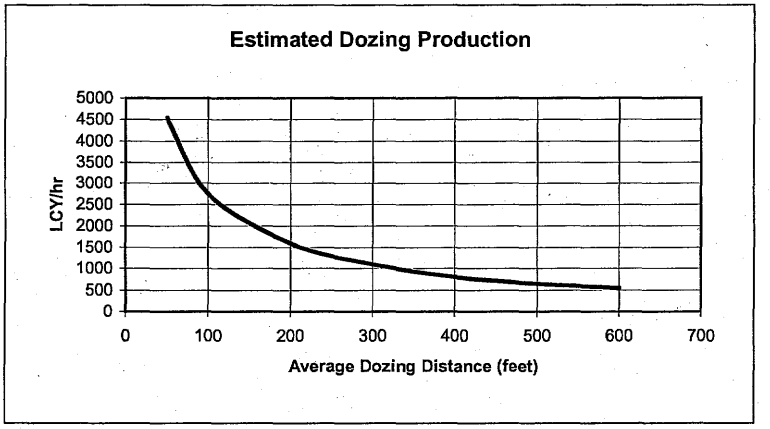
Table:	24-3-03
Mine Area:	J-16
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,300
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,048,055

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,300 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,121 cy/hr**

Hours Required = 1,048,055 (Volume to be Moved) / 1,121 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,282 Hours**

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

2012
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Table:	24-3-04
Mine Area:	J-16
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

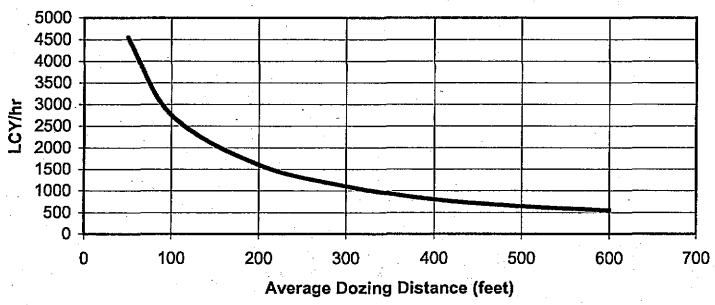
Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,381,296

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,139 cy/hr**

Hours Required = 2,381,296 (Volume to be Moved) / 1,139 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,868 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

JAN 2012
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Table:	24-3-05
Mine Area:	J-16
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

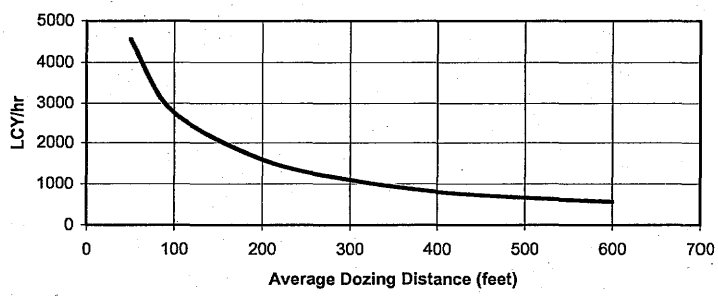
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **1,419 cy/hour**

Hours Required = 493,370 (Volume to be Moved) / 1,419 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **477 hours**

Quantity of Material to be Moved (cy)
493,370

References: Table 24-2-3, Cat Handbook, Ed. 28.

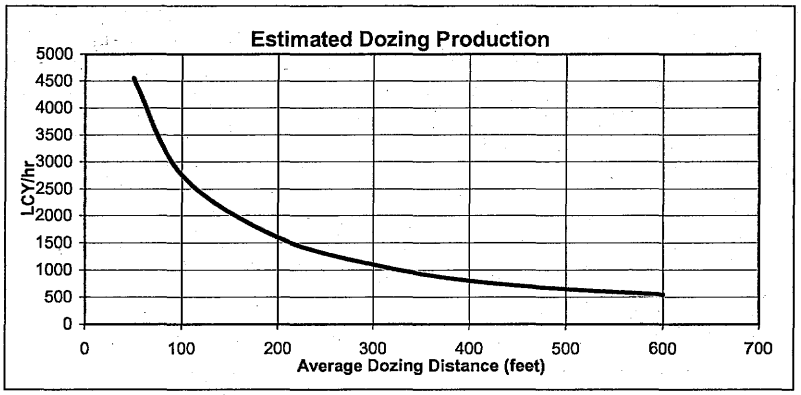
JAN 2012
APPROVED

Table:	24-3-06
Mine Area:	J-16
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
711,000

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 711,000 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **824 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

JAN 2012
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Table:	24-3-07
Mine Area:	J-16
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

230 acres

Hours Required	=	230 /	0.125 x	1.371	=	2,523 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

JAN 2012
APPROVED

Table:	24-3-08
Mine Area:	J-16
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
58,580 lineal feet

Hours Required	=	58,580 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**76**	**Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

JAN 2012
APPROVED

Table:	24-3-09
Mine Area:	J-16
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
9,600 lineal feet

Hours Required	=	9,600 / Drainages/Downdrain Requirement (ft)	800 x Production Rate (ft/hr)	1.371 = Work Schedule Factor	**16 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

APPROVED

Table:	24-3-10	Page 1
Mine Area:	J-16	
Project:	Surface Stabilization	
Task:	Load, haul, and place riprap	
Equipment:	988H Loader	
	769D Rear Dump Truck	

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

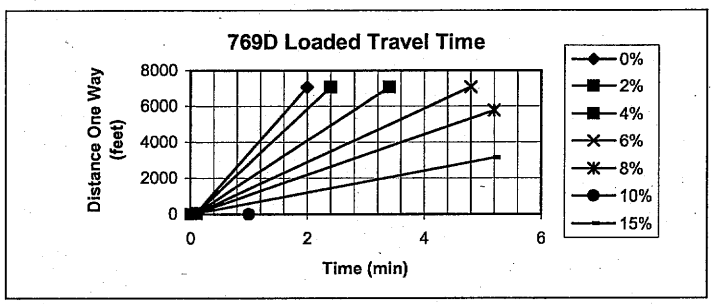
Characterization of Equipment Used (type, size. etc):

988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

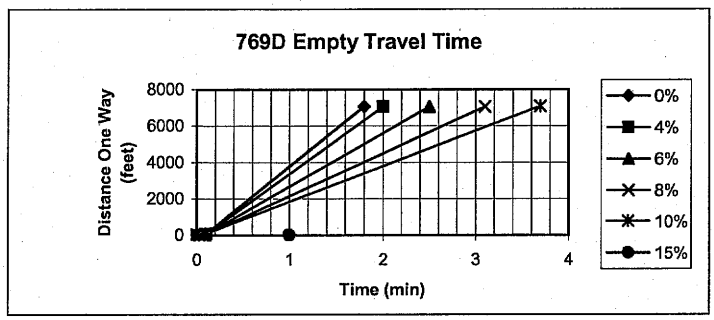
Productivity Factors

Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	3,500
Effective Grade (%) (loaded)	1



Production Times

Haul Time (min)	1.1
Dump Time (min)	1.1
Return Time (min)	1.70
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	21,133



Placement

Riprap Placement Requirement (ft)	4,800
Placement Rate (ft/shift)	500
Shift (hours)	8

JAN 2012
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Table: 24-3-10 (cont.) Page 2
Mine Area: J-16
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=(	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	1.1 Haul Time	+	1.1 Dump Time	+	1.70 Return Time	= 6.26 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	6.26 Truck Cycle Time	)x 60 min/hr = 254 cy/hr
Required Fleet Hours	=	21,133 Riprap Haulage Requirement	/	254 Fleet Productivity	x	1.371 Work Schedule Factor	=	**114 hrs**	

Placement Summary

Required Loader Hours	=(	4,800 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **105 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

2012
APPROVED

Table:	24-3-11
Mine Area:	J-16
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

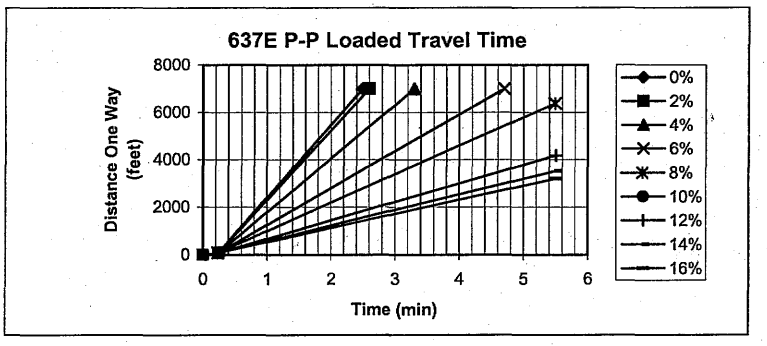
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

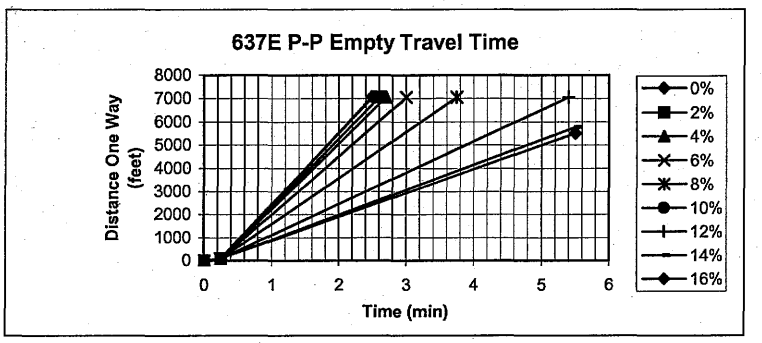
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
645,850





Cycle Time	=	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	= 4.6 min
Cycles/Hour	=	60 (min/hr)	/	4.6 (Cycle Time)	=	13 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	13.04 (Cycles/ Hour)	=	**404 cy/hr**			

Hours Required	=	645,850 (Volume)	/	404 (Hourly)	x	1.371 (Work Schedule)	=	**2,191 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-3-12
Mine Area:	J-16
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

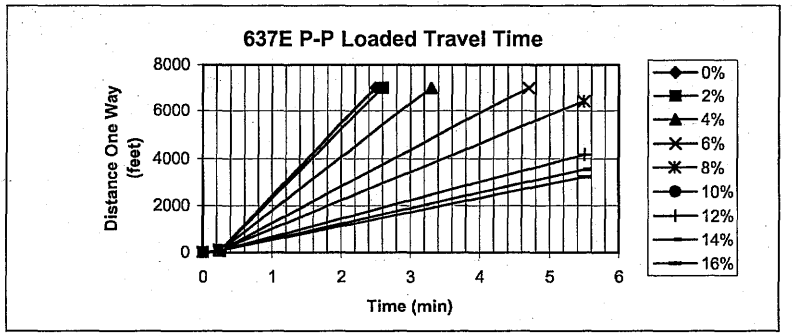
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

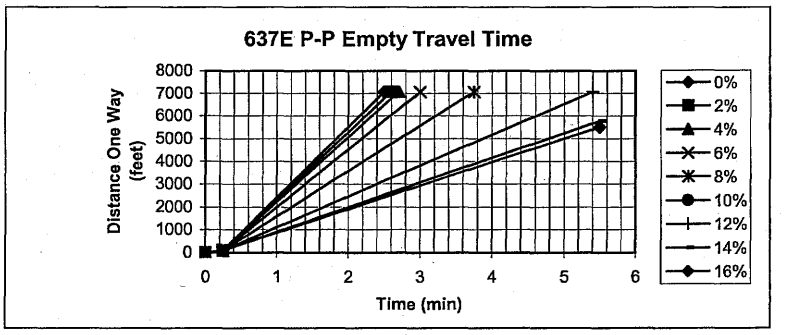
Loaded Distance (ft)	1,400
Loaded Grade (%)	-4.0
Loaded Effective Grade (%)	1.0
Empty Distance (ft)	1,400
Empty Grade (%)	4.0
Empty Effective Grade (%)	9.0

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	2.0
Empty Travel Time (from chart)	1.8

Quantity of Material to be Moved (cy)
1,076,416





Cycle Time	=	2.0 Load Time	+	2.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.8 Empty Trip Time	= 7.0 min
Cycles/Hour	=	60 min/hr	/	7.0 Cycle Time	=	9 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	8.57 Cycles/ Hour	=	**266 cy/hr**			

Hours Required	=	1,076,416 Volume	/	266 Hourly Production	x	1.371 Work Schedule Factor	=	**5556 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-3-13
Mine Area:	J-16
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-16 Mining Area (Category I)

Revegetation Area

Area (acre)	417
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 417 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$645,308**

Reseeding Costs = 417 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$215,381**

References: Table 24-1-3 and 24-2-7.

JAN 2012
APPROVED

Table:	24-3-14
Mine Area:	J-16
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

J-16 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	11
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 11 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$16,249**

Reseeding Costs = 11 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$5,423**

References: Table 24-1-3 and 24-2-7.

JAN 2012
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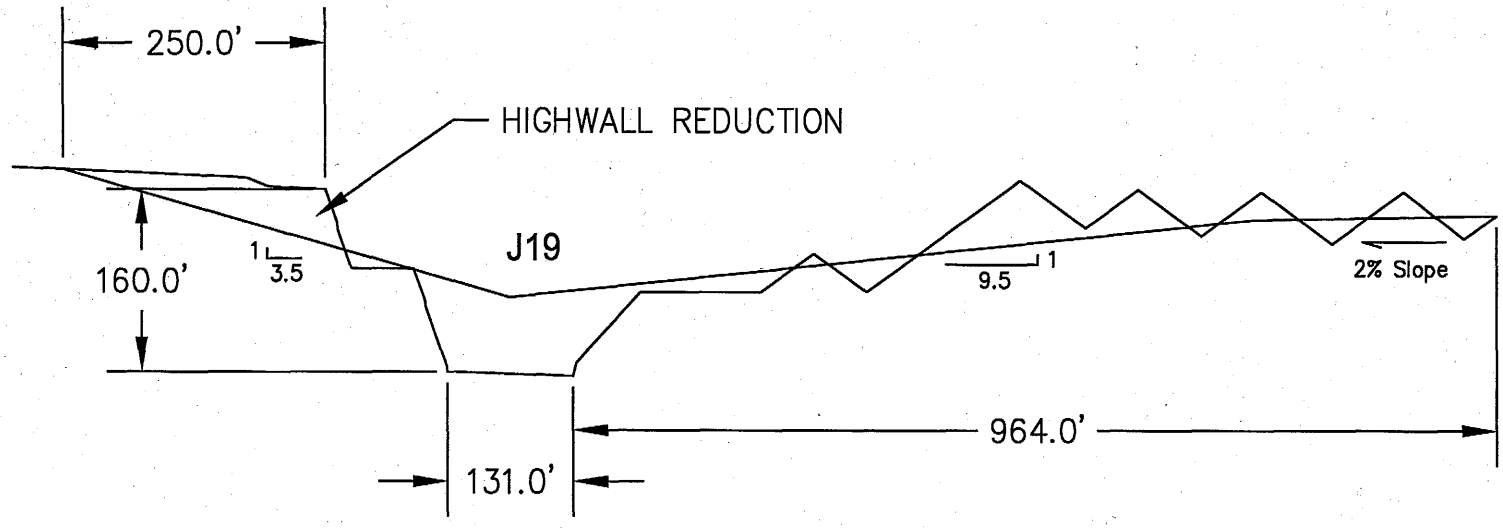
MINE AREA: J19

Worksheet No. 24-3-1

Earthwork Quantity Worksheet



HIGHWALL REDUCTION

Area = 8,890

Pit Length = 32,100

Volume = 10,569,222

Swelled Volume = 13,211,528

SPOIL TO OPEN PIT

Spoil 1,2 = 11,116,111

SPOIL GRADING

Spoil 3,4 = 2,247,000

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SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

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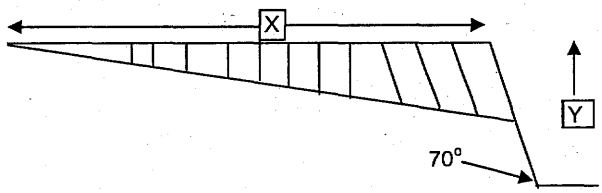
Table:	24-3-02	Page 1
Mine Area:	J-19	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Atlas Copco Pit Viper 271	



Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271

Highwall Reduction Dimensions:

X (feet)	250
Y (feet)	160
Number of Rows	10

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	2,302
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	70	1300
2	42	63	1181
3	63	57	1061
Total	126	190	3,542

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	2,111
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	47	885
5	105	41	773
6	126	35	661
7	147	29	549
8	168	23	437
9	189	17	321
10	210	11	210
Total	1,029	206	3,838

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: J-19
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Atlas Copco Pit Viper 271

Activity Description
Drill, load, and blast highwall

Y
Drill Rig is Atlas Copco Pit Viper 271

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,905
Blast 9 7/8"	$2,175
Explosives (per pound)[2]	$0.19
Drill Cost (per hour)	$362.37

Labor Costs

Driller Rate (per hour)	$33.47
Blaster Rate (per hour)	$34.55
Driller/Blaster Helper Rate (per hour)	$21.07

Cast Holes (Rows 1-3)

Total Drill Footage	=(	32,100 Pit Length	/	24 Drill Hole Spacing	)x		253,761 feet
Total Overburden Volume	=(	32,100 Pit Length	/	24 Drill Hole Spacing	)x		4,736,868 cy
Drilling Time	=	253,761 Total Drill Footage	/	150 Drilling Rate	x		2,320 hours
Drilling Cost	=	2,320 Drilling Time	x(	$362.37 Drill Cost	+	$21.07 Driller Helper Rate	
	+(	1/370 Bit Life	x	$2,905 Bit Cost	))=		
Load and Blast Cost[1]	=(	2,320 Drilling Time	x	$34.55 Blaster Rate	x		
	+(	4,736,868 Total Overburden Volume	x	0.65 Powder Factor	x		**$2,273,962**

Blast Holes (Rows 4 and up)

Total Drill Footage	=(	32,100 Pit Length	/	24 Drill Hole Spacing	)x		274,981 feet
Total Overburden Volume	=(	32,100 Pit Length	/	24 Drill Hole Spacing	)x		5,132,986 cy
Drilling Time	=	274,981 Total Drill Footage	/	150 Drilling Rate	x		2,514 hours
Drilling Cost	=	2,514 Drilling Time	x(	$362.37 Drill Cost	+	$21.07 Driller Helper Rate	
	+(	1/170 Bit Life	x	$2,175 Bit Cost	))=		
Load and Blast Cost[1]	=(	2,514 Drilling Time	x	$34.55 Blaster Rate	x		
	+(	5,132,986 Total Overburden Volume	x	0.55 Powder Factor	x		**$2,366,594**

Total Cost

$985,488 Drilling Cost (Cast Holes)	+	$2,273,962 Load and Blast Cost[1] (Cast Holes)	+	$1,080,326 Drilling Cost (Blast Holes)	+	**$6,706,370**

Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

J-19 24-3-02 (cont.)
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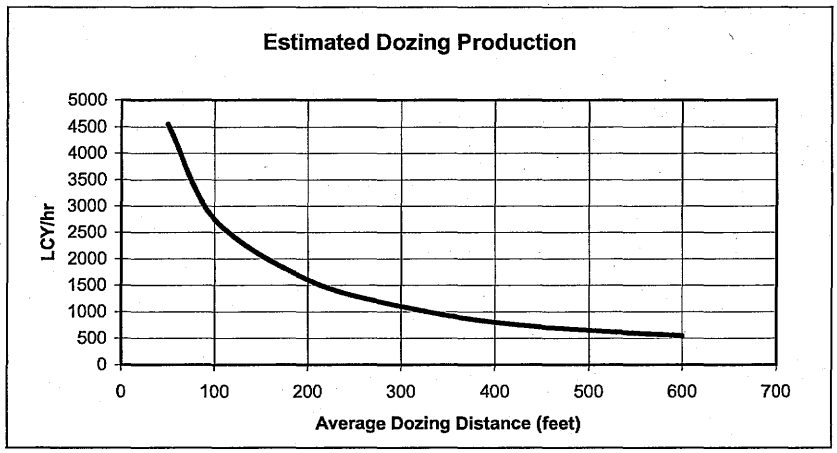
Table:	24-3-03
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,300
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,300 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,121 cy/hr**

Hours Required = 9,908,646 (Volume to be Moved) / 1,121 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **12,120 Hours**

Quantity of Material to be Moved (cy)
9,908,646

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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J-19 24-3-03

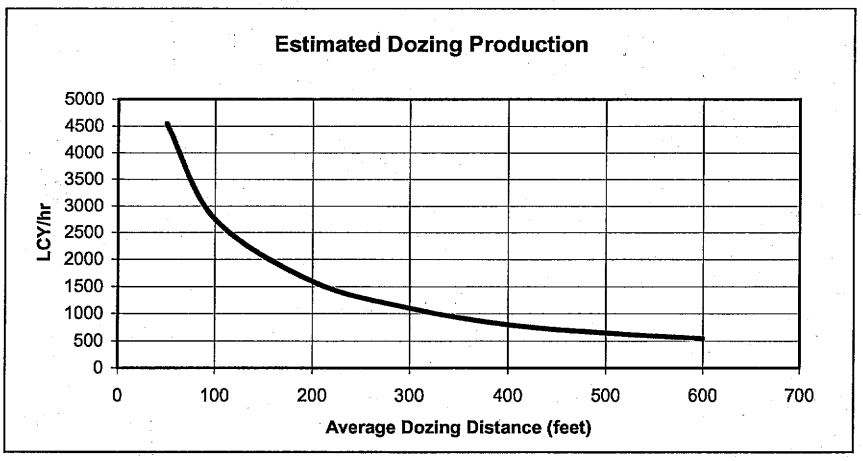
Table:	24-3-04
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,300
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
11,116,111

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,300 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,346 cy/hr**

Hours Required = 11,116,111 (Volume to be Moved) / 1,346 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **11,330 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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24-3-04

Table:	24-3-05
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

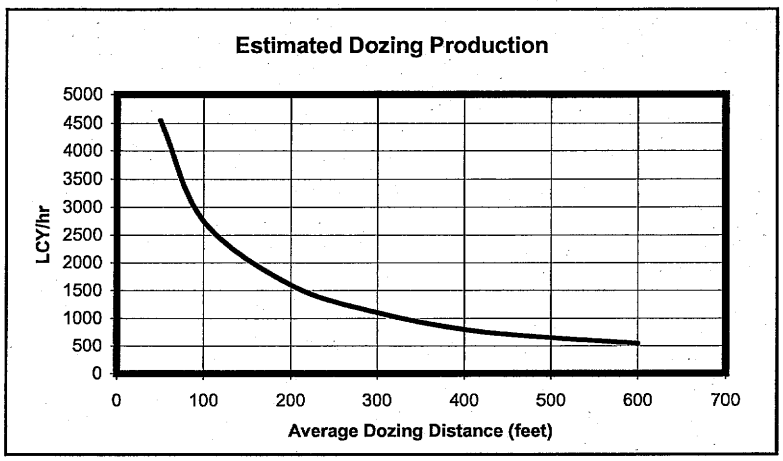
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,300
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustments Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 1,300 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **1,153 cy/hour**

Hours Required = 2,247,000 (Volume to be Moved) / 1,153 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,672 hours**

Quantity of Material to be Moved (cy)
2,247,000

References: Table 24-2-3, Cat Handbook, Ed. 28.

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2012
J-19 24-3-05

Table:	24-3-06
Mine Area:	J-19
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

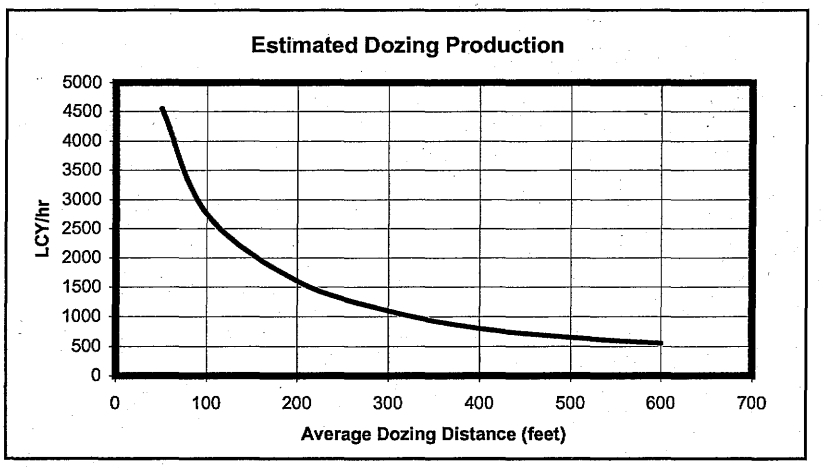
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)

4,681,434



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 4,681,434 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **5,428 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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J-19 24-3-06

Table:	24-3-07
Mine Area:	J-19
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

761 acres

Hours Required	=	761 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**8,349 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
166,170 lineal feet

Hours Required	=	166,170 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**215 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
16,900 lineal feet

Hours Required	=	16,900 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**29**	**Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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24-3-09

Table:	24-3-10 Page 1
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988H Loader
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

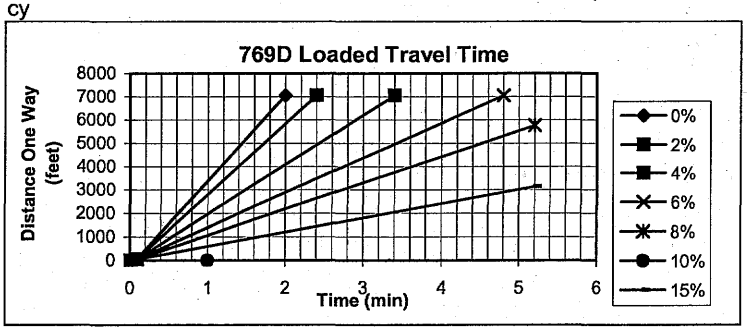
Characterization of Equipment Used (type, size. etc):

988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

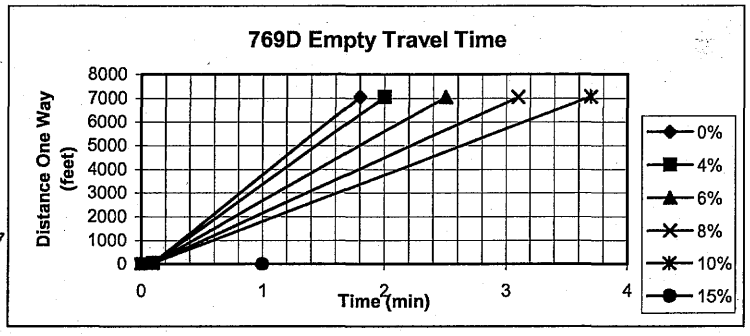
Productivity Factors

Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	4,500
Effective Grade (%)	6



Production Times

Haul Time (min)	3.0
Dump Time (min)	1.1
Return Time (min)	1.6
Truck/Loader Match (trucks per loader)	3
Riprap Haulage Requirement (cy)	52,767



Placement

Riprap Placement Requirement (ft)	8,450
Placement Rate (ft/shift)	500
Shift (hours)	8

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J-19 24-3-10
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Table: 24-3-10 (cont.) Page 2
Mine Area: J-19
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	3.0 Haul Time	+	1.1 Dump Time	+	1.60 Return Time	= 8.06 min
Fleet Productivity	=(	3 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	3 Loader/Truck Match	x	8.06 Truck Cycle Time	)x 60 min/hr = 197 cy/hr
Required Fleet Hours	=	52,767 Riprap Haulage Requirement	/	197 Fleet Productivity	x	1.371 Work Schedule Factor	=	**367 hrs**	

Placement Summary

Required Loader Hours	=(	8,450 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **185.4 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	J-19
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

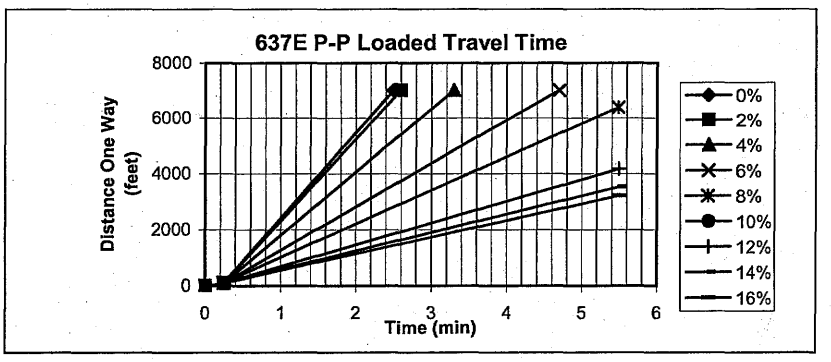
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

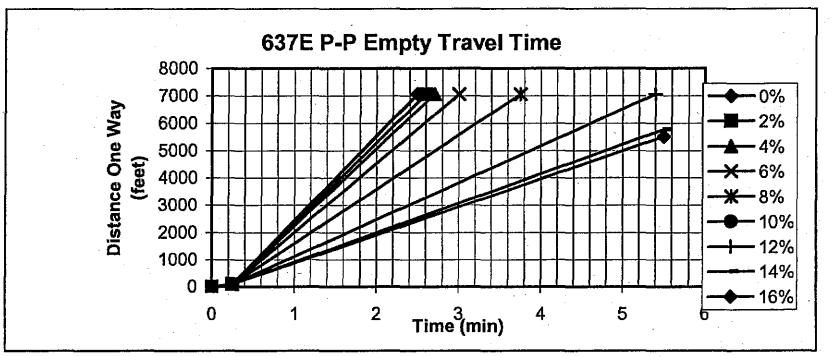
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
4,161,626





Cycle Time	=	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	= 4.6 min
Cycles/Hour	=	60 (min/hr)	/	4.6 (Cycle Time)	=	13 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	13.04 (Cycles/ Hour)	=	**404 cy/hr**			

Hours Required	=	4,161,626 (Volume)	/	404 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**14,115 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	J-19
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

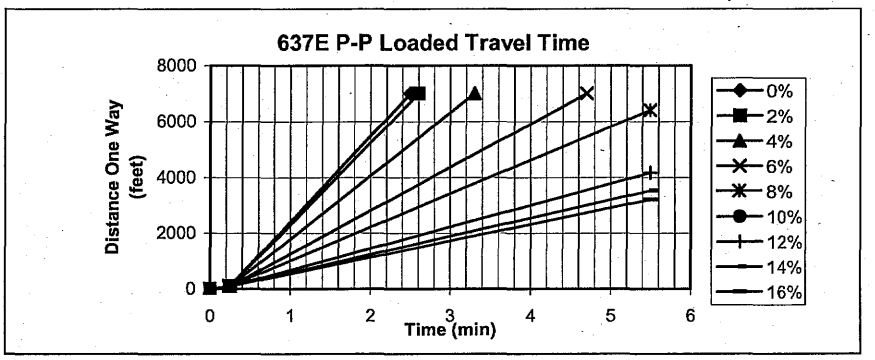
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

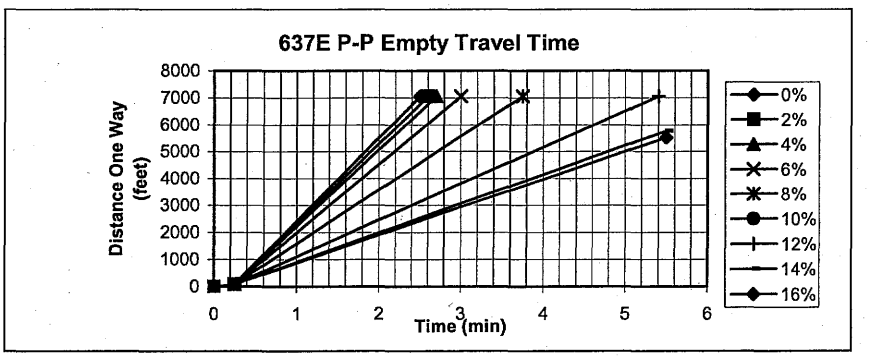
Loaded Distance (ft)	1,900
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	1,900
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	1.8
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved
6,936,043 cy





Cycle Time =	2.0 (Load Time)	+	1.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.2 (Empty Trip Time)	=	6.2 min
Cycles/Hour =	60 (min/hr)	/	6.2 (Cycle Time)	=	10 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	9.68 (Cycles/ Hour)	=	**300 cy/hr**				

Hours Required =	6,936,043 (Volume)	/	300 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**31,708 hrs**	

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2012

References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	J-19
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-19 Mining Area (Category I)

Revegetation Area

Area (acre)	2,687
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	2,687 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$4,158,133**

Reseeding Costs	=	2,687 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$1,387,836**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	J-19
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

J-19 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	158.0
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 158 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$244,505**

Reseeding Costs = 158 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$81,607**

References: Table 24-1-3 and 24-2-7.

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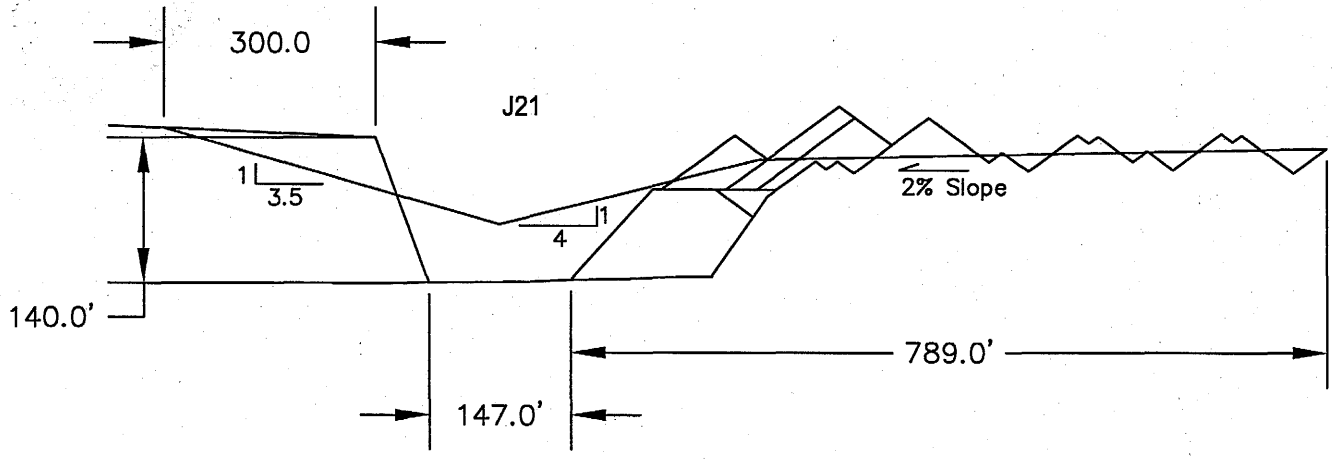
MINE AREA: J21 - SINGLE PIT

Worksheet No. 24-3-1

Earthwork Quantity Worksheet



HIGHWALL REDUCTION

Area = 6470

Pit Length = 5,200

Volume = 1,246,074

Swelled Volume = 1,557,593

SPOIL TO OPEN PIT

Spoil 1,2 = 1,363,556

SPOIL GRADING

Spoil 3,4 = 381,333

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SCALE

100' 0 100' 200'

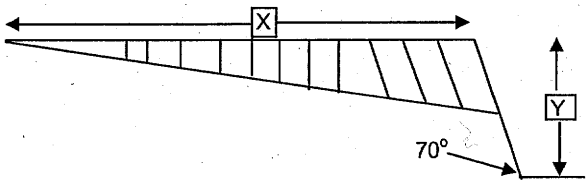
CONTOUR INTERVAL N/A

AutoCAD: J21FinalSection.dwg

Table:	24-3-02	Page 1
Mine Area:	J-21Single Width	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Atlas Copco Pit Viper 271	

Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271



Highwall Reduction Dimensions:

X (feet)	300
Y (feet)	140
Number of Rows	11

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	1,666
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	49	924
2	42	46	854
3	63	42	785
Total	126	137	2,563

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	1,951
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	36	672
5	105	33	607
6	126	29	541
7	147	26	476
8	168	22	411
9	189	19	345
10	210	15	280
11	231	12	215
Total	1,260	190	3,547

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: J-21Single Width
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Atlas Copco Pit Viper 271

Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,905
Blast 9 7/8"	$2,175
Explosives (per pound)[2]	$0.19
Drill Cost (per hour)	$362.37

Labor Costs

Driller Rate (per hour)	$33.47
Blaster Rate (per hour)	$34.55
Driller/Blaster Helper Rate (per hour)	$21.07

Cast Holes (Rows 1-3)

Total Drill Footage	=(	5,200 Pit Length	/	24 Drill Hole Spacing	)x	137 Total Drillhole Footage (Rows 1-3)	=	29,744	feet
Total Overburden Volume	=(	5,200 Pit Length	/	24 Drill Hole Spacing	)x	2,563 Total Overburden Volume (Rows 1-3)	=	555,217	cy
Drilling Time	=	29,744 Total Drill Footage	/	150 Drilling Rate	x	1.371 Work Schedule Factor	=	272	hours
Drilling Cost	=	272 Drilling Time	x(	$362.37 Drill Cost	+	$33.47 Driller Rate	+	$21.07 Driller Helper Rate	
	+(	1/370 Bit Life	x	$2,905 Bit Cost	))		=	**$115,511**	
Load and Blast Cost[1]	=(	272 Drilling Time	x	$34.55 Blaster Rate	x	$21.07 Blaster Helper Rate	)		
	+(	555,217 Total Overburden Volume	x	0.65 Powder Factor	x	$0.19 Explosive Cost	)	= **$266,535**	

Blast Holes (Rows 4 and up)

Total Drill Footage	=(	5,200 Pit Length	/	24 Drill Hole Spacing	)x	190 Total Drillhole Footage (Rows 4 and up)	=	41,167	feet
Total Overburden Volume	=(	5,200 Pit Length	/	24 Drill Hole Spacing	)x	3,547 Total Overburden Volume (Rows 4 and up)	=	768,444	cy
Drilling Time	=	41,167 Total Drill Footage	/	150 Drilling Rate	x	1.371 Work Schedule Factor	=	376	hours
Drilling Cost	=	376 Drilling Time	x(	$362.37 Drill Cost	+	$33.47 Driller Rate	+	$21.07 Driller Helper Rate	
	+(	1/170 Bit Life	x	$2,175 Bit Cost	))		=	**$161,732**	
Load and Blast Cost[1]	=(	376 Drilling Time	x	$34.55 Blaster Rate	x	$21.07 Blaster Helper Rate	)		
	+(	768,444 Total Overburden Volume	x	0.55 Powder Factor	x	$0.19 Explosive Cost	)	= **$354,296**	

Total Cost

$115,511 Drilling Cost (Cast Holes)	+	$266,535 Load and Blast Cost[1] (Cast Holes)	+	$161,732 Drilling Cost (Blast Holes)	+	$354,296 Load and Blast Cost[1] (Blast Holes)	=	**$898,075**

Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

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Table:	24-3-03
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,300
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

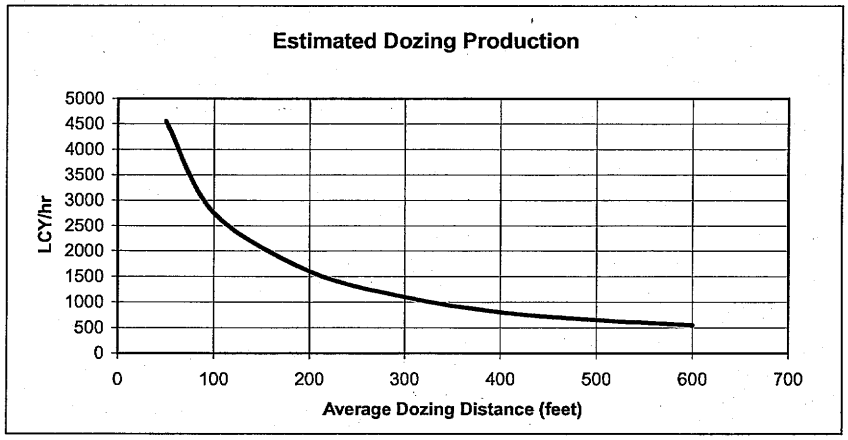
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,168,195



Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,300 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,121 cy/hr**

Hours Required = 1,168,195 (Volume to be Moved) / 1,121 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,429 Hours**

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

Single Width 24-3-03
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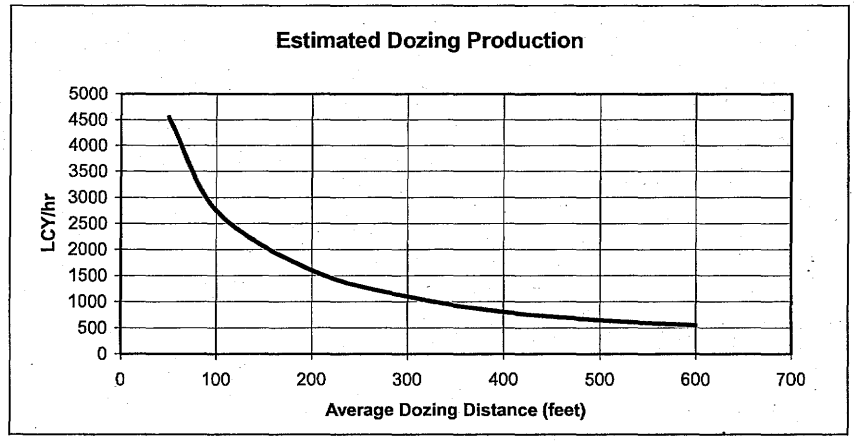
Table:	24-3-04
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,363,556

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,139 cy/hr**

Hours Required = 1,363,556 (Volume to be Moved) / 1,139 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,643 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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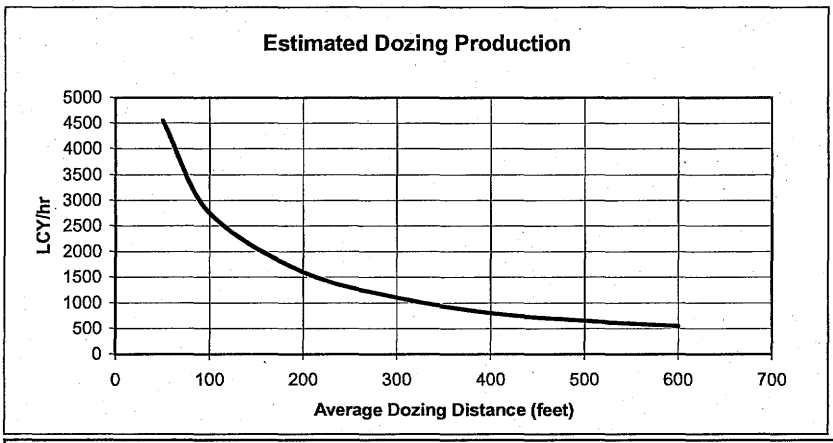
Table:	24-3-05
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility
(i.e., dust, rain, snow, fog, or darkness) (0.8) no

Elevation Factor
<7,500 feet (1.0) yes

Quantity of Material to be Moved (cy)
381,333

Productivity Adjustment Factor	=	0.75 Operator Factor	x	1.20 Material Factor	x	1.2 Grade Factor	x	0.82 Density Correction	
	x	1.00 Production Method	x	1.00 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	= **0.89**

Net Hourly Production	=	1,600 Normal Hourly Production (see graph above)	x	0.89 Operating Adjustment Factor	=	**1,419 cy/hour**

Hours Required	=	381,333 Volume to be Moved	/	1,419 Net Hourly Production	x	1.371 Work Schedule Factor	=	**368 hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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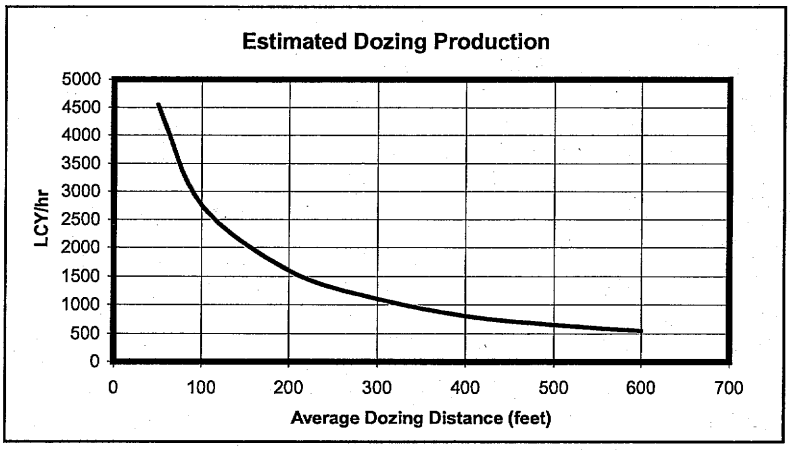
Table:	24-3-06
Mine Area:	J-21Single Width
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,404,922

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 1,404,922 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,629 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	J-21Single Width
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity
Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)
D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded
251 acres

Hours Required	=	251	/	0.125	x	1.371	=	**2,754 Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
155,620 lineal feet

Hours Required	=	155,620 /	1,060 x	1.371	=	**201 Hours**
		Terrace Requirement (ft)	Production Rate (ft/hr)	Work Schedule Factor		

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
12,200 lineal feet

Hours Required	=	12,200 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**21 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

JAN 28 '09
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Table:	24-3-10 Page 1
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988H Loader
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size, etc):

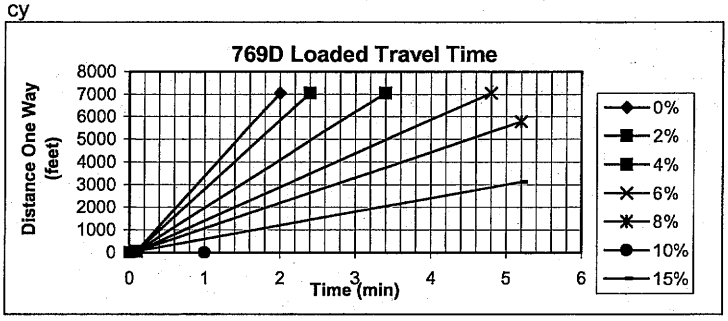
988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors	
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	3,300
Effective Grade (%)	8
Production Times	
Haul Time (min)	4.4
Dump Time (min)	1.1
Return Time (min)	2.2
Truck/Loader Match (trucks per loader)	4
Riprap Haulage Requirement (cy)	24,267

Placement

Riprap Placement Requirement (ft)	6,100
Placement Rate (ft/shift)	500
Shift (hours)	8



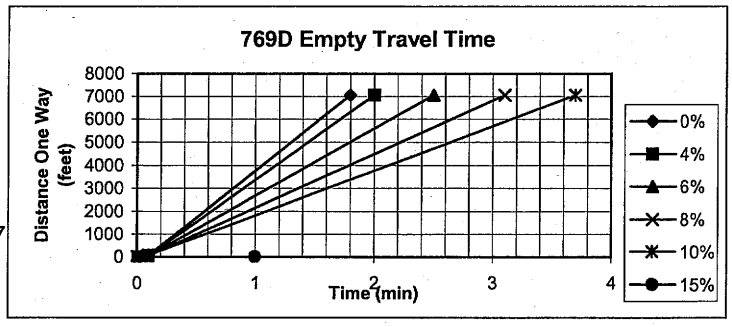


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Table: 24-3-10 (cont.) Page 2
Mine Area: J-21Single Width
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=(	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	4.4 Haul Time	+	1.1 Dump Time	+	2.20 Return Time	=	10.06 min			
Fleet Productivity	=(	4 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	4 Loader/Truck Match	x	10.06 Truck Cycle Time	)x	60 min/hr	=	158 cy/hr	
Required Fleet Hours	=	24,267 Riprap Haulage Requirement	/	158 Fleet Productivity	x	1.371 Work Schedule Factor	=	**210 hrs**					

Placement Summary

Required Loader Hours	=(	6,100 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	=	**134 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11	
Mine Area:		J-21Single Width
Project:		Topsoil/Suitable Material Replacement
Task:		Suitable Material Placement
Equipment:		637E P-P Scraper

Earthmoving Activity

Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

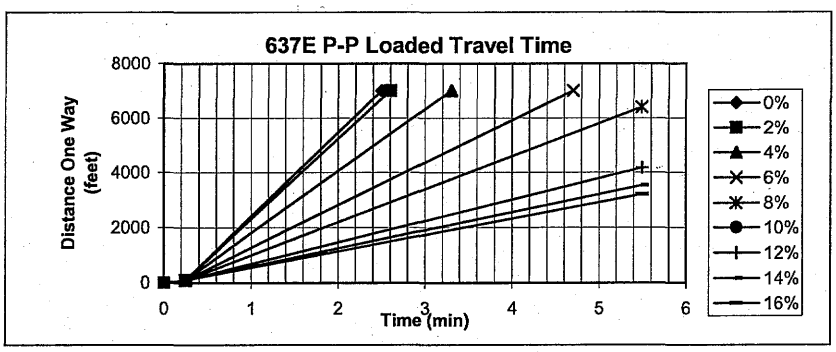
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

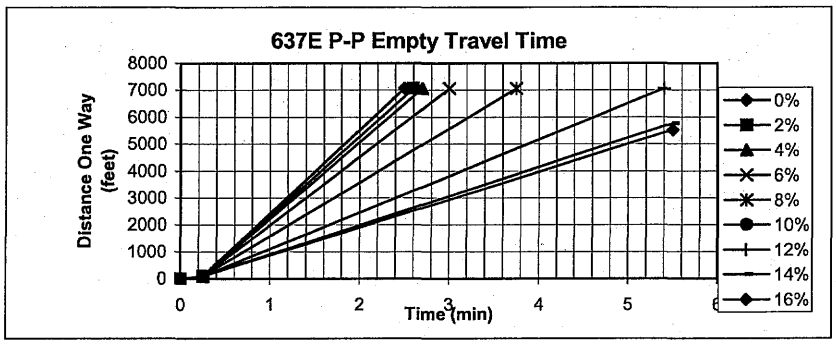
Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)

839,450





Cycle Time	=	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	= 4.6 min
Cycles/Hour	=	60 (min/hr)	/	4.6 (Cycle Time)	=	13 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	13.04 (Cycles/ Hour)	=	**404 cy/hr**			

Hours Required	=	839,450 (Volume)	/	404 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**2,847 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

24-3-11
JAN 2012
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Table:	24-3-12
Mine Area:	J-21Single Width
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

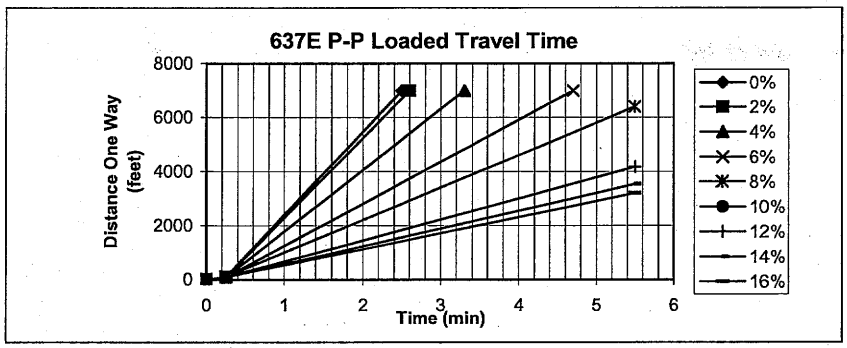
Loaded Distance (ft)	2,000
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	2,000
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

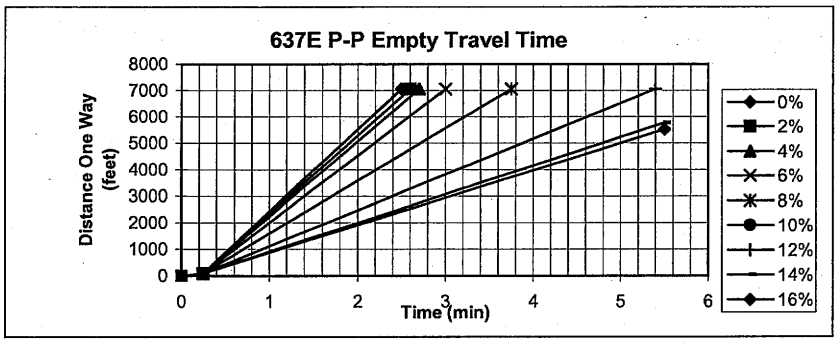
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	1.8
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved (cy)

1,399,083





Cycle Time	=	2.0 (Load Time)	+	1.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.2 (Empty Trip Time)	= 6.2 min
Cycles/Hour	=	60 (min/hr)	/	6.2 (Cycle Time)	=	10 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	9.68 (Cycles/ Hour)	=	**300 cy/hr**			

Hours Required	=	1,399,083 (Volume)	/	300 (Hourly Production)	x	1.371 (Work Schedule Factor)	= **6,396 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

APPROVED

Table:	24-3-13
Mine Area:	J-21Single Width
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mining Area (Category I)

Revegetation Area

Area (acre)	542
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	542 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$838,745**

Reseeding Costs	=	542 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$279,943**

References: Table 24-1-3 and 24-2-7.

JAN 2012
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Table:	24-3-14
Mine Area:	J-21Single Width
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	12
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 12 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$18,570**

Reseeding Costs = 12 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$6,198**

References: Table 24-1-3 and 24-2-7.

2012
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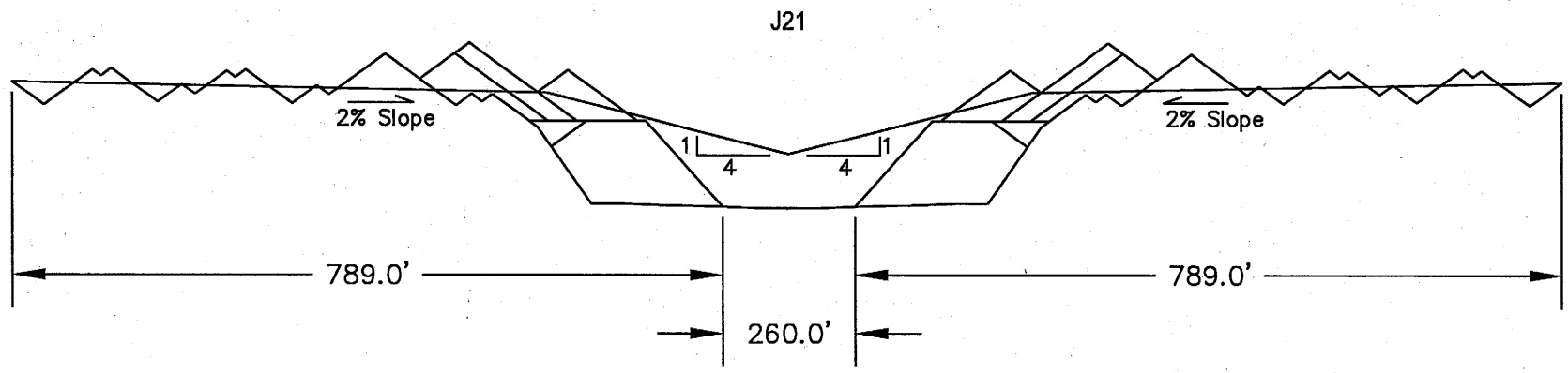
MINE AREA: J21 - DOUBLE-WIDE PIT

Worksheet No. 24-3-1

Earthwork Quantity Worksheet



HIGHWALL REDUCTION

Area = 0

Pit Length = 6,050

Volume = 0

Swelled Volume = 0

SPOIL TO OPEN PIT

Spoil 1,2 = 3,603,111

SPOIL GRADING

Spoil 3,4 = 644,213

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SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

AutoCAD: J21FinalSection.dwg

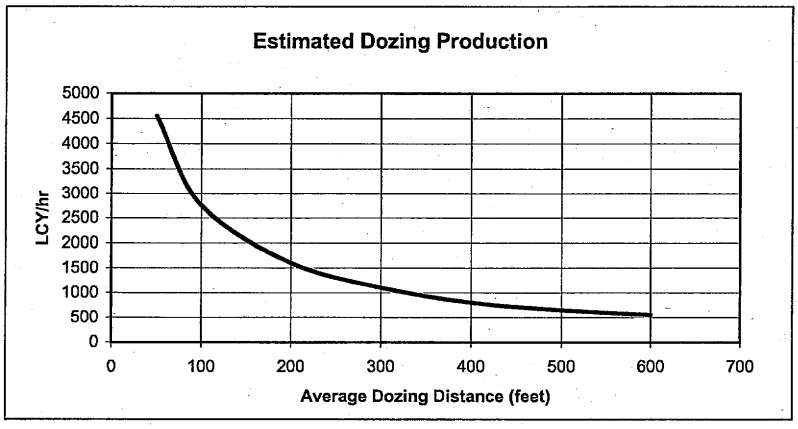
Table:	24-3-04
Mine Area:	J-21 Double Width
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	340
Hourly production (from chart)	1,000
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
3,603,111

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.5 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.11**

Net Hourly Production = 1,000 (Normal Hourly Production (see graph above)) x 1.11 (Productivity Adjustment Factor) = **1,109 cy/hr**

Hours Required = 3,603,111 (Volume to be Moved) / 1,109 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,456 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

APPROVED

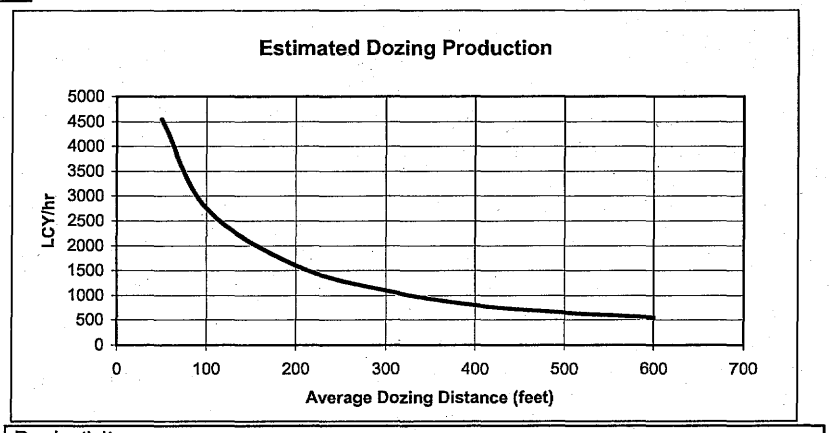
Table:	24-3-05
Mine Area:	J-21 Double Width
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.5 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.11**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.11 (Operating Adjustment Factor) = **1,220 cy/hour**

Hours Required = 644,213 (Volume to be Moved) / 1,220 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **724 hours**

Quantity of Material to be Moved (cy)
644,213

References: Table 24-2-3, Cat Handbook, Ed. 28.

JAN 2012
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Table:	24-3-06
Mine Area:	J-21 Double Width
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

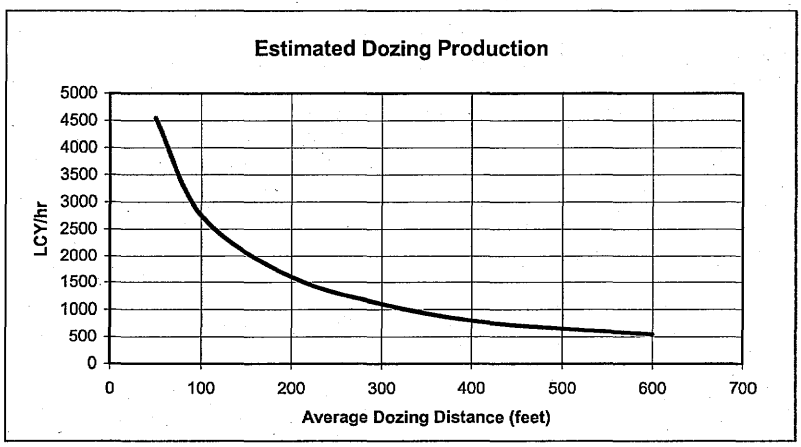
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,170,359 cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 1,170,359 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,357 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

JAN 2012
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Table:	24-3-07
Mine Area:	J-21 Double Width
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

173 acres

Hours Required	=	173 / Area to be Graded (acres)	0.125 x Net Hourly Production (acres/hr)	1.371 Work Schedule Factor	=	**1,898 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

JAN 2012
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Table:	24-3-08
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
80,730 lineal feet

Hours Required	=	80,730 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**104 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

JAN 2012
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Table:	24-3-09
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
12,670 lineal feet

Hours Required	=	12,670 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	22 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

JAN 2012
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Table:	24-3-10 Page 1
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988H Loader
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

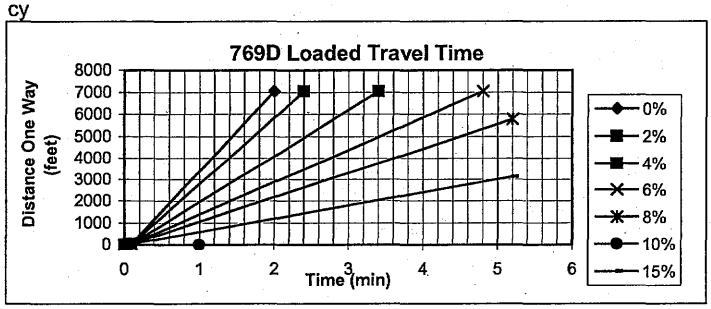
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	5

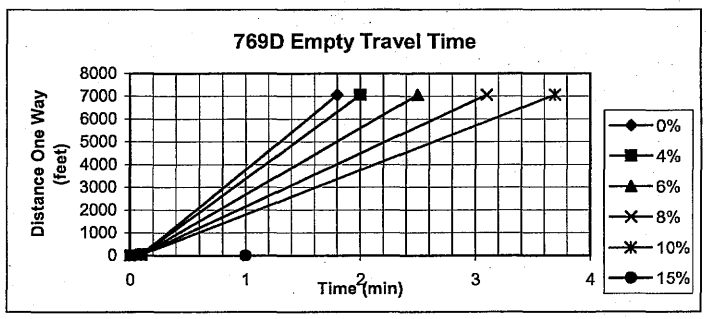
Production Times

Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.7
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	26,650

Placement

Riprap Placement Requirement (ft)	6,335
Placement Rate (ft/shift)	500
Shift (hours)	8





JAN 2012
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Table: 24-3-10 (cont.) Page 2
Mine Area: J-21 Double Width
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	=	0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy				
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min				

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.70 Return Time	=	4.96 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.96 Truck Cycle Time	)x	60 min/hr = 321 cy/hr
Required Fleet Hours	=	26,650 Riprap Haulage Requirement	/	321 Fleet Productivity	x	1.371 Work Schedule Factor	=	**114 hrs**		

Placement Summary

Required Loader Hours	=(	6,335 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	=	**139 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

JAN 2012
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Table:	24-3-11
Mine Area:	J-21 Double Width
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

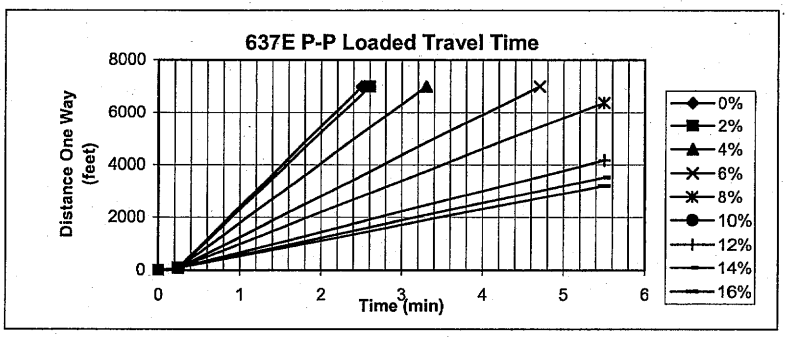
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

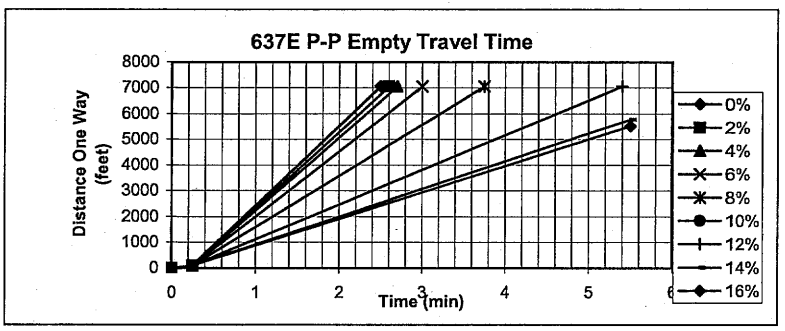
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved (cy)
662,886





Cycle Time	=	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.2 (Empty Trip Time)	= 5.2 min
Cycles/Hour	=	60 (min/hr)	/	5.2 (Cycle Time)	=	12 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	11.54 (Cycles/ Hour)	=	**358 cy/hr**			

Hours Required	=	662,886 (Volume)	/	358 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**2,542 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-3-12
Mine Area:	J-21 Double Width
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

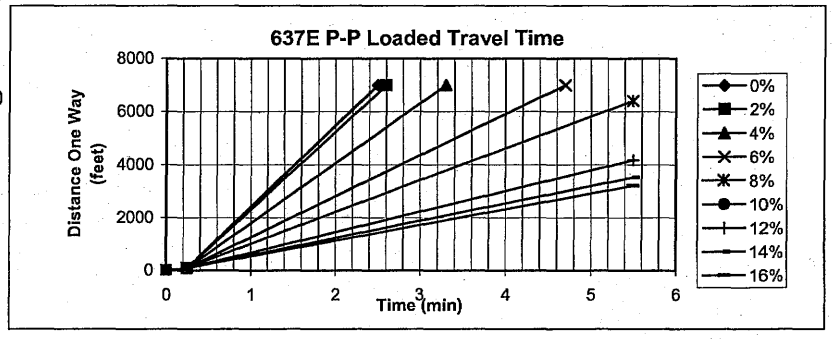
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

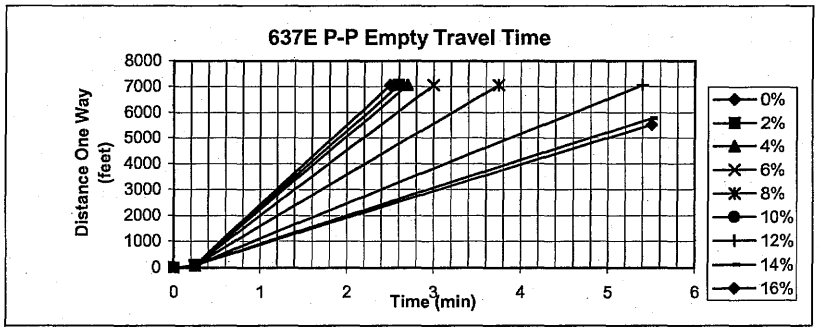
Loaded Distance (ft)	2,200
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	2,200
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	2.4
Loaded Travel Time (from chart)	2.2
Empty Travel Time (from chart)	1.0

Quantity of Material to be Moved (cy)
1,104,811





Cycle Time	=	2.0 Load Time	+	2.2 Loaded Trip Time	+	2.4 Maneuver and Spread Time	+	1.0 Empty Trip Time	= 7.6 min
Cycles/Hour	=	60 min/hr	/	7.6 Cycle Time	=	8 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	7.89 Cycles/ Hour	=	**245 cy/hr**			

Hours Required	=	1,104,811 Volume	/	245 Hourly Production	x	1.371 Work Schedule Factor	=	**6,191 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-3-13
Mine Area:	J-21 Double Width
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Expansion Mining Area (Category I)

Revegetation Area	
Area (acre)	428
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	428 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$662,330**

Reseeding Costs	=	428 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$221,062**

References: Table 24-1-3 and 24-2-7.

JAN 2012
APPROVED

Table:	24-3-14
Mine Area:	J-21 Double Width
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Expansion Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	154
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 154 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs and fencing) = **$238,315**

Reseeding Costs = 154 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$79,541**

References: Table 24-1-3 and 24-2-7.

JAN 2012
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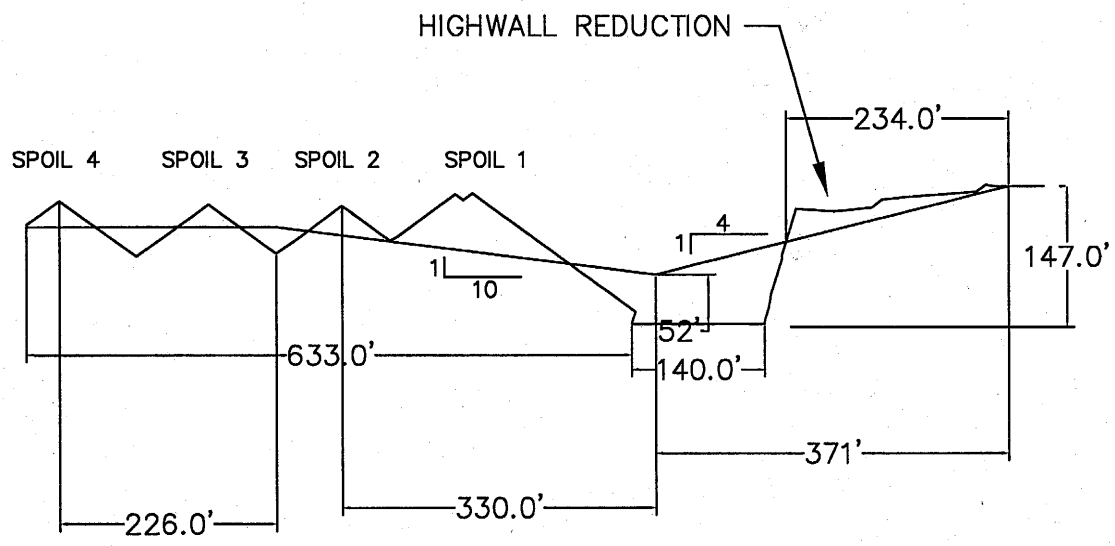
MINE AREA: N9

Worksheet No. 24-3-1

Earthwork Quantity Worksheet



HIGHWALL REDUCTION

Area = 3,240 ft

Pit Length = 8,800 ft

Volume = 1,056,000 cy

Swelled Volume = 1,320,000 cy

SPOIL TO OPEN PIT

Spoil 1,2= 2,418,696 cy

SPOIL GRADING

Spoil 3,4 = 804,059 cy

SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

JAN 2012

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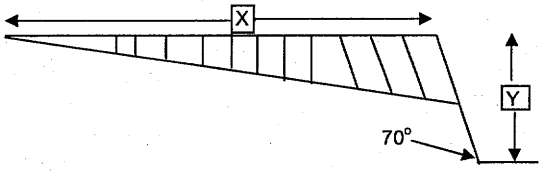
AutoCAD: N9FinalSection.dwg

Table:	24-3-02	Page 1
Mine Area:	N-9	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Atlas Copco Pit Viper 271	

Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271



Highwall Reduction Dimensions:

X (feet)	234
Y (feet)	147
Number of Rows	9

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	1,859
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	57	1058
2	42	51	954
3	63	45	849
Total	126	153	2,861

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	1,502
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	38	700
5	105	32	602
6	126	27	504
7	147	22	406
8	168	17	308
9	189	11	210
Total	819	146	2,730

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

JAN 2012
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Table: 24-3-02 (cor Page 2
Mine Area: N-9
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Atlas Copco Pit Viper 271

Activity Description
Drill, load, and blast highwall

Drill Rig is Atlas Copco Pit Viper 271

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,905
Blast 9 7/8"	$2,175
Explosives (per pound)[2]	$0.19
Drill Cost (per hour)	$362.37

Labor Costs

Driller Rate (per hour)	$33.47
Blaster Rate (per hour)	$34.55
Driller/Blaster Helper Rate (per hour)	$21.07

Cast Holes (Rows 1-3)

Total Drill Footage =(8,800 (Pit Length) / 24 (Drill Hole Spacing))x 153 (Total Drillhole Footage (Rows 1-3)) = 56,189 feet

Total Overburde Volume =(8,800 (Pit Length) / 24 (Drill Hole Spacing))x 2,861 (Total Overburden Volume (Rows 1-3)) = 1,048,854 cy

Drilling Time = 56,189 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 514 hours

Drilling Cost = 514 (Drilling Time) x($362.37 (Drill Cost) + $33.47 (Driller Rate) + $21.07 (Driller Helper Rate)
+(1/370 (Bit Life) x $2,905 (Bit Cost))= **$218,210**

Load and Blast Cost[1] =(514 (Drilling Time) x $34.55 (Blaster Rate) x $21.07 (Blaster Helper Rate))
+(1,048,854 (Total Overburden Volume) x 0.65 (Powder Factor) x $0.19 (Explosive Cost))= **$503,508**

Blast Holes (Rows 4 and up)

Total Drill Footage =(8,800 (Pit Length) / 24 (Drill Hole Spacing))x 146 (Total Drillhole Footage (Rows 4 and up)) = 53,625 feet

otal Overburde Volume =(8,800 (Pit Length) / 24 (Drill Hole Spacing))x 2,730 (Total Overburden Volume (Rows 4 and up)) = 1,001,000 cy

Drilling Time = 53,625 (Total Drill Footage) / 150 (Drilling Rate) x 1.371 (Work Schedule Factor) = 490 hours

Drilling Cost = 490 (Drilling Time) x($362.37 (Drill Cost) + $33.47 (Driller Rate) + $21.07 (Driller Helper Rate)
+(1/170 (Bit Life) x $2,175 (Bit Cost))= **$210,678**

Load and Blast Cost[1] =(490 (Drilling Time) x $34.55 (Blaster Rate) x $21.07 (Blaster Helper Rate))
+(1,001,000 (Total Overburden Volume) x 0.55 (Powder Factor) x $0.19 (Explosive Cost))= **$461,517**

Total Cost

$218,210 (Drilling Cost (Cast Holes)) + $503,508 (Load and Blast Cost[1] (Cast Holes)) + $210,678 (Drilling Cost (Blast Holes)) + $461,517 (Load and Blast Cost[1] (Blast Holes)) = **$1,393,914**

Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.
References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

JAN 2012
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Table:	24-3-03
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

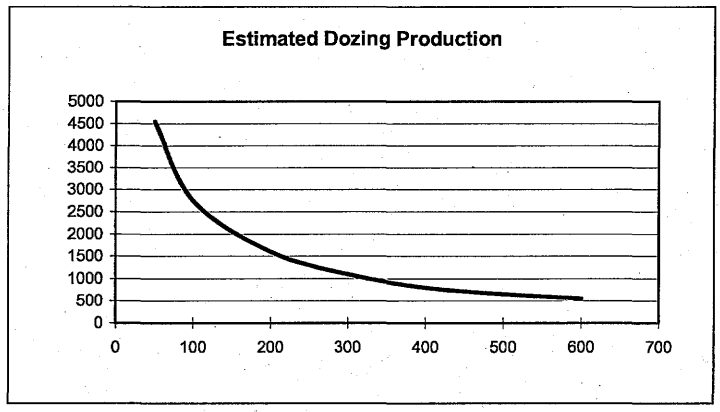
Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.5 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.92**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.92 (Productivity Adjustment Factor) = **1,479 cy/hr**

Hours Required = 990,000 (Volume to be Moved) / 1,479 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **918 Hours**

Quantity of Material to be Moved (cy)
990,000

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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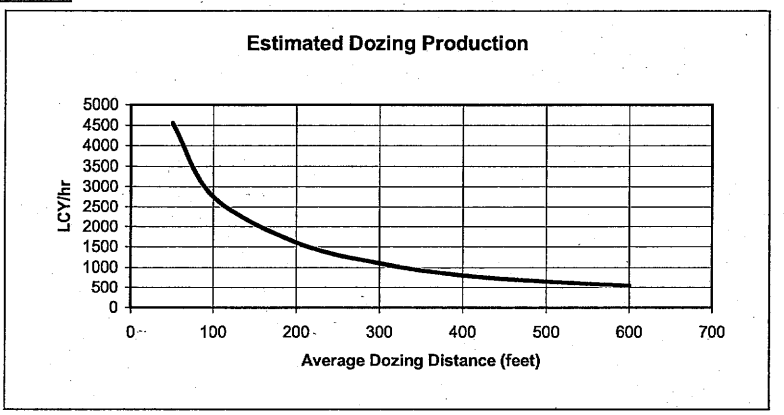
Table:	24-3-04
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes



Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-10
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,418,696

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction)
x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,139 cy/hr**

Hours Required = 2,418,696 (Volume to be Moved) / 1,139 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,914 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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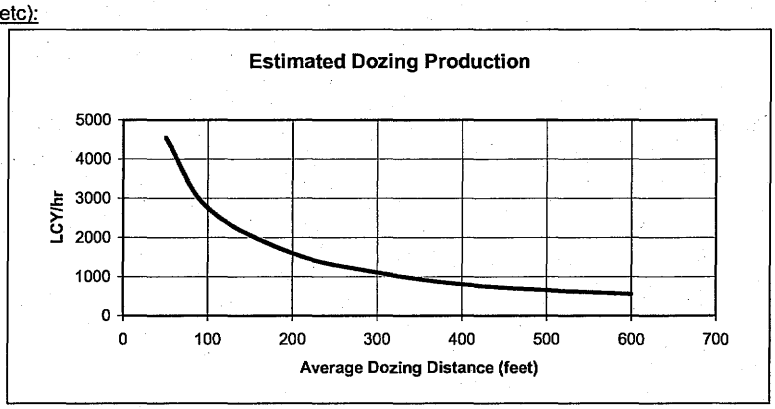
Table:	24-3-05
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes



Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	0
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **976 cy/hour**

Hours Required = 804,059 (Volume to be Moved) / 976 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,130 hours**

Quantity of Material to be Moved (cy)
804,059

References: Table 24-2-3, Cat Handbook, Ed. 28.

JAN 2012
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Table:	24-3-06
Mine Area:	N-9
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

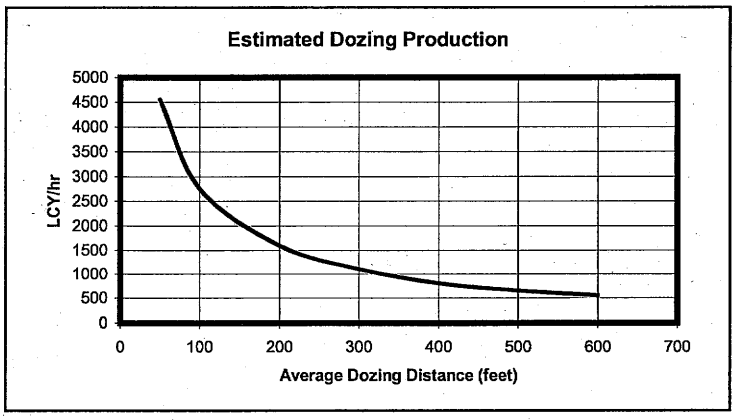
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,691,338



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 1,691,338 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,961 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

JAN 2012
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Table:	24-3-07
Mine Area:	N-9
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

483 acres

Hours Required	=	483 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**5,299 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

JAN 2012
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Table:	24-3-08
Mine Area:	N-9
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
129,920 lineal feet

Hours Required	=	129,920 /	1,060 x	1.371 =	**168 Hours**
		Terrace Requirement (ft)	Production Rate (ft/hr)	Work Schedule Factor	

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

JAN 2012
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Table:	24-3-09
Mine Area:	N-9
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
11,300 lineal feet

Hours Required	=	11,300 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	19	Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10	Page 1
Mine Area:	N-9	
Project:	Surface Stabilization	
Task:	Load, haul, and place riprap	
Equipment:	988H Loader	
	769D Rear Dump Truck	

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size, etc):

988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

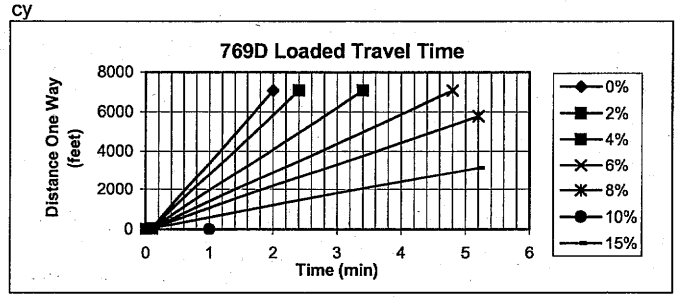
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	5

Production Times

Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.7
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	24,467

Placement

Riprap Placement Requirement (ft)	5,650
Placement Rate (ft/shift)	500
Shift (hours)	8



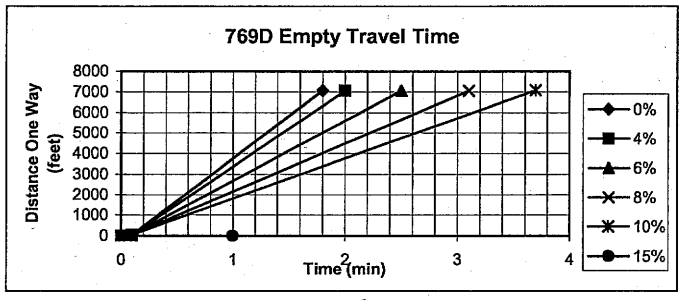


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Table: 24-3-10 (cont.) Page 2
Mine Area: N-9
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.70 Return Time	= 4.96 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.96 Truck Cycle Time	)x 60 min/hr = 321 cy/hr
Required Fleet Hours	=	24,467 Riprap Haulage Requirement	/	321 Fleet Productivity	x	1.371 Work Schedule Factor	=	**105 hrs**	

Placement Summary

Required Loader Hours	=(	5,650 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **124.0 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-9
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

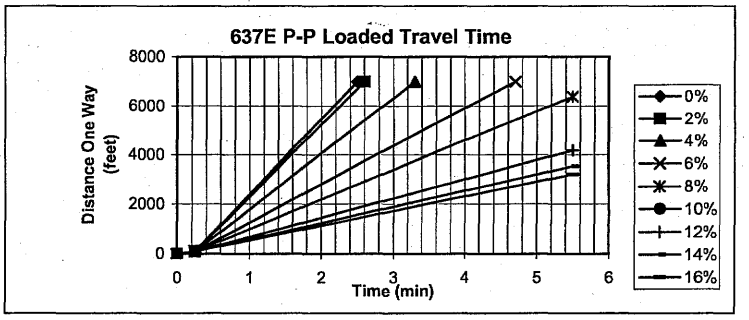
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

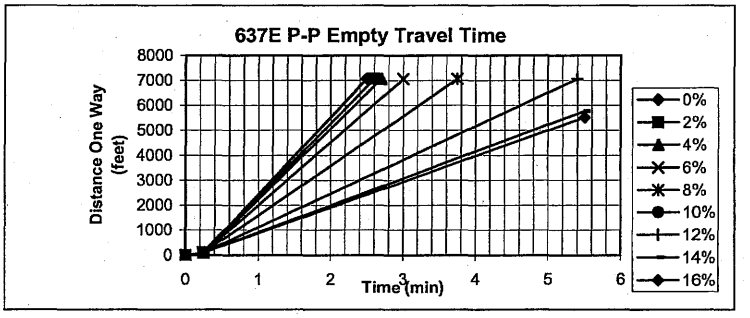
Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved (cy)

1,462,067





Cycle Time	=	2.0 Load Time	+	0.8 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.2 Empty Trip Time	= 5.2 min
Cycles/Hour	=	60 min/hr	/	5.2 Cycle Time	=	12 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	11.54 Cycles/ Hour	=	**358 cy/hr**			

Hours Required	=	1,462,067 Volume	/	358 Hourly	x	1.371 Work Schedule	=	**5,606 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	N-9
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity. etc)
637E P-P Scraper - capacity = 31 cy

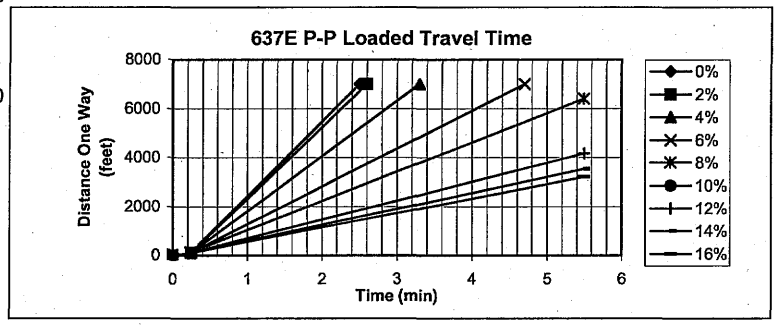
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

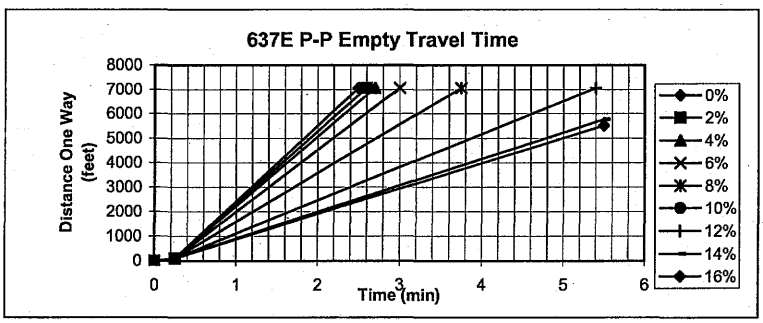
Loaded Distance (ft)	3,300
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,300
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.8
Loaded Travel Time (from chart)	2.8
Empty Travel Time (from chart)	1.3

Quantity of Material to be Moved (cy)
2,436,779





Cycle Time =	2.0 Load Time	+	2.8 Loaded Trip Time	+	1.8 Maneuver and Spread Time	+	1.3 Empty Trip Time	=	7.9 min
Cycles/Hour =	60 min/hr	/	7.9 Cycle Time	=	8 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	7.59 Cycles/ Hour	=	**235 cy/hr**				

Hours Required =	2,436,779 Volume	/	235 Hourly Production	x	1.371 Work Schedule Factor	=	**14,194 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

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Table:	24-3-13
Mine Area:	N-9
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-9 Mining Area (Category I)

Revegetation Area

Area (acre)	944
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	944 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$1,460,840**

Reseeding Costs	=	944 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$487,576**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-9
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpiles
Equipment:	Miscellaneous

Revegetation Area Description
N-9 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	45
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	45 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$69,638**

Reseeding Costs	=	45 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$23,243**

References: Table 24-1-3 and 24-2-7.

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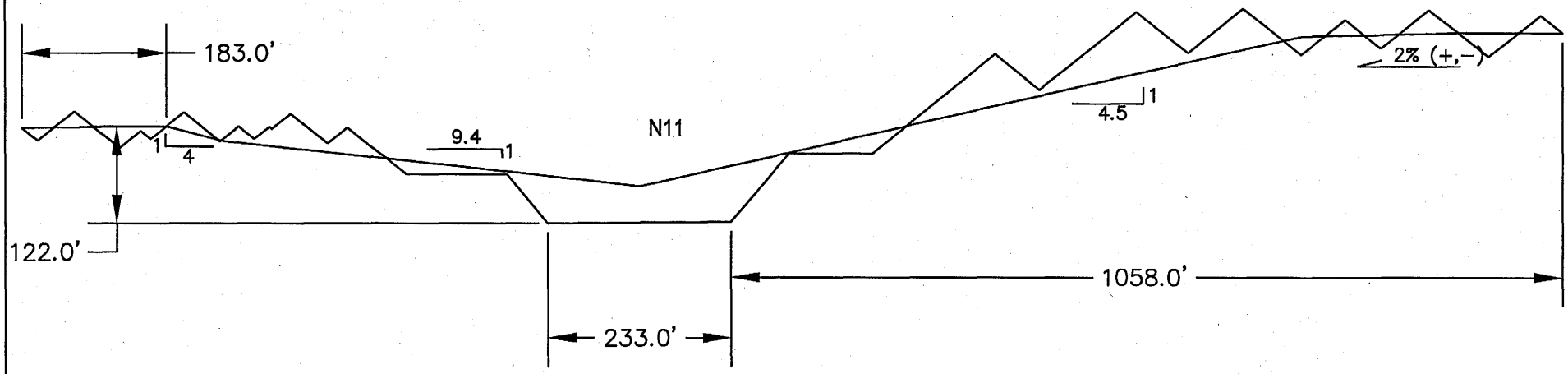
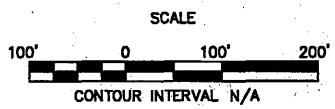
MINE AREA: N11

Worksheet No. 24-3-1

Earthwork Quantity Worksheet





HIGHWALL REDUCTION

Area = NA

Pit Length = 8,450

Volume = NA

Swelled Volume = NA

SPOIL TO OPEN PIT

Spoil 1,2 = 1,258,110 + 3,774,330 = 5,032,440

SPOIL GRADING

Spoil 3,4 = 899,770

AutoCAD: N11FinalSection.dwg

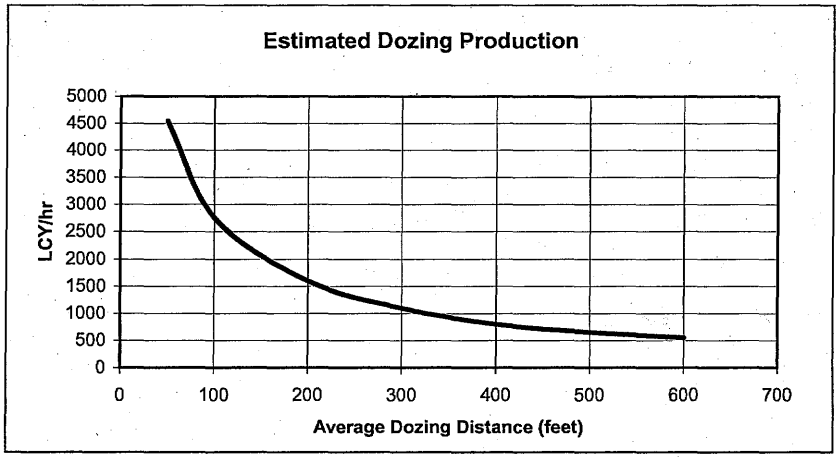
Table:	24-3-04
Mine Area:	N-11
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-22
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
5,032,444

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,139 cy/hr**

Hours Required = 5,032,444 (Volume to be Moved) / 1,139 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **6,062 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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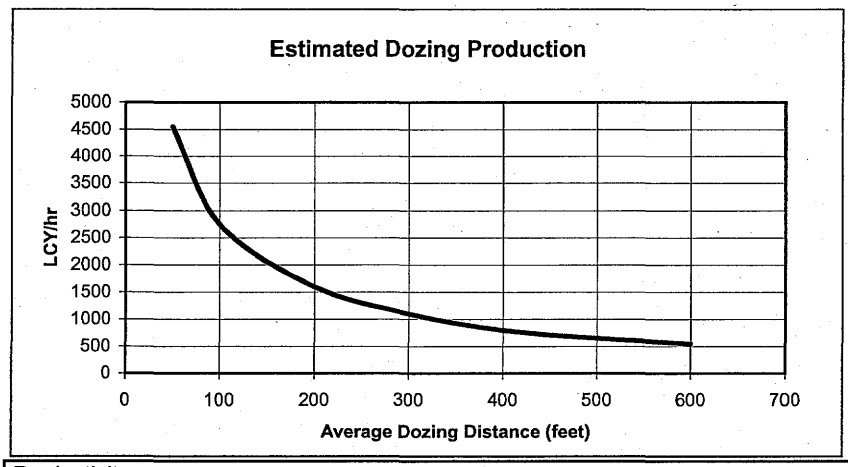
Table:	24-3-05
Mine Area:	N-11
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes



Description of Dozer Use:

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **976 cy/hour**

Hours Required = 899,769 (Volume to be Moved) / 976 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,264 hours**

Quantity of Material to be Moved (cy)
899,769

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-11
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

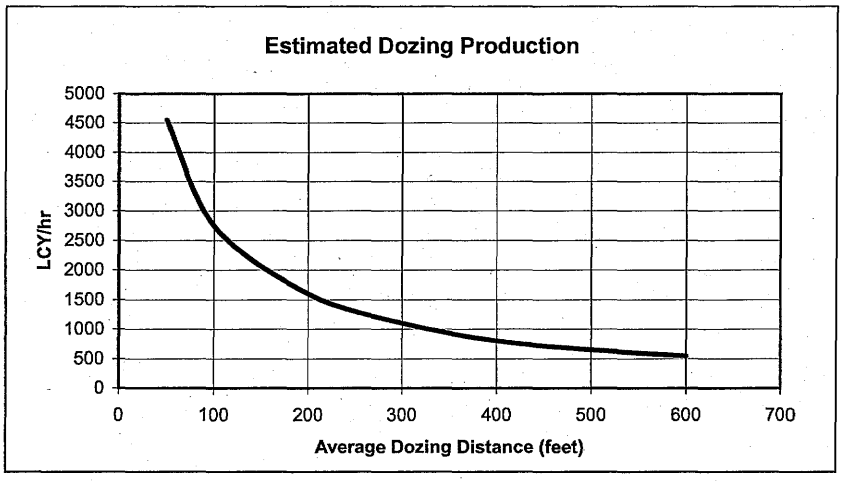
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)

780,239 cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 780,239 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **905 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-11
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

272 acres

Hours Required	=	272 /	0.125 x	1.371	=	**2,984 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

N-11 24-307
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Table:	24-3-08
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
129,920 lineal feet

Hours Required	=	129,920 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**168 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
11,300 lineal feet

Hours Required	=	11,300 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**19 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988H Loader
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

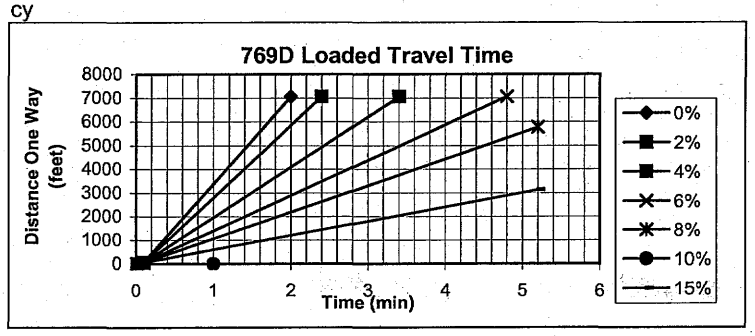
988H Loader - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors	
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	2
Production Times	
Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.7
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	24,467

Placement

Riprap Placement Requirement (ft)	5,650
Placement Rate (ft/shift)	500
Shift (hours)	8



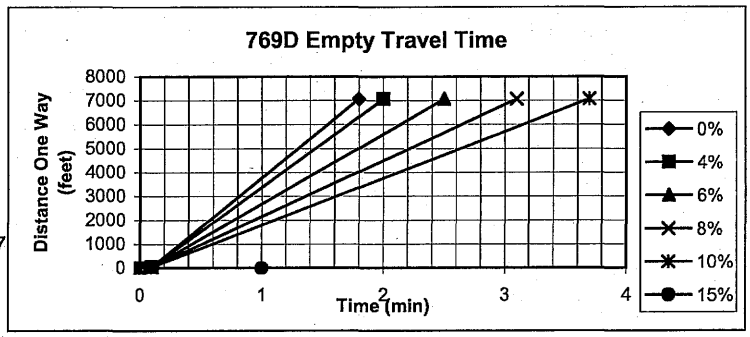


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Table: 24-3-10 (cont.) Page 2
Mine Area: N-11
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988H Loader
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.70 Return Time	= 4.96 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.96 Truck Cycle Time	)x 60 min/hr = 321 cy/hr
Required Fleet Hours	=	24,467 Riprap Haulage Requirement	/	321 Fleet Productivity	x	1.371 Work Schedule Factor	=	**105 hrs**	

Placement Summary

Required Loader Hours	=(	5,650 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **124 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-11
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

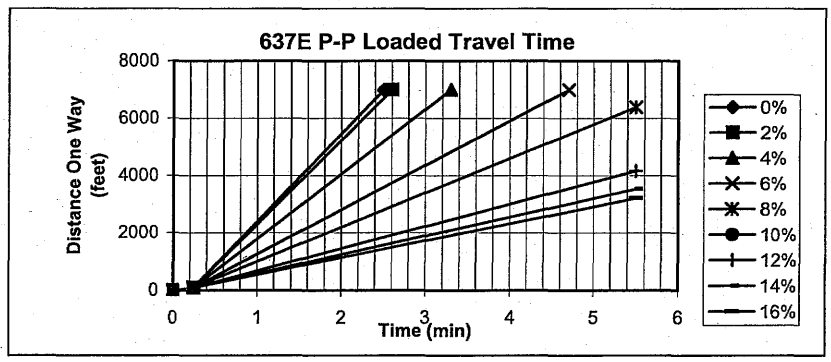
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

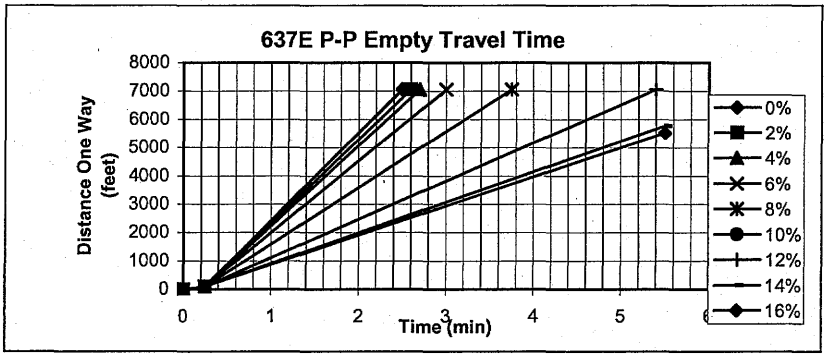
Production Times

Typical Load Time for 637E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.8

Quantity of Material to be Moved (cy)

808,474





Cycle Time =	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.8 (Empty Trip Time)	=	4.8 min
Cycles/Hour =	60 (min/hr)	/	4.8 (Cycle Time)	=	13 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	12.50 (Cycles/ Hour)	=	**388 cy/hr**				

Hours Required =	808,474 (Volume)	/	388 (Hourly)	x	1.371 (Work Schedule)	=	**2,861 hrs**	

References: Table 24-2-7, Cat Handbook, Ed. 28

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Table:	24-3-12
Mine Area:	N-11
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

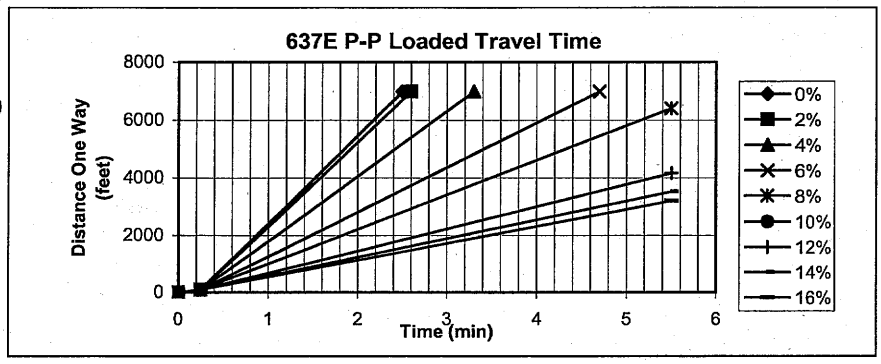
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

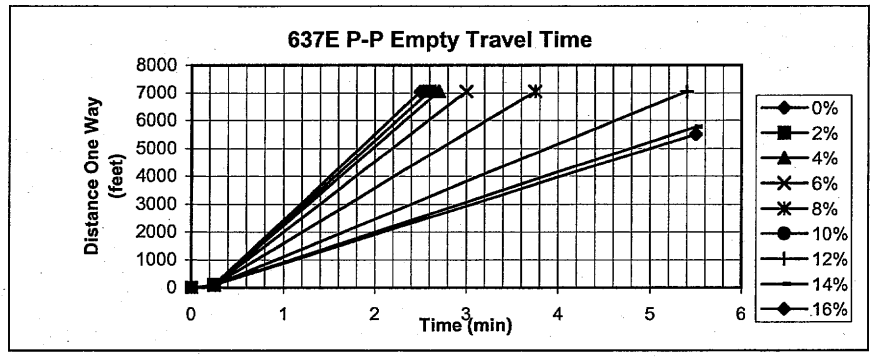
Loaded Distance (ft)	3,000
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,000
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.8
Loaded Travel Time (from chart)	3.0
Empty Travel Time (from chart)	1.8

Quantity of Material to be Moved (cy)
1,347,456





Cycle Time	=	2.0 (Load Time)	+	3.0 (Loaded Trip Time)	+	1.8 (Maneuver and Spread Time)	+	1.8 (Empty Trip Time)	= 8.6 min
Cycles/Hour	=	60 (min/hr)	/	8.6 (Cycle Time)	=	7 cycles/hr			
Hourly Production	=	31 (Adjusted Load (cy))	x	6.98 (Cycles/Hour)	=	**216 cy/hr**			

Hours Required	=	1,347,456 (Volume)	/	216 (Hourly Production)	x	1.371 (Work Schedule Factor)	= **8,544 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

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Table:	24-3-13
Mine Area:	N-11
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Mining Area (Category I)

Revegetation Area

Area (acre)	522
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	522 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$807,795**

Reseeding Costs	=	522 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$269,613**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-11
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

N-11 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	47
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	47 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$72,733**

Reseeding Costs	=	47 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$24,276**

References: Table 24-1-3 and 24-2-7.

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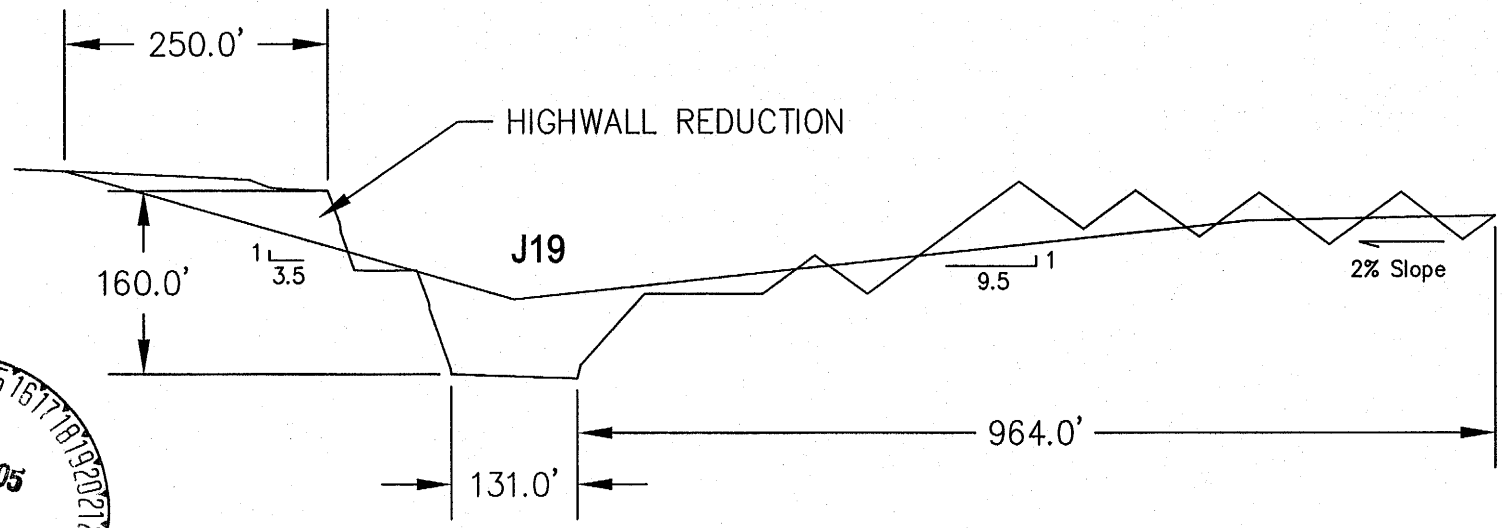
MINE AREA: J19

Worksheet No. 24-3-1

Earthwork Quantity Worksheet



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HIGHWALL REDUCTION

Area = 8,890
Pit Length = 39,900
Volume = 13,137,444
Swelled Volume = 16,421,800

SPOIL TO OPEN PIT

Spoil 1,2 = 13,817,220

SPOIL GRADING

Spoil 3,4 = 2,793,000

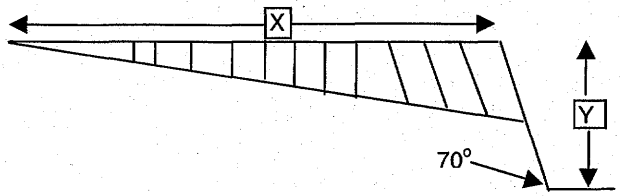
SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

AutoCAD: J19FinalSection.dwg

Table: 24-3-02 Page 1
Mine Area: J-19
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Driltech D55SP



Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP

Highwall Reduction Dimensions:

X (feet)	250
Y (feet)	160
Number of Rows	10

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	2,302
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	70	1300
2	42	63	1181
3	63	57	1061
Total	126	190	3,542

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	2,111
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	47	885
5	105	41	773
6	126	35	661
7	147	29	549
8	168	23	437
9	189	17	321
10	210	11	210
Total	1,029	206	3,838

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: J-19
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Driltech D55SP

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,400
Blast 9 7/8"	$1,800
Explosives (per pound)[2]	$0.10
Drill Cost (per hour)	$196.78

Labor Costs

Driller Rate (per hour)	$26.59
Blaster Rate (per hour)	$27.67
Driller/Blaster Helper Rate (per hour)	$13.14

Cast Holes (Rows 1-3)

Total Drill Footage =(39,900 Pit Length / 24 Drill Hole Spacing)x 190 Total Drillhole Footage (Rows 1-3) = **315,422 feet**

Total Overburden Volume =(39,900 Pit Length / 24 Drill Hole Spacing)x 3,542 Total Overburden Volume (Rows 1-3) = **5,887,883 cy**

Drilling Time = 315,422 Total Drill Footage / 150 Drilling Rate x 1.371 Work Schedule Factor = **2,884 hours**

Drilling Cost = 2,884 Drilling Time x($196.78 Drill Cost + $26.59 Driller Rate + $13.14 Driller Helper Rate
+(1/370 Bit Life x $2,400 Bit Cost))= **$700,781**

Load and Blast Cost[1] =(2,884 Drilling Time x $27.67 Blaster Rate x $13.14 Blaster Helper Rate)
+(5,887,883 Total Overburden Volume x 0.65 Powder Factor x $0.10 Explosive Cost)= **$1,431,238**

Blast Holes (Rows 4 and up)

Total Drill Footage =(39,900 Pit Length / 24 Drill Hole Spacing)x 206 Total Drillhole Footage (Rows 4 and up) = **341,799 feet**

Total Overburden Volume =(39,900 Pit Length / 24 Drill Hole Spacing)x 3,838 Total Overburden Volume (Rows 4 and up) = **6,380,254 cy**

Drilling Time = 341,799 Total Drill Footage / 150 Drilling Rate x 1.371 Work Schedule Factor = **3,125 hours**

Drilling Cost = 3,125 Drilling Time x($196.78 Drill Cost + $26.59 Driller Rate + $13.14 Driller Helper Rate
+(1/170 Bit Life x $1,800 Bit Cost))= **$772,202**

Load and Blast Cost[1] =(3,125 Drilling Time x $27.67 Blaster Rate x $13.14 Blaster Helper Rate)
+(6,380,254 Total Overburden Volume x 0.55 Powder Factor x $0.10 Explosive Cost)= **$1,487,121**

Total Cost

$700,781 Drilling Cost (Cast Holes) + $1,431,238 Load and Blast Cost[1] (Cast Holes) + $772,202 Drilling Cost (Blast Holes) + $1,487,121 Load and Blast Cost[1] (Blast Holes) = **$4,391,342**

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Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

Table:	24-3-03
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

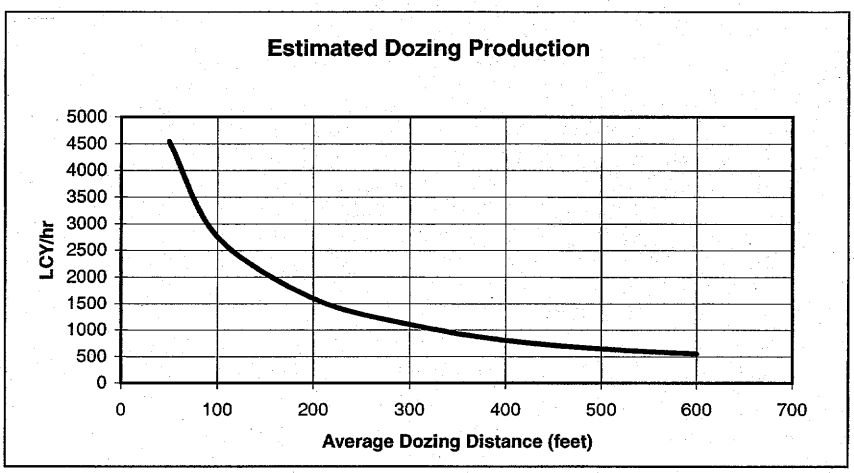
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
12,316,350



Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,380 cy/hr**

Hours Required = 12,316,350 (Volume to be Moved) / 1,380 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **12,240 Hours**

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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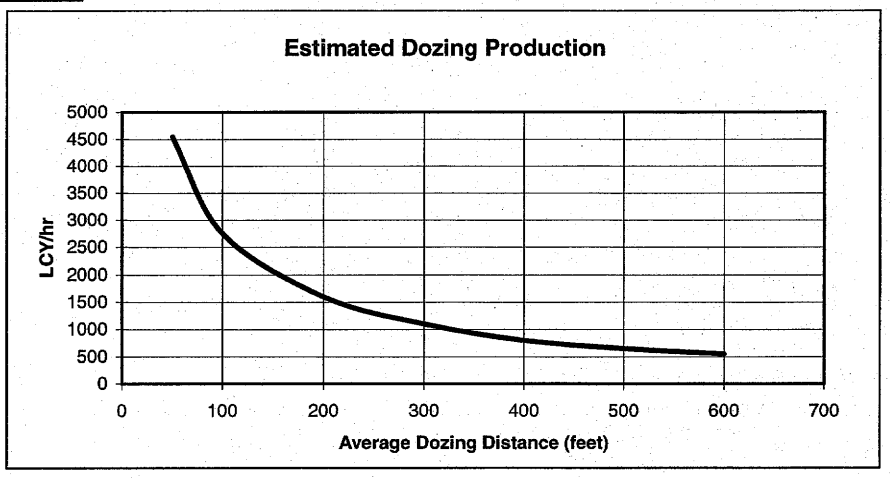
Table:	24-3-04
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
13,817,220

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,656 cy/hr**

Hours Required = 13,817,220 (Volume to be Moved) / 1,656 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **11,443 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-05
Mine Area:	J-19
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

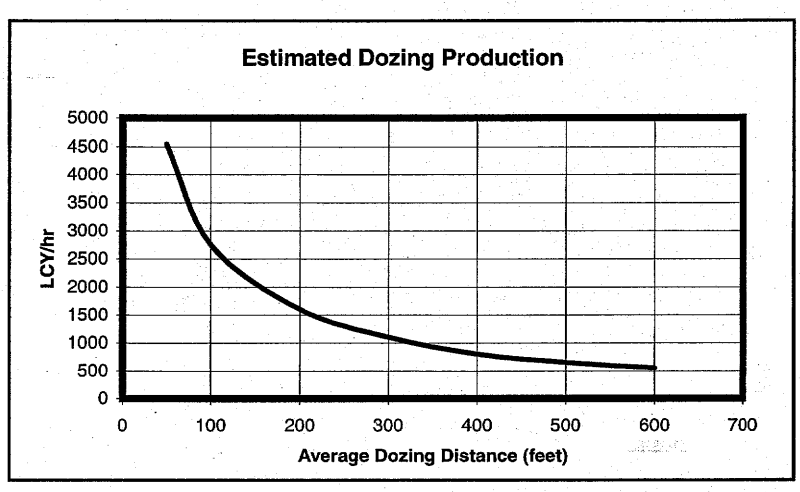
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 2,793,000 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,542 hours**

Quantity of Material to be Moved (cy)
2,793,000

References: Table 24-2-3, Cat Handbook, Ed. 28.

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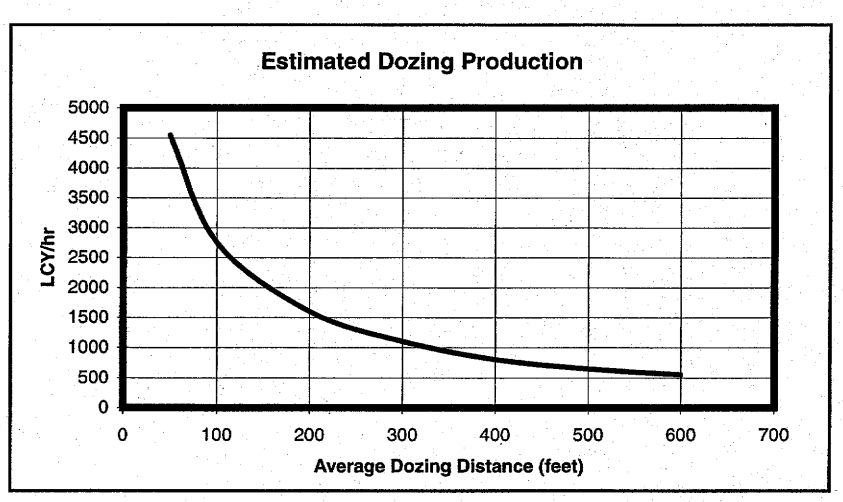
Table:	24-3-06
Mine Area:	J-19
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
6812151

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 6,812,151 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **7,898 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	J-19
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

488 acres

Hours Required	=	488 / Area to be Graded (acres)	0.125 x Net Hourly Production (acres/hr)	1.371 Work Schedule Factor	=	**5,354 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
166,170 lineal feet

Hours Required	=	166,170 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**215 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
16,900 lineal feet

Hours Required	=	16,900 / Drainages/Downdrain Requirement (ft)	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**29 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	J-19
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

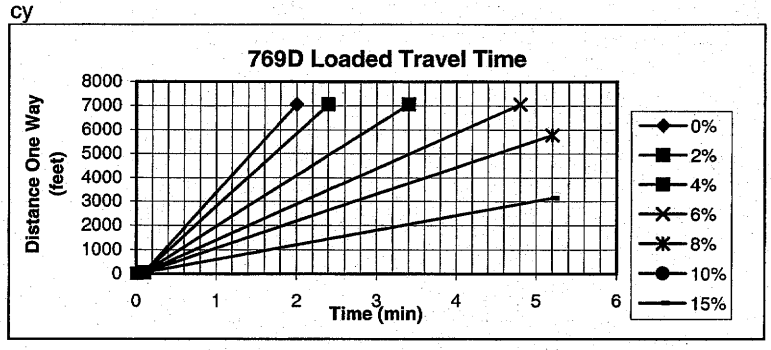
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	4,500
Effective Grade (%)	6

Production Times

Haul Time (min)	3.0
Dump Time (min)	1.1
Return Time (min)	1.6
Truck/Loader Match (trucks per loader)	3
Riprap Haulage Requirement (cy)	54,750

Placement

Riprap Placement Requirement (ft)	16,430
Placement Rate (ft/shift)	500
Shift (hours)	8



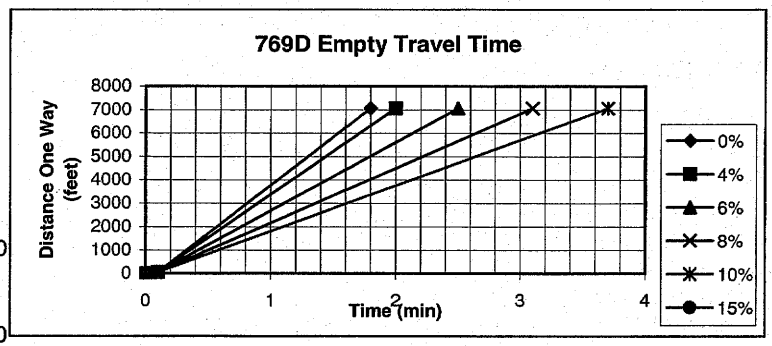


Table: 24-3-10 (cont.) Page 2
Mine Area: J-19
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	3.0 Haul Time	+	1.1 Dump Time	+	1.60 Return Time	= 8.06 min
Fleet Productivity	=(	3 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	3 Loader/Truck Match	x	8.06 Truck Cycle Time	)x 60 min/hr = 197 cy/hr
Required Fleet Hours	=	54,750 Riprap Haulage Requirement	/	197 Fleet Productivity	x	1.371 Work Schedule Factor	=	**380 hrs**	

Placement Summary

Required Loader Hours	=(	16,430 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **360.5 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	J-19
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

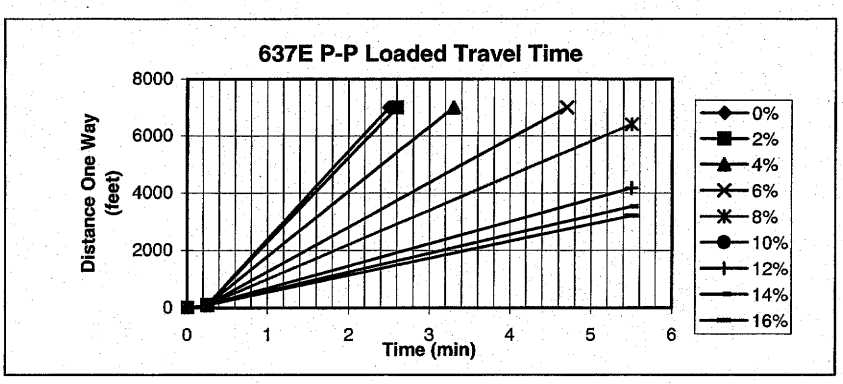
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

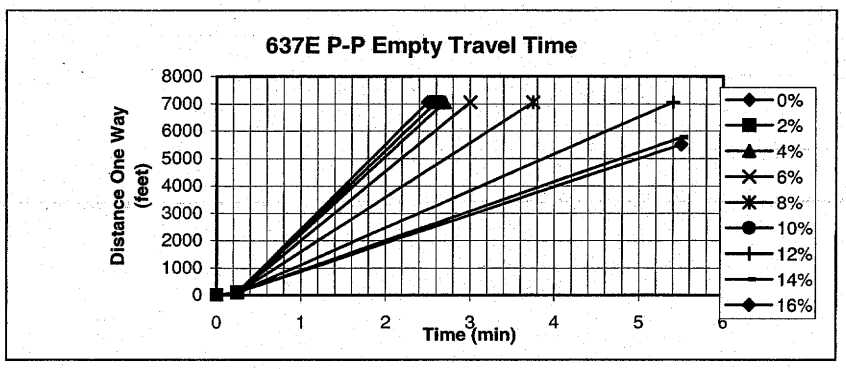
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
4,337,948





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required	=	4,337,948 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**8,316 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	J-19
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

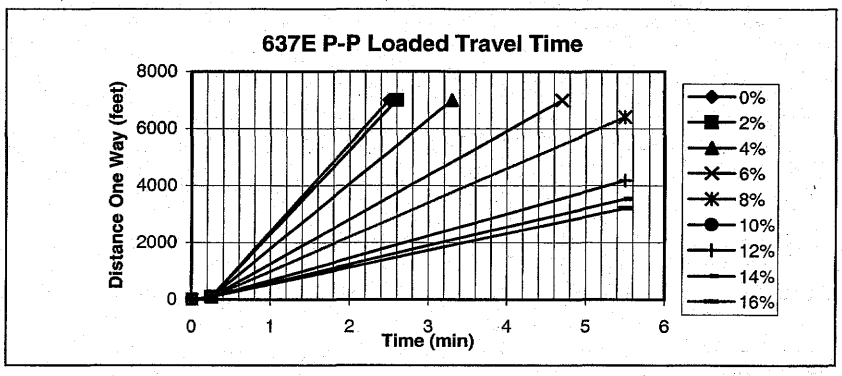
Loaded Distance (ft)	1,900
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	1,900
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

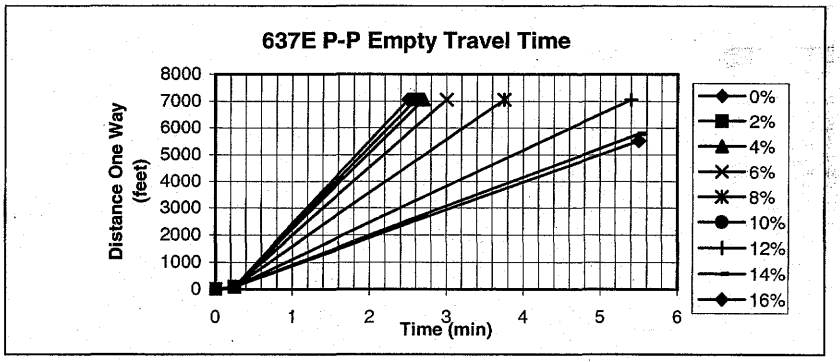
Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	1.6
Empty Travel Time (from chart)	0.8

Quantity of Material to be Moved

7,229,913 cy





Cycle Time =	1.0 (Load Time)	+	1.6 (Loaded Trip Time)	+	0.6 (Maneuver and Spread Time)	+	0.8 (Empty Trip Time)	= 4.0 min
Cycles/Hour =	60 (min/hr)	/	4.0 (Cycle Time)	=	15 cycles/hr			
Hourly Production =	31 (Adjusted Load (cy))	x	15.00 (Cycles/ Hour)	=	**465 cy/hr**			

Hours Required =	7,229,913 (Volume)	/	465 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**21323 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	J-19
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-19 Mining Area (Category I)

Revegetation Area

Area (acre)	2,801
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 2,801 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$3,475,848**

Reseeding Costs = 2,801 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$1,137,143**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	J-19
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

J-19 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	166.7
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 167 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$206,875**

Reseeding Costs = 167 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$67,680**

References: Table 24-1-3 and 24-2-7.

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MINE AREA: J21 - SINGLE PIT

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

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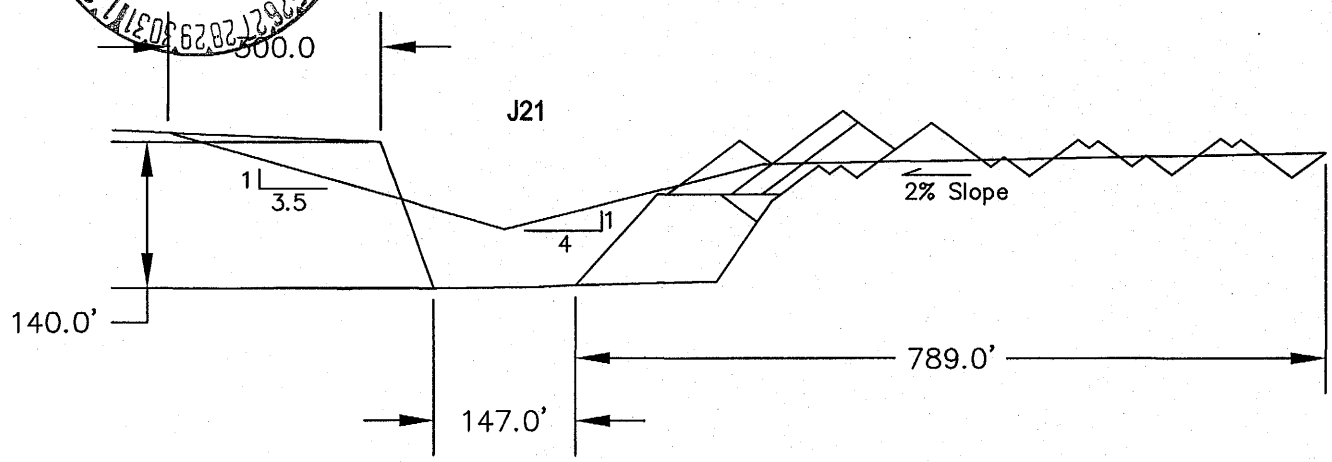


HIGHWALL REDUCTION

Area = 6470
Pit Length = 16,000
Volume = 3,834,100
Swelled Volume = 4,792,600

SPOIL TO OPEN PIT

Spoil 1,2 = 4,195,560

SPOIL GRADING

Spoil 3,4 = 1,173,330

SCALE

100' 0 100' 200'

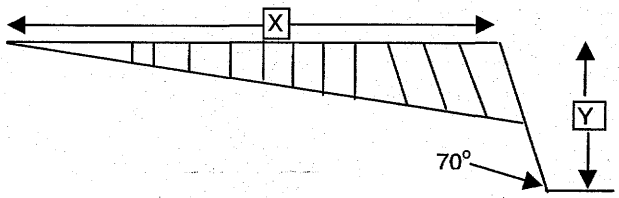
CONTOUR INTERVAL N/A

AutoCAD: J21FinalSection.dwg

Table:	24-3-02	Page 1
Mine Area:	J-21Single Width	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Driltech D55SP	

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP



Highwall Reduction Dimensions:

X (feet)	300
Y (feet)	140
Number of Rows	11

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	1,666
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	49	924
2	42	46	854
3	63	42	785
Total	126	137	2,563

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	1,951
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	36	672
5	105	33	607
6	126	29	541
7	147	26	476
8	168	22	411
9	189	19	345
10	210	15	280
11	231	12	215
Total	1,260	190	3,547

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: J-21Single Width
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Driltech D55SP

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,400
Blast 9 7/8"	$1,800
Explosives (per pound)[2]	$0.10
Drill Cost (per hour)	$196.78

Labor Costs

Driller Rate (per hour)	$26.59
Blaster Rate (per hour)	$27.67
Driller/Blaster Helper Rate (per hour)	$13.14

Cast Holes (Rows 1-3)

Total Drill Footage =(16,000 Pit Length / 24 Drill Hole Spacing)x 137 Total Drillhole Footage (Rows 1-3) = **91,519 feet**

Total Overburden Volume =(16,000 Pit Length / 24 Drill Hole Spacing)x 2,563 Total Overburden Volume (Rows 1-3) = **1,708,360 cy**

Drilling Time = 91,519 Total Drill Footage / 150 Drilling Rate x 1.371 Work Schedule Factor = **837 hours**

Drilling Cost = 837 Drilling Time x($196.78 Drill Cost + $26.59 Driller Rate + $13.14 Driller Helper Rate
+(1/370 Bit Life x $2,400 Bit Cost))= **$203,331**

Load and Blast Cost[1] =(837 Drilling Time x $27.67 Blaster Rate x $13.14 Blaster Helper Rate)
+(1,708,360 Total Overburden Volume x 0.65 Powder Factor x $0.10 Explosive Cost)= **$415,271**

Blast Holes (Rows 4 and up)

Total Drill Footage =(16,000 Pit Length / 24 Drill Hole Spacing)x 190 Total Drillhole Footage (Rows 4 and up) = **126,667 feet**

Total Overburden Volume =(16,000 Pit Length / 24 Drill Hole Spacing)x 3,547 Total Overburden Volume (Rows 4 and up) = **2,364,444 cy**

Drilling Time = 126,667 Total Drill Footage / 150 Drilling Rate x 1.371 Work Schedule Factor = **1,158 hours**

Drilling Cost = 1,158 Drilling Time x($196.78 Drill Cost + $26.59 Driller Rate + $13.14 Driller Helper Rate
+(1/170 Bit Life x $1,800 Bit Cost))= **$286,169**

Load and Blast Cost[1] =(1,158 Drilling Time x $27.67 Blaster Rate x $13.14 Blaster Helper Rate)
+(2,364,444 Total Overburden Volume x 0.55 Powder Factor x $0.10 Explosive Cost)= **$551,109**

Total Cost

$203,331 Drilling Cost (Cast Holes) + $415,271 Load and Blast Cost[1] (Cast Holes) + $286,169 Drilling Cost (Blast Holes) + $551,109 Load and Blast Cost[1] (Blast Holes) = **$1,455,880**

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Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

Table:	24-3-03
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

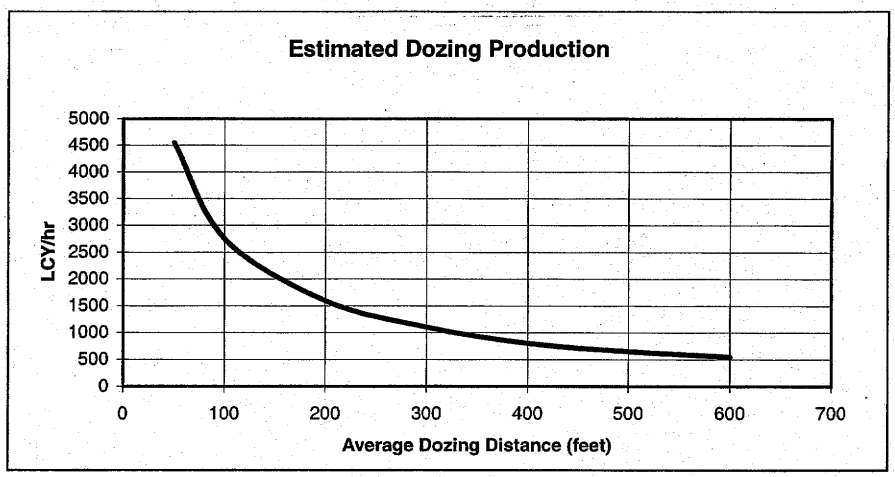
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
3,594,413



Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,380 cy/hr**

Hours Required = 3,594,413 (Volume to be Moved) / 1,380 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3,572 Hours**

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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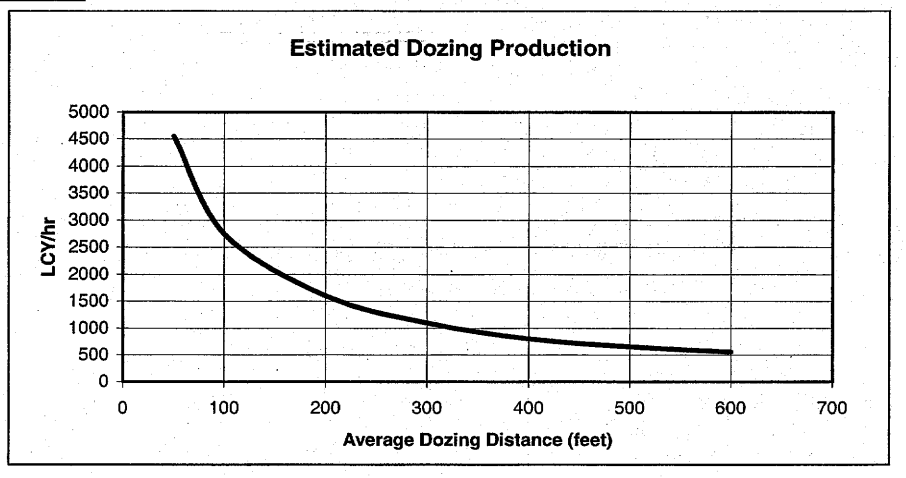
Table:	24-3-04
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
4,195,560

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,656 cy/hr**

Hours Required = 4,195,560 (Volume to be Moved) / 1,656 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3,475 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-05
Mine Area:	J-21Single Width
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

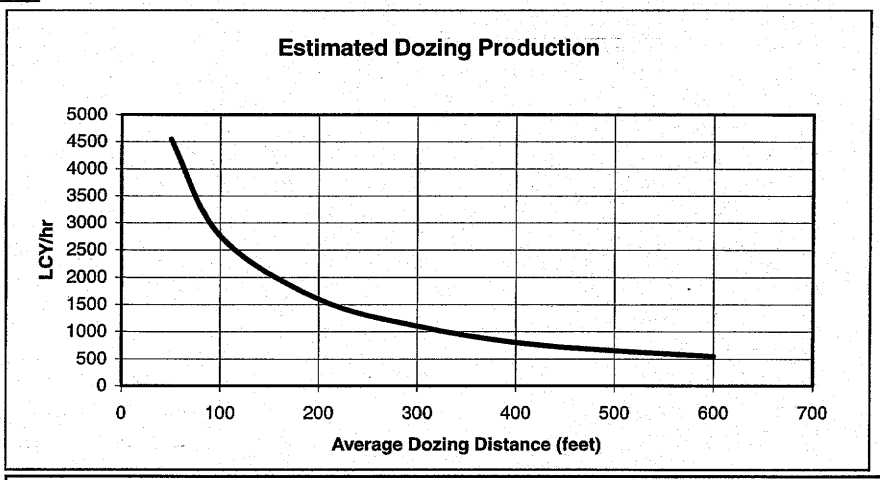
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 1,173,330 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **648 hours**

Quantity of Material to be Moved (cy)
1,173,330

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	J-21Single Width
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

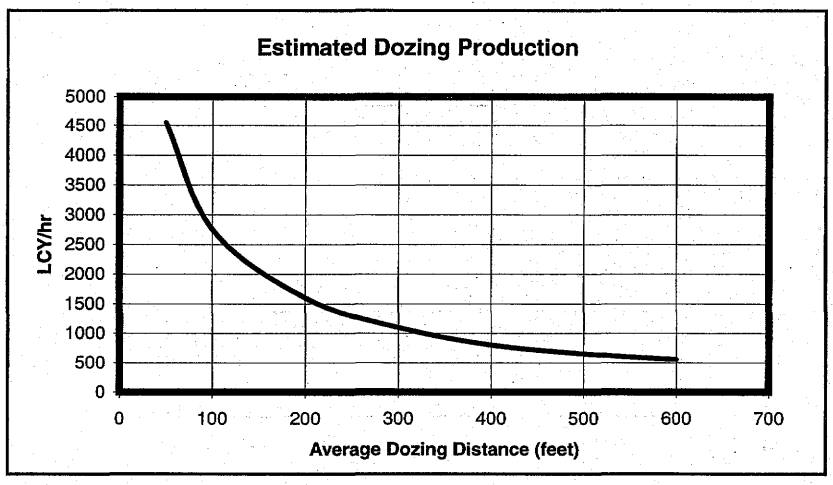
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2623178



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 2,623,178 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3,041 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	J-21Single Width
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

200 acres

Hours Required	=	200 / Area to be Graded (acres)	0.125 x Net Hourly Production (acres/hr)	1.371 Work Schedule Factor	=	**2,194 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
155,620 lineal feet

Hours Required	=	155,620 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**201 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
24,430 lineal feet

Hours Required	=	24,430 / Drainages/Downdrain Requirement (ft)	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**42 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	J-21Single Width
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

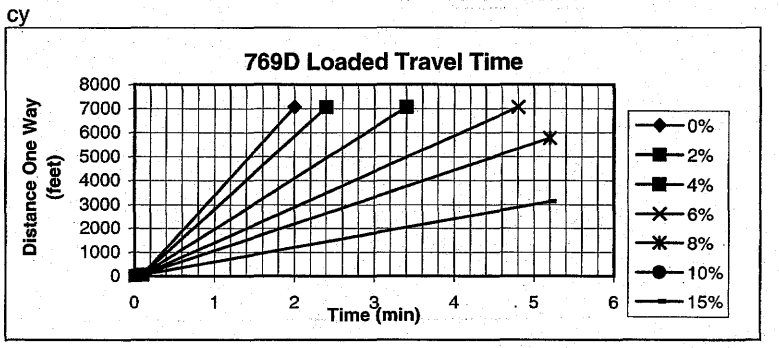
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	3,300
Effective Grade (%)	8

Production Times

Haul Time (min)	4.4
Dump Time (min)	1.1
Return Time (min)	2.2
Truck/Loader Match (trucks per loader)	4
Riprap Haulage Requirement (cy)	51,350

Placement

Riprap Placement Requirement (ft)	15,415
Placement Rate (ft/shift)	500
Shift (hours)	8



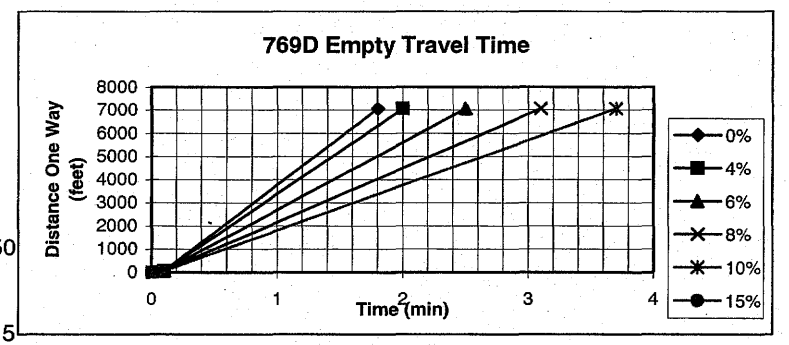


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Table: 24-3-10 (cont.) Page 2
Mine Area: J-21Single Width
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=(	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	4.4 Haul Time	+	1.1 Dump Time	+	2.20 Return Time	= 10.06 min
Fleet Productivity	=(	4 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	4 Loader/Truck Match	x	10.06 Truck Cycle Time	)x 60 min/hr = 158 cy/hr
Required Fleet Hours	=	51,350 Riprap Haulage Requirement	/	158 Fleet Productivity	x	1.371 Work Schedule Factor	=	**445 hrs**	

Placement Summary

Required Loader Hours	=(	15,415 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **338 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	J-21Single Width
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

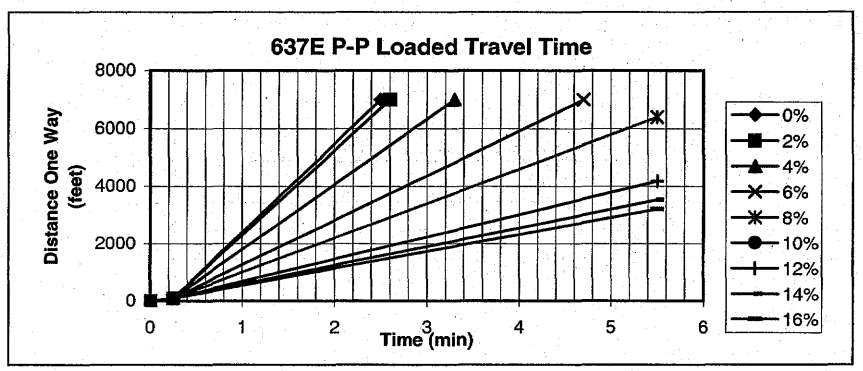
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

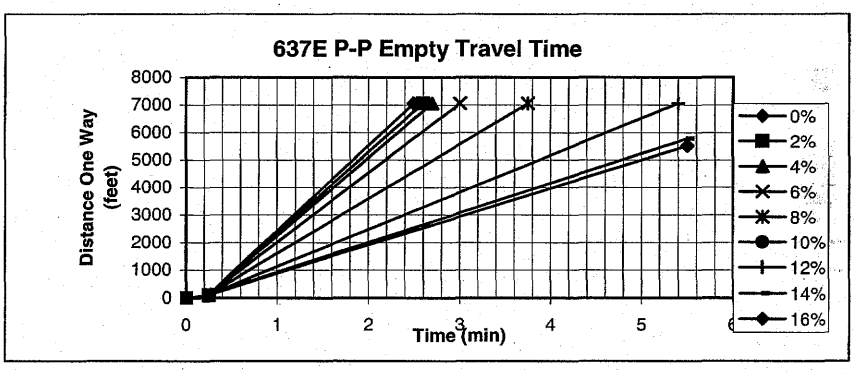
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
1,385,673





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	= 2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**			

Hours Required	=	1,385,673 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**2,656 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	J-21Single Width
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity. etc)
637E P-P Scraper - capacity = 31 cy

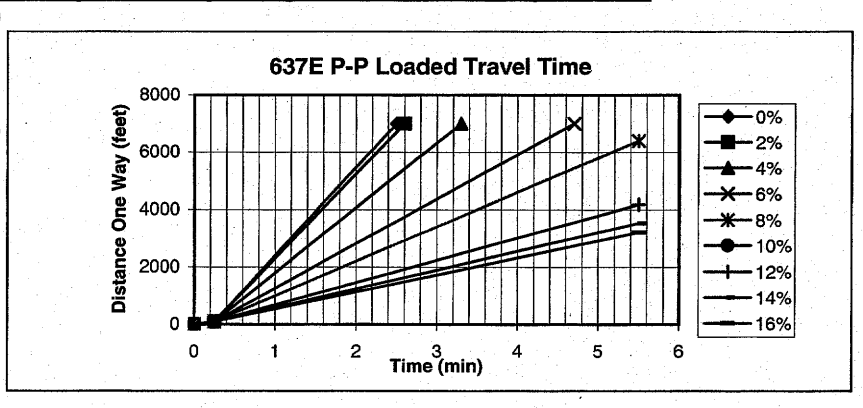
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

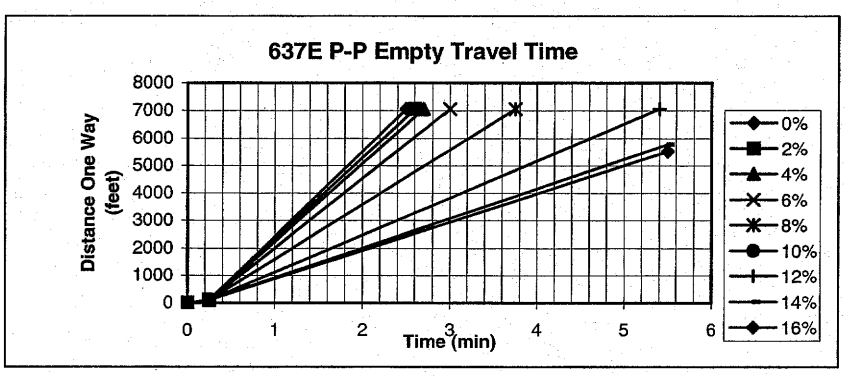
Loaded Distance (ft)	3,500
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,500
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	2.6
Empty Travel Time (from chart)	1.4

Quantity of Material to be Moved (cy)
2,309,454





Cycle Time	=	1.0 Load Time	+	2.6 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	1.4 Empty Trip Time	= 5.6 min
Cycles/Hour	=	60 min/hr	/	5.6 Cycle Time	=	11 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	10.71 Cycles/ Hour	=	**332 cy/hr**			

Hours Required	=	2,309,454 Volume	/	332 Hourly Production	x	1.371 Work Schedule Factor	=	**9536 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	J-21Single Width
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mining Area (Category I)

Revegetation Area

Area (acre)	895
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=	895 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	) =	**$1,110,292**

Reseeding Costs	=	895 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	=	**$363,238**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	J-21Single Width
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	156.5
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 157 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$194,217**

Reseeding Costs = 157 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$63,539**

References: Table 24-1-3 and 24-2-7.

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MINE AREA: J21 - DOUBLE-WIDE PIT

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

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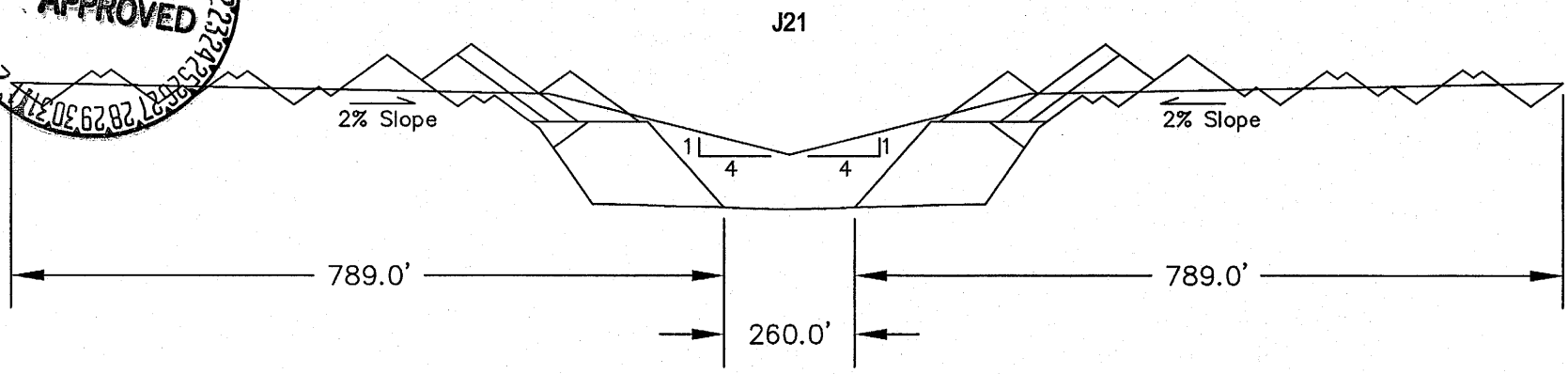


HIGHWALL REDUCTION

Area = 0
Pit Length = 8,300
Volume = 0
Swelled Volume = 0

SPOIL TO OPEN PIT

Spoil 1,2 = 4,943,110

SPOIL GRADING

Spoil 3,4 = 883,800

SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

AutoCAD: J21FinalSection.dwg

Table:	24-3-04
Mine Area:	J-21 Double Width
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

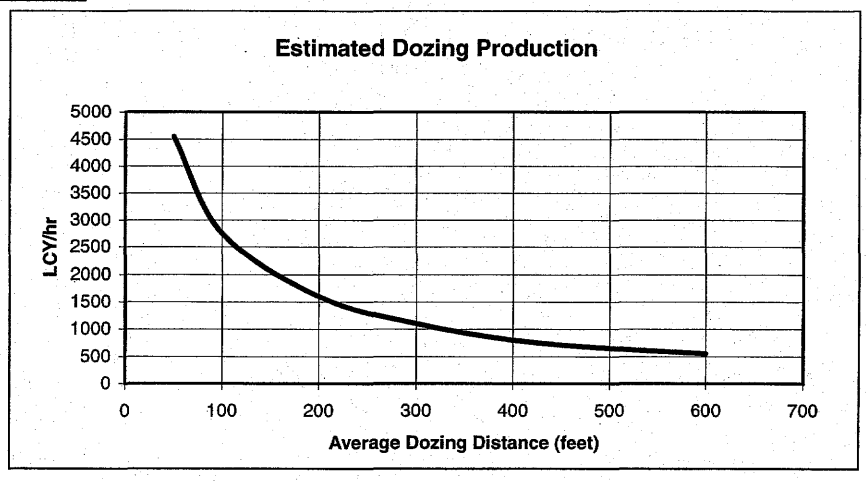
Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	250
Hourly production (from chart)	1,250
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
4,943,110

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.5 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.11**

Net Hourly Production = 1,250 (Normal Hourly Production (see graph above)) x 1.11 (Productivity Adjustment Factor) = **1,386 cy/hr**

Hours Required = 4,943,110 (Volume to be Moved) / 1,386 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,891 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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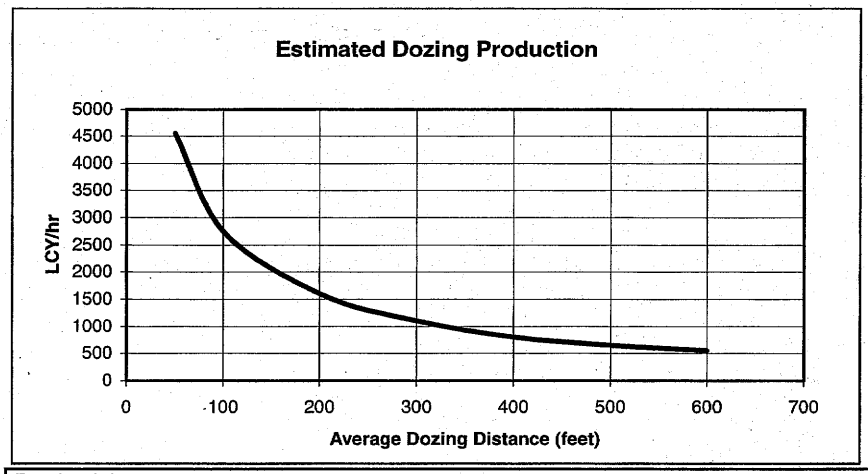
Table:	24-3-05
Mine Area:	J-21 Double Width
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	210
Hourly production (from chart)	1,500
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.5 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.11**

Net Hourly Production = 1,500 (Normal Hourly Production (see graph above)) x 1.11 (Operating Adjustment Factor) = **1,663 cy/hour**

Hours Required = 883,800 (Volume to be Moved) / 1,663 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **729 hours**

Quantity of Material to be Moved (cy)
883,800

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	J-21 Double Width
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

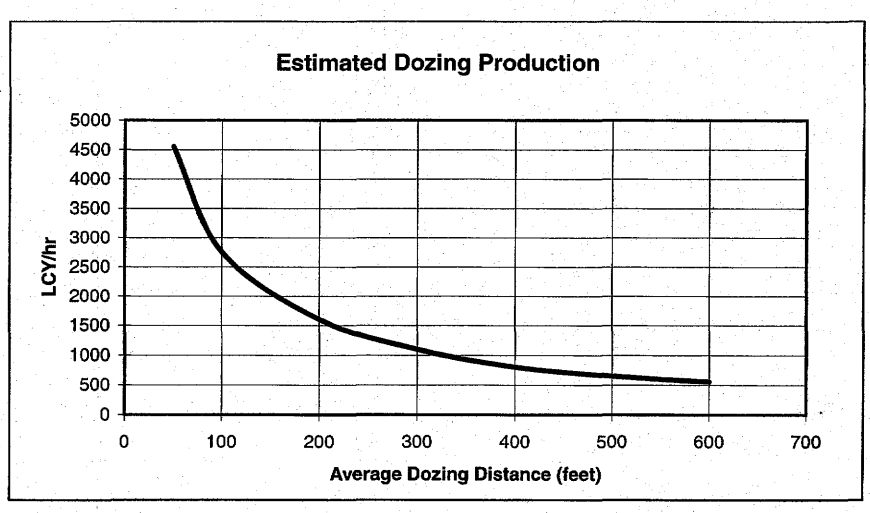
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)

832091	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 832,091 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **965 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	J-21 Double Width
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

0 acres

Hours Required	=	0	/	0.125	x	1.371	=	**0**	**Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor			

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
52,000 lineal feet

Hours Required	=	52,000 / Terrace Requirement (ft)	1,060 x Production Rate (ft/hr)	1.371 Work Schedule Factor	=	**67 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
9,000 lineal feet

Hours Required	=	9,000 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**15 Hours**

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	J-21 Double Width
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size, etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

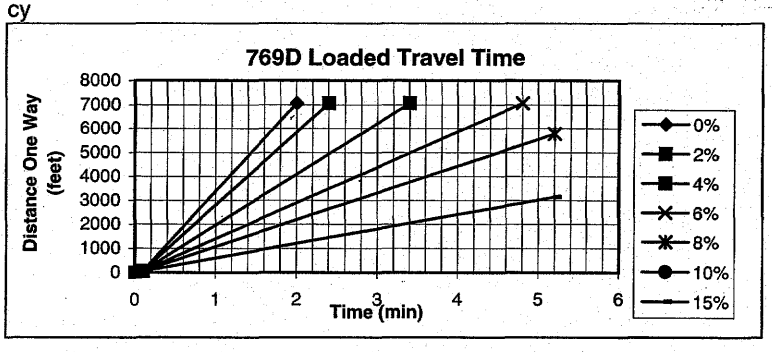
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	5

Production Times

Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.7
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	21,000

Placement

Riprap Placement Requirement (ft)	6,300
Placement Rate (ft/shift)	500
Shift (hours)	8



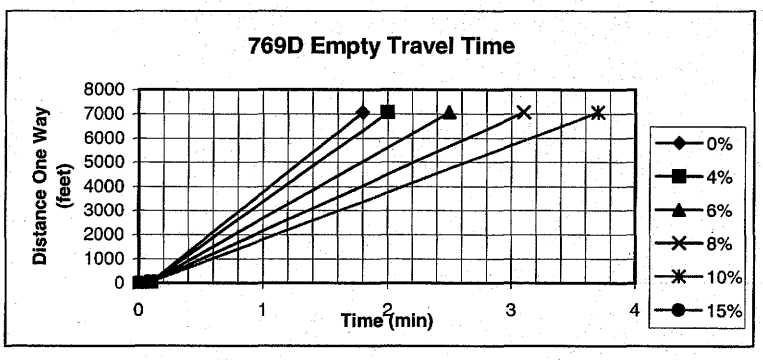


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Table: 24-3-10 (cont.) Page 2
Mine Area: J-21 Double Width
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.70 Return Time	= 4.96 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.96 Truck Cycle Time	)x 60 min/hr = 321 cy/hr
Required Fleet Hours	=	21,000 Riprap Haulage Requirement	/	321 Fleet Productivity	x	1.371 Work Schedule Factor	=	**90 hrs**	

Placement Summary

Required Loader Hours	=(	6,300 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **138 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	J-21 Double Width
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

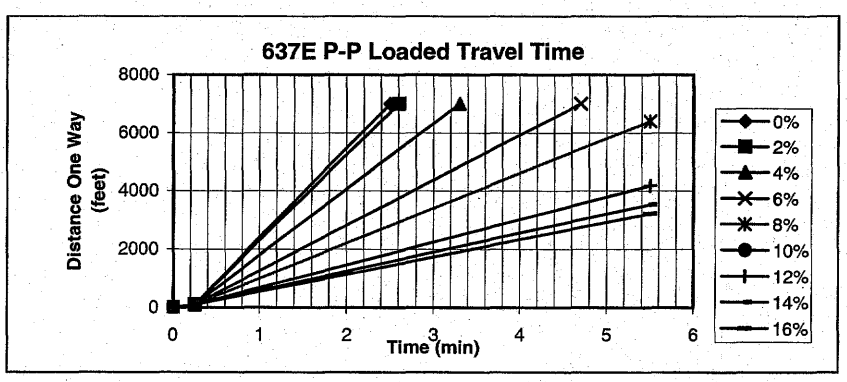
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

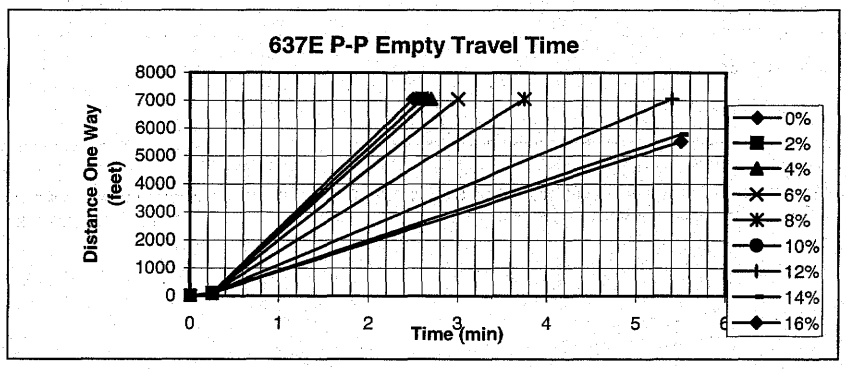
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
1,337,116





Cycle Time =	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour =	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required =	1,337,116 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**2,563 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	J-21 Double Width
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

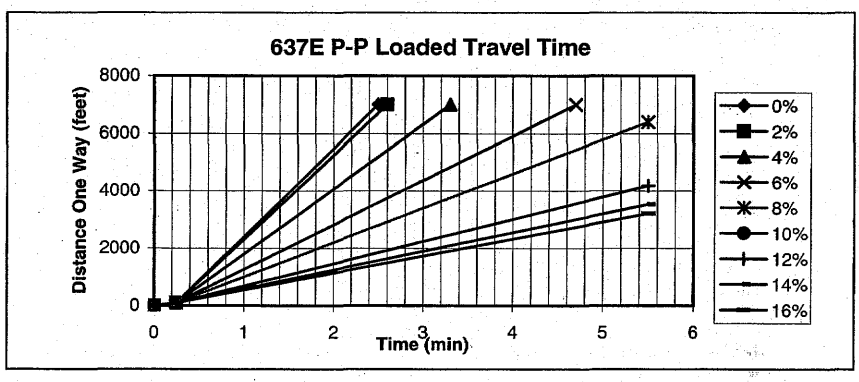
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

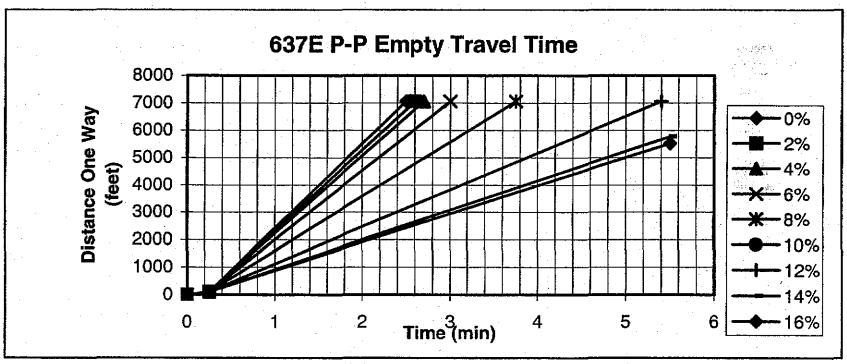
Loaded Distance (ft)	1,200
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	1,200
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	1.1
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
2,228,526





Cycle Time =	1.0 (Load Time)	+	1.1 (Loaded Trip Time)	+	0.6 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	=	3.3 min
Cycles/Hour =	60 (min/hr)	/	3.3 (Cycle Time)	=	18 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	18.18 (Cycles/ Hour)	=	**564 cy/hr**				

Hours Required =	2,228,526 (Volume)	/	564 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**5422 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	J-21 Double Width
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Expansion Mining Area (Category I)

Revegetation Area

Area (acre)	863
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs =	863 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	) =	**$1,071,385**
Reseeding Costs =	863 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	=	**$350,509**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	J-21 Double Width
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Expansion Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	41
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 41 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$50,757**

Reseeding Costs = 41 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$16,605**

References: Table 24-1-3 and 24-2-7.

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MINE AREA: N11

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

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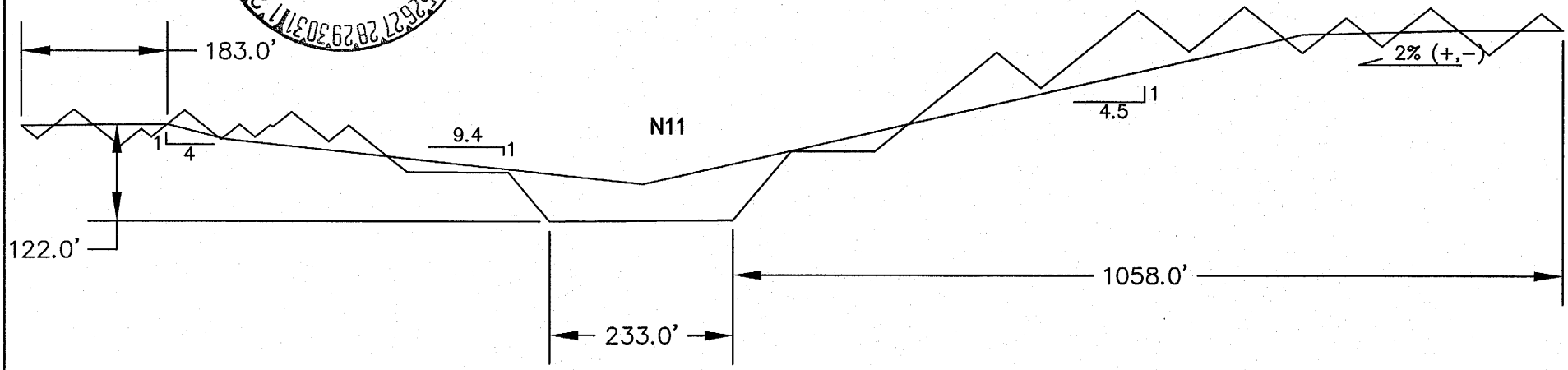


HIGHWALL REDUCTION

Area = NA
Pit Length = 8,450
Volume = NA
Swelled Volume = NA

SPOIL TO OPEN PIT

Spoil 1,2 = 1,258,110 + 3,774,330 = 5,032,440

SPOIL GRADING

Spoil 3,4 = 899,770

SCALE

100' 0 100' 200'

CONTOUR INTERVAL N/A

AutoCAD: N11FinalSection.dwg

Table:	24-3-03
Mine Area:	N-11
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils (Highwall Side)
Equipment:	D11R Dozer

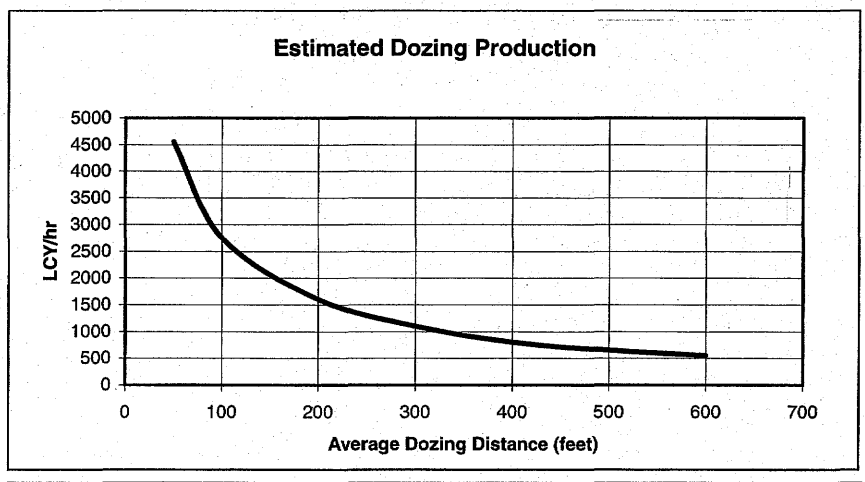
Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	340
Hourly production (from chart)	1,000
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
1,258,110

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 1,000 (Normal Hourly Production (see graph above)) x 0.89 (Productivity Adjustment Factor) = **887 cy/hr**

Hours Required = 1,258,110 (Volume to be Moved) / 887 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,945 Hours**

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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Table:	24-3-04
Mine Area:	N-11
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

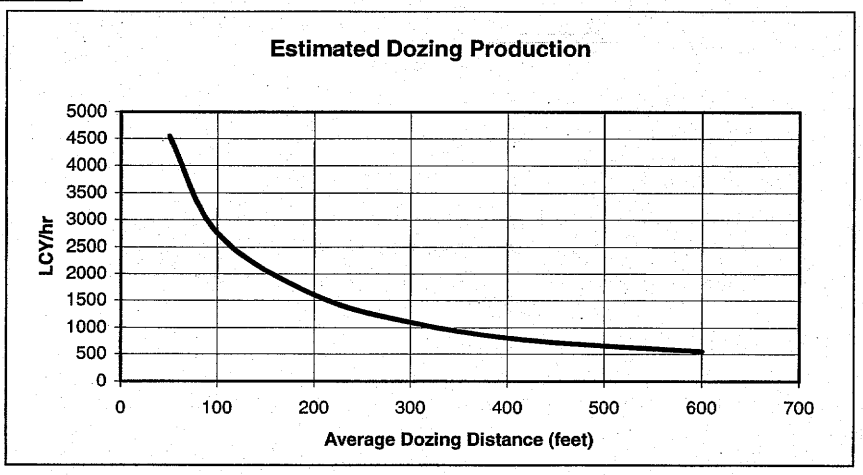
Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	450
Hourly production (from chart)	750
Grade (in percent)	-22
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
3,774,330

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 750 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **776 cy/hr**

Hours Required = 3,774,330 (Volume to be Moved) / 776 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **6,668 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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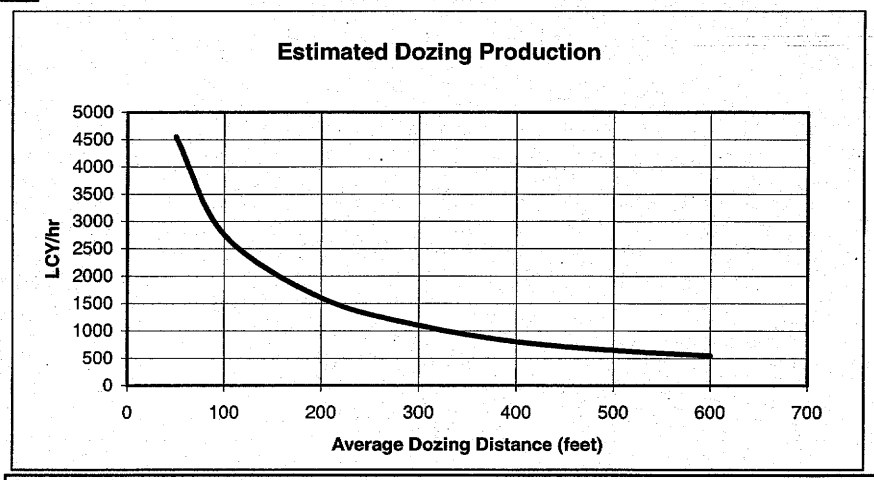
Table:	24-3-05
Mine Area:	N-11
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 899,770 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **497 hours**

Quantity of Material to be Moved (cy)
899,770

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-11
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

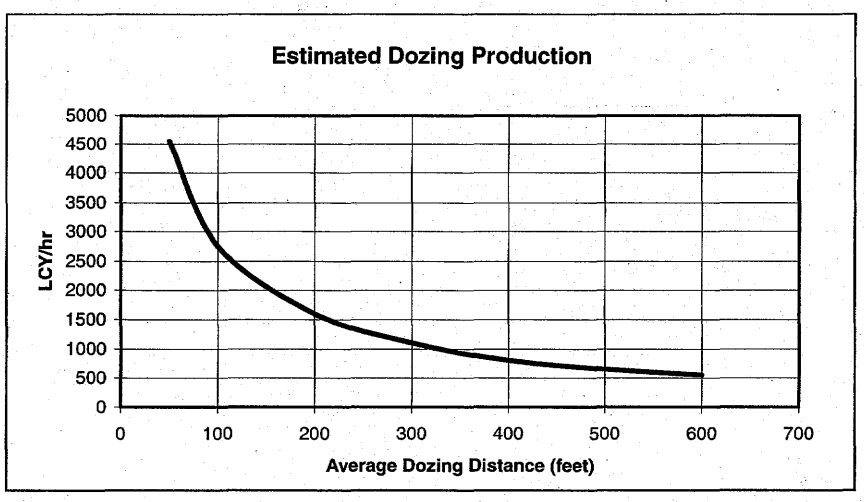
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)

832091 cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 832,091 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **965 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

APPROVED SEP 2005

Table:	24-3-07
Mine Area:	N-11
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

648 acres

Hours Required	=	648	/	0.125	x	1.371	=	**7,109 Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
129,920 lineal feet

Hours Required	=	129,920 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**168 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
11,300 lineal feet

Hours Required	=	11,300 / Drainages/Downdrain Requirement (ft)	800 / Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	19 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	N-11
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size. etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

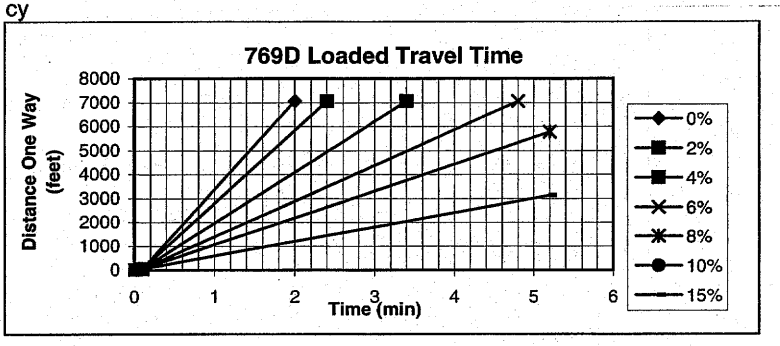
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	2

Production Times

Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.7
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	24,500

Placement

Riprap Placement Requirement (ft)	7,340
Placement Rate (ft/shift)	500
Shift (hours)	8



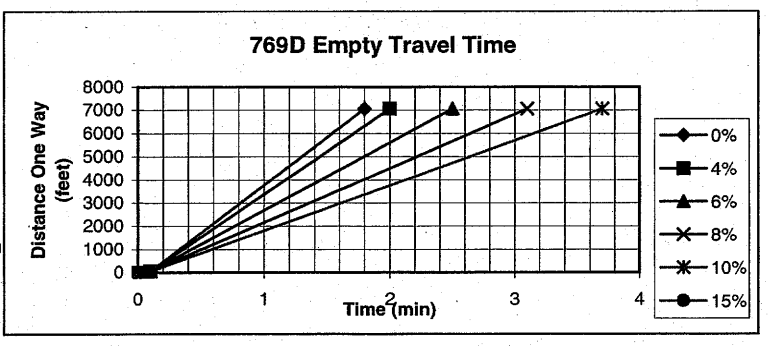


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Table: 24-3-10 (cont.) Page 2
Mine Area: N-11
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.70 Return Time	= 4.96 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.96 Truck Cycle Time	)x 60 min/hr = 321 cy/hr
Required Fleet Hours	=	24,500 Riprap Haulage Requirement	/	321 Fleet Productivity	x	1.371 Work Schedule Factor	=	**105 hrs**	

Placement Summary

Required Loader Hours	=(	7,340 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **161 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-11
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

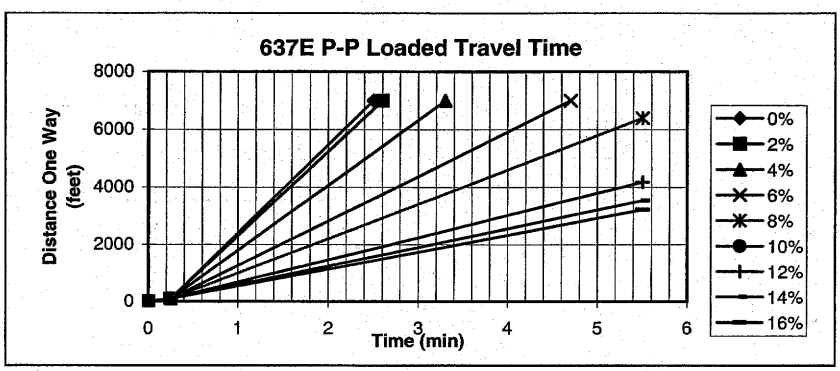
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

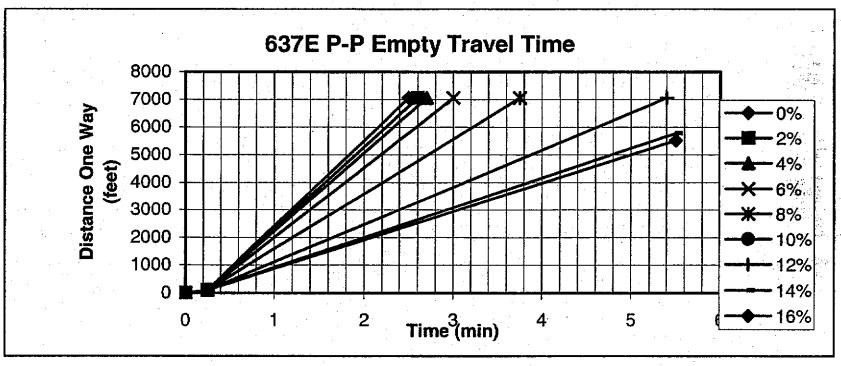
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
1,337,116





Cycle Time =	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour =	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required =	1,337,116 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**2,563 hrs**	

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	N-11
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

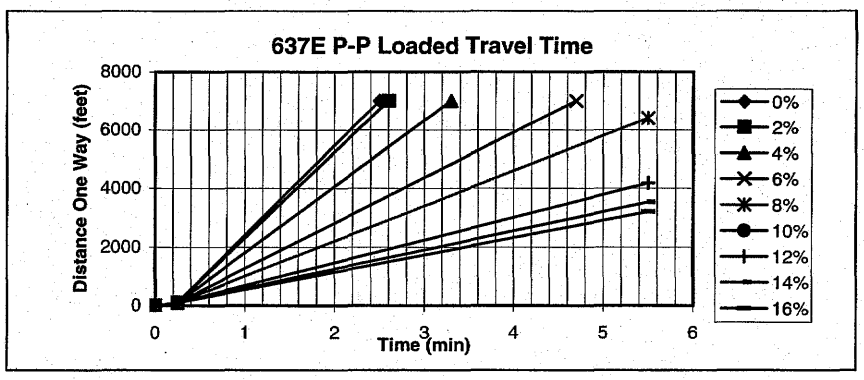
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

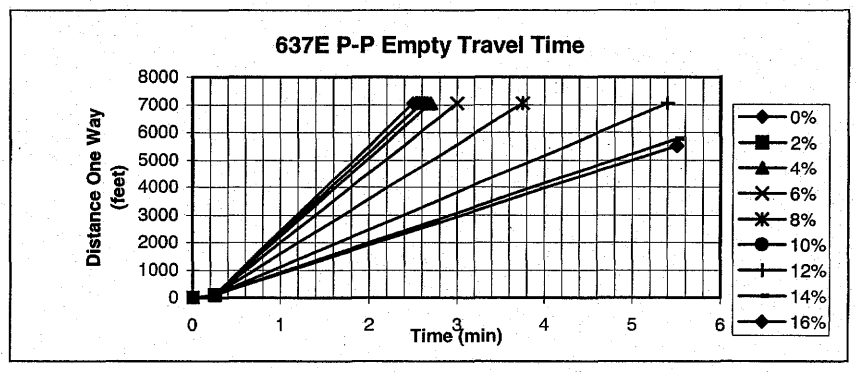
Loaded Distance (ft)	3,500
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	3,500
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	1.1
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
2,228,526





Cycle Time =	1.0 Load Time	+	1.1 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	3.3 min
Cycles/Hour =	60 min/hr	/	3.3 Cycle Time	=	18 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	18.18 Cycles/ Hour	=	**564 cy/hr**				

Hours Required =	2,228,526 Volume	/	564 Hourly Production	x	1.371 Work Schedule Factor	=	**5422 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-11
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Mining Area (Category I)

Revegetation Area

Area (acre)	863
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 863 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$1,071,385**

Reseeding Costs = 863 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$350,509**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-11
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

N-11 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	39.7
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 40 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$49,268**

Reseeding Costs = 40 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$16,118**

References: Table 24-1-3 and 24-2-7.

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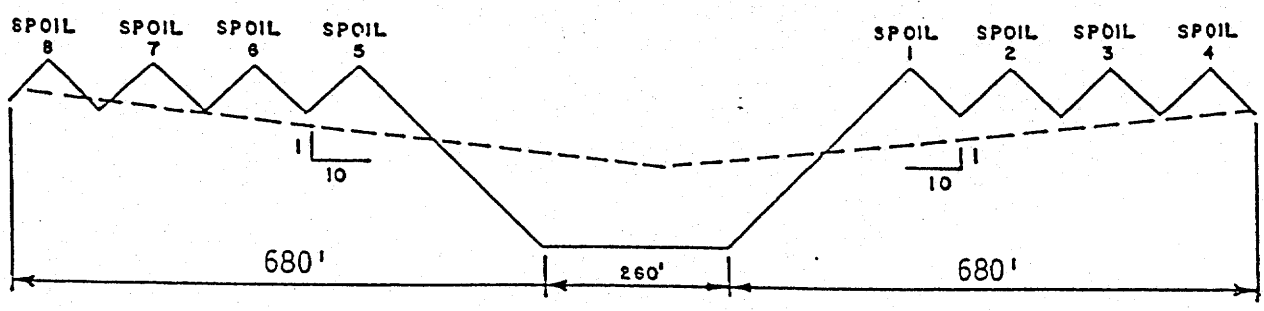
Mine Area N-14
Project Open Pit Backfilling

Date Open Pit Backfilling

WORKSHEET NO. N-14-1

EARTHWORK QUANTITY WORKSHEET



Open Pit Volume

Area = 44,800 sq.ft. (digitized area)

Pit Length = 3,400 ft. (actual) x 2 = 6,800' (double wide pit)
Pit Volume Needed = 5,641,500 cy.yd.

Spoil to Open Pit

Spoils 1, 2, 3, 5, 6, 7 = 44,800 sq. ft. x 3,400 ft. = 5,641,500 cu. yd.

Spoil Grading

Spoils 4, 8 = 1,900 sq. ft. x 3,400 ft. = 239,300 cu. yd.

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SEP 2005

Revised 03/23/95

Table:	24-3-03
Mine Area:	N-14
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils (Highwall Side)
Equipment:	D11R Dozer

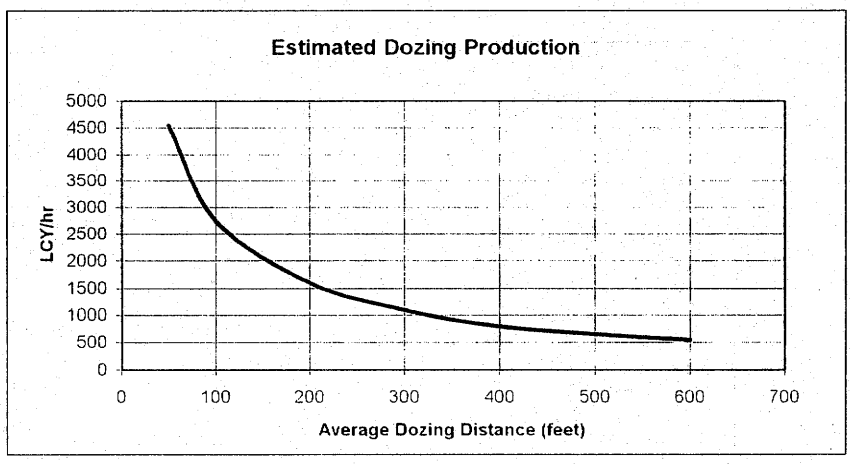
Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,820,740

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.4 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.86**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.86 (Productivity Adjustment Factor) = **1,380 cy/hr**

Hours Required = 2,820,740 (Volume to be Moved) / 1,380 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,803 Hours**

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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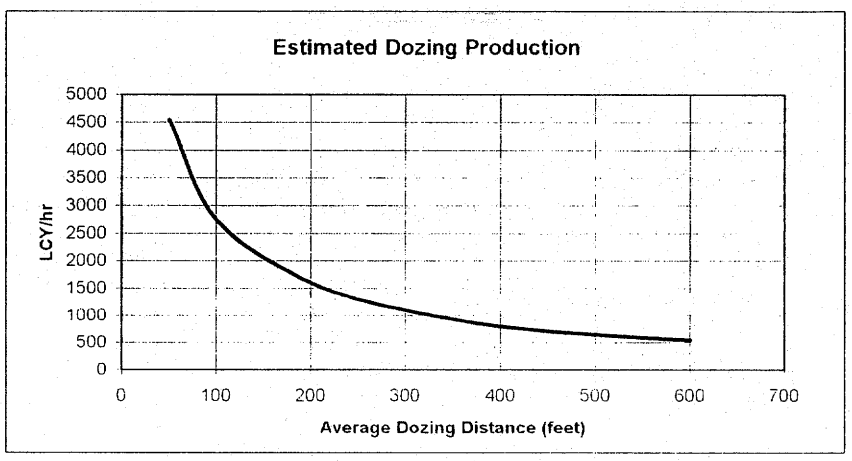
Table:	24-3-04
Mine Area:	N-14
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils (Spoil Side)
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,820,740

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,656 cy/hr**

Hours Required = 2,820,740 (Volume to be Moved) / 1,656 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,336 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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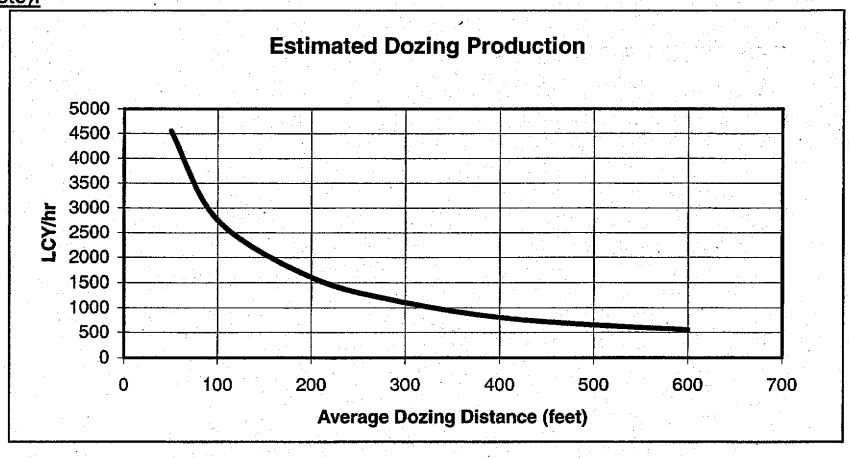
Table:	24-3-05
Mine Area:	N-14
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes



Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
239,260

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 239,260 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **132 hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-14
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

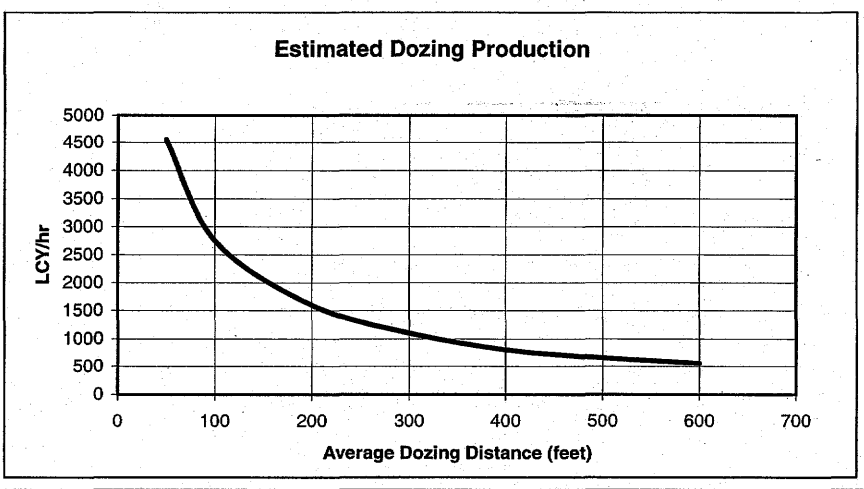
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
3535600



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 3,535,600 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,099 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-14
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

42 acres

Hours Required	=	42 / Area to be Graded (acres)	0.125 x Net Hourly Production (acres/hr)	1.371 Work Schedule Factor	=	**461 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	N-14
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
37,410 lineal feet

Hours Required	=	37,410 / Terrace Requirement (ft)	1,060 x Production Rate (ft/hr)	1.371 = Work Schedule Factor	48 Hours

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-14
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
6,780 lineal feet

Hours Required	=	6,780 / Drainages/Downdrain Requirement (ft)	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	12 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10	Page 1
Mine Area:	N-14	
Project:	Surface Stabilization	
Task:	Load, haul, and place riprap	
Equipment:	988F Loader Series II	
	769D Rear Dump Truck	

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

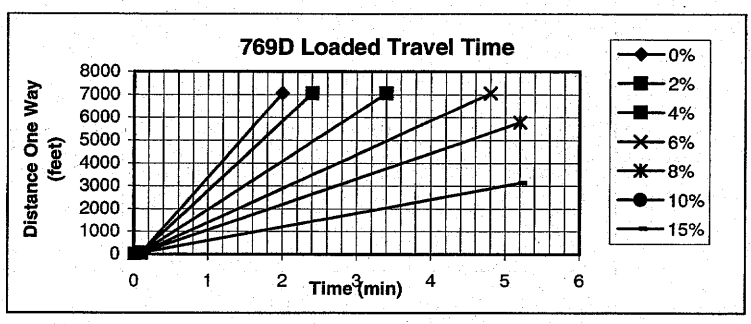
Characterization of Equipment Used (type, size. etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

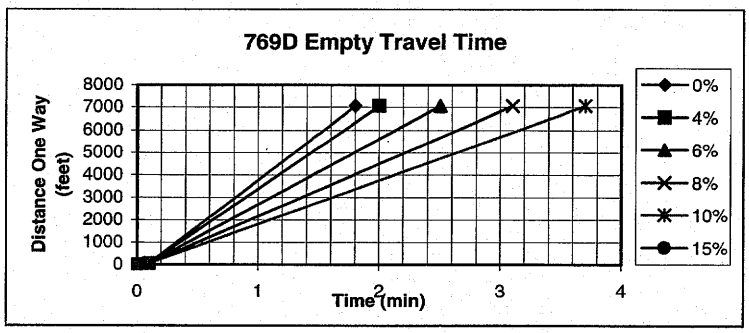
Productivity Factors

Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	2



Production Times

Haul Time (min)	1.8
Dump Time (min)	1.1
Return Time (min)	1.0
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	4,550



Placement

Riprap Placement Requirement (ft)	7,340
Placement Rate (ft/shift)	500
Shift (hours)	8

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Table: 24-3-10 (cont.) Page 2
Mine Area: N-14
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	1.8 Haul Time	+	1.1 Dump Time	+	1.00 Return Time	= 6.26 min
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	6.26 Truck Cycle Time	)x 60 min/hr = 254 cy/hr
Required Fleet Hours	=	4,550 Riprap Haulage Requirement	/	254 Fleet Productivity	x	1.371 Work Schedule Factor	=	**25 hrs**	

Placement Summary

Required Loader Hours	=(	7,340 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	= **161 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-14
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

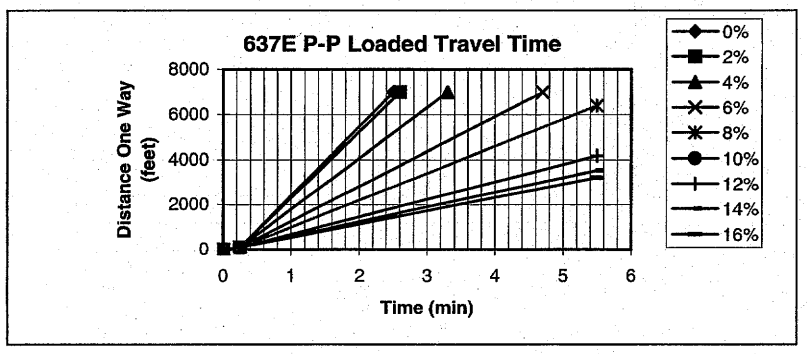
Loaded Distance (ft)	700
Loaded Grade (%)	-5.0
Loaded Effective Grade (%)	0.0
Empty Distance (ft)	700
Empty Grade (%)	5.0
Empty Effective Grade (%)	10.0

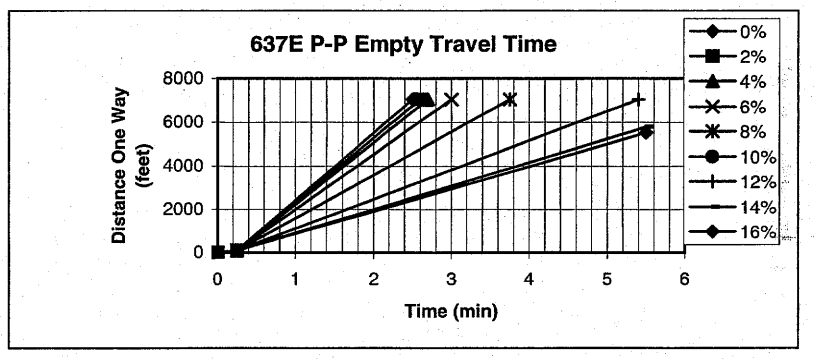
Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)

292,321





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	= 2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**			

Hours Required	=	292,321 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**560 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	N-14
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

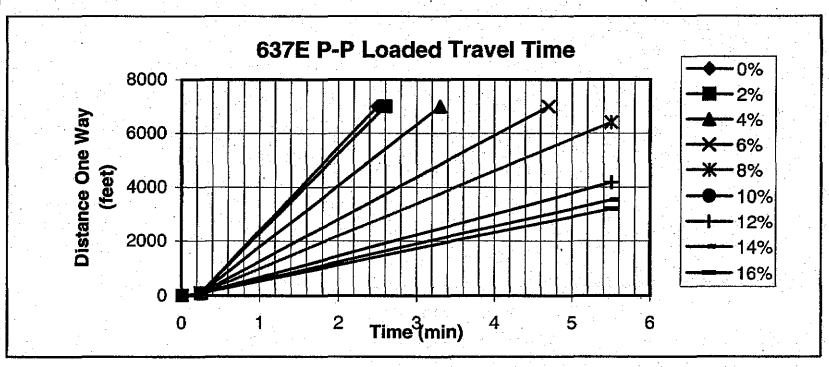
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

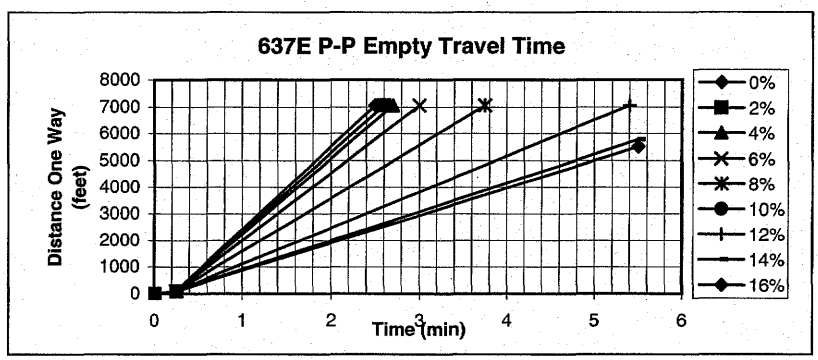
Loaded Distance (ft)	5,300
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	5,300
Empty Grade (%)	1.0
Empty Effective Grade (%)	6.0

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	2.4
Empty Travel Time (from chart)	1.9

Quantity of Material to be Moved (cy)
487,201





Cycle Time	=	1.0 Load Time	+	2.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	1.9 Empty Trip Time	= 5.9 min
Cycles/Hour	=	60 min/hr	/	5.9 Cycle Time	=	10 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	10.17 Cycles/ Hour	=	**315 cy/hr**			

Hours Required	=	487,201 Volume	/	315 Hourly Production	x	1.371 Work Schedule Factor	=	**2119 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-14
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-14 Mining Area (Category I)

Revegetation Area

Area (acre)	189
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 189 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$234,226**

Reseeding Costs = 189 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$76,628**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-14
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description

N-14 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	15.2
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 15 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$18,863**

Reseeding Costs = 15 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$6,171**

References: Table 24-1-3 and 24-2-7.

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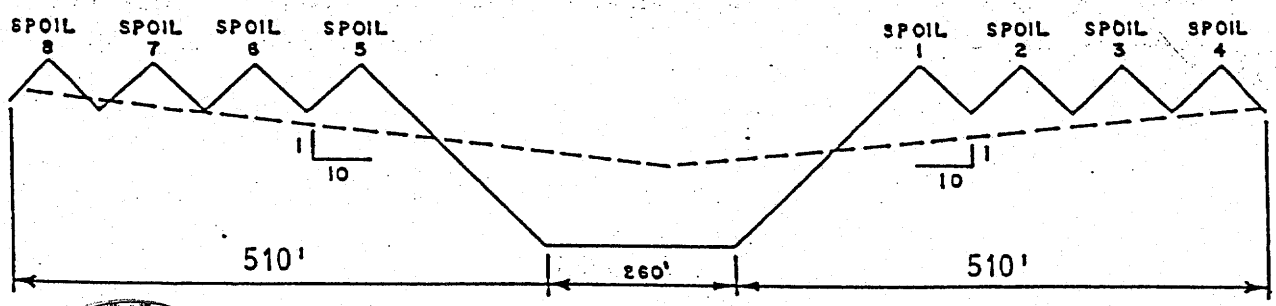
Mine Area N-14E
Project Open Pit Backfilling

Date Open Pit Backfilling

WORKSHEET NO. N-14E-1

EARTHWORK QUANTITY WORKSHEET



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Open Pit Volume

Area = 7,900 sq.ft. (digitized area)

Pit Length = 3,400 ft. (actual) x 2 = 6,800' (double wide pit)
Pit Volume Needed = 994,800 cu.yd.

Spoil to Open Pit

Spoils 1, 2, 5, 6 = 7,900 sq. ft. x 3,400 ft. = 994,800 cu. yd.

Spoil Grading

Spoils 3, 4, 7, 8 = 4,120 sq. ft. x 3,400 ft. = 518,800 cu. yd.

Revised 03/23/95

Table:	24-3-03
Mine Area:	N-14E
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils (Highwall Side)
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

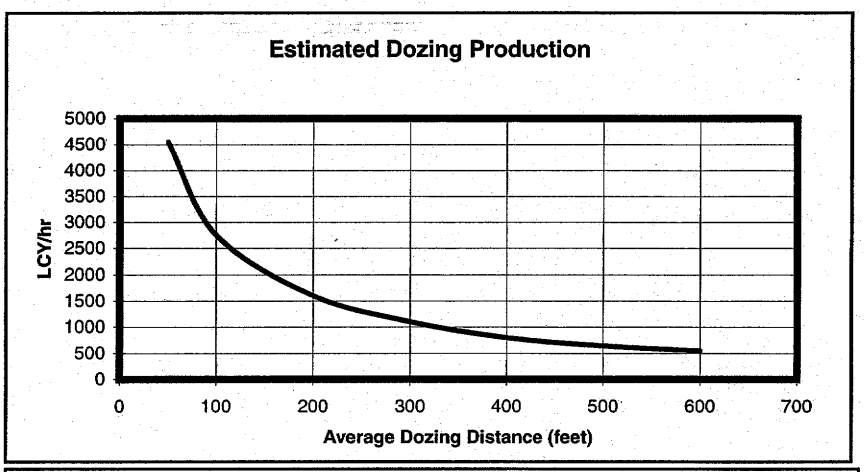
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
497,405



Productivity Adjustment Factor	=	0.75 Operator Factor	x	1.00 Material Factor	x	1.4 Grade Correction	x	0.82 Density Correction	
	x	1.00 Production Method	x	1.0 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	= **0.86**

Net Hourly Production	=	1,600 Normal Hourly Production (see graph above)	x	0.86 Productivity Adjustment Factor	=	**1,380 cy/hr**

Hours Required	=	497,405 Volume to be Moved	/	1,380 Net Hourly Production	x	1.371 Work Schedule Factor	=	**494 Hours**

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed 28

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Table:	24-3-04
Mine Area:	N-14E
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils (Spoil Side)
Equipment:	D11R Dozer

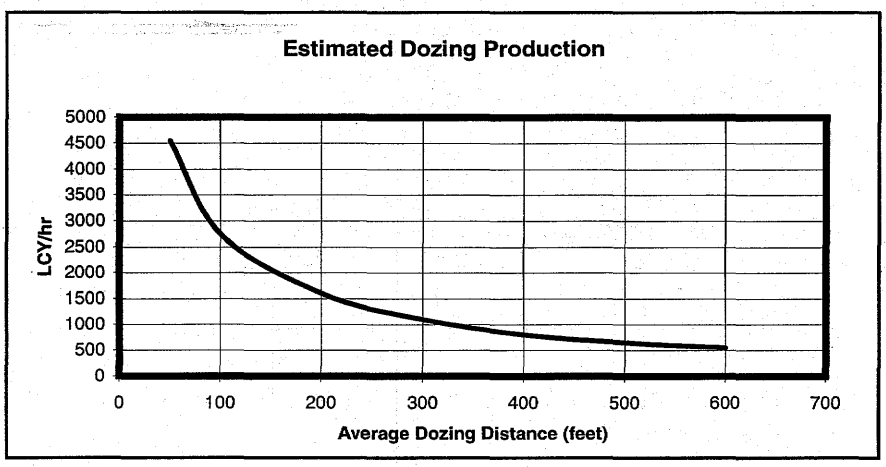
Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	-20
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustments Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
497,405

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **1,656 cy/hr**

Hours Required = 497,405 (Volume to be Moved) / 1,656 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **412 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-05
Mine Area:	N-14E
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

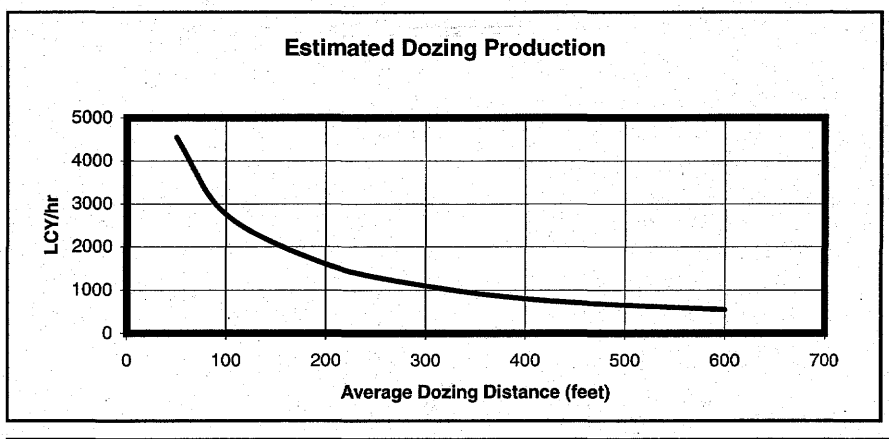
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	100
Hourly production (from chart)	2,800
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,800 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,484 cy/hour**

Hours Required = 518,810 (Volume to be Moved) / 2,484 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **286 hours**

Quantity of Material to be Moved (cy)
518,810

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-14E
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

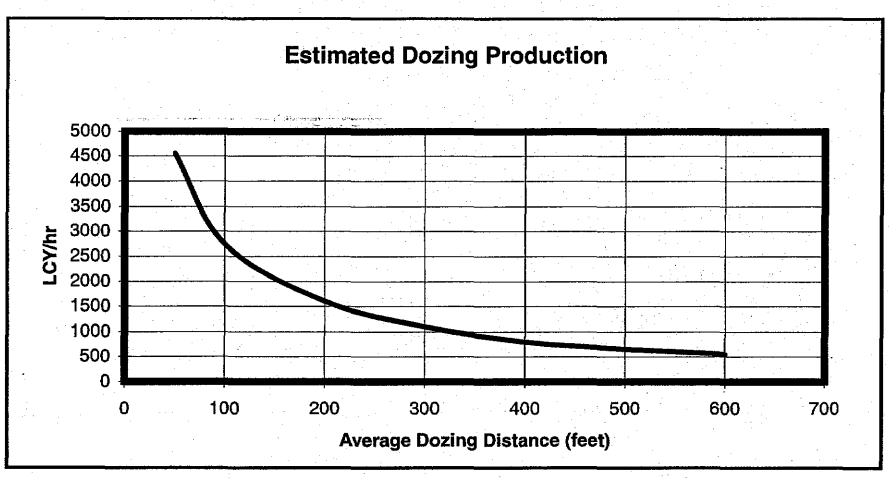
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
166200



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 166,200 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **193 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-14E
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

21 acres

Hours Required	=	21	/	0.125	x	1.371	=	**230**	**Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor			

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	N-14E
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
24,940 lineal feet

Hours Required	=	24,940 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	**32 Hours**

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-14E
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
4,520 lineal feet

Hours Required	=	4,520 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	8 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10	Page 1
Mine Area:	N-14E	
Project:	Surface Stabilization	
Task:	Load, haul, and place riprap	
Equipment:	988F Loader Series II	
	769D Rear Dump Truck	

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

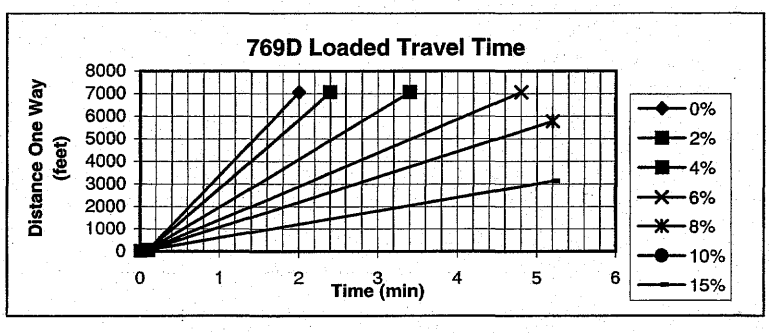
Characterization of Equipment Used (type, size. etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

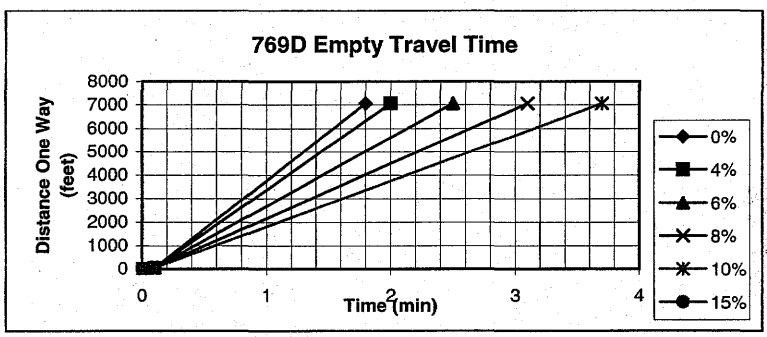
Productivity Factors

Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,100
Effective Grade (%)	4



Production Times

Haul Time (min)	0.8
Dump Time (min)	1.1
Return Time (min)	0.60
Truck/Loader Match (trucks per loader)	2
Riprap Haulage Requirement (cy)	12,100



Placement

Riprap Placement Requirement (ft)	4,750
Placement Rate (ft/shift)	500
Shift (hours)	8

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Table: 24-3-10 (cont.) Page 2
Mine Area: N-14E
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	= 0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy			
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min			

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.8 Haul Time	+	1.1 Dump Time	+	0.60 Return Time	=	4.86 min			
Fleet Productivity	=(	2 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	2 Loader/Truck Match	x	4.86 Truck Cycle Time	)x	60 min/hr	=	327 cy/hr	
Required Fleet Hours	=	12,100 Riprap Haulage Requirement	/	327 Fleet Productivity	x	1.371 Work Schedule Factor	=	**51 hrs**					

Placement Summary

Required Loader Hours	=(	4,750 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	=	**104 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

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Table:	24-3-11
Mine Area:	N-14E
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used
637E P-P Scraper - capacity 31 cy

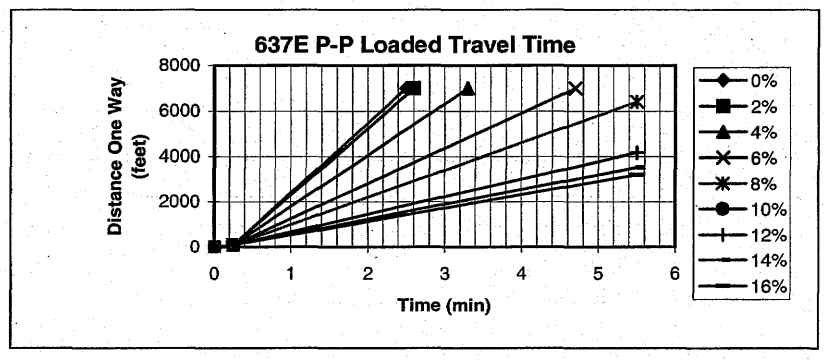
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

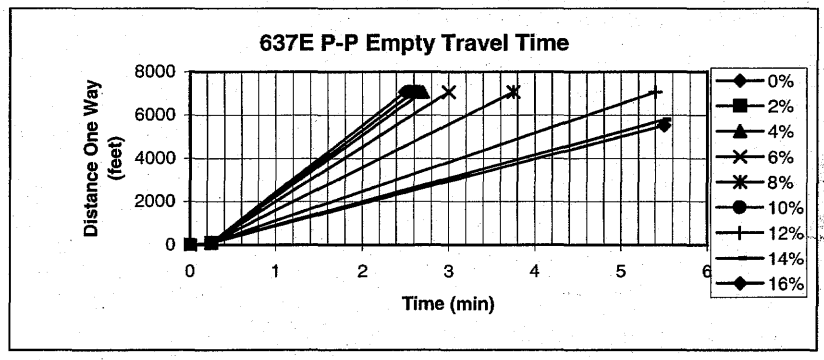
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
218,694





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required	=	218,694 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**419 hrs**

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-12
Mine Area:	N-14E
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

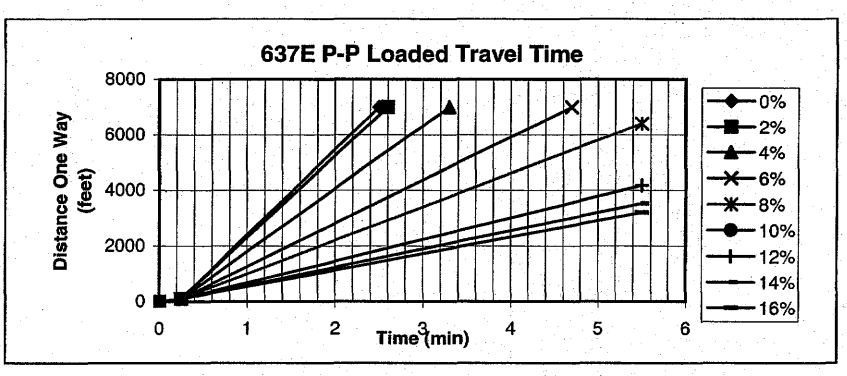
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

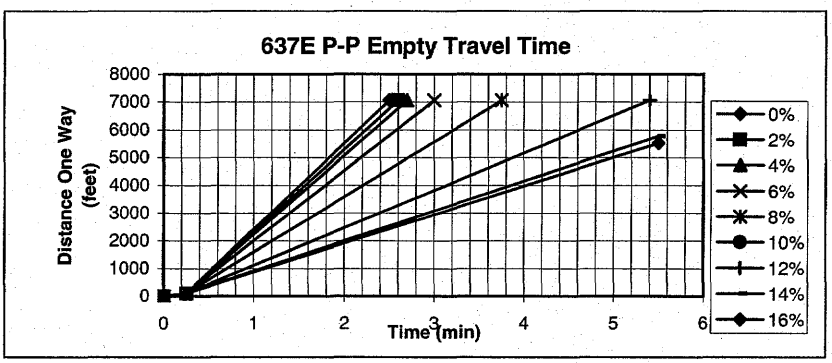
Loaded Distance (ft)	4,400
Loaded Grade (%)	-1
Loaded Effective Grade (%)	4.0
Empty Distance (ft)	4,400
Empty Grade (%)	-2.0
Empty Effective Grade (%)	3.0

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	1.0
Empty Travel Time (from chart)	0.7

Quantity of Material to be Moved (cy)
227,806





Cycle Time =	1.0 Load Time	+	1.0 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.7 Empty Trip Time	=	3.3 min	
Cycles/Hour =	60 min/hr	/	3.3 Cycle Time	=	18 cycles/hr					
Hourly Production =	31 Adjusted Load (cy)	x	18.18 Cycles/ Hour	=	**564 cy/hr**					

Hours Required =	227,806 Volume	/	564 Hourly Production	x	1.371 Work Schedule Factor	=	**554 hrs**	

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References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-14E
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-14E Mining Area (Category I)

Revegetation Area

Area (acre)	141
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 141 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$175,232**

Reseeding Costs = 141 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$57,328**

References: Table 24-1-3 and 24-2-7.

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Table:	24-3-14
Mine Area:	N-14E
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpile
Equipment:	Miscellaneous

Revegetation Area Description
N-14E Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	18.7
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 19 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$23,207**

Reseeding Costs = 19 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$7,592**

References: Table 24-1-3 and 24-2-7.

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MINE AREA: N9

Worksheet No. 24-3-1

Earthwork Quantity Worksheet

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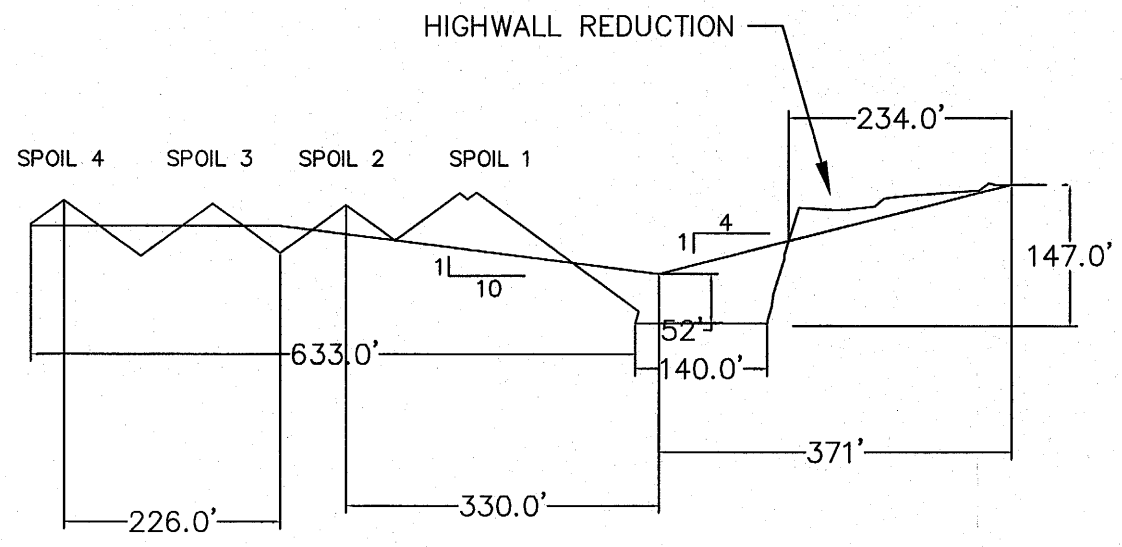


HIGHWALL REDUCTION

Area = 3,240 ft

Pit Length = 9,000 ft

Volume = 1,080,000 cy

Swelled Volume = 1,350,000 cy

SPOIL TO OPEN PIT

Spoil 1,2= 2,473,667 cy

SPOIL GRADING

Spoil 3,4 = 822,330 cy

SCALE

100' 0 100' 200'

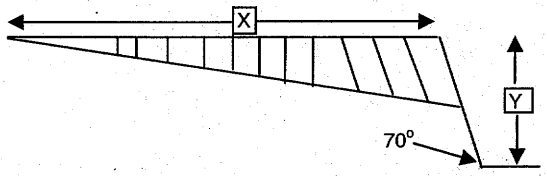
CONTOUR INTERVAL N/A

AutoCAD: N9FinalSection.dwg

Table:	24-3-02	Page 1
Mine Area:	N-9	
Project:	Highwall Reduction	
Task:	Cast/Blast Highwall	
Equipment:	Driltech D55SP	

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP



Highwall Reduction Dimensions:

X (feet)	234
Y (feet)	147
Number of Rows	9

Drill Pattern (Cast) - 21'x24'

Hole Diameter (inches)	10 5/8
Powder Factor (lbs/cy)	0.65
Explosive Weight (lbs)[1]	1,859
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
1	21	57	1058
2	42	51	954
3	63	45	849
Total	126	153	2,861

Drill Pattern (Blast) - 21'x24'

Hole (inches)	9 7/8
Powder Factor (lbs/cy)	0.55
Explosive Weight (lbs)[2]	1,502
(single hole sequence)	

Row	Distance to Highwall (ft)	Drillhole Footage (ft)	Overburden Volume per Hole (cy)
4	84	38	700
5	105	32	602
6	126	27	504
7	147	22	406
8	168	17	308
9	189	11	210
Total	819	146	2,730

Notes:
1. Weight of explosives (cast rows, 1,2, and 3) based on total overburden volume and powder factor (0.65 lbs/cy).
2. Weight of explosives (blast rows, 4 and up) based on total overburden volume and powder factor (0.55 lbs/cy).

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Table: 24-3-02 (cont. Page 2
Mine Area: N-9
Project: Highwall Reduction
Task: Cast/Blast Highwall
Equipment: Driltech D55SP

Activity Description
Drill, load, and blast highwall

Drill Rig is Driltech D55SP

Assumptions

Drilling Rate (ft/hr)	150
Bit Life (hrs)	
Cast 10 5/8"	370
Blast 9 7/8"	170

Unit Costs

Bit Cost (per bit)	
Cast 10 5/8"	$2,400
Blast 9 7/8"	$1,800
Explosives (per pound)[2]	$0.10
Drill Cost (per hour)	$196.78

Labor Costs

Driller Rate (per hour)	$26.59
Blaster Rate (per hour)	$27.67
Driller/Blaster Helper Rate (per hour)	$13.14

Cast Holes (Rows 1-3)

Total Drill Footage	=(	9,000 Pit Length	/	24 Drill Hole Spacing	)x	153 Total Drillhole Footage (Rows 1-3)	=	57,466 feet		
Total Overburden Volume	=(	9,000 Pit Length	/	24 Drill Hole Spacing	)x	2,861 Total Overburden Volume (Rows 1-3)	=	1,072,691 cy		
Drilling Time	=	57,466 Total Drill Footage	/	150 Drilling Rate)	x	1.371 Work Schedule Factor	=	525 hours		
Drilling Cost	=	525 Drilling Time	x(	$196.78 Drill Cost	+	$26.59 Driller Rate	+	$13.14 Driller Helper Rate		
	+(	1/370 Bit Life	x	$2,400 Bit Cost	))	= **$127,673**				
Load and Blast Cost[1]	=(	525 Drilling Time	x	$27.67 Blaster Rate	x	$13.14 Blaster Helper Rate	)			
	+(	1,072,691 Total Overburden Volume	x	0.65 Powder Factor	x	$0.10 Explosive Cost	)	= **$260,752**		

Blast Holes (Rows 4 and up)

Total Drill Footage	=(	9,000 Pit Length	/	24 Drill Hole Spacing	)x	146 Total Drillhole Footage (Rows 4 and up)	=	54,844 feet		
Total Overburden Volume	=(	9,000 Pit Length	/	24 Drill Hole Spacing	)x	2,730 Total Overburden Volume (Rows 4 and up)	=	1,023,750 cy		
Drilling Time	=	54,844 Total Drill Footage	/	150 Drilling Rate	x	1.371 Work Schedule Factor	=	501 hours		
Drilling Cost	=	501 Drilling Time	x(	$196.78 Drill Cost	+	$26.59 Driller Rate	+	$13.14 Driller Helper Rate		
	+(	1/170 Bit Life	x	$1,800 Bit Cost	))	= **$123,904**				
Load and Blast Cost[1]	=(	501 Drilling Time	x	$27.67 Blaster Rate	x	$13.14 Blaster Helper Rate	)			
	+(	1,023,750 Total Overburden Volume	x	0.55 Powder Factor	x	$0.10 Explosive Cost	)	= **$238,618**		

Total Cost

$127,673 Drilling Cost (Cast Holes)	+	$260,752 Load and Blast Cost[1] (Cast Holes)	+	$123,904 Drilling Cost (Blast Holes)	+	$238,618 Load and Blast Cost[1] (Blast Holes)	=	**$750,946**

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Notes:
1. Assumes continuous drill/load/blast sequence with loading and blasting time being roughly equivalent to drilling time.
2. All explosive supplies (i.e. explosives, primers, etc.) are included in explosives cost.

References: Tables 24-1-1, 24-1-2, 24-2-3, and 24-3-1.

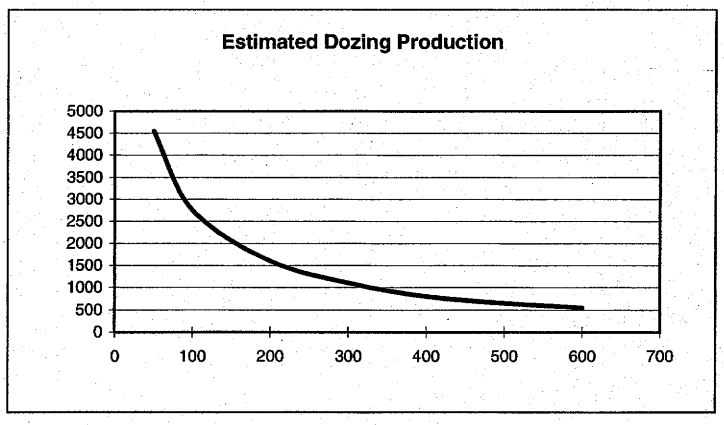
Table:	24-3-03
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze Highwall
Equipment:	D11R Dozer

Earthmoving Activity:
Doze blasted highwall reduction material into pit

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	185.5
Hourly production (from chart)	1,700
Grade (in percent)	-25
Grade Correction	1.5
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.00 (Material Factor) x 1.5 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.92**

Net Hourly Production = 1,700 (Normal Hourly Production (see graph above)) x 0.92 (Productivity Adjustment Factor) = **1,571 cy/hr**

Hours Required = 1,012,500 (Volume to be Moved) / 1,571 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **884 Hours**

Quantity of Material to be Moved (cy)
1,012,500

Note: Quantity of material to be moved includes swelled highwall reduction volume from Table 24-2-3 less 25% for blast casting

References: Tables 24-2-3 and 24-3-2, and Cat Handbook, Ed. 28

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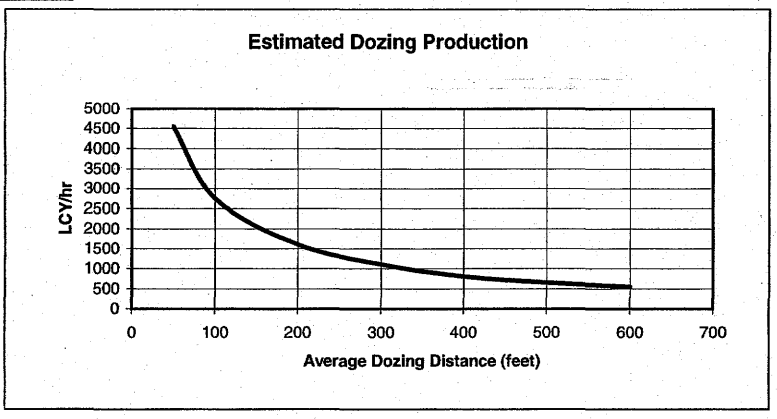
Table:	24-3-04
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze First Two Spoils
Equipment:	D11R Dozer

Earthmoving Activity:
Doze first two spoil ridges (first two spoils go into pit)

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	164.5
Hourly production (from chart)	2,000
Grade (in percent)	-10
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
2,473,670

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.4 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **1.04**

Net Hourly Production = 2,000 (Normal Hourly Production (see graph above)) x 1.04 (Productivity Adjustment Factor) = **2,070 cy/hr**

Hours Required = 2,473,670 (Volume to be Moved) / 2,070 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,639 Hours**

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-05
Mine Area:	N-9
Project:	Backfill Mine Pits
Task:	Doze Back Two Spoils
Equipment:	D11R Dozer

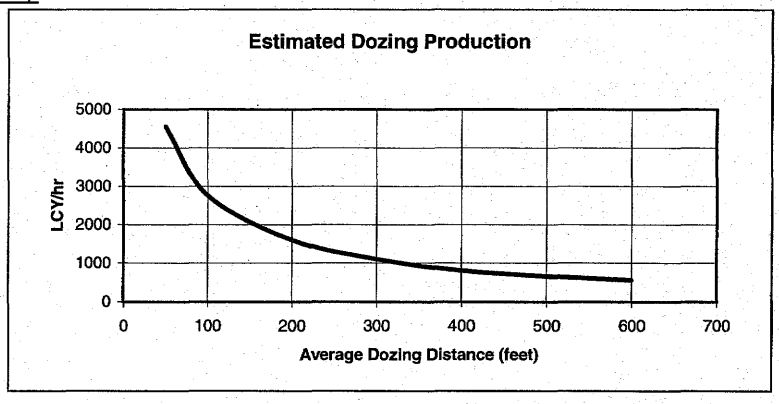
Earthmoving Activity:
Doze back two spoil ridges

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade	
Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	113
Hourly production (from chart)	2,600
Grade (in percent)	0
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Cable controlled blade (.6)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Productivity Adjustment Factor = 0.75 (Operator Factor) x 1.20 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.89**

Net Hourly Production = 2,600 (Normal Hourly Production (see graph above)) x 0.89 (Operating Adjustment Factor) = **2,307 cy/hour**

Hours Required = 822,330 (Volume to be Moved) / 2,307 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **489 hours**

Quantity of Material to be Moved (cy)
822,330

References: Table 24-2-3, Cat Handbook, Ed. 28.

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Table:	24-3-06
Mine Area:	N-9
Project:	Backfill and Grade Ramps
Task:	Backfill/Grade Ramps
Equipment:	D11R Dozer

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use:

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

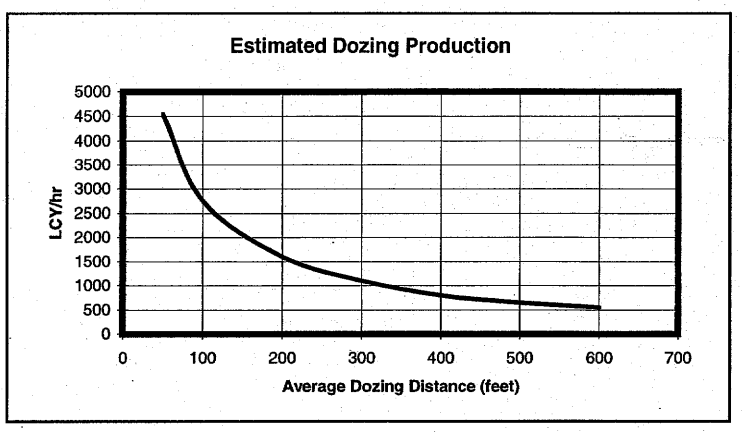
Poor Visibility

(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved (cy)
832091



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.20 (Material Factor) x 1.00 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1,183 cy/hr**

Hours Required = 832,091 (Volume to be Moved) / 1,183 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **965 hours**

References: Table 24-2-4, Cat Handbook, Ed. 28

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Table:	24-3-07
Mine Area:	N-9
Project:	General Grading
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

498 acres

Hours Required	=	498 /	0.125 x	1.371	=	5,464 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-5

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Table:	24-3-08
Mine Area:	N-9
Project:	Surface Stabilization
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
52,000 lineal feet

Hours Required	=	52,000 /	1,060 x	1.371 =	67 Hours
		Terrace Requirement (ft)	Production Rate (ft/hr)	Work Schedule Factor	

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-09
Mine Area:	N-9
Project:	Surface Stabilization
Task:	Grade Drainages/Downdrains
Equipment:	D7R Dozer

Earthmoving Activity
Grade drainages and downdrains.

Characterization of Dozer Used (type, size. etc)
D7R, U-blade

Production Rate (lineal ft/hr) 800

Drainages/Downdrains Requirement
9,000 lineal feet

Hours Required	=	9,000 Drainages/Downdrain Requirement (ft)	/	800 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	=	15 Hours

Note: Production rate based on average grading speed of 2 mph and 12 passes (PWCC experience).

Reference: Table 24-2-6

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Table:	24-3-10 Page 1
Mine Area:	N-9
Project:	Surface Stabilization
Task:	Load, haul, and place riprap
Equipment:	988F Loader Series II
	769D Rear Dump Truck

Earthmoving Activity

Load, haul,and place riprap in main channels and downdrains.

Characterization of Equipment Used (type, size, etc):

988F Loader Series II - bucket capacity	7.8	cy
769D Rear Dump Truck - truck capacity	30.9	cy

Loading and Haulage

Productivity Factors

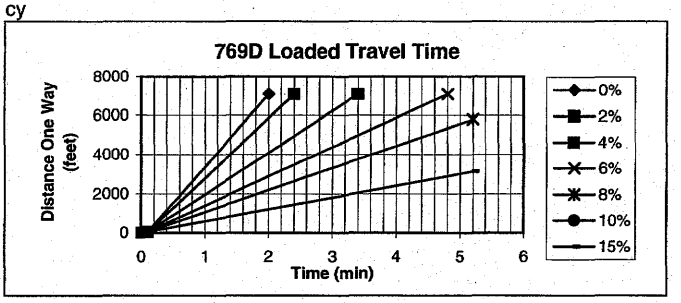
Basic Loader Cycle (min)	0.58
Bulky Material (min)	0.03
Dumped Pile (min)	0.02
Common Loader/Truck Ownership (min)	-0.04
Work Hour Factor (50 min/hr)	0.83
Bucket Fill Factor	0.85
Truck Loaded Volume-4 passes (cy)	26.52
Haulage Distance (ft)	2,500
Effective Grade (%)	5

Production Times

Haul Time (min)	0.0
Dump Time (min)	0.0
Return Time (min)	0.00
Truck/Loader Match (trucks per loader)	1
Riprap Haulage Requirement (cy)	21,000

Placement

Riprap Placement Requirement (ft)	6,300
Placement Rate (ft/shift)	500
Shift (hours)	8



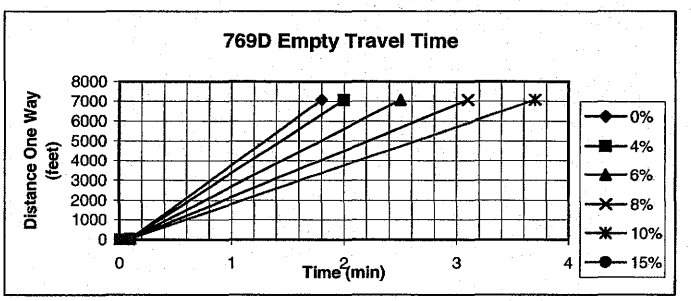


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Table: 24-3-10 (cont.) Page 2
Mine Area: N-9
Project: Surface Stabilization
Task: Load, haul, and place riprap
Equipment: 988F Loader Series II
769D Rear Dump Truck

Load Summary

Loader Cycle Time	=	0.58 Basic Loader Cycle Time	+	0.03 Bulky Material	+	0.02 Dumped Pile	+	-0.04 Common Leader/Truck	=	0.59 min
Loader Volume per Cycle	=	7.80 Bucket Capacity	x	0.85 Bucket Fill Factor	=	6.63 cy				
Loader Cycle Time (per truck)	=	0.59 Loader Cycle Time	x	4 Passes per Truck	=	2.36 min				

Haul Summary

Truck Cycle Time	=	2.36 Load Time	+	0.0 Haul Time	+	0.0 Dump Time	+	0.00 Return Time	=	2.36 min
Fleet Productivity	=(	1 Loader/Truck Match	x	26.52 Truck Loaded Volume	)/(	1 Loader/Truck Match	x	2.36 Truck Cycle Time	)x	60 min/hr = 674 cy/hr
Required Fleet Hours	=	21,000 Riprap Haulage Requirement	/	674 Fleet Productivity	x	1.371 Work Schedule Factor	=	**43 hrs**		

Placement Summary

Required Loader Hours	=(	6,300 Riprap Placement Requirement	/	500 Placement Rate	)x	8 Operating Shift	x	1.371 Work Schedule Factor	=	**138.2 hrs**

Notes: Riprap placement rate based on PWCC experience. Riprap placement length based on 20 percent of main channels and 50 percent of downdrain channels.

References: Table 24-2-6, Cat Handbook, Ed. 28.

SEP 2005 APPROVED

Table:	24-3-11
Mine Area:	N-9
Project:	Topsoil/Suitable Material Replacement
Task:	Suitable Material Placement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place suitable material to graded spoil areas

Characterization of Equipment Used

637E P-P Scraper - capacity	31	cy

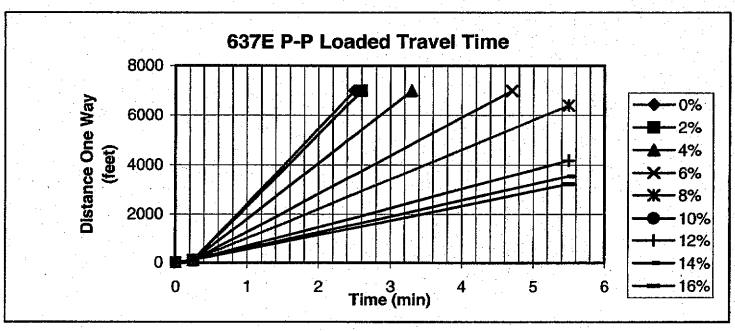
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

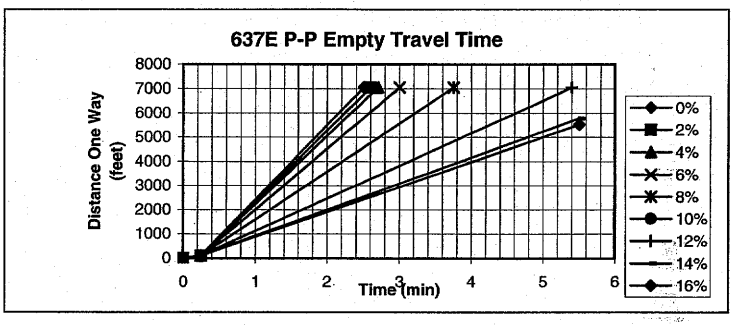
Loaded Distance (ft)	700
Loaded Grade (%)	-5
Loaded Effective Grade (%)	0
Empty Distance (ft)	700
Empty Grade (%)	5
Empty Effective Grade (%)	10

Production Times

Typical Load Time for 637E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	0.4
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved (cy)
1,499,014





Cycle Time	=	1.0 Load Time	+	0.4 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	0.6 Empty Trip Time	=	2.6 min
Cycles/Hour	=	60 min/hr	/	2.6 Cycle Time	=	23 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	23.08 Cycles/ Hour	=	**715 cy/hr**				

Hours Required	=	1,499,014 Volume	/	715 Hourly Production	x	1.371 Work Schedule Factor	=	**2,874 hrs**

References: Table 24-2-7, Cat Handbook, Ed. 28

APPROVED
SEP 2005

Table:	24-3-12
Mine Area:	N-9
Project:	Topsoil/Suitable Material Replacement
Task:	Topsoil Replacement
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place topsoil onto graded spoil areas

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

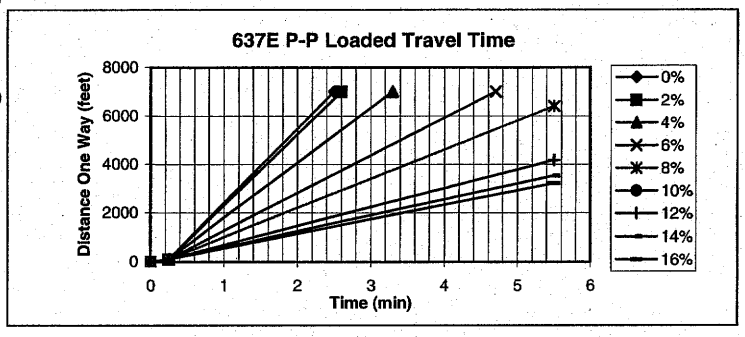
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

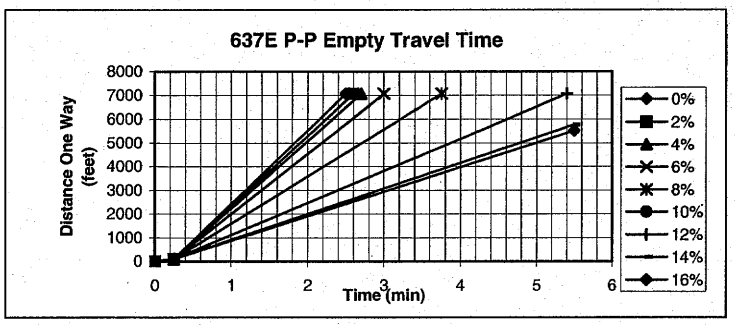
Loaded Distance (ft)	5,300
Loaded Grade (%)	2.5
Loaded Effective Grade (%)	7.5
Empty Distance (ft)	5,300
Empty Grade (%)	-2.5
Empty Effective Grade (%)	2.5

Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	3.2
Empty Travel Time (from chart)	1.5

Quantity of Material to be Moved (cy)
2,498,357





Cycle Time =	1.0 (Load Time)	+	3.2 (Loaded Trip Time)	+	0.6 (Maneuver and Spread Time)	+	1.5 (Empty Trip Time)	=	6.3 min	
Cycles/Hour =	60 (min/hr)	/	6.3 (Cycle Time)	=	10 cycles/hr					
Hourly Production =	31 (Adjusted Load (cy))	x	9.52 (Cycles/ Hour)	=	**295 cy/hr**					

Hours Required =	2,498,357 (Volume)	/	295 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**11605.27 hrs**

SEP 2005 APPROVED

References: Table 24-2-7, Cat Handbook, Ed. 28

Table:	24-3-13
Mine Area:	N-9
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-9 Mining Area (Category I)

Revegetation Area

Area (acre)	968
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = 968 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs) = **$1,201,109**

Reseeding Costs = 968 Acres * 0.5 Failure * $812.00 Reseeding Cost = **$392,949**

References: Table 24-1-3 and 24-2-7.

SEP 2005 APPROVED

Table:	24-3-14
Mine Area:	N-9
Project:	Revegetation
Task:	Revegetation of Topsoil Stockpiles
Equipment:	Miscellaneous

Revegetation Area Description
N-9 Mining Area (Category I) - Topsoil Stockpiles

Revegetation Area

Area (acre)	77
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=	77 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	) =	**$95,681**

Reseeding Costs	=	77 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	=	**$31,303**

References: Table 24-1-3 and 24-2-7.

SEP 2005
APPROVED

ATTACHMENT 24-4

MAINTENANCE AREA (CATEGORY II AND IIA) WORKSHEETS

Category II (Sheets 24-4-01, 24-4-02, and 24-4-03)

- General Grading
- Dozer Ripping
- Revegetation
- Grade Terraces

Category IIA (Sheets 24-4-05, 24-4-06, and 24-4-07)

- General Grading
- Dozer Ripping
- Revegetation

JAN 2012
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Table:	24-4-01
Mine Area:	J-16
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

201 acres

Hours Required	=	201 /	0.125 x	1.371 x	0.50 =	**1103 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	J-16
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

201	acres
972,840	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 972,840 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **143 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

APPROVED

Table:	24-4-03
Mine Area:	J-16
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-16 Mine Area (Category II)

Revegetation Area

Area (acre)	201
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = (201 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs)) * 0.50 Category II Adjustment = **$155,524**

Reseeding Costs = 201 Acres * 0.5 Failure * $1,033.00 Reseeding Cost * 0.50 Category II Adjustment = **$51,908**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	J-1/N-6
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

0 acres

Hours Required	=	0 /	0.125 x	1.371 x	0.50 =	0 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

APPROVED SEP 2005

Table:	24-4-02
Mine Area:	J-1/N-6
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

0	acres
0	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 0 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **0 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

SEP 2005 APPROVED

Table:	24-4-03
Mine Area:	J-1/N-6
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-1 Mine Area (Category II)

Revegetation Area

Area (acre)	0
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=(	0 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$0**

Reseeding Costs	=	0 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$0**

References: Tables 24-1-3 and 24-2-2

APPROVED SEP 2005

Table:	24-4-04
Mine Area:	Black Mesa
Project:	Surface Stabilization at 50%
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
3,000 lineal feet

Hours Required	=	3,000 / Terrace Requirement (ft)	1,060 x Production Rate (ft/hr)	1.371 x Work Schedule Factor	0.50 Category II Adjustment	=	1.9 Hours

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

SEP 2005 APPROVED

Table:	24-4-01
Mine Area:	J-19
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

400 acres

Hours Required	=	400 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**2194 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012

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Table:	24-4-02
Mine Area:	J-19
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

400	acres
1,936,000	cy

Cycle Time	=	300 (Rip Distance)	/	120 (Speed Factor (fpm))	+	0.25 (Turn Time)	=	2.8	min/pass		
Passes per hour	=	60 (min/hr)	/	2.8 (Cycle Time)	=	21.8	pass/hr				
Volume ripped per pass	=(	3.00 (Tool Penetration)	x	6.4 (Rip Spacing)	x	300 (Rip Length)	)/	27 (cf/cy)	=	**213**	**cy/pass**

Ripping Production	=	213 (Volume cut per pass)	x	21.8 (Passes per hour)	=	4655	cy/hr				
Hours Required	=	1,936,000 (Volume to be Ripped)	/	4655 (Ripping Production)	x	1.371 (Work Schedule Factor)	x	0.50 (Category II Adjustment)	=	**285**	**hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	J-19
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-19 Mine Area (Category II)

Revegetation Area

Area (acre)	400
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	= (	400 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$309,500**

Reseeding Costs	=	400 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$103,300**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	J-21 Double Width
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

267 acres

Hours Required	=	267 /	0.125 x	1.371 x	0.50 =	**1465 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	J-21 Double Width
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

267	acres
1,292,280	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = **2.8 min/pass**

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = **21.8 pass/hr**

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = **4655 cy/hr**

Hours Required = 1,292,280 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **190 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

2012
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Table:	24-4-03
Mine Area:	J-21 Double Width
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mine Area (Category II)

Revegetation Area

Area (acre)	267
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	267 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$206,591**

Reseeding Costs	=	267 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$68,953**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-1
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

141 acres

Hours Required	=	141 /	0.125 x	1.371 x	0.50 =	773 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED
N-1 24-4-01

Table:	24-4-02
Mine Area:	N-1
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

141	acres
682,440	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 682,440 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **101 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

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Table:	24-4-03
Mine Area:	N-1
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-1 Mine Area (Category II)

Revegetation Area

Area (acre)	141
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	141 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	= **$109,099**

Reseeding Costs	=	141 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$36,413**

References: Tables 24-1-3 and 24-2-2

JAN 2012
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Table:	24-4-01
Mine Area:	N-2
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

46 acres

Hours Required	=	46 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**252 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
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Table:	24-4-02
Mine Area:	N-2
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

46	acres
222,640	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass =(3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 222,640 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **33 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	N-2
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-2 Mine Area (Category II)

Revegetation Area

Area (acre)	46
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	46 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$35,593**

Reseeding Costs	=	46 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$11,880**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-7/8
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

17 acres

Hours Required	=	17 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**93 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	N-7/8
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

17	acres
82,280	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length)) / 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 82,280 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **12 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	N-7/8
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-7/8 Mine Area (Category II)

Revegetation Area

Area (acre)	17
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	17 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$13,154**

Reseeding Costs	=	17 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$4,390**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-9
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

141 acres

Hours Required	=	141 /	0.125 x	1.371 x	0.50 =	773 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	N-9
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

141	acres
682,440	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 682,440 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **101 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	N-9
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Mine Area (Category II)

Revegetation Area

Area (acre)	141
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	= (	141 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$109,099**

Reseeding Costs	=	141 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$36,413**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-10
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

20 acres

Hours Required	=	20 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**110 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	N-10
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

20	acres
96,800	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 96,800 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **14 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	N-10
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-10 Mine Area (Category II)

Revegetation Area

Area (acre)	20
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = (20 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs)) * 0.50 Category II Adjustment = **$15,475**

Reseeding Costs = 20 Acres * 0.5 Failure * $1,033.00 Reseeding Cost * 0.50 Category II Adjustment = **$5,165**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-11
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity
Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)
D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded
309 acres

Hours Required	=	309 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**1695 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	N-11
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

309	acres
1,495,560	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length)) / 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 1,495,560 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **220 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

APPROVED

Table:	24-4-03
Mine Area:	N-11
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Mine Area (Category II)

Revegetation Area

Area (acre)	309
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	309 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$239,089**

Reseeding Costs	=	309 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$79,799**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-14
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

99 acres

Hours Required	=	99 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**543 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

2012
APPROVED

Table:	24-4-02
Mine Area:	N-14
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

99	acres
479,160	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 479,160 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **71 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	N-14
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-14 Mine Area (Category II)

Revegetation Area

Area (acre)	99
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = (99 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs)) * 0.50 Category II Adjustment = **$76,601**

Reseeding Costs = 99 Acres * 0.5 Failure * $1,033.00 Reseeding Cost * 0.50 Category II Adjustment = **$25,567**

References: Tables 24-1-3 and 24-2-2

APPROVED

Table:	24-4-01
Mine Area:	Kayenta Facilities
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

286 acres

Hours Required	=	286 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**1569 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-02
Mine Area:	Kayenta Facilities
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

286	acres
1,384,240	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 1,384,240 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **204 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-03
Mine Area:	Kayenta Facilities
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-16 Mine Area (Category II)

Revegetation Area

Area (acre)	286
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	286 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	= **$221,293**

Reseeding Costs	=	286 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$73,860**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-01
Mine Area:	N-14E
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

35 acres

Hours Required	=	35 / Area to be Graded (acres)	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	**194 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

SEP 2005 APPROVED

Table:	24-4-02
Mine Area:	N-14E
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

35	acres
171,409	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = **2.8 min/pass**

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = **21.8 pass/hr**

Volume cut per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length)) / 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = **4655 cy/hr**

Hours Required = 171,409 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **25 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

SEP 2005 APPROVED

Table:	24-4-03
Mine Area:	N-14E
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-14E Mine Area (Category II)

Revegetation Area

Area (acre)	35
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	=(	35.415 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	)) *	0.50 Category II Adjustment	=	**$21,975**

Reseeding Costs	=	35.415 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	*	0.50 Category II Adjustment	=	**$7,189**

References: Tables 24-1-3 and 24-2-2

APPROVED
SEP 2005

Table:	24-4-01
Mine Area:	Kayenta Facilities
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

35 acres

Hours Required	=	35 /	0.125 x	1.371 x	0.50 =	194 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category II Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

SEP 2005 APPROVED

Table:	24-4-02
Mine Area:	Kayenta Facilities
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

35	acres
171,409	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = **2.8 min/pass**

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = **21.8 pass/hr**

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length)) / 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = **4655 cy/hr**

Hours Required = 171,409 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category II Adjustment) = **25 hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

SEP 2005 APPROVED

Table:	24-4-03
Mine Area:	Kayenta Facilities
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-16 Mine Area (Category II)

Revegetation Area

Area (acre)	35
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs = (35.415 Acres * ($926.00 $/Acre for seeding, fertilizing, mulching and fencing + $315.00 $/Acre for planting trees and shrubs)) * 0.50 Category II Adjustment = **$21,975**

Reseeding Costs = 35.415 Acres * 0.5 Failure * $812.00 Reseeding Cost * 0.50 Category II Adjustment = **$7,189**

References: Tables 24-1-3 and 24-2-2

SEP 2005 APPROVED

Table:	24-4-04
Mine Area:	Kayenta
Project:	Surface Stabilization at 50%
Task:	Grade Terraces
Equipment:	D7R Dozer

Earthmoving Activity
Grade terraces

Characterization of Dozer Used (type, size, etc)
D7R, U-blade

Production Rate (lineal ft/hr) 1,060

Terrace Requirement
128,000 lineal feet

Hours Required	=	128,000 / Terrace Requirement (ft)	1,060 Production Rate (ft/hr)	x	1.371 Work Schedule Factor	x	0.50 Category II Adjustment	=	83 Hours

Note: Production rate based on average grading speed of 3 mph and 5 passes (PWCC experience).

Reference: Table 24-2-6

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SEP 2005

ATTACHMENT 24-4

MAINTENANCE AREA (CATEGORY II AND IIA) WORKSHEETS

Category II (Sheets 24-4-01, 24-4-02, and 24-4-03)

- General Grading
- Dozer Ripping
- Revegetation
- Grade Terraces

Category IIA (Sheets 24-4-05, 24-4-06, and 24-4-07)

- General Grading
- Dozer Ripping
- Revegetation

JAN 2012
APPROVED

Table:	24-4-05
Mine Area:	J-16
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

103 acres

Hours Required	=	103	/	0.125	x	1.371	x	0.50	=	**565 Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor		Category IIA Adjustment		

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-06
Mine Area:	J-16
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

103	acres
498,520	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass =(3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 498,520 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category IIA Adjustment) = **73 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2 2
APPROVED

Table:	24-4-07
Mine Area:	J-16
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-16 Mine Area (Category IIAA)

Revegetation Area

Area (acre)	103
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=(	103 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category IIA Adjustment	=	**$79,696**

Reseeding Costs	=	103 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category IIA Adjustment	=	**$26,600**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-05
Mine Area:	J-19
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

1,477 acres

Hours Required	=	1,477 /	0.125 x	1.371 x	0.50 =	**8102 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category IIA Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

2012 APPROVED

Table:	24-4-06
Mine Area:	J-19
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

1,477	acres
7,148,680	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 7,148,680 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category IIA Adjustment) = **1053 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-07
Mine Area:	J-19
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-19 Mine Area (Category IIA)

Revegetation Area

Area (acre)	1,477
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = (1477 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs)) * 0.50 Category IIA Adjustment = **$1,142,829**

Reseeding Costs = 1477 Acres * 0.5 Failure * $1,033.00 Reseeding Cost * 0.50 Category IIA Adjustment = **$381,435**

References: Tables 24-1-3 and 24-2-2

APPROVED

Table:	24-4-05
Mine Area:	J-21 Double Width
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

760 acres

Hours Required	=	760 /	0.125 x	1.371 x	0.50 =	4169 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category IIA Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-06
Mine Area:	J-21 Double Width
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

760	acres
3,678,400	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 3,678,400 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category IIA Adjustment) = **542 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

J-21 Double Width 24-4-06
JAN 2012
APPROVED

Table:	24-4-07
Mine Area:	J-21 Double Width
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
J-21 Mine Area (Category IIA)

Revegetation Area

Area (acre)	760
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	= (760 Acres	* ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+ $375.00 $/Acre for planting trees and shrubs	)) * 0.50 Category IIA Adjustment	=	**$588,050**

Reseeding Costs	= 760 Acres	* 0.5 Failure	* $1,033.00 Reseeding Cost	* 0.50 Category IIA Adjustment	=	**$196,270**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-05
Mine Area:	N-1
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

188 acres

Hours Required	=	188 /	0.125 x	1.371 x	0.50 =	1034 Hours
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category IIA Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

APPROVED SEP 2005

Table:	24-4-06
Mine Area:	N-1
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

188	acres
912,117	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = **2.8 min/pass**

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = **21.8 pass/hr**

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = **4655 cy/hr**

Hours Required = 912,117 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category IIA Adjustment) = **134 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

SEP 2005 APPROVED

Table:	24-4-07
Mine Area:	N-1
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-1 Mine Area (Category IIA)

Revegetation Area

Area (acre)	188
Seeding, fertilizing, mulching and fencing costs (per acre)	$926.00
Tree and Shrub Costs (per acre)	$315.00
Reseeding Cost (per acre)	$812.00
Percent Failure	50%

Revegetation Costs	= (	188.454 Acres	* (	$926.00 $/Acre for seeding, fertilizing, mulching and fencing	+	$315.00 $/Acre for planting trees and shrubs	)) *	0.50 Category IIA Adjustment	=	**$116,936**

Reseeding Costs	=	188.454 Acres	*	0.5 Failure	*	$812.00 Reseeding Cost	*	0.50 Category IIA Adjustment	=	**$38,256**

References: Tables 24-1-3 and 24-2-2

APPROVED
SEP 2005

Table:	24-4-07
Mine Area:	N-11
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-11 Mine Area (Category IIA)

Revegetation Area

Area (acre)	420
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = (420 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs)) * 0.50 Category IIA Adjustment = **$324,975**

Reseeding Costs = 420 Acres * 0.5 Failure * $1,033.00 Reseeding Cost * 0.50 Category IIA Adjustment = **$108,465**

References: Tables 24-1-3 and 24-2-2

JAN 2012
APPROVED

Table:	24-4-05
Mine Area:	N-14E
Project:	General Grading at 50%
Task:	General Grading
Equipment:	D11R Dozer

Earthmoving Activity

Miscellaneous grading in and around the pit area, especially at either end of the pit that is not accounted for in the normal spoil pile grading. Assume that the grading required is a mixture of rough grading and final grading.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

19 acres

Hours Required	=	19 /	0.125 x	1.371 x	0.50 =	**104 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	Category IIA Adjustment	

Note: Production rate based on PWCC experience.

Reference: Table 24-2-2

JAN 2012
APPROVED

Table:	24-4-06
Mine Area:	N-14E
Project:	Surface Ripping at 50%
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

19	acres
91,960	cy

Cycle Time = 300 (Rip Distance) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume ripped per pass = (3.00 (Tool Penetration) x 6.4 (Rip Spacing) x 300 (Rip Length))/ 27 (cf/cy) = **213 cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 cy/hr

Hours Required = 91,960 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) x 0.50 (Category IIA Adjustment) = **14 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-2.

JAN 2012
APPROVED

Table:	24-4-07
Mine Area:	N-14E
Project:	Revegetation at 50%
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
N-14E Mine Area (Category IIA)

Revegetation Area

Area (acre)	19
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	= (	19 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	)) *	0.50 Category IIA Adjustment	=	**$14,701**

Reseeding Costs	=	19 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	*	0.50 Category IIA Adjustment	=	**$4,907**

References: Tables 24-1-3 and 24-2-2

JAN 2012
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ATTACHMENT 24-5

FACILITIES AREA (CATEGORY V) WORKSHEETS
Major Facilities

(Separate Sets for Black Mesa, Kayenta, and the Joint Facilities)

- Demolish Facilities
- Concrete Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Facilities Area Grading
- Haul and Place Topsoil
- Revegetation

Conveyors

- Demolish Conveyor

Powerlines

- Powerline Removal

Scoria Pits

- Dozer Ripping
- Scoria Pit Grading
- Haul and Place Topsoil
- Revegetation

Landfarm

- Haul Landfarm Material
- Dozer Ripping
- Landfarm Grading
- Haul and Place Topsoil
- Revegetation

Airport (Joint Only)

- Asphalt Removal/Disposal
- Dozer Ripping

Permanent Roads

- Doze Roads
- Dozer Ripping
- Grading
- Haul and Place Topsoil
- Revegetation

Primary Roads

- Culvert Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Grading

JAN 2012
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ATTACHMENT 24-5

FACILITIES AREA (CATEGORY V) WORKSHEETS

(Continued)

Primary Roads
(Continued)

- Haul and Place Topsoil
- Revegetation

Ancillary Roads

- Culvert Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Grading
- Haul and Place Topsoil
- Revegetation

Water Storage and
Sedimentation Ponds

- Sediment Removal
- Grade Embankment into Basin
- Grading
- Haul and Place Topsoil
- Revegetation

Environmental Monitoring Sites

- Concrete Removal/Disposal
- Site Reclamation

Monitoring Wells

- Well Reclamation

N-11 Coal Handling Facility

- Cut/Fill Earthwork
- Grading

Draglines and Shovels

- Removal

Equipment Requirements and On-Site Mobilization

- Equipment Requirements
- On-Site Mobilization

JAN 2012
APPROVED

Table: 24-5-01
Mine Area: Black Mesa
Project: Facilities Demolition
Task: Demolish Facilities
Equipment: Miscellaneous

Structure Material	Demolition Unit Cost
Steel (s)	0.33
Concrete(c)	0.46

Description	Quantity (ft^3 unless noted)	Unit Cost	Total
Mine Conveyor Belts (ft)	5244	$48.35	$253,547
Sample Tower Building	122,400	$0.33	$40,392
Tire Shop	9,000	$0.33	$2,970
Bucket House	27,000	$0.33	$8,910
Tripple Control Building	18,304	$0.33	$6,040
Bath House	68,880	$0.33	$22,730
Shop/Warehouse	505,440	$0.33	$166,795
Old Electric Shop	86,020	$0.33	$28,387
Old Lab Building	11,808	$0.33	$3,897
Office	38,400	$0.33	$12,672
Welding Shop	166,400	$0.33	$54,912
Mine Sample Tower	20,000	$0.33	$6,600
Preparation Storage Bldg.	20,400	$0.33	$6,732
New Electric Shop	87,906	$0.33	$29,009
Canopy on Shops	8,640	$0.33	$2,851
Compressor Building	20,880	$0.33	$6,890
Truck Dump/Hopper	67,500	$0.33	$22,275
Live Storage	2,032,000	$0.33	$670,560
N-6 Explosive Storage	17,316	$0.33	$5,714
BM Water Tank	792,624	$0.33	$261,566
Eight (8) Pumphouses	12,288	$0.33	$4,055
Coal Lab Buildings	22,320	$0.33	$7,366
Warehouse Addition	37,800	$0.33	$12,474
Bathhouse Water Tank	13,400	$0.33	$4,422
A.G. Lube and Fuel Tanks	11,400	$0.33	$3,762
(2) Tipple Ship Buildings	24,000	$0.33	$7,920
Breaker Building	66,000	$0.33	$21,780
Pumphouse	14,400	$0.33	$4,752
(3) Water Tanks	30,000	$0.33	$9,900
Shop Addition	204,750	$0.33	$67,568
PM Slab	6,825	$0.46	$3,140
Shop Approach's (4)	8,424	$0.46	$3,875
Tank Farm Slab	6,825	$0.46	$3,140
Landfill Design Fee	-	-	$100,000
Total			**$1,867,603**

JAN 2
APPROVED

Table:	24-5-02
Mine Area:	Black Mesa
Project:	Concrete Removal
Task:	Concrete Removal/Disposal
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Remove 8" of concrete from facilities area.

Characterization of Dozer and Ripper Used:
D11R, single shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	0.7
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
5,410 cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 0.67 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **47 bank cy/pass**

Ripping Production = 47 (Volume cut per pass) x 21.8 (Passes per hour) = 1,034 hours

Hours Required = 5,410 (Volume to be Ripped) / 1,034 (Ripping Production) x 1.371 (Work Schedule Factor) = **7.2 hours**

Concrete Disposal (at $9.00/cy)= **$48,690**

References: Cat Handbook, Ed. 28, Table 24-2-8.

JAN 2012
APPROVED

Table:	24-5-03
Mine Area:	Black Mesa
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:

Push 1' of gravel or scoria off the side of the facilities parking area.
Doze a trench 4' deep to accept surfacing material, then push the 4' of suitable material back over the top

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

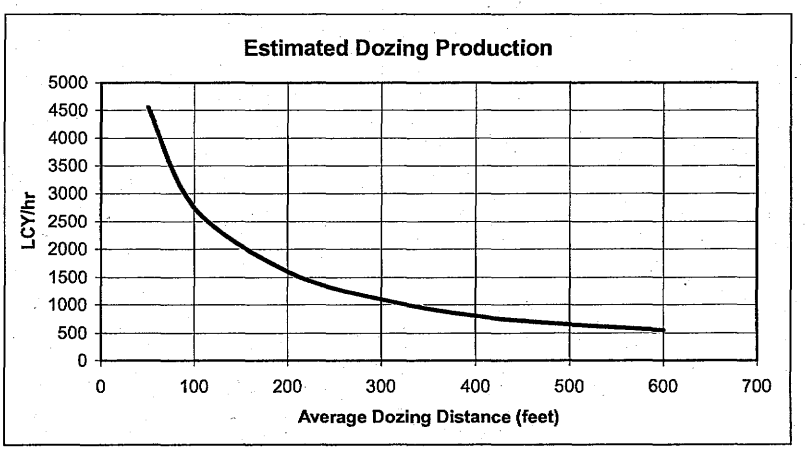
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

2,480,112	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 2,480,112 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3,457 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

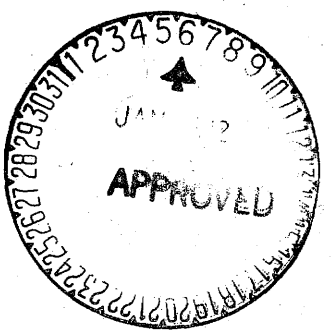


Table:	24-5-04
Mine Area:	Black Mesa
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity

Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

1,263,240	cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4,655 hours

Hours Required = 1,263,240 (Volume to be Ripped) / 4,655 (Ripping Production) x 1.371 (Work Schedule Factor) = **372 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-8.

JAN 2012
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Table:	24-5-05
Mine Area:	Black Mesa
Project:	Grade Facilities Areas
Task:	Facilities Area Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grading the cut and fills to blend into the surrounding topography to drain, burial of road surface material a minimum of three feet.

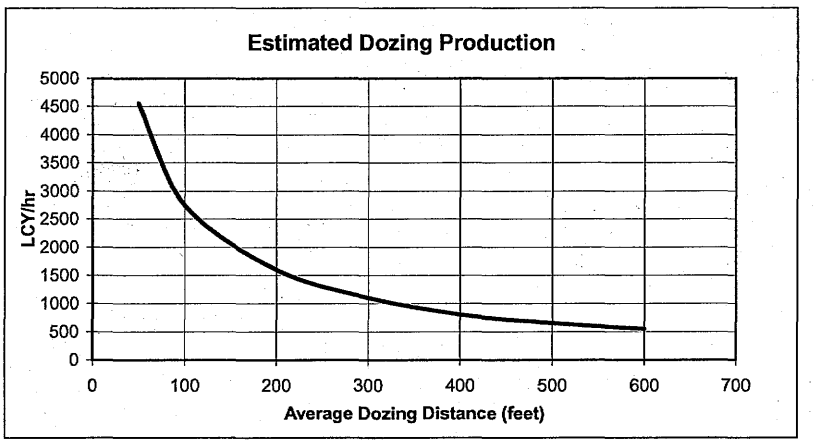
Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

1,263,240	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 1,263,240 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,761 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

JAN 2012
APPROVED

Table:	24-5-06
Mine Area:	Black Mesa
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul 4' of material to cover concrete pads and 1.25' of material to cover remaining parking/storage areas.

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

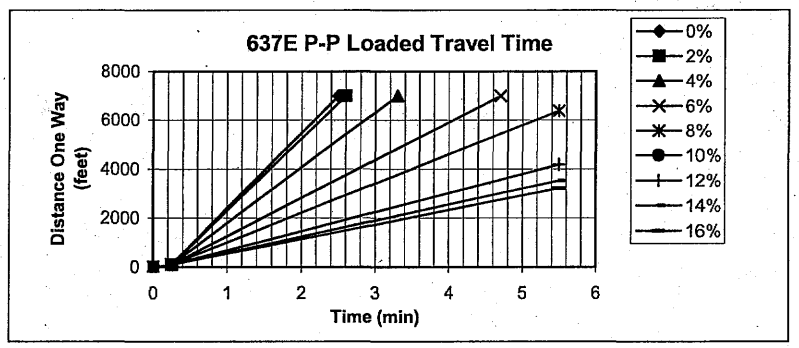
Loaded Distance (ft)	2000
Loaded Grade (%)	0
Loaded Effective Grade (%)	3
Empty Distance (ft)	2000
Empty Grade (%)	0
Empty Effective Grade (%)	3

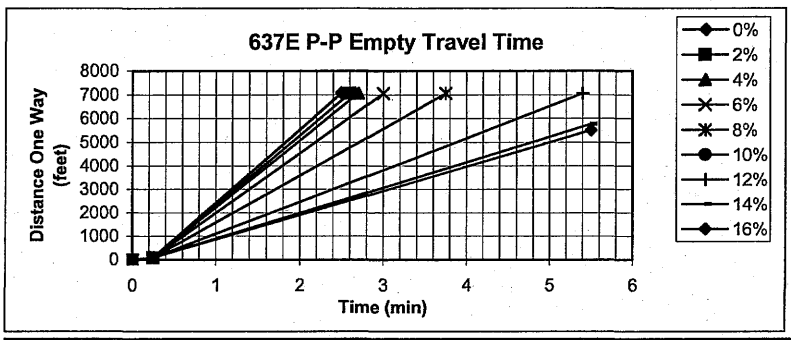
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	1.6
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved

547,601 cy





Cycle Time =	2.0 (Load Time)	+	1.6 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.2 (Empty Trip Time)	=	6.0 min
Cycles/Hour =	60 (min/hr)	/	6.0 (Cycle Time)	=	10 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	10.00 (Cycles/ Hour)	=	**310 cy/hr**				

Hours Required =	547,601 (Volume)	/	310 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**2,423 hrs**

Reference: Table 24-2-8, Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-07
Mine Area:	Black Mesa
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Black Mesa Mine major facilities

Revegetation Area

Area (acre)	433
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 433 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$460,063**

Reseeding Costs = 433 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$183,051**

References: Table 24-1-3 and Table 24-2-8

JAN 2012
APPROVED

Table: 24-5-08
Mine Area: Black Mesa Conveyors
Project: Conveyor Demolition
Task: Demolish Conveyor
Equipment: Miscellaneous

Description	Quantity (ft)	Crew	Days	Unit Cost	Demolition Cost
Conveyor System (Labor)	2,800	B-8	31	$5,495	$170,011

Notes:
1. The conveyor system includes the belt, pans, idlers, and supports.
2. The unit cost includes concrete footing removal and disposal.
3. Means B-8 crew removes 90.5 feet of conveyor per day
4. Daily Rate for means B-8 Crew is $5,495/day from RSMeans Site Work & Landscape Cost Data 2010.

JAN 2012
APPROVED

Table: 24-5-09
Mine Area: Black Mesa Powerlines
Project: Facilities-Powerlines
Task: Remove Powerlines
Equipment: Miscellaneous

Description	Quantity	Days	Unit Cost	Demolition Cost
Powerline Removal (ft)	107,574	20	$7,000.46	$142,626

Assumptions:
1. Means crew R-6 removes 1 mile of powerline per day.
2. Daily rate for crew R-6 is $7,000.46/day from RSMeans Site Work & Landscape Cost Data 2010.

JAN 2012
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Table:	24-5-10
Mine Area:	Black Mesa Scoria Pits
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of scoria pit prior to grading

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
355,014 cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 355,014 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **105 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
APPROVED

Table:	24-5-11
Mine Area:	Black Mesa Scoria Pits
Project:	Grade Scoria Pit Area
Task:	Scoria Pit Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grade scoria pit to blend into surrounding area.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1500
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

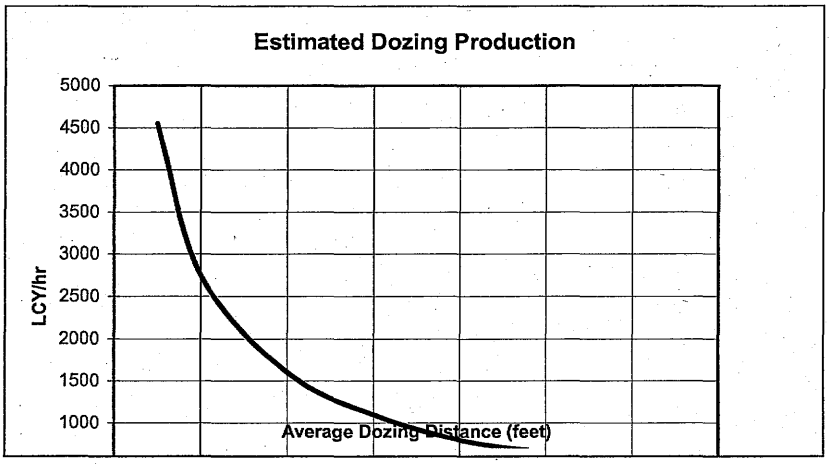
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

355,014	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,500 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **923 cy/hr**

Hours Required = 355,014 (Volume to be Moved) / 922.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **528 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-9

JAN 2012
APPROVED

Table:	24-5-12
Mine Area:	Black Mesa Scoria Pits
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
1.6 ft. of topsoil disturbance area around scoria pits

Characterization of Scraper Used (type, capacity. etc)
637E P-P Scraper - capacity = 31 cy

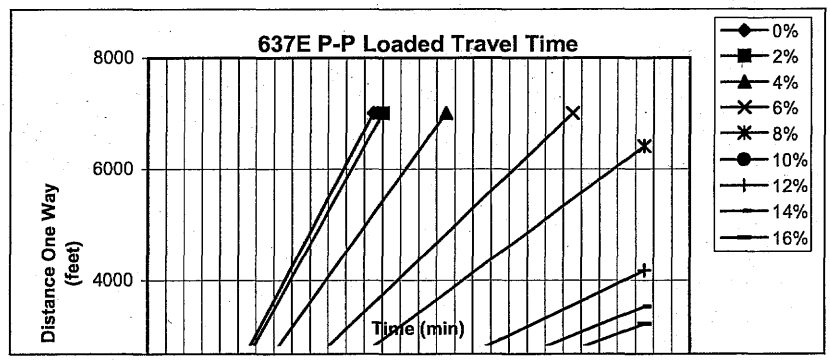
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

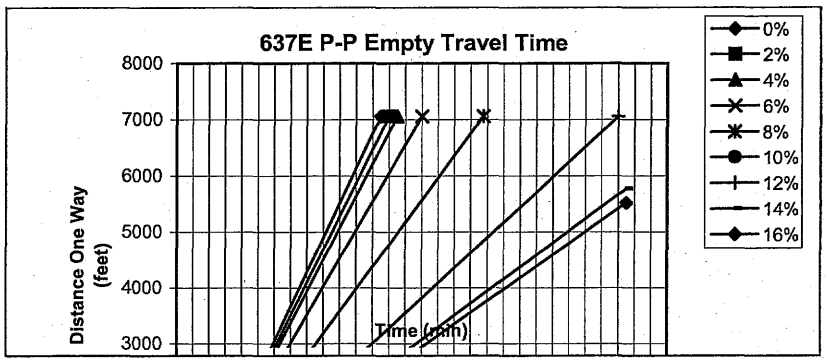
Loaded Distance (ft)	1500
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	1500
Empty Grade (%)	0
Empty Effective Grade (%)	5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	2.0
Empty Travel Time (from chart)	1.6

Quantity of Material to be Moved
189,341 cy





Cycle Time =	2.0 Load Time	+	2.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.6 Empty Trip Time	=	6.8 min
Cycles/Hour =	60 min/hr	/	6.8 Cycle Time	=	9 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	8.82 Cycles/ Hour	=	**274 cy/hr**				

Hours Required =	189,341 Volume	/	274 Hourly Production	x	1.371 Work Schedule Factor	=	**949 hrs**	

JAN 2012
APPROVED

Reference: Table 24-2-9, Cat Handbook, Ed. 28

Table:	24-5-13
Mine Area:	Black Mesa Scoria Pits
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Black Mesa Mine regraded scoria pits

Revegetation Area

Area (acre)	73
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 73 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$77,934**

Reseeding Costs = 73 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$31,009**

References: Table 24-1-3 and Table 24-2-9

JAN 2012
APPROVED

Table:	24-5-21
Mine Area:	Black Mesa Permanent Roads
Project:	Dozing to Narrow Road
Task:	Doze Roads
Equipment:	D11R Dozer

Earthmoving Activity:
Push 50' of gravel/scoria off the side of the road for burial.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	50
Hourly production (from chart)	4,550
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

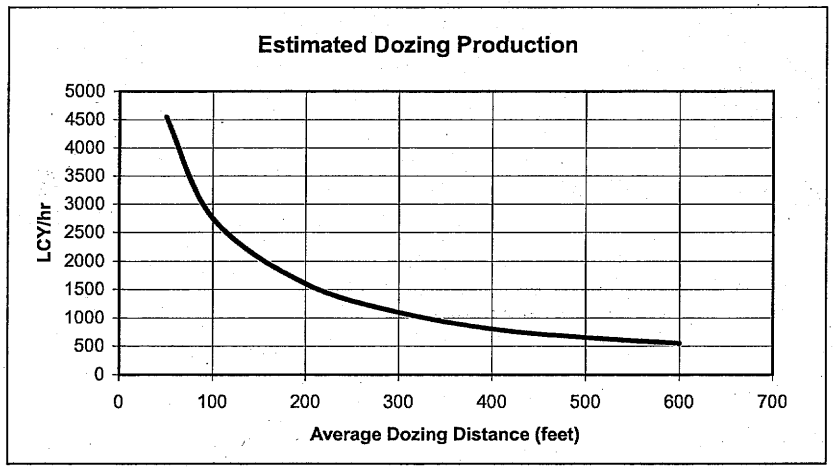
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	47,893
Width (ft)	50
Total (cy)	88,691



Productivity Adjustment Factor = 0.75 (Operator Factor) x 0.80 (Material Factor) x 1.0 (Grade Correction) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.0 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 4,550 (Normal Hourly Production (see graph above) x 0.49 (Productivity Adjustment Factor) = **2243 cy/hr**

Hours Required = 88691 (Volume to be Moved) / 2243 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **54 hrs**

Reference: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-22
Mine Area:	Black Mesa Permanent Roads
Project:	Surface Ripping to Narrow Road
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped	
Length (ft)	47,893
Width (ft)	50
Total (cy)	266,072

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 266,072 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **78 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2 12
APPROVED

Table:	24-5-23
Mine Area:	Black Mesa Permanent Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	47,893
Width (ft)	100
Total (acres)	110

Hours Required	=	110 /	0.125 x	1.371 =	**1206 Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor	

Note: Production rate based on PWCC experience.

JAN 2012
APPROVED

Table:	24-5-24
Mine Area:	Black Mesa Permanent Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

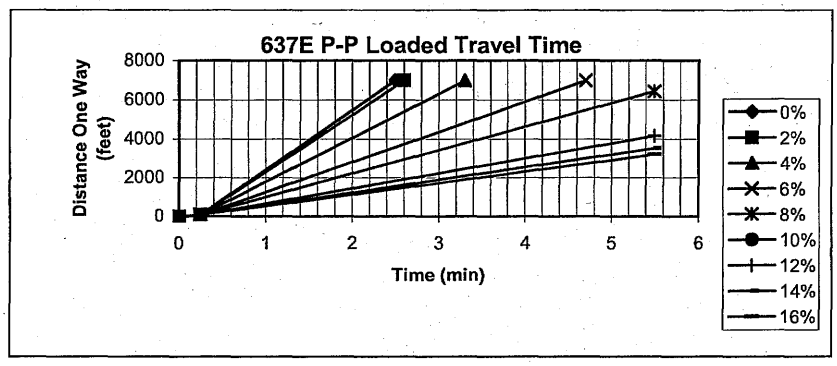
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

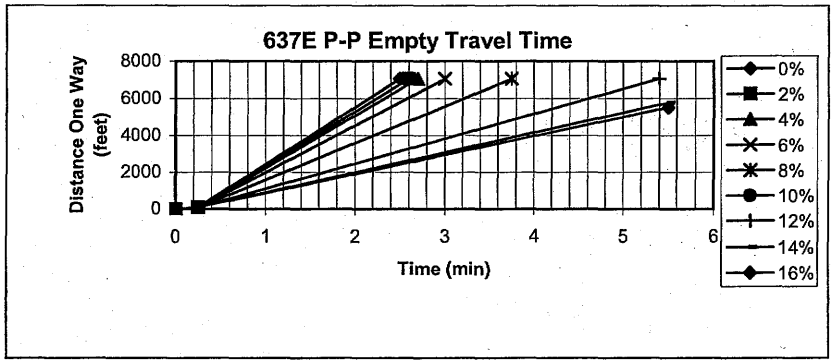
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	3.2

Quantity of Material to be Moved

Length (ft)	47,893
Width (ft)	100
Total (cy)	283,810





Cycle Time =	2.0 Load Time	+	4.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	3.2 Empty Trip Time	=	10.4 min
Cycles/Hour =	60 min/hr	/	10.4 Cycle Time	=	6 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	5.77 Cycles/ Hour	=	**179 cy/hr**				

Hours Required =	283,810 Volume	/	179 Hourly Production	x	1.371 Work Schedule Factor	=	**2,176 hrs**	

Reference: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-25
Mine Area:	Black Mesa Permanent Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Black Mesa Mine permanent roads

Revegetation Area

Area (acre)	110
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 110 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$116,819**

Reseeding Costs = 110 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$46,480**

References: Table 24-1-3

JAN 2012
APPROVED

Table:	24-5-26
Mine Area:	Black Mesa Primary Roads
Project:	Culvert Removal
Task:	Culvert Removal/Disposal
Equipment:	D11R Dozer

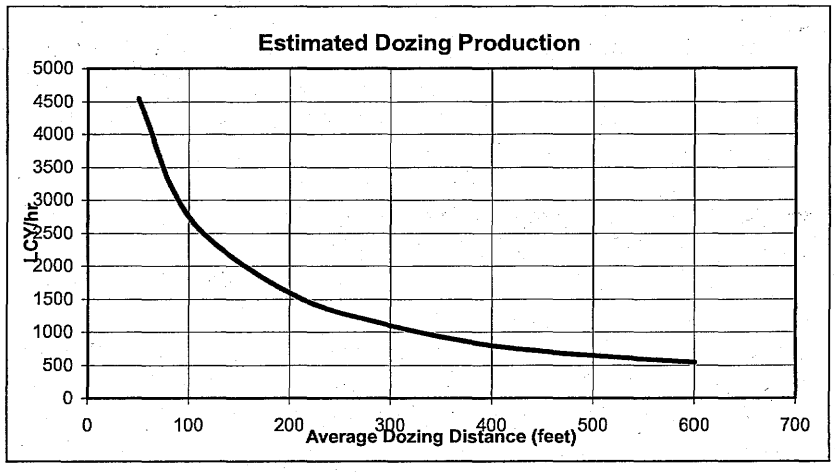
Earthmoving Activity:
Remove and dispose of culvert embankment material and culverts.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1100
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustments Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Total (cy)	213,080

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **676.5 cy/hr**

Hours Required = 213,080 (Total (cy) Volume to be Moved) / 676.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **432 Hours**

Culvert (ft)	5040
Culvert Disposal Cost (at $0.29/cf)	$17,669

Note: Quantity of material and culvert are 40% of total for Black Mesa portion of the cost.

References: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-27
Mine Area:	Black Mesa Primary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

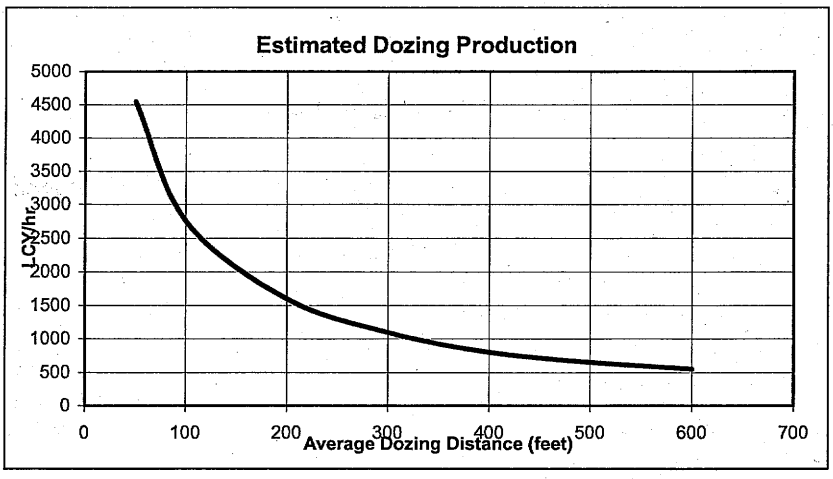
Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	80
Hourly production (from chart)	3500
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	58,376
Width (ft)	80
Total (cy)	172,966

References: Cat Handbook, Ed. 28

Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 3,500 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **1722 cy/hr**

Hours Required = 172,966 (Total (cy) Volume to be Moved) / 1722 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **138 Hours**

JAN 2012
APPROVED

Table:	24-5-28
Mine Area:	Black Mesa Primary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped	
Length (ft)	58,376
Width (ft)	80
Total (cy)	518,898

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 518,898 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **153 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
APPROVED

Table:	24-5-29
Mine Area:	Black Mesa Primary Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	58,376
Width (ft)	200
Total (acres)	268

Hours Required	=	268	/	0.125	x	1.371	=	**2941**	**Hours**
		Area to be Graded (acres)		Net Hourly Production (acres/hr)		Work Schedule Factor			

Note: Production rate based on PWCC experience.

JAN 2012
APPROVED

Table:	24-5-30
Mine Area:	Black Mesa Primary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

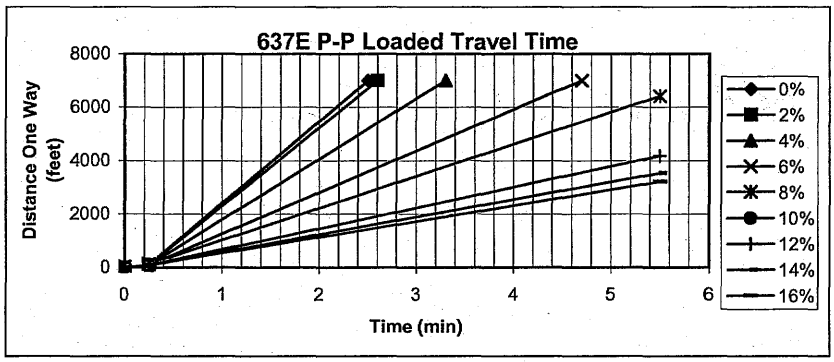
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

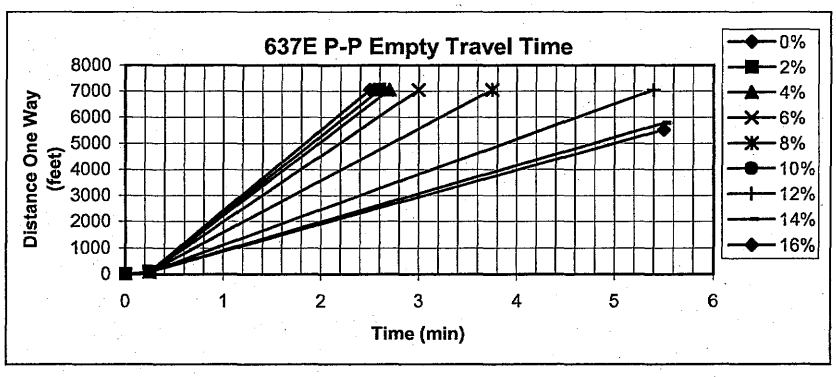
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	3.0

Quantity of Material to be Moved

Length (ft)	58,376
Width (ft)	200
Total (cy)	691,864





Cycle Time =	2.0 Load Time	+	4.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	3.0 Empty Trip Time	=	10.2 min
Cycles/Hour =	60 min/hr	/	10.2 Cycle Time	=	6 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	5.88 Cycles/ Hour	=	**182 cy/hr**				

Hours Required =	691,864 Volume	/	182 Hourly Production	x	1.371 Work Schedule Factor	=	**5203 hrs**	

JAN 2012
APPROVED

Reference: Cat Handbook, Ed. 28

Table:	24-5-31
Mine Area:	Black Mesa Primary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Black Mesa Mine primary roads

Revegetation Area

Area (acre)	268
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 268 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$284,777**

Reseeding Costs = 268 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$113,308**

References: Table 24-1-3

JAN 2012
APPROVED

Table:	24-5-32
Mine Area:	Black Mesa Ancillary Roads
Project:	Culvert Removal
Task:	Culvert Removal/Disposal
Equipment:	D11R Dozer

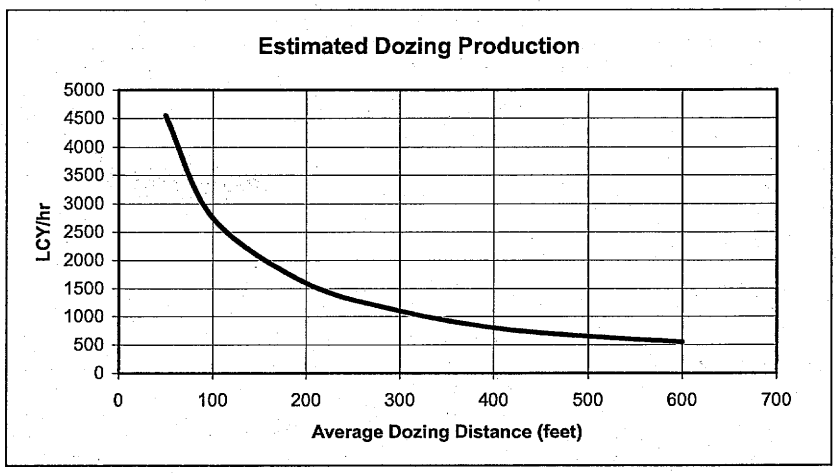
Earthmoving Activity:
Remove and dispose of culvert embankment material and culverts.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1100
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

196,272	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **676.5 cy/hr**

Hours Required = 196,272 (Total Volume to be Moved) / 676.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **398 Hours**

Culvert (ft)	4640
Culvert Disposal Cost (at $0.29/cf)	$17,418

Note: Quantity of material and culvert are 40% of total for Black Mesa portion of the cost.

References: Cat Handbook, Ed. 28

APPROVED

Table:	24-5-33
Mine Area:	Black Mesa Ancillary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

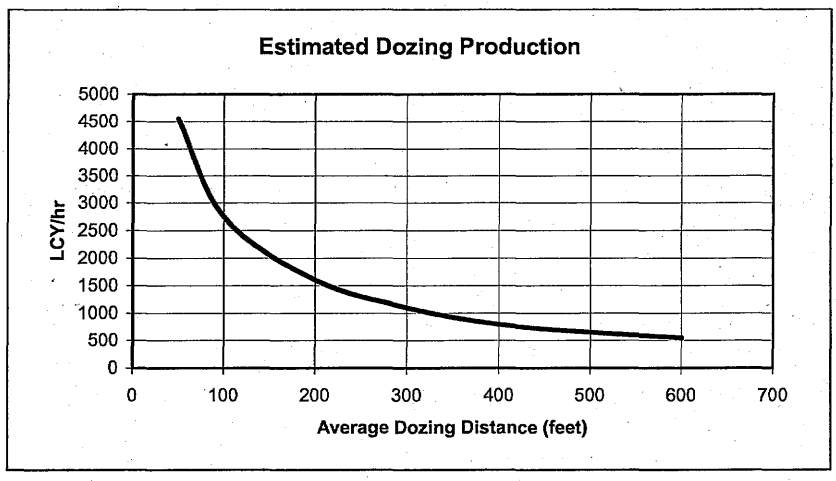
Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	25
Hourly production (from chart)	5000
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	187990
Width (ft)	25
Total (cy)	174,065

Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 5,000 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **2460 cy/hr**

Hours Required = 174,065 (Total (cy) Volume to be Moved) / 2460 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **97 Hours**

References: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-34
Mine Area:	Black Mesa Ancillary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

Length (ft)	187,990
Width (ft)	25
Total (cy)	522194

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 522,194 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **154 hours**

Reference: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-35
Mine Area:	Black Mesa Ancillary Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	187,990
Width (ft)	80
Total (acres)	345

Hours Required	=	345 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**3788**	**Hours**

Note: Production rate based on PWCC experience.

JAN 2012
APPROVED

Table:	24-5-36
Mine Area:	Black Mesa Ancillary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

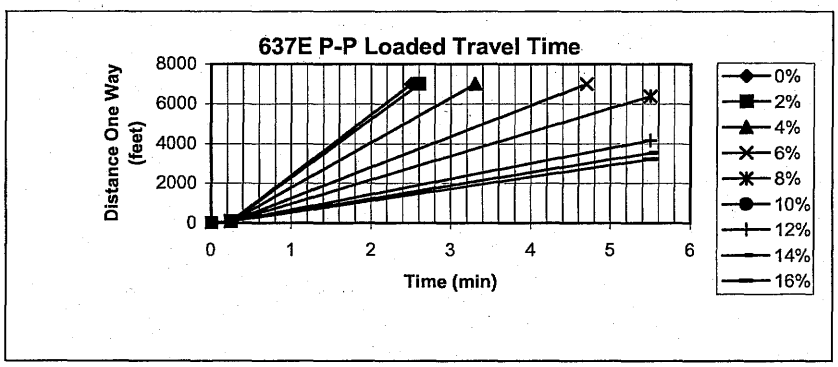
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

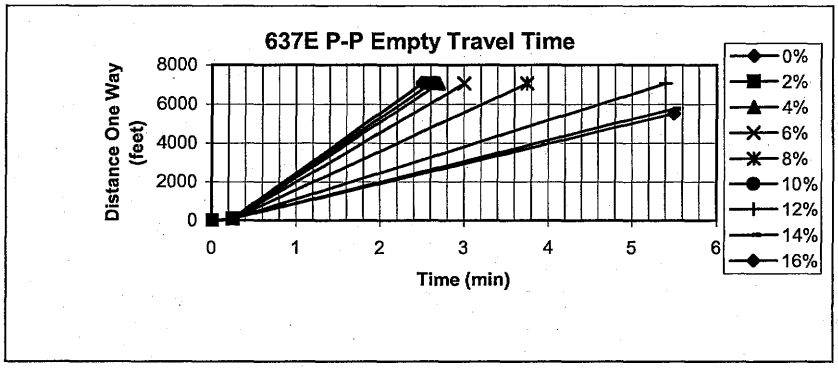
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	2.4

Quantity of Material to be Moved

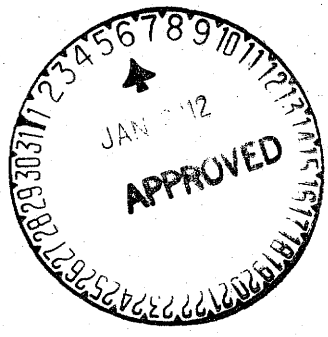
Length (ft)	187,990
Width (ft)	80
Total (cy)	891,212





Cycle Time =	2.0 Load Time	+	4.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	2.4 Empty Trip Time	=	9.6 min
Cycles/Hour =	60 min/hr	/	9.6 Cycle Time	=	6 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	6.25 Cycles/ Hour	=	**194 cy/hr**				

Hours Required =	891,212 Volume	/	194 Hourly Production	x	1.371 Work Schedule Factor	=	**6308 hrs**	



Reference: Cat Handbook, Ed. 28

Table:	24-5-37
Mine Area:	Black Mesa Ancillary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Black Mesa Mine ancillary roads

Revegetation Area

Area (acre)	345
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 345 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$366,831**

Reseeding Costs = 345 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$145,956**

References: Table 24-1-3

JAN 2012
APPROVED

Table:	24-5-38	Page 1
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds	
Project:	Clean Out Sediment	
Task:	Sediment Removal	
Equipment:	D11R Dozer	

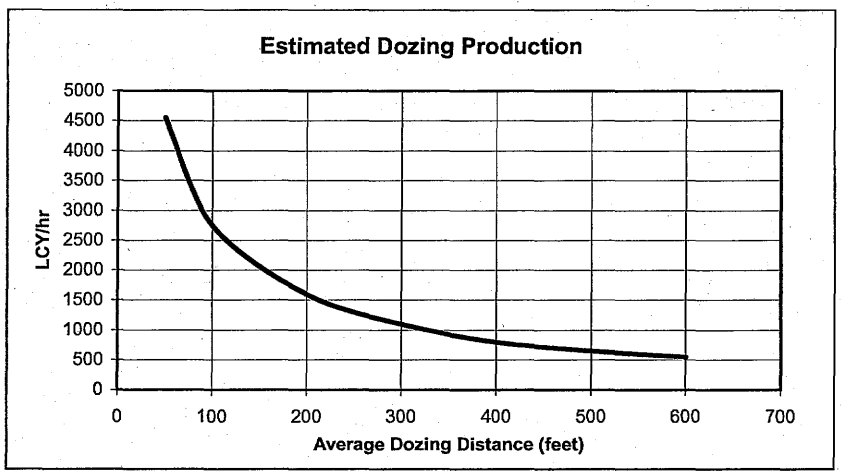
Earthmoving Activity:
Sediment removal/disposal (65%) from pond areas.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

237,640	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 237,640 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **331 Hours**

Notes:
1. Quantity of material to be moved based on 65% of total sediment, 25% is assumed in the incised portion of the pond, not requiring removal and 10% is cleaned out with a dragline.
2. Quantity of material is based on 40% (Black Mesa portion of cost) of water storage and sedimentation ponds.

References: Table 24-2-10 and Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-38 (cont.) Page 2
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds
Project:	Clean Out Sediment
Task:	Sediment Removal
Equipment:	9225 American Dragline

Earthmoving Activity:
Sediment removal/disposal (10%) from pond areas with a dragline.

Characterization of Dragline Used (type, size, etc):
9225 American Dragline, bucket capacity (yd^3) = 2

Swing depth and angle correction[3] 0.9

Productivity Adjustment Factors
Operator Factor
Is operator excellent (1) no
Is operator average (.75) yes
Is operator poor (.6) no

Quantity of Material to be Moved[1]
36,560 cy

Productivity Adjustment Factor	=	0.75 Operating Factor	x	0.9 Swing Factor	=	**0.68**

Net Hourly Production	=	145 Normal Hourly Production	x	0.68 Productivity Adjustment Factor	=	**98 cy/hr**

Hours Required	=	36,560 Volume to be Moved	/	98 Net Hourly Production	x	1.371 Work Schedule Factor	=	**512 Hours**

Notes:
1. Quantity of material to be moved based on 65% of total sediment, 25% is assumed in the incised portion of the pond, not requiring removal and 10% is cleaned out with a dragline.
2. Quantity of material is based on 40% (Black Mesa portion of cost) of water storage and sedimentation ponds.
3. Production rate based on Peabody experience.
4. Optimum depth of cut is 11.8 feet.

Reference: Table 24-2-10

JAN 2012
APPROVED

Table:	24-5-39
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds
Project:	Embankment Removal
Task:	Grade Embankment into Basin
Equipment:	D11R Dozer

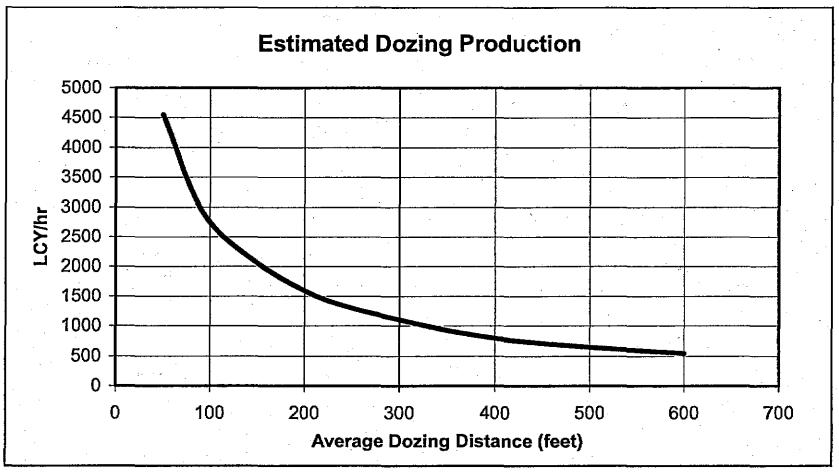
Earthmoving Activity:
Blade embankment material into surrounding drainage, pond area or sides of drainage.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

322,578	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 322,578 (Total Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **450 Hours**

References: Table 24-2-10 and Cat Handbook, Ed. 28

JA 2
APPROVED

Table:	24-5-40
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds
Project:	Grade Pond Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

215 acres

Hours Required	=	215 / Area to be Graded (acres)	0.125 / Net Hourly Production (acres/hr)	x	1.371 / Work Schedule Factor	=	**2359 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-10

JAN 2012
APPROVED

Table:	24-5-41
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place 1.6' topsoil to disturbed pond areas.

Characterization of Scraper Used (type, capacity. etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

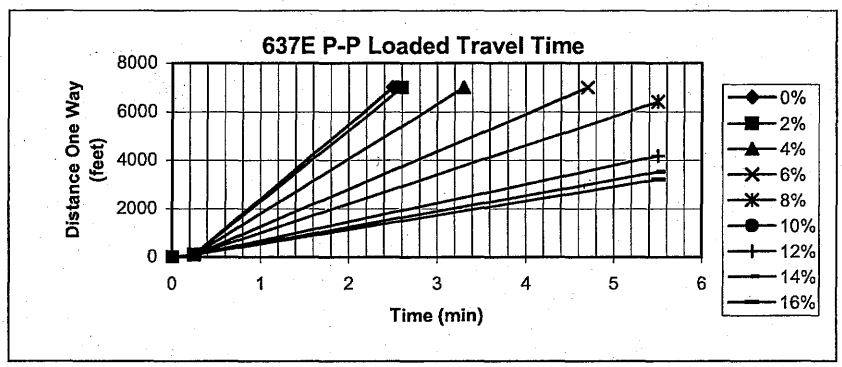
Loaded Distance (ft)	1000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	1000
Empty Grade (%)	0
Empty Effective Grade (%)	5

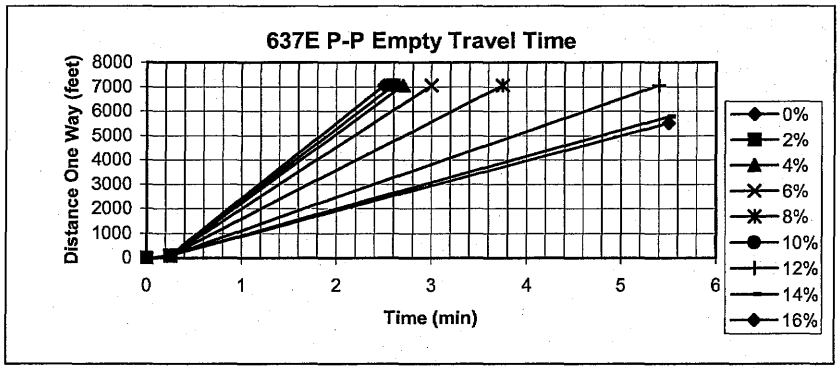
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved

555,090 cy





Cycle Time =	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	=	4.6 min
Cycles/Hour =	60 (min/hr)	/	4.6 (Cycle Time)	=	13 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	13.04 (Cycles/ Hour)	=	**404 cy/hr**				

Hours Required =	555,090 (Volume)	/	404 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**1883 hrs**	

Jan 2012
APPROVED

References: Table 24-2-10 and Cat Handbook, Ed. 28

Table:	24-5-42
Mine Area:	Black Mesa Water Storage and Sedimentation Ponds
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description

Black Mesa Mine regraded sedimentation and water storage ponds.

Revegetation Area

Area (acre)	215
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs = 215 Acres * ($1,062.50 $/Acre for seeding, fertilizing, mulching and fencing + $0.00 $/Acre for planting trees and shrubs) = **$228,480**

Reseeding Costs = 215 Acres * 0.5 Failure * $845.50 Reseeding Cost = **$90,908**

References: Table 24-1-3

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Table: 24-5-43 Page 1
Mine Area: Black Mesa Environmental Monitoring Sites
Project: Off Permit Environmental Monitoring Sites
Task: Concrete Removal/Disposal

Environmental Monitoring Sites

Approximately 7 off-permit environmental monitoring sites will exist in 2010. The sites vary in size and disturbance area. Ten of these sites are minor sites consisting only of a single riser (e.g., alluvial monitoring well, precipitation gage, or crest gage). The remaining six sites are slightly larger and may include concrete flumes, steel sediment sample structures, or overhead steel catwalk structures, etc. for stormwater sampling. In order to be conservative, Peabody included enough reclamation liability costs to remove the monitoring structures, grade and blend the site, assuming the entire bonding area is disturbed, and reclaim and revegetate the site. Following is a list of monitoring sites and estimated bonding area:

Site ID	Bond Area (acres)		Site ID	Bond Area (acres)	
ALUV77	1		CG34	3	
ALUV95	1		SW16	3	
	2	acres	SW25	3	
			SW26	3	
			SW155	3	
				15	acres

Total Reclamation Area = 17 acres

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Table: 24-5-43 (cont.) Page 2
Mine Area: Black Mesa Environmental Monitoring Sites
Project: Off Permit Environmental Monitoring Sites
Task: Site Reclamation
Equipment Concrete Removal/Disposal

Description	Quantity (ft^3)	Unit Cost	No. of Sites	Total
Demolish steel and concrete at five SW sites	18000	0.41	5	$36,900
Concrete/materials to grout alluvial wells (minor sites)	1	50	2	$100
Laborer (minor sites)	2	77.16	7	$1,080
Pickup Truck (minor sites)	1	60.56	7	$424
		Total Cost =		$38,504
		40% of Total Cost =		$ 15,402

Estimator Notes
1. Volume dimensions are 300' x 10' x 6'.
2. Assume 4 hours at each site.
3. Assume pickup truck is $15.14 per hour.
4. Assume 60% of total cost for Kayenta Mine portion of cost.

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Table:	24-5-44	Page 1
Mine Area:	Black Mesa Environmental Monitoring Sites	
Project:	Grade Reclaimed Area	
Task:	Site Reclamation	
Equipment:	D11R Dozer	

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain (SW sites).

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Total (acres) 6

Hours Required	=	6 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**66 Hours**

Notes: Production rate based on PWCC experience.
Acres based on 40% of total acres for Black Mesa portion of the cost.

References: Cat Handbook, Ed. 28

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Table: 24-5-44 (cont.) Page 2
Mine Area: Black Mesa Environmental Monitoring Sites
Project: Revegetation
Task: Site Reclamation
Equipment: Miscellaneous

Revegetation Area Description

Black Mesa Mine percentage of revegetating the five "SW" sites

Revegetation Area

Area (acre)	6
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,062.50
Tree and Shrub Costs (per acre)	$0.00
Reseeding Cost (per acre)	$845.50
Percent Failure	50%

Revegetation Costs	=	6 Acres	* (	$1,062.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$0.00 $/Acre for planting trees and shrubs	) =	**$6,375**

Reseeding Costs	=	6 Acres	*	0.5 Failure	*	$845.50 Reseeding Cost	=	**$2,537**

Note: Revegetation area based on 40% of total area for Black Mesa portion of cost.

References: Table 24-1-3

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Table:	24-5-45
Mine Area:	Black Mesa Monitoring Wells
Project:	Reclaim Monitoring Wells
Task:	Well/Site Reclamation
Equipment:	Miscellaneous

Environmental Monitoring Water Wells

Approximately 62 monitoring water wells will exist in 2010.
Well abandonment procedures to be used include:
1) Cutting the casing off a foot below ground level or even with the ground surface;
2) Filling the well bore from the bottom to within 20 feet of the surface with bentonite or cuttings/gravel;
3) Grouting the top 20 feet of the well bore with cement;
4) Removing all locking well covers and protective fences;
5) Scarifying and seeding the ground surface in the immediate vicinity of the well.

Abandonment cost per well = $1,000 per well

Reclamation Cost	=	62 Number of Wells	x	$1,000 Cost per Well	x	0.4 40% of Total	=	**$24,800**

Note: Reclamation Cost based on 40% of total for Black Mesa portion of the cost.

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Table: 24-5-50
Mine Area: Black Mesa Draglines
Project: Dragline Removal
Task: Disassemble and Remove Draglines
Equipment: Miscellaneous

Description	Quantity (units))	Unit Cost	Removal Cost
8750 Dragline	1	$200,000.00	$200,000
		Total	$200,000

Note: Cost based on PWCC experience.
With the current resale market for large excavators, this is conservative.

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ATTACHMENT 24-5

FACILITIES AREA (CATEGORY V) WORKSHEETS
Major Facilities

(Separate Sets for Black Mesa, Kayenta, and the Joint Facilities)

- Demolish Facilities
- Concrete Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Facilities Area Grading
- Haul and Place Topsoil
- Revegetation

Conveyors

- Demolish Conveyor

Powerlines

- Powerline Removal

Scoria Pits

- Dozer Ripping
- Scoria Pit Grading
- Haul and Place Topsoil
- Revegetation

Landfarm

- Haul Landfarm Material
- Dozer Ripping
- Landfarm Grading
- Haul and Place Topsoil
- Revegetation

Airport (Joint Only)

- Asphalt Removal/Disposal
- Dozer Ripping

Permanent Roads

- Doze Roads
- Dozer Ripping
- Grading
- Haul and Place Topsoil
- Revegetation

Primary Roads

- Culvert Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Grading

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ATTACHMENT 24-5

FACILITIES AREA (CATEGORY V) WORKSHEETS

(Continued)

Primary Roads
(Continued)

- Haul and Place Topsoil
- Revegetation

Ancillary Roads

- Culvert Removal/Disposal
- Surfacing Removal/Disposal
- Dozer Ripping
- Grading
- Haul and Place Topsoil
- Revegetation

Water Storage and
Sedimentation Ponds

- Sediment Removal
- Grade Embankment into Basin
- Grading
- Haul and Place Topsoil
- Revegetation

Environmental Monitoring Sites

- Concrete Removal/Disposal
- Site Reclamation

Monitoring Wells

- Well Reclamation

N-11 Coal Handling Facility

- Cut/Fill Earthwork
- Grading

Draglines and Shovels

- Removal

Equipment Requirements and On-Site Mobilization

- Equipment Requirements
- On-Site Mobilization

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e: 24-5-01 Page 1
Area: Kayenta
Project: Facilities Demolition
Task: Demolish Facilities
Equipment: Miscellaneous

KAYENTA MINE
FACILITIES DEMOLITION ESTIMATE
7/31/08

Structure Material	Demolition Unit Cost
Steel (s)	0.33
Concrete(c)	0.46

Facilities Name	Structure Material	Facility Length (ft)	Width (ft)	Height (ft)	Volume (cu ft)	Unit Cost ($)	Total Cost ($)
N-8 Facilities:							
Coal Lab.	s	45	30	14	18,900	0.33	$ 6,237
Pumphouse	s	30	20	11	6,600	0.33	$ 2,178
Pumphouse	s	25	20	12	6,000	0.33	$ 1,980
Shop	s	224	90	26	524,160	0.33	$ 172,973
Shop Addition	s	52	24	11	13,728	0.33	$ 4,530
Shop Addition/ Office	s	52	24	13	16,224	0.33	$ 5,354
Tire Repair Shed	s	50	30	18	27,000	0.33	$ 8,910
Water Tank (Diameter)	s	92	-	40	265,904	0.33	$ 87,748
N-14 Facilities:							
CDK Contractor Building	s	60	35	16	33,600	0.33	$ 11,088
Explosives Building	c	50	35	11	19,250	0.33	$ 6,353
Laboratory	s	60	28	10	16,800	0.33	$ 5,544
MC Building	s	20	10	10	2,000	0.33	$ 660
Pumphouse	s	12	12	9	1,296	0.33	$ 428
er Tank (Diameter)	s	40	-	32	40,212	0.33	$ 13,270
J-28 Facilities:							
Bathhouse	s	100	80	16	128,000	0.33	$ 42,240
Bucket Shed	s	126	100	37	466,200	0.33	$ 153,846
Electric Shop	s	69	49	26	87,906	0.33	$ 29,009
Explosive Storage at J-21 Pit	c	33	16	37	19,536	0.33	$ 6,447
Mine Office	s	80	30	10	24,000	0.33	$ 7,920
Pickup Wash Pump House	s	21	18	14	5,292	0.33	$ 1,746
Tire Repair Shop	s	90	20	12	21,600	0.33	$ 7,128
Tire Repair Shop Addition	s	40	35	18	25,200	0.33	$ 8,316
Truck Shop	s	240	100	32	768,000	0.33	$ 253,440
Truck Shop Addition	s	40	35	32	44,800	0.33	$ 14,784
Truck Shop Addition	s	30	16	16	7,680	0.33	$ 2,534
Truck Shop Addition	s	25	20	16	8,000	0.33	$ 2,640
Truck Wash Pump C75 House	s	20	20	8	3,200	0.33	$ 1,056
Water Tank (Diameter)	s	145	-	40	660,520	0.33	$ 217,972
Welding Shop	s	100	100	30	300,000	0.33	$ 99,000
Coal Handling Facilities:							
Loadout & Silos:							
4-Silos (Diameter)	c	46	-	200	1,329,525	0.46	$ 611,582
Large Building on Silo	s	50	50	40	100,000	0.33	$ 33,000
MCC Building	c	24	16	10	3,840	0.46	$ 1,766
MCC Buidling on Silos	c	16	9	10	1,440	0.46	$ 662
Subtotal:							$ 1,821,679

Kayenta 24-5-01

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Table: 24-5-01 (cont.) Page 2
Mine Area: Kayenta
Project: Facilities Demolition
Task: Demolish Facilities
Equipment: Miscellaneous

Facilities Name	Structure Material	Facility Length (ft)	Width (ft)	Height (ft)	Volume (cu ft)	Unit Cost ($)	Total Cost ($)
N-8 Facilities:							
Analyzer Building	s	21	12	29	7,308	0.33	$ 2,412
Conveyor Control Building	s	30	18	10	5,400	0.33	$ 1,782
5-MCC Buildings	c	20	20	10	20,000	0.46	$ 9,200
Reclaim Hopper No. 1	s	220	20	25	110,000	0.33	$ 36,300
Reclaim Hopper No. 2	s	40	20	25	20,000	0.33	$ 6,600
Reclaim Hopper No. 3	s	20	20	20	8,000	0.33	$ 2,640
7-Scales	s	10	10	10	7,000	0.33	$ 2,310
Screening Control Building	s	50	24	12	14,400	0.33	$ 4,752
Screening Tower	s	38	38	82	118,408	0.33	$ 39,075
Truck Dump	s	60	60	42	151,200	0.33	$ 49,896
Weigh Bin	s	22	20	46	20,240	0.33	$ 6,679
J-28 Facilities:							
Analyzer Building	s	30	16	40	19,200	0.33	$ 6,336
Belt Take Up	s	29	21	33	20,097	0.33	$ 6,632
Crusher Tower	s	100	30	50	150,000	0.33	$ 49,500
Dust Control Building #1 & #2	s	30	20	13	15,600	0.33	$ 5,148
Dust Control Building #3	s	20	12	9	2,160	0.33	$ 713
Dust Control Building #4	s	16	12	9	1,728	0.33	$ 570
Filter House	s	40	30	15	18,000	0.33	$ 5,940
Laboratory	s	60	30	12	21,600	0.33	$ 7,128
Live Storage Dome (Diameter)	s	180	-	-	292,573	0.33	$ 96,549
4-MCC Buildings	c	30	20	10	24,000	0.46	$ 11,040
Reclaim Hopper	s	30	26	37	28,860	0.33	$ 9,524
Sample Tower	s	30	20	40	24,000	0.33	$ 7,920
4-Scales	s	10	10	10	4,000	0.33	$ 1,320
Truck Dump	s	70	63	100	441,000	0.33	$ 145,530
Conveyor 1N and 1S		-	-	-	-		
Transfer Stations:							
J-28 Transfer	s	36	27	68	66,096	0.33	$ 21,812
Transfer A	s	43	37	20	31,820	0.33	$ 10,501
Transfer A	s	17	16	20	5,440	0.33	$ 1,795
Transfer B	s	28	16	12	5,376	0.33	$ 1,774
Transfer C	s	50	40	38	76,000	0.33	$ 25,080
Transfer F	s	45	16	35	25,200	0.33	$ 8,316
Transfer 24/25	s	45	16	35	25,200	0.33	$ 8,316
Transfer 24/25	s	10	10	10	1,000	0.33	$ 330
Transfer 23/24	s	20	20	20	8,000	0.33	$ 2,640
Transfer 22/23	s	30	20	11	6,600	0.33	$ 2,178
Transfer 21/22	s	20	20	11	4,400	0.33	$ 1,452
Transfer 20/21	s	24	20	12	5,760	0.33	$ 1,901
Transfer 20	s	20	20	12	4,800	0.33	$ 1,584
Landfill Design Fee	-	-					$ 100,000
Subtotal:							$ 703,174

Total	**$2,524,852**

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Table:	24-5-02
Mine Area:	Kayenta
Project:	Concrete Removal
Task:	Concrete Removal/Disposal
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Remove 8" of concrete from facilities area.

Characterization of Dozer and Ripper Used:
D11R, single shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	0.7
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
10,266 cy

Cycle Time	=	300 (Cut Length)	/	120 (Speed Factor (fpm))	+	0.25 (Turn Time)	=	2.8	min/pass	
Passes per hour	=	60 (min/hr)	/	2.8 (Cycle Time)	=	21.8	pass/hr			
Volume cut per pass	=	0.67 (Tool Penetration)	x	6.4 (Cut Spacing)	x	300 (Cut Length)	/	27 (cf/cy)	=	**47 bank cy/pass**

Ripping Production	=	47 (Volume cut per pass)	x	21.8 (Passes per hour)	=	1,034	hours	
Hours Required	=	10,266 (Volume to be Ripped)	/	1,034 (Ripping Production)	x	1.371 (Work Schedule Factor)	=	**13.6 hours**

Concrete Disposal (at $9.00/cy)= **$92,394**

References: Cat Handbook, Ed. 28, Table 24-2-8.

Kayenta 24-5-02

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Table:	24-5-03
Mine Area:	Kayenta
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push 1' of gravel or scoria off the side of the facilities parking area.
Doze a trench 4' deep to accept surfacing material, then push the 4' of suitable material back over the top

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

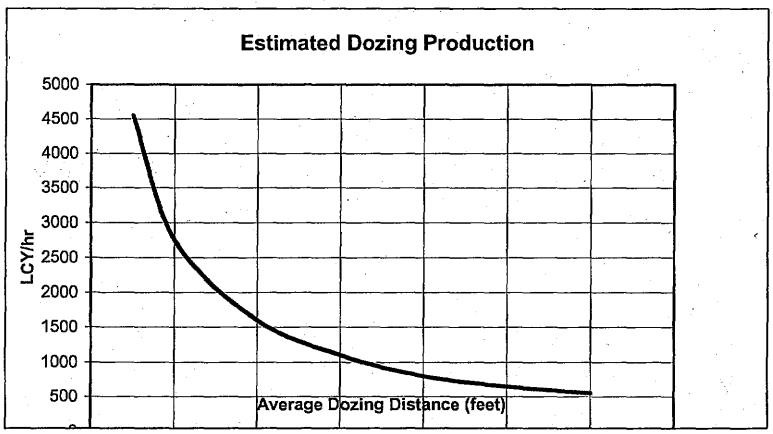
Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved
5,768,406 cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 5,768,406 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **8,040 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

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Table:	24-5-04
Mine Area:	Kayenta
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
2,928,200 cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4,655 hours

Hours Required = 2,928,200 (Volume to be Ripped) / 4,655 (Ripping Production) x 1.371 (Work Schedule Factor) = **863 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-8.

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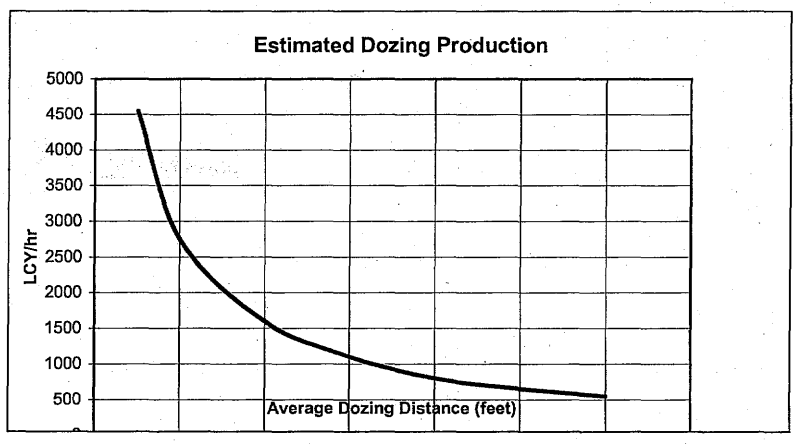
Table:	24-5-05
Mine Area:	Kayenta
Project:	Grade Facilities Areas
Task:	Facilities Area Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grading the cut and fills to blend into the surrounding topography to drain, burial of road surface material a minimum of three feet.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

2,928,200	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 2,928,200 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **4,081 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

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Table:	24-5-06
Mine Area:	Kayenta
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul 4' of material to cover concrete pads and 1.25' of material to cover remaining parking/storage areas.

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

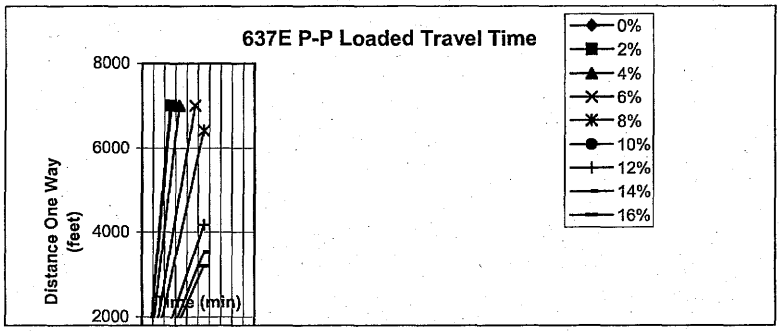
Loaded Distance (ft)	2000
Loaded Grade (%)	0
Loaded Effective Grade (%)	3
Empty Distance (ft)	2000
Empty Grade (%)	0
Empty Effective Grade (%)	3

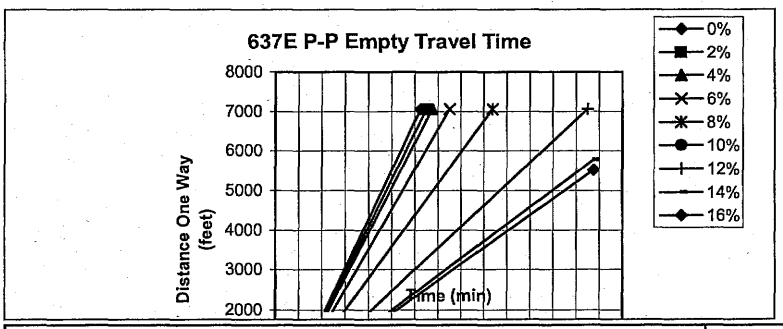
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	1.6
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved

1,260,413 cy





Cycle Time = 2.0 (Load Time) + 1.6 (Loaded Trip Time) + 1.2 (Maneuver and Spread Time) + 1.2 (Empty Trip Time) = 6.0 min

Cycles/Hour = 60 (min/hr) / 6.0 (Cycle Time) = 10 cycles/hr

Hourly Production = 31 (Adjusted Load (cy)) x 10.00 (Cycles/Hour) = **310 cy/hr**

Hours Required = 1,260,413 (Volume) / 310 (Hourly Production) x 1.371 (Work Schedule Factor) = **5,576 hrs**

Reference: Table 24-2-8, Cat Handbook, Ed. 28

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Table:	24-5-07
Mine Area:	Kayenta
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine major facilities

Revegetation Area

Area (acre)	1,005
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 1,005 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$1,555,238**

Reseeding Costs = 1,005 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$519,083**

References: Table 24-1-3 and Table 24-2-8

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Table: 24-5-08
Mine Area: Kayenta Conveyors
Project: Conveyor Demolition
Task: Demolish Conveyor
Equipment: Miscellaneous

Description	Quantity (ft)	Crew	Days	Unit Cost	Demolition Cost
Conveyor System (steel)	90,610	B-8	1,001	$5,495	$5,501,679

Notes:
1. The conveyor system includes the belt, pans, idlers, and supports.
2. The unit cost includes concrete footing removal and disposal.
3. Means B-8 crew removes 90.5 feet of conveyor per day
4. Daily Rate for means B-8 Crew is $5,495/day from RSMeans Site Work & Landscape Cost Data 2010.

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Table: 24-5-09
Mine Area: Kayenta Powerlines
Project: Facilities-Powerlines
Task: Remove Powerlines
Equipment: Miscellaneous

Description	Quantity (ft)	Days	Unit Cost	Demolition Cost
Powerline Removal (ft)	175,699	33	$7,000.46	$232,950

Assumptions:
1. Means crew R-6 removes 1 mile of powerline per day.
2. Daily rate for crew R-6 is $7,000.46/day from RSMeans Site Work & Landscape Cost Data 2010.

JAN 2012
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Table:	24-5-10
Mine Area:	Kayenta Scoria Pits
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of scoria pit prior to grading

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
271,040 cy

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8 min/pass				
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8 pass/hr						
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	**213 bank cy/pass**		

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655 hours		
Hours Required	=	271,040 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	**80 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
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Table:	24-5-11
Mine Area:	Kayenta Scoria Pits
Project:	Grade Scoria Pit Area
Task:	Scoria Pit Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grade scoria pit to blend into surrounding area.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1500
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

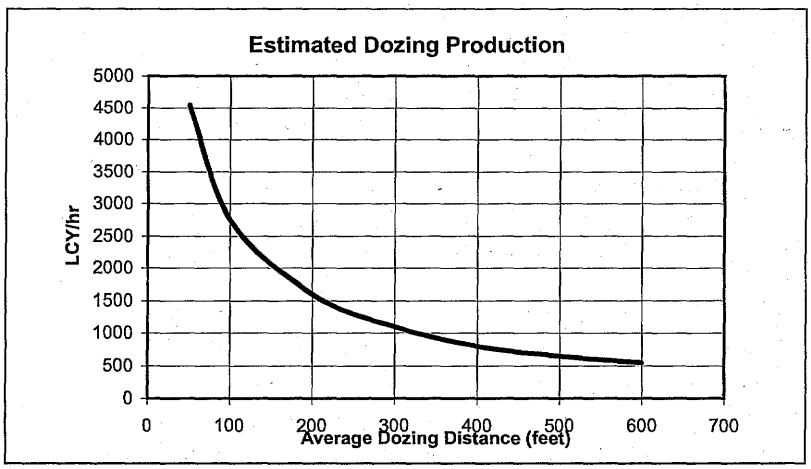
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

271,040	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,500 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **1107 cy/hr**

Hours Required = 271,040 (Volume to be Moved) / 1107 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **336 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-9

JAN 2012
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Table:	24-5-12
Mine Area:	Kayenta Scoria Pits
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Topsoil disturbance area around scoria pits

Characterization of Scraper Used (type, capacity. etc)
637E P-P Scraper - capacity = 31 cy

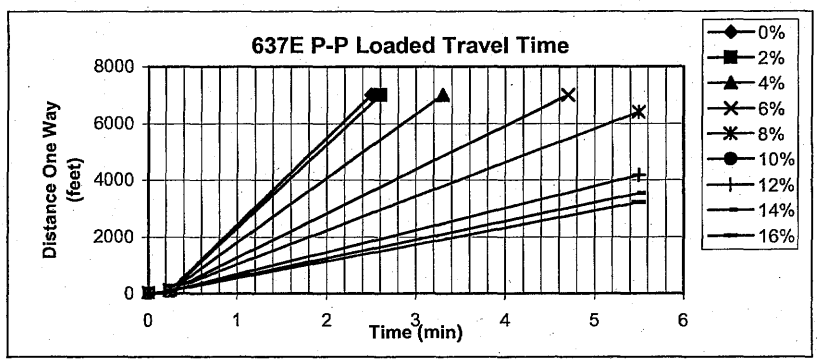
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

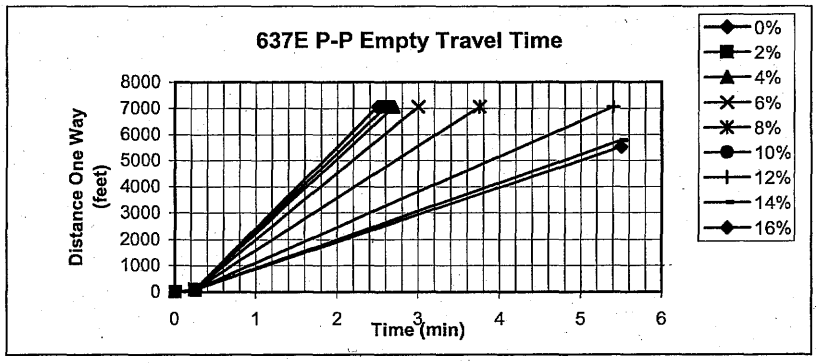
Loaded Distance (ft)	1500
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	1500
Empty Grade (%)	0
Empty Effective Grade (%)	5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	2.0
Empty Travel Time (from chart)	1.6

Quantity of Material to be Moved
144,554 cy





Cycle Time =	2.0 (Load Time)	+	2.0 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.6 (Empty Trip Time)	=	6.8 min
Cycles/Hour =	60 (min/hr)	/	6.8 (Cycle Time)	=	9 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	8.82 (Cycles/ Hour)	=	**274 cy/hr**				

Hours Required =	144,554 (Volume)	/	274 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**725 hrs**	

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Reference: Table 24-2-9, Cat Handbook, Ed. 28

Table:	24-5-13
Mine Area:	Kayenta Scoria Pits
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine regraded scoria pits

Revegetation Area

Area (acre)	56
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 56 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$86,660**

Reseeding Costs = 56 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$28,924**

References: Table 24-1-3 and Table 24-2-9

JAN 2012
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Table:	24-5-14
Mine Area:	Kayenta Landfarm Areas
Project:	Landfarm Removal
Task:	Haul Landfarm Material
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul away landfarm material

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

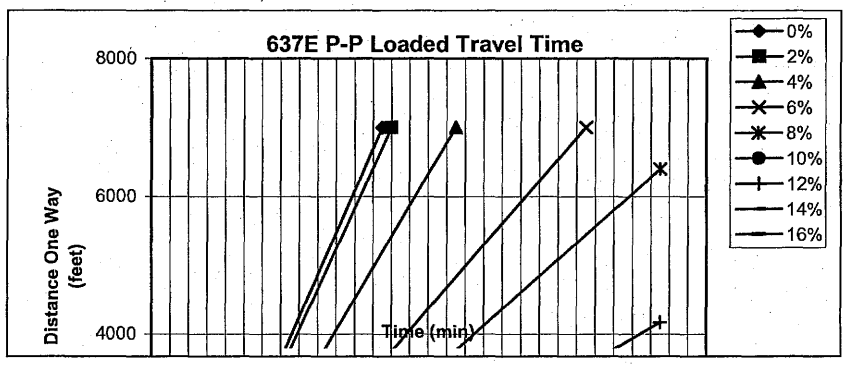
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

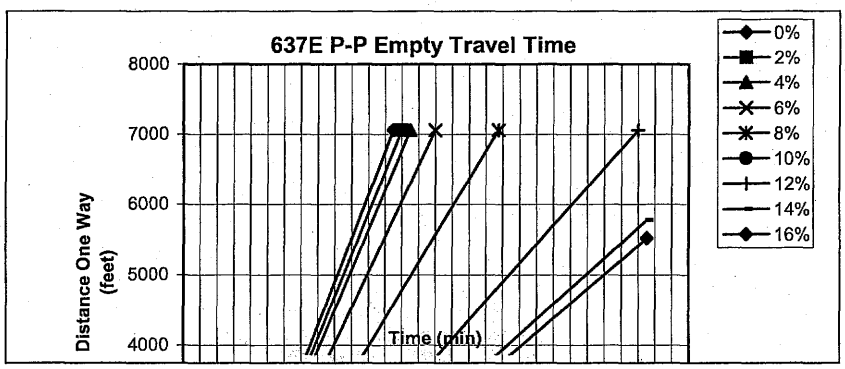
Loaded Distance (ft)	3500
Loaded Grade (%)	4
Loaded Effective Grade (%)	9
Empty Distance (ft)	3500
Empty Grade (%)	-4
Empty Effective Grade (%)	1

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	8.0
Empty Travel Time (from chart)	3.4

Quantity of Material to be Moved
5,000 cy





Cycle Time =	2.0 Load Time	+	8.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	3.4 Empty Trip Time	=	14.6 min	
Cycles/Hour =	60 min/hr	/	14.6 Cycle Time	=	4 cycles/hr					
Hourly Production =	31 Adjusted Load (cy)	x	4.11 Cycles/ Hour	=	**127 cy/hr**					

Hours Required =	5,000 Volume	/	127 Hourly Production	x	1.371 Work Schedule Factor	=	**54 hrs**		

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Note: Quantity of material based on 100% (Kayenta portion of cost) of 5,000 cy.

Reference: Cat Handbook, Ed. 28

Table:	24-5-15
Mine Area:	Kayenta Landfarm Areas
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of landfarm area prior to grading

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped
12,100 cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 12,100 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **4 hours**

Note: Quantity of material based on 100% (Kayenta portion of cost) of 2.5 acre.

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
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Table:	24-5-16
Mine Area:	Kayenta Landfarm Areas
Project:	Grade Landfarm Area
Task:	Landfarm Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grade landfarm area to blend into surrounding area.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	350
Hourly production (from chart)	1500
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	yes
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

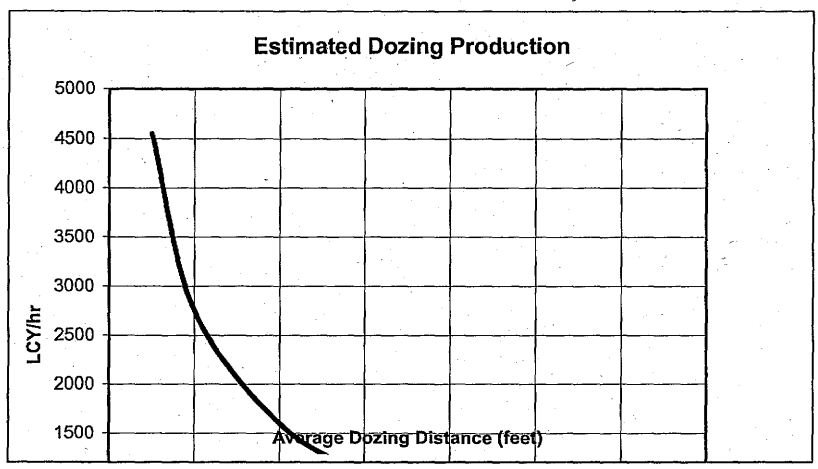
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

4,033	cy



Productivity Adjustment Factor	=	0.75 Operating Factor	x	1.2 Material Factor	x	1.0 Grade Factor	x	0.82 Density Correction			
	x	1.00 Production Method	x	1.00 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	=	**0.74**	

Net Hourly Production	=	1,500 Normal Hourly Production (see graph above)	x	0.74 Productivity Adjustment Factor	=	**1107**	**cy/hr**

Hours Required	=	4,033 Volume to be Moved	/	1107 Net Hourly Production	x	1.371 Work Schedule Factor	=	**5 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-9

JAN 2012
APPROVED

Table:	24-5-17
Mine Area:	Kayenta Landfarm Areas
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Topsoil replacement at the landfarm area

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

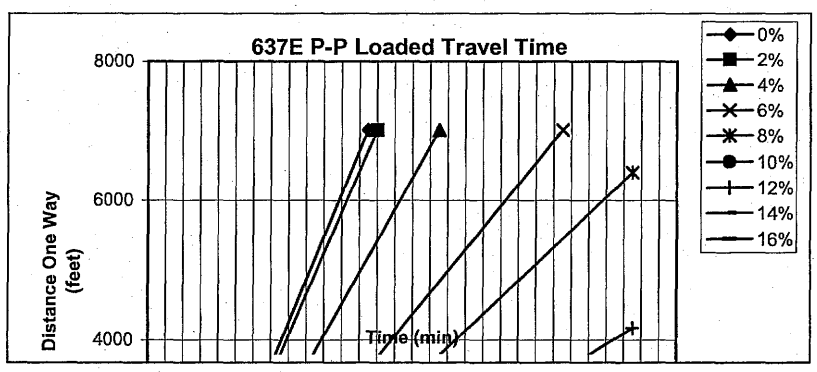
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

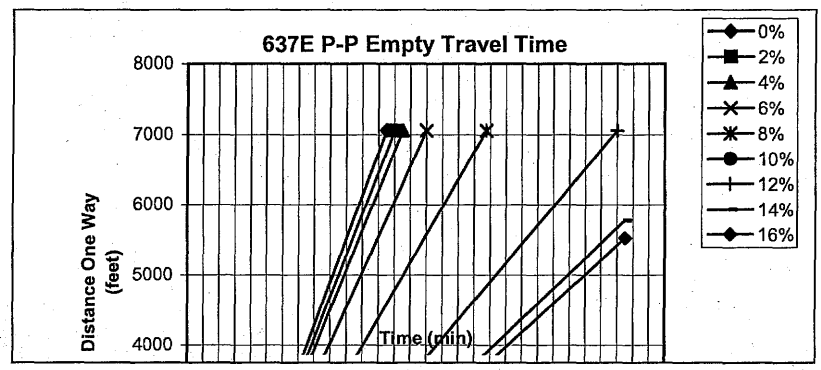
Loaded Distance (ft)	1500
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	1500
Empty Grade (%)	0
Empty Effective Grade (%)	5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	3.0
Empty Travel Time (from chart)	2.0

Quantity of Material to be Moved
6,050 cy





Cycle Time =	2.0 Load Time	+	3.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	2.0 Empty Trip Time	=	8.2 min
Cycles/Hour =	60 min/hr	/	8.2 Cycle Time	=	7 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	7.32 Cycles/ Hour	=	**227 cy/hr**				

Hours Required =	6,050 Volume	/	227 Hourly Production	x	1.371 Work Schedule Factor	=	**37 hrs**	

JAN 2012
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Reference: Table 24-2-9, Cat Handbook, Ed. 28

Table:	24-5-18
Mine Area:	Kayenta Landfarm Areas
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine landfarm areas

Revegetation Area

Area (acre)	2.5
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 2.5 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$3,869**

Reseeding Costs = 2.5 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$1,291**

References: Table 24-1-3 and Table 24-2-9

JAN 2012
APPROVED

Table:	24-5-21
Mine Area:	Kayenta Permanent Roads
Project:	Dozing to Narrow Road
Task:	Doze Roads
Equipment:	D11R Dozer

Earthmoving Activity:
Push 50' of gravel/scoria off the side of the road for burial.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use:

Average dozing distance (feet)	50
Hourly production (from chart)	4,550
Grade (in percent)	0
Grade Correction	1.4
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

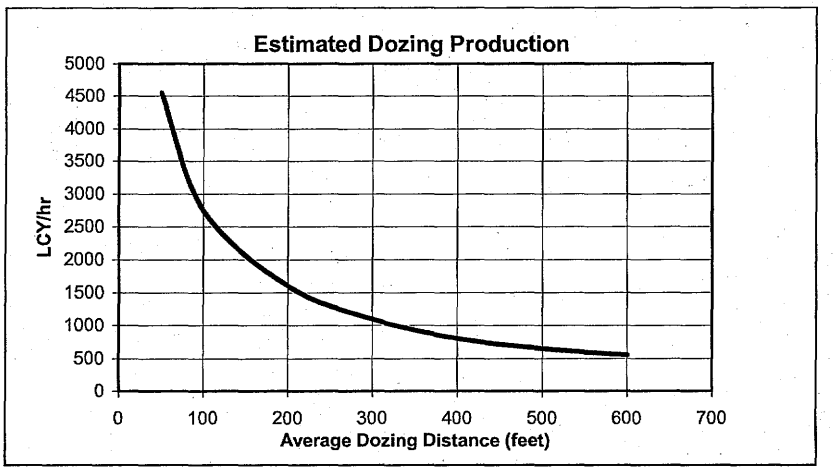
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	99,428
Width (ft)	50
Total (cy)	184,126



Productivity Adjustment Factor	=	0.75 Operator Factor	x	0.80 Material Factor	x	1.4 Grade Correction	x	0.82 Density Correction		
	x	1.00 Production Method	x	1.0 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	=	**0.69**

Net Hourly Production	=	4,550 Normal Hourly Production (see graph above	x	0.69 Productivity Adjustment Factor	=	**3140 cy/hr**

Hours Required	=	184126 Volume to be Moved	/	3140 Net Hourly Production	x	1.371 Work Schedule Factor	=	**80 Hours**

Reference: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-22
Mine Area:	Kayenta Permanent Roads
Project:	Surface Ripping to Narrow Road
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped	
Length (ft)	99,428
Width (ft)	50
Total (cy)	552,378

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 552,378 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **163 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
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Table:	24-5-23
Mine Area:	Kayenta Permanent Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)
D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	99,428
Width (ft)	100
Total (acres)	228

Hours Required	=	228 /	0.125 x	1.371 =	**2504**	**Hours**
		Area to be Graded (acres)	Net Hourly Production (acres/hr)	Work Schedule Factor		

Note: Production rate based on PWCC experience.

JAN 2012
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Table:	24-5-24
Mine Area:	Kayenta Permanent Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

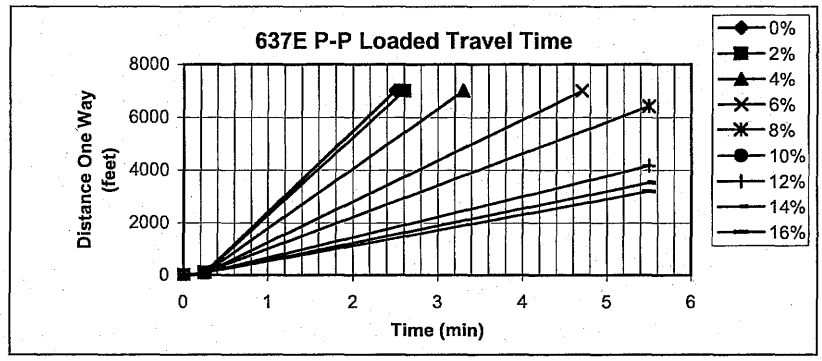
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

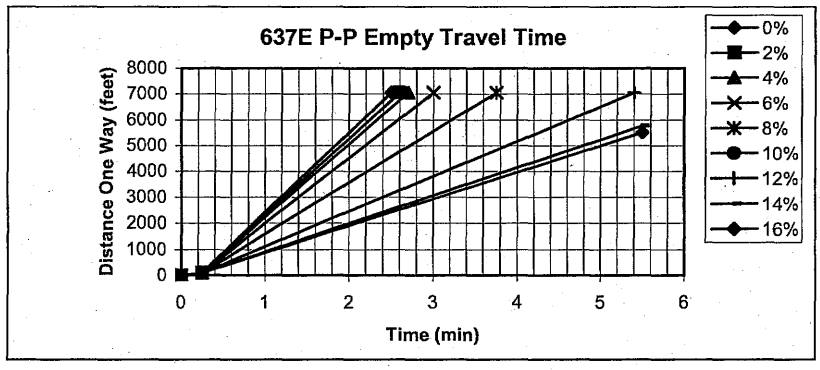
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	3.2

Quantity of Material to be Moved

Length (ft)	99,428
Width (ft)	100
Total (cy)	589,203





Cycle Time =	2.0 (Load Time)	+	4.0 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	3.2 (Empty Trip Time)	=	10.4 min
Cycles/Hour =	60 (min/hr)	/	10.4 (Cycle Time)	=	6 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	5.77 (Cycles/ Hour)	=	**179 cy/hr**				

Hours Required =	589,203 (Volume)	/	179 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**4,518 hrs**	

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Reference: Cat Handbook, Ed. 28

Table:	24-5-25
Mine Area:	Kayenta Permanent Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine permanent roads

Revegetation Area

Area (acre)	228
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs =	228 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$353,225**
Reseeding Costs =	228 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$117,894**

References: Table 24-1-3

JAN 2012
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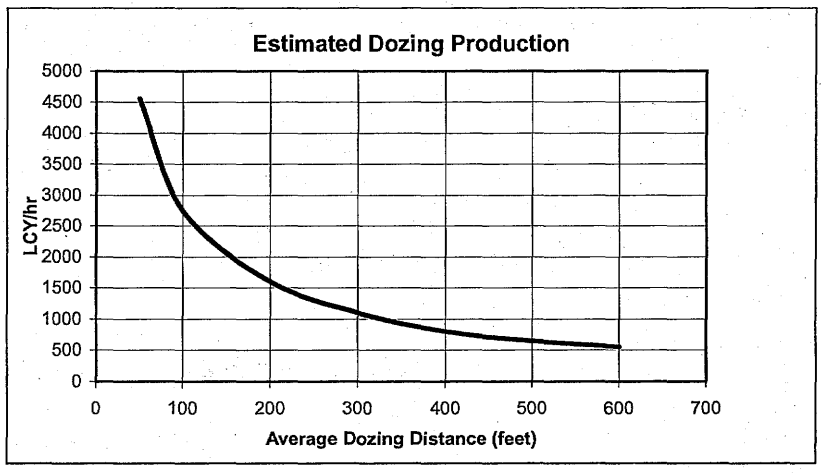
Table:	24-5-26
Mine Area:	Kayenta Primary Roads
Project:	Culvert Removal
Task:	Culvert Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Remove and dispose of culvert embankment material and culverts.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1100
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Total (cy)	484,758

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **676.5 cy/hr**

Hours Required = 484,758 (Total (cy) Volume to be Moved) / 676.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **983 Hours**

Culvert (ft)	11460
Culvert Disposal Cost (at $0.29/cf)	**$26,504**

Note: Quantity of material and culvert are 60% of total for Kayenta portion of the cost.

References: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-27
Mine Area:	Kayenta Primary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	100
Hourly production (from chart)	2750
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

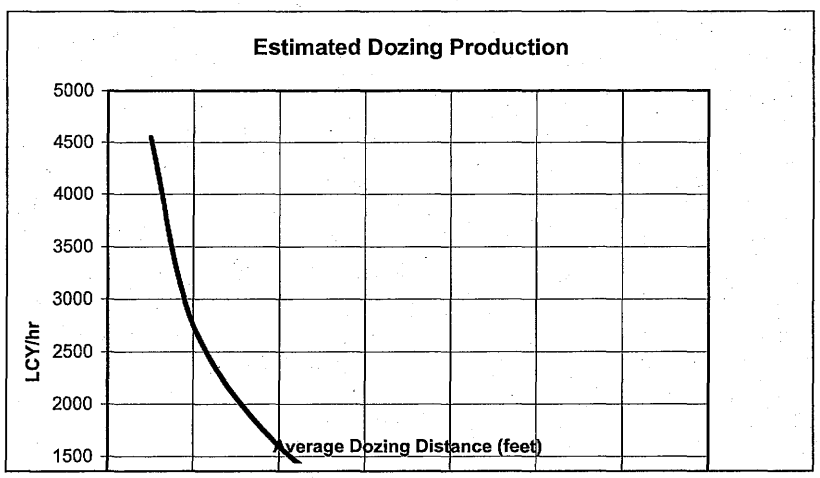
Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	241011
Width (ft)	80
Total (cy)	714,107

References: Cat Handbook, Ed. 28



Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 2,750 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **1353 cy/hr**

Hours Required = 714,107 (Total (cy) Volume to be Moved) / 1353 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **724 Hours**

JAN 2012
APPROVED

Table:	24-5-28
Mine Area:	Kayenta Primary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120
Quantity of Material to be Ripped	
Length (ft)	241,011
Width (ft)	80
Total (cy)	2,142,320

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 2,142,320 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **631 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
APPROVED

Table:	24-5-29
Mine Area:	Kayenta Primary Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size, etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	241,011
Width (ft)	200
Total (acres)	1107

Hours Required	=	1,107 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**12,141 Hours**

Note: Production rate based on PWCC experience.

JAN 2012
APPROVED

Table:	24-5-30
Mine Area:	Kayenta Primary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

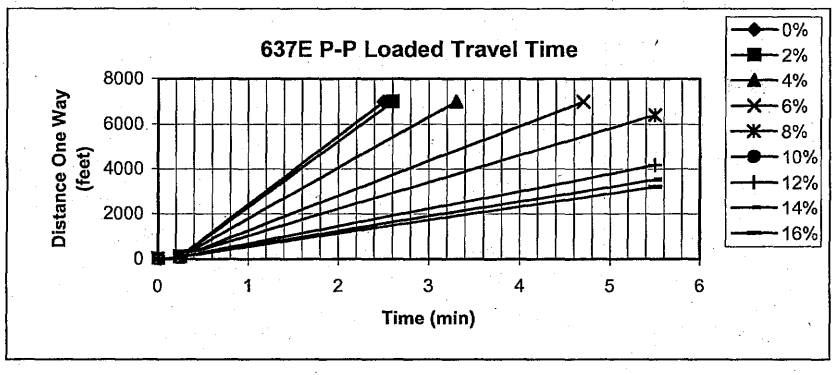
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

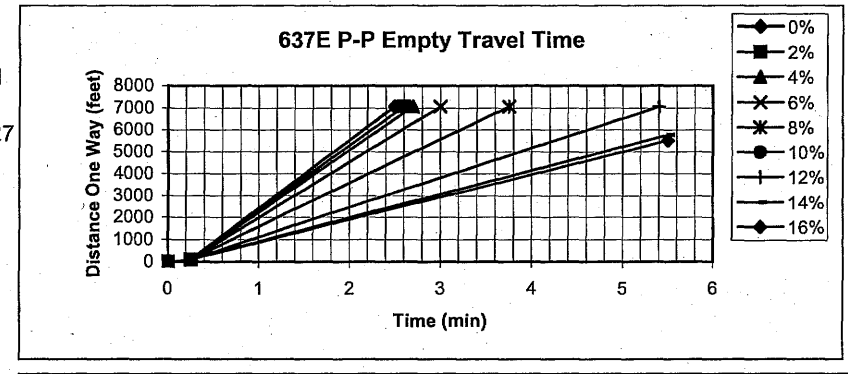
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	3.0
Empty Travel Time (from chart)	1.5

Quantity of Material to be Moved

Length (ft)	241,011
Width (ft)	200
Total (cy)	2,856,427





Cycle Time = 2.0 (Load Time) + 3.0 (Loaded Trip Time) + 1.2 (Maneuver and Spread Time) + 1.5 (Empty Trip Time) = 7.7 min

Cycles/Hour = 60 (min/hr) / 7.7 (Cycle Time) = 8 cycles/hr

Hourly Production = 31 (Adjusted Load (cy)) x 7.79 (Cycles/Hour) = **242 cy/hr**

Hours Required = 2,856,427 (Volume) / 242 (Hourly Production) x 1.371 (Work Schedule Factor) = **16,217 hrs**

APPROVED

Reference: Cat Handbook, Ed. 28

Table:	24-5-31
Mine Area:	Kayenta Primary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine primary roads

Revegetation Area

Area (acre)	1,107
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 1107 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$1,712,417**

Reseeding Costs = 1107 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$571,544**

References: Table 24-1-3

JAN 2012
APPROVED

Table:	24-5-32
Mine Area:	Kayenta Ancillary Roads
Project:	Culvert Removal
Task:	Culvert Removal/Disposal
Equipment:	D11R Dozer

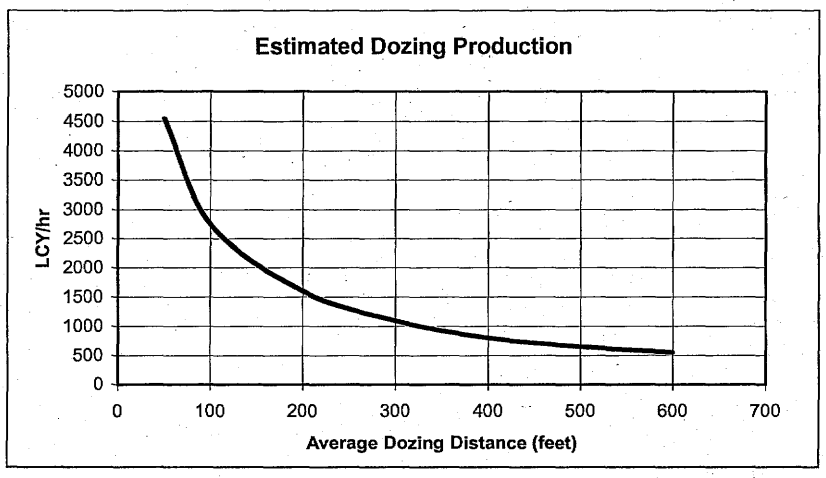
Earthmoving Activity:
Remove and dispose of culvert embankment material and culverts.

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1100
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Total (cy)	294,408

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **676.5 cy/hr**

Hours Required = 294,408 (Total (cy) Volume to be Moved) / 676.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **597 Hours**

Culvert (ft)	6960
Culvert Disposal Cost (at $0.29/cf)	**$26,126**

Note: Quantity of material and culvert are 60% of total for Kayenta portion of the cost.

References: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-33
Mine Area:	Kayenta Ancillary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	50
Hourly production (from chart)	4550
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

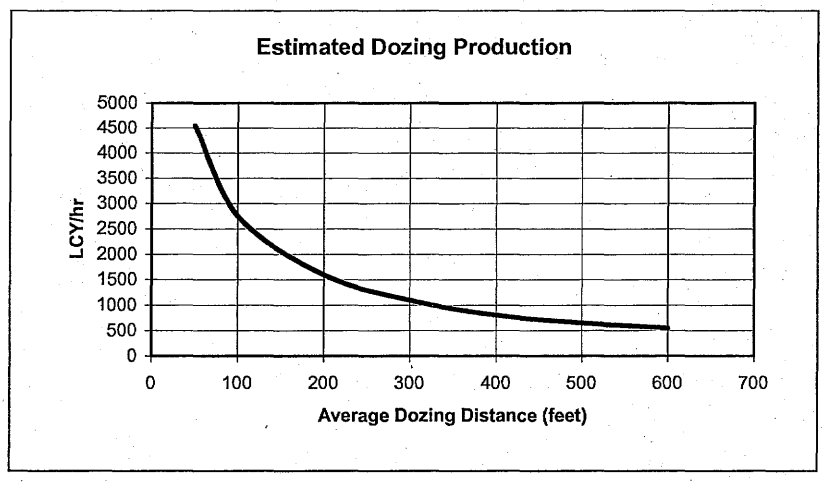
Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	387,548
Width (ft)	25
Total (cy)	358,841

References: Cat Handbook, Ed. 28



Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 4,550 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **2238.6 cy/hr**

Hours Required = 358,841 (Total (cy) Volume to be Moved) / 2238.6 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **220 Hours**

JAN 2012
APPROVED

Table:	24-5-34
Mine Area:	Kayenta Ancillary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

Length (ft)	387,548
Width (ft)	25
Total (cy)	1076522

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 1,076,522 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **317 hours**

Reference: Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-35
Mine Area:	Kayenta Ancillary Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)
D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Length (ft)	387,548
Width (ft)	80
Total (acres)	712

Hours Required	=	712 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**7809**	**Hours**

Note: Production rate based on PWCC experience.

JAN 2012
APPROVED

Table:	24-5-36
Mine Area:	Kayenta Ancillary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity

Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

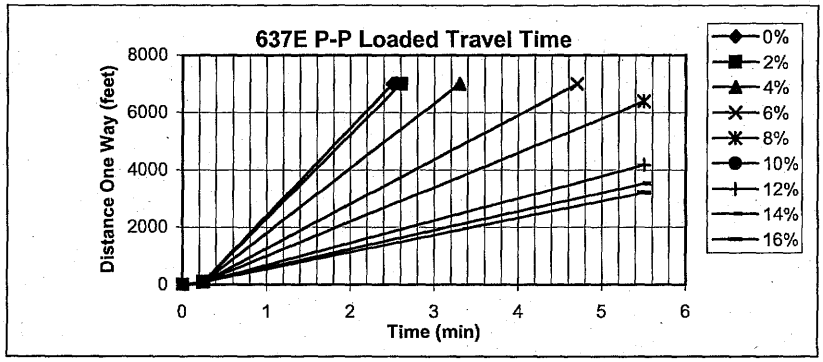
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

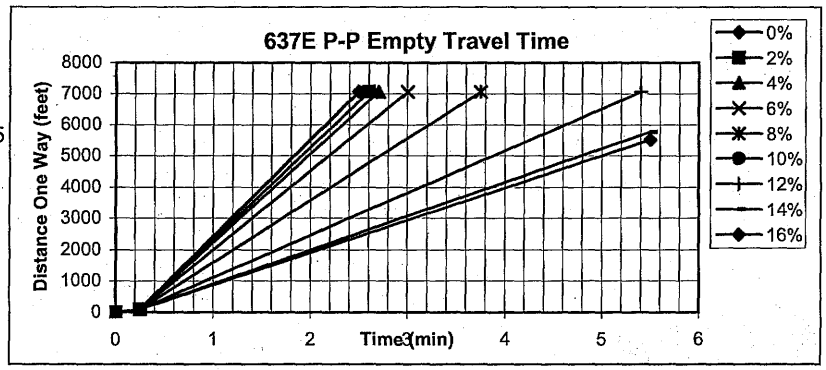
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	3.0

Quantity of Material to be Moved

Length (ft)	387,548
Width (ft)	80
Total (cy)	1,837,265





Cycle Time =	2.0 Load Time	+	4.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	3.0 Empty Trip Time	=	10.2 min
Cycles/Hour =	60 min/hr	/	10.2 Cycle Time	=	6 cycles/hr				
Hourly Production =	31 Adjusted Load (cy)	x	5.88 Cycles/ Hour	=	**182 cy/hr**				

Hours Required =	1,837,265 Volume	/	182 Hourly Production	x	1.371 Work Schedule Factor	=	**13818 hrs**

APPROVED

Reference: Cat Handbook, Ed. 28

Table:	24-5-37
Mine Area:	Kayenta Ancillary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine ancillary roads

Revegetation Area

Area (acre)	712
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 712 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$1,101,433**

Reseeding Costs = 712 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$367,619**

References: Table 24-1-3

JAN 2012
APPROVED

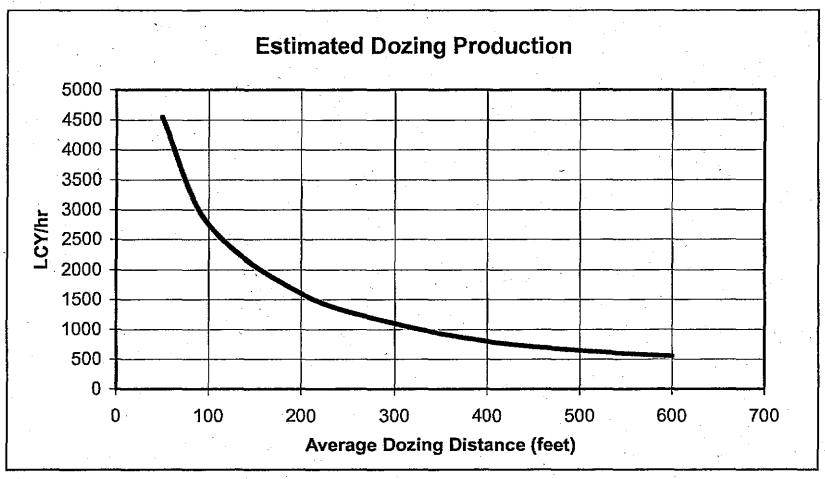
Table:	24-5-38	Page 1
Mine Area:	Kayenta Water Storage and Sedimentation Ponds	
Project:	Clean Out Sediment	
Task:	Sediment Removal	
Equipment:	D11R Dozer	

Earthmoving Activity:
Sediment removal/disposal (65%) from pond areas.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

356,460	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 356,460 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **497 Hours**

Notes:
1. Quantity of material to be moved based on 65% of total sediment, 25% is assumed in the incised portion of the pond, not requiring removal and 10% is cleaned out with a dragline.
2. Quantity of material is based on 60% (Kayenta portion of cost) of water storage and sedimentation ponds.

References: Table 24-2-10 and Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-38 (cont.) Page 2
Mine Area:	Kayenta Water Storage and Sedimentation Ponds
Project:	Clean Out Sediment
Task:	Sediment Removal
Equipment:	9225 American Dragline

Earthmoving Activity:
Sediment removal/disposal (10%) from pond areas with a dragline.

Characterization of Dragline Used (type, size. etc):
9225 American Dragline, bucket capacity (yd^3) = 2

Swing depth and angle correction[3] 0.9

Productivity Adjustment Factors
Operator Factor
Is operator excellent (1) no
Is operator average (.75) yes
Is operator poor (.6) no

Quantity of Material to be Moved[1]
54,840 cy

Productivity Adjustment Factor	=	0.75 Operating Factor	x	0.9 Swing Factor	=	**0.68**

Net Hourly Production	=	145 Normal Hourly Production[2]	x	0.68 Productivity Adjustment Factor	=	**98 cy/hr**

Hours Required	=	54,840 Volume to be Moved	/	97.875 Net Hourly Production	x	1.371 Work Schedule Factor	=	**768 Hours**

Notes:
1. Quantity of material to be moved based on 65% of total sediment, 25% is assumed in the incised portion of the pond, not requiring removal and 10% is cleaned out with a dragline.
2. Quantity of material is based on 60% (Kayenta portion of cost) of water storage and sedimentation ponds.
3. Production rate based on Peabody experience.
4. Optimum depth of cut is 11.8 feet.

Reference: Table 24-2-10

JAN 2012
APPROVED

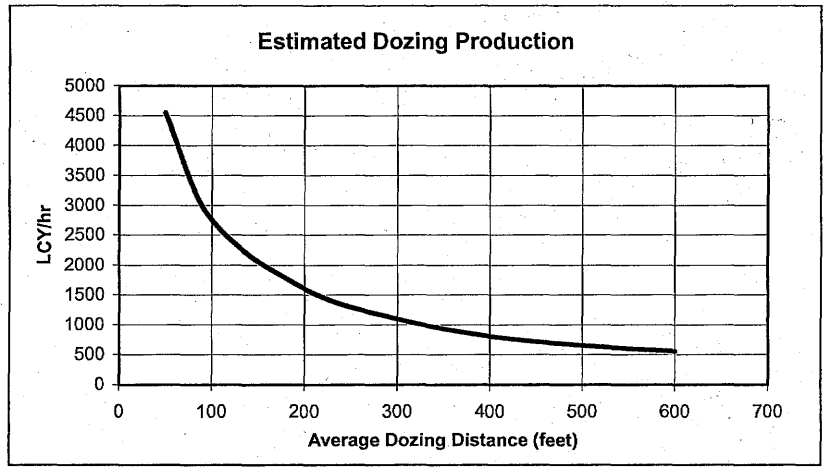
Table:	24-5-39
Mine Area:	Kayenta Water Storage and Sedimentation Ponds
Project:	Embankment Removal
Task:	Grade Embankment into Basin
Equipment:	D11R Dozer

Earthmoving Activity:
Blade embankment material into surrounding drainage, pond area or sides of drainage.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade
Power shift transmission (1.0) yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82



Productivity Adjustment Factors
Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

483,867	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 483,867 (Total Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **674 Hours**

References: Table 24-2-10 and Cat Handbook, Ed. 28

JAN 2012
APPROVED

Table:	24-5-40
Mine Area:	Kayenta Water Storage and Sedimentation Ponds
Project:	Grade Pond Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

323 acres

Hours Required	=	323 / Area to be Graded (acres)	0.125 / Net Hourly Production (acres/hr)	x	1.371 / Work Schedule Factor	=	**3539 Hours**

Note: Production rate based on PWCC experience.

Reference: Table 24-2-10

JAN 2012
APPROVED

Table:	24-5-41
Mine Area:	Kayenta Water Storage and Sedimentation Ponds
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

JAN 2012
APPROVED

Earthmoving Activity
Haul and place 1.6' topsoil to disturbed pond areas.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

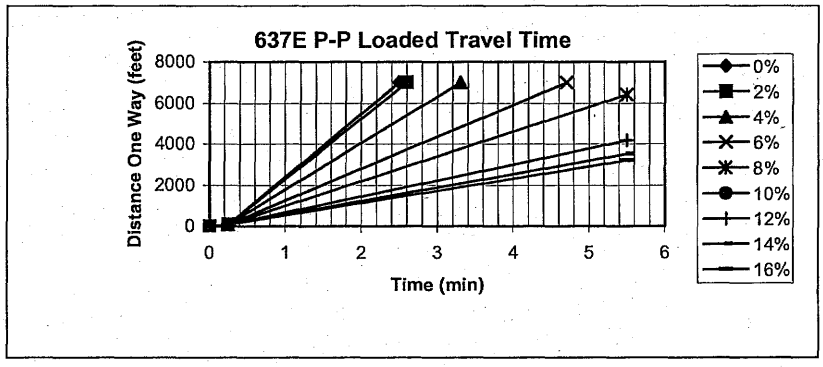
Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

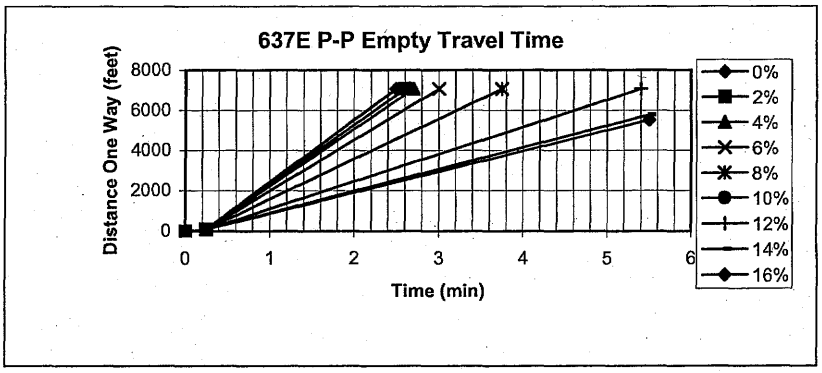
Loaded Distance (ft)	1000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	1000
Empty Grade (%)	0
Empty Effective Grade (%)	5

Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	0.8
Empty Travel Time (from chart)	0.6

Quantity of Material to be Moved
832,635 cy





Cycle Time =	2.0 (Load Time)	+	0.8 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	0.6 (Empty Trip Time)	=	4.6 min
Cycles/Hour =	60 (min/hr)	/	4.6 (Cycle Time)	=	13 cycles/hr				
Hourly Production =	31 (Adjusted Load (cy))	x	13.04 (Cycles/ Hour)	=	**404 cy/hr**				

Hours Required =	832,635 (Volume)	/	404 (Hourly Production)	x	1.371 (Work Schedule Factor)	=	**2824 hrs**

References: Table 24-2-10 and Cat Handbook, Ed. 28

Table:	24-5-42
Mine Area:	Kayenta Water Storage and Sedimentation Ponds
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description

Kayenta Mine regraded sedimentation and water storage ponds.

Revegetation Area

Area (acre)	323
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	323 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$499,162**

Reseeding Costs	=	323 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$166,602**

References: Table 24-1-3

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Table: 24-5-43 Page 1
Mine Area: Kayenta Environmental Monitoring Sites
Project: Off Permit Environmental Monitoring Sites
Task: Concrete Removal/Disposal

Environmental Monitoring Sites

Approximately 7 off-permit environmental monitoring sites will exist in 2010. The sites vary in size and disturbance area. Ten of these sites are minor sites consisting only of a single riser (e.g., alluvial monitoring well, precipitation gage, or crest gage). The remaining six sites are slightly larger and may include concrete flumes, steel sediment sample structures, or overhead steel catwalk structures, etc. for stormwater sampling. In order to be conservative, Peabody included enough reclamation liability costs to remove the monitoring structures, grade and blend the site, assuming the entire bonding area is disturbed, and reclaim and revegetate the site. Following is a list of monitoring sites and estimated bonding area:

Site ID	Bond Area (acres)		Site ID	Bond Area (acres)	
ALUV77	1		CG34	3	
ALUV95	1		SW16	3	
	2	acres	SW25	3	
			SW26	3	
			SW155	3	
				15	acres

Total Reclamation Area = 17 acres

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Table: 24-5-43 (cont.) Page 2
Mine Area: Kayenta Environmental Monitoring Sites
Project: Off Permit Environmental Monitoring Sites
Task: Concrete Removal/Disposal
Equipment Miscellaneous

Description	Quantity (ft^3)	Unit Cost	No. of Sites	Total
Demolish steel and concrete at five SW sites	18000	0.41	5	$36,900
Concrete/materials to grout alluvial wells (minor sites)	1	50	2	$100
Laborer (minor sites)	2	77.16	7	$1,080
Pickup Truck (minor sites)	1	60.56	7	$424
		Total Cost =		$38,504
		60% of Total Cost =		$ 23,102

Estimator Notes
1. Volume dimensions are 300' x 10' x 6'.
2. Assume 4 hours at each site.
3. Assume pickup truck is $15.14 per hour.
4. Assume 40% of total cost for Black Mesa Mine portion of cost.

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Table:	24-5-44	Page 1
Mine Area:	Kayenta Environmental Monitoring Sites	
Project:	Grade Reclaimed Area	
Task:	Site Reclamation	
Equipment:	D11R Dozer	

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain (SW sites).

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift) 1.0

Acres to be Graded

Total (acres) 9

Hours Required	=	9 / Area to be Graded (acres)	0.125 / Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**99 Hours**

Notes: Production rate based on PWCC experience.
Acres based on 60% of total acres for Kayenta portion of the cost.

References: Cat Handbook, Ed. 28

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Table:	24-5-44 (cont.)	Page 2
Mine Area:	Kayenta Environmental Monitoring Sites	
Project:	Revegetation	
Task:	Site Reclamation	
Equipment:	Miscellaneous	

Revegetation Area Description

Kayenta Mine percentage of revegetating the six "SW" sites

Revegetation Area

Area (acre)	9
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	9 Acres	* ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs)	=	**$13,928**
Reseeding Costs	=	9 Acres	* 0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$4,649**

Note: Revegetation area based on 60% of total area for Kayenta portion of cost.

References: Table 24-1-3

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Table:	24-5-45
Mine Area:	Kayenta Monitoring Wells
Project:	Reclaim Monitoring Wells
Task:	Well/Site Reclamation
Equipment:	Miscellaneous

Environmental Monitoring Water Wells

Approximately 62 monitoring water wells will exist in 2010.
Well abandonment procedures to be used include:
1) Cutting the casing off a foot below ground level or even with the ground surface;
2) Filling the well bore from the bottom to within 20 feet of the surface with bentonite or cuttings/gravel;
3) Grouting the top 20 feet of the well bore with cement;
4) Removing all locking well covers and protective fences;
5) Scarifying and seeding the ground surface in the immediate vicinity of the well.

Abandonment cost per well = $1,000 per well

Reclamation Cost	=	62 (Number of Wells)	x	$1,000 (Cost per Well)	x	0.6 (60% of Total)	=	**$37,200**

Note: Reclamation Cost based on 60% of total for Kayenta portion of the cost.

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Table:	24-5-46
Mine Area:	Kayenta N-11 Coal Handling Facility
Project:	Cut/Fill Earthwork
Task:	Cut/Fill Earthwork
Equipment:	637E P-P Scraper

Earthmoving Activity
Fill earthwork.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

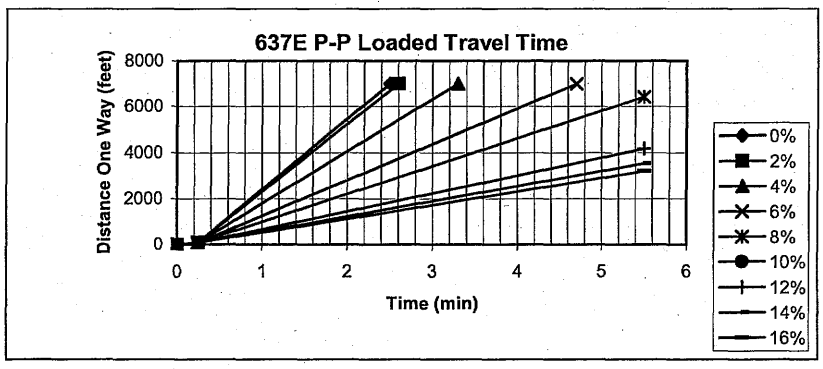
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

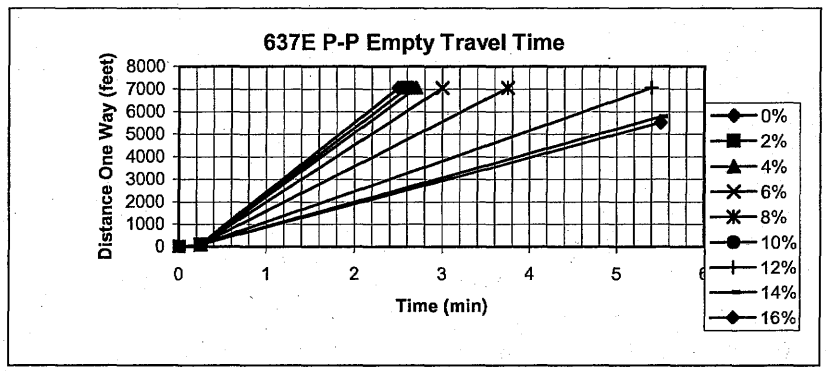
Production Times

Typical Load Time for 657E P-P	1.0
Maneuver and spread or dump	0.6
Loaded Travel Time (from chart)	2.0
Empty Travel Time (from chart)	1.5

Quantity of Material to be Moved

Total (cy)	659,063





Cycle Time =	1.0 Load Time	+	2.0 Loaded Trip Time	+	0.6 Maneuver and Spread Time	+	1.5 Empty Trip Time	= 5.1 min
Cycles/Hour =	60 min/hr	/	5.1 Cycle Time	=	12 cycles/hr			
Hourly Production =	31 Adjusted Load (cy)	x	11.76 Cycles/ Hour	=	**365 cy/hr**			

Hours Required =	659,063 Volume	/	365 Hourly Production	x	1.371 Work Schedule Factor	=	**2478 hrs**

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Table:	24-5-47
Mine Area:	Kayenta N-11 Coal Handling Facility
Project:	Grade Facilities Areas
Task:	Facilities Area Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grading the cut and fills to blend into the surrounding topography to drain, burial of road surface material a minimum of three feet.

Characterization of Dozer Used (type, size. etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1,100
Grade (in percent)	-10
Grade Correction	1.2
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

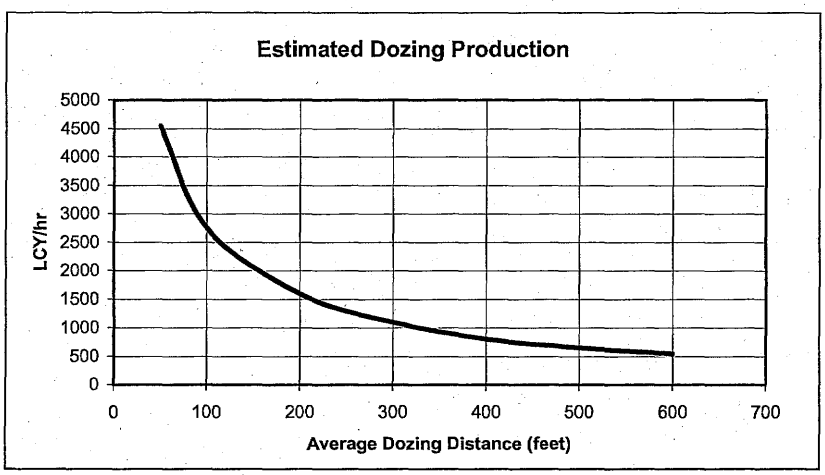
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

422,795	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.2 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.74**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.74 (Productivity Adjustment Factor) = **812 cy/hr**

Hours Required = 422,795 (Volume to be Moved) / 812 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **714 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

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Table: 24-5-48
Mine Area: Joint
Project: Equipment Scheduling
Task: Equipment Requirements
Equipment: All

Equipment Type				Required Hours	No. of Units	Hours per Unit	Required Months
MAJOR EQUIPMENT	**Black Mesa Mine**	**Joint**	**Kayenta Mine**				
637G P-P Scraper	24,627	1,935	149,321	175,883	15	11,726	35.2
D11R Dozer - Ripper	869	360	5,427	6,656	1	6,656	20.0
D11R Dozer	30,843	4,286	156,923	192,052	17	11,297	33.9
D7R Dozer	272	-	1,098	1,370	1	1,370	4.1
988H Loader	166	-	852	1,018	1	1,018	3.1
Atlas Copco Pit Viper 271	-	-	7,434	7,434	1	7,434	22.3
769D Rear Dump Truck	211	-	1,075	1,286	3	429	1.3
9225 American Dragline	648	-	974	1,622	1	1,622	4.9
MAJOR EQUIPMENT	57,636	6,581	323,104		40		
SUPPORT EQUIPMENT							
16M Grader	9,604	-	14,420	24,024	2	12,012	36
Truck Tractor	4,800	-	7,200	12,000	1	12,000	36
Water Truck	8,800	-	15,000	23,800	2	11,900	36
Service Truck	4,800	-	7,200	12,000	1	12,000	36
Flatbed Truck	4,800	-	7,200	12,000	1	12,000	36
Light Duty Diesel Crew	28,000	-	44,000	72,000	6	12,000	36
Welding/Supply Truck	4,800	-	7,200	12,000	1	12,000	36
Equipment Trailer	4,800	-	7,200	12,000	1	12,000	36
Parts Trailer	3,200	-	4,800	8,000	2	4,000	12
Office Trailer	3,200	-	4,800	8,000	2	4,000	12
Diesel Floodlighting	43,200	-	64,800	108,000	9	12,000	36
SUPPORT EQUIPMENT	120,004	-	183,820		28		
Total:	177,640	6,581	506,924				

Note: Required months based on 4,000 hours per year or 333 hours per month.

Reference: Table 24-1-5

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Table: 24-5-49
Mine Area: Joint
Project: On-Site Mobilization
Task: Interior Mobilization Hours
Equipment: All

Mine Area	637G P-P Scraper	D11R Dozer	D7R Dozer	16M Grader	988H Loader	Atlas Copco Pit Viper 271	769D Dump Truck	9225 American Dragline
N-6	16	20	8	4	8	0	12	
BM Facilities	16	8						136
Joint Facilities	16	16						
Total Black Mesa Mine Area:	48	44	8	4	8	0	12	136
J-16	16	24	8	4	8	4	12	
J-19	16	16	8	4	8	4	12	
J-21	16	32	8	4	8	4	12	
N-9	16	24	8	4	8	4	12	
N-11	16	4	8	4	8	0	12	
Kayenta Facilities	16	16						
All Areas	227	382						206
Total Kayenta Mine Area:	323	498	40	20	40	16	60	206
Total	371	542	48	24	48	16	72	342

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Table: 24-5-50
Mine Area: Kayenta Draglines and Shovels
Project: Dragline and Shovel Removal
Task: Disassemble and Remove Draglines and Shovels
Equipment: Miscellaneous

Description	Quantity (units))	Unit Cost	Removal Cost
2570 Dragline	1	$200,000.00	$200,000
8750 Dragline	1	$200,000.00	$200,000
8200 Dragline	1	$200,000.00	$200,000
1260 Dragline	1	$100,000.00	$100,000
295 Shovel	2	$50,000.00	$100,000
		Total	$800,000

Note: Cost based on PWCC experience.
With the current resale market for large excavators, this is conservative.

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Table: 24-5-01
Mine Area: Joint - (KM)
Project: Facilities Demolition
Task: Demolish Facilities
Equipment:

Structure Material	Demolition Unit Cost
Steel (s)	0.33
Concrete(c)	0.46

Description	Quantity (ft^3 unless noted)	Unit Cost	Total
Warehouse	300,000	$0.33	$99,000
Operations and Warehouse	43,200	$0.33	$14,256
Engineering Building	128,000	$0.33	$42,240
Operations Office	43,200	$0.33	$14,256
Human Resources Bldg.	84,000	$0.33	$27,720
Reclamation Barn	45,360	$0.33	$14,969
Addition/Warehouse	214,500	$0.33	$70,785
Addition of Operations	4,560	$0.33	$1,505
Reclamation Shop	50,102	$0.33	$16,534
Reclamation Office	20,020	$0.33	$6,607
J3 Airport Building	21,600	$0.33	$7,128
Const. Tr. Ct. Pumphouse	1,920	$0.33	$634
Const. Tr. Ct. Watertank	13,400	$0.33	$4,422
Ambulance Garage	17,550	$0.33	$5,792
Oil Lab	11,520	$0.33	$3,802
MCW Water Tank	13,400	$0.33	$4,422
Public Coal Facility	61,500	$0.33	$20,295
Public Coal Conveyor Length (ft)	600	$0.33	$198
MCW Fuel Farm	30,100	$0.33	$9,933
Water Well Trailer	7,840	$0.33	$2,587
Old E.Q. Trailer	15,960	$0.33	$5,267
Waste Handling Facility	2,468	$0.33	$814
Additional/Warehouse	49,780	$0.33	$16,427
Reclamation Barn/Addition	36,288	$0.33	$11,975
Total			**$401,566**

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Table:	24-5-02
Mine Area:	Joint - (KM)
Project:	Concrete Removal
Task:	Concrete Removal/Disposal
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity

Remove 8" of concrete from facilities area.

Characterization of Dozer and Ripper Used:

D11R, single shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	0.7
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

2,022	cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 0.67 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **47 bank cy/pass**

Ripping Production = 47 (Volume cut per pass) x 21.8 (Passes per hour) = 1,034 hours

Hours Required = 2,022 (Volume to be Ripped) / 1,034 (Ripping Production) x 1.371 (Work Schedule Factor) = **2.7 hours**

Concrete Disposal (at $9.00/cy)= **$18,198**

References: Cat Handbook, Ed. 28, Table 24-2-8.

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Table:	24-5-03
Mine Area:	Joint - (KM)
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:

Push 1' of gravel or scoria off the side of the facilities parking area.
Doze a trench 4' deep to accept surfacing material, then push the 4' of suitable material back over the top

Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

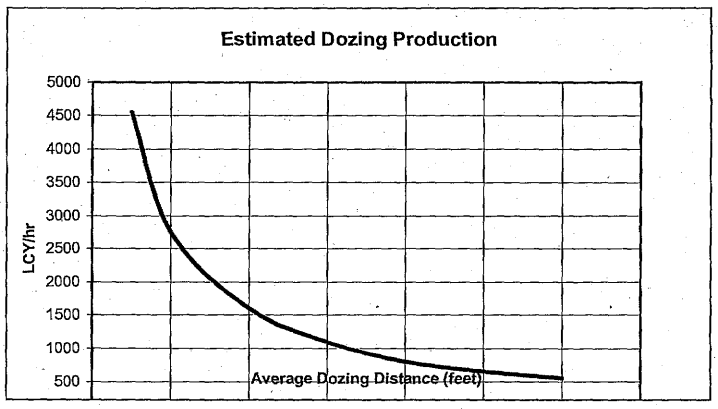
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

2,044,512	cy



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 2,044,512 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **2,849 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

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Table:	24-5-04
Mine Area:	Joint - (KM)
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity

Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:

D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

1,030,920	cy

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4,655 hours

Hours Required = 1,030,920 (Volume to be Ripped) / 4,655 (Ripping Production) x 1.371 (Work Schedule Factor) = **304 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-8.

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Table:	24-5-05
Mine Area:	Joint - (KM)
Project:	Grade Facilities Areas
Task:	Facilities Area Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grading the cut and fills to blend into the surrounding topography to drain, burial of road surface material a minimum of three feet.

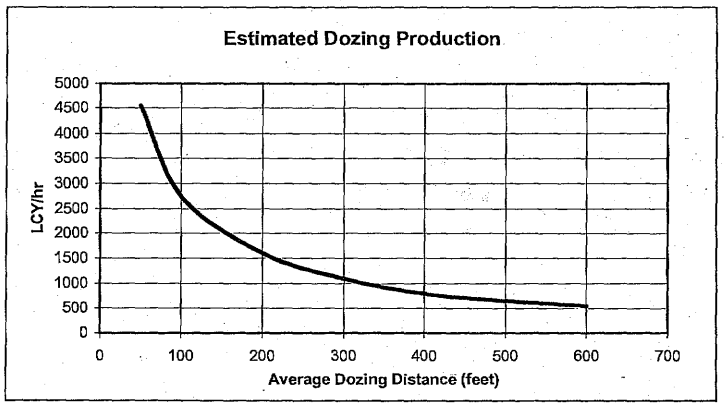
Characterization of Dozer Used (type, size, etc):

D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	200
Hourly production (from chart)	1,600
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2,800
Density Correction	0.82



Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

1,030,920	cy

Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,600 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **984 cy/hr**

Hours Required = 1,030,920 (Volume to be Moved) / 984 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1,437 Hours**

References: Cat Handbook, Ed. 28, Table 24-2-8

JAN 2
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Table:	24-5-06	
Mine Area:		Joint - (KM)
Project:		Topsoil Replacement
Task:		Haul and Place Topsoil
Equipment:		637E P-P Scraper

Earthmoving Activity

Haul 4' of material to cover concrete pads and 1.25' of material to cover remaining parking/storage areas.

Characterization of Scraper Used (type, capacity. etc)

637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

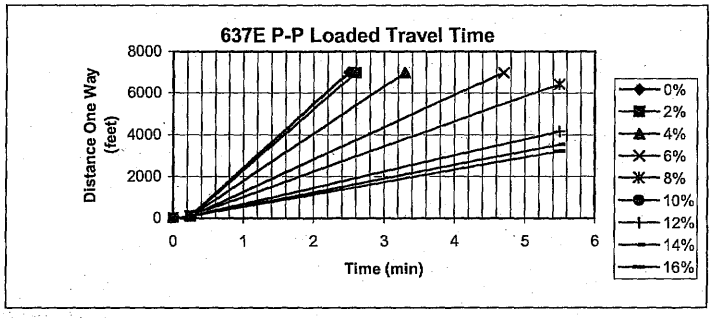
Loaded Distance (ft)	2000
Loaded Grade (%)	0
Loaded Effective Grade (%)	3
Empty Distance (ft)	2000
Empty Grade (%)	0
Empty Effective Grade (%)	3

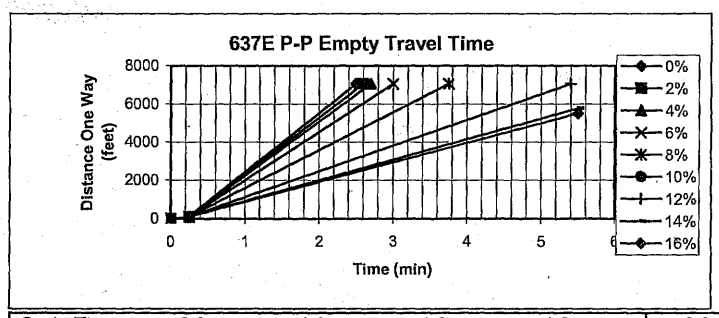
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	1.6
Empty Travel Time (from chart)	1.2

Quantity of Material to be Moved

437,491 cy





Cycle Time = 2.0 (Load Time) + 1.6 (Loaded Trip Time) + 1.2 (Maneuver and Spread Time) + 1.2 (Empty Trip Time) = 6.0 min

Cycles/Hour = 60 (min/hr) / 6.0 (Cycle Time) = 10 cycles/hr

Hourly Production = 31 (Adjusted Load (cy)) x 10 (Cycles/Hour) = **310 cy/hr**

Hours Required = 437,491 (Volume) / 310 (Hourly Production) x 1.371 (Work Schedule Factor) = **1,935 hrs**

Reference: Table 24-2-8, Cat Handbook, Ed. 28

JAN 2012
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Table:	24-5-07
Mine Area:	Joint - (KM)
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
All major facilities

Revegetation Area

Area (acre)	354
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs	=	354 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$547,815**

Reseeding Costs	=	354 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$182,841**

References: Table 24-1-3 and Table 24-2-8

JAN 2012
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Table: 24-5-19
Mine Area: J-3 Airport - (KM)
Project: Asphalt Removal
Task: Asphalt Removal/Disposal
Equipment D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 8" asphalt material prior to dozing into trench.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (	0.7
Cut spacin	6.4
Cut length	300
Speed (ft/n	120

Quantity of Material to
20,246 cy

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8 min/pass		
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8 pass/hr				
Volume cut per pass	=	1 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	**48 bank cy/pass**

Ripping Production	=	48 Volume cut per pass	x	21.8 Passes per hour	=	1040 hours		
Hours Required	=	20,246 Volume to be Ripped	/	1040 Ripping Production	x	1.371 Work Schedule Factor	=	**27 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-8.

JAN 2012
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Table: 24-5-20
Mine Area: J-3 Airport - (KM)
Project: Surface Ripping
Task: Dozer Ripping
Equipment D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of airport area prior to grading

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (	3
Cut spacin	6.4
Cut length	300
Speed (ft/n	120
Quantity of Material to	
90,656	cy

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8	min/pass	
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8	pass/hr			
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	**213 bank cy/pass**

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655	hours		
Hours Required	=	90,656 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	**27**	**hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JAN 2012
APPROVED

ATTACHMENT 24-6

EXPLORATION BONDS

Jan 2012
APPROVED

CHAPTER 24
TABLE 24-6-01

RECLAMATION COST ESTIMATE

The following summarizes estimated reclamation costs associated with the proposed two-year Phase I PWCC exploration program for the J-21 Mining Area:

Plugging drillholes (within 5-yr area) – 121 (5" x 500') @ $50/hole	$6,100
Sealing drillholes (outside 5-yr area) – 295 (5" x 500') @ $350/hole	$103,300
Backfilling mud pits – 310 @ 25cy @ $0.60yd	$4,700
Regrading drill pads (outside 5-yr area) – 210 @ 0.17 acre @ $2,000/acre	$71,400
Regrading roads (outside 5-yr area) – 46,533 feet @ $100 per 100 ft	$46,600
Soil replacement - [(35.7 acres-drill pads) +	
(16 acres-road) x 43,560 ft^2 x 0.5 ft/27 @ %0.50/yd	$20,900
Revegetation – (51.7 acres) @ $600/acre	$31,100
Total Direct Costs	**$284,100**

Consultant & Indirect costs

JAN 2012
APPROVED

BOND SUMMARY

NAVAJO	400FH4568	St. Paul Fire & Marine Ins. Co.	$15,000
	400FH4571	St. Paul Fire & Marine Ins. Co.	15,000
	400FH4573	St. Paul Fire & Marine Ins. Co.	15,000
NAVAJO/HOPI	400FN6323	St. Paul Fire & Marine Ins. Co.	15,000
	400FN6324	St. Paul Fire & Marine Ins. Co.	15,000
	400FN6325	St. Paul Fire & Marine Ins. Co.	15,000
	400FN6349	St. Paul Fire & Marine Ins. Co.	15,000

APPROVED

ALEXANDER & ALEXANDER, INC.
P.O. BOX 412182
KANSAS CITY MO 64141
TELEPHONE: 816-391-1000

ACCOUNT NUMBER
9K 140755
INVOICE NUMBER
693921
INVOICE DATE
1 5 89

TO PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

TERMS: PAYMENT IS DUE UPON EFFECTIVE DATE OF COVERAGE
****

01	400FH4571	ST PAUL FIRE & MARINE INS CO	188.00
		PEABODY COAL COMPANY	
		LICENSE PERMIT RENEWAL POLICY	
	#8580	EFFECTIVE 01-20-89 EXPIRES 01-20-92	
		USDI COLLECTIVE BOND	
		$15,000-NAVAJO RESERVATION	
		AZ	
		TOTAL	188.00

JAN 2012
APPROVED

RECEIVED
JAN 16 1989
RISK MANAGEMENT DEPARTMENT

(to replace Commercial Union Insurance Company and CK 516197)

Form 5-154 f
October 1956

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

JAN 2012
APPROVED

Copy - Nonnegotiable
SL 1-9-79

COLLECTIVE BOND

400FH 4[illegible]71

KNOW ALL MEN BY THESE PRESENTS, That we, Peabody Coal Company of St. Louis, Missouri, as principal, and St. Paul Fire and Marine Insurance Company of St. Paul, Minnesota, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 20th day of January, 1979

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in Coal mining leases and prospecting permits on the Navajo Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waives any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

ACKNOWLEDGMENT OF CORPORATION

STATE OF Delaware
COUNTY OF New Castle } ss:

Before me, a notary public, in and for said county and State on this ____ day of FEB 8 1968, 19____ personally appeared R. P. Conerly to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MY COMMISSION EXPIRES JUNE 6, 1969

My commission expires ____, 19____ Notary Public.

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF ____
COUNTY OF ____ } ss:

Before me, a notary public, in and for said county and State, on this ____ day of ____, 19____ personally appeared ____, to me known to be the identical person ____ who executed the within and foregoing instrument, and acknowledged to me that ____ executed the same as ____ free and voluntary act and deed for the uses and purposes therein set forth.

My commission expires ____, 19____ Notary Public.

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment and agrees to fulfill all the obligations, conditions, and stipulations in said described indenture of lease, when assigned, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement.

IN WITNESS WHEREOF, the said assignee has hereunto set its hand and seal this FEB 8 1968 day of ____, 19____

ATTEST:
By W. R. Kinsey, Asst. Secretary
(Corporate Seal)

Peabody Coal Company,
a Delaware corporation
By F. B. McKown, Vice President
Secretary President

CONSENT OF SURETY

The COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK, of ____, surety for ____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at ____ this ____ day of FEB 8 1968, 19____

COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK
By ____ Attorney in fact

JAN 2012
APPROVED

APPROVED:

DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
____, 19____
Area Director.

ALEXANDER & ALEXANDER, INC.
P.O. BOX 412182
KANSAS CITY MO 64141
TELEPHONE: 816-391-1000

ACCOUNT NUMBER		
9K 140755		
INVOICE NUMBER		
693923		
INVOICE DATE		
1	5	89

TO
PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

TERMS: PAYMENT IS DUE UPON EFFECTIVE DATE OF COVERAGE
****

01	400FH4573	ST PAUL FIRE & MARINE INS CO PEABODY COAL COMPANY LICENSE PERMIT RENEWAL POLICY EFFECTIVE 01-20-89 EXPIRES 01-20-92 USDI COLLECTIVE BOND $15,000 NAVAJO RESERVATION, AZ	188.00
	# 8580		
		TOTAL	188.00

RECEIVED
JAN 10 1989
RISK MANAGEMENT DEPARTMENT

JAN 2012
APPROVED

(to replace Commercial Union Insurance Company Bond No: 5[illegible])

Form 5-154 f
October 1956

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Copy —
Non negotiable
SL 1-8-79

400FH 45

JAN 2012
APPROVED

COLLECTIVE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, Peabody Coal Company of St. Louis, Missouri, as principal, and St. Paul Fire and Marine Insurance Company of St. Paul, Minnesota, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 20th day of Janaury, 1979

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in COAL mining leases and prospecting permits on the Navajo Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waives any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

Now, if the said principal herein shall faithfully carry out and observe all the obligations assumed in such leases and permits to which PEABODY COAL COMPANY is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $.....; the total premium paid is $.....

Signed and sealed in the presence of—

WITNESSES:*

Suzanne Luepke
P. O. Box 235, St. Louis, Mo. 63166
Henry Schwartz
P. O. Box 235, St. Louis, Mo. 63166

as to PEABODY COAL COMPANY [SEAL]
BY Ole Saltzo
Senior Vice Pres., Operations
ATTEST:

P. O.

~~as to~~ J. M. Touhill [SEAL]
Asst. Secretary

P. O.

P. O.

P. O.

as to [SEAL]

P. O.

Jean Dirl
P. O. Box 13647, K.C., MO. 64199
Joni N. Finley
P. O. Box 13647, K.C., Mo. 64199

as to St. Paul Fire and Marine Insurance Company [SEAL]
By: Sue Camarillo
Sue Camarillo, Attorney-in-fact

JAN 2012
APPROVED

*Two witnesses to all signatures.

ALEXANDER & ALEXANDER, INC.
P.O. BOX 412162
KANSAS CITY MO 64141
TELEPHONE: 816-391-1000

ACCOUNT NUMBER
9K 140755
INVOICE NUMBER
693919
INVOICE DATE
1 5 89

TO
PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

TERMS: PAYMENT IS DUE UPON EFFECTIVE DATE OF COVERAGE
****

01	400FH4568	ST PAUL FIRE & MARINE INS CO	300.00
		PEABODY COAL COMPANY	
		LICENSE PERMIT RENEWAL POLICY	
	#8580	EFFECTIVE 01-20-89 EXPIRES 01-20-94	
		USDI COLLECTIVE BOND $15,000	
		NAVAJO RESERVATION-AZ	
		TOTAL	300.00

RECEIVED
JAN 16 1989
RISK MANAGEMENT DEPARTMENT

JAN 2012
APPROVED

October 1956 Bond No: (61 96)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Copy - Non Negotiable
SL 1-8-78

JAN 2012
APPROVED

COLLECTIVE BOND

Bond No: 400FH 4568

KNOW ALL MEN BY THESE PRESENTS, That we, Peabody Coal Company

of St. Louis, Missouri, as principal,

and St. Paul Fire and Marine Insurance Company

of St. Paul, Minnesota, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 20th day of January, 1979

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in coal mining leases and prospecting permits on the Navajo Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waives any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

Now, if the said principal herein shall faithfully carry out and observe all the obligations assumed in such leases and permits to which Peabody Coal Company is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $_____; the total premium paid is $_____

Signed and sealed in the presence of—

WITNESSES:*

Suzanne Luepke
P. O. Box 235, St. Louis, Mo. 63166

Arlene M. Agnew
P. O. Box 235, St. Louis, Mo. 63166

as to PEABODY COAL COMPANY [SEAL]

By: James F. Hobbs
Vice President, Resource Development

Attest:

~~as to~~ Marvin D. Young [SEAL]
Secretary

P. O.

P. O. 13647, Kansas City, Mo. 64199

Gary M. Blank
P. O. 13647, Kansas City, Mo. 64199

St. Paul Fire and Marine Insurance Company

~~as to~~ Sue Camarillo [SEAL]
Sue Camarillo, Attorney-in-fact

P. O.

P. O.

P. O.

as to [SEAL]

APPROVED JAN 2012

*Two witnesses to all signatures.

Ale & Alexander

P. O. Box 19182
Kansas City, Missouri 64141
Telephone 816 391-1000

To

PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

Terms: Payment is due as of effective date of insurance coverage

Insured	Invoice Date
SAME AS ABOVE	05 02 86

Effective	Expiration	Account No.	Invoice No.
05 13 86	05 13 92	6599262	233320

Insurance

LICENSE PERMIT BOND R LANGE
COLLECTIVE BOND - USA
INDIAN-HOPI INDIANS - ARIZONA

Policy Number	Insuring Company	Premium
400FN6324	ST PAUL	100.00
#5743		

JAN 2012
APPROVED

Form 5-154 (
Revised 1956

Copy Non Negotiable

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

JAN 2012
APPROVED

COLLECTIVE BOND

Bond No. 57 07 00

KNOW ALL MEN BY THESE PRESENTS, That we, Sentry Royalty Company, a Nevada corporation of St. Louis, Missouri, as principal, and COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK of New York, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 13th day of May, 19 66.

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in coal mining leases and prospecting permits on the Navajo-Hopi Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waive any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

Now, if the said principal.... here.... shall faithfully carry out and observe.... the obligations assumed in such leases and permits to which .....Sentry Royalty Company..... is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $ 2.50 per Thousand ; the total premium paid is $ 38.00

Signed and sealed in the presence of—

WITNESSES:*

P. O. 301 N. Memorial Drive St. Louis, Mo.

P. O. 301 N. Memorial Dr. St. Louis, Mo.

as to Sentry Royalty Company [SEAL]

By C. E. Stokes
President

ATTEST:

as to C. O. Mulvaney [SEAL]
Secretary

P. O. 301 N. Memorial Drive St. Louis Mo

P. O. 301 N. Memorial Dr. St. Louis, Mo.

P. O. .....

P. O. .....

as to ..... [SEAL]

WITNESS:
By: Leslie McCartney
301 W. 11th St., Kansas City, Mo.
By: Lizette Harris
301 W. 11th St., Kansas City, Mo.

COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK
Surety

as to By: Robert A. Soderland [SEAL]
Robert A. Soderland, Attorney-in-fact

APPROVED

*Two witnesses to all signatures.

Alexander & Alexander

Alexander & Alexander Inc.
P. O. Box 19182
Kansas City, Missouri 64141
Telephone 816 391-1000

To

PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

Terms: Payment is due as of effective date of insurance coverage

Insured	Invoice Date
PEABODY COAL COMPANY	05 02 86

Effective	Expiration	Account No.	Invoice No.
05 13 86	05 13 92	6599262	233322

Insurance

LICENSE PERMIT BOND
COLLECTIVE BOND - USA
INDIAN-HOPI INDIANS - ARIZONA

R LANGE

Policy Number	Insuring Company	Premium
400FN6323 #5743	ST PAUL	100.00

JAN 2012
APPROVED

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Copy Non Negotiable SL

Bond No. 57 06 97

COLLECTIVE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, Sentry Royalty Company

a Nevada corporation of St. Louis, Missouri, as principal,

and COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK

of New York, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 13th day of May, 1966

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in coal mining leases and prospecting permits on the Navajo-Hopi Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waive any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

APPROVED

Now, if the said principal.... herein shall faithfully carry out and observe all the obligations assumed in such leases and permits to which Sentry Royalty Company is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $ 2.50 per Thousand; the total premium paid is $ 38.00

Signed and sealed in the presence of—

WITNESSES:*

P. O. 301 N. Memorial Drive St. Louis Mo.

P. O. Irma D. Onken 301 N. Memorial Dr. St. Louis, Mo.

as to Sentry Royalty Company [SEAL]

By C. E. Stokes President

ATTEST:

~~as to~~ E. Mulvaney Secretary [SEAL]

P. O. 301 N. Memorial Drive St. Louis Mo.

P. O. Irma D. Onken 301 N. Memorial Dr. St. Louis, Mo.

P. O. as to [SEAL]

P. O.

WITNESS:

Marla Malloy

301 West 11th St., Kansas City, Mo.

Julia McEntyre

301 West 11th St., Kansas City, Mo.

COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK Surety

as to By: Robert A. Soderland [SEAL]

Robert A. Soderland, Attorney-in-fact

JAN 2012 APPROVED

* No witnesses to all signatures.

Alexander & Alexander

Kansas City, Missouri 64141
Telephone 816 391-1000

To

PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

Terms: Payment is due as of effective date of insurance coverage

Insured	Invoice Date
SAME AS ABOVE	05 02 86

Effective	Expiration	Account No.	Invoice No.
05 13 86	05 13 92	6599262	233316

Insurance

LICENSE PERMIT BOND R LANGE
COLLECTIVE BOND - USA
INDIAN-HOPI INDIANS - ARIZONA - 15,000

Policy Number	Insuring Company	Premium
400FN6325	ST PAUL	100.00
#5743		

JAN 2012
APPROVED

This bond is to replace Commercial Union Insurance Company Bond No: 57 06 98

Form 5-154f
October 1956

JAN 2012
APPROVED

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Bond No: 400FN 6325

COLLECTIVE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, Peabody Coal Company of St. Louis, Missouri, as principal, and St. Paul Fire and Marine Insurance Company of St. Paul, Minnesota, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 13th day of May, 19 80

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in coal mining leases and prospecting permits on the Navajo-Hopi Reservation in the State of Arizona of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waive any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

Now, if the said principal herein shall faithfully carry out and observe all the obligations assumed in such leases and permits to which Peabody Coal Company is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $_____; the total premium paid is $ Neg.

Signed and sealed in the presence of—

WITNESSES:*

(1) _____

P. O. _____ as to PEABODY COAL COMPANY [SEAL]

(1) _____

P. O. _____

P. O. _____ as to J. F. Hobbs [SEAL]
Vice President, Resource Management

P. O. _____

ST. PAUL FIRE AND MARINE INSURANCE COMPANY

(1) _____

P. O. 13647, K. C., Missouri 64199 BY: _____ [SEAL]
Sue Camarillo, Attorney-in-fact

(2) P. O. 13647, K.C., Missouri 64199

P. O. _____ as to _____ [SEAL]

P. O. _____

*Two witnesses to all signatures.

APPROVED
J 2012

Ate & Alexander

P. O. Box 19182
Kansas City, Missouri 64141
Telephone 816 391-1000

To

PEABODY HOLDING COMPANY INC
JAMES J BRITTAIN
P O BOX 373
ST LOUIS MO 63166

Terms: Payment is due as of effective date of insurance coverage

Insured	Invoice Date
PEABODY COAL COMPANY	05 02 86

Effective	Expiration	Account No.	Invoice No.
05 13 86	05 13 92	6599262	233318

Insurance

LICENSE PERMIT BOND R LANGE
COLLECTIVE BOND - USA 15,000
INDIAN-HOPI INDIANS - ARIZONA

Policy Number	Insuring Company	Premium
400FN6349	ST PAUL	100.00
#9910		

JAN 2012
APPROVED

Form 5-154 C
October 1956

Copy Nonnegotiable

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

JAN 2012
APPROVED

COLLECTIVE BOND

Bond No. 57 06 99

KNOW ALL MEN BY THESE PRESENTS, That we, Sentry Royalty Company, a Nevada corporation of St. Louis, Missouri, as principal, and COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK of New York, as surety, are held and firmly bound unto the United States of America in the sum of fifteen thousand dollars ($15,000), lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 13th day of May, 19 66

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in coal mining leases and prospecting permits on the Navajo-Hopi Reservation in the State of Arizona various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waive any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

Now, if the said principal.... herein shall faithfully carry out and observe all the obligations assumed in such leases and permits to which .....Sentry Royalty Company..... is now or may hereafter become a party, and shall observe all the laws of the United States and regulations made, or which shall be made thereunder, for the government of trade and intercourse with Indian tribes, and all rules and regulations that have been or shall hereafter be lawfully prescribed by the Secretary of the Interior relative to such mining leases and permits, and shall in all particulars comply with the provisions of such leases, permits, rules, and regulations, then this obligation shall be null and void; otherwise, to remain in full force and effect.

The rate of premium charged on this bond is $ 2.50 per Thousand ; the total premium paid is $ 38.00

Signed and sealed in the presence of—

WITNESSES:*

P. O. 301 N. Memorial Drive St. Louis, Mo.

P. O. 301 N. Memorial Dr. St. Louis, Mo.

as to Sentry Royalty Company [SEAL]

By [signature] President

ATTEST:

~~as to~~ [signature] [SEAL] Secretary

P. O. 301 N. Memorial Drive St. Louis, Mo.

P. O. 301 N. Memorial Dr. St. Louis, Mo.

P. O.

P. O.

as to [SEAL]

JAN 2012 APPROVED

WITNESS:

By: [signature]

301 W. 11th St., Kansas City, Mo.

By: [signature]

301 W. 11th St., Kansas City, Mo.

COMMERCIAL UNION INSURANCE COMPANY OF NEW YORK

Surety

as to By: [signature] [SEAL]

Robert A. Soderland, Attorney-in-fact

*Two witnesses to all signatures.

ATTACHMENT 24-6

N-9 POWERLINE ADDITION -

BOND CALCULATION

JUN 2010

APPROVED

Revised 04/23/10

Table: 24-6-01
Mine Area: 2010 N-9 New Powerline Addition
Project: Facilities-Powerlines
Task: Remove Powerlines
Equipment: Miscellaneous

	Description	Quantity (ft)	Days	Unit Cost	Demolition Cost
Direct Cost:	Powerline Removal (ft)	5,600	1	$7,000.46	$7,425
Indirect Cost:	@ 28.2% with Tax & 2010 Inflation				$2,094
Bond Required:					9,519
					Use $10,000

Assumptions:
1. Means crew R-6 removes 1 mile of powerline per day.
2. Daily rate for crew R-6 is $7,000.46/day from RSMeans Site Work & Landscape Cost Data 2010.
3. See Drawing 85360 and 89800, Sheet NW, all other disturbance is included within N-9 Mining Area.

APPROVED
JUN 2010

CHAPTER 24
TABLE 24-6-01

RECLAMATION COST ESTIMATE

The following summarizes estimated reclamation costs associated with the proposed two-year Phase I PWCC exploration program for the J-21 Mining Area:

Plugging drillholes (within 5-yr area) – 121 (5" x 500') @ $50/hole	$6,100
Sealing drillholes (outside 5-yr area) – 295 (5" x 500') @ $350/hole	$103,300
Backfilling mud pits – 310 @ 25cy @ $0.60yd	$4,700
Regrading drill pads (outside 5-yr area) – 210 @ 0.17 acre @ $2,000/acre	$71,400
Regrading roads (outside 5-yr area) – 46,533 feet @ $100 per 100 ft	$46,600
Soil replacement - [(35.7 acres-drill pads) +	
(16 acres-road) x 43,560 ft^2 x 0.5 ft/27 @ %0.50/yd	$20,900
Revegetation – (51.7 acres) @ $600/acre	$31,100
Total Direct Costs	**$284,100**

JUN 2000
APPROVED

ATTACHMENT 24-7

J-21 POWERLINE EXTENSION &

J-21 BY-PASS ROAD

BOND CALCULATION

JUN 2011

APPROVED

MAY 3, 2011

J-21 POWERLINE EXTENSION &

J-21 BY-PASS ROAD

MAY 3, 2011

PURPOSE: To permit the construction of approximately 0.4 miles of J-21 powerline extension, and approximately 2.0 miles of new J-21 by-pass road construction, (see Drawing No. 85210, SE Sheet). As the J-21 Pit moves south, the electrical system must move south to provide electrical power to the draglines. In addition, due to safety considerations, the J-21 by-pass road is necessary to separate small vehicle traffic from the normal J-19/J-21 Pit heavy equipment and mine traffic on the J-19 Haul Road. This new J-21 by-pass road will connect the new by-pass road to existing J-21 roads for small vehicle traffic, and route the traffic on the existing J-21 roads to the J-28 Facilities and beyond.

THE J-21 POWERLINE EXTENSION AND J-21 BY-PASS ROAD IS WITHIN THE EXISTING J-19 AND J-21 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS. ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT. BONDING MONEY TO COVER THIS PERMIT REVISION TOTALS $333,000. OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT, ESPECIALLY SINCE ALL OF THE J-21 BY-PASS ROAD IS WITHIN THE APPROVED 5-YEAR DISTURBANCE AREA.

JUN 2011
APPROVED

PEABODY WESTERN COAL COMPANY
KAYENTA MINE
OSM PERMIT: AZ-0001D
J-21 POWERLINE EXTENSION &
J-21 BY-PASS ROAD PERMIT REVISION
BONDING COST ESTIMATE
DATE: MAY 3, 2011

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-09a	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	-	-	-	2,100	feet	-	$2,800	$1.33
24-5-27a	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	12	$35.58	11,733	cy	$355.49	$4,266	$0.36
24-5-28a	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	10	$35.58	35,200	cy	$379.92	$3,799	$0.11
24-5-29a	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	266	$35.58	1,107	acres	$355.49	$94,560	$85.42
24-5-30a	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	355	$35.58	62,578	cy	$286.22	$101,608	$1.62
24-5-31a	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	24	acres	-	$50,036	$2,084.83
Total Road Direct Cost:											$254,270	
Total Road & Powerline Direct Cost:											$257,070	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$75,836	
Total Estimated Bonding Cost:											$332,905	
										Use:	$ 333,000	

NOTE: THE J-21 POWERLINE EXTENSION AND J-21 BY-PASS ROAD IS WITHIN THE EXISTING J-19 AND J-21 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,
ESPECIALLY SINCE ALL OF THE J-21 BY-PASS ROAD IS WITHIN THE APPROVED 5-YEAR DISTURBANCE AREA.

JUN 2011
APPROVED

Table: 24-5-09a
Mine Area: Kayenta J-21 Powerline Extension_2011
Project: Facilities-Powerlines
Task: Remove Powerlines
Equipment: Miscellaneous

Description	Quantity (ft)	Days	Unit Cost	Demolition Cost
Powerline Removal (ft)	2,100	0.4	$7,000.46	$2,800

Assumptions:
1. Means crew R-6 removes 1 mile of powerline per day.
2. Daily rate for crew R-6 is $7,000.46/day from RSMeans Site Work & Landscape Cost Data 2010.

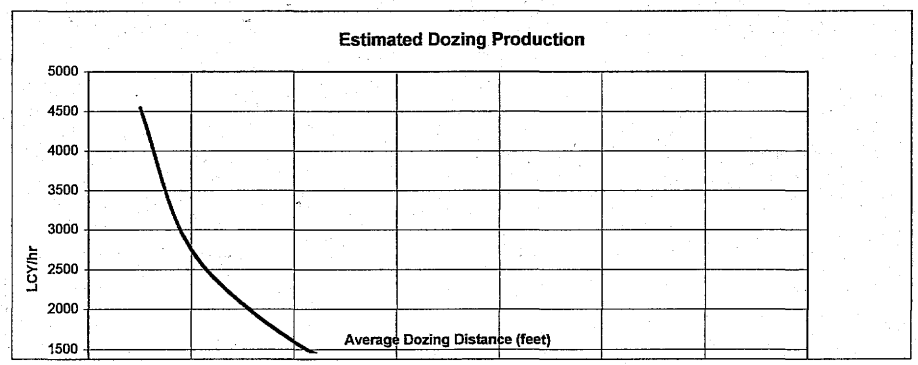
JUN 2011
APPROVED

Table:	24-5-27a
Mine Area:	Kayenta J-21 By-Pass Primary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes
Description of Dozer Use	
Average dozing distance (feet)	100
Hourly production (from chart)	2750
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82
Productivity Adjustment Factors	
Operator Factor	
Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no
Material Factor	
Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no
Production Method/Blade Factor	
Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes
Poor Visibility	
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no
Elevation Factor	
<7,500 feet (1.0)	yes
Quantity of Material to be Moved	
Length (ft)	10560
Width (ft)	30
Total (cy)	11,733



Productivity Adjustment Factor =	0.75 Operating Factor	x	0.8 Material Factor	x	1.0 Grade Factor	x	0.82 Density Correction				
x	1.00 Production Method	x	1.00 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	=	**0.49**		
Net Hourly Production =	2,750 Normal Hourly Production (see graph above)	x	0.49 Productivity Adjustment Factor	=	**1353 cy/hr**						
Hours Required =	11,733 Total (cy) Volume to be Moved	/	1353 Net Hourly Production	x	1.371 Work Schedule Factor	=	**12 Hours**				

References: Cat Handbook, Ed. 28

JUN 2011
APPROVED

Table:	24-5-28a
Mine Area:	Kayenta J-21 By-Pass Primary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120
Quantity of Material to be Ripped	
Length (ft)	10,560
Width (ft)	30
Total (cy)	35,200

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8 min/pass			
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8 pass/hr					
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	**213**	**bank cy/pass**

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655 hours		
Hours Required	=	35,200 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	**10 hours**

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

JUN 2011
APPROVED

Table: 24-5-29a
Mine Area: Kayenta J-21 By-Pass Primary Roads
Project: Grade Ripped Areas
Task: Grading
Equipment D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)
D11R, three shank ripper, U-blade

Production 1.0

Acres to be Graded
Length (ft) 10,560
Width (ft) 100
Total (acres 24

Hours Required	=	24 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	**266 Hours**

Note: Production rate based on PWCC experience.

JUN 2011
APPROVED

Table:	24-5-30a
Mine Area:	Kayenta J-21 By-Pass Primary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

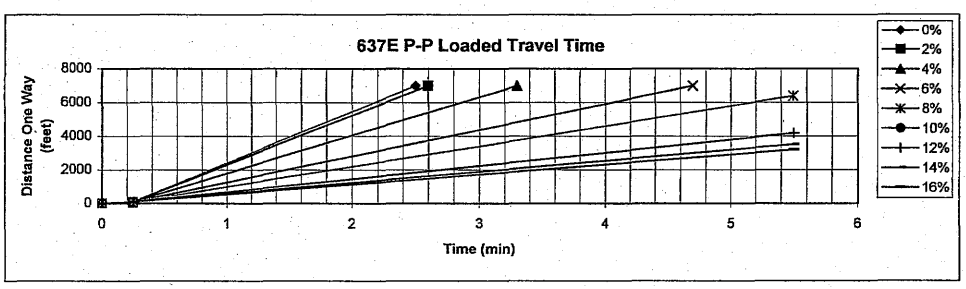
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

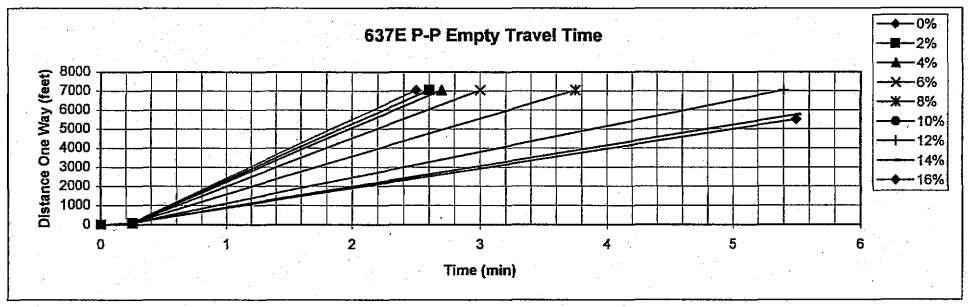
Production Times

Typical Load Time for 657E F	2.0
Maneuver and spread or dun	1.2
Loaded Travel Time (from ch	3.0
Empty Travel Time (from cha	1.5

Quantity of Material to be Moved

Length (ft)	10,560
Width (ft)	100
Total (cy)	62,578





Cycle Time	=	2.0 Load Time	+	3.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.5 Empty Trip Time	=	7.7 min
Cycles/Hou	=	60 min/hr	/	7.7 Cycle Time	=	8 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	7.79 Cycles/ Hour	=	**242 cy/hr**				

Hours Required	=	62,578 Volume	/	242 Hourly Production	x	1.371 Work Schedule Factor	=	**355 hrs**

Reference: Cat Handbook, Ed. 28

JUN 2011
APPROVED

Table:	24-5-31a
Mine Area:	Kayenta J-21 By-Pass Primary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine primary roads

Revegetation Area

Area (acre)	24
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetatio = Costs	24 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =		**$37,515**
Reseeding = Costs	24 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=		**$12,521**

References: Table 24-1-3

APPROVED

ATTACHMENT 24-8

N-8 FACILITIES BY-PASS ROAD

BOND CALCULATION

August 8, 2011

3
NOV
APPROVED

N-8 FACILITIES BY-PASS ROAD

PURPOSE: To permit the construction of approximately 0.23 miles of N-8 facilities by-pass road, (see Drawing No. 85210, NW Sheet, etc.). Due to safety concerns pertaining to the current N-8 Facilities access route, the proposed alternative will decrease blind spots, place more stop signs, and limit sharp horizontal curves. The proposed route will connect to the current N-8 Facilities road and serve the same purpose as the existing layout. An earth berm will block southbound access to the old N-8 facilities route but will not limit entry of local permitted gate access. The electrical sub-station will be on the south area of the berm and will be service accessible through the old northbound route.

THE N-8 FACILITIES BY-PASS ROAD IS WITHIN THE EXISTING N-8 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS. ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT. UPON OSM APPROVAL, PWCC WILL PROVIDE $41,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION. OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT.

NOV 2011
APPROVED

PEABODY WESTERN COAL COMPANY
KAYENTA MINE
OSM PERMIT: AZ-0001D
N-8 FACILITIES BY-PASS ROAD PERMIT REVISION
BONDING COST ESTIMATE
DATE: AUGUST 08, 2011

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-27b	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	1	$35.58	1,444	cy	$355.49	$355	$0.25
24-5-28b	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	1	$35.58	4,333	cy	$379.92	$380	$0.09
24-5-29b	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	33	$35.58	3	acres	$355.49	$11,731	$3,910.39
24-5-30b	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	44	$35.58	7,704	cy	$286.22	$12,594	$1.63
24-5-31b	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	3	acres	-	$6,159	$2,053.00
Total Road Direct Cost:											$31,219	
Total Road Direct Cost:											$31,219	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$9,210	
Total Estimated Bonding Cost:											$40,429	
										Use:	$ 41,000	

NOTE: N-8 FACILITIES BY-PASS ROAD IS WITHIN THE EXISTING N-8 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
UPON OSM APPROVAL, PWCC WILL PROVIDE $41,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION.
OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,

NOV 2011
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Table:	24-5-27b
Mine Area:	Kayenta N-8 Facilities By-Pass Road
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	100
Hourly production (from chart)	2750
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

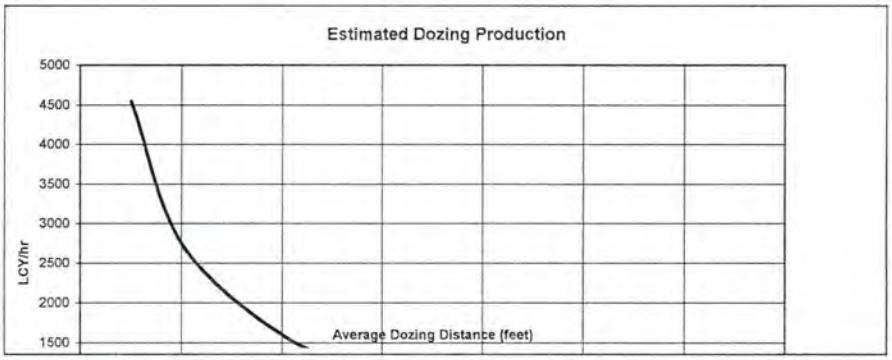
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	1300
Width (ft)	30
Total (cy)	1,444



Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 2,750 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **1353 cy/hr**

Hours Required = 1,444 (Total (cy) Volume to be Moved) / 1353 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **1 Hours**

References: Cat Handbook, Ed. 28

Table: 24-5-28b
Mine Area: Kayenta N-8 Facilities By-Pass Road
Project: Surface Ripping
Task: Dozer Ripping
Equipment: D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120
Quantity of Material to be Ripped	
Length (ft)	1,300
Width (ft)	30
Total (cy)	4,333

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8	min/pass		
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8	pass/hr				
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	213	bank cy/pass

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655	hours		
Hours Required	=	4,333 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	1	hours

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

NOV
APPROVED

Table: 24-5-29b
Mine Area: Kayenta N-8 Facilities By-Pass Road
Project: Grade Ripped Areas
Task: Grading
Equipment D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size, etc)
D11R, three shank ripper, U-blade

Production 1.0

Acres to be Graded
Length (ft) 1,300
Width (ft) 100
Total (acres 3

Hours Required =	3 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor =	33 Hours

Note: Production rate based on PWCC experience.

NOV 2011
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Table:	24-5-30b
Mine Area:	Kayenta N-8 Facilities By-Pass Road
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity : 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

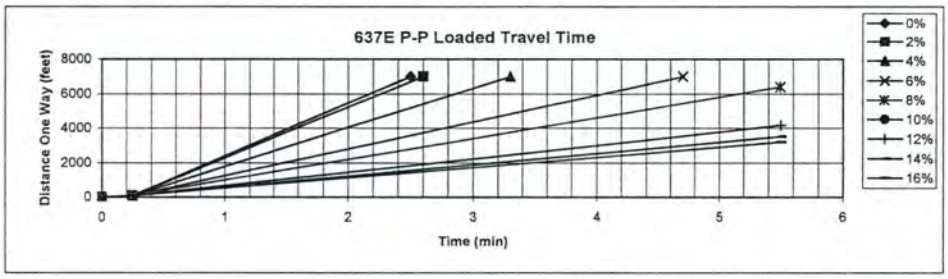
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

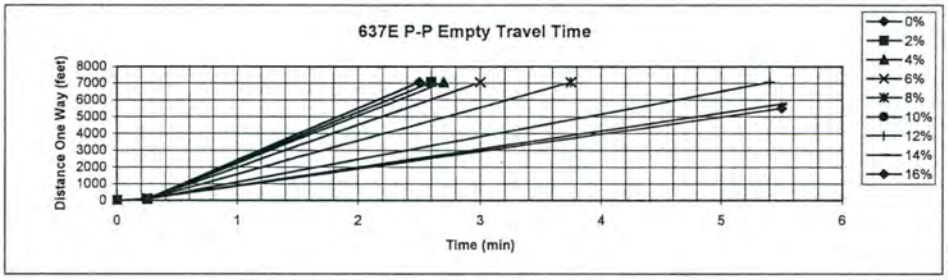
Production Times

Typical Load Time for 657E F	2.0
Maneuver and spread or dum	1.2
Loaded Travel Time (from cha	3.0
Empty Travel Time (from chai	1.5

Quantity of Material to be Moved

Length (ft)	1,300
Width (ft)	100
Total (cy)	7,704





Cycle Time	=	2.0 (Load Time)	+	3.0 (Loaded Trip Time)	+	1.2 (Maneuver and Spread Time)	+	1.5 (Empty Trip Time) = 7.7 min
Cycles/Hou	=	60 (min/hr)	/	7.7 (Cycle Time)	=	8 cycles/hr		
Hourly Production	=	31 (Adjusted Load (cy))	x	7.79 (Cycles/ Hour)	=	**242 cy/hr**		

Hours Required	=	7,704 (Volume)	/	242 (Hourly Production)	x	1.371 (Work Schedule Factor)	= **44 hrs**

Reference: Cat Handbook, Ed. 28

NOV
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Table:	24-5-31b
Mine Area:	Kayenta N-8 Facilities By-Pass Road
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine primary roads

Revegetation Area

Area (acre)	3								
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50	Revegetatio = Costs	3 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$4,618**
Tree and Shrub Costs (per acre)	$375.00								
Reseeding Cost (per acre)	$1,033.00	Reseeding = Costs	3 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$1,541**
Percent Failure	50%								

References: Table 24-1-3

NOV 2011
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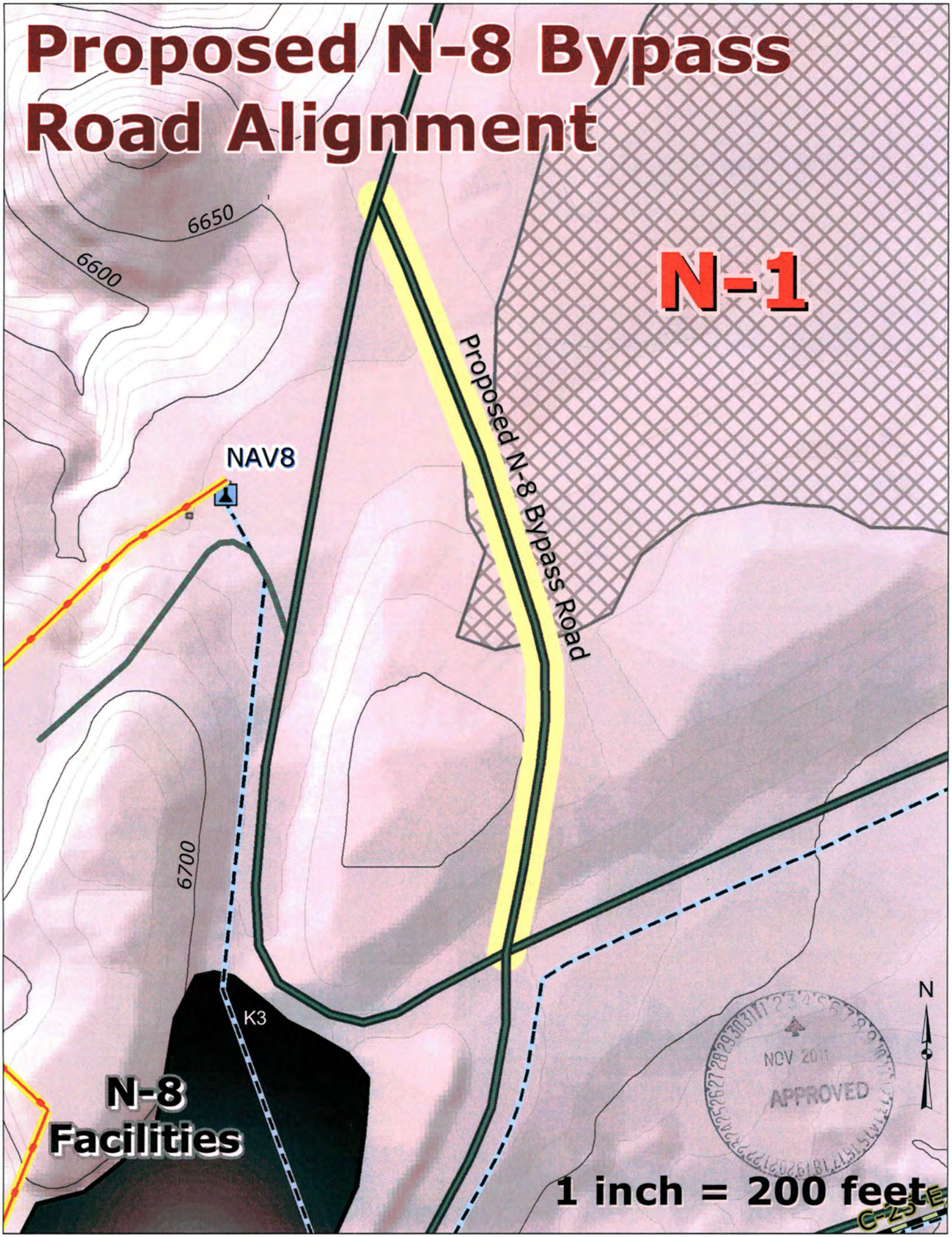
Proposed N-8 Bypass Road Alignment



BONDING CALCULATIONS

ATTACHMENT 24-9

PROPOSED J-19 BYPASS POWERLINE EXTENSION

APR 2012
APPROVED

Table: 24-5-09c
Mine Area: Kayenta J-19 ByPass Powerline Extension_2012
Project: Facilities-Powerlines
Task: Remove Powerlines
Equipment: Miscellaneous

Description	Quantity (ft)	Days	Unit Cost	Demolition Cost
Powerline Removal (ft)	21,510	4.1	$7,000.46	$28,702

Assumptions:
1. Means crew R-6 removes 1 mile of powerline per day.
2. Daily rate for crew R-6 is $7,000.46/day from RSMeans Site Work & Landscape Cost Data 2010.

APR 2012
APPROVED

PEABODY WESTERN COAL COMPANY
KAYENTA MINE
OSM PERMIT: AZ-0001D
J-19 BYPASS POWERLINE PERMIT REVISION
BONDING COST ESTIMATE
DATE: DECEMBER 19, 2011

TABLE	AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-09c	Kayenta Powerlines	Facilities-Powerlines	Remove Powerlines	Miscellaneous	$7,000.46/Day @ 4.1 Days			21,510	feet	-	$28,702	$1.33
Total Powerline Direct Cost:											$28,702	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$8,467	
Total Estimated Bonding Cost:											$37,169	
										Use:	$ 38,000	

NOTE: THE J-19 BYPASS POWERLINE EXTENSION WITHIN THE EXISTING J-19 AND J-21 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
UPON OSM APPROVAL, PWCC WILL PROVIDE $38,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION.
OSM HOLDS ABOUT $44,883,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,

APR 2012
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ATTACHMENT 24-9

N-9 & J-21 (2012) POND CONSTRUCTION ACCESS ROAD

BOND CALCULATION

February 9, 2012

APR 2012
APPROVED

N-9 & J-21 POND CONSTRUCTION ROAD ACCESS

PURPOSE: To permit the construction of approximately 0.53 miles of N-9 pond construction access road, and improvements to approximately 0.33 miles of J-21 pond construction access road (see Drawing No. 85210, NW & SE Sheet, etc.). The N-9 & J-21 pond construction roads will provide contractor access to their designated work site locations. The N-9 road access will utilize a previous drilling exploration road, and the J-21 road will be improving existing lease roads to provide safe contractor access.

THE N-9 & J-21 POND CONSTRUCTION ROAD ACCESS IS WITHIN THE EXISTING N-9 & J-21 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS OR WITHIN THE NEW PONDS WATERSHED AND BMP SEDIMENT CONTROL PROVIDED WITH SILT FENCE OR EQUIVALENT. ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT. UPON OSM APPROVAL, PWCC WILL PROVIDE $88,000 IN BONDING MONEY TO COVER THE N-9 PERMIT REVISION AND $55,000 TO COVER THE J-21 PERMIT REVISION FOR A TOTAL ADDITIONAL BOND AMOUNT OF $143,000. OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT.

APR 2012
APPROVED

PEABODY WESTERN COAL COMPANY
KAYENTA MINE
OSM PERMIT: AZ-0001E
N-9 & J-21 POND CONSTRUCTION ROAD PERMIT REVISION
BONDING COST ESTIMATE
DATE: FEBRUARY 8, 2012

TABLE	N-9 Ponds AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-27c	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	3	$35.58	3,118	cy	$355.49	$1,066	$0.34
24-5-28c	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	3	$35.58	9,353	cy	$379.92	$1,140	$0.12
24-5-29c	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	71	$35.58	6	acres	$355.49	$25,240	$4,206.63
24-5-30c	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	94	$35.58	16,628	cy	$286.22	$26,905	$1.62
24-5-31c	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	6	acres	-	$13,296	$2,216.00
Total Road Direct Cost:											$67,647	
Total Road Direct Cost:											$67,647	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$19,956	
Total Estimated Bonding Cost:											$87,602	
										Use:	$ 88,000	

NOTE: N-9 POND CONSTRUCTION ROAD IS WITHIN THE EXISTING N-9 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
UPON OSM APPROVAL, PWCC WILL PROVIDE $79,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION.
OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,

TABLE	J-21 Ponds AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-27d	Kayenta Primary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	2	$35.58	1,939	cy	$355.49	$711	$0.37
24-5-28d	Kayenta Primary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	2	$35.58	5,817	cy	$379.92	$760	$0.13
24-5-29d	Kayenta Primary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	44	$35.58	4	acres	$355.49	$15,642	$3,910.39
24-5-30d	Kayenta Primary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	59	$35.58	10,341	cy	$286.22	$16,887	$1.63
24-5-31d	Kayenta Primary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	4	acres	-	$8,268	$2,067.00
Total Road Direct Cost:											$42,267	
Total Road Direct Cost:											$42,267	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$12,469	
Total Estimated Bonding Cost:											$54,736	
										Use:	$ 55,000	

NOTE: J-21 POND CONSTRUCTION ROAD IS WITHIN THE EXISTING J-21 SEDIMENT CONTROL IMPOUNDMENT'S WATERSHEDS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
UPON OSM APPROVAL, PWCC WILL PROVIDE $53,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION.
OSM HOLDS ABOUT $44,924,500 IN EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,

APR 2012
APPROVED

Table:	24-5-27c
Mine Area:	Kayenta N-9 Pond Construction Road
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	100
Hourly production (from chart)	2750
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

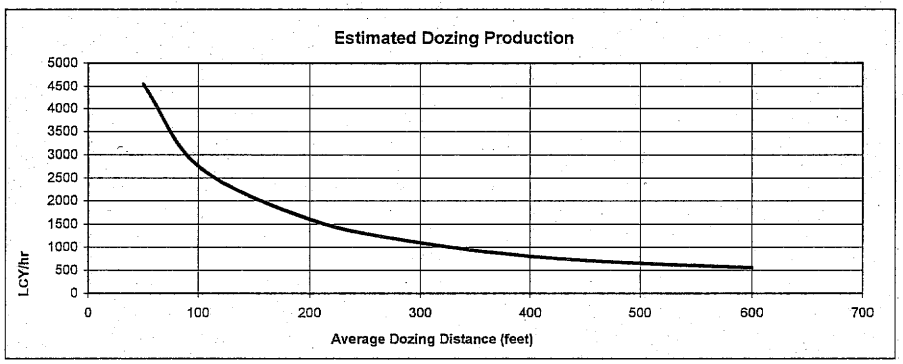
(i.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Length (ft)	2806
Width (ft)	30
Total (cy)	3,118



Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 2,750 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **1353 cy/hr**

Hours Required = 3,118 (Total (cy) Volume to be Moved) / 1353 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **3 Hours**

References: Cat Handbook, Ed. 28

APR 2012
APPROVED

Table:	24-5-28c
Mine Area:	Kayenta N-9 Pond Construction Road
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120
Quantity of Material to be Ripped	
Length (ft)	2,806
Width (ft)	30
Total (cy)	9,353

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8 min/pass		
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8 pass/hr				
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	213 bank cy/pass

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655 hours		
Hours Required	=	9,353 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	3 hours

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

APR 2012
APPROVED

Table: 24-5-29c
Mine Area: Kayenta N-9 Pond Construction Road
Project: Grade Ripped Areas
Task: Grading
Equipment D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size, etc)
D11R, three shank ripper, U-blade

Production 1.0

Acres to be Graded

Length (ft)	2,806
Width (ft)	100
Total (acres	6

Hours Required	=	6 / Area to be Graded (acres)	0.125 x Net Hourly Production (acres/hr)	1.371 = Work Schedule Factor		71 Hours	

Note: Production rate based on PWCC experience.

APR 2012
APPROVED

Table:	24-5-30c
Mine Area:	Kayenta N-9 Pond Construction Road
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity : 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

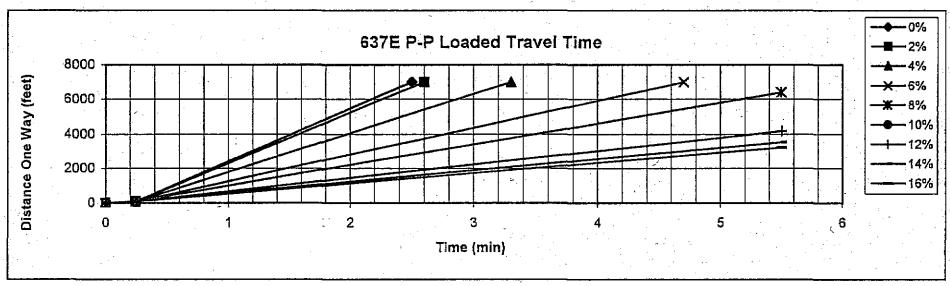
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

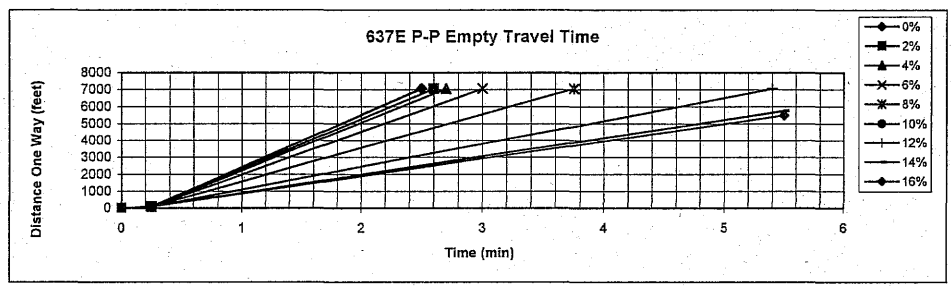
Production Times

Typical Load Time for 657E P	2.0
Maneuver and spread or dum	1.2
Loaded Travel Time (from cha	3.0
Empty Travel Time (from char	1.5

Quantity of Material to be Moved

Length (ft)	2,806
Width (ft)	100
Total (cy)	16,628





Cycle Time	=	2.0 Load Time	+	3.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.5 Empty Trip Time	=	7.7 min
Cycles/Hou	=	60 min/hr	/	7.7 Cycle Time	=	8 cycles/hr				
Hourly Production	=	31 Adjusted Load (cy)	x	7.79 Cycles/ Hour	=	242 cy/hr				

Hours Required	=	16,628 Volume	/	242 Hourly Production	x	1.371 Work Schedule Factor	=	94 hrs

Reference: Cat Handbook, Ed. 28

APR 2012
APPROVED

Table:	24-5-31c
Mine Area:	Kayenta N-9 Pond Construction Road
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine primary roads

Revegetation Area

Area (acre)	6	Revegetatio = Costs	6 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$9,969**
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50								
Tree and Shrub Costs (per acre)	$375.00								
Reseeding Cost (per acre)	$1,033.00	Reseeding = Costs	6 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$3,327**
Percent Failure	50%								

References: Table 24-1-3

4
APR 2012
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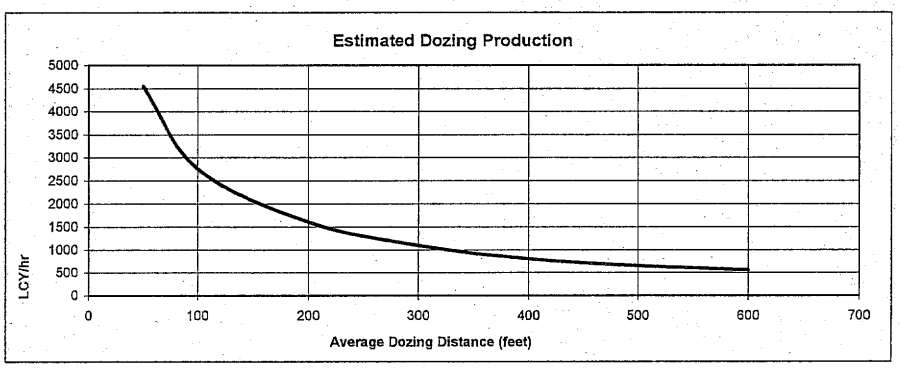
Table:	24-5-27d
Mine Area:	Kayenta J-21 Pond Construction Road
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes
Description of Dozer Use	
Average dozing distance (feet)	100
Hourly production (from chart)	2750
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82
Productivity Adjustment Factors	
Operator Factor	
Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no
Material Factor	
Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no
Production Method/Blade Factor	
Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes
Poor Visibility	
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no
Elevation Factor	
<7,500 feet (1.0)	yes
Quantity of Material to be Moved	
Length (ft)	1745
Width (ft)	30
Total (cy)	1,939



Productivity Adjustment Factor =	0.75 Operating Factor	x	0.8 Material Factor	x	1.0 Grade Factor	x	0.82 Density Correction		
x	1.00 Production Method	x	1.00 Visibility	x	1.00 Elevation	x	1.00 Direct Drive Trans	=	0.49

Net Hourly Production	=	2,750 Normal Hourly Production (see graph above)	x	0.49 Productivity Adjustment Factor	=	1353 cy/hr

Hours Required	=	1,939 Total (cy) Volume to be Moved	/	1353 Net Hourly Production	x	1.371 Work Schedule Factor	=	2 Hours

References: Cat Handbook, Ed. 28

APR 2012
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Table:	24-5-28d
Mine Area:	Kayenta J-21 Pond Construction Road
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped

Length (ft)	1,745
Width (ft)	30
Total (cy)	5,817

Cycle Time	=	300 Cut Length	/	120 Speed Factor (fpm)	+	0.25 Turn Time	=	2.8 min/pass				
Passes per hour	=	60 min/hr	/	2.8 Cycle Time	=	21.8 pass/hr						
Volume cut per pass	=	3.00 Tool Penetration	x	6.4 Cut Spacing	x	300 Cut Length	/	27 cf/cy	=	213 bank cy/pass		

Ripping Production	=	213 Volume cut per pass	x	21.8 Passes per hour	=	4655 hours				
Hours Required	=	5,817 Volume to be Ripped	/	4655 Ripping Production	x	1.371 Work Schedule Factor	=	2 hours		

Reference: Cat Handbook, Ed. 28, Table 24-2-9.

APR 2012
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Table: 24-5-29d
Mine Area: Kayenta J-21 Pond Construction Road
Project: Grade Ripped Areas
Task: Grading
Equipment D11R Dozer

Earthmoving Activity
Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size, etc)
D11R, three shank ripper, U-blade

Production 1.0

Acres to be Graded
Length (ft) 1,745
Width (ft) 100
Total (acres 4

Hours Required	=	4 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	44 Hours

Note: Production rate based on PWCC experience.

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Table:	24-5-30d
Mine Area:	Kayenta J-21 Pond Construction Road
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity : 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

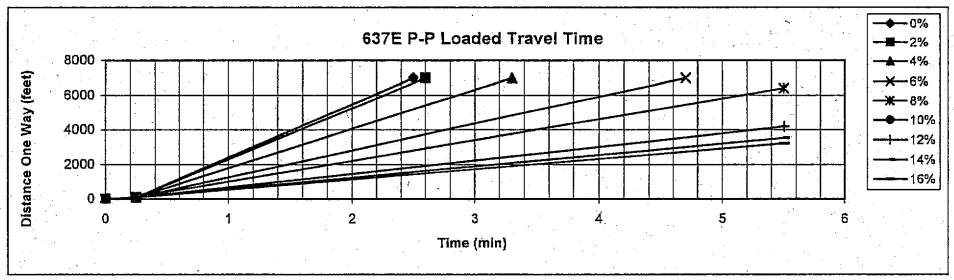
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

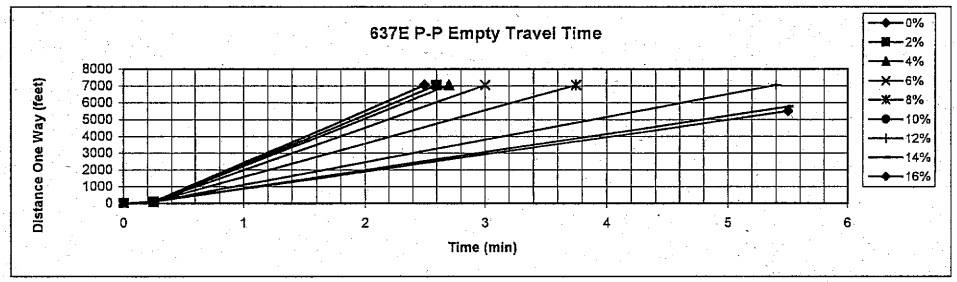
Production Times

Typical Load Time for 657E P	2.0
Maneuver and spread or dum	1.2
Loaded Travel Time (from cha	3.0
Empty Travel Time (from chai	1.5

Quantity of Material to be Moved

Length (ft)	1,745
Width (ft)	100
Total (cy)	10,341





Cycle Time	=	2.0 Load Time	+	3.0 Loaded Trip Time	+	1.2 Maneuver and Spread Time	+	1.5 Empty Trip Time	= 7.7 min
Cycles/Hou	=	60 min/hr	/	7.7 Cycle Time	=	8 cycles/hr			
Hourly Production	=	31 Adjusted Load (cy)	x	7.79 Cycles/ Hour	=	242 cy/hr			

Hours Required	=	10,341 Volume	/	242 Hourly Production	x	1.371 Work Schedule Factor	=	59 hrs

Reference: Cat Handbook, Ed. 28

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Table:	24-5-31d
Mine Area:	Kayenta J-21 Pond Construction Road
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine primary roads

Revegetation Area

Area (acre)	4								
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50	Revegetatio = Costs	4 Acres	* (	$1,172.50 $/Acre for seeding, fertilizing, mulching and fencing	+	$375.00 $/Acre for planting trees and shrubs	) =	**$6,199**
Tree and Shrub Costs (per acre)	$375.00								
Reseeding Cost (per acre)	$1,033.00	Reseeding = Costs	4 Acres	*	0.5 Failure	*	$1,033.00 Reseeding Cost	=	**$2,069**
Percent Failure	50%								

References: Table 24-1-3

APR 2012
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ATTACHMENT 24-10

Proposed Water Well #6 to Kayenta Mine's Main Waterline & Water Tank Construction Project

BOND CALCULATION

May 20, 2013

Proposed Water Well #6 to Kayenta Mine's Main Waterline & Water Tank Construction Project

PURPOSE: To permit the proposed construction of a new 10-inch diameter, approximately 2.1 mile long waterline from PWCC's Water Well #6 to the site of the Proposed relocated N-14 Water Tank, (See Drawing No. 85210, Northwest Sheet, and Drawing No. 85400, Sheet L-8 for location). This new waterline will connect into the existing Kayenta Mine water system and also to the relocated N-14 Water Tank. The purpose of the proposed permit revision is to permit construction of approximately 2.1 miles of new underground waterline and associated material, approximately three miles of ancillary road for the Contractor during construction to access the route on previously disturbed or existing ranch road areas within the Permit Area, and the site where the relocated N-14 water tank will be sited. This water tank is sited to allow the water to gravity flow to the Mine Facilities in both directions. During a power loss or during well or pipeline maintenance, this allows this water tank to gravity feed the remaining portions of the water system.

NOTE: The WW#6 waterline construction roads are within existing roads or mining disturbance areas. Only minor disturbance within the bonded area and along the edge of the roads may be needed by the Contractor to allow safe passage of traffic and equipment. All construction and reclamation activities will be in accordance with the approved OSM Permit. Upon OSM approval, PWCC will provide $444,000 in bonding money to cover this permit revision. OSM holds excess bond money. Therefore, sufficient bond money exists for this project.

PEABODY WESTERN COAL COMPANY
KAYENTA MINE
OSM PERMIT: AZ-0001E
Proposed Water Well #6 to Kayenta Mine's Main Waterline & Water Tank Construction Project - Minor Permit Revision
BONDING COST ESTIMATE
DATE: May 20, 2013

TABLE	WW#6 Waterline Route AREA	PROJECT	TASK	EQUIPMENT	EQUIPMENT UNIT COST	HOURS	LABOR COST	QUANTITY	UNITS	HOURLY COST	TOTAL COST	UNIT COST
24-5-33e	Kayenta Ancillary Roads	Surfacing Removal	Surfacing Removal/Disposal	D11R Dozer	$319.91	9	$35.58	14,630	cy	$355.49	$3,199	$0.22
24-5-34e	Kayenta Ancillary Roads	Surface Ripping	Dozer Ripping	D11R Dozer - Ripper Equipped	$344.34	13	$35.58	43,889	cy	$379.92	$4,939	$0.11
24-5-35e	Kayenta Ancillary Roads	Grade Ripped Areas	Grading	D11R Dozer	$319.91	318	$35.58	29	acres	$355.49	$113,046	$3,898
24-5-36e	Kayenta Ancillary Roads	Topsoil Replacement	Haul and Place Topsoil	637G P-P Scraper	$250.64	563	$35.58	74,904	cy	$286.22	$161,142	$2.15
24-5-37e	Kayenta Ancillary Roads	Revegetation	Revegetation	Miscellaneous	-	-	-	29	acres	-	$59,892	$2,065.24
Total Road Direct Cost:											$342,218	
Total Indirect Costs with Tax & Inflation: (@29.5 percent):											$100,954	
Total Estimated Bonding Cost:											$443,172	
										Use:	$ 444,000	

NOTE: WW#6 WATERLINE CONSTRUCTION ROAD ARE WITHIN EXISTING ROADS OR MINING DISTURBANCE AREAS.
ALL CONSTRUCTION AND RECLAMATION ACTIVITIES WILL BE IN ACCORDANCE WITH THE APPROVED OSM PERMIT.
UPON OSM APPROVAL, PWCC WILL PROVIDE $444,000 IN BONDING MONEY TO COVER THIS PERMIT REVISION.
OSM HOLDS EXCESS BOND MONEY. THEREFORE, SUFFICIENT BOND MONEY EXISTS FOR THIS PROJECT,

Table:	24-5-32
Mine Area:	Kayenta Ancillary Roads
Project:	Culvert Removal
Task:	Culvert Removal/Disposal
Equipment:	D11R Dozer

Earthmoving Activity:
Remove and dispose of culvert embankment material and culverts.

Characterization of Dozer Used (type, size. etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes

Description of Dozer Use

Average dozing distance (feet)	300
Hourly production (from chart)	1100
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82

Productivity Adjustment Factors

Operator Factor

Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no

Material Factor

Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	yes
Hard to drift; (.8)	no
Rock, ripped or blasted (.75)	no

Production Method/Blade Factor

Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes

Poor Visibility

(I.e., dust, rain, snow, fog, or darkness) (0.8)	no

Elevation Factor

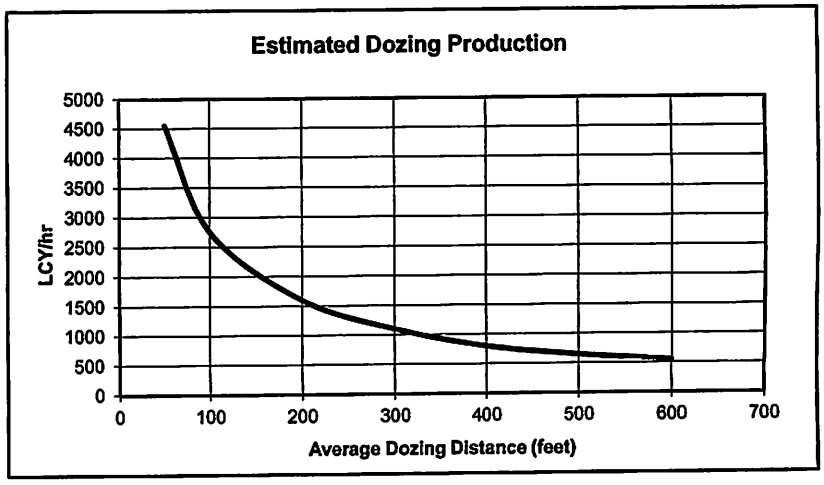
<7,500 feet (1.0)	yes

Quantity of Material to be Moved

Total (cy)

Culvert (ft)

Culvert Disposal Cost (at $0.29/cf) [ ]



Productivity Adjustment Factor = 0.75 (Operating Factor) x 1.0 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.62**

Net Hourly Production = 1,100 (Normal Hourly Production (see graph above)) x 0.62 (Productivity Adjustment Factor) = **676.5 cy/hr**

Hours Required = 0 (Total (cy) Volume to be Moved) / 676.5 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **0 Hours**

Note: Quantity of material and culvert are 60% of total for Kayenta portion of the cost.

References: Cat Handbook, Ed. 28

Table:	24-5-33e
Mine Area:	Kayenta Water Well #6 Project - Ancillary Roads
Project:	Surfacing Removal
Task:	Surfacing Removal/Disposal
Equipment:	D11R Dozer

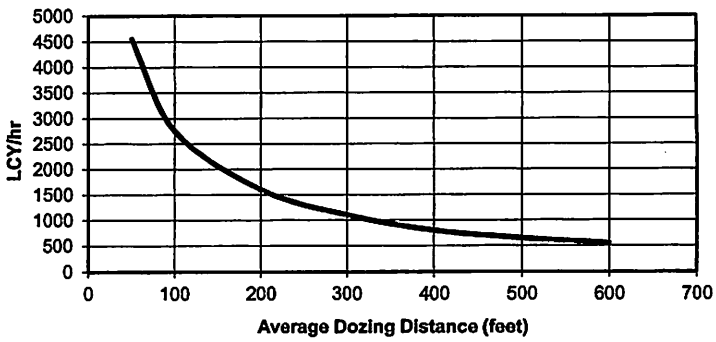
Earthmoving Activity:
Push one foot of gravel/scoria off the side of the road for burial

Characterization of Dozer Used (type, size, etc):
D11R, three-shank ripper, U-blade

Power shift transmission (1.0)	yes
Description of Dozer Use	
Average dozing distance (feet)	50
Hourly production (from chart)	4550
Grade (in percent)	0
Grade Correction	1
Material Unit Weight (lb/lcy)	2800
Density Correction	0.82
Productivity Adjustment Factors	
Operator Factor	
Is operator excellent (1)	no
Is operator average (.75)	yes
Is operator poor (.6)	no
Material Factor	
Loose stockpile (1.2)	no
Hard to cut; frozen -	
with tilt cylinder (.8)	no
without tilt cyliner (.7)	no
Normal material (1)	no
Hard to drift; (.8)	yes
Rock, ripped or blasted (.75)	no
Production Method/Blade Factor	
Slot dozing (1.2)	no
Side by side dozing (1.2)	no
Normal dozing (1.0)	yes
Poor Visibility	
(I.e., dust, rain, snow, fog, or darkness) (0.8)	no
Elevation Factor	
<7,500 feet (1.0)	yes
Quantity of Material to be Moved	
Length (ft)	15,800
Width (ft)	25
Total (cy)	14,630

References: Cat Handbook, Ed. 28

Estimated Dozing Production



Productivity Adjustment Factor = 0.75 (Operating Factor) x 0.8 (Material Factor) x 1.0 (Grade Factor) x 0.82 (Density Correction) x 1.00 (Production Method) x 1.00 (Visibility) x 1.00 (Elevation) x 1.00 (Direct Drive Trans) = **0.49**

Net Hourly Production = 4,550 (Normal Hourly Production (see graph above)) x 0.49 (Productivity Adjustment Factor) = **2238.6 cy/hr**

Hours Required = 14,630 (Total (cy) Volume to be Moved) / 2238.6 (Net Hourly Production) x 1.371 (Work Schedule Factor) = **9 Hours**

Table:	24-5-34e
Mine Area:	Kayenta Water Well #6 Project - Ancillary Roads
Project:	Surface Ripping
Task:	Dozer Ripping
Equipment:	D11R Dozer - Ripper Equipped

Earthmoving Activity
Rip 3' of subbase to aid in vegetation establishment.

Characterization of Dozer and Ripper Used:
D11R, three shank ripper, semi-u blade

Description of Ripping (ripping depth, cut spacing, cut length, and material to be ripped):

Rip depth (ft)	3
Cut spacing (ft/pass)	6.4
Cut length (ft)	300
Speed (ft/min)	120

Quantity of Material to be Ripped	
Length (ft)	15,800
Width (ft)	25
Total (cy)	43889

Cycle Time = 300 (Cut Length) / 120 (Speed Factor (fpm)) + 0.25 (Turn Time) = 2.8 min/pass

Passes per hour = 60 (min/hr) / 2.8 (Cycle Time) = 21.8 pass/hr

Volume cut per pass = 3.00 (Tool Penetration) x 6.4 (Cut Spacing) x 300 (Cut Length) / 27 (cf/cy) = **213 bank cy/pass**

Ripping Production = 213 (Volume cut per pass) x 21.8 (Passes per hour) = 4655 hours

Hours Required = 43,889 (Volume to be Ripped) / 4655 (Ripping Production) x 1.371 (Work Schedule Factor) = **13 hours**

Reference: Cat Handbook, Ed. 28

Table:	24-5-35e
Mine Area:	Kayenta Water Well #6 Project - Ancillary Roads
Project:	Grade Ripped Areas
Task:	Grading
Equipment:	D11R Dozer

Earthmoving Activity

Grade the cut and fills to blend into surrounding topography and to drain and bury road surface material a minimum of 3'.

Characterization of Dozer Used (type, size. etc)

D11R, three shank ripper, U-blade

Production Rate (acres/shift)	1.0

Acres to be Graded

Length (ft)	15,800
Width (ft)	80
Total (acres)	29

Hours Required	=	29 Area to be Graded (acres)	/	0.125 Net Hourly Production (acres/hr)	x	1.371 Work Schedule Factor	=	318	Hours

Note: Production rate based on PWCC experience.

Table:	24-5-36e
Mine Area:	Kayenta Water Well #6 Project - Ancillary Roads
Project:	Topsoil Replacement
Task:	Haul and Place Topsoil
Equipment:	637E P-P Scraper

Earthmoving Activity
Haul and place 1.6' topsoil to cover graded area.

Characterization of Scraper Used (type, capacity, etc)
637E P-P Scraper - capacity = 31 cy

Description of Scraper Route (haul distance, % grade, average rolling resistance for each segment, etc.)

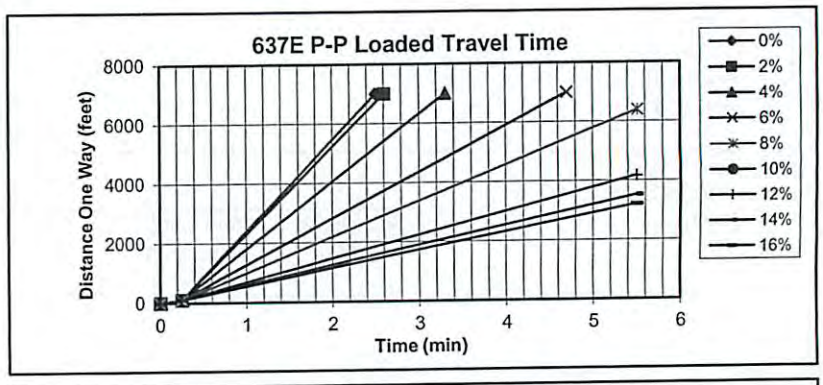
Loaded Distance (ft)	3000
Loaded Grade (%)	0
Loaded Effective Grade (%)	5
Empty Distance (ft)	3000
Empty Grade (%)	0
Empty Effective Grade (%)	5

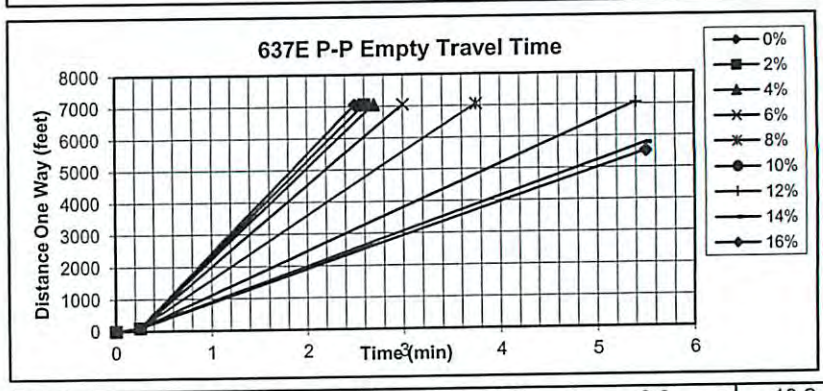
Production Times

Typical Load Time for 657E P-P	2.0
Maneuver and spread or dump	1.2
Loaded Travel Time (from chart)	4.0
Empty Travel Time (from chart)	3.0

Quantity of Material to be Moved

Length (ft)	15,800
Width (ft)	80
Total (cy)	74,904





Cycle Time = 2.0 (Load Time) + 4.0 (Loaded Trip Time) + 1.2 (Maneuver and Spread Time) + 3.0 (Empty Trip Time) = 10.2 min

Cycles/Hour = 60 (min/hr) / 10.2 (Cycle Time) = 6 cycles/hr

Hourly Production = 31 (Adjusted Load (cy)) x 5.88 (Cycles/Hour) = **182 cy/hr**

Hours Required = 74,904 (Volume) / 182 (Hourly Production) x 1.371 (Work Schedule Factor) = **563 hrs**

Reference: Cat Handbook, Ed. 28

Table:	24-5-37e
Mine Area:	Kayenta Water Well #6 Project - Ancillary Roads
Project:	Revegetation
Task:	Revegetation
Equipment:	Miscellaneous

Revegetation Area Description
Kayenta Mine ancillary roads

Revegetation Area

Area (acre)	29
Seeding, fertilizing, mulching and fencing costs (per acre)	$1,172.50
Tree and Shrub Costs (per acre)	$375.00
Reseeding Cost (per acre)	$1,033.00
Percent Failure	50%

Revegetation Costs = 29 Acres * ($1,172.50 $/Acre for seeding, fertilizing, mulching and fencing + $375.00 $/Acre for planting trees and shrubs) = **$44,904**

Reseeding Costs = 29 Acres * 0.5 Failure * $1,033.00 Reseeding Cost = **$14,988**

References: Table 24-1-3