

TOWER RESOURCES, INC.
CENTENNIAL PROJECT

RESPONSE TO REVIEW OF
APPARENT COMPLETENESS REVIEW RESPONSE

AUGUST 25, 1981

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DIVISION OF OIL, GAS AND MINING

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DIVISION OF
OIL, GAS & MINING

TOWER RESOURCES, INC

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August 19, 1981

Mr. John Nadolski
Hydrologist
U.S. Department of Interior
Office of Surface Mining
Brooks Tower
1020 15th Street
Denver, Colorado 80202

Dear Mr. Nadolski,

Enclosed for your review are three (3) copies of Tower Resources' response to the Apparent Completeness Review which was discussed at a meeting held August 13, 1981 in the State D.O.G.M. office.

The information included in this submission will be more than adequate to answer all the questions raised in the Apparent Completeness Review.

Seven (7) copies of this submittal have been directed to your office in Denver. At your suggestion, two of the seven copies were taken to the U.S.G.S. in Salt Lake City and two were taken to the B.L.M. in Price.

We greatly appreciate O.S.M.'s cooperation and expeditious review of the submissions.

If there are any questions at all, please call this office.

Thank you.

Sincerely,



Michael W. Glasson
Senior Geologist

MWG/ac

Enclosures

cc: File

RESPONSE TO REVIEW OF ACR RESPONSE
TOWER RESOURCES, INC.
CENTENNIAL PROJECT
MINING AND RECLAMATION PLAN

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RESPONSE TO REVIEW OF ACR RESPONSE
TOWER RESOURCES, INC.
CENTENNIAL PROJECT
MINING AND RECLAMATION PLAN

UMC 782.13(g). As stated previously, the operation will not adversely affect any existing contiguous leased mineral rights. There are no existing contiguous leased mineral rights other than coal.

UMC 782.16(a). Tower is currently awaiting a policy decision by the Division as to what action, if any, will be necessary concerning County Road 299. The right-of-way extends fifty feet on either side of the center line (refer to letter from County, dated 8-20-81, Appendix M).

UMC 782.19. Applications for permits and approvals have been filed with the appropriate agencies for the proposed Apex (Lower Sunnyside) and Aberdeen Mines as follows:

- 1) Mining and Reclamation Plan (Centennial Project)
 - State of Utah, Division of Oil, Gas and Mining
 - U.S. Department of the Interior, Office of Surface Mining
- 2) Required M.S.H.A. Permits
 - Mine Safety and Health Administration (M.S.H.A.)
- 3) N.P.D.E.S. Permits
 - Environmental Protection Agency
- 4) Septic and Waste Disposal Plans
 - State of Utah, Department of Health
- 5) B.L.M. Right-of-Way for Construction of Proposed Surface Facilities
(This application will not be processed nor final approval granted until early 1982; however, a letter from B.L.M. stating that approval will be given is to be submitted).

Copies of these letters of application are included as Appendix O.

UMC 783.15. The exact intraformational location of spring S18-1 is near the interface between a unit within the Mancos shale and the impermeable shale below, 600 feet below the lowest coal seam (Aberdeen Seam). Spring S34-1 is located 1,600 feet above the highest coal seam (Lower Sunnyside Seam).

UMC 783.16. The required water monitoring data has been sent to the Division (c/o Wayne Hedberg) by Vaughn Hansen Associates. This data includes lab reports and summaries. Additional data will be submitted by Vaughn Hansen as collected. The watershed shows right fork drainage only due to the fact that surface facilities will be placed in the right fork only. (See Plate 12)

UMC 817.21-25. The required soil analysis data will be submitted to the Division the first week of September, 1981. Analysis data was obtained from an Order 2 soil survey (as defined by the National Cooperative Soil Survey) performed by Earth Environmental Consultants of Albuquerque, New Mexico. Presently E.E.C. is awaiting the results of detailed laboratory analysis before submitting a final report. This report will include soil classification according to Soil Taxonomy (Agricultural Handbook 436) to the family level. Detailed pedon descriptions were taken and each major horizon to each major taxonomic unit was sampled and submitted to a testing lab for chemical and textural analysis. Also lab data will be provided for the soil presently stockpiled at the existing facilities. A soil map will be submitted showing the distribution and extent of the soil map units and location of sample sites. The soils will also be rated for topsoil suitability.

UMC 783.27. A letter of negative determination for prime farmland from the Soil Conservation Service has been previously submitted to the Division.

UMC 784.11. Columnization of the three coal seams will be as indicated on Plates V-R, VI-R and VII-R (Addendum B). As has been discussed in earlier submissions, due to the nature of the formation mining in one seam will not adversely affect another. This is because there is an average of 200 feet of interburden between seams which contain massive sandstone units. Tower Resources has no intention of using any mining practice which could possibly have an adverse effect on our coal resource. This obviously would not be in the best interest of the company.

Our mining plans have been carefully reviewed and approved by the U.S. Geological Survey. Plans for any modification of these mine plans will be approved by the Survey.

UMC 784.12. Plate 1 shows a schematic of the location of the new bathhouse and associated drainfield. This new bathhouse and drainfield is necessary due to the expansion of mining and personal requirements. It should be noted that this drainfield will be built according to a registered professional engineer's design based on Health Department requirements and will consist of 15 separate ditches 100 feet long and 3 feet wide (refer to Appendix O for letter of application). The application naturally includes detailed specifications regarding location of sewage line and cleanouts.

UMC 784.16. Permission has been obtained from Carbon County authorities to use the county landfill for disposal of any sediment removed from the ponds. A letter documenting this approval is included as Appendix M.

UMC 784.18. Regarding the letter from the Board of Carbon County Commissioners of January 16, 1978, concerning County Road 299: Deadman refers to the terminus of said public road. Included as Appendix M is a recent letter from Carbon County granting Tower Resources permission "to use Carbon County Road 299 in conjunction with its mining activity and coal hauling" with "no restrictions as to the volume of traffic or the upgrading of the road from pavement through the minesite", and that the county is fully aware of operations being within 100 feet of said road.

UMC 784.19. Rock waste which is developed will consist of roof rock shot down in the construction of ventilation overcasts. This rock will be sloped away from the outside of the overcast which will reduce friction on the air current as it passes over the overcast. This will increase the efficiency of the ventilation around overcasts. Also, since overcasts are used sparingly, the placing of the rock in such a manner could not possibly sterilize any coal reserve.

It should be emphasized that Tower's mine has no faults nor are any anticipated. Also, Tower's mine has excellent roof conditions, therefore, waste rock is not generated from these sources.

In the very unlikely event that a rock problem such as a fault is encountered, Tower will consult with the U.S. Geological Survey to determine the best method for underground storage of the waste. It would most likely be stored in every other cross-cut to maintain access to the pillars for final extraction. Therefore, none of the reserve will be sterilized.

It should be noted that M.S.H.A. has approved of underground rock storage so long as the coal present with the rock is below a certain percentage. The rock waste discussed here contains negligible coal.

UMC 784.20. Plate 15 depicts Tower's plan for Subsidence Monitoring. As can be seen there are 12 stations which will eventually be set up. As mining progresses to the extremes of the property, each station will be established prior to the removal of any pillars near a particular station. These stations will be set up for easy monitoring from an established survey point and it will be possible to detect both vertical and horizontal movement in the rebar. A grid of rebar will be placed above areas to be pillared (refer to description in ACR response, page 9).

A sufficient network of stations has been set up to cover the angle of draw over and outside the entire lease area.

UMC 784.23. Cross-sections, maps and plans for the two proposed portal sites as well as for roads are included as the following Plates:

- Plate 1 "Surface Facilities - Apex (Lower Sunnyside) Mine"
- Plate 2 "Surface Facilities - Aberdeen Mine"
-conceptual layout of surface facilities

- Plate 3 "Topography - Apex Mine"
Plate 4 "Topography - Aberdeen Mine"
-baseline surveys for cross sections
- Plate 5 "Cross Sections - Apex Mine"
Plate 6 "Cross Sections - Aberdeen Mine"
-cross sections (on 50' intervals) through proposed facilities including cuts and fills as well as cross sections through the existing undistributed area
- Plate 7 "Plan and Profile - Pond C"
Plate 8 "Plan and Profile - Pond D"
Plate 9 "Plan and Profile - Pond E"
-complete plan and details including cross sections for each pond, certified by a registered professional engineer
- Plate 12 "Watershed and Culvert Sizing Map"
-complete watershed in area of disturbance, minimum culvert sizes and sizes to be used.
- Plate 13 "Disturbed Area Run-off"
-run-off on disturbed area indicating run-off from specific areas into specific ponds

Also refer to the narrative, "Explanation of Engineering Design - Surface Facilities, Centennial Project" included as Appendix N, and the "Sedimentation and Drainage Control Plan - Centennial Project" included as Appendix P. This engineering design data has been certified by a registered professional engineer.

UMC 784.24. Design specifications for roads within the mine permit area with respect to width, gradient, cut and fill embankments, culverts, drainage ditches and structures are indicated on Plates 1, 2, 3, 4, 5, 6 and 12 and discussed in "Explanation of Engineering Design - Surface Facilities, Centennial Project" (Appendix N). Also refer to Appendix P.

UMC 785.21. At such time as Tower deems the rail loadout at Wellington practicable and if the Division deems necessary, information will be provided as a separate volume for approval by the Division before any construction begins.

UMC 783.19. A final revegetation report prepared by Earth Environmental Consultants of Albuquerque, New Mexico will be submitted the first week in September, 1981. This report will identify and map the ecological plant communities in the area of proposed disturbances. The plant communities will be described in regard to cover, production, diversity and density and will be indicative of the vegetation existing within the study area. A vegetative map will be included showing the distribution and extent of the individual communities and a species list

will be provided for each community. A discussion relating areas of existing facilities to those included in the study area will also be included. Those specific approved and requested sampling methods, discussed during the July 15 meeting between the Division, Tower and E.E.C., were used to sample vegetation. These included randomization of all samples using line-intercept transects and use of the point-quarter method for determining density. The number of samples needed for each parameter sampled was calculated with the following formula using a double tailed t value:

$$n = \frac{(t \text{ value})^2 S^2}{[(\bar{x}) (.1)]^2}$$

UMC 784.13(b)(5)(ii). The following seed mixtures are recommended by the State of Utah, Division of Wildlife Resources to benefit wildlife through enhancement of disturbed habitats. The seed mixtures used for final reclamation will be based upon these Division of Wildlife Resources recommendations. Table 1 indicates the recommended seed mixtures for enhancement of pinyon-juniper habitats and Table 2 indicates recommended seed mixtures for enhancement of riparian habitats. Tower Resources will, to the best of their ability, acquire the following, or similar equivalent mixtures for final reclamation.

Recommended seed mixtures that will benefit wildlife through enhancement of moderately disturbed piñon-juniper habitats of the submontane ecological association. Also included are acceptable alternatives if seed for a plant species is not available. Alternatives marked with an asterisk (*) are for use in special treatments such as erosion control or roadbank stabilization. If disturbance was severe and total reclamation is needed, increase amount of seed by a factor of 2 to 3 times. Information assembled from Plummer, A.P., D.R. Christensen and S.B. Mosen, 1968. Restoring big game range in Utah. Utah Division of Fish and Game (now Utah Division of Wildlife Resources) Publication No. 68-3. 183 pp. Also from personal contacts with A. Perry Plummer.

Species Mixture	Lower elevation (Precipitation less than 12 in.)		Upper elevation (Precipitation 12 in. or more)		Alternate Species
	Broadcast	Drilled	Broadcast	Drilled	
Grasses:					Grasses:
Fairway crested wheatgrass	4	2	3	1-1/2	Bearded or beardless blue-bunch wheatgrass
Standard crested wheatgrass	1	1	1	1/2	Mountain rye
Bluestem wheatgrass	1	1/2	0	0	Orchardgrass
Intermediate wheatgrass	1	1/2	1	1	Sheep fescue
Pubescent wheatgrass	1	1/2	1	1	Bulbous barley
Russian wildrye	1	1/2	1	1	Siberian wheat grass
Smooth brome (southern strain)	0	0	1	1/2	Bulbous bluegrass
				1	Great Basin wildrye
					Sulcata sheep fescue
					Hard fescue
					Indian ricegrass
					Tall wheatgr.
					Meadow brome*
					Winter rye*
Forbs:					Forbs:
Alfalfa (Rambler, Nomad, Travois, or Ladak - equal amount of each	1	1	2	1	Lewis' flax
Chickpea milkvetch	0	0	1	1/2	Nevada showy goldeneye
Utah sweetvetch	1	1/2	1	1/2	Nuttall lomatium
Yellow sweetclover	1	1/2	1	1/2	Pacific aster
Arrowleaf balsamroot	1	1/2	1	1/2	Showy goldeneye
Small burnet	1	1	1	1/2	Eaton penstemon*
				1	Gooseberryleaf globe- mallow*
					Louisiana sagebrush*
					Nevada lupine*
					Bouncing-bet*
					Bramble vetch*
					German iris*
					Cutleaf balsam
					Sicklepod m.
					Oneflower
					helianth.
					Palmer peast.
					Parry golden
					Silky lupine*
					Small aster*
					Tarragon sage
					Thickleaf per
					Toadflax pen
					Vegetable-oye
					salsify*
					Wasatch pen

TABLE 1 (con't)

Species Mixture	Lower elevation (Precipitation less than 12 in.)		Upper elevation (Precipitation 12 in. or more)		Alternate Species
	Broadcast	Drilled	Broadcast	Drilled	
Shrubs:					
Big sagebrush	1	1/2	1	1/2	Shrubs:
Black sagebrush	1	1/2	1	1/2	Nevada ephedra
Rubber rabbitbrush	1	1/2	1	1/2	Littleleaf mountain-
Winterfat	1	1/2	1	1/2	mahogany
Fourwing saltbush	1	1	1	1	Squaw-apple
Totals:	19	11-1/2	20	12-1/2	Tatarian honeysuckle
					Apache-plum*
					Arizona cypress*
					Black common chokecherry*
					Blueberry elder*
					Common lilac*
					Desert peachbrush*
					Fringed sagebrush*
					Gardner saltbush*
					Longflower sage
					Martin ceanoth
					Mountain snow
					Peking cotone
					Rocky Mountain
					smooth sumac
					Roundleaf buff
					berry
					Russian-olive*
					Siberian peash
					Skunk bush su
					Spineless hops
					Spiny hopsage*
					Wyeth eriogon
Shrubs for pits, major disturb-					
ance areas, and tractor cleat					
marks by dribblers:					
Antelope bitterbrush	2	1	3	2	
Cliffrose or desert bitterbrush	1	1/2	0	0	
Fourwing saltbush	2	2	1-1/2	1	
Utah serviceberry	1	1/2	0	0	
Green ephedra	1	1/2	1	1	
Birchleaf mountain-mahogany	1	1/2	1-1/2	1	
Curleaf mountain-mahogany	1	1/2	1-1/2	1	
Woods rose	0	0	1	1	
Golden currant	0	0	1/2	1/4	
Totals:	9	5-1/2	10	7-1/4	

TABLE 2

Recommended seed mixtures and seedling or larger sized transplants that will benefit wildlife through enhancement of moderately disturbed riparian habitats characterized as upland stream side vegetation in the submontane ecological association. Also included are acceptable alternatives if seed for a plant species is not available.

Species	North exposures and shady areas		Sunny exposures (south, west, east)		Mixture for tall mountain brush type, shaded sites.
	Broadcast	Drilled	Broadcast	Drilled	
-Pounds per acre-					
Grasses: (seed mixture, transplants are not practicable)			Grasses: (seed mixture, transplants not practicable)		
Fairway crested wheatgrass	2	1	2	1	Smooth brome (Southern strain) 5
Smooth brome (Southern Strains)	4	2	2	1	Fairway crested wheatgrass 1
Intermediate wheatgrass	4	2	2	1	Intermediate wheatgrass 3
Pubescent wheatgrass	0	0	2	1	Orchardgrass (Utah grown) 2
Bluestem wheatgrass	0	0	1	1/2	Tall oatgrass 1
Orchardgrass	1	1/2	1	1/2	Mountain brome 1
Russian wildrye	0	0	1	1/2	
Tall oatgrass	1	1/2	0	0	
Forbs: (seed mixture, transplants are not practicable)			Forbs: (seed mixture, transplants not practicable)		
Alfalfa (Nomad, Rambler, Travois, Ladak-equal parts)	2	1	2	1	Alfalfa (creeping strains or Ladak) 1
Chickpea milkvetch	0	0	1	1/2	Pacific aster 1/4
Utah Sweetvetch	0	0	1	1/2	Oneflower helianthella 1/2
Yellow sweetclove	0	0	1	1/2	Snowy goldeneye 1/4
Arrowleaf balsamroot	1	1/2	1	1/2	
Pacific aster	1	1/2	1	1/2	
Shrubs: (seed mixture, transplants not usually successful)					
Fourwing saltbrush	0	0	1	1/2	
Rubber Rabbitbrush	1/2	1/4	1/2	1/4	
Douglas Rabbitbrush	1/2	1/4	1/2	1/4	

TABLE 2 (con't)

Species	Any exposure	Density per acre
Shrubs and Trees: (seedling or larger sized transplants)		
Big sagebrush		A mixture of all trees and shrubs so that one plant will be planted in every 50 square feet of disturbed area. This equals 1,000 plants per acre.
Antelope bitterbrush		
Golden currant		
Birchleaf mountain mahogany		
Curlleaf mountain mahogany		
Cliffrose		
Green ephedra		
Woods rose		
Saskatoon serviceberry		
Narrow leaf cottonwood		
Bigtooth maple		
Rocky mountain maple		
Willow (use shoots or entire clumps from local area)		
Dogwood		
Birch		
Alder		

TABLE 2 (con't)

 Alternate Species for Upland Stream side Vegetation In the transition life zone

Grasses:

Bearded bluebunch wheatgrass	Great Basin wildrye	Sand dropseed*
Beardless bluebunch wheatgrass	Green needlegrass*	Siberian wheatgrass
Big bluegrass *	Hard sheep fescue	Slender wheatgrass
Bluestem wheatgrass	Indian ricegrass*	Standard crested wheatgrass
Bottlebrush squirreltail *	Kentucky bluegrass*	Sulcata sheep fescue
Bulbous barley*	Meadow brome*	Tall wheatgrass *
Bulbous bluegrass*	Mountain rye *	Winter rye *

Forbs:

American vetch*	Louisiana sagebrush*	Small burnet
Bouncing bet	Low penstemon*	Stream globemallow*
Bramble vetch*	Nevada showy goldeneye	Sweetanise*
Common cowparsnip*	Nuttall lomatium	Tall milkvetch*
Cutleaf balsamroot	Palmer penstemon*	Tarragon sagebrush*
Eaton penstemon*	Parry goldenrod*	Thickleaf penstemon*
German iris*	Sicklepod milkvetch	Toadflax penstemon*
Gooseberryleaf globemallow*	Sidehill penstemon*	Wasatch penstemon*
Lewis (or blue) flax	Silky lupine*	Cushion eriogonum*

Shrubs:

Apache-plume*	Desert bitterbrush*	Nevada ephedra*
Arizona cypress*	Desert peachbrush*	New Mexican forestiera*
Black common chokecherry*	Dwarf rabbitbrush*	Oldman wormwood (stem cut-
Black sagebrush	Fringed sagebrush*	tings)*
Blueberry elder*	Gambel oak*	Parry rabbitbrush*
Boxelder*	Gardner saltbush*	Peking cotoneaster*
Common bladdersenna*	Longflower snowberry*	Purpleosier willow*
Common lilac*	Martin ceanothus*	Redberry elder*
Creeping barberry*	Mountain snowberry*	Rocky Mountain sumac*

TABLE 2 (con't)

Table Continued

 Alternate Species for Grandstream side Vegetation in the transition life zone

Shrubs: (continued)

Rocky Mountain juniper*

Roundleaf buffaloberry*

Russian-olive*

Siberian peashrub*

Silver buffaloberry*

Skunk bush sumac*

Squaw apple*

Tatarian honeysuckle*

Utah serviceberry

Western virginsbower*

Winterfat*

Wyeth eriogonum

Yellowbrush

UMC 817.97(a). A wildlife map indicating use of the mine plan area is included as Plate 14. It should be noted that the entire area shown on Plate 14 is located within area considered high priority winter and summer range for mule deer, and of substantial value for elk, ruffed grouse, blue grouse, snowshoe-hare and mourning dove. There are no traditional migration routes over the mine plan area. Plate 14 was drawn based on information and maps provided by the D.W.R. A letter from the Division of Wildlife Resources is included as Appendix O stating that the existing transmission line is raptor proof and that the poles are, in fact, beneficial for raptors. Transmission lines to proposed facilities will be constructed according to the same specifications and pole design and will be safe for raptors.

UMC 784.12. Design of existing embankments, cut slopes, location of road embankments, road grades, etc., is indicated on Plates 1, 2, 10, 12 and 13. Cross-sections are included as Plate 11. The "as built" pond specifications were submitted June 5, 1981 (Addendum B, Plate XX).

UMC 784.12(a)(3). Construction began on existing structures May, 1980 and was completed in February, 1981; some minor modifications to existing structures are now being approved.

UMC 784.13. All existing and proposed disturbed areas for all mine facilities are clearly defined on Plates 1, 2, 12 and 13.

Cross-sections and final reclamation contours are indicated on Plates 10 and 11. Temporary contemporaneous reclamation and seeding will be done following completion of construction in a season that gives promise of optimum conditions for establishment of vegetation. The recommended season for most species is late fall. Therefore, if construction proceeds according to schedule, temporary contemporaneous reclamation will be completed at the Apex (Lower Sunnyside) Mine by the end of 1981 and at the Aberdeen Mine by the end of 1982. Final reclamation will begin upon cessation of mining activities and removal of surface structures. As the anticipated life of the project is approximately 35 years, final reclamation is anticipated to begin sometime in 2016.

Areas of post construction contemporaneous reclamation consisting of approximately 5.2 acres are indicated on Plates 1 and 2. Area for final reclamation, approximately 24.25 acres, are indicated on Plate 10.

Oil and grease will be collected at the minesite in barrels and disposed of at the Carbon County landfill. Included as Appendix M is a letter from Carbon County granting Tower permission to dispose of oil and grease at the county landfill. The barrels in which oil and grease is collected at the minesite will be stored in an area covered by Tower's S.S.C.P. plan.

UMC 784.16. Upon cessation of mining activities or when no longer needed, each temporary diversion, excepting sediment ponds, will be removed. Any structures which cannot be re-used such as culverts, unrecoverable pipe, cinder blocks, steel and wood, will be disposed of at the county landfill. A letter from Carbon County granting Tower permission to dispose of such material is included as Appendix M. All affected land will be backfilled and graded to the approximate original contour. All fill will be transported, backfilled, compacted to ensure stability and graded to eliminate highwalls and depressions within reasonable limits (refer to Plate 10). Backfilled material will be placed to support post-mining land use. Final graded slopes will not exceed in grade the approximate premining slopes or any lesser slopes approved by the regulatory authority. Slopes will not exceed the angle of repose with the exception of ledgerrock highwalls. All final grading and placement will be done along the contour or in a manner which minimizes erosion or instability, or slippage of topsoil.

Topsoil will be redistributed in a manner that achieves an approximate uniform, stable thickness, consistent with postmining land use, slopes and surface drainage systems; and that prevents excess compaction of the topsoil, and protects the topsoil from wind and water erosion before and after revegetation. Any necessary nutrients and soil amendments will be added to the redistributed topsoil.

Re-seeding and planting will take place during the first season where optimum conditions exist for re-establishment of vegetation. Suitable mulch will be used to control erosion, promote germination of seeds and increase moisture retention of the soil. The specific seeding mixes used will be based on the recommendations of the D.W.R. (Tables 1 and 2). Revegetation will be monitored to determine success. Areas which fail to support sufficient growth to stabilize conditions will be tested and reseeded until a proper cover is established.

Once the disturbed areas have been restored, vegetation established and any drainage entering the sediment ponds has met applicable State and Federal water quality requirements, the ponds will be removed. The affected land will be reclaimed and revegetated in the same manner described above.

Pond, diversion and culvert designs for the proposed disturbed areas are indicated on Plates 1, 2, 3, 4, 5, 6, 7, 8, 9, 12 and 13 and discussed in the "Explanation of Engineering Design - Surface Facilities, Centennial Project" (Appendix N), and "Sedimentation and Drainage Control Plan - Centennial Project (Appendix P).

211 Cross Reference Index. The following is a cross reference index of the 211 regulations as requested by the U.S.G.S. The submissions indexed include Volume I, Volume II, Addendum A, Addendum B and the Roof Control and Ventilation Volume.

	UMC	Section*	Page
(1) 211.10 (c)(1) Names, addresses, and telephone numbers of persons responsible for operations under the plan to whom notices and orders are to be delivered, and the names and addresses of surface owners of record, and owners of record of subsurface minerals, if other than the United States.	782.13 (a)	2.2	Vol. I: pp. 7-8, 11-12 Vol. II: Plates III, IV Addendum B: pp. 1-2
211.10 (c)(2) A description of geologic conditions, with maps and tables where appropriate, within the area where mining is to be conducted and including any Logical Mining Unit. Such description shall include, as a minimum, potential geologic hazards; and a description of the structural features of the coal and overlying strata, including faults, cleats, joints and fractures and any other information which would affect the orientation of the mine or production methods.	783.14	3.3 6.0	Vol. I: pp. 49-63 Vol II: Plates II, XV, XVI, XVII, XVIII Addendum A: Part II, Laboratory Analysis Addendum B: p. 3 Plate XXII
211.10 (c)(6)(i) The nature and extent of the coal deposit in terms of Btu content, ash, water, sulphur, volatile matter and carbon content, and any other available information that may affect blending or combustion and including estimated recoverable reserves. The recoverable reserves shall be reported for all coal seams of mineable thickness, considering the type of mining and the value of the coal. (This information must conform with the requirements of General Mining Order No 1.)	783.25 (c), (d)	3.3.1 6.5.5.2	Vol. I: pp. 4, 25, 33, 38, Exhibit IV-B
211.10 (c)(6)(ii) The method of mining, including mining sequence and proposed production rate; the plan for any lease issued or readjusted after August 4, 1976, must provide for the mining of all the reserves of the logical mining unit of which the lease is a part in a period of not more than forty years; that period shall begin on the date of approval of the first mining plan for that logical mining unit.	784.11 (a)	3.3.1.3	Vol. I: pp. 24, 25, 32-40 Addendum B: Plates V-R, VI-R, VII-R Roof Control & Ventilation Submittal
The plan must include planned sequence of mining by year for the first 5 years and by number in 5-year increments for remainder of mine life.	783.12 (a)	3.3.1.4 3.3.7 & 3.3.8	Addendum B: Plates V-R, VI-R, VII-R

*Suggested sections listed in Utah DOGM "Permit Application Guidelines"

	<u>UMC</u>	<u>Section</u>	<u>Page</u>
211.10 (c)(6)(iv) The engineering techniques proposed to be used in mining. The plan shall describe the method of mining and present justifications for the method selected. The selected mining system shall conform to sound mining practices and be based on current technology and economics.	784.11 (a)	3.3.1.3	Vol. I: pp. 24-40 Addendum B: pp. 6, 9 Plates V-R, VI-R, VII-R
211.10 (c)(6)(v) A list of all major equipment.	784.11 (a)	3.3.4	Vol. I: pp. 37, 38-39
211.10 (c)(6)(vii) The method of operation and measures by which the operator plans to comply with the obligations and requirements set forth in 211.4 and 211.40 of this Part and any special terms and conditions of the lease, permit, or license. (This can be by a narrative statement and must include only those items related to resource recovery.)	784.13 (a)(2)	3.3.3	Vol. I: pp. 37, 38, 42-45
211.10 (c)(6)(viii) The anticipated starting and termination dates of each phase of the mining operation and number of acres of land to be affected.	782.17 (a) 784.13 (b)(1)	3.36	Vol. I: pp. 25, 26, 34, 37, 40 Addendum B: pp. 2, 6 Plates V-R, VI-R, VII-R
211.10 (c)(6)(x) The measures for ensuring the maximum practicable recovery of the mineral resource. (Sufficient data should be submitted to substantiate the anticipated recovery factor of the resource for the coal reserve base. Data includes sufficient information in the form of narrative, cross-sections, coal thickness isopachs, overburden isopachs and quality and quantity data (Btu content, ash, moisture, sulfur, volatile matter, and fixed carbon and any other available information that may affect blending or combustion) of all known potentially minable seams on the lands involved. The areal extent of mining of each seam to be mined should be delineated. This information must conform with the requirements of General Mining Order No. 1.)	784.13 (b)(6)	3.3.3.1	Vol. I: pp. 25, 33, 34, 37, 38 Exhibit IV-B Addendum B: Plates V-R, VI-R, VII-R
211.10 (c)(6)(xi) The method of abandonment of coal mine operations including protection of unmined coal and other mineral resources.	784.13 (b)(8) 784.14 (d)		Vol. I: pp. 38, 46-48 Addendum B: pp. 6-7, 8, 10

	<u>UMC</u>	<u>Section</u>	<u>Page</u>
211.10(c)(6)(xii) Furnish complete logs of all exploration drill holes (both surface and underground) in Federal leases.	783.14 (a)(1) (ii)	6.5	Vol. I: pp. 56-59 Exhibit IV-A
211.10 (c)(6)(xiv) Plans for protecting oil, gas, and water wells as well as oil, gas, and underground water resources, when encountered.	783.25 (5)	3.3.2.1	Vol. I: pp. 12, 42, 72, 73 Addendum A: Part IV-Hydrologic Inventory
211.10 (c)(6)(xv) Any justification for not recovering any coal deposits that may be detrimentally affected in terms of future recovery by the coal development operations proposed.	784.13 (b)(6)	3.3.3.2	Not Applicable
(If no coal preparation plant is planned and if the operator plans not to mine coal beds or portions of coal beds because of high sulfur, high ash, or other chemical or physical properties, the operator shall submit a narrative and analyses of the rationale for not mining such beds or portions of seams.)			
211.10 (c)(7) Suitable topographic maps or aerial photographs showing:			
(i) Topographic and natural drainage features, roads and vehicular trails.	783.25 (k)		Vol II: Plates I, II, XI Addendum A: Part IV-Hydrologic Inventory
(ii) The name of the watershed and location of the surface stream or tributary into which mine waters will be discharged, if applicable.	783.16 (a) 783.25 (y)		Addendum B: Plate XIX Not Applicable
(iii) Cross sections and plan views of the land to be affected, including the actual area to be mined, showing elevation and location of drill holes and depicting the following information: the nature and depth of the various strata of overburden; the nature and thickness and extent of any coal, or if rider seams above the specific coal proposed to be mined; the nature of the strata beneath the coal to be mined for a vertical distance of at least 20 meters beneath the base of the coal seam; the location of the next known deeper coal seam below the deepest seam to be mined and representative characteristics thereof; the location of any	783.25 (a) 783.25 (j)		Vol. I: pp. 53, 54, 55 Vol. II: Plates V, VI, VII, XV, XVI, XVII, XVIII Addendum A: Part IV-Hydrologic Inventory Addendum B: pp. 11, Plates XIX, XXII

other mineral values encountered within the logical mining unit; hydrologic data and other information relevant to the mining plan; all mineral crop lines and the strike and dip of the coal to be mined within the area of land to be affected; location and extent of known surface and underground mine workings (active and abandoned), oil or gas wells, and water wells within 1/4 mile of the affected lands. (Hydrologic information is required only as relevant to resource recovery.)

Plan maps of the area to be mined on a suitable topographic base showing: lease boundaries and numbers, boundaries of nonfederal coal, LMU boundaries, and surface ownership boundaries.

(iv) Locations of surface structures and facilities, including loading facilities.

(v) For an underground mine, in addition, the planned mine layout, including location and dimensions of shafts, slopes, drifts, crosscuts, rooms, haulageways, aircourses, entries, and barrier pillars; show typical panel recovery, sequence of development and retreat.

Submit the Roof Control and Ventilation System and Methane and Dust Control Plans approved by Mine Safety and Health Administration (MSHA) as a part of the mining and reclamation plan.

Include a structural contour map of bed(s) to be mined.

If several seams are involved, include interburden isopach map(s) on 10-foot intervals.

Include an isopach map of overburden of surface mines on 20-foot intervals.

Include an isopach map of overlying strata over underground mines on 250-foot intervals.

Furnish a copy of any subsidence control plan required by 30 UMC 784.20.

UMC Section Page

4.3.1 Vol. I: pp. 3, 15
4.3.2 Vol. II: Plates I, II, III, IV

784.23 3.2.3 Vol. II: Plates I, II, VIII, VIII-A, IX, X, X-A
(b)(1) 3.2.4 Addendum B: Plate XIV

3.3.1.2 Vol. I: pp. 32-40
Roof Control & Ventilation Plan Vol

3.3.1.6 Vol. I: Exhibit II-A - Roof Control & Ventilation Plan Vol.

6.4.2 Vol. I: pp. 53-55
Vol. II: Plates XV, XVI, XVII, XVIII

6.5.5 Vol. I: pp. 53-55
Vol. II: Plates XV, XVI, XVII, XVIII

6.5.5 Not Applicable

6.5.5 Vol. I: pp. 53-55
Vol. II: Plates XV, XVI, XVII, XVIII

3.4.2 Vol. I: pp. 42-43
Addendum B: pp. 9

(vi) If auger mining is proposed, the location and diameter of auger holes, the depth to be drilled, and the estimated percentage of recovery. In determining whether or not to recommend approval of proposed auger mining, the Regional Director and mining supervisor shall take into account the percentage of recovery, which shall in general exceed 30 percent, and probable adverse effects upon water quality.

UMC
(SMC)
785.20

Section

Page

Not Applicable

If surface mining is proposed, include a general layout of the proposal including location and width of box cut(s), location of main haulroads, and location and width of coal fenders.

Not Applicable

211.10 (c)(8) Any requests for variances from the performance standards of 30 CFR Part 211.

Not Applicable

APPENDIX M



CARBON COUNTY
PRICE, UTAH 84501

August 19, 1981

Michael W. Glasson,
Senior Geologist
Tower Resources, Inc.
P. O. Box 1027
Price, Utah 84501

Re; Use of County Road 299 and County Landfill

Dear Mr. Glasson:

As per your request and at the request of the State of Utah, Division of Oil, Gas and Mining, this letter is to assure all those concerned that Carbon County is aware Tower Resources is using County Road 299 and that activities associated with mining are taking place on and within 100 feet of said road. Tower Resources, Inc. (AMCA Coal Leasing, Inc.) has permission to use Carbon County Road 299 in conjunction with its mining activity and coal hauling and there are no restrictions as to the volume of traffic or the upgrading of the road from the pavement through the minesite so long as approval is obtained prior to making any "radical" changes (refer to letter from Carbon County dated January 16, 1978, enclosed.)

This letter is also to grant permission for Tower Resources to use the Carbon County landfill to dispose of various items. These items will include excess vegetation removed during the construction of the new mine facilities in Deadman Canyon. Tower also has permission to dispose of used oil which is collected at the minesite from time to time in metal containers.

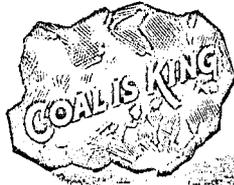
Carbon County understands that during periods of high runoff, the sediment collection structures located at the minesite will reach their maximum allowable volume. In such instances, Tower has permission to dispose of this sediment at the County Landfill. Carbon County also understands that under State and Federal regulations Tower is required to reclaim the minesite upon cessation of all mining activities. Reclamation will involve the removal of certain structures. Those structures which cannot be used may be disposed of at the County Landfill. These items may include culverts as well as unrecoverable pipes, cinder blocks, steel and wood, etc.

If there are any questions regarding these measures, please call this office.

Respectfully,

BOARD OF CARBON COUNTY COMMISSIONERS

Lee Semken,
Chairman



CARBON COUNTY

PRICE, UTAH

January 16, 1978

AMCA Coal Leasing, Inc.
P. O. Box 1027
Price, Utah 84501

Attn. Mr. Sam Quigley

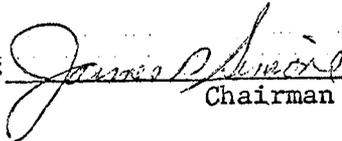
Gentlemen:

The Carbon County Board of Commissioners hereby grants AMCA Coal Leasing, Inc., permission to upgrade County Road No. 299 north to Dead Man.

If you plan on making any radical changes to the re-alignment of said County road, permission must be obtained from Carbon County. Before actual work is done on this road, we would appreciate your contacting our County Road Supervisor, Mr. Burke Johnstun. It is mutually agreed that there will be no restrictions on this road as far as traffic is concerned.

Sincerely yours,

BOARD OF CARBON COUNTY COMMISSIONERS

By: 

Chairman

JPS:JW



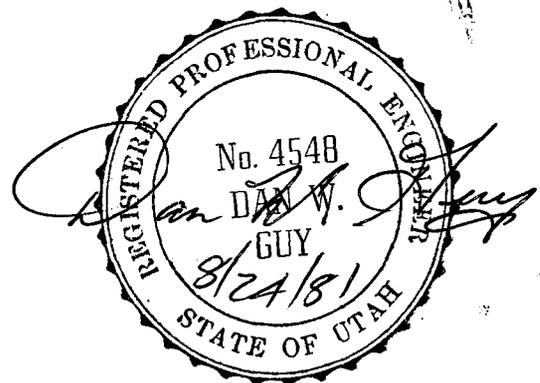
APPENDIX N

Explanation of Engineering Design
Centennial Project Surface Facilities

Plates 1 and 2 show the planned surface facilities for Tower Resources Centennial Project. The earthwork for this project will consist of construction of access roads, mine portal areas, material storage yards, coal storage pads, office yards and sedimentation control features such as ponds, dams, dikes, diversion ditches and culverts. To arrive at the final configuration of the planned facilities, cut and fill were balanced laterally at 50' intervals along a centerline running basically along the canyon bottom throughout the length of the project. The original topography of the canyon is shown on Plates 3 and 4. This topography was prepared by aerial photography and mapping done by Olympus Aerial Surveys of Salt Lake City in 1979. These plates show the centerline of the cross-sections as well as the cross-section intervals. (This same centerline is shown in red on the site plans, Plates 1 and 2, for easier reference). Point 0+00 on the centerline coincides with the south quarter corner of Section 7 T.13S., R.11E., S.L.B.M. Cross-sections were prepared off the topographic maps and many additional cross-sections in critical areas were made by field surveys conducted by Bruce Ware, licensed land surveyor. These cross-sections are shown on Plates 5 and 6. Note that cross-sections from 2+50 to 11+50 have been deleted from the plates because this is the area of the existing Pinnacle Mine and no further earthwork is planned in this area. However, cross-sections for this area are shown on the reclamation map (Plate 11) on 200' intervals. From the cross-sections, cuts and fills were balanced and the resulting site plan based thereon.

All sedimentation ponds, culverts, diversion structures and ditches have been designed using the formulas and criteria as listed in the enclosed addendum "Plan for Construction and Maintenance of Sedimentation Ponds".

To the best of my knowledge the surface facilities for the Centennial Project and all earthen structures included therein have been designed according to sound and accepted engineering procedures.



APPENDIX 0

TOWER RESOURCES, INC

P. O. BOX 1027
PRICE, UTAH 84501
(801) 637-5385

August 21, 1981

Mr. John W. Barton
District Manager
Mine Safety & Health Administration
P.O. Box 25367
Denver, Colorado 80225

Dear Mr. Barton:

Tower Resources, Inc., plans to open a new coal mine in Carbon County, Utah. In compliance with CFR 30 75.1721(b), the following information is submitted:

- 1) The mine will be called the Apex Mine and will be located in Deadman Canyon approximately 10 miles north of Price on the Airport Road. The mine will be located approximately 2000' up canyon from the existing Pinnacle Mine which is owned and operated by Tower Resources. The legal identity number for the new Apex Mine is 42-01750.
- 2) The mine will be operated by Tower Resources, Inc., of Madisonville, Kentucky. Samuel C. Quigley, Price, Utah, will be the General Manager of the mine.
- 3) Thomas R. May, Price, Utah, is the Safety Director and will be in charge of health and safety at the mine.
- 4) The Apex Mine will operate in the Lower Sunnyside Seam which varies in height from 4' to 7'.
- 5) Room and pillar mining will be done using continuous miners with shuttle car face haulage. Coal will be transported to the surface by conveyor belt.
- 6) The proposed roof control plan as required by 75.200-5 is included herein.
- 7) The proposed ventilation plan and methane and dust control plan is required by 75.316-1 and 75.316-2 is included herein.
- 8) The proposed plan for training and retraining as required by 75.166-1 is included herein.

Mr. John W. Barton
August 21, 1981
Page Two

- 9) The proposed plan for sealing abandon areas is required by 75.330-1 is included herein.
- 10) The proposed plan for searching miners for smoking materials as required by 75.1702 is included herein.
- 11) The proposed plan for emergency medical assistance and emergency communication as required by 75.1713-1 and 75.1713-2 is included herein.

If you have further questions, please call me.

Sincerely,



David E. Shaver
Chief Engineer

DES/ac

Enclosures

cc: File

TOWER RESOURCES, INC

P. O. BOX 1027
PRICE, UTAH 84501
(801) 637-5385

August 01, 1981

Mr. Roger Frenette
Chief, Water & Hazardous Wastes
Enforcement Branch
United States EPA
Region VIII
1860 Lincoln Street
Denver, Colorado 80295

Attn.: Ms. Cathy Ruggiero

Dear Mr. Frenette:

On November 13, 1980, Tower submitted to your office an area map depicting the location of our two permitted point discharges. This letter is to update the status of our point sources.

We have still not received our renewed NPDES permit (original expired 12-31-80) and we want you to be aware of new proposals.

As you are aware, Tower's two permitted sedimentation ponds are for the collection of precipitation runoff across our disturbed area only. These two permitted discharge points are shown on the enclosed area map as A and B.

Tower will be constructing new underground coal mining facilities this fall adjacent to the existing mine which will require three new sedimentation control structures and will represent three new point sources. We are hereby requesting a new NPDES permit to cover these new structures under the same limitations of our existing permit (UT 0023507). It should be noted that in the last year there has been no discharge from our existing permitted structures.

Attached is EPA form 7550-8 (1-73) and a map depicting the exact location of our existing (A and B) and our proposed (C, D and E) sedimentation ponds.

If you have any questions or require additional information, please do not hesitate to call.

Sincerely,



Michael W. Glasson
Senior Geologist

MWG/ac

Attachments

TOWER RESOURCES, INC

P. O. BOX 1027
PRICE, UTAH 84501
(801) 637-5385

August 21, 1981

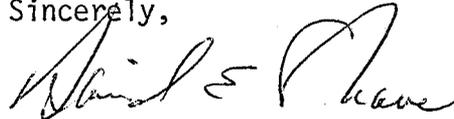
Mr. Don Ostler
Utah Bureau of Water Pollution Control
150 West North Temple
Salt Lake City, Utah 84103

Dear Mr. Ostler:

Tower Resources, Inc., plans to construct a central bathhouse for its' Centennial Project, a coal mining operation in Carbon County, Utah. Please find enclosed herein for your approval, complete engineering design for a wastewater disposal system for this bathhouse consisting of a septic tank and drain field. The system has been designed by Dan Guy, registered professional engineer in the State of Utah, using the criteria outlined in Part V, Small Underground Wastewater Disposal System.

Your expeditious review of this system will be greatly appreciated. If you have further questions or need additional information, please contact me.

Sincerely,



David E. Shaver
Chief Engineer

DES/ac

Enclosure

cc: File

TOWER RESOURCES, INC

P. O. BOX 1027
PRICE, UTAH 84501
(801) 637-5385

Rec'd. SR/PA AUG 20 1981

August 18, 1981

Mr. Leon Berggren
Area Manager
Price Area
Bureau of Land Management
P.O. Drawer AB
Price, Utah 84501

Attn.: Mr. Mark Mackiewicz

Dear Mr. Berggren:

Enclosed for your review is an application for a nonlinear Right-of-Way to be located adjacent to Tower's coal leases in Carbon County, Utah. This application has been made under 90 stat. 2743; 43 U.S.C. 1701 et. seq. (October 21, 1976). This proposed right-of-way is located in Township 13 South, Range 11 East, S.L.B.M. in section 18; E $\frac{1}{2}$ E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$, and can be described as follows:

Beginning at the South $\frac{1}{4}$ Corner
Section 7, T.13S., R.11E., S.L.B.M.
Thence West 330'
Thence South 1320'
Thence East 330'
Thence North 1320' to the point of beginning
containing 10 acres more or less.

In accordance with instructions in 6.(d) of the application, a \$250.00 filing fee has been enclosed on check #433.

This right-of-way will be very closely interrelated with both existing and future projects on both private and public lands as well as other rights of ways previously issued to Tower such as U-45965.

As you are aware, Tower Resources opened the Pinnacle Mine on the Zion's fee property under a permit issued by the State of Utah, Department of Natural Resources. The Pinnacle Mine is currently operating on fee coal. On January 19, 1981, Tower submitted a mining and reclamation plan under the permanent program for mining and associated surface facilities for two new mines adjacent to the Pinnacle Mine, on federal surface and coal. We find after completing the engineering plans

Mr. Leon Berggren
August 18, 1981
Page Two

that due to the location of our leases relative to the base of Deadman Canyon there is insufficient area to construct all the necessary structures at one of the two new mines, specifically the administrative office area and sediment control structures (sedimentation ponds). Please refer to the enclosed plans which show the boundaries of the requested right-of-way and the location of these ponds relative to our proposed surface facilities for the three mines. Also enclosed is a detailed plan and profile of the ponds themselves showing specific dimensions.

Regulations regarding the surface effects of underground coal mining are very specific relating to protection of the hydrologic balance and sediment control measures. The proposed structures shown on the 1":50' plate are necessary for the efficient protection of the prevailing hydrologic conditions and therefore are not only beneficial but necessary to assure no additional sediment loading takes place as a result of the mining installations to be installed in the fall of 1981.

As per requirements found in the Utah Mining Code Part 816 and Title 30 CFR Part 816, these ponds have been designed by a Registered Professional Engineer to insure the integrity and the safety of the structures.

As this right-of-way is part of our overall mining and reclamation plan, it would be necessary for this right-of-way to be granted before the State Board of Oil, Gas and Mining and the U.S. Department of Interior could grant approval for construction. However, because this right-of-way would not be granted in time to meet with Tower's schedule for construction, (we anticipate approval by October 1, 1981), we would request that your office write us a letter copied to Oil, Gas and Mining and O.S.M. stating that although the right-of-way cannot be issued in time, that you have reviewed the application and concur with the need for its issuance and that it will be issued. Mr. Mark Mackiewicz of your office indicated it might be completed by January of 1982. Such a letter would give D.O.G.M. and O.S.M. grounds to grant approval for this particular segment of our plan. Naturally, they will review the technical specifications of the structures before granting approval.

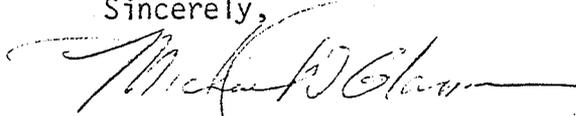
We greatly appreciate the B.L.M.'s expeditious review of this application and their cooperation in assisting Tower to obtain all necessary permits for mining its coal resource.

Mr. Leon Berggren
August 18, 1981
Page Three

Please call this office if you require additional information or
consultation.

Thank you.

Sincerely,

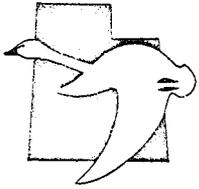
A handwritten signature in cursive script, appearing to read "Michael W. Glasson". The signature is written in dark ink and is positioned above the typed name.

Michael W. Glasson
Senior Geologist

MWG/ac

Enclosures

cc: File



DIVISION OF WILDLIFE RESOURCES
DOUGLAS F. DAY
Director

EQUAL OPPORTUNITY EMPLOYER

1596 West North Temple/Salt Lake City, Utah 84116/801-533-9333

August 24, 1981

Reply To SOUTHEASTERN REGIONAL OFFICE
455 West Railroad Avenue, Box 840, Price, Utah 84501
(801) 637-3310

Mr. Michael Glasson
Senior Geologist
Tower Resources
P. O. Box 1027
Price, UT 84501

Dear Sir:

In response to your inquiry of August 24, 1981. Construction of the power lines to the Deadman Mine on the Bureau of Land Management right-of-way and distribution lines to operational sites were constructed under guidelines developed by the Utah State Division of Wildlife Resources.

Sincerely,

Game Manager-Southeastern Region

JWB:hm

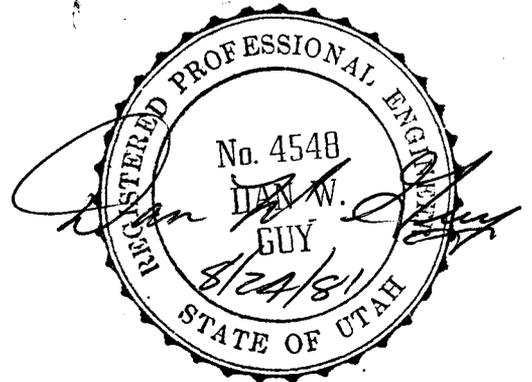
APPENDIX P

SEDIMENTATION
AND
DRAINAGE CONTROL PLAN
FOR THE
CENTENNIAL PROJECT
(REVISED 08-21-81)

PREPARED FOR:
TOWER RESOURCES, INC.

BY

DAN W. GUY
REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH NO. 4548



PLAN FOR CONSTRUCTION AND MAINTENANCE
OF SEDIMENTATION PONDS
CENTENNIAL PROJECT

General Description

Tower Resources Centennial Project will be comprised of three mines located closely together in Deadman Canyon. The Pinnacle Mine is presently in operation mining the Gilson Seam. The other two mines will be the Apex Mine in the Lower Sunnyside Seam and the Aberdeen Mine in the A Seam. Surface runoff from the Pinnacle Mine is controlled by Ponds A and B. Engineering design for these ponds have been presented to the Division of Oil, Gas and Mining on 4-3-80 and 7-7-81. Surface runoff from the Apex and Aberdeen Mines will be controlled by Ponds C, D and E. Design for these ponds are shown on Plates 7, 8 and 9 included herein.

The Centennial Project is to be located in the Right Fork of Deadman Canyon. This is an ephemeral drainage flowing only from direct runoff and eventually reaches the Price River some 12 miles to the south. The major drainages in the minesite area will be routed under the site through large culverts. The projected minesite will have a disturbed area of approximately 24.25 acres. In order to minimize additional sediment loading to the main drainage, it is proposed to collect the runoff from this disturbed area and pass it into 5 separate sedimentation ponds. Berms will be placed on the lower edge of all disturbed areas to prevent runoff from reaching natural drainages before it has passed through the sedimentation ponds.

Centennial Project

Sedimentation Pond Specifications

Location

The proposed ponds are to be located superimposed over the main drainage of the Right Fork of Deadman Canyon. The main canyon drainage will be routed through a 42" culvert located under the ponds. The sites are located downslope of the disturbed areas to simplify collection of runoff water. (See attached maps)

Design

The proposed ponds are designed to fully contain the expected runoff and sediment load from a 10 year - 24 hour precipitation event in this area. The design has been certified by a registered professional engineer.

Construction

The construction of the ponds will be as per the specifications set forth in the Construction Specifications sheet attached to this plan.

Capacity

Each pond is designed to contain the runoff and sediment load from a 10 year - 24 hour precipitation event in the area of drainage. In addition, each pond has an overflow capacity in excess of that required for a 25 year - 6 hour event.

Safety Precautions

The ponds will be built as per specifications and under supervision of a qualified, registered professional engineer. The structures will be regularly inspected by a licensed individual as required by law. Ponds will be cleaned at minimum when sediment reaches 20% of volume.

Measuring devices will be installed in the ponds to show when the ponds have filled with sediment to the clean-out level.

Monitoring

Water monitoring stations will be established at the outlet of the ponds. Sample parameters and frequencies shall be as per specification of the NPDES permit.

Maintenance

The ponds shall be inspected after each storm and the sediment cleaned as necessary. In no event shall sediment be allowed to build beyond 20% of pond capacity. Sediment removed shall be disposed of at the Carbon County sanitary landfill.

Seeding

An approved seed mix will be applied to all feasible disturbed areas in an effort to minimize erosion and sediment loading to the ponds. The proper seed mixture for this area has been obtained through the local BLM.

Culverts

All culverts are shown on the attached maps. Calculations for sizing are also included. It should be noted that all culvert sizes were arrived at and approved through consultation with the DOGM hydrologic engineer.

Calculations

The following sheets reflect the calculations for sizing and details of each separate pond. Attached maps show pond locations and volumes as well as watershed areas.

Construction Specifications

For Sedimentation Ponds

1. All construction of sedimentation ponds will be performed under the direction of a qualified registered professional engineer.
2. Dams shall be constructed with primary overflows 3 ft. from the top, and emergency overflows 2 ft. from the top.
3. The areas of pond construction shall be examined for topsoil, and if present in removable quantities such soil shall be removed separately and stored in an approved topsoil storage location.
4. In areas where fill is to be placed, natural ground shall be removed for at least 12" below the base of the structure.
5. Native materials will be used where practical. Fill will be placed in lifts not to exceed 15" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.
6. Rip-rap will be placed at all inlets and outlets to prevent scouring. Rip-rap will consist of substantial (non-slaking) rock material of 6" or greater size.
7. Each pond shall be fitted with an inverted inlet to the primary overflow, to prevent the passage of oil into the discharge.
8. Slopes of the dams shall not be steeper than 2.0:1, inside and outside.

9. Tops and external slopes of the dams shall be planted with an approved seed mix to prevent erosion and promote stability.

Compaction of the slopes shall be at least 95%.

10. Top width of dams shall be not less than $(H + 35)/5$.

Pond C

1. Use 1.82" for 10 year - 24 hour event

2. Disturbed Watershed - 10.50 acres

3. Runoff Curve No. = CN = ~~X~~ 90

4. Area Runoff = Q (in.) = $(P-0.25)^2 / (P+0.85)$; Where:

$$S = (1,000/CN) - 10$$

$$P = 1.82''$$

$$Q \text{ (in.)} = [1.82-0.2(1.11)]^2 / [1.82+0.8(1.11)] =$$

$$\frac{2.553}{2.709} = .94 \text{ in.} = 0.0785 \text{ ft.}$$

$$\text{Volume} = 10.50 \text{ acres} \times 0.0785 \text{ ft.} = 0.824 \text{ acre-ft.}$$

5. Sediment Storage Volume

$$10.50 \text{ acres} \times 0.1 \text{ acre-ft./acre} = 1.05 \text{ acre-ft.}$$

6. Direct Precipitation into Pond

$$\text{Area of Ponds} = .39 \text{ acres}$$

$$.39 \text{ acres} \times 1.82 \text{ in.} \times 1/12 \text{ ft./in.} = 0.059 \text{ acre-ft.}$$

7. Total Required Pond Volume

$$0.824 + 1.05 + 0.059 = 1.933$$

8. Pond Volume @ Outlet

$$\text{Pond C} = .789 \text{ acre-ft.}, \text{ Pond C2} = 1.629 \text{ acre-ft.}$$

$$\text{Total Pond Volume} = 2.418 \text{ acre-ft.}$$

$$\text{At 20\% cleaning point} - \text{Volume} = 1.934 \text{ acre-ft.}$$

9. Conclusion: Pond size is adequate to contain the runoff and sediment load from a 10 year - 24 hour precipitation event in the area of drainage to the pond.

Pond D

1. Use 1.82" for 10 year - 24 hour event

2. Disturbed Watershed - 0.746 acres

3. Runoff Curve No. = CN = ~~90~~ ~~90~~ 90

4. Area Runoff = Q (in.) = $(P-0.2S)^2 / (P+0.8S)$; Where:

$$S = (1,000/CN) - 10$$

$$P = 1.82"$$

$$Q \text{ (in.)} = [1.82-0.2(1.11)]^2 / [1.82+0.8(1.11)] =$$

$$\frac{2.553}{2.709} = .94 \text{ in.} = .0785 \text{ ft.}$$

$$\text{Volume} = 0.746 \text{ acres} \times 0.0785 \text{ ft.} = 0.059 \text{ acre/ft.}$$

5. Sediment Storage Volume

$$0.746 \text{ acres} \times 0.1 \text{ acre/ft./acre} = 0.074 \text{ acre-ft.}$$

6. Direct Runoff into Pond

$$\text{Area of Pond} = 0.115 \text{ acres}$$

$$0.115 \text{ acres} \times 1.82 \text{ in.} \times 1/12 \text{ ft./in.} = 0.017 \text{ acre-ft.}$$

7. Total Required Pond Volume

$$.059 + .074 + .017 = 0.15 \text{ acre-ft.}$$

8. Pond Volume @ Outlet = 0.303 acre-ft.

$$\text{at 20\% Cleaning Point} = 0.242 \text{ acre-ft.}$$

9. Conclusion: Pond size is adequate to contain the runoff and sediment load from a 10 year - 24 hour precipitation event in the area of drainage to the pond.

Pond E

1. Use 1.82" for 10 year - 24 hour event
2. Disturbed Watershed - 6.02 acres
3. Runoff Curve No. = CN = 90
4. Area Runoff = Q (in.) = $(P-0.25)^2 / (P+0.85)$; Where:

$$S = (1,000/CN) - 10$$

$$P = 1.82''$$

$$Q \text{ (in.)} = [1.82-0.2(1.11)]^2 / [1.82+0.8(1.11)] =$$

$$\frac{2.553}{2.709} = .94 \text{ in.} = .0785 \text{ ft.}$$

$$\text{Volume} = 6.02 \text{ acres} \times 0.0785 \text{ ft.} = 0.472 \text{ acre-ft.}$$

5. Sediment Storage Volume

$$6.02 \times 0.075 \text{ acre-ft./acre} = 0.451 \text{ acre-ft.}$$

Note: 0.075 sediment loading factor used because much of the disturbed area (Aberdeen Mine storage yard and truck turn around) is level and will contribute little if any sediment during a 10 year - 24 hour precipitation event.

6. Direct Precipitation into Ponds

$$\text{Area of Ponds} = 0.165 \text{ acres}$$

$$0.165 \text{ acres} \times 1.82 \text{ in.} \times 1/12 \text{ ft./in.} = 0.025 \text{ acre-ft.}$$

7. Total Required Pond Volume

$$0.472 + 0.451 + 0.025 = 0.948$$

8. Pond Volume @ Outlet = 1.205 acre-ft.

$$\text{at 20\% Cleaning Point} = 0.964$$

9. Conclusion: Pond size is adequate to contain the runoff and sediment load from a 10 year - 24 hour precipitation event in the area of drainage to the pond.

Pond Discharge Structures

Principle Spillways - These will consist of an 18" culvert, fitted with an inverted inlet to provide for oil skimming. The inlet will be approximately 1' below water level. The culvert will be located 3' below the top of the dam, and will discharge directly onto a rip-rapped channel leading to the main drainage as in Pond E or directly into the main 42" culvert in Ponds D and E. These spillways will provide for the normal dewatering of the pond at base capacity.

Emergency Spillways - The emergency spillway for Pond E will be the open notch type with a trapezoidal cross section. The spillway dimensions will be as shown on the attached sheet. This will be located 12" above the principal spillway and 2' below the top of the dam. This structure will be rip-rapped through the point of discharge and into the main channel. This spillway will provide an added safety factor to protect the dam in the event of overload on the culvert discharge.

The emergency spillway for Pond C will consist of an open 36" culvert which empties directly into the main 42" culvert which drains the main canyon. This emergency spillway will be open at the top and will extend to within 2' of the top of the dam. At right angle to this emergency spillway culvert will be an 18" culvert to handle non-emergency overflow conditions. This 18" pipe will have an inverted inlet to skim oil and grease and flotsam from the water.

The emergency spillway for Pond D will be a rip-rapped ditch leading to Pond E. This is a small pond which collects runoff from a very small area. If the pond should ever overflow from a massive influx of water the overflow will run into Pond E and from there into the main drainage.

Calculations

Source of Formulae

B.L.M. State Engineer

Rational Formula

$$QP = Cia$$

QP = Peak Discharge (C.f.s.)

C = Runoff Coefficient (@ 100% runoff, C = 1)

i = Rainfall intensity (in./hr.) for a 25 year - 6 hour storm in

Price, i = .255

a = Area (acres)

Manning Equation

$$D = \left[\frac{(2.16Qn)}{\sqrt{s}} \right]^{0.375}$$

D = Diameter (feet)

Q = QP = Peak Discharge (cfs)

n = Roughness factor (0.02 for steel culvert)

s = Slope (0.0556% = 1 foot for 18 feet)

Pond C (Principle Spillway)

1. QP = Cia; C=1, i=.255, a=10.96 acres

$$QP = (1) (0.255) (10.96)$$

$$QP = 2.795 \text{ cfs}$$

2. $D = \left[\frac{(2.16Qn)}{\sqrt{s}} \right]^{0.375}$; Q = 2.795, n = 0.02, $\sqrt{s} = .2357$

$$D = \left[\frac{(2.16)(2.795)(0.02)}{0.2357} \right]^{0.375}$$

Req. $D_{req} = .778 \text{ ft.} = 9.34 \text{ inches}$

Actual D = 36 inches

Pond D (Principle Spillway)

1. $QP = Cia; C=1, i=.255, a=0.746$ acres

$$QP = (1) (.255) (.746)$$

$$QP = 0.1902 \text{ cfs}$$

2. $D = \left[\frac{(2.16Qn)}{\sqrt{s}} \right]^{.375}; Q = 0.1902, n = 0.02, \sqrt{s} = .2357$

$$D = \left[\frac{(2.16)(.1902)(.02)}{.2357} \right]^{.375}$$

Req. D = .28 ft. = 3.4 inches

Actual D = 18 inches

Pond E (Principle Spillway)

1. $QP = Cia; C=1, i=.255, a=6.02$ acres

$$QP = (1) (.255) (6.02)$$

$$QP = 1.535 \text{ cfs}$$

2. $D = \left[\frac{(2.16Qn)}{\sqrt{s}} \right]^{.375}; Q = 1.535, n = .02, \sqrt{s} = .2357$

$$D = \left[\frac{(2.16)(1.535)(.02)}{.2357} \right]^{.375}$$

Req. D = .6215 ft. = 7.46 inches

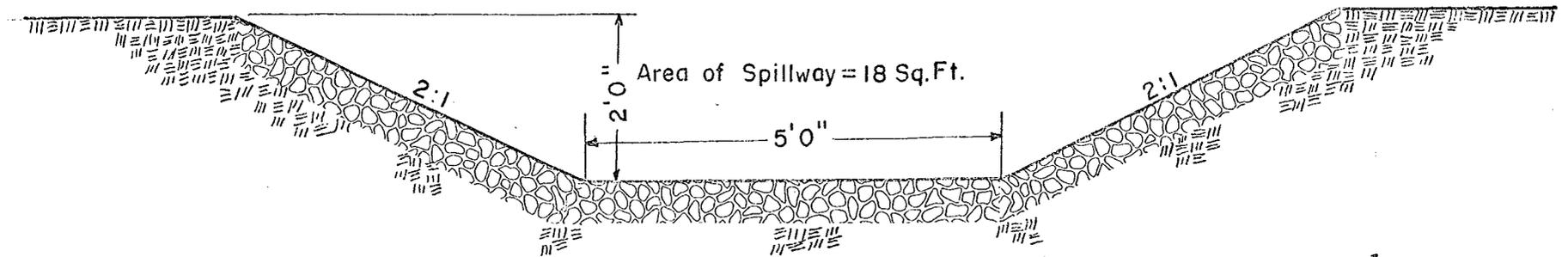
Actual D = 18 inches

Conclusion. The above calculations show the principle discharge structures for each pond to be more than adequate to pass the runoff from a 25 year - 6 hour precipitation event draining to the ponds. Since the emergency spillway has a cross-sectional area of 10 times that of the culverts (18 ft.² vs. 1.77 ft.²) it is obvious that it will be adequate to safely pass much larger events if necessary.

Tower Resources, Inc.

Price, Utah

Centennial Project



Typical Section of Emergency Spillways

Scale : 1" = 2'0"

Date : 8-20-81

Culverts

General

Culverts will be sized as per the designations on the attached maps, and will be placed to drain on a minimum of .0556% slope (1 ft./18 ft.). Each culvert will be fitted with a trash rack on the inlet to help prevent plugging from washed-in debris. Each culvert shall discharge onto a protected surface (i.e. rip-rap, conveyor belting, flexible downspouts, or other) to prevent scouring and erosion. The use of energy dissipators shall be employed as necessary to reduce velocities and prevent erosion from culvert discharges.

Maintenance

Culverts shall be inspected regularly, and cleaned as necessary to provide for passage of designed flows. Inlets and outlets shall also be maintained so as to prevent plugging or undue restriction of water flow.

CULVERT SIZE DETERMINATION

SOURCE:

Bureau of Land Management State Engineer

RATIONAL FORMULA:

$$QP = C i a$$

QP = Peak Discharge (cubic feet per second)

C = Runoff coefficient (@ 100% runoff, C=1)

i = Rainfall intensity (inches per hour) for a 10 year - 24 hour storm in Price $i=0.0758$

a = area (acres)

MANNING EQUATION

$$D = \left[\frac{2.16 Q n}{\sqrt{s}} \right]^{0.375}$$

D = Diameter (feet)

Q = QP = Peak Discharge (cfs)

n = roughness factor (0.02 for steel culvert)

s = slope (0.0556% = 1 foot for 18 feet)

Using the above formulas minimum culvert sizes were calculated based on 100% runoff from a 10 year - 24 hour storm:

WATERSHED AND CULVERT SIZING MAP

<u>Culvert</u>	<u>Watershed Area (acres)</u>	<u>Culvert Needed (in.)</u>	<u>Culvert Used (in.)</u>
C1	467.58	24.2	30
C2	25.71	8.2	18
C3	493.29	24.7	36
C4	87.78	12.9	18
C5	581.07	26.3	36
C6	40.04	9.6	18
C7	621.11	26.9	36
C8	53.63	10.7	18
C9	674.74	27.8	42
C10	29.38	8.6	18
C11	704.12	28.2	42
C12	74.20	12.1	18
C13	778.32	29.3	42
C14	27.18	8.3	18
C15	805.50	29.7	42

It should be noted that the culvert sizes Tower will use are sufficient for 100% runoff from a 100 year, 24 hour storm in Price.

Diversion Structures

General

Diversion ditch locations are shown on the enclosed Surface Facilities Map. The direction of flow is also shown. All diversions are classed as temporary, and will be removed upon final reclamation.

Specifications

Diversions along the upslope side of the road will be as per specifications on the haul road design. At a minimum, these, and any other diversions shown, will meet the minimum size specifications on the attached Diversion Ditch Typical sheet. Diversions are sized to carry the runoff from a 50 year - 24 hour precipitation event in the area.

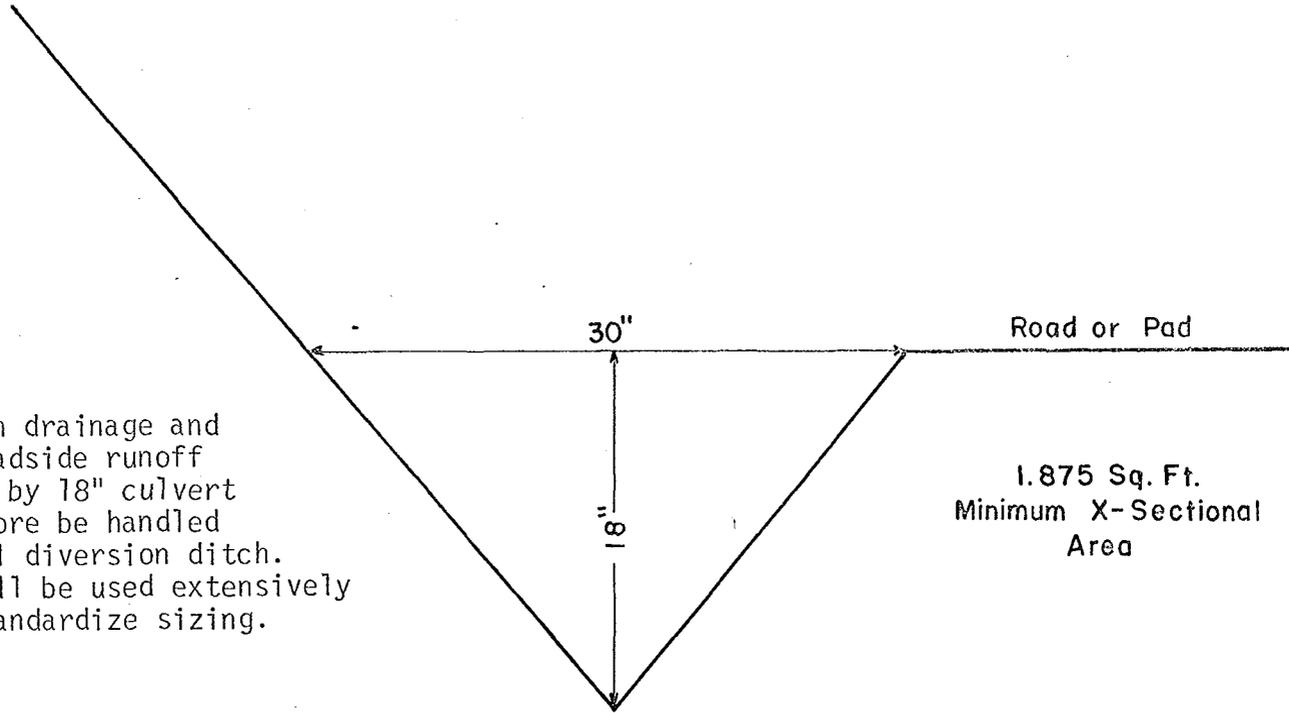
Maintenance

All diversions will be maintained so as to pass the volumes of water for which they were designed. Sluffage will be cleaned out along with regular road maintenance procedures, and any blockage will be removed as soon as practicable after occurrence. Velocities will be controlled as needed to prevent excessive scouring.

Tower Resources, Inc.

Price, Utah

Centennial Project



Note: All side canyon drainage and all pad and roadside runoff can be handled by 18" culvert and can therefore be handled by this typical diversion ditch. 18" culvert will be used extensively in order to standardize sizing.

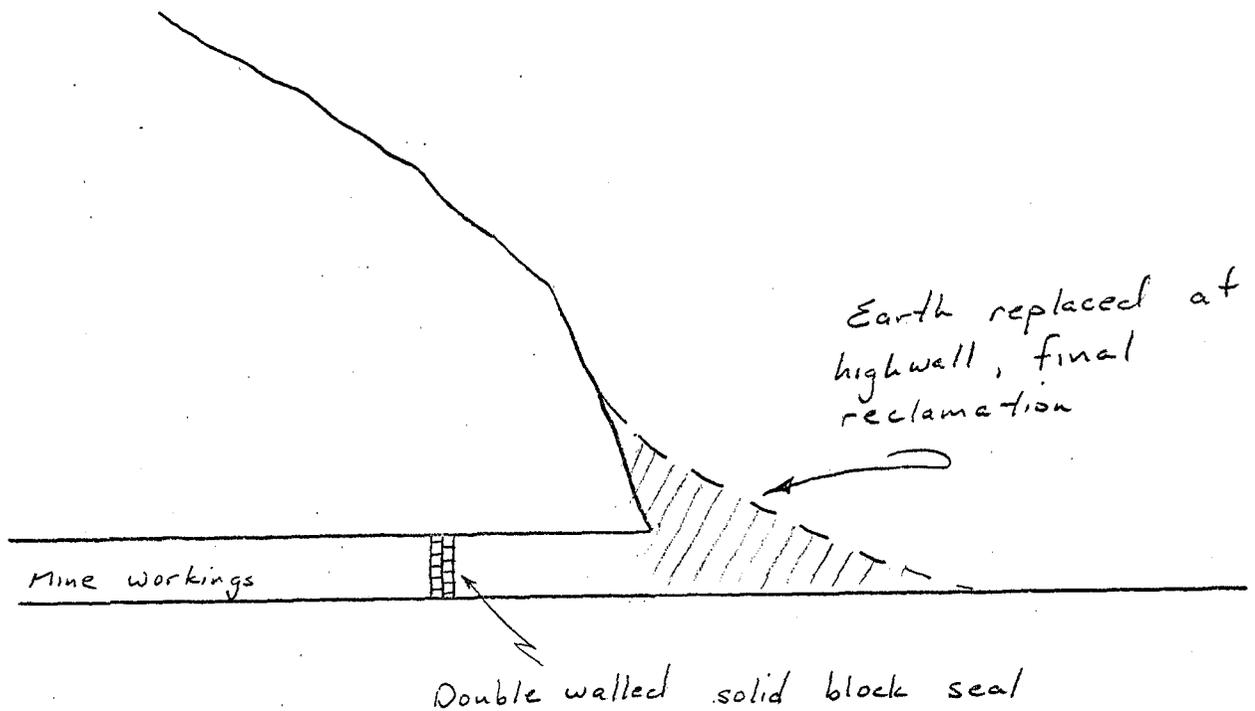
Diversion Ditch Typical

Scale: 1" = 10"

Date: 8-20-81 J.B.

Plan for Sealing Portals
Final Reclamation
Centennial Project

All portals developed as part of the Centennial Project will be sealed upon abandonment of the mines and final reclamation. Seals will be constructed of solid concrete blocks with mortared joints erected double walled. The seals will be located back from the surface far enough that the surface effects of reclamation will not have an adverse effect on the seals. No combustible material will be used in the construction of the seals.



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DIVISION OF
OIL, GAS & MINING

Plan for Sealing all Wells
(Exploration Wells, Water Wells, Water Monitoring Wells)

Tower Resources to date has drilled eleven holes within the leases and some have been exploratory and some water wells. The water wells are still open and the exploratory holes have been sealed. The method for sealing in the past and for the future shall consist of at a minimum cementing through the coal seams above and below for a minimum of 20 feet as well as a concrete surface plug. The remainder of the hole is filled with drill cuttings, or in the case of a shallow hole, the entire length is cemented. If present, casing is removed when physically possible. Non-combustible material is used to seal wells.

Plan for Powder and Fuel Storage

Any powder and fuel stored on the permit area will be in compliance with all M.S.H.A. regulations. These items will be stored in areas where non-combustibles are not within close proximity. Also, any used oil will be stored in an area of non-combustible and in an area within our S.P.C.C. plan.

All blasting shall be performed by qualified personal, certified through M.S.H.A.

Evidence of Negligable Coal in Underground Rock Waste

M.S.H.A. regulations do not permit coal to be stored underground. Therefore, any coal found in wasterock stored underground must be negligable. Also, as stated previously, underground wasterock disposal will be done under U.S.G.S. recommendations.

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