



0038

ACT 1007 1012 #2

8160 South Highland Drive, Suite A-4 • Sandy, Utah 84093 • (801) 943-4144 • Fax: (801) 942-1852

**FAX TRANSMISSION**

Time: 2:40 AM/PM

Date: 10/9/97

To: Wayne Western

Company: DOGM

FAX #: \_\_\_\_\_

\*\*\*\*\*

From: Tim Thompson

JBR Environmental Consultants, Inc. Re: COVOL 97G

FAX #: 801-942-1852

Total number of pages (including cover page): 18

Special Instructions or Comments: Here are all pages  
that are most current for 97G.  
Any questions, please call.  
Look forward to a green light tomorrow

Tim Thompson

## Application for Permit Processing Detailed Schedule of Changes to the MRP 9/30/97

Title of Application: **Wellington**

Permit Number: **007/012/1976**

**Modular Coal Fines Wash Plant Constr. # 2 (Add'l Info.)**

Mine: **Wellington Prep. Plant**

Permittee: **NEICO**

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg. No. 712 a 1 of 2 "Refuse Basin" w/ Rev. 6
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg No. T1-9597 "Site Grading, Facility & Runoff Control" w/ Rev 2
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Sec. 5.26 pg. 15
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Sec. 5.26 pg 15a
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Sec 2.40 pg 1a
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Sec 2.40 pg 1b
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Sec 2.40 pg 1c
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Figure 2.40-1 "Soil Test Pits and Refuse Delineation"
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Soil Description Field Forms - Sites COVOL-01, 02
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg. 9709-T1 "NW Tailings Area Tailings Deposition" 9/97
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg. 9709-T2 "Upper Basin Tailings Deposition - Yr. 1" 9/97
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg. 9709-T3 "Upper Basin Tailings Depo. End of Project" 9/97
<input checked="" type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Dwg. 9709-T4 "Upper Basin Tailings Depo. Reclamation Slope" 9/97
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?





522 COAL RECOVERY (R645-301-522)

Refuse material (fines) was deposited on the Wellington site by previous owners who conducted coal cleaning activities. The current plan describes the slurry ponds to be reclaimed by burial with coarse refuse, followed by covering with topsoil, then revegetation. As an alternative to this reclamation procedures, the operator is currently conducting investigations as to the feasibility of removing the fines beforehand. In addition, a modular coal fines wash plant is to be constructed on the west bank of the lower coal refuse pond where the vegetation test plot currently exists. A few feet of coal fines have accumulated in the bottom of the Clear Water Pond and will be removed with heavy equipment during construction. These fines will be stockpiled near the modular wash plant for future processing. Access will be from the northwest side of the pond from an existing road. In the northwest area of the upper refuse pond, a tailings impoundment and retention berm will be constructed. Most of the All erected facilities will be more than 100 feet from the County Road. However, the clean coal stockpile, waterlines and power poles/lines will be within 100 feet of Farnham Road. The public will be prevented access by using fencing and gates. Note that the mining and processing of the fines will be detailed a forthcoming minor amendment.

The operator was granted authorization by the State of Utah, Division of Oil, Gas & Mining (DOG M) to conduct a pilot study to remove coal slurry fines from the pond areas at the Wellington site. Prior to DOGM approval (August 23, 1991), an application was submitted as an permit amendment (April 25, 1991) and deficiencies subsequently addressed (July 15, 1991). Refer to Appendix M of the Mining & Reclamation Plan (MRP) for these documents.

Primary purpose of the pilot study is to compare methodologies and costs for fines removal for reclamation and/or marketability. The refuse removal experiment will determine whether the fine refuse can be removed - thus eliminating problem spoils that may hinder revegetation. With the refuse removed, it will be possible to examine more closely the underlying original

Present Use - The impounding structure that forms the lower refuse pond basin. The existing drain pipes will be rehabilitated.

V. Clearwater Pond

Past Use - The clear water pond provided storage for the clarified water that was used in coal processing.

Present Use - Will remain to be used for sediment control at final reclamation. A few feet of coal fines have accumulated in the bottom of this pond and will be removed with heavy equipment prior to the introduction of any water. These fines will be stockpiled near the modular wash plant for future processing. Access will be from the northwest side of the pond from an existing road.

W. Clearwater Dike

Past Use - The impounding structure for the Clear Water Pond.

Present Use - The impounding structure for the Clear Water Pond basin. The existing drain pipes and decant structures will be rehabilitated.

X. Coarse Refuse Pile

Past Use - The Coarse Refuse Pile was the disposal area for coarse reject from the coal cleaning process.

Present Use - The south end of the pile is the location of the construction of the modular coal fines wash plant.

Y. Siaperas Ditch

Past Use - Used for irrigation return flows and to receive natural storm drainage.

Present Use - Used to divert irrigation and storm water away from the upper Refuse Basin.

AA. Clear Water Pipeline

Past Use - A buried line that carried water from the Clear Water Pond to the coal cleaning plant for processing raw coal.

Present Use - The structure is not used for present operations.

~~No~~ Some mining, construction and reclamation activities will currently occur within 100 feet of a public road. However, some construction activity, as described in this minor amendment submittal, is expected in the near future. All newly erected facilities will be more than 100 feet from the County Road. The ~~clean coal stockpile, waterlines, and power poles/lines will be~~ within 100 feet of Farnham Road. The public will be prevented access by using fencing and gates. The fencing is approximately 10 feet from the edge of the road. However, the next nearest facility in the loadout area, the conveyor transfer and coal stockpile, is 50 feet from the road. DOGM will be notified in a forthcoming minor amendment to mine and process the fines from the upper and lower refuse basins.

Before modifying any building the Permittee will update their Mining and Reclamation Plan. The updated MRP will include detailed plans, maps and drawings approved by the DOGM.

Before doing any reclamation work such as demolishing and removing the dryer building the operator will notify DOGM to the time and sequence.

#### Utility Installation and Support Facilities

All coal mining, construction related to the wash plant and reclamation operations will be conducted in a manner which minimizes damage, destruction, or disruption of services provided by oil, gas, and water wells; oil, gas, and coal-slurry pipelines, railroads; electric and telephone lines; and water and sewage lines which pass over, under, or through the permit area. In addition, electric power to the wash plant and supply well will be re-established using the existing corridors by

installing poles, wires and appurtenances. ~~The 367/3 lines to the Clear Water Pond and supply well will parallel Paragon Road on the east side (see Drawing #1-9597).~~ All electric power lines will be owned and maintained by Pacifi Corp. (see Appendix EP). The two waterlines will be above ground, 12 inch diameter carbon steel, which rest on short timber trestles. Both the overhead power line and the waterlines will be behind the existing fence and within 100 feet of the County Road. Their distance varies from 40 to 80 feet from the edge of the road. Where the water line crosses under the County Road, it will be placed in an existing concrete culvert to prevent having to cut through the road and block traffic.

The support facilities will be operated in accordance with a permit issued by the State of Utah, Division of Oil, Gas & Mining (DOGM). Descriptions and photographs for each support facility

consistent with the current reclamation plan. Regrading activities are included in the modification to the bond calculations even though very minimal earthmoving is required. Dismantling and disposal of the surface facilities are the focus of the revised bond calculations. Reclamation issues will be expanded on in future submittals.

A new tailings berm will be constructed within the North-West corner of the Upper Refuse pond to replace the existing berm (Ref. Drawing 712a). The new berm will be constructed based on the design criteria generally described in the enclosed letters and sketches from RB&G Engineers, Inc., from Mr. Brad Price to Mr. Rick Hoggan of Millcreek Engineering Company September 5 and October 2, 1997 (ref Appendix NW). Existing coal fines from the North-West area will be excavated and stockpiled in the Plant North Storage Pile to allow for construction of the Proposed Northwest (NW) Tailings Pond. This Proposed Northwest Pond is located within the upper pond, and is required to separate initial plant tailings from the initial dredging operation to facilitate proper settling of tails. The existing NW berm consists of coarse refuse material placed on top of earlier coal fines and must be replaced with the new berm, as the existing berm will not provide a stable structure as coal fines are reclaimed by the dredging operation.

Additional construction activities required prior to introduction of water into the Upper and Lower ponds includes grubbing and removal of all vegetation, dry excavation of a starting area in each refuse pond for initial dredge placement, rehabilitation of existing drain structures, and trimming of the shallow fines at pond edges. All coal fines material located at the pond edges at less than 4 feet of thickness cannot be accessed by the dredge and will be excavated and cast toward the center of the ponds to facilitate reclaim by the dredging operation. Grubbing, excavations within the refuse ponds and edges material trimming will be conducted from the coal fines surface to maintain operations within the disturbed area only.

TABLE 742-0c: Culvert Design Summary

Culvert ID	Contributing Ditch	Design Peak Flow (cfs)	Minimum Allowable CMP Culvert Diameter (feet)
CVL-C1	CVL-D1	2.6	1
CVL-C2	CVL-D2 & CVL-D3	3.2	1.25
CVL-C2	CVL-D5	5.3	1.25

#### 742.220 through 742.221 Sedimentation Ponds

Six existing ponds are included in the sediment control plan. These ponds include the Plant Sediment Pond, Refuse Basin Sediment Pond, Slurry Pipeline Sediment Pond, Road Pond, Auxiliary Pond and the Dryer Sediment Pond. The Road Pond, Auxiliary Pond and the Dryer Sediment Pond are used in series. The Plant Sediment Pond, Slurry Pond, and the Refuse Basin Sediment Pond are used independently with respect to each other. The sediment ponds are located near the disturbed area, and will be maintained to provide adequate sediment storage volume as described below.

The Road Pond, Auxiliary Pond and the Dryer Sediment Pond are connected in series; however, the Dryer Pond was enlarged in 1994, and will contain the entire runoff from the 10-year 24-hour precipitation event. The computed 10-year 24-hour runoff to the series of ponds is presented in Table 742-1 along with available storage between proposed decant elevations and spillway elevations. Stage capacity curves are presented in the Hydrologic Appendix. The peak 25-year 6-hour storm event discharge from the pond was computed assuming the pond full to the spillway elevation prior to start of storm.

The Dryer Sediment Pond will serve as the final treatment facility for Watershed No. 4. The Dryer Sediment Pond, as constructed, will provide dead storage (i.e. storage below the decant level) for approximately 10 times the computed 3-year sediment volume (see computations in Hydrologic Appendix).

Hydraulic analysis of the Pipeline slurry south ditch indicates that the steepest section has a design velocity (with the 10-year, 6-hour storm event) of about 5.2 fps. Erosion control blankets are proposed to be used in all reaches of the south ditch which have bottom slopes exceeding 4%. These erosion control blankets will be installed in accordance with the manufacturer recommendations.

The Pipeline Slurry north ditch has a small tributary area (about 1.1 acres) and hydraulic analysis with the 10-year, 6-hour design flow rate indicates that the ditch is stable.

#### 742.320 through 742.324 Diversion of Perennial and Intermittent Streams

The Siaperas Ditch is an old ditch that collects runoff from agricultural and undisturbed lands northwest of the permit area as shown on Dwg. G9-3504. The tributary area includes as much as 1266 acres in addition to the flow from the 680 acre drainage area diverted by the Permanent Diversion that empties into the Siaperas Ditch, for a total tributary area of 1946 acres. In accordance with R645-301-746.212, the Siaperas Ditch must safely pass the runoff produced from a 100-year, 6-hour precipitation event since it prevents run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the Siaperas Ditch can adequately meet this requirement.

The so-called Permanent Diversion is a permanent diversion that diverts runoff from 680 acres of the undisturbed hills to the east of the permit area. The Permanent Diversion was constructed approximately ten years ago. The ditch was originally designed to have a 10 ft width bottom width with 1.5 horizontal to 1 vertical side slopes and a 4 inch thick layer of riprap in selected location (see Dwg. E9-3427). Field examination (June 19, 1993) and analysis of the 1991 mapping reveals that the channel is well vegetated and stable when compared to surround channels. In accordance with R645-301-746.212, this diversion must be designed to safely pass the runoff produced for a 100-year, 6-hour precipitation event since it prevent run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the design of the Permanent Diversion adequately meets this requirement.

The Covol coal fines wash plant will be built within Watershed #7 (Drawing 712a). There is almost no tributary watershed uphill from the plant site and lower margin of the plant site is adjacent to the Lower Refuse pond. Therefore, there are no perennial, intermittent or ephemeral channels that will be impacted by the Covol coal fines wash plant, as such, no diversions are planned. Runoff from the plant site will be controlled with grading to 2 percent along the existing topographic slope, and with berms structures as described on page 1 of Section 7.42. ~~As a result, all runoff (approximately 4.6 acre-feet from the 10-year, 24-hour precipitation event of 1.82 inches) produced on areas disturbed with construction of the wash plant will infiltrate locally or will drain to the Lower Refuse Pond in a controlled manner.~~

## Soils

A soil survey was conducted at the two sites to be disturbed on July 17 August 12, 1997. The wash plant site would be located on the old test plot site where various repetitions of topsoil and coarse coal refuse were applied to determine effects on revegetation. The upper disturbed area is situated on a small knoll that may have been altered in the past by removal of the soil materials. All soil surveys were conducted in accordance with standards of the National Cooperative Soil Survey.

The test plots consist of 6-12 inch layer of topsoil over coarse coal refuse or areas of topsoil over the abandoned coal fines. Pits were dug to obtain samples of the topsoil and coarse coal refuse for analysis in the lab according to Table 1 in Guidelines For Management of Topsoil and Overburden 1988. No profile descriptions were obtained other than to note the thickness of the material examined. Generally the topsoil materials were loams about 9-10 inches thick on the 12 inch applications and 3-5 inches on the 6 inch applications. The topsoil materials could be salvaged (about 1310 cy based on average depth of 7.5 inches over 1.3 acres) if lab analysis indicates suitability with all parameters tested (Table 2.40.1). Topsoil materials will not be salvaged due to Boron levels (12-14 mg/Kg) which is in excess of DOGM's guidelines.

The upper disturbed area is a Gerst soil that apparently has had the upper horizons removed or disturbed in the past as the depths to the underlying Mancos shale were uncharacteristically shallow. Four pits were excavated to 60 inches and profile descriptions obtained, all are indicated below. Pits #1 & #2 are located on top of the knoll adjacent to the pad for the flotation cells while pits #3 & #4 are located on the slopes below the pad (Figure 2.40-1). A line on this map delineates undisturbed soils from the coal refuse. The data from the pits indicate about five inches of salvagable topsoil would be available on the 9,500 sq. ft. disturbed area, or approximately 146 9,600 sq. ft. disturbed area (8000 sq. ft. flotation pad + 1600 sq. ft. slurry tank) or approximately 148 cy of topsoil materials to be stored at the north stockpile. The amount of topsoil available at the slurry tank site is an estimate based on the four soil pits sited in similar terrain, a topsoil pit will be sited there to determine the soil type and salvagable topsoil materials. There will be no topsoil salvage on the access road or on the steep slopes below the flotation cell site. See Appendix for field forms and lab analysis reports.

Soil salvage will be done using a small dozer to carefully remove the upper five inches. This material will be loaded into trucks and taken to the top of the stockpile north of the coarse refuse pile. A third party will ensure quality control during salvage operations. For final reclamation, 1' of topsoil from Borrow Area "B" will be placed, as previously described, with either scrapers or small dozers and pocked a few inches deep prior to revegetation.

Because of the paucity and poor value of the Gerst series topsoils at the site, an interim revegetation test program will be instituted on the construction fill materials. Hand methods will be employed on the small sites available during operations. The revegetation steps include:

1. Digging and turning the fill materials to relieve compaction
2. Grade the seedbed to provide for moisture retention - pocked or gouged
3. Mulching with chopped green alfalfa hay at two tons per acre
4. Fertilize with phosphate and nitrogen rich fertilizer
5. Broadcast approved seed mix at the established rate
6. Rake the mulch, fertilizer and seed mix into the fill material sufficient to cover with mineral soil.

Tables 2-6,2-7 and page 122 in the current MRP have chemical and physical data on the Gerst soils in the borrow areas sufficient to characterize any substitute topsoil materials. Table 2.40-2 has the lab analysis from pits #1 & #2.

**Gerst Soil Series**Pit #1

- Ap 0-3 inches; grayish brown (2.5Y 5/2) gravelly fine sandy loam, (15 percent gravel) dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure breaking to weak thin platy structure; slightly hard, firm, slightly sticky and slightly plastic; few fine roots; strongly effervescent; clear irregular boundary.
- A 3-5 inches; grayish brown (2.5Y 5/2) fine sandy clay loam, very dark grayish brown (2.5Y 3/2) moist; thin platy structure; hard, firm, sticky and plastic; few fine roots; strongly effervescent; moderately alkaline (pH 7.9); clear wavy boundary.
- Cl 5-17 inches; grayish brown (2.5Y 5/2) channery clay loam, dark grayish brown (2.5Y 4/2) moist; massive, hard, firm, very sticky and very plastic; 50 percent shale fragments; strongly effervescent; gradual wavy boundary.
- Cr 17 inches- partly weathered Mancos shale.

(The diagnosed A horizon may be the undisturbed portion of the pristine A horizon)

Pit #2

- Ap 0-5 inches; grayish brown (10YR 5/2) very gravelly ~~and cobbly~~ fine sandy loam, (25 percent gravel and 15 percent sandstone cobbles) dark grayish brown (10YR 4/2) moist; moderate medium angular blocky structure; slightly hard, slightly friable, slightly sticky and nonplastic; many fine and few medium roots; strongly effervescent; clear irregular boundary.
- Cl 5-10 inches; ~~gravelly and (very)~~ channery dark brown (10YR 4/3) silt loam, dark grayish brown (10YR 4/2) moist; massive, soft, friable, very sticky and very plastic; very few fine roots; 50 percent shale fragments, 10 percent sandstone rocks; strongly effervescent; moderately alkaline (pH 7.9); disseminated calcium carbonate; clear wavy boundary.
- Cr 10 inches- partly weathered Mancos shale.

Pit #3

- A 0-5 inches; very dark grayish brown (2.5Y 3/2 moist) gravelly loam; weak medium angular blocky structure; soft, very friable, sticky and plastic; common fine and few small roots; ~~20 percent cobbles;~~ (15 percent gravels, 15 percent cobbles) strongly calcareous; clear smooth boundary.
- Cl 5-10 inches; dark grayish brown (2.5Y 4/2 moist) clay loam; moderate fine platy structure breaking to small angular blocky structure; hard, firm, sticky and plastic; common fine and few medium roots; strongly calcareous; clear smooth boundary.
- C2 10-18 inches; clay; massive structure; partly weathered shale.
- CR 18 inches- shale and partly weathered shale.

2.40

1b

09/30/97

Pit #4

A 0-3 inches; brown (10YR 4/3 moist) cobbly loam; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; 20 percent cobbles; strongly calcareous; clear smooth boundary.

AC 3-7 inches; dark yellowish brown (10YR 5/3) 4/4 (moist) very gravelly sandy loam; weak small subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium roots; (40 percent gravels) strongly calcareous; clear smooth boundary.

C1 7-13 inches; yellowish brown (10YR 5/4) gravelly sandy loam; massive structure; loose, loose; common fine roots; (20 percent gravels, 15 percent cobbles) gradual smooth boundary.

C2 13-36 inches; clays and partly weathered shale.

Cr 36 inches- shale.

(The A horizon is 0' 6" at another adjacent site so differentiation from AC may be part of the continuum.

Table 2.40-1 Physical and Chemical Analyses of Test Plot Soils

Sample	pH units	EC mhos/cm	SAR	Alkalinity mg/Kg	Total N mg/Kg	Sol. Na mg/L	SE mg/Kg	B mg/Kg
topsoil #1	7.92	2,621	0.49	108,000	1,540	43	<0.8	14
topsoil #2	7.85	4,193	1.47	108,000	1,510	93	<0.8	12
coarse refuse #1	7.60	2,666	1.04	17,600	4,670	124	<0.8	33
coarse refuse #2	8.14	5,757	1.69	28,700	<202	197	0.9	62
refuse #1	7.50	2,834	3.26	13,600	5,700	441	<0.8	38
refuse #2	6.60	4,596	0.66	1,650	4,320	165	1.1	40

topsoil sample 0-10"

coarse refuse 10-27"

refuse 27"-

Table 2.40-2 Physical and Chemical Analysis of Grst Soil Pits

Sample	pH units	EC mhos/cm	SAR	Alkalinity mg/Kg	Total N mg/Kg	Rock %	CA mg/L	Mg mg/L	K mg/L	Na mg/L	OC mg/Kg
Pit #1	7.89	872	1.66	60,400	997	12.9	484	127	6.4	159	9,110
Pit #2	7.92	160	0.51	50,200	589	58.5	27	19	0.4	14	7,460

composite samples 0-10"

2.40

1c

10/02/97

October 2, 1997

Rick Hoggan  
Millcreek Engineering Company  
P.O. Box 22102  
Salt Lake City, UT 84122



**RB&G  
ENGINEERING  
INC.**

Dear Mr. Hoggan:

At your request, stability analyses have been performed for the proposed Northwest Tailings Pond Dike at the COVOL Technologies Project near Wellington, Utah. The analyses included Steady State Seepage and Seismic Pseudo Static. It does not appear that a Sudden Drawdown Condition will exist and hence Sudden Drawdown analysis was not performed. The strength parameters for the embankment coarse coal refuse and the natural soil were obtained from the 1983 Study and the Subterranean Associates borehole which was referenced in the September 5, 1997 letter.

The analyses were performed on the proposed cross section transmitted with the Sept. 5 letter. The results of the analyses are presented in the enclosed figure. The analyses were performed using a computer adaption of Spencer's Method which satisfies both force and moment equilibrium. It will be observed that a Factor of Safety of 1.78 was obtained for the Steady State Condition and a Factor of Safety of 1.29 was obtained for the Pseudostatic Analysis. We believe that these factors of safety are adequate for the proposed dike and recommend that the cross section and construction recommendations made in the Sept. 5 correspondence be utilized.

If there are any questions regarding the information outlined above, please call.

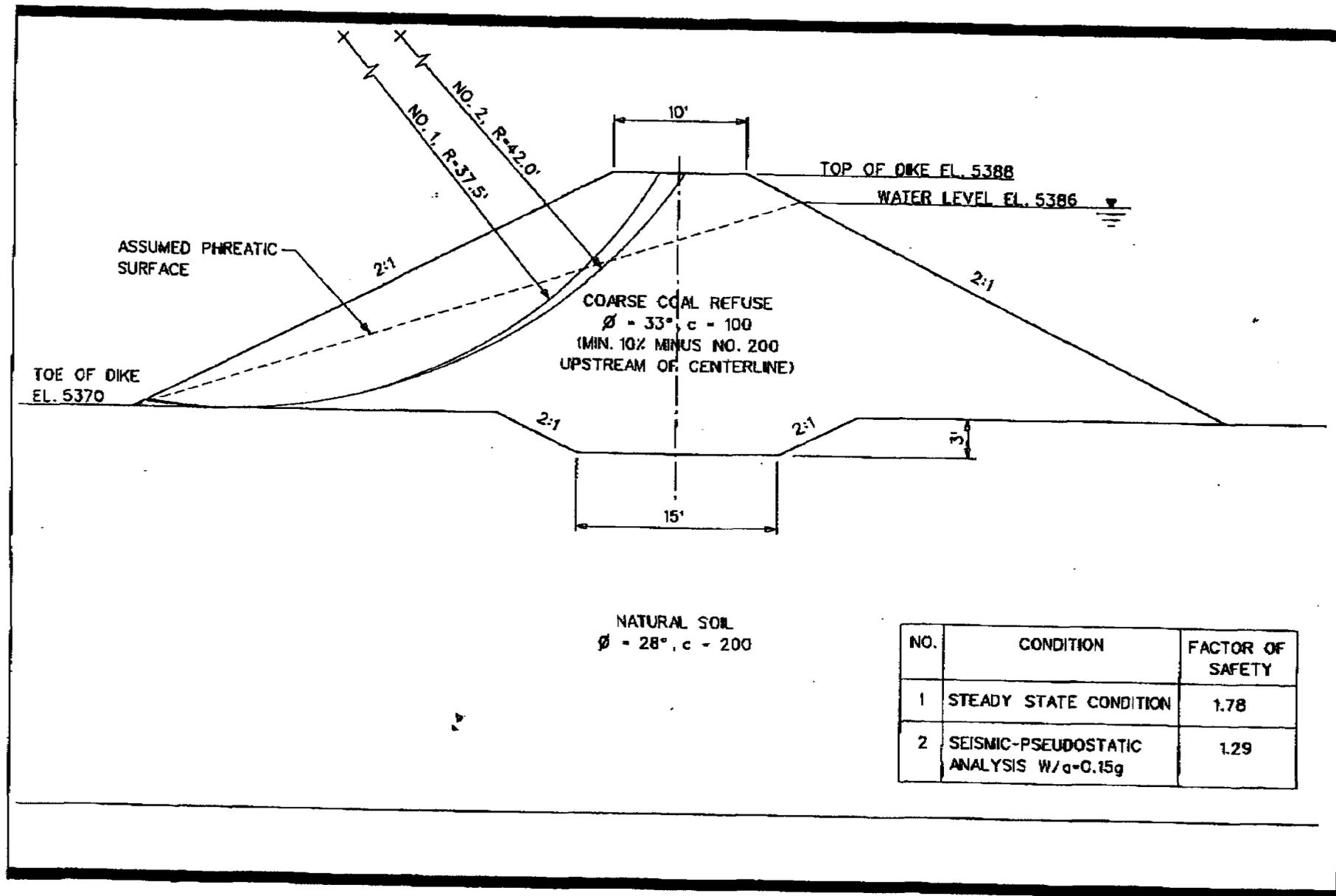
Sincerely,

RB&G ENGINEERING

Bradford E. Price, P.E.  
Principal, Geotechnical Engineer

1435 WEST 820 NORTH  
PROVO, UTAH 84601-1345

PROVO 801-374-5771  
SALT LAKE CITY 801-521-5771



**RB&G  
ENGINEERING  
INC.**  
Provo, Utah

Figure  
Northwest Tailings Dike - Safety Factors

SOIL DESCRIPTIONS

JBR FIELD FORM

Soil Type: CEKST

Project Couach-01

Site FLATTOP CREEK Date 07-17-97 Sample Site # 1

Classification USDC TERNORTHANTS

Native Vegetation ATEO, ARND, GUSA, CHVI - HIGH DRY, BTRP Climate cool continental

Parent Material MAUCOS SHALE SANDSTONE FLOBS ON SURFACE (SAND)

Physiography COGOCADO PLATEAU

Relief Drainage PINE RIVER Salt or alkali

Elevation 5500 Ground Water NA Stoniness

Slope 2% Moisture DE 7.7

Aspect SE Root Dist. 0-17" EC 9.7

Erosion GRAVEL PAVEMENT % Coarse Frag. Clay

Permeability

Additional Notes

Horizon	Depth	Color		Texture	Structure	Consistence			Rea- tion	Bound- ary	Other
		dry	moist			dry	moist	wet			
A <sub>p</sub>	0-3"	2.5Y 3/2	2.5Y 4/2	F S <sub>ah</sub>	F W S <sub>ah</sub>	SL	S <sub>L</sub> F <sub>a</sub>	3.5/MA	S	IR-S	
A <sub>1</sub>	3-5"	2.5Y 7/2	2.5Y 7/2	F S <sub>ah</sub>	F W PL	H	FI	5T/PL	S	C-S	
C <sub>1</sub>	5-17"	10YR 6/2	10YR 6/2	E L	M	H	V F <sub>i</sub>	5T/PL	V	E-S	
C <sub>R</sub>	17"-	10YR 6/2		WEATHERED SHALE							

A<sub>p</sub> STRUCTURE BREAKS TO THIN PLATY

3-5" MAY BE REMNANT A<sub>1</sub>

SOIL DESCRIPTIONS  
JBR FIELD FORM

Soil Type: SEST

Project C0006-01

Site FLOTATION CELLS Date 07-17-97 Sample Site # 2  
 Classification UTILE FLORIDANTIS  
 Location NORTH OF CELL SITE  
 Native Vegetation ARAO, ATCO, CHU - HIDA Climate COLD CONT.  
 Parent Material MANCOS SHALE, SANDSTONE ON SURFACE  
 Physiography COLORADO MOUNTAIN  
 Relief KNOLL TOP Drainage PRICE RIVER Salt or alkali  
 Elevation 5500 Ground Water  
 Slope 8% Moisture  
 Aspect N-NE Root Dist. 0-10" pH 7.9  
 Erosion SURFACE SCRAPED % Coarse Frag. EC 1.6  
 Permeability Clay

Additional Notes

SURFACE SCRAPED IN PAST, POSSIBLY 4-8" REMOVED  
NATIVE VEGETATION RE-ESTABLISHED

Horizon	Depth	Color		Texture	Structure	Consistence			Rea- tion	Bound- ary	Other
		dry	moist			dry	moist	wet			
<u>AP</u>	<u>0-5"</u>	<u>10YR 7/2</u>	<u>10YR 4/2</u>	<u>F, S, L</u>	<u>MM AGG</u>	<u>SLH</u>	<u>F</u>	<u>5-5 1/2</u>	<u>S</u>	<u>IR-C</u>	
<u>C1</u>	<u>5-10"</u>	<u>10YR 4/3</u>	<u>2.5Y 7/2</u>	<u>C, L</u>	<u>M</u>	<u>SO</u>	<u>FR</u>	<u>1.5</u>	<u>S</u>	<u>S-C</u>	
<u>CR</u>	<u>10"+</u>	<u>WEATHERED GRAY SHALE</u>									