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FILE: ACT/015/032 #3, 9

GENWAL COAL COMPANY

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RECEIVED
MAY 20 1985
DIVISION OF OIL GAS & MINING

May 15, 1985

Mr. Wayne Hedburg
Department of Natural Resources
Division of Oil, Gas and Mining
355 W. North Temple
3 Triad Center
Suite 350
Salt Lake City, UT 84180-1203

Dear Mr. Hedburg,

In response to your letter dated April 23, 1985, Genwal Coal Company would like to terminate our "construction water monitoring" status and commence an "operational surface water monitoring" program.

Genwal Coal Company will accept all of the parameters as outlined in the program you enclosed with your letter. In order to prevent any misunderstanding I am enclosing a copy of the program with a correction in the text referencing table 3, which I believe should read table 2, as stated in your letter.

I hope this meets your requirements. If there are any further questions or comments please feel free to contact me at 637-7383. Thank you very much for your time and consideration.

Sincerely yours,

Andrew C. King

Andrew C. King

enc

II. Surface Water Hydrology

A. Identification of surface water systems.

1. Determine watershed basin characteristics (with map of a scale 1:24,000 or larger).

   a. Delineate drainage basin boundaries and watershed names.

   b. Describe physical characteristics (topographic relief, slope, drainage patterns).

B. Baseline data to establish surface water conditions.

1. Compile existing flow and quality data on streams and reservoirs from state and federal agencies, private agencies, past and on-going mining operations, regulatory agencies, etc.

2. Inventory all streams, lakes, reservoirs and impoundments within permit area and adjacent areas which could potentially be affected by mining.

   a. Stream information to be inventoried:

      (1) location of primary channel and tributaries;

      (2) historical and present seasonal variability of flows and water quality;

      (3) categorization of stream (i.e., perennial, intermittent or ephemeral) based on above information;

      (4) water usage, rights and permission for sampling.

   b. Lake, reservoir and impoundment information to be inventoried:

      (1) location and relationship to local drainage;

      (2) composition of material of impounding dam; length of crest and height of dam from upstream toe to top of crest;

      (3) historical and present seasonal variability of water levels and water quality;

      (4) water usage, rights and permission for sampling.

II.B. (continued)

3. Determine on-site erosion rates and sediment yields.

   a. Refer to B.5.c for acceptable methodology.

4. Selection of baseline monitoring sites:

   a. Sites shall include a combination of lake, reservoir, impoundment and stream locations.

   b. The number of monitoring sites is dependent upon the:

      (1) complexity of the surface water system;

      (2) size of mine plan area.

   c. In general for streams, samples should be taken upstream and downstream from affected areas.

      All sites for measurement of stream flow need not be sampled for quality, but all quality samples should be accompanied by a flow measurement.

   d. For reservoirs, lakes and impoundments, samples should be taken in at different depth intervals at several locations on the body of water depending on size.

      All quality samples should be accompanied by the current maximum water level measurement of reservoir or lake.

5. Data acquisition.

   a. Stream flow measurement and analyses.

      (1) Flow measurements can be made using a current meter, flume (portable or permanent), weir, stage recorder or other applicable method as approved by the Division giving a reliable flow estimate. Refer to Water Measurement Manual, U. S. Bureau of Reclamation 1974 for other accepted methods of flow determination.

II.B.5.a (continued)

(2) Water samples should be collected in accordance with: Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases, National Handbook of Recommended Methods for Water Data Acquisition (1977) and Methods for Chemical Analysis of Water and Wastes, EPA, March 1979.

(3) Ephemeral streams should be sampled by use of a crest gage (or similar device) and single stage sediment sampler.

(4) Stream sampling and analysis.

(A) Frequency and duration, refer to Table 3.

(B) Field measurements, refer to Table 1.

(C) Laboratory analyses, refer to Table 1.

b. Lake, reservoir, impoundment measurement and analyses.

(1) Maximum lake level data should be collected by taking readings from a stadia staff installed in the lake itself.

(2) Water samples should be collected by use of a Kemmerer depth sampler, a similar weight-activated device or other device approved by the Division.

(3) Lake/reservoir sampling and analysis.

(A) Frequency and duration, refer to Table 2

(B) Field measurements, refer to Table 1.

(C) Laboratory analyses, refer to Table 1.

c. Erosion rates and sediment yield analyses.

II.B.5.c (continued)

(1) On-site erosion rates can be predicted using the Universal Soil Loss Equation (USLE), Modified Universal Soil Loss Equation (MUSLE), Pacific Southwest Interagency Committee (PSIAC), a sediment test plot and other applicable professionally practiced method(s) and models.

6. Predict or describe the consequences of mining and reclamation on the existing flow regime, including peak flows, low flows, water yield, chemical water quality, erosion and sediment and aquatic biota.

a. Submit a minimum of one year baseline data in the Permit Application Package (PAP) in accordance with Table ~~3~~ 2

b. Interpret baseline data to provide information in the PAP about the probable hydrologic consequences from mining of the quantity and quality of surface water.

C. <u>Operational</u> monitoring.

1. Streams.

a. Select with Division approval representative stream sites for operational monitoring.

b. Monitor selected sites as described in Table 3.

c. Parameter selection and analysis frequency as described in Table 1 and Table ~~3~~ 2, respectively.

2. Lakes, reservoirs and impoundments.

a. Select with Division approval representative lake locations for operational monitoring.

b. Continue measuring and sampling selected sites as described in Table ~~3~~ 2.

c. Parameter selection and analysis frequency as described in Table 1 and Table ~~3~~ 2, respectively.

II.C (continued)

3. Submit monitoring results quarterly and an annual summary. The annual summary must analyze variance in flow characteristics and water quality and should include tables, graphs, hydrographs and/or statistics, etc.

D. Postmining monitoring--two years after cessation of earthmoving and site activity.

1. Identify representative stream and lake sites for measuring and sampling.

2. Continue monitoring representative sites as described in Table 3.

3. Parameter selection and analysis frequency as described in Table 1 and Table ~~3~~ 2, respectively.

4. Submit monitoring data annually. Summarize and assess mining impacts and system recovery at the termination of the bonding period.

TABLE 1

SURFACE WATER BASELINE AND OPERATIONAL
WATER QUALITY PARAMETER LIST

Field Measurements:

*	-	Water Levels or Flow
*	-	pH
*	-	Specific Conductivity (umhos/cm)
*	-	Temperature (C^o)
*	-	Dissolved Oxygen (ppm)

Laboratory Measurements: (mg/l)

*	-	Total Settleable Solids
*	-	Total Suspended Solids
*	-	Total Dissolved Solids
*	-	Total Hardness (as $CaCO_3$)
	-	Aluminum (Al)
	-	Arsenic (As)
	-	Barium (Ba)
	-	Boron (B)
*	-	Carbonate (CO_3^{-2})
*	-	Bicarbonate (HCO_3^-)
	-	Cadmium (Cd)
*	-	Calcium (Ca)
*	-	Chloride (Cl^-)
	-	Chromium (Cr)
	-	Copper (Cu)
	-	Fluoride (F^-)
*	-	Dissolved Iron (Fe)
	-	Lead (Pb)
*	-	Magnesium (Mg)
*	-	Manganese (Mn)
	-	Mercury (Hg)
	-	Molybdenum (Mo)
	-	Nickel (Ni)
	-	Nitrogen: Ammonia (NH_3)
	-	Nitrate (NO_3^-)
	-	Nitrate (NO_2)
*	-	Potassium (K)
	-	Phosphate (PO_4^{-3})
	-	Selenium (Se)
*	-	Sodium (Na)
*	-	Sulfate (SO_4^{-2})
	-	Sulfide (S^-)
	-	Zinc (Zn)
*	-	Oil and Grease
*	-	Cation-Anion Balance

-Baseline
*Operational

Table 2. Surface Water Sampling

	Baseline	Operational	Postmining
Type of Sampling Site	Surface Water Bodies	Surface Water Bodies	Surface Water Bodies
Field Measurements (See Table 1)	Performed during water level/flow measurements	Performed during water level/flow measurements	Performed during water level/flow measurements
Sample Frequency	Quarterly for lakes, reservoirs and impoundments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams determined at pre-design conference.	Quarterly for lakes, reservoirs and impoundments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams determined at pre-design conference.	Two per annum for perennial streams (high & low flow); two per annum during snowmelt and rainfall for intermittent streams.
Sampling Duration	Two years (one complete year of data before submission of PAP.	Yearly until two years after surface reclamation activities have ceased.	Until termination of bonding.
Type of Data Collected and Reported	Flow and/or water levels and water quality.	Flow and/or water levels and water quality.	Flow and/or water levels and water quality per operational parameters.
Comments	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements

Table 2. (continued)

	Baseline	Operational	Postmining
Comments		For every fifth year preceding repermitting, one sample at low flow and high flow each should be taken for baseline water quality parameters.	