

# APPENDIX D

## SAMPLE REPORT OUTLINE FOR PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

### Baseline Information

#### I. Description of the permit and adjacent area

##### A. Description of the mining operations including:

- Identify any problems with overburden based on data developed from analyses of test borings or core sampling
- Describe the geology of the permit and adjacent areas
- Describe overburden chemistry
- Review acid-base accounting data for adjacent operations

##### B. Description of the surface-water system:

- Identify all ephemeral, intermittent, and perennial streams; locate on appropriate maps
- Identify all lakes, ponds, and springs; locate on appropriate maps
- Collect all available surface-water quality and surface-water quantity baseline data for the general area containing the permit plan area
- Identify all water users and locate points of diversion and water quantity and quality needs of users
- Obtain data for similar mining operations in the area

##### C. Description of the ground-water system:

- Identify all ground-water wells, seeps, and other ground-water discharge areas and locate on appropriate maps
- Collect all available ground-water quality and ground-water quantity baseline data for the general area containing the permit plan area
- List known aquifers and locate on appropriate maps and cross sections

- Describe local and regional components of ground-water flow and their interaction with the surface-water system in the general area containing the permit plan area
- Identify all ground-water users and quantity and quality needs of users
- Obtain data for similar mining operations in the area

**D. Description of climatic conditions:**

- Collect existing precipitation data for the permit and adjacent areas including monthly and mean annual values
- Collect existing monthly temperature and snowfall data for the permit and adjacent areas
- Collect existing rainfall frequency data for storms for the permit and adjacent area
- Calculate premining estimates of the monthly runoff, evapotranspiration and storage for the permit and adjacent areas

**II. Description of baseline data collection program**

**A. Overburden:**

- Existing data
- Sampling program
- Evaluation of data and potential impacts on hydrology

**B. Surface water:**

- Evaluation of existing data to determine additional data needs
- Describe sampling frequency and identify chemical and physical parameters for analysis
- Present baseline data

**C. Ground water:**

- Describe the evaluation of existing data to determine additional data needs
- Identify existing domestic wells that may be used to measure ground-water surface, and that can be sampled for water quality
- Describe any additional wells drilled and developed to obtain water levels, water quality data, and for performing aquifer tests
- Present baseline data

**D. Soil loss and sediment yield:**

- Describe how on-site erosion concerns were identified and predicted
- Determine unstable stream and riparian zones by field and map inspection
- Collect the following data to quantify soil loss and sediment yield:
  - Soils information from published sources
  - Water samples during medium and high flow for laboratory analyses of suspended solids
  - Field measurements of channel gradients, bank materials, and channel cross sections

**E. Alluvial Valley Floors**

- Identify Alluvial Valley Floors if mine is located semiarid or arid areas west of the 100<sup>th</sup> Meridian

## **Analysis and Prediction Information<sup>2</sup>**

**III. Prediction of probable hydrologic consequences of the mining operation**

**A. Prediction of mining impacts (surface water):**

- Provide rationale for selection of the hydrologic technique that allows for prediction of the potential impact based on overburden, mining methods, hydrologic concerns, and reclamation plans. The following are some examples:
- Erosion changes (MUSLE, RUSLE)
- Runoff changes (S.S., HEC-1, Rational Equation)
- Chemical quality impacts (empirical relationships to overburden, mixing equations that will handle alkaline-acid buffering, etc.)
- Disruption or elimination of aquifers by removal of the coal resource.
- Assess impacts to receiving streams and water users.

**B. Prediction of mining impacts (ground water):**

- Identify and select hydrologic techniques that allow for prediction of potential impacts based on chemical analysis of overburden, mining methods, hydrology and reclamation plans. The following are some possible examples of hydrologic analyses:

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<sup>2</sup> To be used with subsequent analysis and prediction technical reference document

- Loss or gain of ground water by prediction and analysis of water level changes in unconfined aquifers.
- Changes in aquifer characteristics.
- Chemical change of ground water by solute transport analysis, correlation with overburden chemistry, etc.
- Disruption or elimination of aquifers by removal of the coal resource.
- Assess ground-water impacts on receiving streams, regional aquifers, and local water users.

**C. Make predictions of mining impacts on stream morphology:**

- Changes in stream stability.
- Upland stability problems.
- Impact on land use, water uses, etc.
- Effect of permanent structures (ponds, diversions, etc.) on stream morphology.

**IV. Summary And Conclusions**