

The Implementation of Reasonable Potential Analysis



*Ohler Strip
Lower Turkeyfoot Township
Somerset County*

Cambria DMO

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Geographic Characteristics

Kiski – Conemaugh
TMDL

Surface Coal Mining of the
Conemaugh and Allegheny
Groups

Freeport and Kittanning
Coals



*Ankeny Mine
Jenner Township
Somerset County*

Reasonable Potential Analysis (RPA)

- Used to determine whether a WQBEL is required.
- Used to determine whether a discharge(s) has the potential to cause or contribute to an excursion above an applicable water quality standard.
 - *EPA NPDES Permit Writers Manual, September 2010*

Implementation of RPA at the Cambria DMO

- When?
- In non-TMDL watersheds.
- In TMDL watersheds where a WLA is not available.
- 3 Step RPA process.
 - RP (RPA screening).
PADEP TGD 563-2112-115, June 2013
 - RPA determination using mass balance equation.
PADEP TGD 563-2112-115, June 2013
EPA NPDES Permit Writers' Manual, September 2010
 - Development of effluent limits using WQSS or PENTOXSD.

RP (RPA Screening)

- For coal SMPs: *Typically* Iron, Manganese, Total Suspended Solids effluent limits are required.
- The concentration of other parameters is compared to the state water quality criterion.
 - *PA Code Chapter 93*
- Contaminant Concentration < State Water Quality Criterion.
 - **No potential for excursion, RPA finished.**
- Contaminant Concentration > State Water Quality Criterion.
 - **Possible potential for excursion, RPA continues to step 2.**
 - *PADEP TGD 563-2112-115, June 2013*

RPA Step 2

- Mass Balance Equation

- $Q_s C_s + Q_d C_d = Q_r C_r$

- Where:

- Q_s = stream flow above point of discharge
 - C_s = background concentration
 - Q_d = discharge effluent flow
 - C_d = effluent contaminant concentration
 - Q_r = resultant in-stream flow, after discharge
 - C_r = resultant in-stream contaminant concentration
 - *PADEP TGD 563-2112-115, June 2013*
 - *EPA NPDES Permit Writers Manual, September 2010*

Choosing Variables

- Flow

- Discharge

- New permit applications

- Average flow rate

- Permit renewal applications

- 95th percentile low flow rate

- Stream

- Q_{7-10} flow rate

- Concentration

- Average Concentration

- Utilized for the vast majority (> 95%) of RPA calculations.

- Maximum Concentration

- Can be utilized in special circumstances for emphasis.

- Sensitive watersheds.

Typical RPA Parameters

- Sulfate
- Osmotic Pressure
- Aluminum
- Effluent Characterization Data
 - Appendix D of 40 CFR 122
 - *PADEP TGD 563-2112-115, June 2013*

RPA Step 3

- Development of effluent limits using WQSS or PENTOXSD.
 - Effluent limit will always be somewhere between BAT and in-stream criteria.
 - BAT (monthly average)
 - Fe 3.0 mg/L
 - Mn 2.0 mg/L
 - Al 2.0 mg/L (*guideline, not BAT limit*)
 - In-stream criteria (monthly average)
 - Fe 1.5 mg/L
 - Mn 1.0 mg/L
 - Al 0.75 mg/L
 - Osmotic Pressure 50 mOsm/kg
 - WQBELs calculated using WQSS or PENTOXSD may be used if they are more stringent than BAT, but less stringent than in-stream criteria.
 - PADEP TGD 563-2112-115, June 2013
 - PA Code Chapter 93

Why we Conduct RPA this way?

- Assume rapid and complete mixing.
 - Vast majority (> 95%) of mine sites in the Cambria district discharge to head water streams, where mixing is rapid and complete.

- RPA conducted according to PADEP and EPA guidance.
 - Pre-screening conducted according to PADEP guidance.
 - *PADEP TGD 563-2112-115, June 2013*

 - RPA conducted according to PADEP and EPA guidance.
 - *PADEP TGD 563-2112-115, June 2013*
 - *Chapter 6.3.2 Conducting a Reasonable Potential Analysis Using Data.*
 - *EPA NPDES Permit Writers' Manual, September 2010.*



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