Critical Documentation of the CHIA Process by State RAs

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Office of Surface Mining Reclamation & Enforcement

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- CHIAs

  SMCRA requires RA to assess the probable cumulative impacts of all anticipated mining in a given area to assure the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area

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Anticipated mining:

- All existing operations
  - Actively removing coal
  - In reclamation phase only
  - In temporary cessation
  - In process of permit revocation
  - Coal recovery incidental to extraction of other minerals (no SMCRA permit)
  - The proposed operation

Critical Documentation of the CHIA Process by State RAs

Anticipated mining:

- Prospective mining operations
  - Permit application submitted
  - Site where adequate baseline & mine development info

Critical Documentation of the CHIA Process by State RAs

- *Proposed Stream Protection Rule (SPR)*
  - *<u>Existing</u> and anticipated mining*
    - *Proposed operation*
    - *Existing surface & ug coal mining operations*
    - *Any proposed surface & ug coal mining operation (application submitted to RA)*
    - *Any proposed surface or ug coal mining operation where authorization certification or permit app submitted under the CWA*

Critical Documentation of the CHIA Process by State RAs

- *Proposed SPR*
  - *<u>Existing</u> and anticipated mining*
    - *Existing & proposed coal mining operations – federal coal (BLM)*
    - *For ug mines, all areas of contiguous coal reserves adjacent to an existing or proposed ug mine owned/controlled by applicant*

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- Material damage

  Implies some functional impairment of surface lands, features, structures, facilities, or water resources that results in the land's inability to support current or reasonably foreseeable uses

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- Common areas with deficiencies in documentation
  - Geologic data
  - Water resources
  - Delineation of CIA
  - Material damage

Inadequate permit application info / PHC = inadequate CHIA

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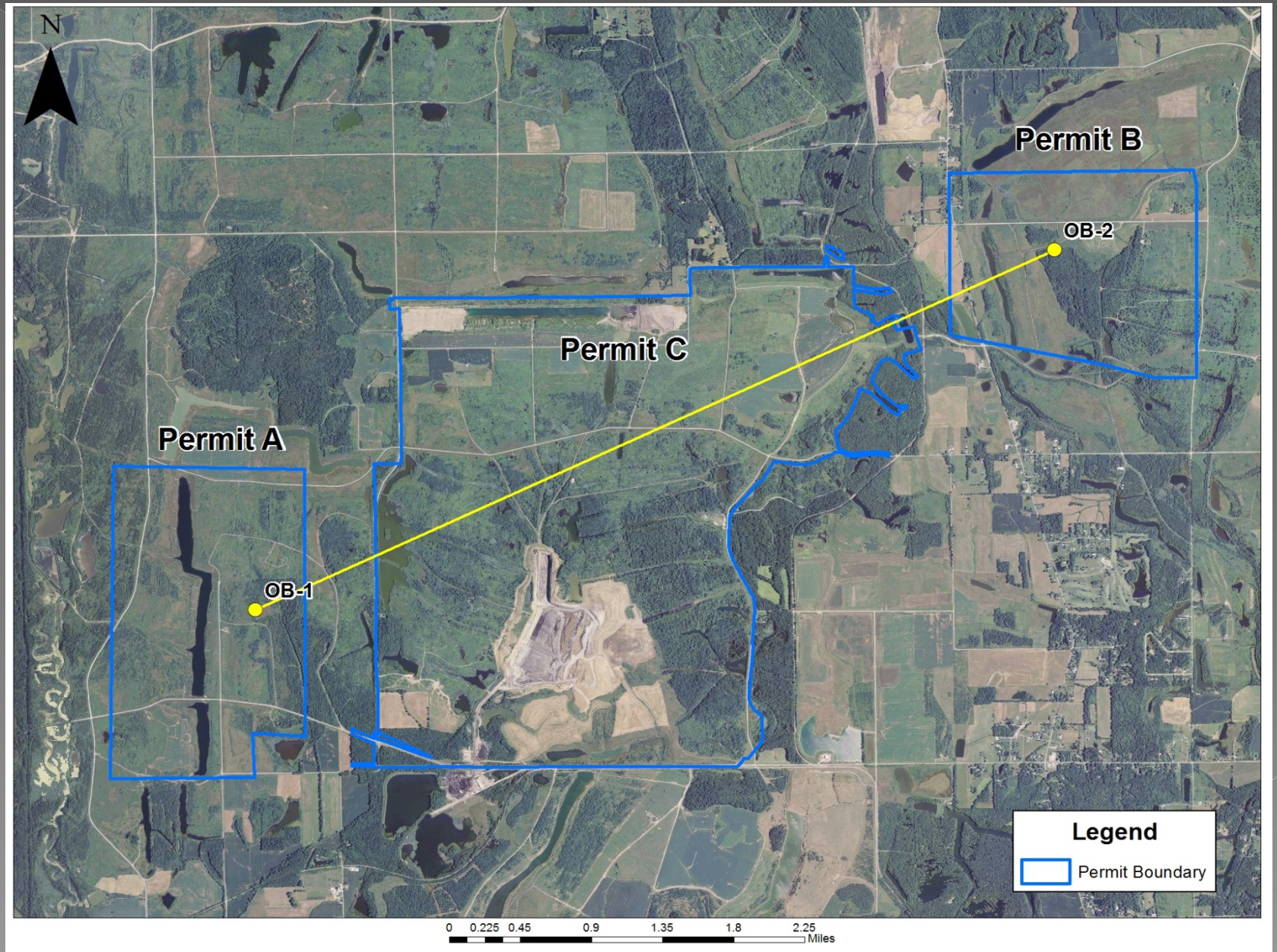
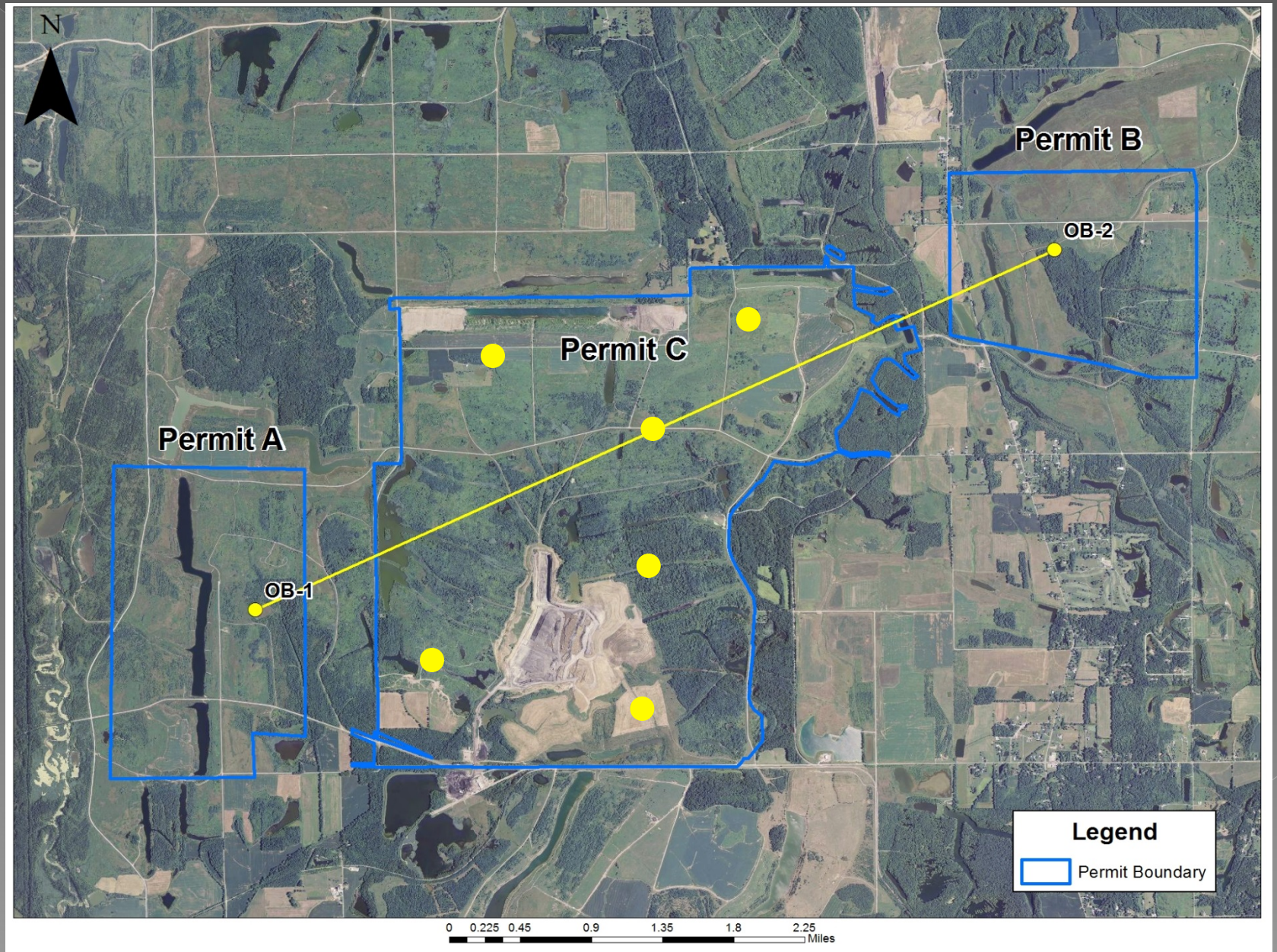
- Common areas with deficiencies in documentation
  - **Geologic data**
  - Water resources
  - Delineation of CIA
  - Material damage

Documentation Deficiencies Noted During Oversight Reviews

- Use of geologic data from outside the proposed permit area to supplement insufficient on site information without documentation or justification
  - Geologic characterization & OB properties


N
Permit B
OB-2
Permit C
Permit A
OB-1
Legend
Permit Boundary
0 0.225 0.45 0.9 1.35 1.8 2.25
Miles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Documentation Deficiencies Noted During Oversight Reviews

- When using geologic data from other sources
  - CHIA must identify data sources along with justification for their use

Proposed SPR: *An explanation of how the areal and structural geology and other parameters affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface water and groundwater.*

Documentation Deficiencies Noted During Oversight Reviews

- Overburden properties
  - Use of overburden spreadsheets
    - PADEP spreadsheet method (Smith and Brady, 1990)
      - Volumetric calculations of each strata within area of influence
      - 'Models' layers as a truncated cone
      - Calculates the NP/MPA ratio
      - Underestimates volumes in flat-lying areas

Documentation Deficiencies Noted During Oversight Reviews

- Modified spreadsheet – MCR
  - Tech Assist Project – November 2013
  - Revised spreadsheet formulas to better estimate volumes for areas of low relief – below drainage
  - ArcGIS – Thiessen polygons to project areas of influence
  - Revised standard unit weights for lithologies
  - Similar interpolations as PADEP – NP/MPA
  - Auto calcs & drop-down menus for ease of data entry

Overburden Analysis Spreadsheet

Operator/Mine: Dolet Hills
Permit No: LSM-3
County/Parish: DeSoto

Drill Hole: OB0944

Unit Weight By Lithology (Tons/AC-FT):

Clay	CL	2662
Loam	LO	1951
Sand	SA	2527
Coal (lignite)	CO-L	1750
Limestone	LS	3549
Sandstone	SS	3428
Shale	SH	2259
Siltstone	ST	3750
Coal (bitum)	CO-B	1800

Total Depth of Boring/Sampling Interval (ft)	133	Top Acreage	1	Bottom Acreage	1	Beginning Depth of Constant Acreage (ft)	1

Sample interval top (ft below ground)	Sample interval bottom (ft below ground)	Sample interval thickness (ft)	Sample Interval lithology	Unit weight (Tons/ AC-FT)	Fizz rating	Pyritic Sulfur (%)	NP (T/KT)	Exchangeable Acidity (T/KT)	Deficiency / Excess (*NNP) (T/KT)	Acreage	Fraction spoiled	Tons MPA	Tons NP	Tons NNP	Tons of overburden	pH**
0	1	1	CL	2662	NR	0.00	0.00	1.80	-1.80	1.00	100%	4.79	0.00	-4.79	2,662	4.0
1	4	3	LO	1951	NR	0.00	0.00	1.50	-1.50	1.00	100%	8.78	0.00	-8.78	5,853	4.1
4	7	3	LO	1951	NR	0.00	0.00	1.30	-1.30	1.00	100%	7.61	0.00	-7.61	5,853	4.3
7	10	3	LO	1951	NR	0.00	0.00	1.20	-1.20	1.00	100%	7.02	0.00	-7.02	5,853	4.3
10	13	3	SA	2527	NR	0.00	0.00	0.50	-0.50	1.00	100%	3.79	0.00	-3.79	7,581	3.9
20	24	4	LO	1951	NR	0.00	0.00	1.70	-1.70	1.00	100%	13.27	0.00	-13.27	7,804	3.9
29	31	2	CL	2662	NR	0.50	0.00	3.20	-18.83	1.00	100%	100.22	0.00	-100.22	5,324	3.0
31	33	2	LO	1951	NR	0.39	0.00	1.80	-13.99	1.00	100%	54.58	0.00	-54.58	3,902	2.9
34	38	4	CL	2662	NR	0.60	0.00	2.90	-21.65	1.00	100%	230.53	0.00	-230.53	10,648	2.8
39	46	7	LO	1951	NR	0.10	0.00	2.90	-6.03	1.00	100%	82.28	0.00	-82.28	13,657	3.2
49	53	4	LO	1951	NR	0.07	0.00	2.20	-4.39	1.00	100%	34.24	0.00	-34.24	7,804	3.3
55	62	7	LO	1951	NR	0.04	5.50	0.00	4.25	1.00	100%	17.07	75.11	58.04	13,657	5.6
63	72	9	LO	1951	NR	0.05	1.30	0.40	-0.66	1.00	100%	34.46	22.83	-11.63	17,559	3.7
72	76	4	LO	1951	NR	0.37	0.00	0.60	-12.16	1.00	100%	94.92	0.00	-94.92	7,804	3.6
79	92	13	LO	1951	NR	0.15	0.00	0.20	-4.89	1.00	100%	123.96	0.00	-123.96	25,363	4.9
92	99	7	CL	2662	NR	0.03	1.60	0.10	0.56	1.00	100%	19.33	29.81	10.48	18,634	5.5
99	109	10	LO	1951	NR	0.03	1.50	0.00	0.56	1.00	100%	18.29	29.27	10.97	19,510	5.6
109	116	7	LO	1951	NR	0.02	1.90	0.00	1.28	1.00	100%	8.54	25.95	17.41	13,657	5.4
118	119	1	LO	1951	NR	0.06	1.40	0.10	-0.58	1.00	100%	3.85	2.73	-1.12	1,951	5.0
119	129	10	SA	2527	NR	0.02	0.00	0.20	-0.83	1.00	100%	20.85	0.00	-20.85	25,270	3.6
131	133	2	SA	2527	NR	0.04	0.00	0.20	-1.45	1.00	100%	7.33	0.00	-7.33	5,054	3.5

Total (Tons):	895.71	185.70	-710.01	225,400
Total (Tons/KT):	3.97	0.82	-3.15	
NP/MPA Ratio	0.21			
Available NNP (Tons/Ac)	-710.01	DEFICIENT		

Input

Auto Calculation - NO INPUT

*NNP < or = -5 T/KT = potentially toxic, LOC standards

** < 4 SU = acid/toxic, LOC standards

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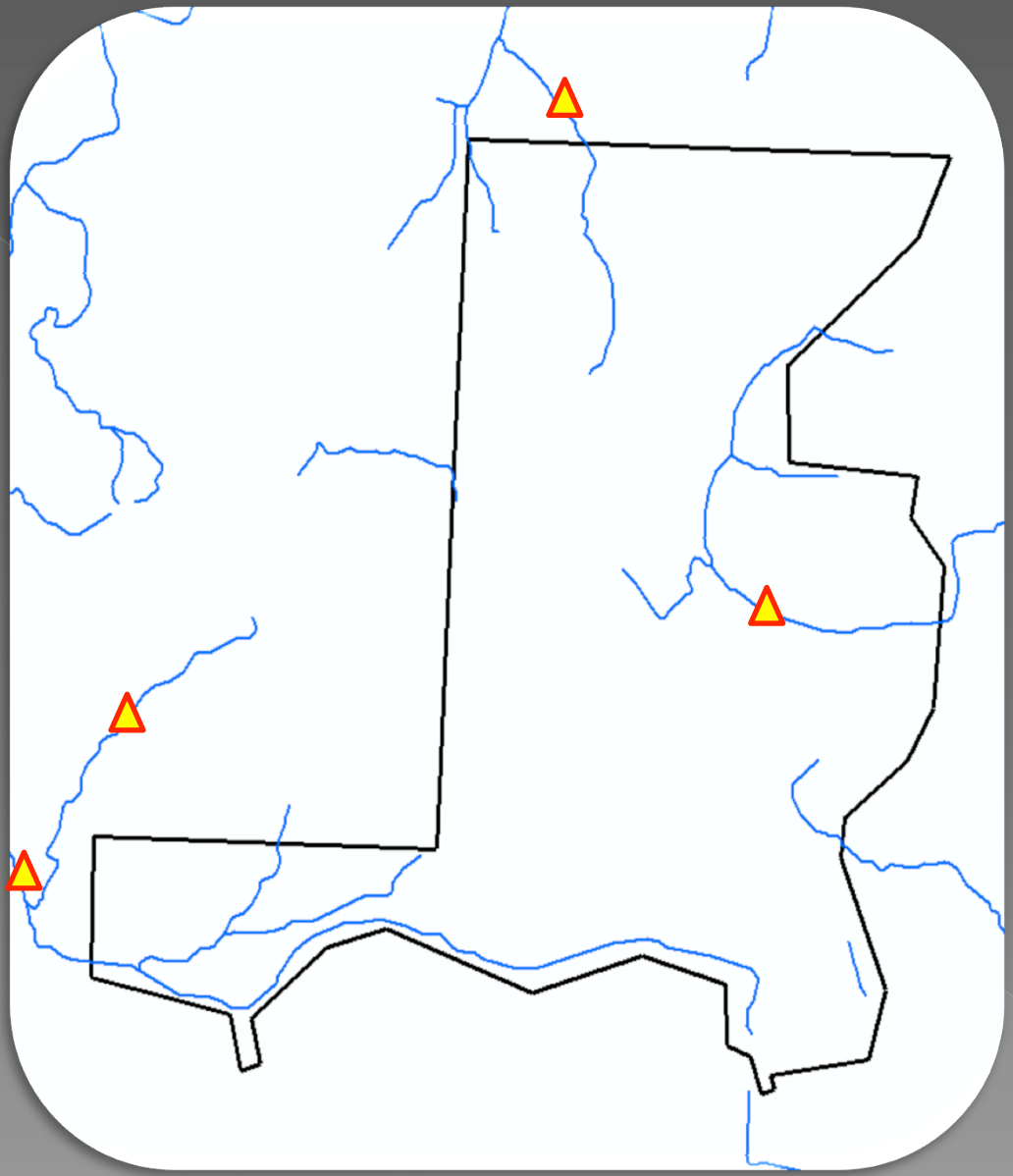
- More common areas of deficiencies in documentation
  - Geologic data
  - **Water resources**
  - Delineation of CIA
  - Material damage

Critical Documentation of the CHIA Process by State RAs

- More common areas of deficiencies in documentation
  - Geologic data
  - **Water resources – surface water**
  - Delineation of CIA
  - Material damage

Documentation Deficiencies Noted During Oversight Reviews

- **Surface water**
  - Surface water monitoring
    - Justification / documentation that sampling locations are adequate for characterization & providing sufficient baseline data for characterization & future comparison purposes
      - Streams (upstream, downstream)
      - Ponds, lakes, impoundments



Documentation Deficiencies Noted During Oversight Reviews

- **Surface water**
  - CHIA must document & justify surface water monitoring of water resources
    - Adequate baseline sampling locations of all / select surface water sites
    - Adequate baseline parameters & sufficient number of samples to demonstrate seasonal variation
    - Adequate monitoring during mining & reclamation

Documentation Deficiencies Noted During Oversight Reviews

- **Surface water**
  - CHIA must document & justify surface water monitoring of water resources
    - Use of off site data
    - Mine pools discharges

Documentation Deficiencies Noted During Oversight Reviews

- **Surface water baseline- Proposed SPR**
  - Minimum parameters
  - Info on all stream types
  - Minimum of 12 consecutive months of samples (Palmer Drought Severity Index)
  - Precipitation data
  - Assessment of biological condition
  - Data on discharges from previous mining

Critical Documentation of the CHIA Process by State RAs

- More common areas of deficiencies in documentation
  - Geologic data
  - **Water resources – groundwater**
  - Delineation of CIA
  - Material damage

Documentation Deficiencies Noted During Oversight Reviews

- **<u>Groundwater</u> – CHIA must document & justify:**
  - Sufficient number of monitoring wells in strategic locations for characterization & impact analysis
    - Upgradient & downgradient
    - GW flow direction
    - Detect potential impact on gw resources
      - Domestic wells

Documentation Deficiencies Noted During Oversight Reviews

- **<u>Groundwater</u> – CHIA must document & justify:**
  - Adequate depth and construction
  - Adequate parameters & sufficient number of samples (quantify quality & establish quantity – seasonal variation)
  - Mine pools
  - Use of models
  - Use of off site data
  - Monitoring plan

Documentation Deficiencies Noted During Oversight Reviews

- **Groundwater baseline – Proposed SPR**
  - Mine pools within or adjacent & hydrologically connected – assess characteristics
  - Properly screened wells
  - Parameters
  - Upgradient & downgradient monitoring of the proposed permit area
  - Minimum of 12 consecutive months (Palmer Drought Severity Index)
  - ……

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  - Geologic data
  - Water resources
  - **Delineation of CIA**
  - Material damage

Critical Documentation of the CHIA Process by State RAs

- CIA (Cumulative Impact Area)
  - The area, including the permit area, within which impacts resulting from the proposed operation may interact with the impacts of all anticipated mining on surface- and ground-water systems (30 CFR 701.5)

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- CIA
  - Delineate on map (sw & gw)

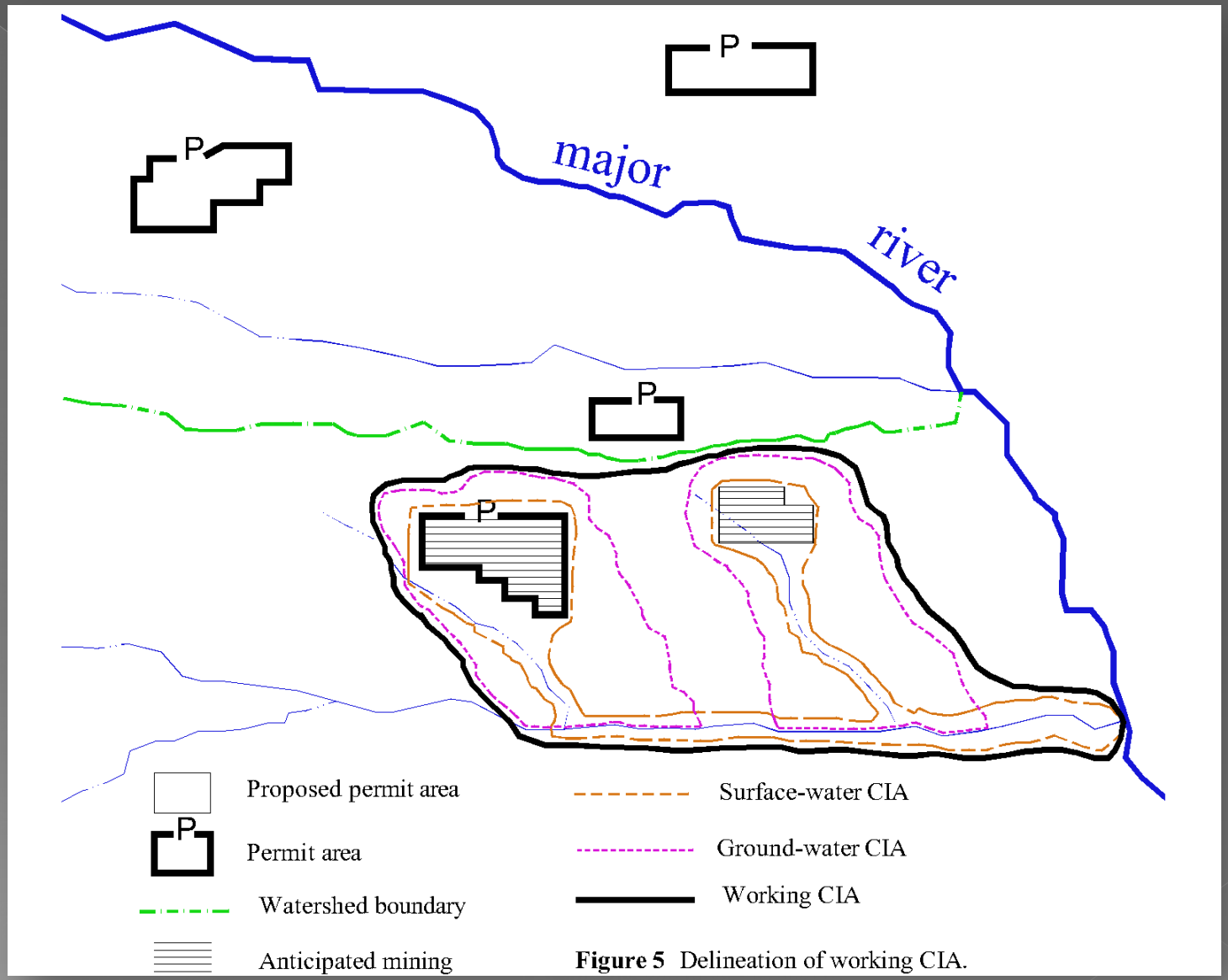

Figure 5 Delineation of working CIA.

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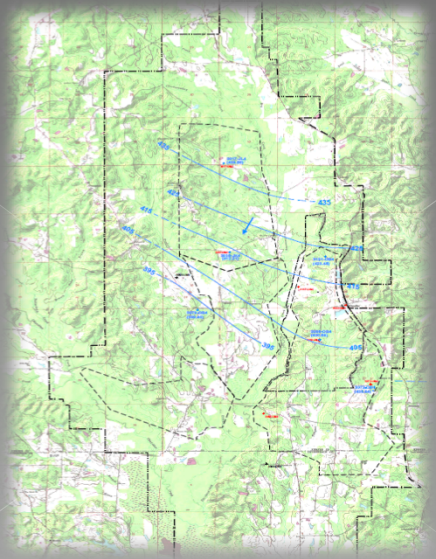
- CIA
  - Delineate on map (sw & gw)
  - Document in CHIA how the CIA was determined including a discussion of those nearby operations that were not included
  - Hydrologically isolated systems
  - Include necessary references



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- Material damage criteria - CHIA
  - **Needs to be quantitative not qualitative**
  - **Document / justification of criteria**
  - **Discuss how monitoring plans will be used to monitor for material damage to the hydrologic balance outside the permit area**

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- Material damage means (Proposed SPR):
  - Any functional impairment of surface lands, features, structures or facilities;
  - Any physical change that has a significant adverse impact on the affected land's capability to support any current or reasonably foreseeable uses or causes significant loss in production or income; or
  - Any significant change in the condition, appearance or utility of any structure or facility from its presubsidence condition.

- (Proposed SPR) Material damage to the hydrologic balance outside the permit area means:
  - Any adverse impact from surface coal mining and reclamation operations or from underground mining activities, including any adverse impacts from subsidence that may occur as a result of underground mining activities, on the quality or quantity of surface water or groundwater, or on the biological condition of a perennial or intermittent stream, that would…..

- (Proposed SPR) Material damage to the hydrologic balance outside the permit area means:
  - Preclude any designated use under sections 101(a) or 303(c) of the CWA or any existing or reasonably foreseeable use of surface water or groundwater outside the permit area or……

or

- (Proposed SPR) Material damage to the hydrologic balance outside the permit area means:
  - Impact threatened or endangered species, or have an adverse effect on designated critical habitat, outside the permit area in violation of the Endangered Species Act of 1973

Critical Documentation of the CHIA Process by State RAs

- Keep CHIA in mind during permit application review
- Ensure PHC is sufficient
- Consider using checklists
- **Justify/document, justify/document, justify/document**!
- Peer review