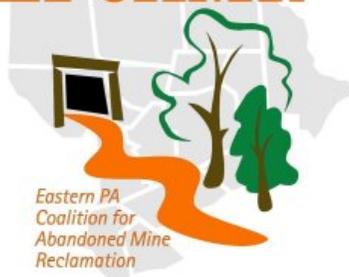


# EPCAMR



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July 30, 2008

**Re: Quarterly Report of work done for Mine Pool Mapping Grant (2<sup>nd</sup> Qtr. 2008)**

## **Mine Pool Mapping Update Work Progress Report (chronological)**

### March

- 3/10 – 3/11 EPCAMR and PA DEP Pottsville District Mining Office Staff conducted an intensive two-day field sampling event, photo-inventory, flow sampling, GIS coordinate and elevation update of the larger abandoned mine discharges in the Western Middle Anthracite Coal Fields for the Mine Pool Mapping Program. Purchased a 500GB hard drive for this program to obtain and store 366 GB of the Office of Surface Mining (OSM) digital mine map repository scanned imagery.
- Posted the Mine Pool Mapping 1<sup>st</sup> Quarter 2008 Report to the “Talking Timbers” section of the homepage.

### April

- Attempted to research the source of the Knox Mining Disaster layer to form metadata for the file. The layer was sent to me via McCormick and Taylor as a part of the Luzerne / Lackawanna Bi-County Comprehensive Plan. Found a report on the Mining Safety & Health Administration (MSHA) website recalling the disaster, but nothing from the “Anthracite Institute”. This is a possible source of information for the “Northern Field” section of the study.
- Began looking at the new OSM mine map folios to see what they contained and what help they may be with the mine pool mapping project.

### May

- EPCAMR staff hosted a Mine Pool Mapping Project Work Session at the Luzerne Conservation District (LCD) Office to showcase work that has been completed so far.
- Created an electronic database of borehole data from the USGS WRIR Report for the Western Middle Anthracite Region mine pools. Compared this information to the borehole data from PA DEP BAMR to add another few years worth of quarterly monitoring data to the approximately 20 years worth of existing data for the Mine Pool Mapping Project. Also reformatted the graphs in the BAMR Borehole Database to better represent consistency in the data.

### June

- Worked off of notes taken from a Mine Pool Mapping work session to adjust an existing Western Middle Anthracite Colliery boundaries file and add bottom elevations. Also added the Weston and Morea Mine Collieries to the database, which are a part of the Western Middle Field, but were not in the file. These mines were found by referencing the Office of Surface Mining’s (OSM) folios. This data will be used by USGS to create a mine pool water flow model in ModFlow. Also prepared the BAMR Boreholes file for use with ModFlow.
- Received Earth Vision, a 3D Modeling program, from the OSM TIPS program and installed it on the GIS Laptop. This program may be used to generate 3D maps of mines in the region. An

example was already completed in the Wyoming Valley by Mike Dunn, OSM in Pittsburg, as he was researching the Dundee Borehole collapse.

- Digitized the mine pools in the Eastern Middle Anthracite Region as portrayed in the Bureau of Mines Report 491 for the Mine Pool Mapping Project. Also defined the different coal regions in PA DCNR's Limit of Coal Layer to help break up the different coal fields. Used the Limit of Coal layer to define the boundaries for the Western Middle Coal Field. Reprojected and clipped several layers to these boundaries and handed this data over to the USGS at a Mine Pool mapping Works Session at the Pottsville District Mining Office.
- Georeferenced an excel table from the USGS containing discharge locations with elevations, water quality / quantity and treatment recommendations in ArcMap. Wrote metadata and defined the 3D Projection for the file so it could be portrayed in ArcGlobe and ModFlow. Also began the arduous task of lining up OSM's Folios with above ground reference points, with the end goal to line up the barrier pillars, mine pools and tunnels to be sure they are in the correct underground locations. The OSM folios are the best portrayal of underground mining extents available, but it takes a lot of work to be sure they are lined up properly. Once the folios have been georeferenced properly, OSM and BAMR have requested these files back for their use.

July

- Adjusted several barrier pillars related to the Kohinoor and Indian Ridge Collieries in the GIS layer to match up to those portrayed in the OSM Folios. More of this needs to be done to correct all in the Western Middle Field.
- Spoke with Mike Dunn, OSM in Pittsburg, about structural contours as requested by the USGS. Found out that creating them from the USGS Coal Investigations C-series maps was possible with several pieces of software: Adobe Photoshop Elements (to optimize scanned images for processing), R2V (to create vector lines, like contours and faults) from the raster images) and Earth Vision (to view in 3D and convert to GIS & ModFlow formats). Ordered these immediately to begin processing the images. The original paper copy maps should be scanned in 400 dpi resolution and 24 bit color for best results.
- Spent some time to talk with Mike Dunn and go through online tutorials to learn the R2V and EarthVision.
- Received C10 (Mount Carmel East) in 200 dpi resolution from Jim Andrews, Pottsville DMO, via ftp file transfer and sent to Mike Dunn for image optimization. Began my first trial of the new software and produced a structure contour (minus the faults). This image was workable in the current resolution, but made a "choppy" vector contour layer when "Vectorized."
- Received a DVD of 5 scanned C-series Maps at 400 dpi resolution from Jim Andrews: C-19, C-25, C-46, C-47, and C-48. Each file was about 800MB, causing some problems for Photoshop. Used GIMP 2.0, freeware image processing software, to clip the images to only the area that was needed. This reduced the file size enough with out compromising the resolution to use Photoshop and the other programs. We will continue to look for the rest of these maps to get a complete structure contour for the western middle coal field.
- Compiled reports and numbers for this 2<sup>nd</sup> Quarter Mine Pool Mapping Project Report.

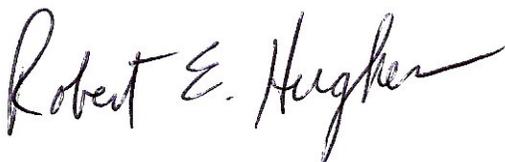
# Eastern PA Coalition for Abandoned Mine Reclamation- Mine Reclamation-Eastern PA Mine Pool Mapping Update Work Progress Report 2-PD060367

- On 4-30-08, EPCAMR Staff prepared the tentative agenda for the 5-6-08 Mine Pool Mapping Meeting at the EPCAMR Office (**See Attached Tentative Agenda for 5-6-08 EPCAMR Partners Meeting with detailed discussion points**); At the meeting, Roger was given a database of the barrier pillars by Mike; Roger will be looking at sumps, pumps, and shafts to get good bottom elevations of the lowest seams mined and will need to configure a schematic detailing the underground workings; Water levels in the boreholes (@ 40) were deemed very important for the flow system being developed by the USGS; The hydraulic conductivity and transmissivity of the mine pool water is going to equal the volume conservatively; Kim Snyder of PA DEP BAMR will provide EPCAMR with an updated spreadsheet of borehole data with corrected positions; BAMR and OSM have geologic cross-sections on microfilm; Roger will assist Ian in finding the Coal Ash sites for chemical monitoring data and will talk with Cindy in the Pottsville DMO for SubChapter G Monitoring Points as well; Ian reported that we are not finding everything that we were initially looking for in the Surface Mine Permits
- EPCAMR Staff ordered and received the Maxtor External Hard Drive to be able to receive the massive quantity of digital OSM Folio Files that would be necessary to reference, review, and incorporate into the digital mapping file system
- Triet Tran from PA DEP informed EPCAMR that our CRP review for Professor Andrew Kleit, came back without any problems; Professor Kleit will be contracted to complete an economic impact framework analyses on the potential reuse of mine pool water along with another PSU Professor as independent contractors; Received a response back from Professor Jim Shortle that he does not have the time available to commit to the project and has therefore decided to withdraw from the contract negotiations; However, he did refer another economist from PSU to the project, Dr. William Delavan, Ph. D. in Environmental Economics who has experience in mine drainage work; Executive Director ran his name through the CRP System as a background check and he was cleared; Talked with Dr. Delavan on the phone to update him on the progress of the project and his eventual involvement
- Worked on GIS Mine Pool Mapping Reimbursement, completed paperwork, and mailed copies to the PA DEP Grants Center and the Pottsville DMO
- Received and reviewed a copy of Roger Hornberger's Monthly Progress Reports; Reviewed reference documentation that was attached with the Reports; **See attached Progress Reports and Reference Documentation for April, May, June, July 2008**; Submitted Invoices to EPCAMR for reimbursement
- Received and reviewed a copy of Ian Palmer's Monthly Progress Report's ( **See attached ICP 08 04,05,06,07 Progress Reports**); Submitted Invoices to EPCAMR for reimbursement

- Worked with Mike Dunn, OSM-Pittsburgh to talk with Bill Winters about EPCAMR being the recipient of one or both of their Altek 36" x 48" active area digitizers that they are going to be putting into surplus; EPCAMR will need to pick up from the Pittsburgh over the summer
- On 6-26-08, Mike Hewitt-EPCAMR Watershed Outreach Coordinator convened a meeting of the project partners at the Pottsville District Mining Office to review work progress to date and to discuss the USGS Groundwater Modeling needs
- On 6-30-08, EPCAMR Executive Director prepared a letter to Paul Swartz, SRBC Executive Director requesting permission to use publication No. 207, titled "**Surface Overflows of Abandoned Mines in the Eastern Middle Anthracite Field**" by Jerrald R. Hollowell as a reference document for a chapter in a publication that Roger Hornberger and EPCAMR are working on for the PA Geological Survey publication; Mr. Hollowell and the Susquehanna River Basin Commission would be given full credit for the use of the report; We have referred to excellent information in two Pennsylvania Geologic Survey Water Resources Reports by Hollowell (1971) and Hollowell and Koester (1975) in the chapter on the Northern Anthracite Field; Received permission from Paul on the next day
- Received and reviewed the USGS Quarterly Report and corresponded with the Dauphin County Conservation District with regards to the billing; **See attached USGS Quarterly Report;** Chuck Cravotta provided EPCAMR and the DCCD with a quarterly progress report; USGS expects that they will begin data evaluation and development of the conceptual model for the Western Middle Field during the next two quarters; In addition to Dan Goode, John Clune will be assisting on the project; Chuck provided EPCAMR with the listings of available USGS publications for the Anthracite Coalfields; Chuck compiled this information through the Publications Warehouse website (<http://pubs.er.usgs.gov/usgspubs/>) searching by author; Chuck will attempt to obtain a hard copy or electronic copy, if available, of each of the reports that cover the areas of Western Middle or Southern Anthracite Fields; Generally only the USGS Bulletin (B) or Professional Paper (PP) series reports are available in electronic format; If USGS can scan the hard copy reports, perhaps the warehouse will be able to post them for future users
- Reviewed Roger's analyses on the information that he gathered on the major pumpers in the Western Middle Field for use in the USGS groundwater model; The Commonwealth of Pennsylvania, DEP Bureau of Abandoned Mine Reclamation is the largest pumper, by far, in the Western Middle Field, with their pumping operation at the Gilberton Shaft; BAMR has been pumping there for many years to prevent the flooding of the basements of homes in the town of Gilberton; Jack Buckwalter from BAMR gave Roger a spreadsheet of monthly pumping records from 1992 through 2007; They generally pump about 3 billion gallons per year, and their spreadsheet shows the hour meter starting and ending numbers for each month and the estimated gallons pumped from the mine pool; The pumping data is expressed as total gallons pumped per month and total gallons per year; Roger converted the annual data from 1992 through 2007 to gallons per day and gallons per minute; The data range from 1,897,100.62 gpd (1,317.43 gpm) to 11,742,718.69 gpd (8,154.67 gpm). A problem with this data set is that in 4 of these years there are months where 0 pumping took place; 1999 has 6 months without pumping. Roger, then deleted these 4 years with any 0 months, and then the range became 4,757,601 gpd (3,303.89 gpm) to 11,742,718.69 gpd; The zero has been interpreted to be when the pumps were at a critical stage to pump, otherwise, the water levels were lower than necessary to pump

- In order to get one number that the team can use for the Gilberton Shaft pumping, Roger computed means and medians; The mean for all 16 years period of record is 5,054.471 gpm, and the mean for the 12 years not having a 0 month is 5,861.974 gpm. Roger constructed a quick "stem and leaf" frequency distribution to determine the median value; the data are somewhat symmetrically or normally distributed, and the median is 5,770.5 gpm; The fact that the mean and median are so close is an indication that the data are not far from being normally distributed, so Roger thinks the team can use either number to represent continuous pumping from the Gilberton Shaft
- The cogeneration plants in the Western Middle Field typically pump water from the mine pool, treat it and use it for cooling water; Roger called all of them to get the pumping values; Gilberton Power is pumping the mine pool at a location very close to the Gilberton Shaft, and they pump 1,200 gpm continuously or 1.7 mgd; Schuylkill Energy Resources (SER) located near Shenandoah, have been pumping from the Maple Hill Shaft, and they report 165,000 gpd (114.58 gpm) and more recently are pumping 822 gpm, 24 hrs/day, 7days/week; Wheelabrator Frackville Energy near Frackville has 2 pumps rated at 1500 gpm, but they are currently using only 1 pump and are continuously (i.e. 24 hrs/day) pumping 400 gpm; One of the potential problems with some of this Cogen plant data (e.g. SER) is that they may use part of the pumped water to condition their ash and this water may not be treated and thus may not be accounted for in their recorded pumping data; Mount Carmel Cogen near Kulpmont, does not pump from the mine pool; they have a deal with aquaPennsylvania to obtain their cooling water from the public water supply
- Roger has made some inquiries (e.g. Shamokin City Manager) about industrial users of the mine pool water and has found only one in the Western Middle Field, and it is noteworthy; Several years ago a representative of a local potato company came to the Pottsville District Mining Office inquiring about where they could drill a well to get a significant amount of process water and the mine pool was discussed as an alternative; The company is Keystone Potato Products and they are located on Route 25 near the Hegins exit on I-81; Roger talked with the plant manager and they did drill a well into the underlying mine pool and typically pump 150,000 to 200,000 gpd about 3 days per week when they are doing a certain type of potato processing
- EPCAMR Executive Director and EPCAMR Staff prepared third GIS Mine Pool Mapping Report to keep everyone updated on the project through July 2008

Respectfully Submitted,



Robert E. Hughes  
EPCAMR Executive Director  
Luzerne Conservation District AML Program Manager