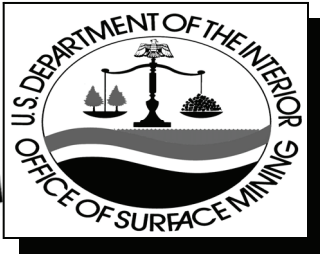
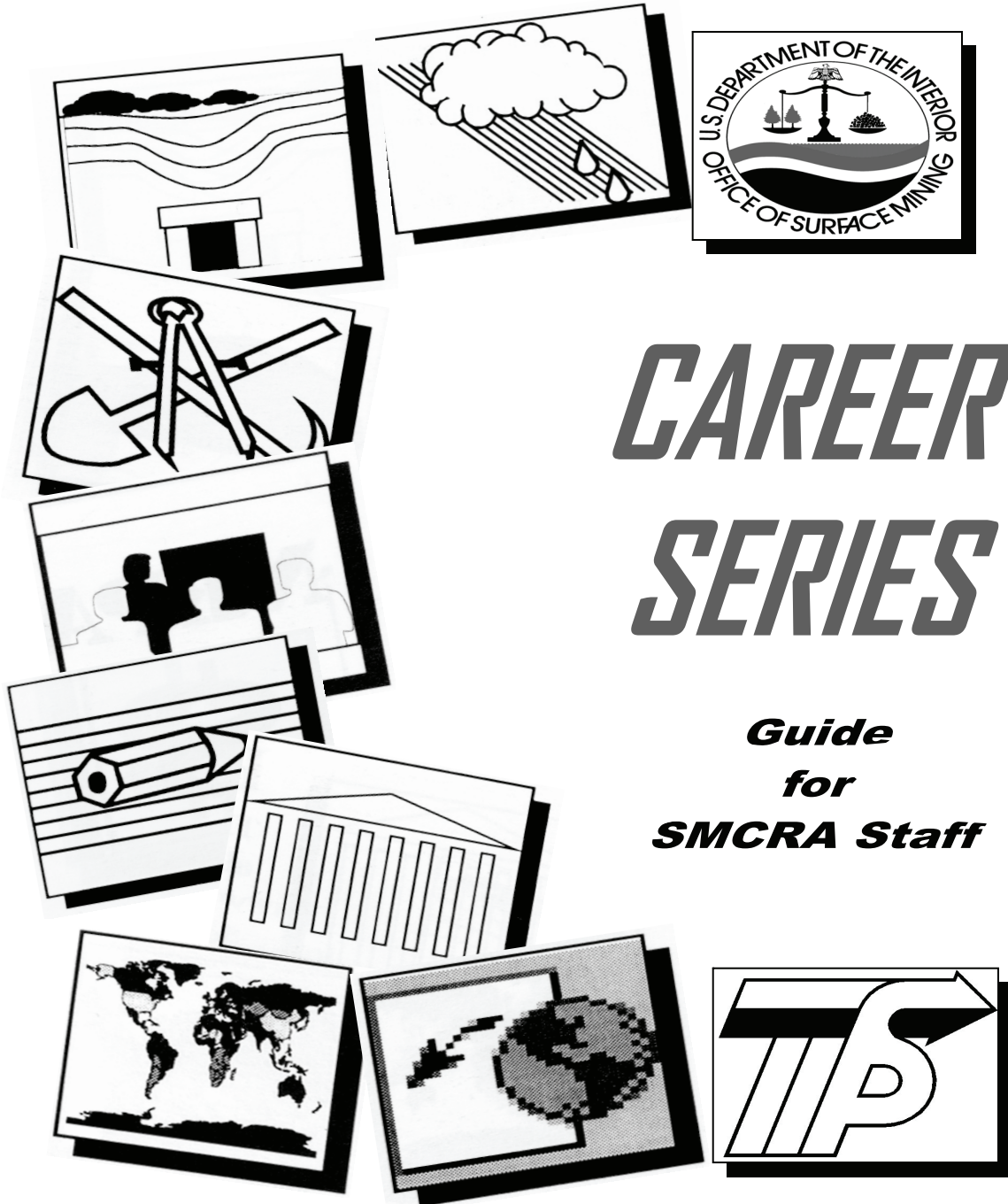


Office of Surface Mining Reclamation and Enforcement
National Technical Training Program
TIPS Training Program



CAREER
SERIES

Guide
for
SMCRA Staff



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April 2008

Introduction to

NTTP/TIPS Training Career Series Guide

The National Technical Training Program (NTTP) and the Technical Innovation and Professional Services (TIPS) training programs are pleased to announce and provide you with our Training Career Series Guide. Given the current and ever increasing turnover of staff in the nation's SMCRA programs, the NTTP/TIPS management, at the request of the NTTP Steering Committee and with assistance from the training programs' Instructor Advisory Council, has developed career specific course listings.

What are Career Series?

Career Series are a collection of NTTP and TIPS training courses specific to different job descriptions within SMCRA agencies and were designed to assist the employee and their manager/management in the selection of training course requests. The series will allow the selection of course requests based on an individual's strengths, challenges and existing background knowledge and training. They will also serve as a guide for progression of career specific training considering the educational content of the specific courses. These series have been developed by State, Federal and Tribal training experts in the NTTP and TIPS training programs as an outline of the general sequencing of courses available. The NTTP and TIPS course catalogs (hard copy and on-line versions) <http://www.tips.osmre.gov/NTTP/NTTPCourses.htm> http://www.tips.osmre.gov/training/tips_html/tipscourses_ilt.asp?FY=2008 provide you with the basic course descriptions and 'Who Should Attend' information and gives students and managers an explanation of content, prerequisites, and applicability to the functional areas.

How Do I Use the Career Series Guide?

The career series guide should be used in concert with the NTTP and TIPS course catalogs listed above. The employee, new or experienced, and their supervisor/manager should review the career series and catalog descriptions in light of their current education and experience in their specific position. We recognize that in many OSM, State and Tribal agency offices individuals may be employed in positions with multidisciplinary job duties, i.e. regulatory as well as AML duties, permitting reviews as well as complaint responders; in those instances, multiple series listings should be used in concert to develop a training sequence based on the individual employee and program needs. We have included a basic overview of the job duties that were considered in developing each series to assist you with the selection process. After reviewing the series, select NTTP and TIPS training courses that fill in the gaps in your

experience and training and/or that provide new educational and career development opportunities. The choices should then be provided by the agency's training contact to NTTP through the annual Training Needs Survey as space requests.

What Courses are Covered by the Career Series Guide?

Both NTTP and TIPS courses were included in development of the Career Series Guide. These career series consider prerequisites and sequenced courses so that the educational development follows the mining and reclamation programs. An Appendix is included with the series that outlines the NTTP and TIPS courses that have recommended prerequisites. **The Career Series Guide course listings should not be considered as obligatory course series requirements.** The sequenced listings should serve as a **practical guide** for individual employees and their supervisors in developing a career training path that will assist with their professional development and program specific employee needs. Also be aware that within the TIPS training program there are also many on-line training opportunities that are not included individually within the career series but are available to the students to learn new tools as they progress in their career development.

We encourage input on these career series and will continue to update the series as new courses are added to the training program and time permits. We will also be using these series to examine the courses taught and the modules within the courses to ascertain if additional courses or modules need to be developed.

We believe that the development of these series coupled with the success in working with George Mason University to authorize Continuing Education Credits for our courses are a positive step forward for our training programs and we welcome your comments regarding the same.

We sincerely hope that you find these recommendations helpful as you and your staff identify your training needs and participate in the training programs. If you or your staff have questions regarding this Career Series Guide, feel free to contact the NTTP at 202-208-2769 or TIPS Training Office at 303-293-5067, for assistance.

CAREER SERIES GUIDE

FOR

SMCRA STAFF



REGULATORY ENGINEERS Career Series

Purpose: To provide a recommended sequence of classes for engineers (mining, civil, environmental) working in coal regulatory programs to facilitate professional development.

Regulatory Engineers – This includes persons who are employed in a variety of capacities within the coal regulatory arena. It includes engineers whose duties involve any number of the following: evaluation of mine site permit plans and designs for compliance with regulatory provisions of SMCRA and state regulations; evaluation of field conditions related to mine plans and engineering designs; evaluations of regulatory engineering field problems and construction evaluations; evaluations of field conditions relative to potential mining related causes; and generally serves as an expert in the application of geotechnical and mining engineering principles to issues involving mining and land-reclamation.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = prerequisite suggestion, see Appendix**

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining/environmental related topics

Effective Writing

Underground Mining Technology

AutoCAD Fundamentals for Permitting and Reclamation*

Permit Findings Workshop

Carlson Mining for Permitting and Reclamation (SurvCADD)*

AutoCAD Map for Permitting and Reclamation*

Surface and Groundwater Hydrology

Soils and Revegetation

Introduction to GPS with Garmin eTrex Vista C

Erosion and Sediment Control*

Acid-Forming Materials: Fundamentals and Applications

SEDCAD Applications and Extensions for Mine Permitting and Reclamation*

Bonding – Cost Estimation

Galena Slope Stability Analysis

Evidence Preparation and Testimony*

AutoCAD Map with Raster Design for Underground and Surface Mine Mapping*

ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis

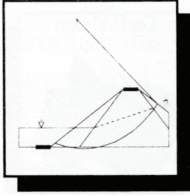
Blasting and Inspection

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Expert Witness*
Subsidence*
Excess Spoil Handling and Disposal in Steep-Slope Topography*
Introduction to ArcGIS for Mining and Reclamation*
Coal Field Communications: How to get it Right!*
Surface Deformation Prediction System (SDPS)*
Blasting Log Evaluation Program (BLEP)*
Geology and Geochemistry of Acid Forming Materials*
Advanced Carlson Mining for Permitting and Reclamation (SurvCADD)*
Advanced AutoCAD for Permitting and Reclamation*
ARCGIS Spatial Analyst for Mining and Reclamation*
Advanced Blasting: Investigations and Analysis of Adverse Effects*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Permitting Hydrology*
Enforcement Procedures
Wetlands Awareness
Quantitative Hydrogeology*
Underground Mine Mapping with GIS
NEPA Procedures
Analyzing Environmental Monitoring Data Using Statgraphics Plus
Historic and Archeological Resources
SMCRA and the ESA: Implementation of the 1996 Biological Opinion
Modeling and Analysis with Groundwater Vistas
Testing and Analysis of Aquifer Characteristics with AQTESOLV
Statistics Workshop: Interpretation of Water Quality Data Using Statgraphics and AquaChem*
Passive Treatment: Theory and Applications Workshop
AMDTreat for Acid Drainage Treatment Cost Estimation*
Geology and Geochemistry of Acid Forming Materials
Water Quality Analysis Using AquaChem*
GPS Analyst for ArcGIS*
Image Analysis for ArcGIS*
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
Geoplotter 3 GPS and PF Office: Advanced GIS Mapping for Reclamation*



AML ENGINEERS/DESIGNERS Career Series

Purpose: To provide a recommended sequence of classes for engineers (mining, civil, environmental) and designers working in the Abandoned Mine Land Program to facilitate professional development.

AML Engineer/Designers – This includes those who are employed in a variety of capacities within the AML programs who are involved with the development of design documents and specifications related to abandoned mine reclamation construction planning and project development. They may be involved in the creation of designs and specifications for abandoned mine reclamation projects; evaluation of consultant developed designs for construction projects; evaluations and analysis of field related construction problems and projections; analysis of abandoned mine land citizen complaints related to land stability, subsidence and other engineering related problems; and generally serves as an expert in the application of geotechnical and mining engineering principles to issues involving mining and land-reclamation.

Black Font = NTTP Courses Blue Font = TIPS Courses
* = suggested prerequisite, see Appendix

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining/environmental related topics

Effective Writing

AML Reclamation Projects

AutoCAD Fundamentals for Permitting and Reclamation*

Carlson Mining for Permitting and Reclamation (SurvCADD)*

AutoCAD Map for Permitting and Reclamation*

Surface and Groundwater Hydrology

Soils and Revegetation

SEDCAD Applications and Extensions for Mine Permitting and Reclamation*

Bonding – Cost Estimation

AML Design Workshop: Dangerous Highwalls*

Acid-Forming Materials: Fundamentals and Applications

Galena Slope Stability Analysis

Erosion and Sediment Control*

Acid-Forming Materials: AML Workshop

Underground Mining Technology

AML Design Workshop: Landslides*

AML Design Workshop: Subsidence*

AML Design Workshop: Dangerous Openings (Vertical Shafts/Audits)*

AML Design Workshop: Drilling and Grouting*
AML Design Workshop: Fires*
Advanced Carlson Mining Reclamation and Permitting (SurvCADD)*
Advanced AutoCAD for Permitting and Reclamation*
AutoCAD Map with Raster Design for Underground and Surface Mine Mapping*
Subsidence*
Surface Deformation Prediction System (SDPS)*
Evidence Preparation and Testimony*
ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis*

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

AML Realty
NEPA Procedures
Coal Field Communications: How to get it Right!*
SMCRA and the ESA: Implementation of the 1996 Biological Opinion
Passive Treatment: Theory and Applications Workshop*
AMD Treat for Acid Drainage Treatment Cost Estimation*
Introduction to ArcGIS for Mining and Reclamation
ARCGIS Spatial Analyst for Mining and Reclamation*
Expert Witness*
Underground Mine Mapping with GIS

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Geology and Geochemistry of Acid Forming Materials*
Introduction to GPS with Garmin Etrex Vista C
Image Analysis for ArcGIS*
Wetlands Awareness
Quantitative Hydrogeology*
Modeling and Analysis with Groundwater Vistas*
Forensic Hydrologic Investigations*
Testing and Analysis of Aquifer Characteristics with AQTESOLV
Water Quality Analysis Using AquaChem*
Analyzing Environmental Monitoring Data Using Statgraphics PLUS
Statistics Workshop: Interpretation of Water Quality Data Using Statgraphics and AquaChem*
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping for Reclamation*
GPS Analyst for ArcGIS*
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*



EXPLOSIVE ENGINEERS Career Series

Purpose: To provide a recommended sequence of classes for Explosive Engineers working in the Regulatory and Abandoned Mine Land programs to facilitate professional development.

Explosives Engineers – This includes persons who work in active and/or abandoned mine programs. They include individuals who work with active mining regulation and are responsible for blasting plan review in applications for mining permits, compliance evaluations with blasting standards and analysis of blasting related complaints. In the AML program individuals may be involved in excavation activities, backfilling, void caving projects and/or development of contract specifications.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = suggested prerequisites, see Appendix**

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining/environmental related topics

Effective Writing

Principles of Inspection

Blasting and Inspection

Blast Log Evaluation Program (BLEP)*

Introduction to GPS with Garmin eTrex Vista C

Applied Engineering Principles

Historic and Archaeological Resources

Enforcement Procedures*

Evidence Preparation and Testimony*

Introduction to ArcGIS for Mining and Reclamation

Permit Findings Workshop

AutoCAD Fundamentals for Permitting and Reclamation*

AutoCAD Map for Permitting and Reclamation*

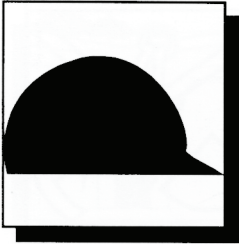
Advanced Blasting. Investigations and Analysis of Adverse Effects*

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Underground Mining Technology
Enforcement Tools and Applications
Subsidence*
Expert Witness*
Coalfield Communications: How to get it Right!*
Excess Spoil Handling and Disposal in Steep-Slope Topography*
Galena Slope Stability Analysis
Underground Mine Mapping with GIS

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

AML Reclamation Projects
AML Design Workshop: Dangerous Highwalls*
Historic and Archeological Resources: Refresher*
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping for Reclamation*



REGULATORY INSPECTION PERSONNEL Career Series

Purpose: Provide a recommended sequence of classes for regulatory inspection personnel to facilitate professional development.

Regulatory Inspector position in this career series includes those whose main job duties fall in the any or the following areas: Field inspection of SMCRA regulated mine sites, both those actively mining and those in any of the multiple phases of reclamation, for the purposes of documentation of activities, compliance evaluation and the issuance and defense of regulatory enforcement actions; Field inspections of citizen complaints related to the mining and reclamation process; as well as those whose inspection responsibilities might be more specialized into revegetation success, bond release evaluations or contemporaneous reclamation compliance reviews.

Black font = NTTP Courses **Blue font = TIPS Courses**

*** = suggested prerequisite, see Appendix**

ENTRY LEVEL COURSES – Classes to provide a basic understanding of mining/environmental related topics

Basic Inspection Workbook

Principles of Inspection

Effective Writing

Enforcement Procedures

Surface and Groundwater Hydrology

Blasting and Inspection

[Introduction to GPS with Garmin eTrex Vista C](#)

Acid-Forming Materials: Fundamentals and Applications

Applied Engineering Principles

Soils and Revegetation

Erosion and Sediment Control*

Evidence Preparation and Testimony*

Underground Mining Technology

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Blasting Log Evaluation Program (BLEP)*

Enforcement Tools and Applications

Geology and Geochemistry of Acid Forming Materials*

Excess Spoil Handling and Disposal in Steep-Slope Topography*

Advanced Blasting: Investigations and Analysis of Adverse Effects*

Coalfield Communications: How to get it Right!*

Subsidence*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Expert Witness*

AutoCAD Fundamentals for Permitting and Reclamation*

Historic and Archeological Resources

Wetlands Awareness

Permitting Hydrology*

Trimble GeoXT, TerraSync and PF Office: Mobile Computing
for Reclamation*

Bonding Workshop-Cost Estimation

Historic and Archeological Resources: Refresher*

Advanced AutoCAD for Permitting and Reclamation*

Carlson Mining for Permitting and Reclamation (SurvCADD)*

NEPA Procedures

SMCRA and the ESA: Implementation of the
1996 Biological Opinion

Forensic Hydrologic Investigations*

Analyzing Environmental Monitoring Data Using Statgraphics PLUS

ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis*

AutoCAD Map for Permitting and Reclamation*

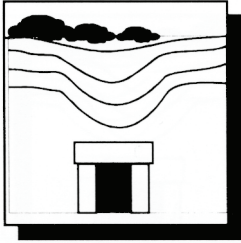
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping
for Reclamation*

Introduction to ArcGIS for Mining and Reclamation*

GPS Analyst for ArcGIS*

Advanced Carlson Mining for Permitting and Reclamation (SurvCADD)*

Water Quality Analysis Using AquaChem*



AML INSPECTION AND FIELD PERSONNEL Career Series

Purpose: Provide a recommended sequence of classes for entry level Abandoned Mine Land (AML) Inspection and Field Personnel to facilitate professional development.

AML Inspection/Field Personnel - This includes those whose main job duties fall in the areas of: Field inspection of Abandoned Mine Land mine sites for the purposes of documentation of field conditions, Evaluation of the causes of field related problems; Development of remediation plans; Field inspections of citizen complaints related to AML conditions; as well as those whose inspection responsibilities may be more specialized such as contract field inspection.

Black Font = NTTP Courses **Blue Font = TIPS Courses**

*** = prerequisite suggestion, see Appendix**

ENTRY LEVEL COURSES

Classes designed to provide a basic understanding of mining/reclamation/ environmental related topics

AML Reclamation Projects

Effective Writing

Principles of Inspection

Soils and Revegetation

Erosion and Sediment Control*

Acid-Forming Materials: Fundamentals and Applications

[Introduction to GPS with Garmin eTrex Vista C](#)

Applied Engineering Principles

Surface and Groundwater Hydrology

NEPA Procedures

Underground Mining Technology

[AutoCAD Fundamentals for Permitting and Reclamation*](#)

Wetlands Awareness

[Carlson Mining for Permitting and Reclamation \(SurvCADD\)*](#)

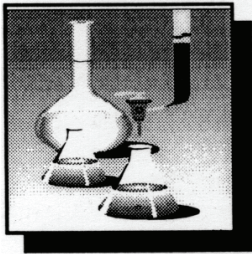
SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Blasting and Inspection
AML Realty
Historic and Archeological Resources
Geology and Geochemistry of Acid Forming Materials*
[Advanced AutoCAD for Permitting and Reclamation*](#)
Acid-Forming Materials: AML Workshop
Subsidence*
[Advanced Carlson Mining for Reclamation and Permitting \(SurvCADD\)*](#)
[AMD Treat for Acid Drainage Treatment Cost Estimation*](#)
Passive Treatment: Theory and Applications Workshop*
Evidence Preparation and Testimony*
[ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis*](#)
Coalfield Communications: How to get it Right!*
[AutoCAD Map for Permitting and Reclamation*](#)

ELECTIVE COURSES

Classes that will provide educational enhancement for career related development

Bonding Workshop-Cost Estimation
[Introduction to ArcGIS for Mining and Reclamation](#)
Historic and Archeological Resources: Refresher*
[Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*](#)
AML Design Workshop: Dangerous Highwalls*
AML Design Workshop: Dangerous Openings
(Vertical Shafts/Audits)*
AML Design Workshop: Drilling and Grouting*
AML Design Workshop: Fires*
AML Design Workshop: Landslides*
AML Design Workshop: Subsidence*
[Blasting Log Evaluation Program \(BLEP\)*](#)
[Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping
for Reclamation*](#)
[GPS Analyst for ArcGIS*](#)
[Water Quality Analysis Using AquaChem*](#)



HYDROLOGIST/GEOLOGIST Career Series

Purpose: To provide a recommended sequence of classes for entry level hydrologists and geologists working in Coal Regulatory and Abandoned Mine Land (AML) programs to facilitate professional development.

Hydrologist/Geologist positions as they are considered in this career series includes those whose main job duties fall in any or all of the following areas: Hydrological/geological reviews of regulatory permit applications; Hydrological/geological evaluations of regulated mining sites (before, during and post mining); Hydrological evaluations of water supply complaints; Hydrological/geological evaluations and investigations of AML related problems; as well as designs of remediation for impacts from AML related problems.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = prerequisite suggestion, see Appendix**

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining and reclamation hydrology and geology related topics

Surface and Groundwater Hydrology

Underground Mining Technology

Permitting Hydrology*

Quantitative Hydrogeology*

Acid Forming Materials: Fundamentals and Applications

Effective Writing

[Introduction to GPS with Garmin eTrex Vista C](#)

Evidence Preparation and Testimony*

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Geology and Geochemistry of Acid Forming Materials*

Subsidence*

Forensic Hydrologic Investigations*
Testing and Analysis of Aquifer Characteristics with AQTESOLV*
Analyzing Environmental Monitoring Data Using Statgraphics PLUS
Water Quality Analysis Using AquaChem*
Statistics Workshop: Interpretation of Water Quality Data
Using Statgraphics and AquaChem*
Modeling and Analysis with Groundwater Vistas*
Wetlands Awareness
Expert Witness*
Introduction to ArcGIS for Mining and Reclamation
Coal Field Communications: How to get it Right!*
Passive Treatment: Theory and Applications Workshop*
AMDTreat for Acid Drainage Treatment Cost Estimation*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Erosion and Sediment Control*
Underground Mine Mapping with GIS
GPS Analyst for ArcGIS*
Image Analysis for ArcGIS*
Trimble GeoXT, TerraSync and PF Office: Mobile Computing
for Reclamation*
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping
for Reclamation*
Surface Deformation Prediction System (SDPS)
AutoCAD Fundamentals for Permitting and Reclamation*
Carlson Mining for Reclamation and Permitting (SurvCADD)*
AutoCAD Map for Permitting and Reclamation*
ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis*
SEDCAD Applications and Extensions for Mine Permitting
and Reclamation*
Advanced AutoCAD for Permitting and Reclamation*
AutoCAD Map with Raster Design for Underground and
Surface Mine Mapping*
ARCGIS Spatial Analyst for Mining and Reclamation*
Advanced Carlson Mining for Reclamation and Permitting (SurvCADD)*



**NATURAL SCIENTIST/
SOIL SCIENTIST
Career Series**

Purpose: Provide a recommended sequence of classes for entry level Natural Scientist / Soil Scientist Personnel to facilitate professional development.

Natural Scientist/Soil Scientist - This includes scientists working in the Regulatory as well as the Abandoned Mine Land (AML) programs. Specifically, the positions would include those whose main job duties fall in the areas of: Review and assessment of regulatory permit applications; Field evaluations of regulated mining sites (before, during or post mining); Evaluations of citizen complaints; Evaluations and investigations of AML related problems; and designing of remediation for AML related problems.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = prerequisite suggestion, see Appendix**

**ENTRY LEVEL COURSES – Classes to provide a basic understanding of mining/
environmental related topics**

Basic Inspection Workbook

Effective Writing

Principles of Inspection

[Introduction to GPS with Garmin eTrex Vista C](#)

Soils and Revegetation

Evidence Preparation and Testimony*

Acid-Forming Materials: Fundamentals and Applications

[AutoCAD Fundamentals for Permitting and Reclamation](#)

[Introduction to ArcGIS for Mining and Reclamation*](#)

**SECONDARY COURSES – Classes that will provide advanced training from the
entry level classes**

Geology and Geochemistry of Acid Forming Materials*

Wetlands Awareness

SMCRA and the ESA: Implementation of the
1996 Biological Opinion

Erosion and Sediment Control*
NEPA Procedures
Carlson Mining for Permitting and Reclamation (SurvCADD)*
Advanced AutoCAD for Permitting and Reclamation*
Expert Witness*
ARCGIS Spatial Analyst for Mining and Reclamation*
ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis*
AutoCAD Map for Permitting and Reclamation*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Applied Engineering Principles
Surface and Groundwater Hydrology
SEDCAD Applications and Extensions for Mine Permitting and Reclamation*
Underground Mining Technology
Analyzing Environmental Monitoring Data Using Statgraphics PLUS
Advanced Carlson Mining for Permitting and Reclamation (SurvCADD)*
Subsidence*
GPS Analyst for ArcGIS*
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping for Reclamation*
AML Reclamation Projects
Surface Deformation Prediction System (SDPS)*
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
Image Analysis for ArcGIS*
Excess Spoil Handling and Disposal in Steep-Slope Topography*



PERMIT REVIEWERS Career Series

Purpose: Provide a recommended sequence of classes for entry level permit reviewers to facilitate professional development.

Permit Reviewer – This includes those who are employed in a variety of capacities within the coal regulatory arena including those whose main job duties fall in the areas of: Reviews and evaluations of regulatory permit applications; Field assessments of regulatory permit applications; Review of regulatory permit revisions as they are requested or required; and Environmental assessment of regulatory permit applications and associated documentation in a variety of circumstances.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = prerequisite suggestion, see Appendix**

ENTRY LEVEL COURSES – Classes to provide a basic understanding of mining/ environmental related topics

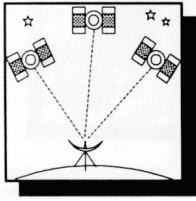
Basic Inspection Workbook
Principles of Inspection
Surface and Groundwater Hydrology
Effective Writing
Acid-Forming Materials: Fundamentals and Applications
Permitting Hydrology*
Soils and Revegetation
Applied Engineering Principles
[AutoCAD Fundamentals for Permitting Reclamation*](#)
Erosion and Sediment Control*
Wetlands Awareness
Historic and Archeological Resources
Excess Spoil Handling and Disposal in Steep-Slope Topography*
Underground Mining Technology
Enforcement Procedures
Evidence Preparation and Testimony*
[Introduction to ArcGIS for Mining and Reclamation*](#)
NEPA Procedures
Permit Findings Workshop

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Geology and Geochemistry of Acid Forming Materials*
Blasting and Inspection
Introduction to GPS Garmin eTrex Vista C
Bonding Workshop-Administrative and Legal Aspects
Bonding Workshop-Cost Estimation
Expert Witness*
Subsidence*
Historic and Archeological Resources: Refresher*
Coalfield Communications: How to get it Right!*
SMCRA and the ESA: Implementation of the 1996 Biological Opinion
SEDCAD Applications and Extensions for Mine Permitting
and Reclamation*
Carlton Mining for Permitting and Reclamation (SurvCADD)*
ArcGIS Spatial Analyst for Mining and Reclamation*
Underground Mine Mapping with GIS
ArcPAD 7: Mobile GIS for Reclamation Mapping and Analysis*
AutoCAD Map for Permitting and Reclamation*
Forensic Hydrologic Investigations*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Enforcement Tools and Applications
Advanced AutoCAD for Permitting and Reclamation*
Advanced Carlson Mining for Permitting and Reclamation (SurvCADD)*
Analyzing Environmental Monitoring Data Using Statgraphics Plus
Galena Slope Stability Analysis
Image Analysis for ArcGIS*
Statistics Workshop: Interpretation of Water Quality Data
Using Statgraphics and AquaChem*
Passive Treatment: Theory and Applications Workshop*
Quantitative Hydrogeology*
AutoCAD Map with Raster Design for Underground and
Surface Mine Mapping*
Water Quality Analysis Using AquaChem*
Testing and Analysis of Aquifer Characteristics with AQTESOLV*



GEOSPATIAL MINE / MAPPING PERSONNEL Career Series

Purpose: To provide a recommended sequence of classes for entry level geospatial/mine mapping personnel working in Coal Regulatory and Abandoned Mine Land (AML) programs to facilitate professional development.

Geospatial / Mine Mapping Positions - This includes those whose main job duties fall in the areas of: Geospatial/Mine Mapping components of regulatory mine permitting reviews and assessments; Reviews and evaluations of underground mining proposals and impacts; Geospatial/Mine Mapping components of AML designs; preparation of AMD remediation designs and watershed evaluations; and Regulatory investigations including subsidence evaluations, predictions and others.

Black Font = NTTP Courses **Blue Font = TIPS Courses**

*** = suggested prerequisite, see Appendix**

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining and reclamation related topics

Effective Writing

Basic Inspection Workbook

AutoCAD Fundamentals for Permitting and Reclamation

Introduction to ArcGIS for Mining and Reclamation

AutoCAD Map for Permitting and Reclamation*

Enforcement Procedures

Trimble GeoXT, TerraSync and PF Office: Mobile Computing
for Reclamation*

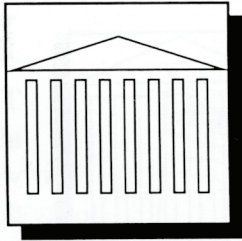
ArcPAD 7: Mobile GIS for Reclamation Mapping and Analysis*

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Advanced AutoCAD for Permitting and Reclamation*
GPS Analyst for ArcGIS*
Underground Mining Technology
Underground Mine Mapping with GIS
AutoCAD Map with Raster Design for Underground and Surface Mine Mapping*
Evidence Preparation and Testimony*
Introduction to GPS with Garmin eTrex Vista C
Image Analysis for ArcGIS*
ArcGIS Spatial Analyst: for Mining and Reclamation*
Surface and Groundwater Hydrology

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Permitting Hydrology*
Subsidence*
Surface Deformation Prediction System (SDPS)*
Quantitative Hydrogeology*
Forensic Hydrologic Investigations*
Carlson mining for Permitting and Reclamation (SurvCADD)*
Expert Witness*



ATTORNEY Career Series

Purpose: Provide a recommended sequence of classes for entry attorneys to facilitate professional development.

Attorney career series includes those whose main job duties fall in any of the following areas: Defense of state or federal agency regulatory and/or AML actions; Policy review for state or federal SMCRA agencies, State program reviews for OSM, Regulation drafting, General legal counsel for state, federal or tribal agencies; Legal researchers.

Black Font = NTTP Courses Blue Font = TIPS Courses

*** = prerequisite suggestion, see Appendix**

ENTRY LEVEL COURSES – Classes to provide a basic understanding of mining/ environmental related topics

Basic Inspection Workbook
Principles of Inspection
Enforcement Procedures
Surface and Groundwater Hydrology
Evidence Preparation and Testimony*
Soils and Revegetation
Acid-Forming Materials for Program Staff

SECONDARY COURSES – Classes that will provide advanced training from the entry level classes

Enforcement Tools and Applications
Blasting and Inspection
Erosion and Sediment Control*
Underground Mining Technology
NEPA Procedures
Permitting Hydrology
Permit Findings Workshop
Expert Witness*

ELECTIVE COURSES – Classes that will provide educational enhancement for career related development

Effective Writing

Bonding Workshop-Administrative and Legal Aspects

Historic and Archeological Resources

AML Realty

AML Reclamation Projects

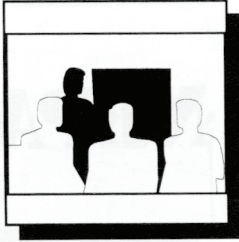
Acid-Forming Materials: Fundamentals and Applications

Excess Spoil Handling and Disposal in Steep-Slope Topography

Wetlands Awareness

Subsidence*

SMCRA and the ESA: Implementation of the 1996 Biological Opinion



PROGRAM MANAGEMENT/ SUPERVISORY PERSONNEL Career Series

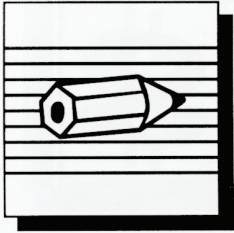
Purpose: To provide a recommended sequence of classes for Management personnel working in Coal Regulatory and Abandoned Mine Land (AML) programs to facilitate professional development.

Program Management and Supervisory Positions - This includes those whose main job duties fall in the areas of: Management of personnel and programs in the coal regulatory programs within OSM, State and Tribal Agencies; Management of personnel and programs within the Abandoned Mine Lands portions of OSM, State and Tribal Agencies.

Program management/supervisory positions cover a wide variety of positions within the SMCRA agencies. In some instances those positions require, in addition to personnel management, a technical expertise in the subject related fields being administered. The following career series courses are recommended as initial courses that would benefit a new management/supervisory position that needed a basic understanding of the components of regulatory and AML related programs. Expanded career development training for those management/supervisory personnel should be chosen using the course catalogs for both the NTTP and TIPS programs in conjunction with the Career Series documents for the specific positions/programs being administered.

ENTRY LEVEL COURSES – Classes that will provide the basic tools and understanding of mining and reclamation related topics

- Basic Inspection Workbook
- Effective Writing
- Evidence Preparation and Testimony
- Coal Field Communications: How to get it Right!
- Principles of Inspection
- AML Reclamation Projects
- NEPA Procedures



**PROGRAM ADMINISTRATIVE
SUPPORT PERSONNEL
Career Series**

Administrative Support Personnel Positions - This includes those whose main job duties fall in the areas of: Program Administrative Support in the coal regulatory and Abandoned Mine Lands programs within OSM, State and Tribal Agencies.

Administrative Support personnel can benefit from some of the basic introductory technical courses, in particular, Basic Inspection Workbook and Effective Writing. In the Regulatory and AML arena of agency programs, additional career development courses should be selected using the course catalogs in concert with specific career series courses based on the level of expertise appropriate for the program support provided by the position.

APPENDIX

LISTING OF NTTP AND TIPS COURSES WITH RECOMMENDED PREREQUISITES

For Specific Course Descriptions and Discussions of Prerequisites refer to the training section on the [Technical Innovation and Professional Services Web Page](#) to view the NTTP Course Catalog and TIPS Instructor-Led Courses

NTTP Course Prerequisites

Advanced Blasting: Investigation and Analysis of Adverse Effects [Must have taken [Blasting and Inspection](#) course within the last five years]

AML Design Workshop: Dangerous Highwalls [AML personnel who have designed or inspected a minimum of two subject related AML projects]

AML Design Workshop: Dangerous Openings [AML personnel who have designed or inspected a minimum of two subject related AML projects]

AML Design Workshop: Drilling and Grouting [Must have taken the [Subsidence](#) course]

AML Design Workshop: Fires [AML personnel who have designed or inspected a minimum of two subject related AML projects]

AML Design Workshop: Landslides [AML personnel who have designed or inspected a minimum of two subject related AML projects]

AML Design Workshop: Subsidence [AML personnel who have designed or inspected a minimum of two subject related AML projects]

Coalfield Communications: How to Get it Right [Designed for staff who have a good deal of contact with the public and the news media]

Erosion and Sediment Control [Recommended to have taken [Soils and Revegetation](#) course]

Evidence Preparation and Testimony [Recommended to have taken the [Enforcement Procedures](#) course]

Excess-Spoil Handling and Disposal in Steep-Slope Topography [Recommended to have taken [Applied Engineering Principles](#) and either [Permitting Hydrology](#) or [Surface and Groundwater Hydrology](#)]

Expert Witness [For technical personnel that have created expert technical opinion reports and have completed the [Enforcement Procedures](#) and [Evidence Preparation and Testimony](#) courses]

Forensic Hydrology [Should have knowledge and background in hydrology, geology and mining and be familiar with common field instruments and techniques]

Geology and Geochemistry of Acid Forming Materials [Designed for individuals who have had advanced high school chemistry or a basic college chemistry course]

Historical and Archeological Resources: Update and Refresher [Must have taken the [Historical and Archeological Resources](#) course]

Passive Treatment: Theory and Application Workshop [Recommend completion of [Acid-Forming Materials: Fundamentals and Applications](#)]

Permitting Hydrology [Not recommended for newly hired personnel]

Quantitative Hydrogeology [Must have a basic knowledge of ground-water geology, hydrology and hydraulic concepts]

Subsidence [Recommended to have taken the [Underground Mining Technology](#) course]

TIPS Course Prerequisites

Advanced AutoCAD for Permitting and Reclamation [Working knowledge of AutoCAD or should have taken [AutoCAD Fundamentals for Permitting and Reclamation](#)]

Advanced Carlson Mining for Reclamation and Permitting (SurvCADD) [working knowledge of SurvCADD or should have taken [Carlson Mining for Permitting and Reclamation \(SurvCADD\)](#)]

AMDTreat for Acid Drainage Treatment Cost Estimation [familiarity with active and passive AMD treatment and treatment cost bonding estimation desirable]

ArcGIS Spatial Analyst: for Mining and Reclamation [MUST have taken [Introduction to ArcGIS For Mining and Reclamation](#)]

ArcPAD 7: Mobile GIS for Reclamation Mapping and Analysis [MUST have experience with GIS and GPS use]

AutoCAD Fundamentals for Permitting and Reclamation [knowledge of maps and drafting concepts required]

AutoCAD Map for Permitting and Reclamation [working knowledge of AutoCAD or MUST have taken [AutoCAD Fundamentals for Permitting and Reclamation](#)]

AutoCAD Map with Raster Design for Underground and Surface Mine Mapping [working knowledge of AutoCAD or AutoCAD Map, helpful if have taken [AutoCAD Map for Permitting and Reclamation](#)]

Blasting Log Evaluation Program (BLEP) [MUST have taken [Blasting and Inspection](#) course or experienced in blast design and log documentation]

Carlson Mining for Permitting and Reclamation (SurvCADD) [working knowledge of AutoCAD or MUST have taken [AutoCAD Fundamentals for Permitting and Reclamation](#)]

GeoExplorer 3 GPS and PF Office: Advanced GPS Mapping for Reclamation [will need Trimble GeoExplorer3 equipment for use in class, familiarity with GIS or CAD software highly recommended]

GPS Analyst for ArcGIS [MUST have taken [Introduction to ArcGIS for Mining and Reclamation](#) or have equivalent experience and GPS experience]

Image Analysis for ArcGIS [MUST have taken [Introduction to ArcGIS for Mining and Reclamation](#)]

Introduction to ArcGIS for Mining and Reclamation [familiarity with GIS helpful]

Modeling and Analysis with Groundwater Vistas [working knowledge of hydrologic terminology and concepts and should have completed [Quantitative Hydrogeology](#)]

SEDCAD Applications and Extensions for Mine Permitting and Reclamation [should have completed [Applied Engineering Principles](#) and [Surface and Groundwater Hydrology](#)]

Surface Deformation Prediction System (SDPS) [MUST have taken [Subsidence](#) class and helpful if have familiarity with AutoCAD or Surfer]

Statistics Workshop: Interpretation of Water Quality Data Using Statgraphics and AquaChem [familiarity with AquaChem, Statgraphics, water quality parameters and statistical procedures preferred]

Testing and Analysis of Aquifer Characteristics with AQTESOLV [working knowledge of hydrologic terminology and concepts and should have completed [Quantitative Hydrogeology](#)]

Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation [MUST bring a GeoXT with TerraSync loaded to class]

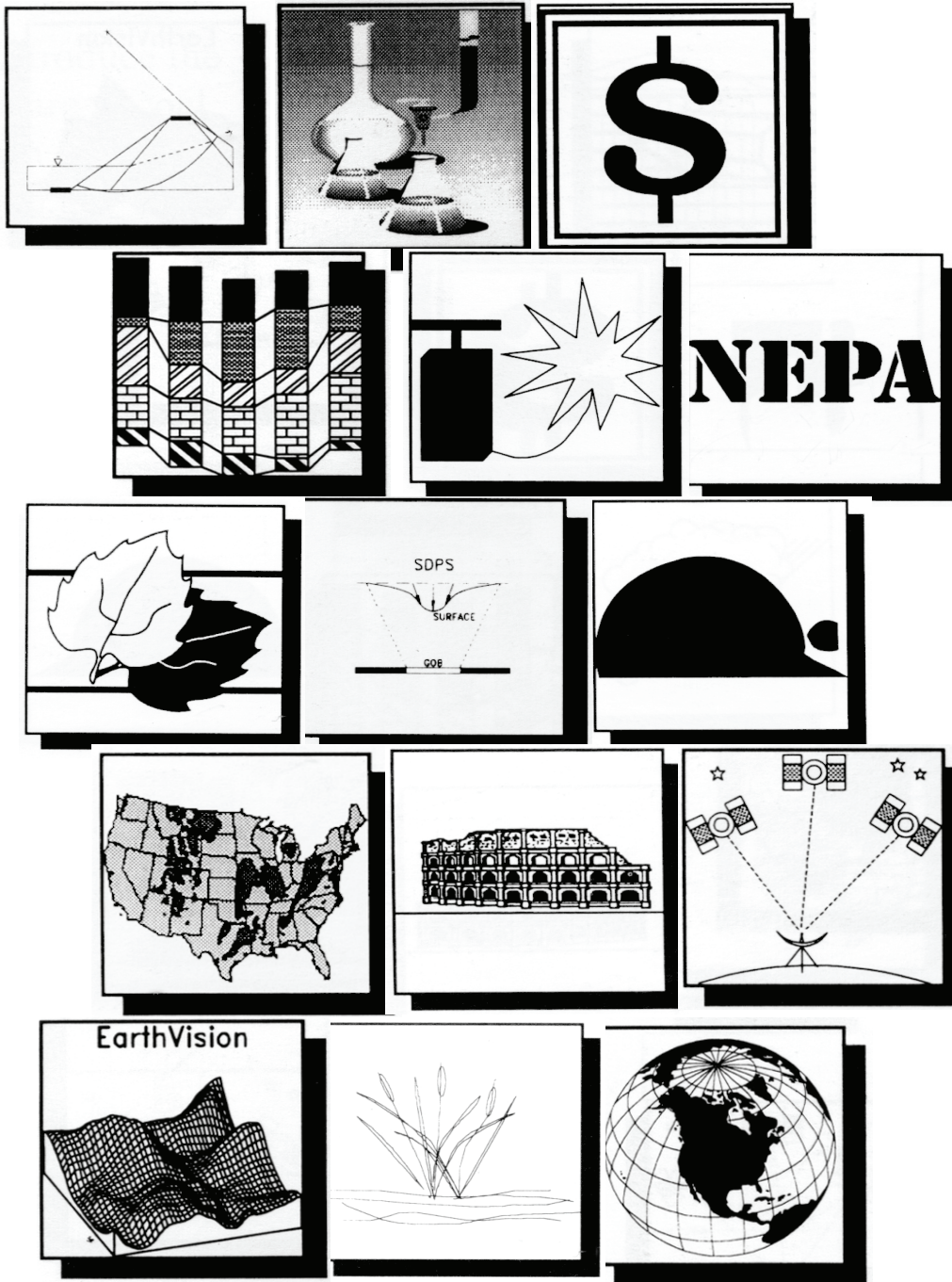
Water Quality Analysis Using AquaChem [One year of college chemistry is strongly recommended. Familiarity with water-quality data is preferred]

NTPP COURSES	Inspectors	
	ACT Inspector	AML Inspector/Field Personnel
X = Entry Level Course		
Acid-Forming Materials: AML Workshop		
Acid-Forming Materials: Fundamentals and Applications	X	X
Acid-Forming Materials for Program Staff		
Advanced Blasting: Investigations and Analysis of Adverse Effects		
AML Design Workshop: Dangerous Highwalls		
AML Design Workshop: Dangerous Openings (Vertical Shafts/Audits)		
AML Design Workshop: Drilling and Grouting		
AML Design Workshop: Fires		
AML Design Workshop: Landslides		
AML Design Workshop: Subsidence		
AML Realty		
AML Reclamation Projects		X
Applied Engineering Principles	X	X
Blasting and Inspection	X	
Bonding Workshop-Administrative and Legal Aspects		
Bonding Workshop-Cost Estimation		
Coalfield Communication: How to get it Right!		
Effective Writing	X	X
Enforcement Procedures	X	
Enforcement Tools and Applications		
Erosion and Sediment Control	X	X
Evidence Preparation and Testimony	X	
Excess Spoil Handling and Disposal in Steep-Slope Topography		
Expert Witness		
Forensic Hydrologic Investigations		
Geology and Geochemistry of Acid Forming Materials		
Historic and Archeological Resources		X
Historic and Archeological Resources: Refresher		X
NEPA Procedures		X
Passive Treatment: Theory and Applications Workshop		
Permit Findings Workshop		
Permitting Hydrology		
Principles of Inspection	X	
Quantitative Hydrogeology		
SMCRA and the ESA: Implementation of the 1996 Biological Opinion		
Soils and Revegetation	X	X
Subsidence		
Surface and Groundwater Hydrology	X	X
Underground Mining Technology	X	X
Wetlands Awareness		
Basic Inspection Workbook	X	

Program Specialists	Engineers			Physical Scientists			Non-Technical	
	Permit Reviewer	AML Engineer, Designers	ACT Engineers	Explosive Engineers	Soils/Natural Scientists	Hydrologist/Geologists	Geo-Spatial / Mine Map Specialist	Attorneys
	X							
X	X	X		X	X			
			X				X	
	X							
	X							
	X							
	X							
	X							
	X							
X			X					X
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X	X	X	X	X	X		X	X
X								
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X		X	X			X		X
X					X			
X			X	X			X	X
					X			
	X	X		X			X	
	X							
X	X	X			X		X	
X	X	X			X			
X				X		X	X	X

TIPS COURSES	Inspectors	
	ACT Inspector	AML Inspector/Field Personnel
X = Entry Level Course		
Advanced AutoCAD for Permitting and Reclamation		
Advanced Carlson Mining for Reclamation and Permitting (SurvCADD)		
AMDTreat for Acid Drainage Treatment Cost Estimation		
Analyzing Environmental Monitoring Data Using Statgraphics PLUS		
ARCGIS Spatial Analyst for Mining and Reclamation		
ARCPAD 7: Mobile GIS for Reclamation Mapping and Analysis		
AutoCAD Map for Permitting and Reclamation		
Blasting Log Evaluation Program (BLEP)		
AutoCAD Fundamentals for Permitting and Reclamation		X
Galena Slope Stability Analysis		
Geoexplorer 3 GPS and PF Office: Advanced GPS Mapping for Reclamation		
GPS Analyst for ArcGIS		
GPS Garmin Etrex Vista C	X	X
Image Analysis for ArcGIS		
Introduction to ArcGIS for Mining and Reclamation		
Modeling and Analysis with Groundwater Vistas		
Surface Deformation Prediction System (SDPS)		
SEDCAD Applications and Extensions for Mine Permitting and Reclamation		
Statistics Workshop: Interpretation of Water Quality Data Using Statgraphics & AquaChem		
Carlson Mining for Permitting and Reclamation (SurvCADD)		X
Testing and Analysis of Aquifer Characteristics with AQTESOLV		
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation		
AutoCAD Map with Raster Design for Underground and Surface Mine Mapping		
Underground Mine Mapping with GIS		
Water Quality Analysis Using AquaChem		

Program Specialists	Engineers			Physical Scientists			Non-Technical	
	Permit Reviewer	AML Engineer Designers	ACT Engineers	Explosive Engineers	Soils/Natural Scientists	Hydrologist/Geologists	Geo-Spatial / Mine Map Specialist	Attorneys
	X							
	X							
	X	X				X		
	X	X	X			X		
			X					
X	X	X	X	X		X		
	X	X						
		X	X	X	X			
X			X	X		X		
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						X		
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