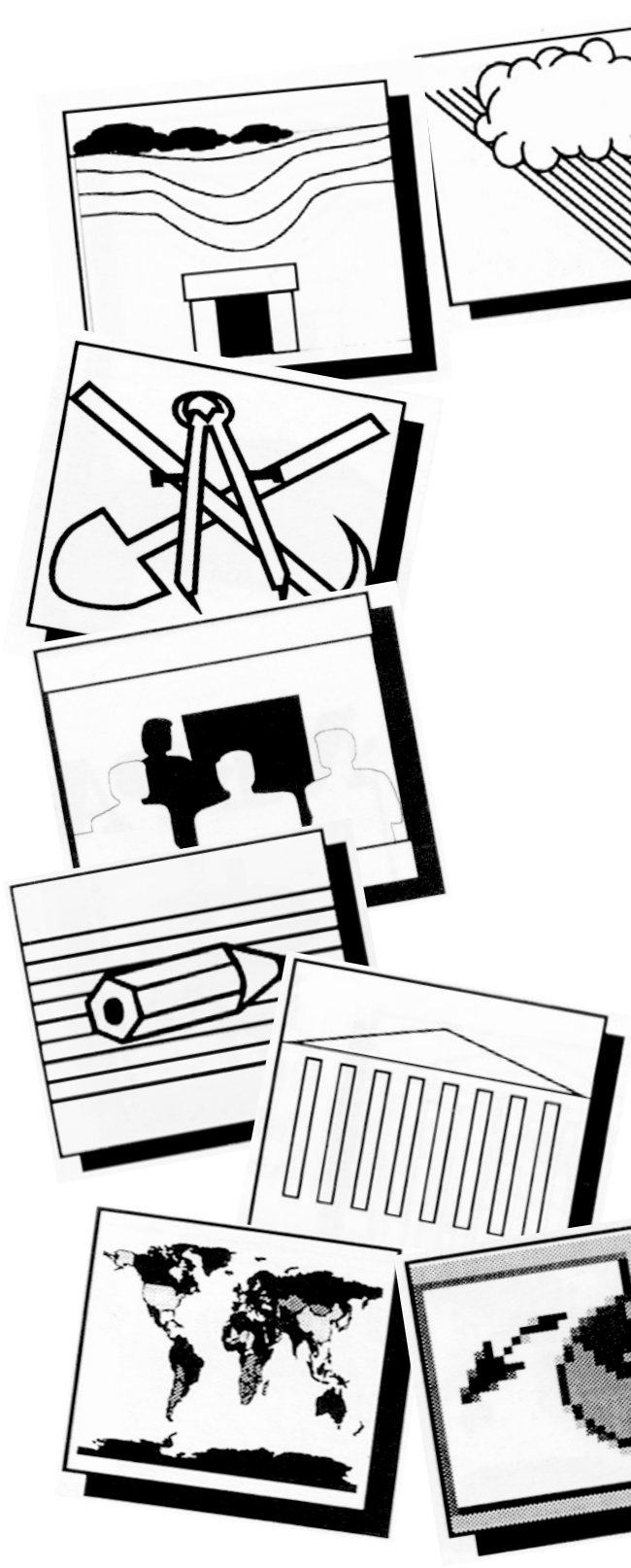
Office of Surface Mining Reclamation and Enforcement

National Technical Training Program

TIPS Training Program



CAREER SERIES

Guide for SMCRA Staff

Updated April 2013

Table of Contents

April 2013

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 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.osmre.gov/science/training.shtm 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 training 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 training 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 276-523-0042, Ext.13, 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**

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

Effective Writing
Underground Mining Technology
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
Permit Findings Workshop
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
Surface and Groundwater Hydrology
Soils and Revegetation
Introduction to GPS with Garmin eTrex
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 – Distance Learning "or"
Galena Slope Stability Analysis
Evidence Preparation and Testimony*
Mine Gas Workshop
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis
CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping*
Blasting and Inspection

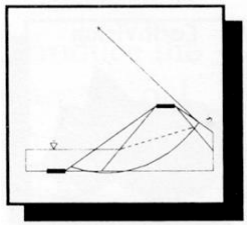
SECONDARY COURSES – Classes that will provide advanced training from the primary classes

Expert Witness*
Subsidence*
Excess Spoil Handling and Disposal in Steep-Slope Topography*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*

Coal Field Communications: How to get it Right!*
Surface Deformation Prediction System (SDPS) – Self Study* "or"
Surface Deformation Prediction System (SDPS)
Blasting Log Evaluation Program (BLEP) – Self Study* "or"
Blasting Log Evaluation Program (BLEP)
Geology and Geochemistry of Acid Forming Materials*
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
ARCGIS Spatial Analyst for Mining and Reclamation*
Advanced Blasting: Investigations and Analysis of Adverse Effects*
Acid-Forming Materials: Soils and Overburden

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

Permitting Hydrology*
Enforcement Procedures
Wetlands Awareness
Quantitative Hydrogeology*
NEPA Procedures
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
Passive Treatment: Theory and Applications Workshop
AMDTreat: Mine Drainage Treatment Cost Calculation*
Geology and Geochemistry of Acid Forming Materials
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
HEC-RAS
Introduction to AqQA – Distance Learning "or"
Introduction to AqQA
Introduction to earthVision 2D and 3D Modeling*
ProXRT Workshop: High Accuracy GPS for GIS*



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**

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

Effective Writing
AML Reclamation Projects
CAD100: AutoCAD Essentials – Distance Learning
CAD101: AutoCAD for Permitting and Reclamation*
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
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 – Distance Learning "or"
Galena Slope Stability Analysis
Erosion and Sediment Control*
Underground Mining Technology
Mine Gas Workshop
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*
CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping*
CAD301: Carlson Mining, Field, Hydrology, & Natural Regrade for Permitting and Reclamation*
Subsidence*
Surface Deformation Prediction System (SDPS) – Self Study* "or"
Surface Deformation Prediction System (SDPS)

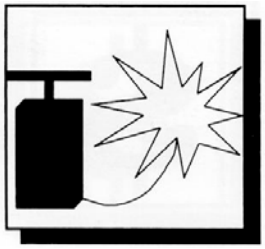
Evidence Preparation and Testimony*
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
Acid-Forming Materials: Soils and Overburden

SECONDARY COURSES – Classes that will provide advanced training from the primary 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*
AMDTreat: Mine Drainage Treatment Cost Calculation*
Introduction to GIS for Mining and Reclamation – Distance Learning "or"*
Introduction to GIS for Mining and Reclamation I*
ARCGIS Spatial Analyst for Mining and Reclamation*
Expert Witness*

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

Geology and Geochemistry of Acid Forming Materials*
Introduction to GPS with Garmin Etrex
Wetlands Awareness
Quantitative Hydrogeology*
Modeling and Analysis with Groundwater Vistas*
Forensic Hydrologic Investigations*
Testing and Analysis of Aquifer Characteristics with AQTESOLV
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
HEC-RAS*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
Introduction to AqQA – Distance Learning* "or"
Introduction to AqQA
Introduction to earthVision 2D and 3D Modeling*



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**

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

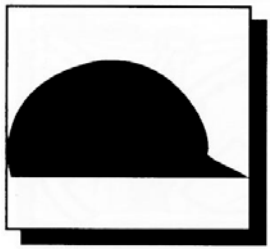
Effective Writing
Principles of Inspection "or" SMCRA Principles and Field Procedures
Blasting and Inspection
Blast Log Evaluation Program (BLEP) – Distance Learning* "or"
Blast Log Evaluation Program (BLEP)
Introduction to GPS with Garmin eTrex
Applied Engineering Principles
Mine Gas Workshop
Historic and Archaeological Resources
Enforcement Procedures*
Evidence Preparation and Testimony*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*
Permit Findings Workshop
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
Advanced Blasting. Investigations and Analysis of Adverse Effects*

SECONDARY COURSES – Classes that will provide advanced training from the primary 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 – Distance Learning "or"
Galena Slope Stability Analysis
Underground Mine Mapping with GIS

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

AML Reclamation Projects
AML Design Workshop: Dangerous Highwalls*



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 re-vegetation success, bond release evaluations or contemporaneous reclamation compliance reviews.

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

PRIMARY COURSES – Classes to provide a basic Understanding of mining/environmental related topics

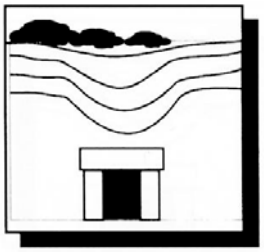
Basic Inspection Workbook
Principles of Inspection "or" SMCRA Principles ad Field Procedures
Effective Writing
Enforcement Procedures
Surface and Groundwater Hydrology
Blasting and Inspection
Introduction to GPS with Garmin eTrex
Acid-Forming Materials: Fundamentals and Applications
Applied Engineering Principles
Soils and Re-vegetation
Erosion and Sediment Control*
Evidence Preparation and Testimony*
Underground Mining Technology
Mine Gas Workshop

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

Blasting Log Evaluation Program (BLEP) – Distance Learning* "or"
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*
Acid –Forming Materials: Soils and Overburden*

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

Expert Witness*
CAD100: AutoCAD Essentials
CAD101: AutoCAD 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
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
NEPA Procedures
SMCRA and the ESA: Implementation of the 1996 Biological Opinion
Forensic Hydrologic Investigations*
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
ProXRT Workshop: High Accuracy GPS for GIS*



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 who 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**

PRIMARY COURSES
Classes designed to provide a basic understanding of mning/reclamation/ environmental related topics

AML Reclamation Projects
Effective Writing
Principles of Inspection "or" SMCRA Principles and Field Procedures
Soils and Revegetation
Erosion and Sediment Control*
Mine Gas Workshop
Acid-Forming Materials: Fundamentals and Applications
Introduction to GPS with Garmin eTrex
Applied Engineering Principles
Surface and Groundwater Hydrology
NEPA Procedures
Underground Mining Technology
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
Wetlands Awareness
CAD201: Carlson Mining Site Design for Permitting and Reclamation*

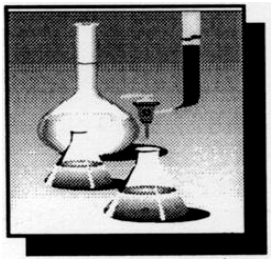
SECONDARY COURSES – Classes that will provide advanced training from the primary classes

Blasting and Inspection
AML Realty
Historic and Archeological Resources
Geology and Geochemistry of Acid Forming Materials*
Acid-Forming Materials: Soils and Overburden*
Subsidence*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
AMDTreat: Mine Drainage Treatments Cost Calculation*
Passive Treatment: Theory and Applications Workshop*

Evidence Preparation and Testimony*
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
Coalfield Communications: How to get it Right!*

ELECTIVE COURSES
Classes that will provide training enhancement for career related development

Bonding Workshop-Cost Estimation
Introduction to GIS for Mining and Reclamation – Distance Learning "or"
Introduction to GIS for Mining and Reclamation I
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 - Distance Learning "or"
Blasting Log Evaluation Program BLEP
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
ProXRT Workshop: High Accuracy GPS for GIS*



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**

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

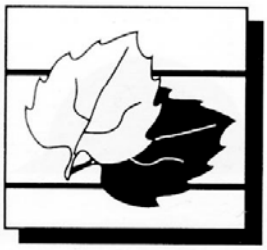
Principles of Inspection "or" SMCRA Principles and Field Procedures
Surface and Groundwater Hydrology
Underground Mining Technology
Permitting Hydrology*
Quantitative Hydrogeology*
Acid Forming Materials: Fundamentals and Applications
Effective Writing
Introduction to GPS with Garmin eTrex
Evidence Preparation and Testimony*

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

Geology and Geochemistry of Acid Forming Materials*
Subsidence*
Acid-Forming Materials: Soils and Overburden
Forensic Hydrologic Investigations*
Testing and Analysis of Aquifer Characteristics with AQTESOLV*
Modeling and Analysis with Groundwater Vistas*
Wetlands Awareness
Expert Witness*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*
Coal Field Communications: How to get it Right!*
Passive Treatment: Theory and Applications Workshop*
AMDTreat: Mine Drainage Treatment Cost Calculation*

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

Erosion and Sediment Control*
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
SDPS: Surface Deformation Prediction System – Distance Learning "or"
SDPS: Surface Deformation Prediction System
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
SEDCAD Applications and Extensions for Mine Permitting and Reclamation*
Advanced AutoCAD for Permitting and Reclamation*
CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping*
ARCGIS Spatial Analyst for Mining and Reclamation*
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
Galena Slope Stability Analysis – Distance Learning "or"
Galena Slope Stability Analysis
HEC-RAS
Introduction to AqQA – Distance Learning "or"
Introduction to AqQA
Introduction to earthVision 2D and 3D Modeling*
ProXRT Workshop: High Accuracy GPS for GIS*



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**

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

Basic Inspection Workbook
Effective Writing
Principles of Inspection "or" SMCRA Principles and Field Procedures
Introduction to GPS with Garmin eTrex
Soils and Re-vegetation
Evidence Preparation and Testimony*
Acid-Forming Materials: Fundamentals and Applications
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*

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

Geology and Geochemistry of Acid Forming Materials*
Wetlands Awareness
SMCRA and the ESA: Implementation of the 1996 Biological Opinion
Acid-Forming Materials: Soils and Overburden
Erosion and Sediment Control*
NEPA Procedures
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
Expert Witness*
ARCGIS Spatial Analyst for Mining and Reclamation*
ARCPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*

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

Applied Engineering Principles
Surface and Groundwater Hydrology
SEDCAD Applications and Extensions for Mine Permitting and Reclamation*
Underground Mining Technology
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
Subsidence*
AML Reclamation Projects
SDPS: Surface Deformation Prediction System – Distance Learning* "or"
SDPS: Surface Deformation Prediction System
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
Image Analysis for ArcGIS*
Excess Spoil Handling and Disposal in Steep-Slope Topography*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
Introduction to earthVision 2D and 3D Modeling*
ProXRT Workshop: High Accuracy GPS for GIS*

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**

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

Basic Inspection Workbook
Principles of Inspection "or" SMCRA Principles and Procedures
Surface and Groundwater Hydrology
Effective Writing
Acid-Forming Materials: Fundamentals and Applications
Permitting Hydrology*
Soils and Revegetation
Applied Engineering Principles
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
Erosion and Sediment Control*
Wetlands Awareness
Mine Gas Workshop
Historic and Archeological Resources
Excess Spoil Handling and Disposal in Steep-Slope Topography*
Underground Mining Technology
Enforcement Procedures
Evidence Preparation and Testimony*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*
NEPA Procedures
Permit Findings Workshop

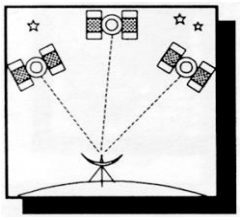
SECONDARY COURSES – Classes that will provide advanced training from the entry classes

Geology and Geochemistry of Acid Forming Materials*
Blasting and Inspection
Introduction to GPS Garmin eTrex

Bonding Workshop-Administrative and Legal Aspects
Bonding Workshop-Cost Estimation
Expert Witness*
Subsidence*
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*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
ArcGIS Spatial Analyst for Mining and Reclamation*
ArcPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*
Forensic Hydrologic Investigations*
Acid-Forming Materials: Soils and Overburden

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

Enforcement Tools and Applications
CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping*
CAD301: Carlson Mining, Field, Hydrology, & Natural Re-grade for Permitting and Reclamation*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
Analyzing Environmental Monitoring Data Using Statgraphics Plus
Galena Slope Stability Analysis – Distance Learning "or"
Galena Slope Stability Analysis
Passive Treatment: Theory and Applications Workshop*
Quantitative Hydrogeology*
Introduction to earthVision 2D and 3D Modeling*



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**

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

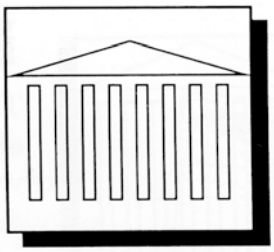
Effective Writing
Basic Inspection Workbook
Principles of Inspection "or" SMCRA Principles and Field Procedures
CAD100: AutoCAD Essentials – Distance Learning "or"
CAD100: AutoCAD Essentials
CAD101: AutoCAD for Permitting and Reclamation*
Introduction to GIS for Mining and Reclamation – Distance Learning* "or"
Introduction to GIS for Mining and Reclamation I*
CAD200: AutoCAD Map 3D for Permitting and Reclamation*
Enforcement Procedures
Trimble GeoXT, TerraSync and PF Office: Mobile Computing for Reclamation*
ArcPAD 10.0: Mobile GIS for Reclamation Mapping and Analysis*

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

Underground Mining Technology
CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping*
CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow*
Evidence Preparation and Testimony*
Introduction to GPS with Garmin eTrex Vista HCx
ArcGIS Spatial Analyst: for Mining and Reclamation*
Surface and Groundwater Hydrology

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

Permitting Hydrology*
Subsidence*
SDPS: Surface Deformation Prediction System - Distance Learning* "or"
SDPS: Surface Deformation Prediction System
Quantitative Hydrogeology*
Forensic Hydrologic Investigations*
CAD201: Carlson Mining Site Design for Permitting and Reclamation*
Expert Witness*
Galena Slope Stability Analysis – Distance Learning "or"
Galena Slope Stability Analysis
Introduction to earthVision 2D and 3D Modeling*
ProXRT Workshop: High Accuracy GPS for GIS*



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**

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

Basic Inspection Workbook
Principles of Inspection "or" SMCRA Principles and Field Procedures
Enforcement Procedures
Surface and Groundwater Hydrology
Evidence Preparation and Testimony*
Soils and Re-vegetation
Acid-Forming Materials: Soils and Overburden

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

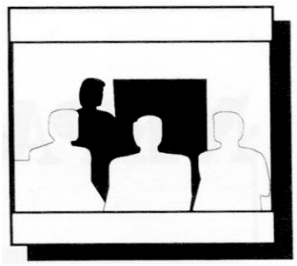
Enforcement Tools and Applications
Blasting and Inspection
Erosion and Sediment Control*
Underground Mining Technology
NEPA Procedures
Permitting Hydrology
Permit Findings Workshop
Expert Witness*

ELECTIVE COURSES – Classes that will provide training 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

TIPS – No TIPS Courses are included in the course series recommended for Attorneys although they are available should a specialization of job duties make them beneficial.



PROGRAM MANAGEMENT/SUPERVISORY PERSONNEL
Career Series

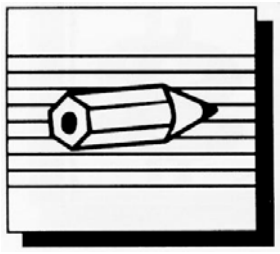
Purpose: To provide a recommended sequence of classes for Management personnel working in Coal Regulatory and Abandoned Mine Land (AML) programs to facilitate professional development.

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.

PRIMARY 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 “or” SMCRA Principles and Field Procedures
AML Reclamation Projects
NEPA Procedures
Introduction to GIS for Mining and Reclamation – Distance Learning* “or”
Introduction to GIS for Mining and Reclamation I*



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 & TIPS COURSES WITH RECOMMENDED PREREQUISITES

For Specific Course Descriptions and
Discussions of Prerequisites
refer to the training section on the
http://www.osmre.gov/science/training.shtm
to view the NTTP Course Catalog and TIPS
Instructor-Led Courses

NTTP Course Prerequisites

Acid-Forming Materials: Soils and Overburden [Recommended to have taken Acid-Forming Materials: Fundamentals and Applications. A basic understanding of chemistry is very helpful.]

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]

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

AMDTreat: Mine Drainage Treatment Cost Calculation Software [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 10.0: Mobile GIS for Reclamation Mapping and Analysis [MUST have experience with GIS and GPS]

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

CAD100: AutoCAD Essentials – Distance Learning [familiarity with computers and Windows OS]

CAD101: AutoCAD for Permitting and Reclamation [knowledge of maps and drafting concepts required]

CAD200: AutoCAD Map 3D for Permitting and Reclamation [working knowledge of AutoCAD or MUST have taken CAD101: AutoCAD for Permitting and Reclamation]

CAD201: Carlson Mining Site Design for Permitting and Reclamation [working knowledge of AutoCAD or MUST have taken CAD101: AutoCAD for Permitting and Reclamation]

CAD300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping [working knowledge of AutoCAD or AutoCAD Map 3D, helpful if have taken CAD200: AutoCAD Map 3D for Permitting and Reclamation]

CAD301: Carlson Mining, Field, Hydrology, and Natural Regrade for Permitting and Reclamation [working knowledge of Carlson Mining or should have taken CAD201: Carlson Mining Site Design for Permitting and Reclamation]

CAD400: Bridging the CAD and GIS Gap in the SMCRA Workflow [working knowledge of AutoCADMap 3D and/or ArcGIS]

Galena Slope Stability Analysis – Distance Learning [familiarity with slope stability and science and engineering principles]

Hydrologic Engineering Center – River Analysis System (HEC-RAS) [familiarity with science and engineering principles]

Introduction to AqQA – Distance Learning [familiarity with hydrology and computers helpful]

Introduction to earthVision 2D and 3D Modeling [experience with GIS and scientific and engineering principles]

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

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

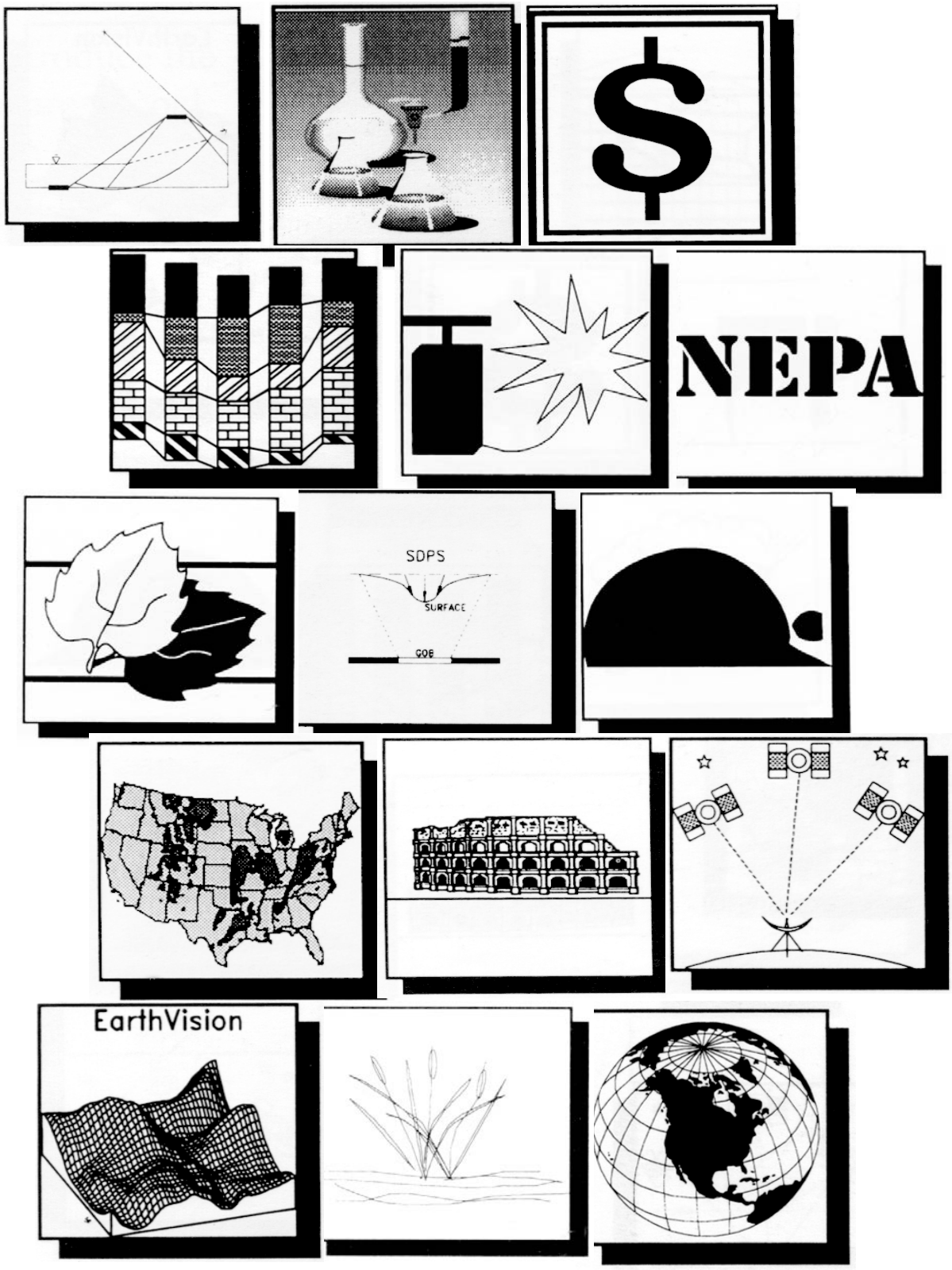
Introduction to GPS with Garmin eTrex [MUST bring a Garmin eTrex unit to class]

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

ProXRT Workshop: High Accuracy GPS for GIS [working knowledge of GPS and GIS]

National Technical Training Program (NTTP) Classes	Inspectors			Program Specialist	Engineers			Physical Scientists			Non-Technical		
	ACT Inspector	AML Inspector/Field Insp	AML Field Personnel	Permit Reviewer	AML Engineer Designer	ACT Engineer	Explosive Designer	Soil/Natural Scientists	Hydrologist/Geologist	Geo-Spacial/Mine Map Sci	Admin. Support/Staff	Attorney	Program Mgr/Supvervisor
Acid-Forming Materials: Fundamentals and Applications	X	X		X									
Acid-Forming Materials: Soils and Overburden	X	X	X	X	X	X	X	X	X				X
Advanced Blasting: Investigations an Analysis of Adverse Actions	X					X	X						
AML Design Workshop: Dangerous Highwalls		X	X		X								
AML Design Workshop: Dangerous Openings Vertical Shafts/Audit		X	X		X								
AML Design Workshop: Drilling and Grouting		X	X		X								
AML Design Workshop: Fires		X	X		X								
AML Design Workshop: Landslides		X	X		X								
AML Design Workshop: Subsidence		X	X		X								
AML Realty		X	X										
AML Reclamation Projects		X	X										
Applied Engineering Principles	X	X	X	X			X						
Blasting and Inspection	X	X	X	X	X	X	X						
Bonding Workshop: Administrative and Legal Aspects												X	
Bonding Workshop: Cost Estimation	X					X							
Coalfield Communications: How to Get It Right	X	X				X	X						
Effective Writing	X	X	X	X	X	X	X	X	X		X	X	X
Enforcement Procedures	X			X								X	X
Enforcement Tools and Applications				X									X
Erosion and Sediment Control	X	X	X	X									
Evidence Preparation and Testimony	X			X		X	X	X	X				X
Excess Spoil Handling and Disposal in Steep Slope Topography	X												
Expert Witness	X			X	X	X		X	X				
Forensic Hydrologic Investigations													
Geology and Geochemistry of Acid-Forming Materials	X	X	X	X				X	X				X
Historic and Archeological Resources	X	X	X	X			X						
Mine Gas Workshop	X	X	X	X	X	X	X						X
NEPA Procedures		X	X		X	X	X						
Passive Treatment: Theory and Applications Workshop		X	X	X									
Permit Findings Workshop				X			X						
Permitting Hydrology	X				X			X					
Principles of Inspection	X			X			X						X
Quantitative Hydrology													
SMCRA and ESA: Implementation of the 1996 Biological Opinion				X				X					
SMCRA Principles and Field Procedures	X	X	X	X			X	X	X	X			X
Soils and Re-vegetation	X	X	X										
Subsidence	X			X		X			X			X	
Surface and Groundwater Hydrology	X	X	X	X								X	X
Underground Mining Technology	X	X	X	X					X				
Wetland Awareness	X	X	X	X				X					
Basic Inspection	X												

Technical Innovation and Professional Services (TIPS) Classes	Inspectors			Program Specialist	Engineers			Physical Scientis			Non-Technical		
	ACT Inspector	AML Inspector/Field Insp	AML Field Personnel	Permit Reviewer	AML Engineer Designer	ACT Engineer	Explosive Designer	Soil/Natural Scientists	Hydrologist/Geologist	Geo-Spacial/Mine Map Sci	Admin. Support/Staff	Attorney	Program Mgr/Supervisor
AMD TREAT: Mine Drainage Treatment Cost Calculations		X	X		X	X			X				
ARCGIS Spatial Analyst: For Mining and Reclamation				X	X	X		X	X	X			
ARCPAD 10.0 Mobile GIS for Reclamation and Analysis	X	X	X	X	X	X		X	X	X			
Blasting Log Evaluation Program (BLEP) – Distance Learning	X					X	X						
CAD 100: AutoCAD Essentials – Distance Learning	X	X	X	X	X	X	X	X	X	X			
CAD 101: AutoCAD for Permitting and Reclamation	X	X	X	X	X	X	X	X	X	X			
CAD 200: AutoCAD Map 3D for Permitting and Reclamation	X	X	X	X	X	X	X	X	X	X			
CAD 201: Carlson Mining Site Design – Permitting and Reclamation	X	X	X	X	X	X	X	X	X	X			
CAD 300: AutoCAD Map 3D with Raster Design for Underground and Surface Mine Mapping				X	X	X			X	X			
CAD 301: Carlson Mining, Field, Hydrology, and Natural Regrade for Permitting and Reclamation	X	X	X	X	X	X		X	X				
CAD 400: Bridging the CAD and GIS Gap in the SMCRA Window	X	X	X	X	X	X		X	X	X			
Galena Slope Stability Analysis – Distance Learning				X	X	X	X		X	X			
HEC-RAS					X	X			X				
Introduction to AqQA – Distance Learning					X	X			X				
Introduction to earthVision 2D and 3D Modeling				X	X	X		X	X	X			
Introduction to GIS for Mining and Reclamation I – Distance Learning	X	X	X	X	X	X	X	X	X	X			X
Introduction to GIS for Mining and Reclamation I	X	X	X	X	X	X	X	X	X	X			X
Introduction to GPS with Garmin Etrex Vista HCx	X	X	X	X	X	X	X	X	X	X			
Modeling and Analysis with Groundwater Vistas					X	X			X				
ProXRT Workshop: High Accuracy GPS for GIS	X	X	X		X	X		X	X	X			
SDPS: Surface Deformation Prediction System – Distance Learning					X	X		X	X	X			
SEDCAD Applications and Extensions for Mining and Reclamation				X	X	X		X	X				
Testing and Analysis of Aquifer Characteristics with AQTESOLV					X	X			X				
Trimble GeoXT, TerraSync, and PF Office: Mobile Computing for Reclamation	X	X	X		X	X		X	X	X			



U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING

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