

Proceedings

18th Annual National Meeting
of the
American Society for
Surface Mining and Reclamation

Land Reclamation – A Different Approach

Proceedings of a conference held June 3-7, 2001
in Albuquerque, New Mexico

Co-editors

Ecology – Richard Vincent
Forestry – James A. Burger
Geotechnical – Gennaro G. Marino
Hydrology – Greg A. Olyphant
Land Use – Susan C. Wessman
Soils and Overburden – Robert G. Darmody
Tailings – Timothy C. Richmond and Stuart A. Bengson
Wetlands – Jack R. Nawrot

Coordinators

Richard I. Barnhisel, Bruce A. Buchanan, Debi Peterson and John J. Pfeil

Published by

The American Society for Surface Mining and Reclamation

2001: 18th National ASSMR Meeting

Meeting Chairman

Bruce A. Buchanan
Buchanan Consultants, Ltd.
P.O. Box 2549
Farmington, NM 87401

Planning and Program Committee

Wayne Robbie
U.S. Forest Service
4805 Choctaw Trail NW
Albuquerque, NM 87120

Tim Ramsey
BHP World Minerals
P.O. Box 210
Waterflow, NM 87418

Ann Wagner
MolyCorp Inc.
P.O. Box 469
Questa, NM 87556-0469

John J. Pfeil
NM Mining and Minerals Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Brent D. Musslewhite
Buchanan Consultants, Ltd.
Box 2549
Farmington, NM 874999

ASSMR Executive Secretary

Richard I. Barnhisel
3134 Montavesta Rd.
Lexington KY 40502-3548
phone 877 701-2086
fax 877 701-2086
E-mail: rbarnhis@ca.uky.edu

Mark D. Hiles
Lee Ranch Coal Company
P.O. Box 757
Grants, NM 87020

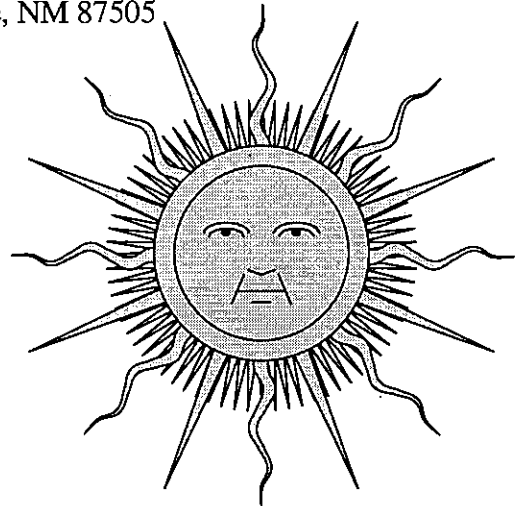
James O'Hara
NM Mining and Minerals Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

John T. Harrington
New Mexico State University
P.O. Box 359
Mora, NM 87732

Teri W. Conrad
220 West Main
Farmington, NM 87401

Virginia T. McLemore
N M Bureau of Mines and Mineral Resources
N M Institute of Mining and Technology
Socorro, NM 87801

Mike Bowen
Executive Director
New Mexico Mining Association
Santa Fe, NM 87505



Contents

<u>Biodiversity Special Session</u>	1
Testing Native Grasses for Survival and Growth in Low pH Mine Overburden	2
<i>Dreesen, Harrington, Wagner, Murray and Sun</i>	
Creating Diverse Wildlife Habitat at La Plata Mine, Northwestern New Mexico, A Case Study: Part 2. Soils and Vegetation	18
<i>Musslewhite, Buchanan, Ramsey, Hamilton and Luther</i>	
Creating Diverse Wildlife Habitat at La Plata Mine, Northwestern New Mexico, A Case Study: Part 1. Landscape Design	26
<i>Ramsey, Hamilton, Musslewhite, Buchanan, and Abiad</i>	
Influence of Provenance on <i>Ribes cereum</i> and <i>Symphoricarpos oreophilus</i> Seed Germination in New Mexico Seed Sources	31
<i>Rosner, Harrington, Dreesen and Murray</i>	
Establishing Wyoming Big Sagebrush on Mined Lands in Wyoming	39
<i>Schuman, Vicklund and Belden</i>	
<u>Ecology Technical Session</u>	48
Palmer Drought Indices as Indicators of Long Term Stability and Permanence of Surface Coal Mine Reclamation	49
<i>Bickel</i>	
Post-mining Land-use Planning and Design: a Multiplicity of Choices and Options	60
<i>Burley</i>	
Stabilization of the Mean as a Demonstration of Sample Adequacy	65
<i>Clark</i>	
Ecological Assessment of Surface Reclamation of a Hardrock Mine in Wisconsin when Compared to Other Standards of Success	70
<i>Hunt, Broughton and Joseph</i>	
The Installation, Establishment, and Maintenance of the Rountree Prairie The University of Wisconsin-Platteville	77
<i>Hunt and Ratigan</i>	
Coal Basin Mine Reclamation Case Study	85
<i>Renner</i>	
<u>Forestry and Wildlife Technical Session</u>	96
Saline Pre-Treatment of Jack Pine Seedlings for Planting on Reclamation Sites Impacted by Saline Tailings	97
<i>Franklin and Zwiazek</i>	
Forest Productivity and Minesoil Development Under a White Pine Plantation Versus Natural Vegetation After 30 Years	103
<i>Gorman, Skousen, Sencindiver and Ziemkiewicz</i>	
Results of Species Trials on Low pH Overburden Materials for Mine Land Reclamation	112
<i>Harrington, Dreesen, Wagner, Murray and Sun</i>	
Forest and Site Productivity on Pre-SMCRA Mined Land	121
<i>Rodrigue and Burger</i>	
<u>Geotechnical Technical Session</u>	133
Siting of a Federal Prison Facility on a Reclaimed Strip Mine in Eastern Kentucky – a Case Study	134
<i>Hintz, Pinnix and Ragozzino</i>	
Extreme Impact of Underground Mining on Linear Transportation Structures	142
<i>Klosek</i>	
Mine Subsidence Investigations in Hillslope/Landfill Areas	151
<i>Mahar and Berner</i>	
Long-Term Floor Stability of an Indiana Coal Mine	159
<i>Marino</i>	

<u>Hydrology Technical Session</u>	173
Water Quality Improvements Over Time and Longevity of Acid Mine Discharges from Underground Mines in Northern West Virginia	174
<i>Demchak, Skousen and McDonald</i>	
Scatterscore Method to Evaluate Changes in Water Quality	183
<i>Kim and Cardone</i>	
Infiltration Test Plot Study for Mine Rock Piles at Questa Mine, New Mexico	195
<i>Wels, O'Kane, Fortin and Christensen</i>	
Overview of Coal-Bed Methane Development and a Discussion of Montana Impacts	210
<i>Wheaton and Olson</i>	
<u>Land Use Technical Session</u>	219
Visualizing the Future: Surface Mining	220
<i>Ellsworth</i>	
SMCRA Bond Release – The Initial Steps at San Juan Mine	223
<i>Estrada and Clark</i>	
Reclamation Revisited: Minas Gerais, Brazil	232
<i>Toy and Griffith</i>	
<u>Poster Presentations</u>	238
Evaluating Techniques for Establishing a Vegetative Cover on an Acidic Reject Coal Basin	239
<i>Barton, Adriano and Seay</i>	
Evaluating Mine Water Treatment Choices (EMWATCH)	240
<i>Brown, Barley, Wood and Parker</i>	
Soil Ordination: Implications for Post-Mining Disturbance Land-Uses	241
<i>Burley and Gray</i>	
Base Metal and Trace Element Concentrations in Stream Sediments Along the Pecos River, From the Southern Pecos Wilderness to Brantley Dam, North of Carlsbad, Eastern New Mexico	246
<i>Carey, Brandvold and McLemore</i>	
Influence of Pisolithus Tinctorius Inoculation on Greenhouse Growth and First-Year Transplant Survival of Conifer Seedlings	255
<i>Harrington, Wagner and Dreesen</i>	
The Influence of Seed Source and Stock Size on First-Year Performance of Direct Transplanted Conifer Seedlings	265
<i>Harrington, Dreesen, Wagner, Murray and Sun</i>	
Conceptual Regrading Using Three-Dimensional GIS to Evaluate Mine Reclamation	271
<i>Jordan</i>	
Characterization and Resource Recovery Potential of Precipitates Associated with Abandoned Coal Mine Drainage	278
<i>Kairies, Watzlaf, Hedin and Capo</i>	
Reclamation of the Retsof Mine and Affected Areas	280
<i>Klugh</i>	
The Assessment of a Phosphogypsum Stack in Texas	287
<i>McGuire, duPont and Rubsam</i>	
Weathering Characteristics of Spoil Materials at La Plata Mine, Northwestern New Mexico. An Eight Year Study	289
<i>Musslewhite, Brown, Buchanan and Ramsey</i>	
Restoring Wetland Form and Function to Everglades Borrow Pits	290
<i>Norland</i>	
Bioremediation of Alkaline Mine Effluent Using Treatment Wetlands	292
<i>O'Sullivan, Murray and Otte</i>	
Characterization of Petroleum Contaminated Soils in Wyoming	294
<i>Peel, Reddy, Stahl and Rodgers</i>	
Modified NP Testing for Lignite Overburden Samples in Texas	296
<i>Porter and Hosner</i>	
Potential for Phytoremediation of Iron Cyanides Using Willow	298
<i>Reeves, Weinstein, Laurence and King</i>	

Soil-Geology Selenium Relationships in Disturbed and Native Ecosystems	300
<i>Skinner and Vance</i>	
Microbial Indicators of Minesoil Quality in Southern West Virginia	317
<i>Stephens, Sexstone, Sencindiver, Skousen and Thomas</i>	
Treatment of Acid Rock Drainage (ARD) with a Limestone Buffered Organic Substrate (LBOS) in a Vertical Flow Constructed Treatment Wetland	326
<i>Thomas and Romanek</i>	
Wyoming Reclamation Ecology Center: A New Research, Education and Outreach Initiative	328
<i>Vance</i>	
Creation of Hydric Soils, Wetlands, and Amphibian Habitat Through Controlled Mine Subsidence: Early Results	329
<i>Wiesbrook, Wilm and Petzing</i>	
<u>Rehabilitation and Reclamation Special Session</u>	331
Reclaiming Sodic Soils Following Saltcedar Removal on the Pueblo of Santa Ana, New Mexico	332
<i>Caplan, Musslewhite, Buchanan and Hendrickx</i>	
Revegetation of a Petroleum Contaminated Site on New Mexico State Trust Land in the Permian Basin	345
<i>Matush and Coss</i>	
Wetland Enhancement and Creation on Reclaimed Abandoned Mined Lands in Northeast Wyoming	348
<i>McKinstry, Richmond and Anderson</i>	
Rehabilitation of a Storm Water Retention Basin and Pump Station	356
<i>Will</i>	
<u>Saline/Sodic Special Session</u>	364
Sodicity: A Reassessment of the Influence of Sodic/Saline Conditions on Mine Land Reclamation	365
<i>Brown, Musslewhite and Buchanan</i>	
<u>Soils and Overburden Technical Session</u>	372
Modifying Root-Zone Spoil Sampling Methods Using Vertical and Horizontal Composite Sampling Techniques	373
<i>Applegate, Buchanan and Postle</i>	
Threshold Limits for Selenium in the Coal Mining Areas of New Mexico	379
<i>Brown, Woomer, Musslewhite and Ramsey</i>	
The Study of Mine Rock Erosion Using Simulated Rainfall at Questa Mine, New Mexico	391
<i>Christensen, Reeves and Fortin</i>	
Effects of Biosolids Loading Rate and Sawdust Additions on Row Crop Yield and Nitrate Leaching Potentials in Virginia Sand and Gravel Mine Reclamation	399
<i>Daniels, Evanylo, Nagle and Schmidt</i>	
Contaminant Migration from Acidic-Metalliferous Tailings into an Earthen Cover During a 26 Year Time Period	407
<i>Dollhopf</i>	
Spoil Quality and Herbaceous Yield Relationships on Silty Reclaimed Grasslands	414
<i>Kirby, Krabbenhoft and Nilson</i>	
Classification of Minesoils: Some Radical Proposals.	418
<i>Kosse</i>	
Plant Responses on Soils Ameliorated with Waste Products	425
<i>Rethman and Truter</i>	
Determining Optimal Sawdust/Biosolids Mixtures to Manage Nitrate Leaching in Reclaimed Disturbed Soils	429
<i>Schmidt, Daniels, Li and McFaden</i>	
The Use of Acid-Base Accounting to Predict Post-mining Drainage Quality on West Virginia Surface Mines	437
<i>Skousen, Sinmons and Ziemkiewicz</i>	
Chemical Properties of Minesoils on a Mountaintop Removal Mine in Southern West Virginia	448
<i>Thomas, Sencindiver, Skousen and Gorman</i>	

<u>Tailings Technical Session</u>	457
Reclaiming Coarse Taconite Tailings – Are Organic Amendments the Answer?	458
<i>Eger, Johnson and Melchert</i>	
Reclamation of U.S. Uranium Mills – Extraordinary Requirements, Extreme Costs	472
<i>Kuhn</i>	
Tailing Reclamation = Oasis = Closure	479
<i>Shetron and Goodman</i>	
Reclamation of Copper Mine Tailings Using Biosolids and Green Waste.	492
<i>Thompson, Wald-Hopkins and White</i>	
Assessment of Water Storage Cover for Questa Tailings Facility, New Mexico	500
<i>Wels, O’Kane and Fortin</i>	
Aquatic Plant Establishment on Water-Covered Nickel Tailings	514
<i>Wilkinson, Beckett and St-Germain</i>	
<u>Wetlands Technical Session</u>	523
Biotic and Abiotic Iron Oxidation Kinetics in Net Alkaline Mine Drainage	524
<i>Athay, Nairn and Strevett</i>	
An Evaluation of Biotic Integrity Associated with Coal Mine Reclamation in the Dry Creek Drainage Basin, Tennessee	529
<i>Brookens, DeAngelo and Stearns</i>	
Sulfate Reduction – Decreases in Substrate Reactivity and the Implication for Long-Term Treatment	542
<i>Eger and Wagner</i>	
Constructed Wetland Research for the Treatment of the Plant Gorgas Coal Pile Runoff	558
<i>Garrett, Jr., Bartolucci and Vermace</i>	
Influence of Ammoniacal-N on Wetland Plant Species	569
<i>Meikle and Waugh</i>	
Remediation Challenges and Opportunities at the Tar Creek Superfund Site, Oklahoma	579
<i>Nairn, Griffin, Strong and Hatley</i>	
Remediation Properties of Materials to Treat Acid Mine Drainage Water at a Gold Mine Operation in Brazil	585
<i>Pinto, Wildeman and Gusek</i>	
Case Study of Pot Ridge Passive Treatment Systems, Cambria County Pennsylvania	592
<i>Rose, Alcorn, Phelps and Bower</i>	
Evaluating Successes in Passive Treatment at Sequatchie Valley Coal Corporation in East Central Tennessee	604
<i>Schmidt and Stearns</i>	
Passive, Periodic Flushing Technology for Mine Drainage Treatment Systems	611
<i>Vinci and Schmidt</i>	
Modeling of Iron Oxidation in a Passive Treatment System	626
<i>Watzlaf, Schroeder and Kairies</i>	
<u>Author Index</u>	639