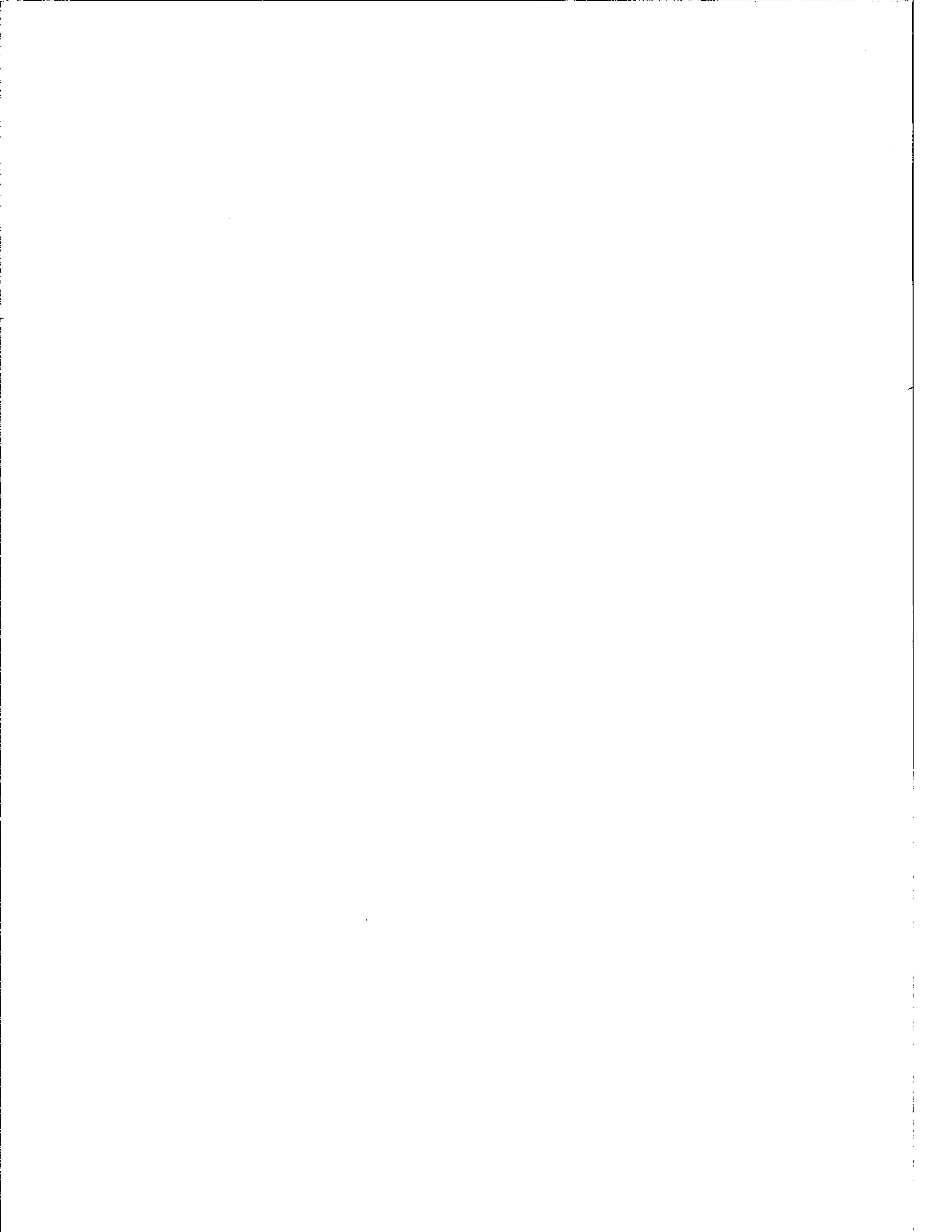


Second Annual Meeting

**American Society
for
Surface Mining
and
Reclamation**

***"Bridging the Gap Between Science, Regulation,
and the Surface Mining Operation"***

**October 8-10, 1985
Clarion Hotel
Denver, Colorado**



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"Bridging the Gap Between Science, Regulation,
and the Surface Mining Operation"

October 8-10, 1985
Clarion Hotel
Denver, Colorado

Co-Chairmen

Dean Williams
Utah International
550 California Street
San Francisco, CA 94104

and

Scott E. Fisher, Jr.
Office of Surface Mining, DOI
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American Society for Surface Mining and Reclamation
Atlantic Richfield Company
Montana State University - Reclamation Research Unit
Northern Energy Resource Company
Peabody Coal Company
Reclamation Research Group
Rocky Mountain Energy Company
U.S. Forest Service
Utah International, Inc.
Utah State University - Institute for Land Rehabilitation
Western Reclamation Group
Western Soil and Overburden Task Group

Note from the Chairmen

This publication contains the proceedings of the Second Annual Meeting of the American Society for Surface Mining and Reclamation. Reprinting of any part of these proceedings without the written permission of the authors is prohibited.

Speakers were asked to submit camera-ready copy for this publication. Because of the schedule for printing, the chairmen were unable to edit the texts and apologize for any errors in the copy or poor reproduction of figures or tables.

Several papers were not received in time to be included in this publication; thus, the lack of conformity between the Agenda of the Symposium and this published proceedings was unavoidable.

Additional copies of the proceedings are available from Bill Plass, 21 Grandview Drive, Princeton, West Virginia 24740.

Dean Williams
Co-Chairman

Acknowledgments

The following people, firms, and organizations have provided significant contributions of time and/or money to this program:

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Sharp Brothers Seed Company
Traux Company
University of Wisconsin, student chapter of ASSMR
Utah International, Inc.

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TUESDAY OCTOBER 8

COAL RECLAMATION

Queen City North and Central Rooms

			<u>Page</u>
12:40 to 1:00 pm	Reclamation of Prime Farmland in Kentucky	J. L. Powell, R. I. Barnhisel, W. O. Thom, J. R. Armstrong, F. A. Craig, and M. L. Ellis	1
1:00 to 1:20 pm	Reclamation Research in the Foothills/ Mountains Region of Alberta: A Case Study	T. M. Macyk	13
1:20 to 1:40 pm	Sod-Seeding Low Maintenance Plant Species into Coastal Bermudagrass Sod on Lignite Overburden in Texas	J. G. Skousen and C. A. Call	18
1:40 to 2:00 pm	Illinois Agricultural Land Productivity Formula	J. S. Lohse, P. Giordano, M. C. Williams and F. A. Vogel	24
2:00 to 2:20 pm	Selection of Grass and Legume Species and Varieties for Reclamation of Mined Land	R. I. Barnhisel, J. L. Powell, M. L. Ellis, J. R. Armstrong, F. A. Craig, and S. K. Laue	40

ACID MATERIALS

2:40 to 3:00 pm	Characterization of the Forms of Sulfur in Overburden Materials of the Western United States	L. L. Jackson, R. C. Severson, and E. E. Engleman	NA
3:00 to 3:20 pm	The Effects of Particle Size Distribution on the Rate of Mine Acid Formation and its Mitigation by Bacterial Inhibitors	M. A. Shellhorn, A. A. Sobek and V. Rastogi	50
3:20 to 3:40 pm	Development of a Computerized Automated Rapid Weathering Apparatus for Determining Total Lime Requirement for Acid Minesoils	K. C. Harvey and D. J. Dollhopf	54
3:40 to 4:00 pm	Development of a Bioassay for Acid Producing Potential in Mine Spoils and Overburden	D. L. Sorenson, J. E. McLean and E. E. Farmer	61

NA= not available

TUESDAY OCTOBER 8

RECLAMATION: THE STANDARDS, ACCOMPLISHMENTS
AND INNOVATION

Queen City South Room

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12:40 to 1:00 pm	Recent Concerns in Assessing Revegetation Success and Releasing Bond Liability	L. G. Kline	NA
1:00 to 1:20 pm	Inherent Similarity of Vegetation Types as a Standard for Revegetation Success	S. L. White and W. R. Keammerer	69
1:20 to 1:40 pm	Reclamation and Grazing Management on a Surface Coal Mine in Northwestern Colorado	W. A. Laycock and W. J. McGinnies	73
1:40 to 2:00 pm	Development of Revegetation Success Standards for La Plata Coal Mine in Northwestern New Mexico	R. Edgar, W. Ruzzo, B. Bailey, C. Berry and F. Samson	77
2:00 to 2:20 pm	The Utilitarian Concept for Determining Mined Land Reclamation Success	B. W. Sindelar and S. Murdock	84

NA= not available

TUESDAY OCTOBER 8

LABORATORY TECHNIQUES

Prospector's Hall

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12:40 to 1:00 pm	Evaluation of the NH_4HCO_3 - DTPA (AB-DTPA) Soil Test For Identifying Seleniferous Soils	R. K. Jump and B. R. Sabey	87
1:00 to 1:20 pm	Western Soil and Overburden Task Group Round Robin Analyses in 1984-1985	R. C. Severson and S. E. Fisher Jr.	NA

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WEDNESDAY OCTOBER 9

RECLAMATION INVENTORY ANALYSIS

Queen City North and Central Rooms

			<u>Page</u>
8:20 to 8:40 am	Use of Soil Parameters in the Evaluation of Reclamation Success in North Dakota	E. C. Doll and N. C. Wollenhaupt	91
8:40 to 9:00 am	Plant Analysis - A Measure of Successful Reclamation	P. J. Smith and D. Y. Boon	95
9:00 to 9:20 am	Estimating Components of Plant Community Diversity on Mined Lands	T. J. Hatton, S. L. Durham and N. E. West	102
9:20 to 9:40 am	Revegetation Technology and Issues at Western Surface Coal Mines	J. Bunin and D. L. Buckner	NA
10:00 to 10:20 am	A New Instrument for Measuring Ground Cover Based on the Point-Hit Technique - The Optical Point Bar	S. R. Viert	106
10:20 to 10:40 am	Point-Intercept Cover Techniques in Revegetation Studies: Maximizing Objectivity and Repeatability	D. L. Buckner	110
10:40 to 11:00 am	Tracking and Evaluating Revegetation Success With a Microcomputer	W. R. Keammerer and B. Gibbs	NA
11:00 to 11:20 am	McKinley Mine: Vegetation Bond Release Criteria Based on Soil Conservation Service Technical Guide Range Site Descriptions	W. R. Erickson	114
11:20 to 11:40 am	Revegetation Observations at Surface Coal Mines in the Axial Basin, Yampa River Basin, and North Park, Colorado	M. S. Savage and D. T. Mathews	117

COAL RECLAMATION TECHNIQUES

12:40 to 1:00 pm	A Wetlands Planning Analysis John Henry No. 1 Mine in King County Washington	M. Abernathy, D. J. Morris and R. Van Wormer	134
1:00 to 1:20 pm	Selecting Plants for Mine Reclamation in Western Wyoming	M. E. Majerus, J. G. Scheetz, and L. K. Holzworth	139
1:20 to 1:40 pm	The Effect of Native Hay Mulch on Reclaimed Prairie in the Northern Great Plains	J. D. Friedlander and F. R. Van Ryn	NA
1:40 to 2:00 pm	Techniques Used to Establish, Maintain and Enhance Grassland Seasonal Variety on the Glenharold Mine in North Dakota	D. J. Nilson, R. L. Williamson, J. C. Thompson, and J. E. Schultz	144

NA= not available

WEDNESDAY OCTOBER 9

NON-COAL RECLAMATION

Queen City South Room

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8:20 to 8:40 am	Reclamation of Abandoned Mica, Feldspar, and Kaolin Surface Mines and Associated Tailings Disposal Sites in Western North Carolina	J. A. Muncy	153
8:40 to 9:00 am	An Innovative Approach to Reclaiming Processed Oil Shale	D. C. Anderson, W. K. Ostler, C. M. McKell, and V. Isaman	158
9:00 to 9:20 am	ASARCO's Revegetation of Mill Tailings and Overburden Wastes From Open-Pit Copper Mining Operations in Arizona	S. A. Bengson	164
9:20 to 9:40 am	Grass Root Penetration in Tosco II Processed Oil Shale	D. L. Buckner	173
10:00 to 10:20 am	Edaphic and Crop Production Changes Resulting from Pipeline Installation in Semiarid Agricultural Ecosystems	S. D. Zellmer, J. D. Taylor, and R. P. Carter	181
10:20 to 10:40 am	A Field Survey of Reclamation Practices in the Overthrust Belt	W. K. Ostler, K. L. Allred, and D. J. Hansen	190
10:40 to 11:00 am	The Use of Manual Surface Seeding, Liming and Fertilization in The Reclamation of Acid, Metal-Contaminated Land in the Sudbury, Ontario Mining and Smelting Region of Canada	K. Winterhalder	196
11:00 to 11:20 am	Lime and Tillage Effects on Extractable Metal Levels in an Acid Contaminated Agricultural Soil	W. M. Schafer	NA

NA= not available

WEDNESDAY OCTOBER 9

HYDROLOGY

Queen City South Room

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2:40 to 3:00 pm	Effect of Crusting on Runoff and Erosion from Reshaped Spoil	S. A. Schroeder	205
3:00 to 3:20 pm	Watershed Reconstruction During The Rehabilitation of Surface Mined Disturbances	E. A. Stieg and D. L. Law	211
3:20 to 3:40 pm	Vegetation and Soil Water Response to Contour Furrows, Dozer Basins, and Surface Additions of Topsoil or Power Plant Ash on Arid Coal Spoils	D. G. Scholl	217
3:40 to 4:00 pm	The Purpose and Design of Water Quality Monitoring Networks at Minesites	C. S. Joy	220
4:00 to 4:20 pm	Hydrologic Parameters of Surface Mine Spoils in the Southwest	E. F. Aldon	228

WEDNESDAY OCTOBER 9

SOIL AND OVERBURDEN ANALYTICAL PARAMETERS

Prospector's Hall

The papers presented in this session will be published at a later date by the Soil Conservation Society of America.

8:20 to 8:40 am	pH Relationship to Revegetation and Water Quality at Western Surface Mines	G. Tucker, W. Berg and D. Gentz
8:40 to 9:00 am	Cadmium and Zinc	G. Halvorson, J. Kramer, J. Mclean and N. Safaya
9:00 to 9:20 am	Copper and Molybdenum	J. Schrack, D. Newman and L. Gough
9:20 to 9:40 am	Acid-base Potential and Sulfur Forms	A. Sobek, L. Hossner, D. Fransway, D. Sorenson, L. Lagaki and D. Naftz

ANALYTICAL PARAMETERS

Prospector's Hall

The papers presented in this session will be published at a later date by the Soil Conservation Society of America.

10:00 to 10:20 am	Impact Assessment of Mercury in Soils and Overburden in the Western United States: A Review	R. Funston, S. Williams and W. Swain
10:20 to 10:40 am	Organic Matter	R. Smith, E. Redente and E. Hooper
10:40 to 11:00 am	Nitrate and Ammonium Nitrogen	G. Wendt, B. Sabey and R. Lawton
11:00 to 11:20 am	Saturation Percentage	S. Merrill, J. Deutsch and M. Pole
11:20 to 11:40 am	Coarse Fragments - Their Effects in the Soil Profile	D. McGirr, L. Munn, C. Scott and N. Harrington
12:40 to 1:00 pm	Particle Size	J. Herron, J. Bokich and D. Scholl
1:00 to 1:20 pm	Electrical Conductivity	F. Samson, T. Portal and J. Bowden
1:20 to 1:40 pm	Boron	R.C. Barth, G. Weiler and C. Severson
1:40 to 2:00 pm	Selenium	S. Fisher, F. Munshower and F. Parady
2:00 to 2:20 pm	Management of Sodium Affected Minesoils	M.G. Carlstrom, F. Amendola, D.A. Shay and D.J. Dollhoph

THURSDAY OCTOBER 10

RECLAMATION OF SOILS

Queen City North and Central Rooms

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8:00 to 8:20 am	Topsoil and Subsoil Replacement on Strip-mined Land in North Dakota	G. A. Halvorson and E. C. Doll	232
8:20 to 8:40 am	Collection and Use of Overburden Chemical Data in Australia	S. Miller	242
8:40 to 9:00 am	Spacial Variability of Rosebud Mine Spoils	K. J. Lang, H. P. Knudsen, and R. Sheldon	NA
9:00 to 9:20 am	Carbonaceous Materials Problems Associated With Reclamation	D. Y. Boon and P. J. Smith	242
9:20 to 9:40 am	Soil and Overburden Management in Western Surface Coal Mine Reclamation - Findings of a Study Conducted for the Congress of the United States - Office of Technology Assessment	J. P. Walsh	251

RECLAMATION TECHNOLOGY

10:00 to 10:20 am	Microcomputers in Regulatory Compliance	C. H. Judy and M. I. Johnson	265
10:20 to 10:40 am	Bare-Plot Analysis as a Tool for Diagnosing Impediments to Revegetation at Surface Coal Mines	C. C. Reith and L. D. Potter	268
10:40 to 11:00 am	Advanced Reclamation Technology in Grading	W. E. Hilgedick	275
11:00 to 11:20 am	A Seeding Technique to Enhance Species Diversity	S. G. Long	279

NA= not applicable

THURSDAY OCTOBER 10

HYDROLOGY

Prospector's Hall

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8:00 to 8:20 am	The Control of Surface Erosion from Overburden Areas	C. S. Joy	346
8:20 to 8:40 am	Concepts and Practices in Replacement of Water Sources on Reclaimed Mined Lands	D. W. Simpson and M. K. Botz	354
8:40 to 9:00 am	Impact of Surface Mining Sediment Control Regulations on the Hydrologic Balance of Dryland Streams	D. O. Doehring, J. R. Hinton, and R. W. Micsak	365
9:00 to 9:20 am	Alternate Methods of Surface Mining Sediment Control and Measuring Water Quality in Streams	J. R. Hinton, W. R. Erickson, R.W. Micsak, and D. O. Doehring	370
9:20 to 9:40 am	The Rights and Obligations of Operators to Control Sediment and Implement Alternative Sediment Control Technologies Under the Surface Mining Control and Reclamation Act of 1977 and the Federal Water Pollution Control Act	R. W. Micsak, J. R. Hinton, and D. O. Doehring	379
10:00 to 10:20 am	Cumulative Hydrologic Impact Assessment in Surface Coal Mining	R. Price, R. Singh, K. Eggleston, and D. Frickel	389
10:20 to 10:40 am	Determining Recharge in Coal Surface Mining Areas	W. J. Stone	394
10:40 to 11:00 am	Use of Geochemical Modeling in the Interpretation of Water Quality and Overburden Chemical Analysis	K. Johnson	404
11:00 to 11:20 am	The Use of the ESM Test for Prediction of Post-Mining Water Quality	D. B. McWhorter	NA
11:20 to 11:40 am	Upward Migration of Vadose Zone Contaminants, as Indicated by Lysimeter Sampling	J. V. Rouse	NA

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