

C/007/016 Incoming

#4074 R



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Grand Junction, CO 81501
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Fax (970) 263-5162

March 29, 2012

RECEIVED

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DIV. OF OIL, GAS & MINING

Coal Regulatory Program
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

RE: 2011 Annual Report for Mountain Coal Company, LLC, Gordon Creek 2, 7, & 8
Mines, C/007/016

To Whom it May Concern:

Please find enclosed with this letter a CD containing a copy of the Mountain Coal Company, LLC Gordon Creek 2, 7, and 8 Mines 2011 Annual Report and electronic files containing the appropriate appendices to the report. The information contained within the Annual Report is, to the best our knowledge, current and correct.

If you have any questions regarding the report, please call me at (970) 261-1425.

Sincerely:

A handwritten signature in blue ink that reads "Chris D. Hansen".

Chris D. Hansen
Environmental Coordinator
Arch Western Bituminous Group, LLC

enclosures

Arch Coal, Inc.**Directors**

James R. Boyd	Lead Director First Elected: 4/27/2006
Douglas H. Hunt	Director First Elected: 4/4/1995
A. Michael Perry	Director First Elected: 9/28/1998
Theodore D. Sands	Director First Elected: 2/25/1999
John W. Eaves	Director First Elected: 2/23/2006
David D. Freudenthal	Director First Elected: 2/23/2011
Patricia Fry Godley	Director First Elected: 7/22/2004
Brian J. Jennings	Director First Elected: 7/27/2006
J. Thomas Jones	Director First Elected: 7/21/2010
Robert G. Potter	Director First Elected: 2/22/2001
Wesley M. Taylor	Director First Elected: 7/28/2005
Peter I. Wold	Director First Elected: 7/21/2010
Steven F. Leer	Chairman & Chief Executive Officer First Elected: 4/27/2006

Officers

Steven F. Leer	Chairman & Chief Executive Officer First Elected: 4/27/2006
Jeffrey W. Strobel	Vice President - Business Development and Strategy First Elected: 10/17/2011
John W. Eaves	President & Chief Operating Officer First Elected: 4/27/2006
Paul A. Lang	Executive Vice President - Operations First Elected: 7/28/2011
David N. Warnecke	Senior Vice President - Marketing and Trading First Elected: 2/24/2011

Arch Coal, Inc.

John T. Drexler

Senior Vice President & Chief Financial Officer

First Elected: 4/24/2008

Robert G. Jones

Senior Vice President - Law, General Counsel and Secretary

First Elected: 8/1/2008

C. Henry Besten Jr.

Senior Vice President - Strategic Development

First Elected: 12/1/2002

John W. Lorson

Vice President and Chief Accounting Officer

First Elected: 4/24/2008

Deck Slone

Vice President - Government, Investor and Public Affairs

First Elected: 8/1/2008

Anthony S. Bumbico

Vice President - Safety

First Elected: 4/27/2006

Sheila B. Feldman

Vice President - Human Resources

First Elected: 2/3/2003

David E. Hartley

Vice President & Chief Information Officer

First Elected: 8/1/2009

Charles David Steele

Vice President - Tax Planning

First Elected: 4/24/2003

James E. Florczak

Treasurer

First Elected: 8/17/1998

Casey Warner

Director - Internal Audit

First Elected: 4/23/2009

Jon S. Ploetz

Assistant Corporate Secretary

First Elected: 2/18/2010

Arch Coal, Inc.**Directors****Gordon F. Ahalt**

End Date: 12/11/1981

Director

First Elected: 7/29/1981

Orin E. Atkins

End Date: 7/7/1971

Director

First Elected: 7/15/1969

Philip W. Block

End Date: 4/26/2001

Director

First Elected: 4/9/1999

James R. Boyd

End Date: 4/27/2006

Director

First Elected: 1/1/1990

James R. Boyd

End Date:

Lead Director

First Elected: 4/27/2006

Robert A. Charpie

End Date: 4/22/1998

Director

First Elected: 6/30/1997

Paul W. Chellgren

End Date: 5/4/2000

Director

First Elected: 6/30/1997

Thomas L. Feazell

End Date: 4/26/2001

Director

First Elected: 6/30/1997

Juan Antonio Ferrando

End Date: 12/11/1998

Director

First Elected: 6/30/1997

Hubert D. Hagen

End Date: 7/7/1971

Director

First Elected: 6/20/1969

William Guy Heckman

End Date: 11/26/1995

Director

First Elected: 6/20/1969

Robert L. Hintz

End Date: 12/26/2001

Director

First Elected: 6/30/1997

Douglas H. Hunt

End Date:

Director

First Elected: 4/4/1995

George David Kelce

End Date: 7/7/1971

Director

First Elected: 7/22/1970

Merl C. Kelce**Director**

Arch Coal, Inc.

End Date: 7/22/1970 First Elected: 6/20/1969

William M. Kelce

End Date: 7/14/1969 First Elected: 6/20/1969

Steven F. Leer

End Date: 4/27/2006 First Elected: 2/11/1992

Thomas Marshall

End Date: 4/22/1998 First Elected: 6/30/1997

William C. Nelson

End Date: 7/7/1971 First Elected: 7/15/1969

James L. Parker

End Date: 3/31/2004 First Elected: 4/4/1995

Gerald H. Patrick

End Date: 9/1/1982 First Elected: 12/18/1974

A. Michael Perry

End Date: First Elected: 9/28/1998

J. Marvin Quin

End Date: 5/4/2000 First Elected: 6/30/1997

Ronald Eugene Samples

End Date: 4/22/1998 First Elected: 9/1/1982

Theodore D. Sands

End Date: First Elected: 2/25/1999

William R. Seaton

End Date: 9/17/1979 First Elected: 7/7/1971

Ignacio Dominguez Urquijo

End Date: 6/5/2002 First Elected: 12/11/1998

William C. Voss

End Date: 12/31/1989 First Elected: 12/11/1981

Carlton D. Weaver

End Date: 7/29/1981 First Elected: 7/15/1969

Frank M. Burke

End Date: 7/24/2010 First Elected: 12/1/2000

Arch Coal, Inc.**John W. Eaves**

End Date:

Director

First Elected: 2/23/2006

David D. Freudenthal

End Date:

Director

First Elected: 2/23/2011

Patricia Fry Godley

End Date:

Director

First Elected: 7/22/2004

John R. Hall

End Date: 4/9/1999

Director

First Elected: 9/17/1979

Brian J. Jennings

End Date:

Director

First Elected: 7/27/2006

J. Thomas Jones

End Date:

Director

First Elected: 7/21/2010

Thomas A. Lockhart

End Date: 4/28/2011

Director

First Elected: 2/21/2003

Robert G. Potter

End Date:

Director

First Elected: 2/22/2001

Wesley M. Taylor

End Date:

Director

First Elected: 7/28/2005

Peter I. Wold

End Date:

Director

First Elected: 7/21/2010

Steven F. Leer

End Date:

Chairman & Chief Executive Officer

First Elected: 4/27/2006

Tom M. Hunt

End Date: 4/4/1995

Director

First Elected: 7/7/1971

W. Herbert Hunt

End Date: 4/4/1995

Director

First Elected: 7/7/1971

Officers**William Guy Heckman**

End Date: 11/26/1995

Chairman Emeritus

First Elected: 12/10/1990

Arch Coal, Inc.**Steven F. Leer**

End Date:

Chairman & Chief Executive Officer

First Elected: 4/27/2006

William Guy Heckman

End Date: 4/6/1982

Chairman of the Board

First Elected: 2/8/1977

William Guy Heckman

End Date: 2/10/1990

Chairman

First Elected: 4/5/1988

Ronald Eugene Samples

End Date: 6/30/1997

Chairman of the Board

First Elected: 12/10/1990

Steven F. Leer

End Date: 4/27/2006

President & Chief Executive Officer

First Elected: 2/11/1992

John W. Eaves

End Date: 4/27/2006

Executive Vice President and Chief Operating Officer

First Elected: 12/11/2002

William Guy Heckman

End Date: 4/5/1988

Chairman & Chief Executive Officer

First Elected: 4/6/1982

Gerald H. Patrick

End Date: 4/3/1979

President & Chief Operating Officer

First Elected: 2/8/1977

Gerald H. Patrick

End Date: 9/1/1982

President & Chief Operating Officer

First Elected: 4/6/1982

Ronald Eugene Samples

End Date: 9/4/1991

Chairman & Chief Executive Officer

First Elected: 12/20/1990

Ronald Eugene Samples

End Date: 2/11/1992

Chairman, President & Chief Executive Officer

First Elected: 9/4/1991

Ronald Eugene Samples

End Date: 4/5/1988

President & Chief Operating Officer

First Elected: 9/1/1982

Ronald Eugene Samples

End Date: 12/20/1990

President & Chief Executive Officer

First Elected: 4/5/1988

Jeffrey W. Strobel

End Date:

Vice President - Business Development and Strategy

First Elected: 10/17/2011

Terry L. Sullivan**President & Chief Operating Officer**

Arch Coal, Inc.

End Date: 9/4/1991

First Elected: 12/20/1990

John W. Eaves

End Date:

President & Chief Operating Officer

First Elected: 4/27/2006

William Guy Heckman

End Date: 2/8/1977

President

First Elected: 7/22/1970

Merl C. Kelce

End Date: 7/2/1970

President

First Elected: 7/2/1969

Paul A. Lang

End Date:

Executive Vice President - Operations

First Elected: 7/28/2011

Gerald H. Patrick

End Date: 4/6/1982

President

First Elected: 4/3/1979

C. Henry Besten Jr.

End Date: 12/1/2002

Senior Vice President - Strategic Marketing

First Elected: 12/1/2002

Steve A. Carter

End Date: 9/18/1995

Executive Vice President - Marketing & Planning

First Elected: 12/10/1990

Steve A. Carter

End Date: 6/30/1997

Executive Vice President - Marketing

First Elected: 9/18/1995

John W. Eaves

End Date: 12/12/2002

Senior Vice President - Marketing

First Elected: 2/24/2000

Walter, Jr. Mueller

End Date: 3/31/1991

Executive Vice President - Engineering, Exploration & Environmental Affairs

First Elected: 12/20/1990

Walter, Jr. Mueller

End Date: 1/1/1993

Executive Vice President - Operations

First Elected: 3/31/1991

Gerald H. Patrick

End Date: 2/8/1977

Executive Vice President

First Elected: 1/27/1976

Terry L. Sullivan

End Date: 12/20/1990

Executive Vice President - Operations

First Elected: 1/15/1988

David N. Warnecke**Senior Vice President - Marketing and Trading**

Arch Coal, Inc.

End Date: First Elected: 2/24/2011

Kenneth G. Woodring

End Date: 2/21/2005 First Elected: 7/1/1997

Executive Vice President - Mining Operations**John T. Drexler**

End Date: First Elected: 4/24/2008

Senior Vice President & Chief Financial Officer**Robert G. Jones**

End Date: First Elected: 8/1/2008

Senior Vice President - Law, General Counsel and Secretary**Patrick A. Kriegshauser**

End Date: 1/26/2000 First Elected: 7/1/1996

Senior Vice President & Chief Financial Officer**Robert J. Messey**

End Date: 4/30/2008 First Elected: 12/1/2000

Senior Vice President & Chief Financial Officer**C. Henry Besten Jr.**

End Date: First Elected: 12/1/2002

Senior Vice President - Strategic Development**Steve A. Carter**

End Date: 12/20/1990 First Elected: 9/1/1988

Senior Vice President - Marketing and Planning**Parvin E. Day**

End Date: 4/30/1973 First Elected: 1/20/1972

Senior Vice President - Operations**Ronald M. Gaudio**

End Date: 1/15/1988 First Elected: 4/7/1987

Senior Vice President - Operations**Patrick A. Kriegshauser**

End Date: 8/17/1998 First Elected: 7/1/1996

Senior Vice President, Treasurer, & Chief Financial Officer**Paul A. Lang**

End Date: 7/27/2011 First Elected: 12/7/2006

Senior Vice President - Operations**Jeffrey N. Quinn**

End Date: 2/29/2000 First Elected: 9/18/1995

Senior Vice President - Law and Human Resources, Secretary and General Counsel**Terry L. Sullivan**

End Date: 1/15/1988 First Elected: 4/7/1987

Senior Vice President - Operations

Arch Coal, Inc.**Paul H. Vining**

End Date: 8/5/2005

Senior Vice President, Marketing & Trading

First Elected: 6/1/2005

John E. Walton

End Date: 6/30/1996

Senior Vice President, Treasurer, & Chief Financial Officer

First Elected: 12/10/1990

John L., Jr. Winemiller

End Date: 3/31/1991

Senior Vice President - Human Resources

First Elected: 12/20/1990

Ben H. Daud

End Date: 1/1/1993

Senior Vice President - Engineering & Development & Environmental Affairs

First Elected: 2/11/1992

John W. Lorson

End Date:

Vice President and Chief Accounting Officer

First Elected: 4/24/2008

R. William Breece, Jr.

End Date: 4/3/1984

Vice President, Secretary & General Counsel

First Elected: 4/6/1982

Cedric Hustace

End Date: 3/15/1976

Vice President, Secretary & General Counsel

First Elected: 8/15/1975

Thomas R. Lloyd

End Date: 2/10/1989

Vice President, Secretary & General Counsel

First Elected: 4/7/1987

Jeffry N. Quinn

End Date: 4/1/1992

Vice President, Secretary & General Counsel

First Elected: 8/1/1990

Jeffry N. Quinn

End Date: 9/18/1995

Senior Vice President, Secretary & General Counsel

First Elected: 4/1/1991

Deck Slone

End Date:

Vice President - Government, Investor and Public Affairs

First Elected: 8/1/2008

Michael T. Abbene

End Date: 7/31/2009

Vice President & Chief Information Officer

First Elected: 7/1/2005

Bradley M Allbritten

End Date: 6/1/2005

Vice President - Marketing

First Elected: 7/31/2002

C. Henry Besten Jr.**Vice President - Strategic Marketing**

Arch Coal, Inc.

End Date: 12/1/2002

First Elected: 7/1/1997

Anthony S. Bumbico

End Date:

Vice President - Safety

First Elected: 4/27/2006

John W. Eaves

End Date: 3/1/2000

Vice President - Marketing

First Elected: 7/1/1997

Sheila B. Feldman

End Date:

Vice President - Human Resources

First Elected: 2/3/2003

David E. Hartley

End Date:

Vice President & Chief Information Officer

First Elected: 8/1/2009

Bennett K. Hatfield

End Date: 3/31/2005

Vice President - Operations

First Elected: 4/24/2003

Jeffery A. Hoops

End Date: 11/19/1998

Vice President - Operations

First Elected: 7/1/1997

Robert G. Jones

End Date: 8/1/2008

Vice President - Law, General Counsel and Secretary

First Elected: 10/16/2000

Terry O'Connor

End Date: 12/31/2001

Vice President - External Affairs

First Elected: 7/22/1998

Gerald H. Patrick

End Date: 1/27/1976

Senior Vice President

First Elected: 7/31/1974

David B. Peugh

End Date: 5/31/2011

Vice President - Business Development

First Elected: 7/1/1997

Robert W. Shanks

End Date: 3/18/2005

Vice President - Operations

First Elected: 7/1/1997

Deck Slone

End Date: 8/1/2008

Vice President - Investor Relations and Public Affairs

First Elected: 4/26/2001

Donald W. Black

End Date: 2/10/1989

Vice President - Coordination & Planning

First Elected: 4/7/1987

Steve A. Carter

End Date: 4/7/1987

Vice President - Coordination & Planning

First Elected: 4/3/1984

Arch Coal, Inc.**Parvin E. Day**

End Date: 1/20/1972

Vice President - Chief Operating Officer

First Elected: 7/7/1971

Hubert D. Hagen

End Date: 1/14/1974

Vice President - Exploration & Development

First Elected: 7/7/1971

George David Kelce

End Date: 9/1/1973

Divisional Vice President - Operations

First Elected: 7/7/1971

Doris B. Lanier

End Date: 10/1/1973

Divisional Vice President - Operations

First Elected: 1/20/1972

Walter, Jr. Mueller

End Date: 12/20/1990

Vice President - Engineering, Exploration and Environmental Affairs

First Elected: 4/7/1987

John P. Mulderig

End Date: 12/1/1992

Vice President - Coordination & Planning

First Elected: 4/3/1990

Neal M. Parker

End Date: 4/6/1982

Vice President - Exploration & Development

First Elected: 1/8/1976

Terry L. Sullivan

End Date: 4/3/1984

Vice President - Operations Administration

First Elected: 1/20/1982

Robert L. Veenstra

End Date: 1/21/1991

Vice President - Marketing Services

First Elected: 4/3/1990

J. Hord Armstrong, III

End Date: 4/7/1987

Vice President/Treasurer, Chief Financial Officer

First Elected: 1/20/1982

Larry R. Brown

End Date: 7/1/2005

Vice President & Chief Information Officer

First Elected: 7/1/1997

Fred B. Chilton

End Date: 8/9/1976

Vice President - Operations

First Elected: 4/29/1974

Gerald C. Clark

End Date: 12/8/1975

Vice President - Engineering

First Elected: 9/1/1973

Teresa A. Daniel

End Date: 5/20/1998

Vice President - Human Resources

First Elected: 7/1/1997

Arch Coal, Inc.**Ben H. Daud**

End Date: 2/11/1992

Vice President - Engineering & Exploration

First Elected: 3/31/1991

Larry C. Fuller

End Date: 4/3/1984

Vice President - Operations

First Elected: 9/1/1983

Larry C. Fuller

End Date: 7/31/1985

Vice President - Operations

First Elected: 4/2/1985

George David Kelce

End Date: 4/29/1974

Vice President - Operations

First Elected: 9/1/1973

Patrick A. Kriegshauser

End Date: 6/30/1996

Vice President & Controller

First Elected: 9/18/1995

Patrick A. Kriegshauser

End Date: 7/1/1996

Vice President - Planning and Development

First Elected: 4/5/1994

Fred E. Lutzeier

End Date: 2/10/1989

Vice President & Controller

First Elected: 4/7/1987

Fred E. Lutzeier

End Date: 12/1/1992

Vice President & Controller

First Elected: 2/11/1992

John P. Mulderig

End Date: 9/18/1995

Vice President & Controller

First Elected: 12/1/1992

Patrick J. Panzarino

End Date: 4/1/1992

Vice President - Sales

First Elected: 1/21/1991

Neal M. Parker

End Date: 4/23/1986

Vice President - Engineering & Exploration

First Elected: 4/6/1982

Gerald H. Patrick

End Date: 7/31/1974

Vice President - Sales

First Elected: 7/15/1969

David B. Peugh

End Date: 6/30/1997

Vice President - Strategic Planning and Development

First Elected: 9/18/1995

William H. Rose

End Date: 4/24/2003

Vice President - Tax

First Elected: 4/22/1998

Thomas J. Sawarynski**Vice President - Operations Support**

Arch Coal, Inc.

End Date: 4/4/1995

First Elected: 4/1/1992

Charles David Steele

End Date:

Vice President - Tax Planning

First Elected: 4/24/2003

John N. Stirewalt

End Date: 3/18/1990

Vice President - Marketing

First Elected: 4/2/1985

Terry L. Sullivan

End Date: 4/8/1986

Vice President - Operations

First Elected: 4/3/1984

David G. Todd

End Date: 8/31/1999

Vice President - External Affairs, Eastern Region

First Elected: 7/22/1998

W. O. Walker

End Date: 4/20/1982

Vice President - Operations

First Elected: 4/3/1979

John E. Walton

End Date: 12/20/1990

Vice President/Treasurer, Chief Financial Officer

First Elected: 4/7/1987

John L., Jr. Winemiller

End Date: 12/20/1990

Vice President - Human Resources

First Elected: 6/1/1983

Bradley M Allbritten

End Date: 2/3/2003

Vice President - Human Resources

First Elected: 2/24/2000

John K. Kinzer Jr.

End Date: 10/1/1999

Vice President - Tax

First Elected: 7/1/1997

Michael F. Moran

End Date: 12/31/1999

Vice President - Planning & Analysis

First Elected: 7/1/1997

David G. Todd

End Date: 7/22/1998

Vice President - External Affairs

First Elected: 7/1/1997

Robert G. Jones

End Date: 10/16/2000

General Counsel and Assistant Secretary

First Elected: 2/24/2000

James E. Florczak

End Date:

Treasurer

First Elected: 8/17/1998

William Guy Heckman

End Date: 7/22/1970

Vice President, Secretary and Treasurer

First Elected: 7/15/1969

Arch Coal, Inc.**Paul J. King**

End Date: 4/3/1973

Vice President, Secretary and Treasurer

First Elected: 7/22/1970

David N. Warnecke

End Date: 3/9/2011

Vice President - Marketing and Trading

First Elected: 8/8/2005

Casey Warner

End Date:

Director - Internal Audit

First Elected: 4/23/2009

R. William Breece, Jr.

End Date: 4/6/1982

Vice President & General Counsel

First Elected: 1/20/1982

Thomas R. Lloyd

End Date: 4/7/1987

Vice President and Secretary

First Elected: 4/3/1984

Parvin E. Day

End Date: 7/7/1971

Vice President

First Elected: 7/22/1970

Larry C. Fuller

End Date: 4/2/1985

Vice President

First Elected: 4/3/1984

Blair M. Gardner

End Date: 6/30/1997

Vice President - External Affairs

First Elected: 2/10/1993

Ronald M. Gaudiano

End Date: 4/7/1987

Vice President

First Elected: 4/2/1985

Hubert D. Hagen

End Date: 7/7/1971

Vice President

First Elected: 7/2/1969

W. Herbert Hunt

End Date: 4/5/1983

Vice President

First Elected: 7/7/1971

William M. Kelce

End Date: 7/7/1971

Vice President

First Elected: 7/2/1969

Paul J. King

End Date: 1/25/1974

Vice President, Treasurer & Assistant Secretary

First Elected: 4/3/1973

Patrick A. Kriegshauser

End Date: 9/18/1995

Vice President - Planning and Development

First Elected: 5/17/1994

Michael O. McKown**Vice President - Human Resources**

Arch Coal, Inc.

End Date: 9/18/1995

First Elected: 7/30/1991

Thomas J. Sawarynski

End Date: 6/30/1997

Vice President - Engineering and Development

First Elected: 5/23/1995

Kenneth D. Slavin

End Date: 8/31/1995

Vice President - Management Information Services

First Elected: 4/22/1988

Terry L. Sullivan

End Date: 4/7/1987

Vice President

First Elected: 4/8/1986

Marvin A. Ude

End Date: 4/4/1989

Vice President

First Elected: 4/2/1985

William C. Voss

End Date: 4/5/1983

Vice President

First Elected: 4/6/1982

John E. Walton

End Date: 4/7/1987

Vice President

First Elected: 10/22/1986

Carlton D. Weaver

End Date: 4/6/1982

Vice President

First Elected: 7/15/1969

Eugene C. Holdaway

End Date: 4/1/1992

Assistant Vice President - Midwest and Western Sales

First Elected: 3/2/1990

Paul J. King

End Date: 4/7/1978

Vice President - Finance and Administration and Assistant Secretary

First Elected: 1/25/1974

Richard S. Klein

End Date: 4/4/1989

Assistant Vice President - Marketing

First Elected: 4/2/1985

Richard S. Klein

End Date: 5/1/1990

Assistant Vice President - Transportation

First Elected: 4/4/1989

Patrick A. Kriegshauser

End Date: 4/5/1994

Assistant Vice President - Coordination and Planning

First Elected: 12/1/1992

David E. Long

End Date: 4/1/1992

Assistant Vice President - Transportation

First Elected: 9/24/1991

John P. Mulderig**Assistant Vice President - Coordination and Planning**

Arch Coal, Inc.

End Date: 4/3/1990

First Elected: 2/10/1989

Neil D. Novak

End Date: 9/20/1991

Assistant Vice President - Transportation

First Elected: 5/1/1990

John W. Lorson

End Date: 6/30/1997

Controller

First Elected: 7/1/1996

John W. Lorson

End Date: 4/30/2008

Controller

First Elected: 4/9/1999

Jeffry N. Quinn

End Date: 8/1/1990

Secretary and General Counsel

First Elected: 4/3/1990

Donald W. Black

End Date: 9/13/1991

Assistant Vice President - Business Development

First Elected: 2/10/1989

John W. Eaves

End Date: 4/1/1992

Assistant Vice President - Eastern Sales

First Elected: 2/4/1991

Sheridan A. Glen

End Date: 4/7/1987

Assistant Vice President

First Elected: 1/20/1982

Sheridan A. Glen

End Date: 4/4/1989

Assistant Vice President - Regional Sales

First Elected: 4/7/1987

Sheridan A. Glen

End Date: 3/2/1990

Assistant Vice President - Sales

First Elected: 4/4/1989

B. K. Gupta

End Date: 4/5/1983

Assistant Vice President - Engineering & Planning

First Elected: 1/20/1982

Dennis N. Kostic

End Date: 1/25/1993

Assistant Vice President - Engineering & Planning

First Elected: 10/1/1991

Richard T. Lammert

End Date: 4/6/1982

Assistant Vice President

First Elected: 1/20/1982

Richard T. Lammert

End Date: 4/5/1983

Assistant Vice President, Planning, Finance & Labor

First Elected: 4/6/1982

Richard T. Lammert

End Date: 4/7/1987

Assistant Vice President - Planning

First Elected: 4/2/1985

Arch Coal, Inc.**Michael O. McKown**

End Date: 7/30/1991

Assistant Vice President - Human Resources

First Elected: 12/20/1990

John M. Nolan

End Date: 4/1/1992

Assistant Vice President - Planning & Administration

First Elected: 4/9/1991

Neil D. Novak

End Date: 1/25/1993

Assistant Vice President - Business Development

First Elected: 9/20/1991

Patrick J. Panzarino

End Date: 4/3/1990

Assistant Vice President - Eastern Coal Sales

First Elected: 3/12/1990

Kenneth D. Slavin

End Date: 4/22/1988

Assistant Vice President - Management Information Services

First Elected: 4/2/1985

Robert L. Veenstra

End Date: 4/3/1990

Assistant Vice President - Marketing Services

First Elected: 3/29/1989

John E. Walton

End Date: 4/3/1984

Assistant Vice President

First Elected: 1/20/1982

J. Hord Armstrong, III

End Date: 1/20/1982

Treasurer & Assistant Secretary

First Elected: 4/3/1978

William Guy Heckman

End Date: 7/15/1969

Senior Vice President, Marketing & Trading

First Elected: 7/2/1969

Thomas E. Koetting

End Date: 4/3/1978

Treasurer & Assistant Secretary

First Elected: 1/25/1974

R. William Breece, Jr.

End Date: 1/20/1982

Secretary

First Elected: 6/11/1976

Cedric Hustace

End Date: 8/15/1975

Secretary

First Elected: 7/20/1972

Jeffry N. Quinn

End Date: 4/3/1990

Secretary and Senior Counsel

First Elected: 2/10/1989

Mark A. Luzecky

End Date: 4/9/1999

Assistant Treasurer

First Elected: 7/1/1997

Arch Coal, Inc.**John H. Ring**

End Date: 6/30/1997

Assistant Treasurer

First Elected: 2/27/1996

E. Wayne Bussell

End Date: 9/18/1995

Assistant Secretary

First Elected: 4/4/1989

Thomas V. Connelly

End Date: 4/3/1984

Assistant Secretary

First Elected: 7/15/1969

Blair M. Gardner

End Date: 2/10/1993

Assistant Secretary

First Elected: 10/14/1985

J. A. Goodson

End Date: 4/8/1980

Assistant Secretary

First Elected: 7/7/1971

Rosemary L. Klein

End Date: 3/1/2000

Assistant Secretary

First Elected: 12/1/1999

Rosemary L. Klein

End Date: 9/29/2000

Secretary

First Elected: 2/24/2000

H.J.M. Littlejohn

End Date: 2/10/1989

Assistant Secretary

First Elected: 4/2/1985

James H. Moore

End Date: 4/8/1980

Assistant Secretary

First Elected: 7/15/1969

Brent L. Motchan

End Date: 10/14/1985

Assistant Secretary

First Elected: 4/7/1981

Roger L. Nicholson

End Date: 4/1/1992

Assistant Secretary

First Elected: 4/3/1990

David Onuscheck

End Date: 4/3/1990

Assistant Secretary

First Elected: 11/1/1988

James W. Parker

End Date: 4/5/1983

Assistant Secretary

First Elected: 4/8/1980

Jeffry N. Quinn

End Date: 2/10/1989

Assistant Secretary

First Elected: 4/7/1987

William H. Rose**Assistant Secretary**

Arch Coal, Inc.

End Date: 6/30/1997

First Elected: 1/29/1978

Miriam Rogers Singer

End Date: 12/1/1999

Assistant Secretary

First Elected: 9/18/1995

James G. Stephenson

End Date: 4/5/1983

Assistant Secretary

First Elected: 4/8/1980

Janet L. Horgan

End Date: 10/14/2005

Assistant Secretary and Counsel

First Elected: 10/16/2000

Thomas E. Miller

End Date: 6/22/1998

Internal Auditor

First Elected: 7/1/1997

Gregory A. Billhartz

End Date: 10/9/2009

Assistant Secretary

First Elected: 12/8/2005

Allen R. Kelley

End Date: 11/17/2008

Internal Auditor

First Elected: 3/15/2005

Charles David Steele

End Date: 4/24/2003

Internal Auditor

First Elected: 6/22/1998

John A. Ziegler

End Date: 3/1/2005

Internal Auditor

First Elected: 4/24/2003

Steve A. Carter

End Date: 4/3/1984

Controller

First Elected: 1/20/1982

Fred E. Lutzeier

End Date: 2/11/1992

Controller

First Elected: 2/10/1989

Jon S. Ploetz

End Date:

Assistant Corporate Secretary

First Elected: 2/18/2010

James P. Pye

End Date: 4/22/1998

Controller

First Elected: 7/1/1997

Thomas J. Sawarynski

End Date: 5/23/1995

Assistant Vice President - Engineering and Development

First Elected: 2/22/1993

Terry L. Sullivan**Controller**

Arch Coal, Inc.

End Date: 1/20/1982

First Elected: 2/8/1977

John E. Walton

End Date: 4/7/1987

Controller

First Elected: 4/3/1984

Arch Western Acquisition Corporation**Directors**

C. Henry Besten Jr.	Director	First Elected: 1/26/2000
Robert G. Jones	Director	First Elected: 5/31/2011
Paul A. Lang	Director	First Elected: 6/27/2005

Officers

Paul A. Lang	President	First Elected: 6/27/2005
Charles David Steele	Vice President - Tax	First Elected: 5/23/2003
John T. Drexler	Vice President	First Elected: 5/1/2008
James E. Florczak	Vice President	First Elected: 3/28/2002
James E. Florczak	Treasurer	First Elected: 9/15/1998
Jolene J. Mermis	Assistant Secretary	First Elected: 7/1/2004
Jon S. Ploetz	Secretary	First Elected: 2/15/2010

Arch Western Acquisition Corporation**Directors****C. Henry Besten Jr.**

End Date:

Director

First Elected: 1/26/2000

Robert G. Jones

End Date: 6/27/2005

Director

First Elected: 3/1/2000

Robert G. Jones

End Date:

Director

First Elected: 5/31/2011

Patrick A. Kriegshauser

End Date: 1/26/2000

Director

First Elected: 5/7/1998

Paul A. Lang

End Date:

Director

First Elected: 6/27/2005

David B. Peugh

End Date: 5/31/2011

Director

First Elected: 5/7/1998

Jeffry N. Quinn

End Date: 2/29/2000

Director

First Elected: 5/7/1998

Officers**Robert G. Jones**

End Date: 6/27/2005

President

First Elected: 3/1/2000

Paul A. Lang

End Date:

President

First Elected: 6/27/2005

Jeffry N. Quinn

End Date: 2/29/2000

President

First Elected: 5/7/1998

Charles David Steele

End Date:

Vice President - Tax

First Elected: 5/23/2003

Patrick A. Kriegshauser

End Date: 9/15/1998

Vice President & Treasurer

First Elected: 5/7/1998

John T. Drexler

End Date:

Vice President

First Elected: 5/1/2008

James E. Florczak**Vice President**

Arch Western Acquisition Corporation

End Date: First Elected: 3/28/2002

Patrick A. Kriegshauser**Vice President**

End Date: 1/26/2000 First Elected: 5/7/1998

Robert J. Messey**Vice President**

End Date: 4/30/2008 First Elected: 3/28/2002

David B. Peugh**Vice President**

End Date: 5/31/2011 First Elected: 5/7/1998

James E. Florczak**Treasurer**

End Date: First Elected: 9/15/1998

Gregory A. Billhartz**Secretary**

End Date: 10/9/2009 First Elected: 11/7/2005

Janet L. Horgan**Secretary**

End Date: 10/14/2005 First Elected: 10/16/2000

Rosemary L. Klein**Secretary**

End Date: 9/29/2000 First Elected: 12/1/1999

Miriam Rogers Singer**Secretary**

End Date: 12/1/1999 First Elected: 5/7/1998

Jolene J. Mermis**Assistant Secretary**

End Date: First Elected: 7/1/2004

Anne W. O'Donnell**Assistant Secretary**

End Date: 6/18/2004 First Elected: 5/23/2003

William H. Rose**Assistant Secretary**

End Date: 5/23/2003 First Elected: 5/7/1998

Jon S. Ploetz**Secretary**

End Date: First Elected: 2/15/2010

Arch Western Bituminous Group, LLC

Directors

Eugene E. DiClaudio

Director

First Elected: 7/29/2004

John W. Eaves

Director

First Elected: 2/21/2005

Paul A. Lang

Director

First Elected: 4/15/2011

Officers

Eugene E. DiClaudio

President and General Manager

First Elected: 7/29/2004

Charles David Steele

Vice President - Tax

First Elected: 7/29/2004

James E. Florczak

Vice President & Treasurer

First Elected: 7/29/2004

Jolene J. Mermis

Assistant Secretary

First Elected: 7/29/2004

Jon S. Ploetz

Secretary

First Elected: 2/15/2010

Arch Western Bituminous Group, LLC**Directors****Gary L. Bennett**

End Date: 4/15/2011

Director

First Elected: 2/14/2011

Eugene E. DiClaudio

End Date:

Director

First Elected: 7/29/2004

John W. Eaves

End Date:

Director

First Elected: 2/21/2005

Paul A. Lang

End Date:

Director

First Elected: 4/15/2011

Robert W. Shanks

End Date: 2/14/2011

Director

First Elected: 7/29/2004

Kenneth G. Woodring

End Date: 2/21/2005

Director

First Elected: 7/29/2004

Officers**Eugene E. DiClaudio**

End Date:

President and General Manager

First Elected: 7/29/2004

Charles David Steele

End Date:

Vice President - Tax

First Elected: 7/29/2004

James E. Florczak

End Date:

Vice President & Treasurer

First Elected: 7/29/2004

Gregory A. Billhartz

End Date: 10/9/2009

Secretary

First Elected: 11/7/2005

Janet L. Horgan

End Date: 10/14/2005

Secretary

First Elected: 7/29/2004

Jolene J. Mermis

End Date:

Assistant Secretary

First Elected: 7/29/2004

Jon S. Ploetz

End Date:

Secretary

First Elected: 2/15/2010

Mountain Coal Company, L.L.C.

Directors

Eugene E. DiClaudio

Director

First Elected: 3/6/1998

John W. Eaves

Director

First Elected: 2/21/2005

Paul A. Lang

Director

First Elected: 4/15/2011

Officers

Eugene E. DiClaudio

President and General Manager

First Elected: 6/1/1998

Charles David Steele

Vice President - Tax

First Elected: 5/23/2003

James E. Florczak

Vice President & Treasurer

First Elected: 7/8/1999

Jolene J. Mermis

Assistant Secretary

First Elected: 7/1/2004

Jon S. Ploetz

Secretary

First Elected: 2/15/2010

Mountain Coal Company, L.L.C.**Directors****Gary L. Bennett**

End Date: 4/15/2011

Director

First Elected: 2/14/2011

C. Henry Besten Jr.

End Date: 2/5/2003

Director

First Elected: 3/23/2000

Eugene E. DiClaudio

End Date:

Director

First Elected: 3/6/1998

John W. Eaves

End Date:

Director

First Elected: 2/21/2005

Robert G. Jones

End Date: 2/5/2003

Director

First Elected: 3/23/2000

Patrick A. Kriegshauser

End Date: 1/26/2000

Director

First Elected: 6/1/1998

Paul A. Lang

End Date:

Director

First Elected: 4/15/2011

Jeffry N. Quinn

End Date: 2/29/2000

Director

First Elected: 6/1/1998

Robert W. Shanks

End Date: 2/14/2011

Director

First Elected: 6/1/1998

Kenneth G. Woodring

End Date: 2/21/2005

Director

First Elected: 6/1/1998

Officers**Eugene E. DiClaudio**

End Date: 6/1/1998

President

First Elected: 3/6/1998

Eugene E. DiClaudio

End Date:

President and General Manager

First Elected: 6/1/1998

Charles David Steele

End Date:

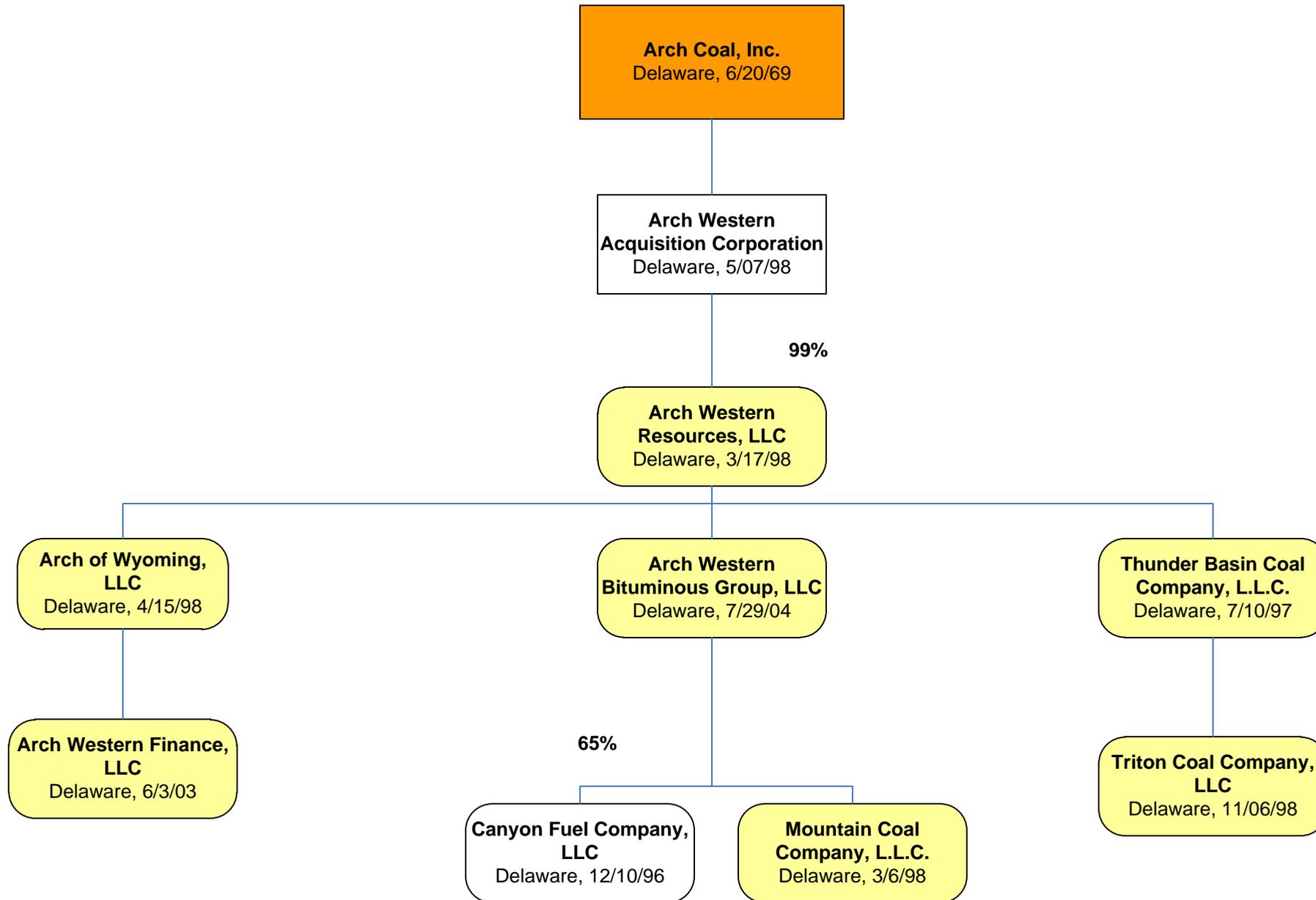
Vice President - Tax

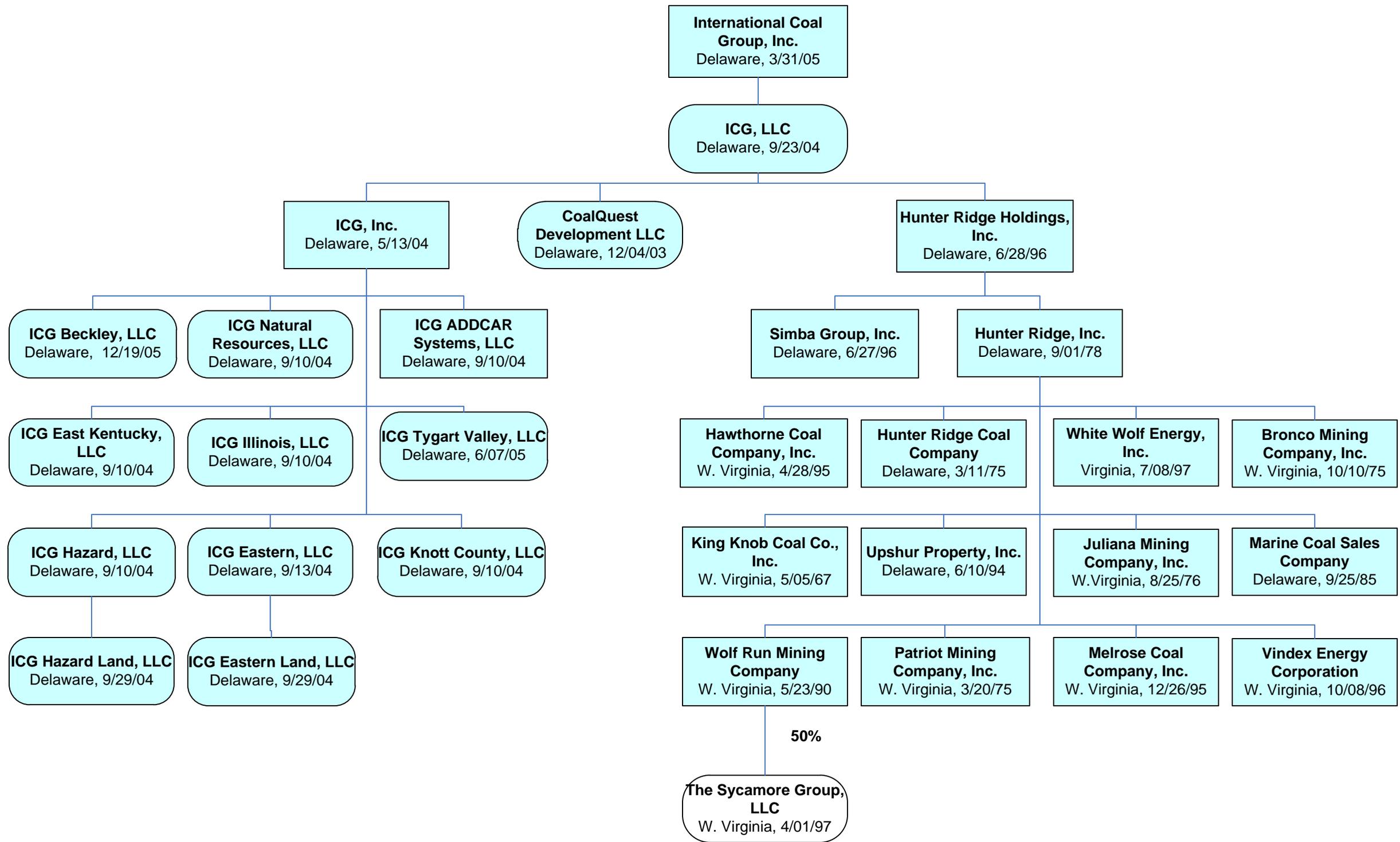
First Elected: 5/23/2003

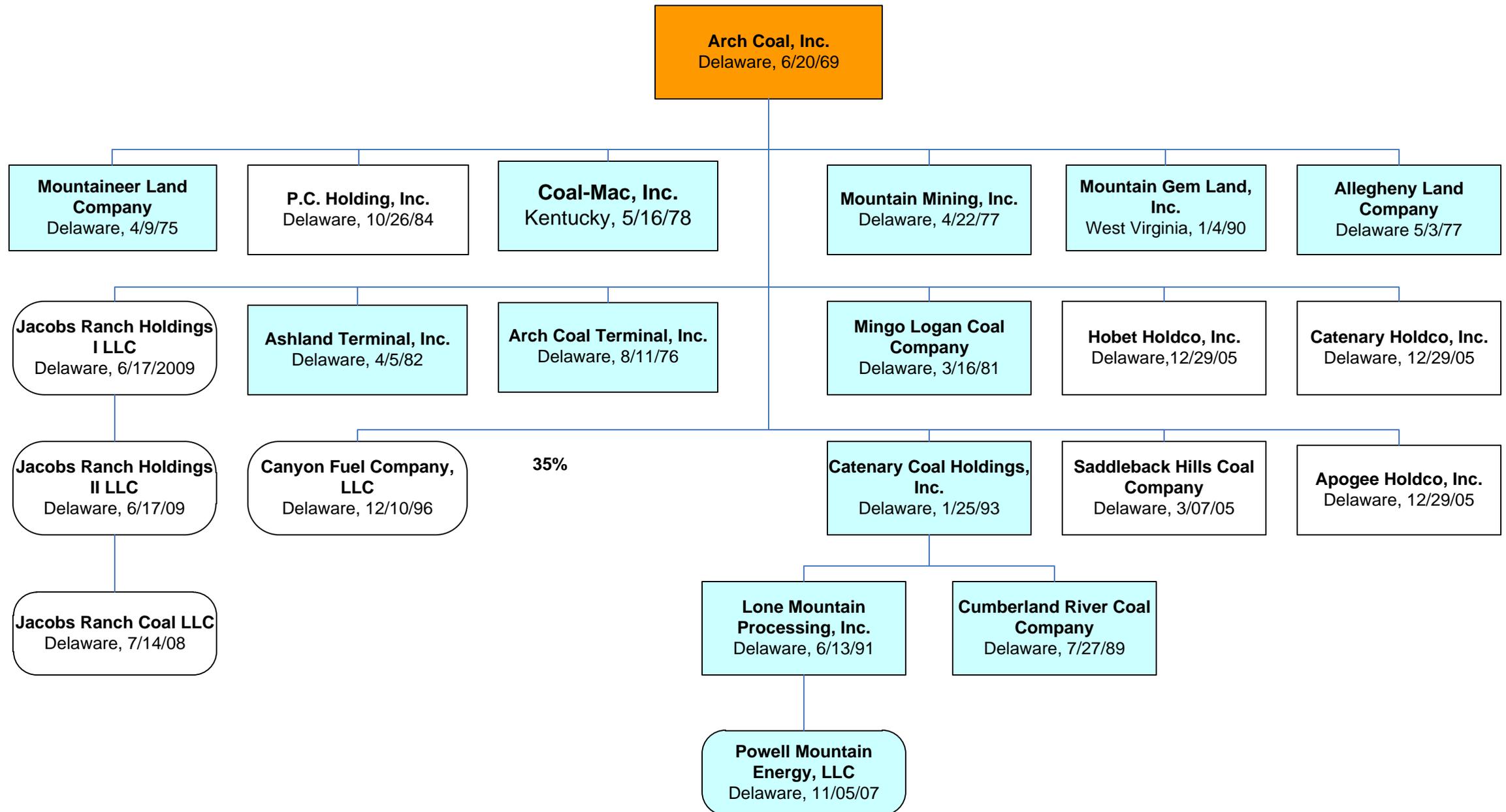
James E. Florczak**Vice President & Treasurer**

Mountain Coal Company, L.L.C.

End Date:		First Elected:	7/8/1999
Mark A. Luzecky		Vice President	
End Date:	7/8/1999	First Elected:	6/1/1998
Robert J. Messey		Vice President	
End Date:	2/5/2003	First Elected:	4/1/2002
James E. Florczak		Treasurer	
End Date:	7/8/1999	First Elected:	9/15/1998
Gregory A. Billhartz		Secretary	
End Date:	10/9/2009	First Elected:	11/7/2005
Janet L. Horgan		Secretary	
End Date:	10/14/2005	First Elected:	10/16/2000
Rosemary L. Klein		Secretary	
End Date:	9/29/2000	First Elected:	12/1/1999
Miriam Rogers Singer		Secretary	
End Date:	12/1/1999	First Elected:	6/1/1998
G. Lynn Colley		Assistant Secretary	
End Date:	9/15/1998	First Elected:	6/1/1998
Robert G. Jones		Assistant Secretary	
End Date:	2/5/2003	First Elected:	4/1/2002
Jolene J. Mermis		Assistant Secretary	
End Date:		First Elected:	7/1/2004
Anne W. O'Donnell		Assistant Secretary	
End Date:	7/1/2004	First Elected:	5/23/2003
William H. Rose		Assistant Secretary	
End Date:	5/23/2003	First Elected:	6/1/1998
Jon S. Ploetz		Secretary	
End Date:		First Elected:	2/15/2010

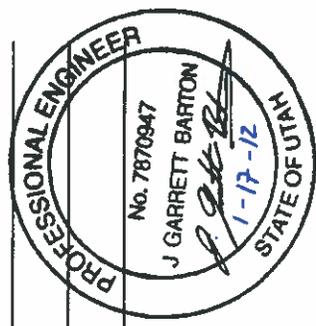






Date		Time		Inspector(s) Signature		Quarterly Inspection Form	
12/8/2011		10:05		Vicky Miller			
Yes		No		Action Required		Date Corrected	
Yes		No		Yes/No			
Stability of Pond							
Pond stability/weakness		Stable		No			
Erosion/Stability of banks		Stable		No			
Vegetation problem around pond				No			
Hazardous Condition							
Any visible contaminants		X					
Hazardous condition observed		X					
Inlet Conditions							
Inlet functioning		X					
Culvert(s)/ditches functioning		X					
Principle & Emergency Spillways							
Water Discharging (rate)		No discharge				Ice and snow covered	
Pond water level		X				Ice and snow covered	
Spillway is clear of debris		X				Ice and snow covered	
Oil skimmer							
Emergency spillway							
Primary spillway functioning		X				Ice and snow covered	

Other Observations: Snow and snow drifts around the pond, some areas are barren of snow others are drift to about a foot. Channels and ditches had drifted snow.
 An inspection was also performed the end of September.



**VEGETATION MONITORING
FOR PHASE III BOND RELEASE
AT THE GORDON CREEK 2/7/8 MINE SITE
YEAR 2: 2010**

**FOR
MOUNTAIN COAL COMPANY, LLC**



Revegetation at the Gordon Creek 2/7/8 Area

Prepared by

MT. NEBO SCIENTIFIC, INC.

330 East 400 South, Suite 6

P.O. Box 337

Springville, Utah 84663

(801) 489-6937

by

Patrick Collins, Ph.D.

for

MOUNTAIN COAL COMPANY

HC35 Box 380

Helper, Utah 84526

November 2011



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INTRODUCTION

Although the vegetation at the Gordon Creek 2/7/8 Mine site has been sampled and monitored since it was reclaimed, this document reports the second of two consecutive years of more comprehensive quantitative sampling that has been conducted at the site. Consequently, in order for mine owners/operators to achieve “final” or Phase III Bond Release, state and federal regulations require more rigorous sample data to be recorded following the “*responsibility period*” of the site, or the period of time of extended obligation mandated by the regulations following final reclamation and revegetation procedures. This means that theoretically enough time has passed for vegetation to become adequately establishment on the reclaimed land to become “diverse, effective and permanent” and has the potential to meet post-mining land use standards.

Results from the first of the two consecutive sample years was submitted previously in a report titled:

*Vegetation Monitoring for Phase III Bond Release
at the Gordon Creek 2/7/8 Mines
Year 1: 2009*

To facilitate comparisons between years, this report has also been included in Appendix A of this document.

General Site Description & Brief History

The reclaimed Gordon Creek 2/7/8 Mine site is located in the Bryner Canyon and Beaver Creek areas of Carbon County, Utah. Elevation of the area is about 8,000 ft above sea level. The study area is shown on the Jump Creek USGS 7.5 minute series quadrangle map in Section 18, Township 13 South, Range 8 East (Figure 1). General native plant communities surrounding the reclaimed site include Mountain Brush/Grass, Oak Shrubland, Sagebrush/Grass, Aspen, and Douglas Fir.

Gordon Creek 2/7/8 Mine site is an area where coal mining operations had been conducted for many years. More recently, the area has been reclaimed and the land restored to a condition that is consistent with the pre-mining and post-mining land uses, or primarily livestock grazing. The post-mining land use of the site following final reclamation was determined by the landowner.

Once the mine portals were sealed during reclamation activities, earthwork operations began to return the area back to its approximate original topography. Final seeding was accomplished using seeds of native and approved introduced plant species (Figure 2). Final seedbed preparations and seeding for most of the area occurred in October 1998 with follow-up seeding on the regraded roads in October 1999.

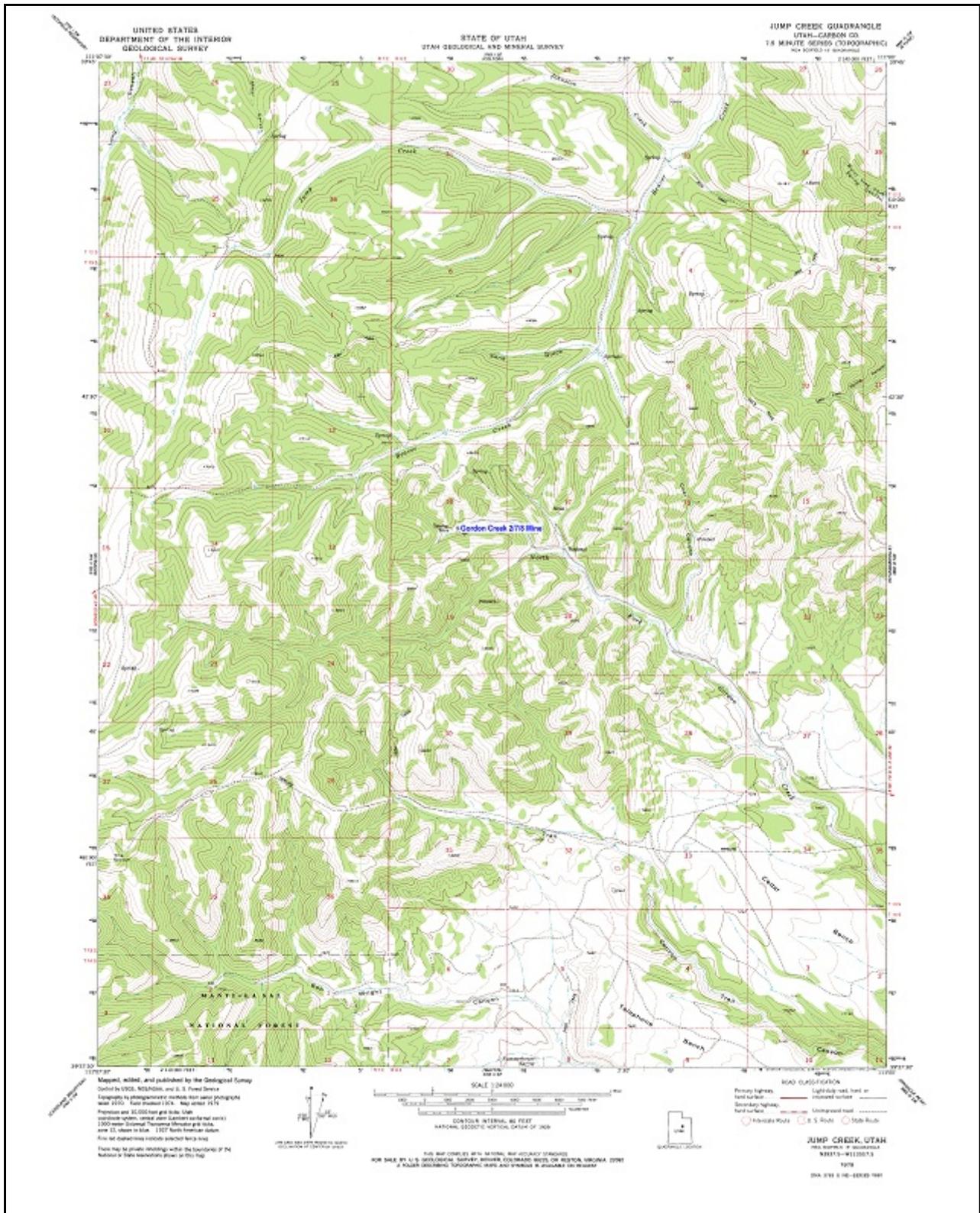


Figure 1: Gordon Creek 2/7/8 Mine Study Area

Study Objectives

This report describes the findings of quantitative sampling the vegetation at the Gordon Creek 2/7/8 Mine site in 2010. The site has been reclaimed long enough that the aforementioned *responsibility period* has passed. As mentioned above, after that time period an application for bond release can be initiated.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
SHRUBS	
Bitterbrush	(<i>Purshia tridentata</i>)
Mtn. Mahogany	(<i>Cercocarpus ledifolius</i>)
Rubber rabbitbrush	(<i>Chrysothamnus nauseosus</i>)
Blue elderberry	(<i>Sambucus caerulea</i>)
Snowberry	(<i>Symphoricarpos albus</i>)
Sagebrush	(<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>)
FORBS	
Northern sweetvetch	(<i>Hedysarum boreale</i>)
Cicer milkvetch	(<i>Astragalus cicer</i>)
Purple daisy fleabane	(<i>Erigeron corymbosus</i>)
Little sunflower	(<i>Helianthella uniflora</i>)
Rocky Mt. penstemon	(<i>Penstemon strictus</i>)
Yellow sweet clover	(<i>Melilotus officinalis</i>)
Alfalfa (Ladak)	(<i>Medicago sativa</i>)
Pacific Aster	(<i>Aster chilensis</i>)
GRASSES	
Thickspike wheatgrass	(<i>Elymus lanceolatus</i>)
Bluebunch wheatgrass	(<i>Elymus spicatus</i>)
Slender wheatgrass	(<i>Elymus trachycaulus</i>)
Indian ricegrass	(<i>Stipa hymenoides</i>)
Gt. Basin wildrye	(<i>Elymus cinereus</i>)

Figure 2: Final Seed Mixture for the Gordon Creek 2/7/8 Mine Site

Thus, Mountain Coal Company may soon submit the application for *final* or *Phase III Bond Release* through the State of Utah, Division of Oil, Gas and Mining (DOG M). Vegetation sampling in both 2009 and 2010 were conducted with that in mind. Because sample adequacy and statistical analyses met the required confidence levels, this dataset can be used as **Year 2** of the two consecutive years of vegetation monitoring required to apply for bond release. **Year 1** data also meet appropriate confidence levels (see report in Appendix A).

Reference Area

A reference area, or a native, undisturbed Mountain Brush/Grass plant community that was previously chosen to represent success standards for final revegetation has also been sampled both years. These datasets have been compared with the reclaimed areas of the Gordon Creek 2/7/8 Mine site data.

METHODS

For this report, quantitative and qualitative data were taken from the vegetation of the reclaimed areas at the Gordon Creek 2/7/8 Mine site as well as the Mountain Brush/Grass Reference Area. Sampling was conducted September 7-10, 2010. Methodologies used for sampling were performed in accordance with the *Vegetation Information Guidelines* supplied by DOGM and were consistent with the 2009 methods.

Transect and Quadrat Placement

Random/regular placement of sample quadrats was designed in an attempt to provide unbiased accuracy of the data compiled. This was accomplished by establishing transect lines the entire length of the reclaimed and reference areas. At regular intervals along the transect lines, random numbers were generated and used to measure distances at right angles to determine sample

locations. Whether these random numbers were odd or even determined which side of the transect a given quadrat was placed. The random number selected would be high enough to place quadrats to the lateral limits of the sample areas and all areas in-between. This insured that the sample quadrats were placed randomly over the entire study area with the intent to adequately represent the site as a whole

Cover, Frequency and Composition

Cover estimates were made using employing methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows "A Utah Flora" (Welsh et al. 2008).

Production

Total annual biomass production was estimated by clipping, drying and weighing current annual growth in sample quadrats. "Double sampling" methods were employed by placing four additional quadrats around the clipped quadrat, then estimating the production of them relative to the clipped plot. Herbaceous and woody species production weights were recorded separately.

Sample Size & Adequacy

Sampling adequacy was calculated using the formula given below.

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

where,

nMIN = minimum adequate sample
t = appropriate confidence t-value
s = standard deviation
x = sample mean
d = desired change from mean

The values used for “t” and “d” insured that sample adequacy was met with 90% confidence within a 10% deviation from the true mean.

Diversity Indices

MacArthur's Diversity Index was employed as an effective diversity measurement and is computed using the following equation:

$$1/\sum p_i^2$$

where,

p_i is the proportion of sum frequency contributed by the *i*th species in the sample area of concern.

The proportional contribution of each species is then squared and the values for all species in the sample areas are summed. This index integrates the number of species and the degree to which frequency of occurrence was equitably distributed among those species.

Another diversity measurement was provided that shows the average number of species encountered at each quadrat. Finally, a third measure of diversity or “richness” is simply the total number of species encountered in the quadrats.

Photographs

Color photographs of the sample areas were taken at the time of sampling and have been included in this report.

RESULTS

Reclaimed Areas

Similar to the 2009 sample results, in 2010 the reclaimed areas were greatly dominated by the forb species known as alfalfa (*Medicago sativa*). However, there were also several grasses that were well-represented including Gt. Basin wildrye (*Elymus cinereus*), thickspike wheatgrass (*E. lanceolatus*), western wheatgrass (*E. smithii*) and bluebunch wheatgrass (*E. spicatus*). Shrubs were also present in the dataset, but were relatively uncommon. For a list of all species present

in the sample quadrats, refer to Table 1.

Table 1: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and frequency by species (2010).

Reclaimed Areas (n=150)	Mean Percent	Standard Deviation	Percent Frequency
SHRUBS			
<i>Artemisia tridentata</i>	1.33	7.54	4.00
<i>Chrysothamnus nauseosus</i>	0.83	6.01	2.00
<i>Gutierrezia sarothrae</i>	0.07	0.81	0.67
<i>Symphoricarpos oreophilus</i>	0.20	1.51	2.00
FORBS			
<i>Artemisia ludoviciana</i>	0.20	1.51	2.00
<i>Astragalus cicer</i>	2.20	6.47	13.33
<i>Cynoglossum officinale</i>	2.27	5.64	20.67
<i>Hedysarum boreale</i>	0.17	1.46	1.33
<i>Lappula occidentalis</i>	0.07	0.81	0.67
<i>Medicago sativa</i>	24.42	21.65	69.33
<i>Penstemon strictus</i>	1.83	7.47	8.00
<i>Sisymbrium altissimum</i>	0.03	0.41	0.67
GRASSES			
<i>Agropyron cristatum</i>	1.03	3.93	6.67
<i>Bromus carinatus</i>	0.97	4.57	5.33
<i>Bromus tectorum</i>	0.10	0.91	1.33
<i>Elymus cinereus</i>	11.08	15.98	46.00
<i>Elymus lanceolatus</i>	6.15	9.44	38.67
<i>Elymus salinus</i>	0.27	3.26	0.67
<i>Elymus smithii</i>	5.02	9.80	30.00
<i>Elymus spicatus</i>	3.70	9.15	20.67
<i>Poa pratensis</i>	0.30	2.02	2.67

Total living cover of the reclaimed areas was estimated at 62.23%, all of which came from understory cover (Table 2-A). Forbs and grasses were nearly equally represented in the composition at 49.55% and 46.67%, respectively, whereas shrubs followed at a distant 3.78%

(Table 2-B).

Reclaimed Areas (n=150; nMIN=8.89)	Mean Percent	Standard Deviation
A. TOTAL COVER		
Understory	62.23	11.28
Litter	11.57	6.00
Bareground	14.60	9.16
Rock	11.60	6.67
B. % COMPOSITION		
Shrubs	3.78	15.92
Forbs	49.55	31.35
Grasses	46.67	30.63

Total annual biomass production of the reclaimed areas was estimated at 1,085.96 pounds per acre of which 1,041.27 pounds came from herbaceous species (forbs and grasses) and only 44.69 pounds came from woody plants (Table 3).

Reclaimed Areas (n=120; nMIN=49.51)		
	Pounds/Acre	
LIFEFORM	MEAN	STD. DEV.
Herbaceous	1041.27	470.09
Woody	44.69	203.23
TOTAL	1085.96	464.91

Color photographs of the reclaimed areas have been included at the end of this report.

Reference Area

The dominant plant by cover and frequency in the Mountain Brush/Grass Reference Area was the grass species, Salina wildrye (*Elymus salinus*). There most common shrub species in the 2010 dataset were antelope bitterbrush (*Purshia tridentata*), alder-leaf mountain-mahogany (*Cercocarpus montanus* and corymb buckwheat (*Eriogonum corymbosum*). Forb species were relatively uncommon in the reference area, each of which consisted of less than 1% of the living cover (Table 4).

Color photographs of the reference area have been included at the end of this report.

Table 4: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and frequency by species (2010).

Mountain Brush/Grass Reference Area (n=90)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
<i>Quercus gambelii</i>	0.22	1.47	2.22
UNDERSTORY			
SHRUBS			
<i>Amelanchier utahensis</i>	1.33	6.49	4.44
<i>Artemisia frigida</i>	0.11	1.05	1.11
<i>Artemisia tridentata var. vaseyana</i>	1.11	6.23	3.33
<i>Cercocarpus montanus</i>	2.83	6.71	20.00
<i>Eriogonum corymbosum</i>	2.44	8.51	8.89
<i>Gutierrezia sarothrae</i>	0.44	1.77	6.67
<i>Mahonia repens</i>	0.28	1.37	4.44
<i>Opuntia fragilis</i>	0.17	0.90	3.33
<i>Purshia tridentata</i>	4.11	11.24	16.67
<i>Quercus gambelii</i>	0.11	1.05	1.11
<i>Symphoricarpos oreophilus</i>	0.06	0.52	1.11
FORBS			
<i>Artemisia ludoviciana</i>	0.06	0.52	1.11
<i>Eriogonum jamesii</i>	0.11	1.05	1.11
<i>Machaeranthera grindelioides</i>	0.17	0.90	2.22
<i>Stanleya pinnata</i>	0.67	2.00	6.67
GRASSES			
<i>Elymus salinus</i>	27.94	12.76	94.44

The total living cover for the reference area was 42.16% (Table 5-A); most of this cover was understory cover (there was only 0.22% cover was overstory). The understory cover was comprised of 69.50% grasses, 28.15% shrubs and 2.36% grasses (Table 5-B).

Table 5: Gordon Creek 2/7/8 Mine. Total cover and standard deviation (2010).

Mountain Brush/Grass Reference Area (n=90; nMIN=8.89)	Mean Percent	Standard Deviation
A. TOTAL COVER		
Overstory (o)	0.22	1.47
Understory (u)	41.94	9.57
Litter	15.61	8.43
Bareground	19.39	9.36
Rock	23.06	10.84
o + u	42.16	9.52
B. % COMPOSITION		
Trees/Shrubs	28.15	30.85
Forbs	2.36	5.99
Grasses	69.50	30.42

Total annual biomass production of the reference area was estimated at 598.51 pounds per acre of which 398.30 pounds came from herbaceous species and 200.21 came from woody plants (Table 6).

Table 6: Production at Gordon Creek 2/7/8 (2010).

Mountain Brush/Grass Reference Area (n=90; nMIN=66.91)		
	Pounds/Acre	
LIFEFORM	MEAN	STD. DEV.
Herbaceous	398.30	185.77
Woody	200.21	284.41
TOTAL	598.51	297.61

Comparisons to the Revegetation Success Standards (2010)

Comparisons were made between the datasets of the reclaimed areas at the Gordon Creek 2/7/8

FIGURE 3. STUDENT'S T TEST - A total living cover comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2010).

Reclaimed Area: $\bar{x}=62.23$; $s=11.28$; $n=150$

Reference Area: $\bar{x}=42.16$; $s=9.52$; $n=90$

$t = 14.126$; $df = 238$, $SL= p<0.01$

Mine site and the Mountain Brush/Grass Reference Area. To begin, statistical tests were implemented that compared the total living vegetative cover of the two areas. A Student's t-test analysis suggested that the reclaimed area's total living cover was significantly greater statistically than the

reference area (Figure 3).

When total annual biomass production of the reclaimed area was compared statistically to that of the reference area, results here also suggested there was significantly more in the former (Figure 4).

FIGURE 4. STUDENT'S T-TEST - A total annual biomass production comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2010).

Reclaimed Area: $\bar{x}=1085.96$; $s=464.91$; $n=120$

Reference Area: $\bar{x}=598.51$; $s=297.61$; $n=90$

$t = 8.697$; $df = 208$, $SL= p<0.01$

MacArthur's Diversity Index was then employed to the datasets of the reclaimed and reference areas. A comparison of the values between these two areas suggested that the total diversity of

the reclaimed area was greater than that of the reference area by quite a wide margin (Figure 5).

Another method of comparing species

diversity of the two areas was to simply calculate the mean number of species present in the sample quadrats. Results from this method also suggested that the reclaimed area was more diverse with respect to species when compared to the

FIGURE 5. MacARTHUR'S INDEX - A **diversity** comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2010).

$$1/\sum p_i^2 =$$

Reclaimed Area: 7.272

Reference Area: 3.172

FIGURE 6. AVERAGE NUMBER OF SPECIES PER SQUARE METER - A **diversity** comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2010).

$$\bar{x} \text{ NO. SPP/M}^2 =$$

Reclaimed Area: 2.77

Reference Area: 1.77

reference area (Figure 6).

Finally, another diversity-type computation, or the total number of species encountered in the sample quadrats, was compared. Again, the reclaimed area value was greater when compared to the reference area (Figure 7).

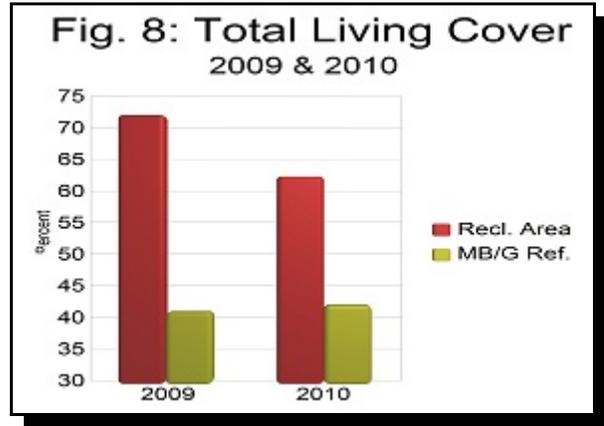
FIGURE 7. TOTAL SPECIES PRESENT - A **diversity** comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2010).

Reclaimed Area: 21

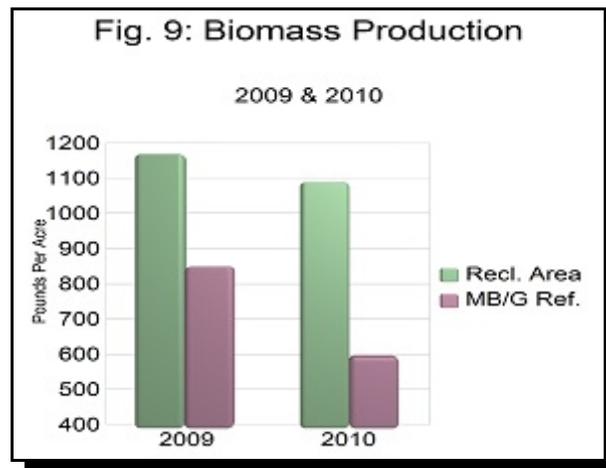
Reference Area: 16

Graphic Comparisons to the Revegetation Success Standards (2009-2010)

As mentioned above, this document is intended to report the findings for the second consecutive year (Year 2, 2010) of two sample years to determine the potential for obtaining final bond release at the reclaimed Gordon Creek 2/7/8 Mine site. Also stated beforehand, detailed results for the first sample year (Year 1, 2009) were reported in a previously-submitted



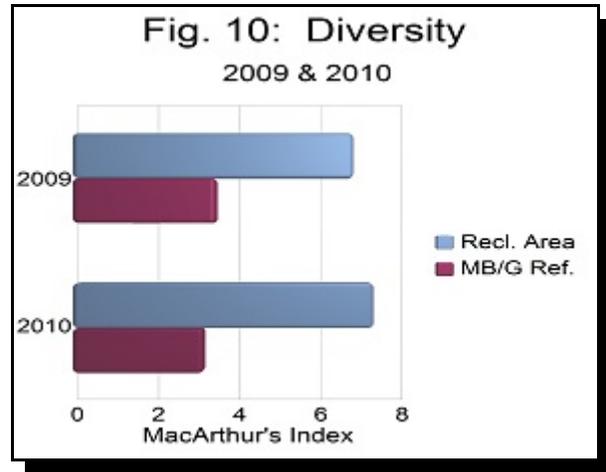
document (Appendix A). Nonetheless, *to facilitate comparisons between the two consecutive years required for potential bond release without referring to the Year 1 report*, a summary of



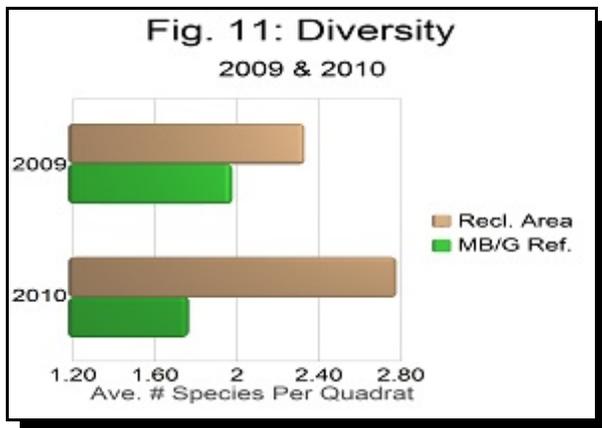
the results for both years, 2009 and 2010, have been prepared and illustrated in this report (Figures 8 - 12).

DISCUSSION & SUMMARY

Subsequent to final reclamation, the primary post-mining land use as determined by the land owner will primarily be that of grazing by domestic livestock. Consequently, Gordon Creek's Mining and Reclamation (MRP) identifies “*stock grazing*” as the post-mining land use, but it also states that “*reclamation is also particularly important as a means of controlling erosion and restoring disturbed areas to productive wildlife habitat*”.



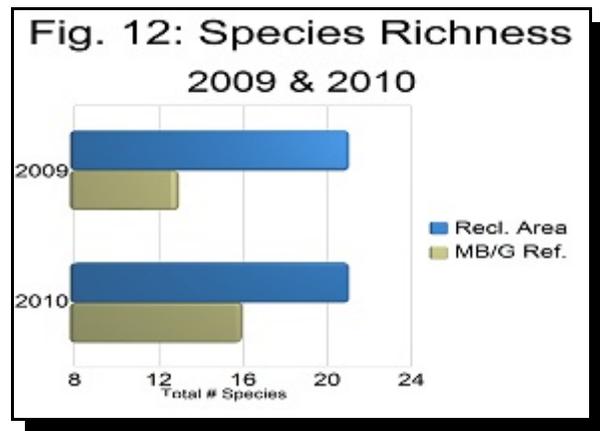
Because the primary post-mining land use was to be focused on livestock grazing, the parameters



to be used for final revegetation success standards dictated in the MRP were **total living cover** and **annual biomass productivity**. Sample results in 2009 and 2010 show that the total living cover and biomass productivity of the reclaimed area exceeded that of the reference area (Figures 8 and 9, respectively).

Although they were not specifically required in the MRP, other parameters were also compared to evaluate specific wildlife habitat qualities of

the reclaimed land when compared to the reference area. These parameters consisted of diversity indices because species and habitat diversity are important components for restoring wildlife habitat. The diversity indices employed to the datasets suggest that



the reclaimed area was more diverse than the reference area in both sample years (Figures 10 - 12).

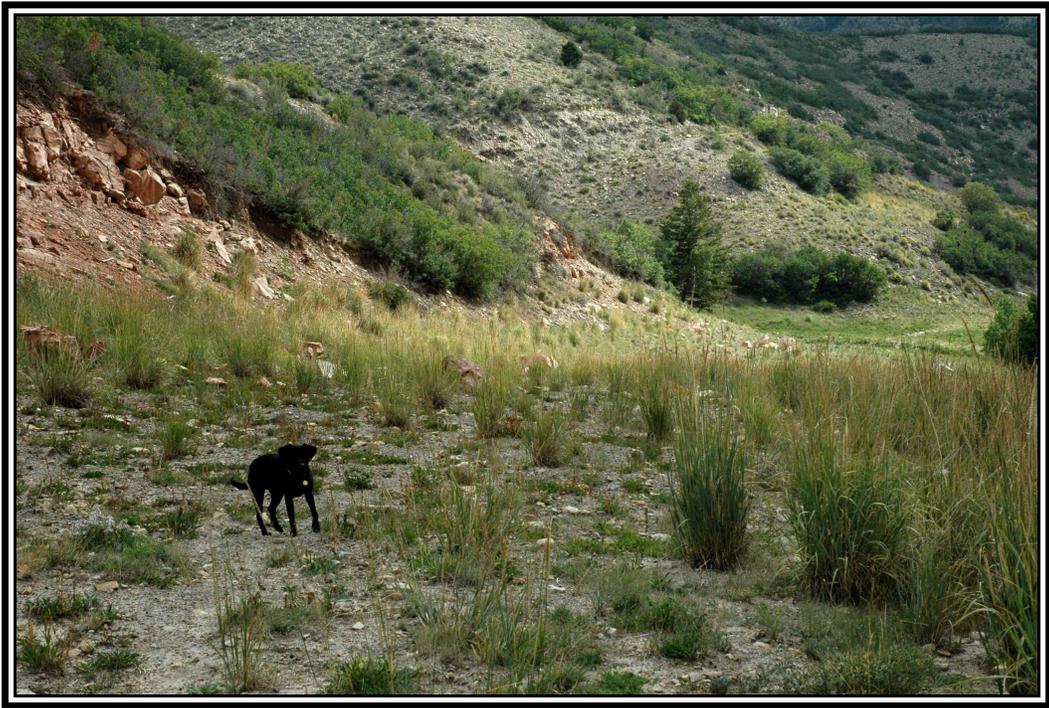
CONCLUSIONS

In conclusion, it appears that revegetation at the Gordon Creek 2/7/8 Mine site has met or exceeded the revegetation success standards for total living cover and annual biomass productivity. Moreover, diversity when compared to the Mountain Brush/Grass Reference Area, was also greater in the reclaimed area. With those parameters in mind, the reclaimed area of the mine site appears to be a likely candidate for Phase III Bond Release through the State of Utah.

**COLOR PHOTOGRAPHS
OF THE
SAMPLE AREAS
2010**

THE RECLAIMED AREAS









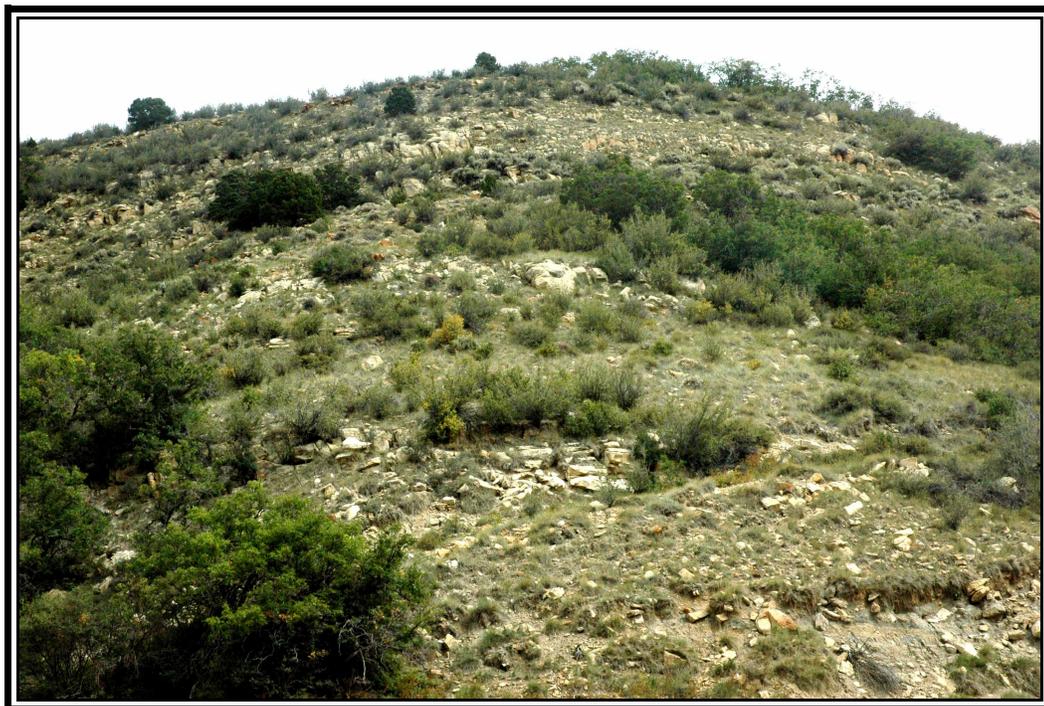
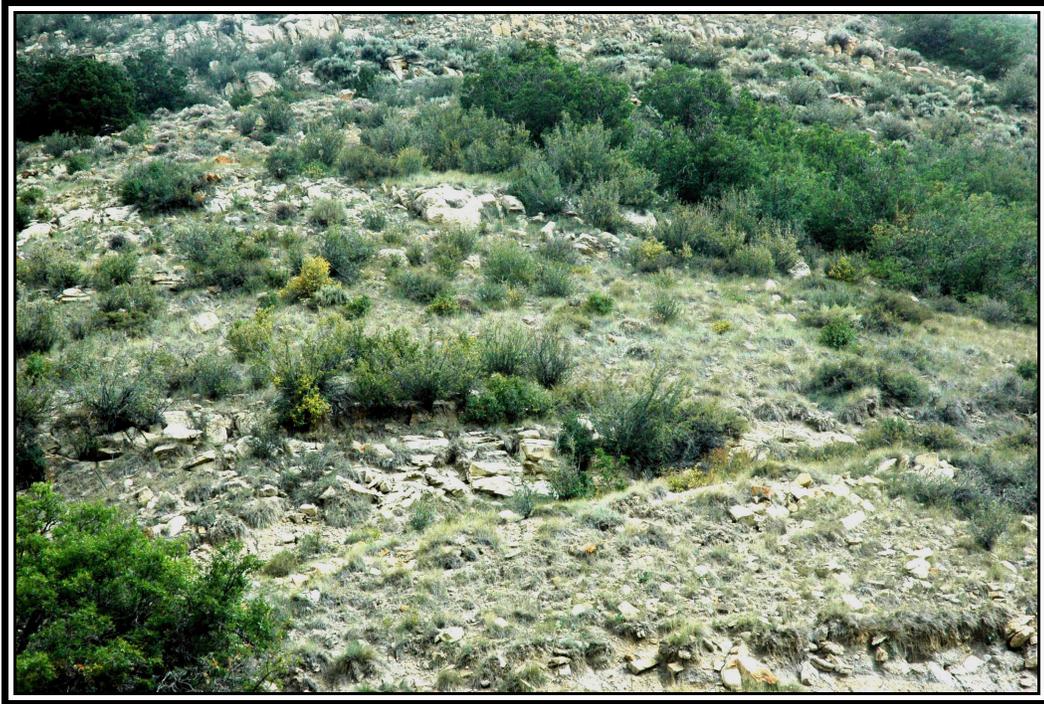








THE MOUNTAIN BRUSH/GRASS REFERENCE AREA





APPENDIX A

Report for
Year 1 (2009)

**VEGETATION MONITORING
FOR PHASE III BOND RELEASE
AT THE GORDON CREEK 2/7/8 MINES
YEAR 1: 2009**

**FOR
MOUNTAIN COAL COMPANY, LLC**



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INTRODUCTION

General Site Description

The Gordon Creek 2/7/8 Mine site is located in the Bryner Canyon and Beaver Creek area of Carbon County, Utah. Elevation of the area is about 8,000 ft above sea level. The study area is shown on the Jump Creek USGS 7.5 minute series quadrangle map in Section 18, Township 13 South, Range 8 East (Figure 1). General plant communities surrounding the area include Mountain Brush/Grass, Oak Shrubland, Sagebrush/Grass, Aspen, and Douglas Fir.

Gordon Creek 2/7/8 is an area where coal mining had been conducted for many years. More recently, the area has been reclaimed and the land restored to a condition that is consistent with the pre-mining and post-mining land uses, or primarily livestock grazing. The post-mining land use of the site following final reclamation was determined by the landowner.

Once the mine portals were sealed during reclamation activities, earthwork operations began to return the area back to its approximate original topography. Final seeding was accomplished using seeds of native and approved introduced plant species (see Figure 2). Final seedbed preparations and seeding for most of the area occurred in October 1998 with follow-up seeding on the regraded roads in October 1999.

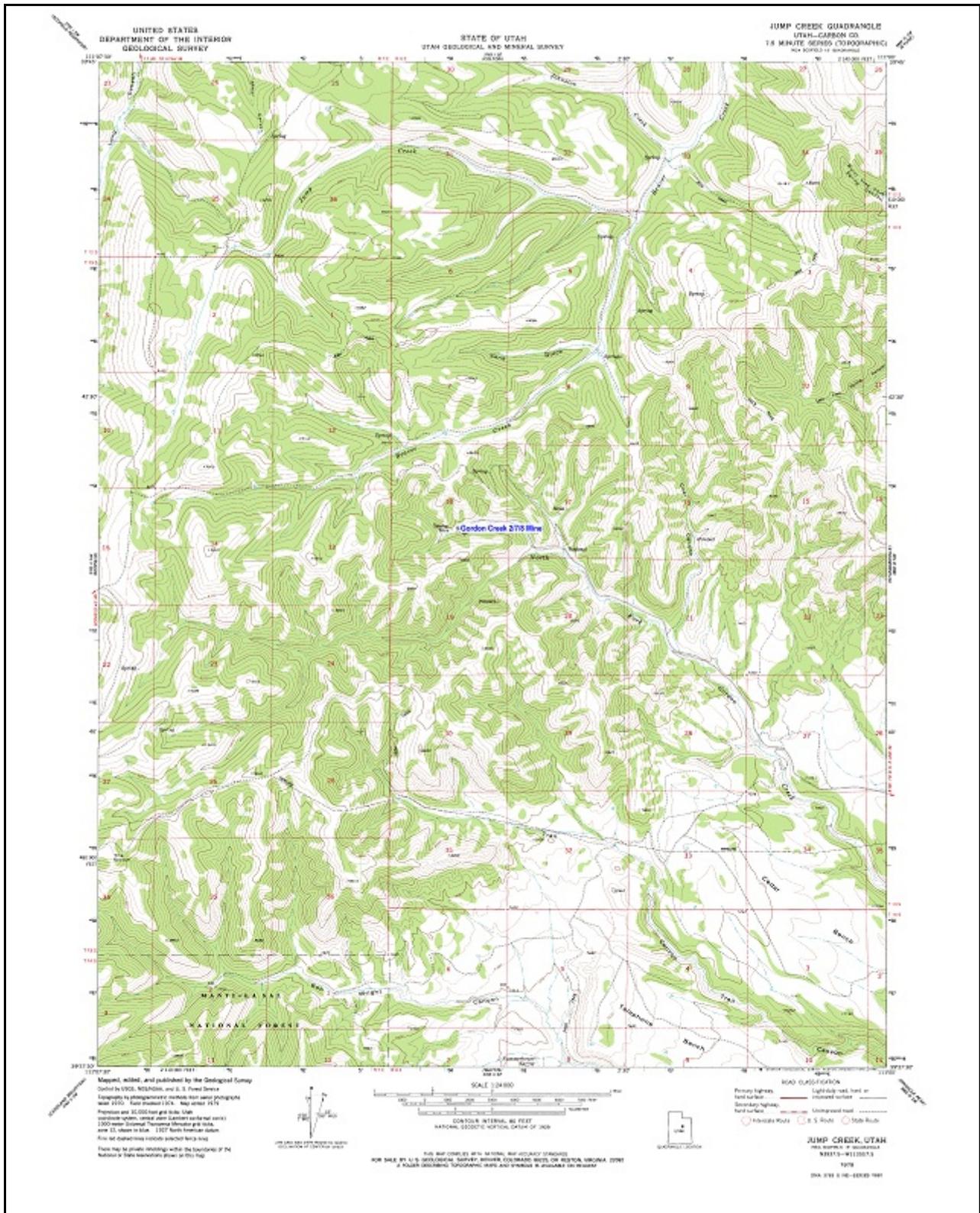


Figure 1: Gordon Creek 2/7/8 Mine Study Area

Study Objectives

This report describes the findings of quantitative sampling the vegetation at Gordon Creek 2/7/8 Mine site in 2009. The site has been reclaimed long enough that the “*Responsibility Period*” of the mine operator has passed. This means that theoretically enough time has passed for vegetation to become adequately establishment on reclaimed land.

After that time period, an application for bond release can be initiated. Thus, Mountain Coal Company may soon submit the application for *Final* or *Phase III Bond Release* through the State of Utah, Division of Oil, Gas and Mining (DOG M). Vegetation sampling in 2009 was conducted with that in mind. Because sample adequacy and statistical analyses meet the required levels, this dataset can be used as “**Year 1**” of the two consecutive years of vegetation monitoring required to apply for final bond release.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
SHRUBS	
Bitterbrush	(<i>Purshia tridentata</i>)
Mtn. Mahogany	(<i>Cercocarpus ledifolius</i>)
Rubber rabbitbrush	(<i>Chrysothamnus nauseosus</i>)
Blue elderberry	(<i>Sambucus caerulea</i>)
Snowberry	(<i>Symphoricarpos albus</i>)
Sagebrush	(<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>)
FORBS	
Northern sweetvetch	(<i>Hedysarum boreale</i>)
Cicer milkvetch	(<i>Astragalus cicer</i>)
Purple daisy fleabane	(<i>Erigeron corymbosus</i>)
Little sunflower	(<i>Helianthella uniflora</i>)
Rocky Mt. penstemon	(<i>Penstemon strictus</i>)
Yellow sweet clover	(<i>Melilotus officinalis</i>)
Alfalfa (Ladak)	(<i>Medicago sativa</i>)
Pacific Aster	(<i>Aster chilensis</i>)
GRASSES	
Thickspike wheatgrass	(<i>Elymus lanceolatus</i>)
Bluebunch wheatgrass	(<i>Elymus spicatus</i>)
Slender wheatgrass	(<i>Elymus trachycaulus</i>)
Indian ricegrass	(<i>Stipa hymenoides</i>)
Gt. Basin wildrye	(<i>Elymus cinereus</i>)

Figure 2: Final Seed Mixture for the Gordon Creek 2/7/8 Mine Site

Reference Area

A reference area, or a native undisturbed Mountain Brush/Grass plant community that was previously chosen to be represent success standards for final revegetation has also been sampled. These data have been compared with the reclaimed areas of the Gordon Creek 2/7/8 Mine site.

METHODS

Quantitative and qualitative data were taken from the vegetation of the reclaimed areas at the Gordon Creek 2/7/8 Mine site as well as the Mountain Brush/Grass Reference Area. Sampling was conducted September 6-9, 2009. Methodologies used for sampling were performed in accordance with the *Vegetation Information Guidelines* supplied by DOGM.

Transect and Quadrat Placement

Random/regular placement of sample quadrats were designed in an attempt to provide unbiased accuracy of the data compiled. This was accomplished by establishing transect lines the entire length of the reclaimed and reference areas. At regular intervals along the transect lines, random numbers were generated and used to measure distances at right angles to determine sample locations. Whether these random numbers were odd or even determined which side of the transect a given quadrat was placed. The random number selected would be high enough to place quadrats to the lateral limits of the sample areas and all areas in-between. This insured that

the sample quadrats were placed randomly over the entire study area in an attempt to adequately represent the site as a whole

Cover, Frequency and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows "A Utah Flora" (Welsh et al. 2008).

Production

Total annual biomass production was estimated by clipping, drying and weighing current annual growth in each sample quadrat. "Double sampling" methods were employed by placing four additional quadrats around the clipped quadrat, then estimating the production of them relative to the clipped plot. Herbaceous and woody species production weights were recorded separately.

Sample Size & Adequacy

Sampling adequacy was calculated using the formula given below.

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

where,

nMIN = minimum adequate sample
t = appropriate confidence t-value
s = standard deviation
x = sample mean
d = desired change from mean

The values used for “t” and “d” insured that sample adequacy was met with 90% confidence within a 10% deviation from the true mean.

Diversity Indices

MacArthur's Diversity Index is an effective diversity measurement and is computed using the following equation:

$$1/\sum pi^2$$

where,

pi is the proportion of sum frequency contributed by the *i*th species in the sample area of concern.

The proportional contribution of each species is then squared and the values for all species in the sample areas are summed. This index integrates the number of species and the degree to which frequency of occurrence was equitably distributed among those species.

Another diversity measurement was provided that shows the average number of species encountered at each quadrat. Finally, a third measure of diversity or “richness” is simply the total number of species encountered in the quadrats.

Photographs

Color photographs of the sample areas were taken at the time of sampling and have been included within this report.

Raw Data

The raw data for total cover, cover by species, frequency and composition are available upon request from DOGM or Mountain Coal Company.

RESULTS

Reclaimed Areas

The reclaimed areas were greatly dominated by the forb species, alfalfa (*Medicago sativa*), however, there were also several grasses that were well-represented including Gt. Basin wildrye (*Elymus cinereus*), thickspike wheatgrass (*E. lanceolatus*), western wheatgrass (*E. smithii*), bluebunch wheatgrass (*E. spicatus*) and Kentucky bluegrass (*Poa pratensis*). For a list of all species present in the sample quadrats, refer to Table 1.

Table 1: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and frequency by species (2009).

Reclaimed Areas (n=150)	Mean Percent	Standard Deviation	Percent Frequency
SHRUBS			
<i>Artemisia tridentata</i>	0.30	2.33	2.00
<i>Chrysothamnus nauseosus</i>	1.70	7.52	5.33
<i>Gutierrezia sarothrae</i>	0.17	1.46	1.33
<i>Purshia tridentata</i>	0.13	1.63	0.67
<i>Symphoricarpos oreophilus</i>	0.27	1.98	2.00
FORBS			
<i>Astragalus cicer</i>	2.63	10.86	12.00
<i>Cynoglossum officinale</i>	0.80	3.52	6.00
<i>Hedysarum boreale</i>	0.13	1.15	1.33
<i>Linum lewisii</i>	0.07	0.81	0.67
<i>Medicago sativa</i>	33.53	29.18	72.00
<i>Penstemon strictus</i>	1.27	4.59	9.33
GRASSES			
<i>Agropyron cristatum</i>	1.17	5.58	5.33
<i>Bromus carinatus</i>	0.13	1.15	1.33
<i>Bromus tectorum</i>	0.03	0.41	0.67
<i>Dactylis glomeratus</i>	0.27	2.37	1.33
<i>Elymus cinereus</i>	7.77	15.52	29.93
<i>Elymus lanceolatus</i>	6.53	12.83	26.67
<i>Elymus salinus</i>	1.43	6.36	6.00
<i>Elymus smithii</i>	5.55	14.13	19.33
<i>Elymus spicatus</i>	4.31	11.17	16.67
<i>Poa pratensis</i>	3.57	10.84	12.67

Total living cover of the reclaimed areas was estimated at 71.77%, all of which came from understory cover (Table 2-A). Although much the composition (51.98%) was comprised of forb species (mostly due to alfalfa), grasses were ranked close behind (44.09%). Shrubs followed at a distant 3.93% of the composition (Table 2-B).

Table 2: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and sample size (2009).

Reclaimed Areas (n=150; nMIN= 6.31)	Mean Percent	Standard Deviation
A. TOTAL COVER		
Understory	71.77	10.96
Litter	9.84	5.78
Bareground	9.25	6.12
Rock	9.14	6.35
B. % COMPOSITION		
Shrubs	3.93	12.77
Forbs	51.98	34.17
Grasses	44.09	31.29
nMIN = Sample Adequacy n= Sample Size		

Total annual biomass production of the reclaimed areas was estimated at 1,164.24 pounds per acre of which 1,138.88 pounds came from herbaceous species (forbs and grasses) and only 25.26 pounds came from woody plants (Table 3).

Table 3: Production at Gordon Creek 2/7/8 (2009).		
Reclaimed Areas (n=150; nMIN=40.12)		
	Pounds/Acre	
LIFEFORM	MEAN	STD. DEV.
Herbaceous	1138.88	471.59
Woody	25.36	114.03
TOTAL	1164.24	448.29

Reference Area

The dominant plant by cover and frequency at the Mountain Brush/Grass Reference Area was the grass species Salina wildrye (*Elymus salinus*). There were four shrub species that were also

relatively common here including alder-leaf mountain-mahogany (*Cercocarpus montanus*), corymb buckwheat (*Eriogonum corymbosum*), broom snakeweed (*Gutierrezia sarothrae*) and antelope bitterbrush (*Purshia tridentata*). Forb species were relatively uncommon in the reference area (Table 4).

Table 4: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and frequency by species (2009).

Mountain Brush/Grass Reference Area (n=90; nMIN= 23.37)	Mean Percent	Standard Deviation	Percent Frequency
OVERSTORY			
<i>Cercocarpus montanus</i>	0.22	2.10	1.11
UNDERSTORY			
SHRUBS			
<i>Amelanchier utahensis</i>	1.11	4.82	7.78
<i>Artemisia frigida</i>	0.11	1.05	1.11
<i>Artemisia tridentata</i> var. <i>vaseyana</i>	0.72	4.69	3.33
<i>Cercocarpus montanus</i>	3.17	7.17	20.00
<i>Eriogonum corymbosum</i>	2.83	8.43	15.56
<i>Gutierrezia sarothrae</i>	1.56	2.95	23.33
<i>Purshia tridentata</i>	1.22	4.55	11.11
<i>Symphoricarpos oreophilus</i>	0.17	1.57	1.11
FORBS			
<i>Eriogonum jamesii</i>	0.56	1.89	8.89
<i>Machaeranthera grindelioides</i>	0.11	0.74	2.22
<i>Stanleya pinnata</i>	0.17	0.90	3.33
GRASSES			
<i>Elymus salinus</i>	28.72	11.04	98.89
<i>Stipa hymenoides</i>	0.44	4.19	1.11

The total living cover for the Reference Area was 41.11% (Table 5-A). Most of this cover was understory cover (there was only 0.22% cover that consisted of overstory). The understory cover was comprised of 73.65% grasses, 24.00% shrubs and 2.35% grasses (Table 5-B).

Table 5: Gordon Creek 2/7/8 Mine. Total cover, standard deviation and sample size (2009).

Mountain Brush/Grass Reference Area (n=90 nMIN= 33.91)	Mean Percent	Standard Deviation
A. TOTAL COVER		
Overstory (o)	0.22	2.10
Understory (u)	40.89	11.73
Litter	14.33	5.44
Bareground	21.44	11.84
Rock	23.33	12.32
o + u	41.11	12.08
B. % COMPOSITION		
Shrubs	24.00	23.56
Forbs	2.35	6.17
Grasses	73.65	23.85

Total annual biomass production of the reference area was estimated at 850.05 pounds per acre of which 603.39 pounds came from herbaceous species and 246.66 came from woody plants (Table 6).

Table 6: Production at Gordon Creek 2/7/8 (2009).		
Mountain Brush/Grass Reference Area (n=90)		
	Pounds/Acre	
LIFEFORM	MEAN	STD. DEV.
Herbaceous	603.39	222.68
Woody	246.66	252.20
TOTAL	850.05	300.91

Dataset Comparisons

Comparisons were made between the datasets of the reclaimed areas at Gordon Creek 2/7/8 and the Mountain Brush/Grass Reference Area . To begin, statistical tests were implemented comparing the total living plant cover of the two areas. A Student's t-test analysis suggested that the reclaimed area's total living cover was significantly greater statistically when it was compared to the reference area (Figure 3).

FIGURE 3. STUDENT'S T TEST - A total living cover comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2009).

Reclaimed Area: $\bar{x}=71.77$; $s=10.96$; $n=150$

Reference Area: $\bar{x}=41.11$; $s=12.08$; $n=90$

$t = 20.186$; $df = 238$, $SL= p<0.01$

When total annual biomass production of the reclaimed area was statistically compared to that of the reference area, results also suggested there was significantly more in the former (Figure 4).

FIGURE 4. STUDENT'S T TEST - A total annual biomass production comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2009).

Reclaimed Area: $\bar{x}=1164.24$; $s=448.29$; $n=150$

Reference Area: $\bar{x}=850.05$; $s=300.91$; $n=90$

$t = 5.897$; $df = 238$, $SL= p<0.01$

MacArthur's Diversity Index was also employed to the datasets of the reclaimed and reference areas. A comparison of the values between these two areas suggested that the total diversity of the reclaimed area was greater than

that of the reference area by quite a wide margin (Figure 5).

Another method of comparing species diversity of the two areas was to simply calculate the mean number of species present in the sample quadrats. Results from this method also

suggested that the reclaimed area was more diverse with respect to species when compared to the reference area (Figure 6).

FIGURE 5. MacARTHUR'S INDEX - A **diversity** comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2009).

$$1/\sum pi^2 =$$

Reclaimed Area: 6.780

Reference Area: 3.474

FIGURE 6. AVERAGE NUMBER OF SPECIES PER SQUARE METER - A **diversity** comparison between the reclaimed area at Gordon Creek 2/7/8 and its reference area (2009).

$$\bar{x} \text{ NO. SPP/M}^2 =$$

Reclaimed Area: 2.33

Reference Area: 1.98

Finally, another diversity-type computation, the total number of species encountered in the sample quadrats, were compared. Again, the reclaimed area value was greater when compared to the reference area (Figure 7).

FIGURE 7. TOTAL SPECIES PRESENT -
A **diversity** comparison between the
reclaimed area at Gordon Creek 2/7/8 and its
reference area (2009).

Reclaimed Area: 21

Reference Area: 13

DISCUSSION & CONCLUSIONS

Subsequent to final reclamation, the primary post-mining land use as determined by the land owner, will primarily be that of grazing by domestic livestock. Consequently, Gordon Creek's Mining and Reclamation (MRP) identifies "*stock grazing*" as the post-mining land use, but it also mentions that "*reclamation is also particularly important as a means of controlling erosion and restoring disturbed areas to productive wildlife habitat*".

Because the primary post-mining land was to be focused on livestock grazing, the parameters to be used for final revegetation success standards dictated in the MRP were **total living cover** and **annual biomass productivity**. Sample results in 2009 show that the total living cover and biomass productivity of the reclaimed area exceeded that of the reference area.

Although they were not specifically called for in the MRP, other parameters were also compared herein to evaluate specific wildlife habitat qualities of the reclaimed land when compared to the reference area. These parameters were diversity indices because species and habitat diversity are important components for restoring wildlife habitat. The diversity indices employed to the datasets suggest that the reclaimed area was more diverse than the reference area in 2009.

SUMMARY

This document reports the results of quantitative sampling the vegetation of the reclaimed area at the Gordon Creek 2/7/8 Mine site. The datasets in this report represent **Year 1** of the two consecutive years required for an application for final bond release to be submitted through the State of Utah, Division of Oil, Gas & Mining (DOG M). A reference area was chosen early in the process to one day provide an area for comparison for future revegetation success standards. This Mountain Brush/Grass Reference Area was also sampled and the results were reported in this document.

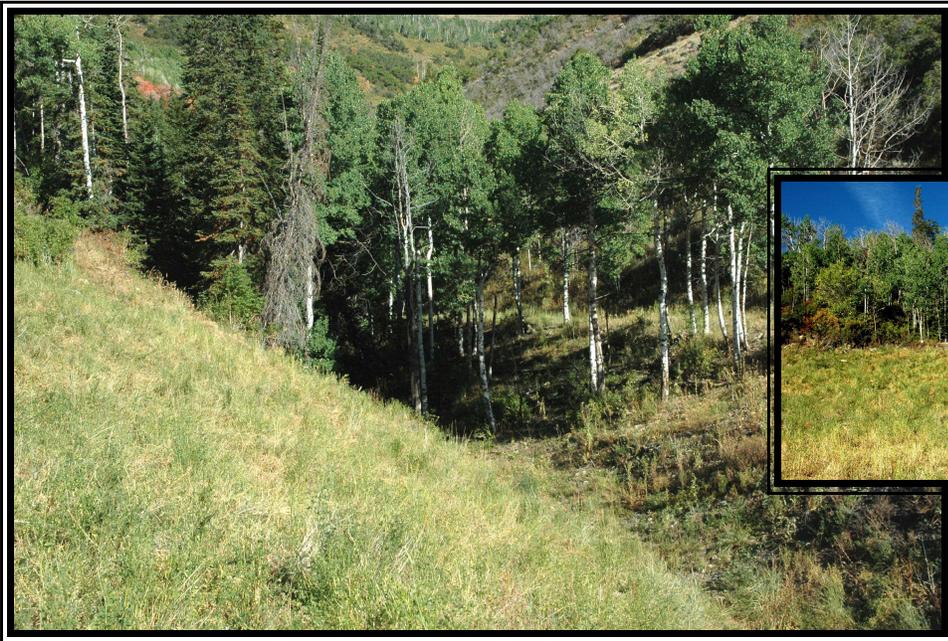
For **Year 1** (2009), when the total living cover, annual biomass production, MacArthur's Divisity Index, average number of species per quadrat and the total number of species of the reclaimed areas were compared with the reference area, all analyses suggested the reclaimed areas met or exceeded those parameters.

Year 2 (2010) sample period will be conducted to meet the required number of sample years for a Phaze III Bond Release application.

**COLOR PHOTOGRAPHS
OF THE
SAMPLE AREAS**

THE RECLAIMED AREAS









THE REFERENCE AREA

