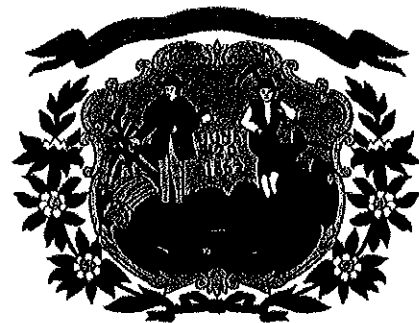
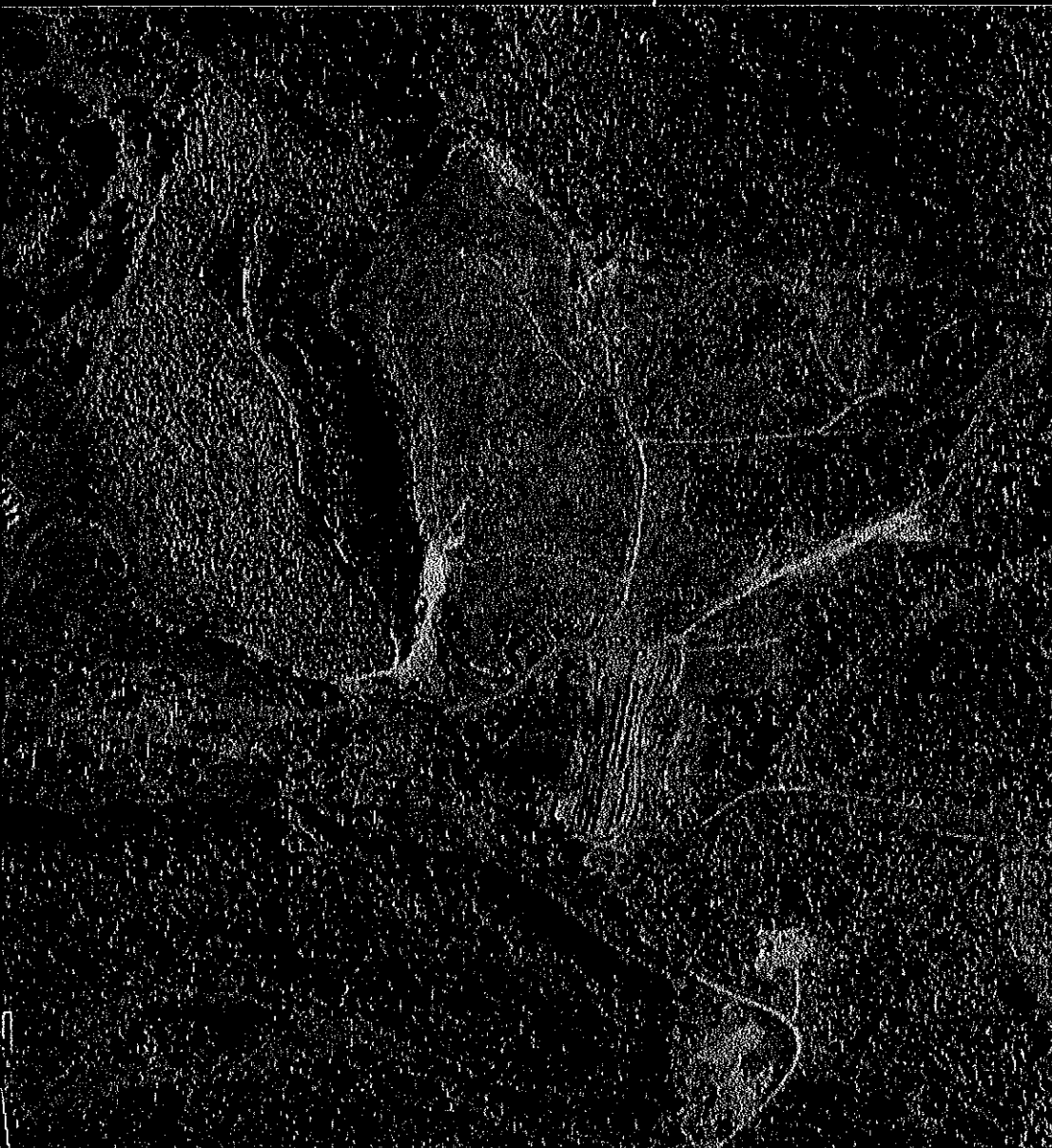


**RFQ No. DEP14764**

**Expression of Interest  
to**

**Provide Services for Engineering Design,  
Construction Specifications and Drawing for Reclamation of  
Abandoned Refuse Pile for Gordon "C" Refuse Area Design  
located in Boone County, West Virginia**

*September 2009*



*Prepared for:*

**West Virginia Department of  
Environmental Protection  
Office of Waste Management  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25301**

**Buyer: CB-23  
Req#: DEP14764  
Opening Date: 9/24/2009  
Opening Time: 1:30 pm**

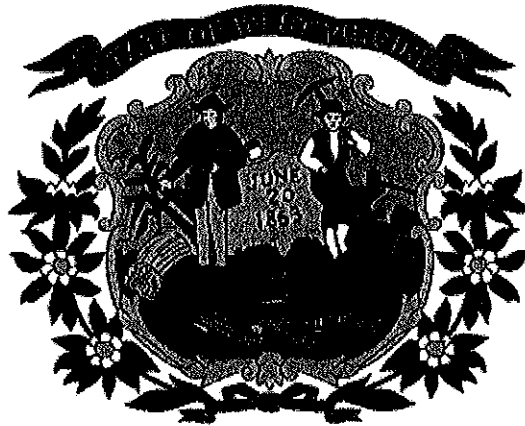
**Marshall Miller & Associates, Inc.  
Energy & Mineral Resources Group  
Industrial Park Road  
Martinsburg, VA 24605  
Tel: 276/322-5467 Fax: 276/322/5460  
www.mma1.com**

**RECEIVED**  
2009 SEP 24 AM 9:54  
WV PURCHASING  
DIVISION



**Expression of Interest – No. DEP 14764:**

**To Provide Services for  
Engineering Design, Construction Specifications and Drawing for Reclamation of  
Abandoned Refuse Pile for Gordon “C” Refuse Area Design  
located in Boone County, West Virginia**



*Prepared For:*

**West Virginia Department of Environmental Protection  
Office of AML&R  
601 57<sup>th</sup> Street SE  
Charleston, West Virginia 25304  
304-926-0499**

*Submitted by:*

**Marshall Miller & Associates  
534 Industrial Park Road  
Bluefield, Virginia 24605  
276-322-5467**

September 24, 2009

Mr. Chuck Bowman, Buyer Supervisor  
Purchasing Division  
West Virginia Department of Administration  
P.O. Box 50130  
Charleston, West Virginia 25305-0130

***RE: Request for Expression of Interest:  
RFQ # DEP 14764***

Dear Mr. Bowman:

Marshall Miller & Associates is pleased to provide the enclosed response to Expression of Interest (EOI) DEP14763. MM&A has extensive in-house capabilities and experience in engineering design, and is very well-qualified to undertake engineering and hydrogeologic assignments. Our staff of approximately 185 personnel includes a large professional staff of civil and remediation engineers, hydrogeologists, geologists, surveyors, environmental scientists, and construction managers who understand the engineering and regulatory issues involved in abandon mine lands reclamation. Our professional staff includes Professional Engineers, Certified Professional Geologists, a Certified Ground Water Professional, environmental scientists, remediation specialists, and experienced technicians.

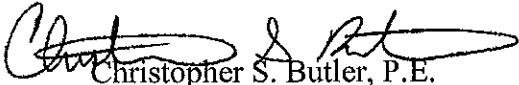
Our highly-qualified, highly-experienced staff is supported with in-house capabilities that are very well-tailored to the demands of the anticipated activities. In-house capabilities include: Geoprobe® direct push technology (truck and bobcat mounted); subsurface geophysical services; heavy equipment (dump trucks, backhoe, loaders) and operators; and surveying.


As you will see in the enclosed EOI, we are continually involved in all of the prescribed services on a routine basis. MM&A has direct experience working with the West Virginia Department of Environmental Protection's Small Operator Assistance Program (SOAP), Landfill Closure Assistance Program (LCAP), and Leaking Underground Storage Tank Program (LUST). Also MM&A has direct experience working with the Virginia Division of Mine Land Reclamation.

In summary, MM&A offers a large, highly-qualified, and highly-experienced staff with in-house support capabilities that are very well tailored to the demands of the anticipated activities. Our strengths in hydrogeology, geology, environmental assessment and engineering, coupled with our direct mining industry experience, makes MM&A uniquely qualified to perform the services desired. We would welcome the opportunity for an interview, and would like to invite you to visit our facilities if you should have the opportunity.

Sincerely,

*MARSHALL MILLER & ASSOCIATES*

  
Christopher S. Butler, P.E.  
*Senior Engineer*

  
William O. Dickey, P.E.  
*Vice President Civil & Structural Engineering*

)  
/sdh  
Enclosures

(PRP3665)

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Affidavit

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AML Consultant Confidential Qualification Questionnaire

AML and Related Project Experience Matrix

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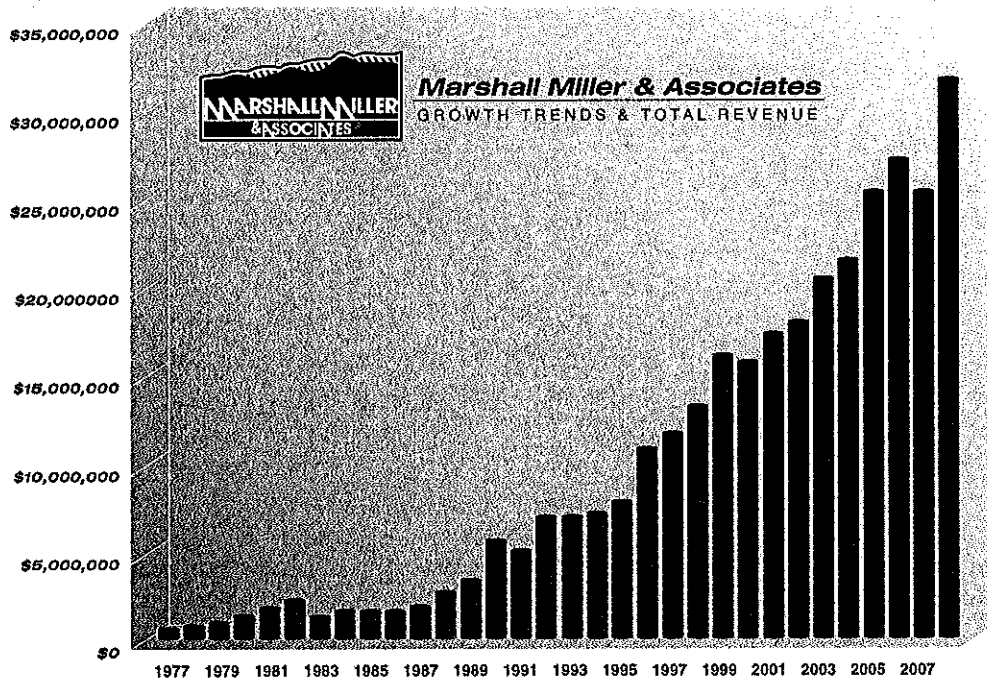
Statement of Qualifications

## CORPORATE OVERVIEW

**Marshall Miller & Associates (MM&A)**, a diverse consulting and engineering firm headquartered in Bedford, Virginia, U.S.A., offers a wide spectrum of services to clients in North America, South America, Asia, and Europe. Over its 34-year history, MM&A has evolved into a leader in the mineral resource, environmental, and carbon management industries. The company's growth is based on a commitment to applying and developing advanced engineering and scientific technologies and maintaining our talented staff of geologists; hydrologists; earth scientists; and mining, petroleum, environmental, and civil engineers.

The roots of MM&A originated with professional services provided to the coal, aggregate, industrial minerals, unconventional gas, financial, and insurance industries. Professional services include mining engineering, coal and petroleum geology, petroleum engineering, mining-related environmental services, expert witness and litigation support, valuation and appraisals, financial and operations assessment, advisory services, permitting/regulatory services, and wireline geophysics. As the leading consulting firm in the United States working in the coal and coalbed methane industries, our energy-related client base consists of over 250 companies. Since 2005 MM&A has been an active participant in a Department of Energy-sponsored Carbon Capture and Storage (CCS) project related to storage in thin, unmineable coal seams and other deep formations.

In the early 1990s MM&A added environmental services to diversify and to insulate the company from the cyclic nature of the energy business. Professional services include environmental risk assessment, remediation, environmental site assessments and impact studies, hazardous waste evaluation, compliance monitoring and reporting, permitting and emergency response. MM&A offers these services to the mining and transportation industries, federal and state government agencies, financial and insurance companies, and local industrial markets proximal to our regional office locations. Our environmental client base consists of over 500 companies.



MM&A is well positioned to continue our growth in the challenging economic climate of 2009 and beyond. The strength and diversification of the MM&A staff gives us a solid base from which to capitalize on changing market conditions and to provide technical services to a wide variety of industries.

## **PROJECT APPROACH**

### **Project Summary**

An approximate 4-acre un-reclaimed refuse pile exists directly behind five residences in Gordon, WV. The slopes are steep and residents are concerned about the possibility of falling debris. Also, two collapsed, draining portals are located at the top of the refuse pile. Specific project design services include:

1. Create diversion channels, ditches and/or under drains to transport drainage,
2. Install appropriate wet seals.
3. Regrade/reclaim refuse areas, and
4. Reclaim and revegetate all areas disturbed during construction.

### **Scope of Work**

#### *Site Characterization*

The scope of work will include review of existing information (reports, data, maps, climatological records) and field reconnaissance, followed as needed by supplemental investigation that may include site investigation of existing features, surveying and mapping, laboratory analysis of soil and water, subsurface investigations to determine location as well as limits and depths of refuse, location of potential borrow areas either on-site or near-by and/or site hydrogeologic investigation. Specific components of the work may include:

- Field collection of soil and hydrogeologic data as necessary, including:
  - Subsurface investigations through drilling, direct-push intrusions, and/or well installations as needed.
  - Surveying of wells and borings, in accordance with WV groundwater monitoring standards.
  - Subsurface earth materials sample collection as needed, to include rock cores, soil split-spoon samples, soil Shelby tube samples, and/or soil direct-push core samples.
  - Surface and/or subsurface water sample collection, from wells, springs, seeps, ponds, or streams as necessary.
  - Proper abandonment of borings and/or wells after use.
- Laboratory analytical services will be provided, to address soils and water as appropriate. These may include soil nutrient and engineering characteristics, soil contaminant analyses, and water contaminant analyses. Contaminant analyses may involve NPDES program-related, stormwater-related, or other analytical suites.

#### *Engineering Design*

The scope of work will include engineering and design of refuse reclamation and drainage control including grading plans and cross sections of the refuse area, sediment and erosion control plans including required ponds. Specific components of the work may include:

- Grading and slope stability evaluation,
- Borrow/spoil balance evaluation,
- Stormwater transport, storage, and routing design, and
- Engineer's construction cost estimate.

### Reclamation Drawings, Specifications, and Permits Preparation

The scope of work will include preparation of construction drawings and specifications suitable for letting of construction bids and the bidding process.

### Construction Monitoring

The scope of work will include, at the option of the WVDEP/AML, construction monitoring during the construction phase of reclamation.

### Evaluation Criteria

1. *WV Registered Professional Engineers in the Primary Office – 20 pts*

MM&A is capable of executing this project from our Charleston, Beckley, Bluefield, Lexington, or Raleigh offices with the following staff.

<b>OFFICE</b>	<b>WVRPE</b>
Charleston	Christopher S. Butler, PE George J. Oberlick, PE
Beckley	Travis B. Cantley, PE William O. Dickey, PE
Bluefield	Justin S. Douthat, PE Joseph R. Overbay, PE Gerard J. Enigk, PE David J. McChesney, PE Quanxi Wang, PE Myron Amick, PE
Lexington	John E. Feddock, PE Edmundo Laporte, PE Hans E. Naumann, PE Warren D. Nicholson, PE
Raleigh	William M. Lupi, PE

The Primary office designated to complete the Gordon "C" Refuse Design project will be in Charleston, West Virginia.

2. *Reclamation Engineering design experience of Primary Office's WVRPE as it relates to the specific project problem areas – 25 pts*

Mr. Christopher S. Butler, PE has experience executing WV-AML projects, such as the Cow Creek-Sarah Ann Waterline, Glen Morgan Subsidence, Owens Refuse (AST Investigation), and Omega Mine AMD Remediation. He has extensive experience completing reclamation projects for the WVDEP's LCAP program that include site characterization, engineering design of regrade slopes and drainage controls, and construction specifications and drawings.

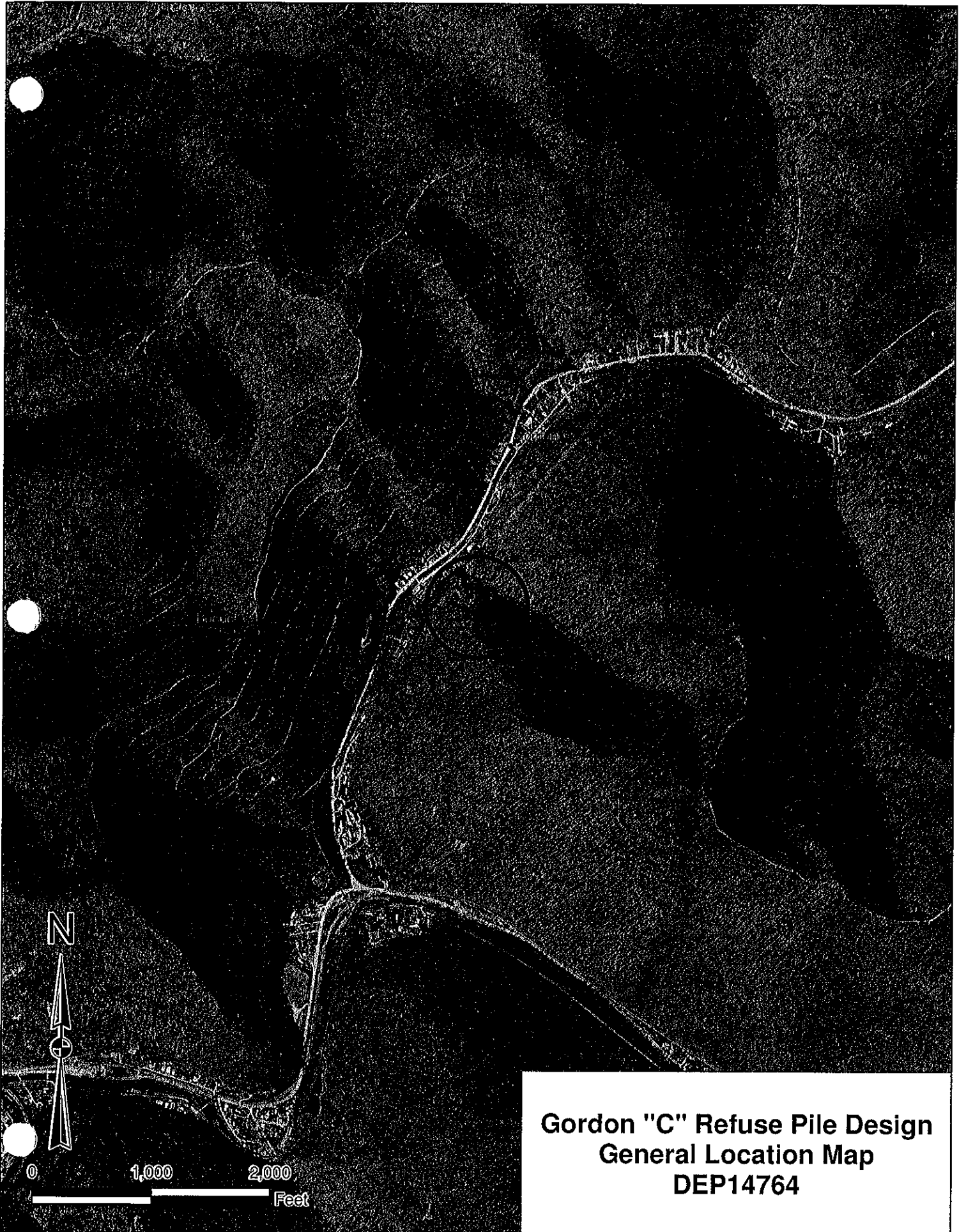
Mr. George J. Oberlick has extensive experience managing, operating and consulting on mining project. During his career he has been responsible for mine engineering, permitting, exploration, and operations that include coal refuse disposal facilities.

3. *Available WV-AML Design Teams within the Primary Office (A design team should consist of one Project Engineer, one CAD person, and availability of other support personnel as required by the particular project) – 20pts*



Our Charleston office design team is immediately available to perform the scope of services and complete the Gordon "C" Refuse Area preliminary design documents within 60 days of a purchase order. The Charleston design team will be lead by Mr. Christopher S. Butler, PE and assisted by Mr. Randy Hansford as design engineer and CAD designer, respectively. The design team will be assisted with support personnel as required and provided QA/QC oversight by Mr. George J. Oberlick, PE and Mr. Dick Almes, PE.

Should MM&A be awarded multiple projects with WV-AML, design teams in another MM&A office (primary either Beckley or Bluefield) will be assembled to meet multiple project schedule demands. All design teams will be lead by one of our West Virginia registered professional engineers.



N



0

1,000

2,000

Feet

**Gordon "C" Refuse Pile Design  
General Location Map  
DEP14764**



State of West Virginia  
 Department of Administration  
 Purchasing Division  
 2019 Washington Street East  
 Post Office Box 50130  
 Charleston, WV 25305-0130

# Request for Quotation

RFQ NUMBER  
 DEP14764

PAGE  
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF:  
 CHUCK BOWMAN  
 304-558-2157

RFQ COPY  
 TYPE NAME/ADDRESS HERE

Boone County  
 Marshall Miller & Associates  
 534 Industrial Park Road  
 Bluefield, VA 24605

Supplier

ENVIRONMENTAL PROTECTION  
 DEPARTMENT OF  
 OFFICE OF AML&R  
 601 57TH STREET SE  
 CHARLESTON, WV  
 25304 304-926-0499

DATE PRINTED 09/03/2009	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
----------------------------	---------------	----------	--------	---------------

BID OPENING DATE: 09/24/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		906-29		
GORDON "C" REFUSE PILE DESIGN  EXPRESSION OF INTEREST  THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING EXPRESSIONS OF INTEREST FOR PROFESSIONAL ENGINEERING DESIGN SERVICES AND CONSTRUCTION MONITORING SERVICES AT THE GORDON "C" REFUSE PILE PROJECT IN BOONE COUNTY, WEST VIRGINIA, PER THE FOLLOWING BID REQUIREMENTS AND ATTACHED SPECIFICATIONS.  BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THIS CONTRACT NULL AND VOID AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Peter Linn</i>	TELEPHONE 304-255-8937	DATE 9-21-09
TITLE EVP	FERN 54-0989421	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS**  
**REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
5. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
14. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
15. **WEST VIRGINIA ALCOHOL & DRUG-FREE WORKPLACE ACT:** If this Contract constitutes a public improvement construction contract as set forth in Article 1D, Chapter 21 of the West Virginia Code ("The West Virginia Alcohol and Drug-Free Workplace Act"), then the following language shall hereby become part of this Contract: "The contractor and its subcontractors shall implement and maintain a written drug-free workplace policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act, as set forth in Article 1D, Chapter 21 of the West Virginia Code. The contractor and its subcontractors shall provide a sworn statement in writing, under the penalties of perjury, that they maintain a valid drug-free workplace policy in compliance with the West Virginia and Drug-Free Workplace Act. It is understood and agreed that this Contract shall be cancelled by the awarding authority if the Contractor: 1) Fails to implement its drug-free workplace policy; 2) Fails to provide information regarding implementation of the contractor's drug-free workplace policy at the request of the public authority; or 3) Provides to the public authority false information regarding the contractor's drug-free workplace policy."

---

**INSTRUCTIONS TO BIDDERS**

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in case of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130



# CERTIFICATE OF LIABILITY INSURANCE

Page 1 of 3

DATE (MM/DD/YYYY)  
02/02/2009

PRODUCER 877-945-7378 Willis HRH 26 Century Blvd. P. O. Box 305191 Nashville, TN 372305191		THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
INSURED Marshall Miller & Associates, Inc. Attn: Steven Carpenter 534 Industrial Park Road Bluefield, VA 24605		INSURERS AFFORDING COVERAGE	NAIC#
		INSURER A: American International Specialty Lines In	26883-001
		INSURER B: Commerce and Industry Insurance Company	19410-003
		INSURER C:	
		INSURER D:	
		INSURER E:	

**COVERAGES**

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR ADD'L LTR INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC	PROP2772529	11/1/2008	11/1/2009	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
B	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS  GARAGE LIABILITY <input type="checkbox"/> ANY AUTO	CA2600308	11/1/2008	11/1/2009	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000  BODILY INJURY (Per person) \$  BODILY INJURY (Per accident) \$  PROPERTY DAMAGE (Per accident) \$  AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC AGG \$
A	EXCESS/UMBRELLA LIABILITY <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE  DEDUCTIBLE <input checked="" type="checkbox"/> RETENTION \$ 10,000	PROU2772600	11/1/2008	11/1/2009	EACH OCCURRENCE \$ 10,000,000 AGGREGATE \$ 10,000,000 \$ \$ \$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under SPECIAL PROVISIONS below	5316752	11/1/2008	11/1/2009	<input checked="" type="checkbox"/> WC STATU-TORY LIMITS <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
A	OTHER Professional Liability	PROP2772529	11/1/2008	11/1/2009	\$1,000,000 per claim \$2,000,000 policy agg \$25,000 Deductible

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS  
 See Attached

<b>CERTIFICATE HOLDER</b>  Proof of Insurance	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE <i>Heather Myerson</i>

PRODUCER 877-945-7378

Willis HRH  
26 Century Blvd.  
P. O. Box 305191  
Nashville, TN 372305191

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

**INSURERS AFFORDING COVERAGE**

**NAIC#**

INSURED  
Marshall Miller & Associates, Inc.  
Attn: Steven Carpenter  
534 Industrial Park Road  
Bluefield, VA 24605

INSURER A: American International Specialty Lines In 26883-001

INSURER B: Commerce and Industry Insurance Company 19410-003

INSURER C:

INSURER D:

INSURER E:

**DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS**

Coverage: Contractors Pollution Liability  
Policy No.: PROP2772529  
Effective: 11/1/08 Expiration: 11/1/09  
Carrier: American International Specialty Lines Insurance Company  
Limits: \$1,000,000 per Occurrence  
\$2,000,000 Aggregate

## IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

## DISCLAIMER

This Certificate of Insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

RFQ No.

DEP14764

STATE OF WEST VIRGINIA  
Purchasing Division**PURCHASING AFFIDAVIT****VENDOR OWING A DEBT TO THE STATE:**

*West Virginia Code §5A-3-10a* provides that: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

**PUBLIC IMPROVEMENT CONTRACTS & DRUG-FREE WORKPLACE ACT:**

*West Virginia Code §21-1D-5* provides that: Any solicitation for a public improvement construction contract shall require each vendor that submits a bid for the work to submit at the same time an affidavit that the vendor has a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code. A public improvement construction contract may not be awarded to a vendor who does not have a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code and who has not submitted that plan to the appropriate contracting authority in timely fashion. For a vendor who is a subcontractor, compliance with Section 5, Article 1D, Chapter 21 of the West Virginia Code may take place before their work on the public improvement is begun.

**ANTITRUST:**

In submitting a bid to any agency for the state of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the state of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the state of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the state of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership or person or entity submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

**LICENSING:**

Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, the vendor must provide all necessary releases to obtain information to enable the Director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

**CONFIDENTIALITY:**

The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures and rules. Vendors should visit [www.state.wv.us/admin/purchase/privacy](http://www.state.wv.us/admin/purchase/privacy) for the Notice of Agency Confidentiality Policies.

Under penalty of law for false swearing (West Virginia Code §61-5-3), it is hereby certified that the vendor acknowledges the information in this said affidavit and is in compliance with the requirements as stated.

Vendor's Name: MARSHALL MILLER & ASSOCIATES INCAuthorized Signature: [Signature] Date: 9/22/09



**WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
AML CONSULTANT CONFIDENTIAL QUALIFICATION QUESTIONNAIRE**

**Attachment "B"**

PROJECT NAME <b>Gordon "C" Refuse Area Design (RFQ # DEP14764)</b>		DATE (DAY, MONTH, YEAR) <b>24, September, 2009</b>	FEIN <b>54-0989421</b>
1. FIRM NAME <b>Marshall Miller &amp; Associates, Inc.</b>		3. FORMER FIRM NAME	
4. HOME OFFICE TELEPHONE <b>(276) 322-5467</b>		5. ESTABLISHED (YEAR) <b>1975</b>	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) <b>NO</b>
2. HOME OFFICE BUSINESS ADDRESS <b>534 Industrial Park Road Bluefield, VA 24605</b>		6. TYPE OWNERSHIP <b>Corporation</b>	
7. PRIMARY AML DESIGN OFFICE: ADDRESS/TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE <b>1018 Kanawha Blvd. East, Suite 400, Charleston, West Virginia 25301 / George Oberlick / 3 Personnel (Primary Office for Project) 200 George Street, Suite 6, Beckley, West Virginia 25801 / Peter Lawson / 14 Personnel 534 Industrial Park Rd., Bluefield, Virginia 24605 / (276) 322-5467 / K. Scott Keim / 97 Personnel 5480Swanton Drive, Lexington, Kentucky 40509 / John Feddock / 13 Personnel 5900 Triangle Drive, Raleigh, North Carolina 27617 / Bill Almes / 11 Personnel</b>			

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM <b>Marshall Miller, Scott Keim, Ronald Mullenex &amp; Cathy Yost</b>	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
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9. PERSONNEL BY DISCIPLINE (Bold Lettering Indicates Minimum Design Team Members)

<u>6</u> ADMINISTRATIVE	<u>1</u> ECOLOGISTS	<u>1</u> LANDSCAPE ARCHITECTS	<u>1</u> STRUCTURAL ENGINEERS
<u>—</u> ARCHITECTS	<u>—</u> ECONOMISTS	<u>1</u> MECHANICAL ENGINEERS	<u>2</u> SURVEYORS
<u>5</u> BIOLOGIST	<u>2</u> ELECTRICAL ENGINEERS	<u>14</u> MINING ENGINEERS	<u>—</u> TRAFFIC ENGINEERS
<u>—</u> CADD OPERATORS	<u>—</u> ENVIRONMENTALISTS	<u>—</u> PHOTOGRAMMETRISTS	<u>72</u> OTHER
<u>—</u> CHEMICAL ENGINEERS	<u>1</u> ESTIMATORS	<u>—</u> PLANNERS: URBAN/REGIONAL	
<u>7</u> CIVIL ENGINEERS	<u>44</u> GEOLOGISTS	<u>—</u> SANITARY ENGINEERS	
<u>3</u> CONSTRUCTION INSPECTORS	<u>—</u> HISTORIANS	<u>2</u> SOILS ENGINEERS	
<u>**</u> DESIGNERS	<u>7</u> HYDROLOGISTS	<u>—</u> SPECIFICATION WRITERS	<u>185</u> TOTAL PERSONNEL
<u>17</u> DRAFTSMEN			

\* All of our draftsmen and most of our mining engineers operate Computer Aided Drafting and Design (CADD).  
\*\* All of our civil engineers and many of our draftsmen are designers.

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 2 (21 total, 7 of which are Civil).  
\*RPES other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? YES NO N/A

11. OBTAIN SIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Confidential Qualification

Questionnaire" for each if copy is not on file with AML.

<p>NAME AND ADDRESS:  <b>Research, Environmental &amp; Industrial Consultants (REIC)</b>                  225 Industrial Park Drive                  P.O. Box 286                  Beaver, WV 25813</p>	<p>SPECIALTY:  <b>Water &amp; Soils Chemistry/Contaminant, Laboratory Analysis</b></p>	<p>WORKED WITH BEFORE                  X Yes                  No</p>
<p>NAME AND ADDRESS:  <b>H.C. Nutting Company</b>                  912 Morris Street                  Charleston, WV 25301</p>	<p>SPECIALTY:  <b>Soil Testing</b></p>	<p>WORKED WITH BEFORE                  X Yes                  No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE                  Yes                  No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE                  Yes                  No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE                  Yes                  No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE                  Yes                  No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE                  Yes                  No</p>

12. Are your firm's personnel experienced in Abandoned Mine Land Remediation/Mine Reclamation Engineering?

**YES** Description and Number of Projects:

MM&A personnel are experienced in engineering and construction aspects to reclaim mine lands. Our projects typically involve mine refuse instability, sedimentation pond design, coal refuse embankment and impoundment design and reclamation, haul road design, rock fill/earthen dam design and remediation, flood routing, hydrological and hydraulic analyses of watershed areas. We have successfully completed more than 10 projects during the past 5 years requiring this experience.

**NO**

B. Are your firm's personnel experienced in Soil Analysis?

**YES** Description and Number of Projects:

MM&A does not operate a soils analysis laboratory. However, our geologist and engineers are highly experienced in sampling of soils and interpreting results of soil analyses for construction purposes. We have successfully completed more than 10 projects during the past 5 years requiring this experience.

**NO**

C. Are your firm's personnel experienced in hydrology and hydraulics?

**YES** Description and Number of Projects:

MM&A personnel are experienced in hydrology and hydraulics; including runoff system design, stormwater structure design and modeling, watershed studies, stream restoration, and channel hydraulics. We have successfully completed more than 10 projects during the past 5 years requiring this experience.

**NO**

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping?

**YES** Description and Number of Projects:

**NO** MM&A subcontracts aerial photography and contour mapping development. MM&A utilizes aerial photography and contour mapping on a routine basis and is experienced with requirements and standards for these services.

E. Are your firm's personnel experienced in domestic waterline design? (Include any experience your firm has in evaluation of aquifer degradation as a result of mining.)

**YES** Description and Number of Projects

MM&A personnel are experienced in domestic waterline design projects and evaluation of mining related aquifer degradation. Currently MM&A is designing a waterline extension for the Shady Springs PSD. MM&A has conducted groundwater evaluations to evaluate facility and mining impacts. Our evaluations have included sampling, data evaluation, regulatory statistical reporting, alternative source demonstration and corrective action planning and design. We have successfully completed more than 10 projects during the past 5 years requiring this experience.

**NO**

F. Are your firm's personnel experienced in Acid Mine Drainage Evaluation and Abatement Design?

**YES** Description and Number of Projects:

MM&A personnel are experienced in AMD evaluation and abatement design. Our experience includes sampling, data evaluation, regulatory statistical reporting, alternative source demonstration and corrective action planning and design. We have successfully completed more than 7 projects during the past 10 years requiring this experience.

**NO**

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Butler, Christopher S. Senior Engineer</b>		4 years	N/A

**Brief Explanation of Responsibilities**  
 Chris Butler is a civil engineer with extensive experience in landfill site investigations, monitoring system design and compliance evaluation, closure design and construction monitoring. He has been the project manager and supervisor in charge of diverse investigations and projects, including landfill closures under the WVDEP LCAP (Kanawha Western landfill, Fayette County landfill, Central West Virginia, Mingo County landfill and Berkeley County landfill). He has served as principal in charge of geologic reserve exploration, evaluation and development. He has experience with large scale earthmoving associated with surface mining operations. In addition, he has experience with a wide range of WV-AML reclamation projects including subsidence, waterline extensions, and acid mine drainage mitigation.

**EDUCATION (Degree, Year, Specialization)**

- Master of Science / 1995 / Civil Engineering / West Virginia University
- Bachelor of Science / 1993 / Civil Engineering / West Virginia University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
National Society of Professional Engineers, West Virginia Tau Beta Pi, Engineering Honor Society	<ul style="list-style-type: none"> <li>• Registered Professional Engineer, West Virginia, No. 13740</li> <li>• West Virginia Licensed Remediation Specialist, Registration Expired</li> <li>• West Virginia Department of Environmental Protection (WVDEP) Approved Person for preparing, signing and certifying surface mine permit applications</li> </ul>

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)		YEARS OF EXPERIENCE	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Richard G. Aimes, P.E. Senior Technical Consultant</b>		35 years	N/A

**Brief Explanation of Responsibilities**  
 Founder and former President of Aimes & Associates, Inc., a geotechnical and geo-environmental engineering firm. The scope of services include geotechnical, environmental, civil and mining engineering, investigative and forensic engineering, regulatory assistance, hydrogeology, design, analysis and construction monitoring of dams, design of coal refuse disposal embankments and impoundments, environmental site assessments, underground storage tank assessments, site remediation, construction management, and the siting, design and permitting of solid and hazardous waste disposal facilities.

**EDUCATION (Degree, Year, Specialization)**

- M.S., Civil / Geotechnical Engineering / 1966 / West Virginia University
- B.S. / Civil Engineering / 1961 / The Citadel

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers, Fellow Association of Iron and Steel Engineers Tau Beta Pi, Engineering Honor Society American Society Testing Materials	<b>Professional Engineer:</b> Pennsylvania (1969), West Virginia (1969) and Virginia (1976).

**13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)**

<b>NAME &amp; TITLE (Last, First, Middle Int.)</b>  <b>Oberlick, George</b> <b>Vice President</b>	<b>YEARS OF AML DESIGN EXPERIENCE:</b>  N/A	<b>YEARS OF EXPERIENCE</b> <b>YEARS OF AML RELATED DESIGN EXPERIENCE:</b>  38 years	<b>YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:</b>  N/A
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**Brief Explanation of Responsibilities**

Provide project management support and participates in domestic and international assignments involving due diligence for mergers and acquisitions. His responsibilities include preparation of technical reports to support coal reserve classifications and requirements of U.S. and Canadian securities agencies, operations and safety audits for coal mining companies, loss control surveys, support services related to coal sales agreements, and coal mine scoping and pre-feasibility evaluations.

**EDUCATION (Degree, Year, Specialization)**

- Bachelor of Science / Engineering of Mines / 1969 / West Virginia University

**MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

- Society for Mining, Metallurgy and Exploration
- Careers in Coal
- Board of Directors, Inez Deposit Bank, FSB, Louisa, Kentucky
- Past Chairman, Board of Trustees, Three Rivers Medical Center, Louisa, Kentucky
- Past Member, Small Business Advisory Council of the Federal Reserve Bank of Cleveland

**REGISTRATION (Type, Year, State)**

- Professional Engineer, West Virginia, Certification No. 008342
- Professional Engineer, Illinois, Certification No. 062-048266
- Mine Manager: Illinois; Mine Foreman: West Virginia, Kentucky and Colorado

**13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)**

<b>NAME &amp; TITLE (Last, First, Middle Int.)</b>  <b>Hansford, Randy M.</b> <b>GIS/Drafting Technician</b>	<b>YEARS OF AML DESIGN EXPERIENCE:</b>  N/A	<b>YEARS OF EXPERIENCE</b> <b>YEARS OF AML RELATED DESIGN EXPERIENCE:</b>  7 years	<b>YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:</b>  N/A
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**Brief Explanation of Responsibilities**

Provide project mapping and data collection and manipulation on domestic coal and environmental projects. Manage databases full of environmental and base data to better coordinate internal project use.

**EDUCATION (Degree, Year, Specialization)**

- Bachelor of Arts / Geography / 2002 / West Virginia University

**MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

**REGISTRATION (Type, Year, State)**

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES

SOFTWARE\*

Norton Antivirus (Individual and Server)  
Microsoft Professional Office Suite (latest version)  
Auto CADD (latest version)  
Dot-Soft Tool Pac for Auto CADD  
Grapher  
Quick Flow  
Twodan  
DUMPStat  
Rockware Utilities  
Century Compulog/Display/Log  
Adobe Design Suite (Photoshop, In Design, Acrobat, Illustrator)  
Raster Design (2003)  
Better WMF  
Tralaine Coordinate Conversion Software  
Corpscon Coordinate Conversion Software  
MS Outlook  
MS Photo Processing  
SurvCADD  
HEC/HMS  
ESRI Arcview (latest version)

EQUIPMENT

MM&A utilizes state of the art computer equipment and peripherals including:  
HP 815 MFP 42" Scanner/Plotter  
HP800 42" Plotter  
Photo quality printers and plotters  
DVD Reader/Recorder  
CD Reader/Recorder  
Microtek Desktop Scanner

\* MM&A will purchase any software if deemed necessary to complete a project based on approval by the project manager.

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
Threemile Surface Mine Coal Boone/Kanawha Counties, WV	Coyote Coal Company Charleston, WV	Design drainage controls, spoil disposal plan, transportation, mine planning, spoil regrade, reclamation, and stream mitigation.	\$75,000,000	5%
Royal Stone Quarry Aggregate Richmond, VA	Vulcan Construction Materials Winston-Salem, NC	Design cut/fill and grading plan to achieve overburden removal volumes that balance with available spoil storage volume. Included construction bid package.	Unknown	On-going
Meadowfill Landfill Bridgeport, WV	Waste Management, Inc.	Conduct a hydrological characterization of landfill situated on an abandoned surface mine. Included construction of monitoring systems.	\$154,000	On-going
Buchanan County Landfill Buchanan County, VA	Buchanan County, VA Grundy, VA	Prepare closure plan for the following areas of concern: leachate management, erosion & sediment control, groundwater monitoring, and gas management.	\$373,000	On-going
TOTAL NUMBER OF PROJECTS:			TOTAL ESTIMATED CONSTRUCTION COSTS: \$	







PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH
N/A					

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.

20. The foregoing is a statement of facts.  
 Signature: Peter Lawson Title: EVP  
 Printed Name: PETER LAWSON Date: 9/23/09

NOTE: THIS DOCUMENT WILL BECOME VOID AFTER DECEMBER 31 IN CALENDAR YEAR OF DATE HEREON.

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis Corp. Personnel	Additional Info Provided in Section (4)	PROJECT EXPERIENCE REQUIREMENTS														PRIMARY STAFF PARTICIPATION CAPACITY *** M=Management P=Professional								
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrogeologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation	Mitigation	Hazardous Waste Disposition	Project Specifications	Water Quality Evaluation/Investigation	Replacement Construction	Inspection/Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Chris Butler, PE	Justin Douhal, PE	Jeffery Almond	Jerry Enjky, PE	Joe Overbay, PE	Edmundo Lopez, PE
WVDEP-AML Glen Morgan Subsidence	P							X																	
WVDEP-AML Omega Mine AMD Remediation	P											X						X							
WVDEP-AML Cow Creek - Sarah Ann Waterline	P																	X							
WVDEP-AML Owens Refuse	P																	X							
WVDEP-LCAP Reclamation (8 Projects)	CP											X						X			MP				
Reclamation Maple Meadow No. 1 Shaft	C											X													
Reserve Evaluation Coal Refuse Impoundments (3 projects)	CP													X								MP			
Evaluation Mine Poot Water for Power Station Source Water	CP																						MP	P	
End of Mine Reclamation Cost Estimations (Surface/Deep Mines)	CP																								
Reclamation Design & Planning (2 projects)	CP																								
Surface Mine Compensatory Mitigation Plan (8 projects)	CP																								
Buck Lilly Excess Soil Reclamation, WVDEP Special Reclamation	CP																								
VA-MLR Landslide Remediation (3 project)	C																								P

\* List whether project experience is corporate or personnel based or both.

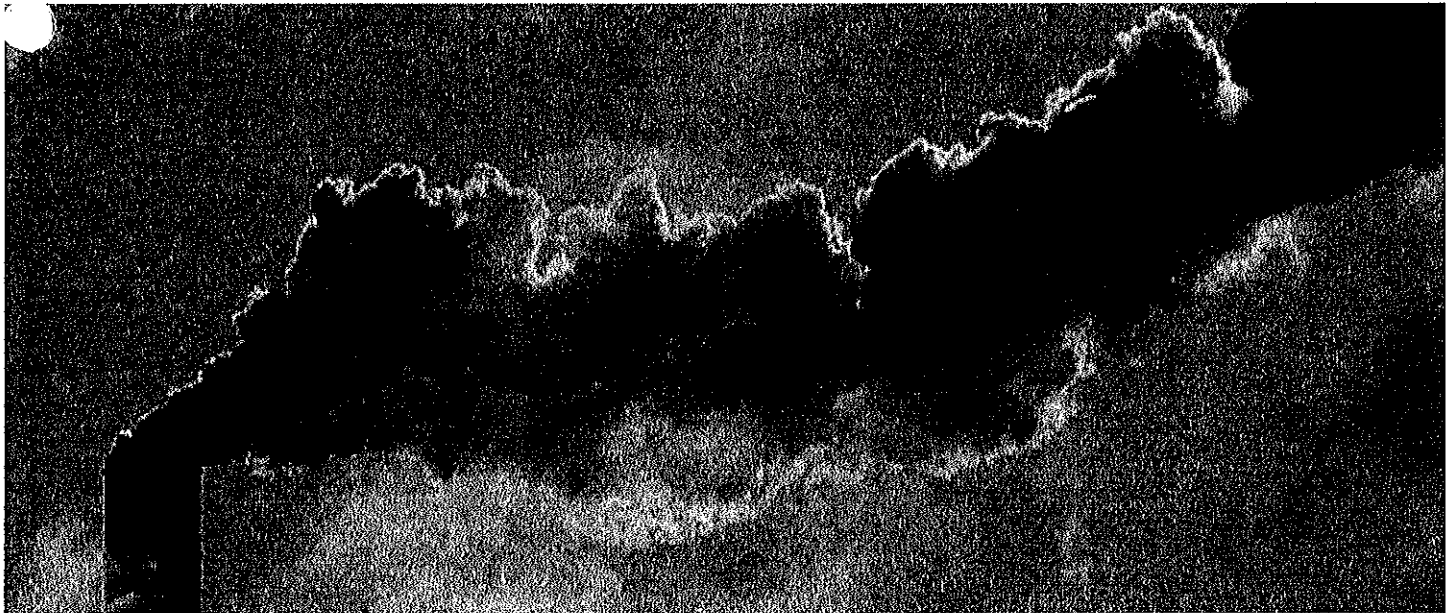
\*\* Use this area to provide specific sections or pages if needed for reference.

\*\*\* List Primary Design Personnel and their functional capacity for the projects listed.

2009

# STATEMENT OF QUALIFICATIONS

ENERGY / ENVIRONMENTAL / ENGINEERING / CARBON MANAGEMENT



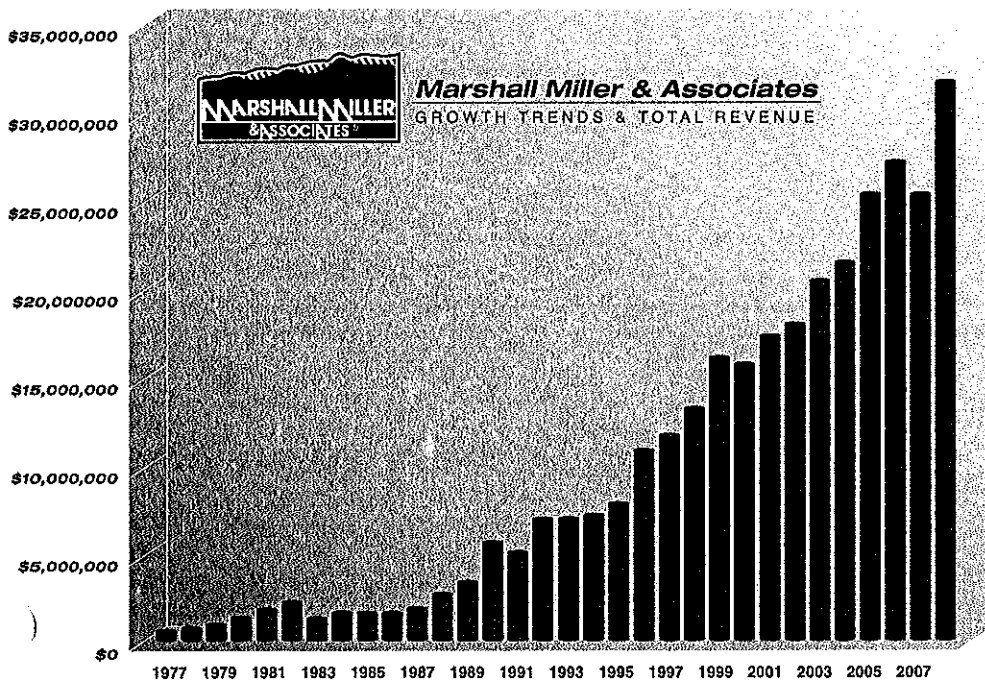
# INTRODUCTION

Marshall Miller & Associates (MM&A), a diverse consulting and engineering firm headquartered in Bluefield, Virginia, U.S.A., offers a wide spectrum of services to clients in North America, South America, Asia, and Europe. Over its 34-year history, MM&A has evolved into a leader in the mineral resource, environmental, and carbon management industries. The company's growth is based on a commitment to applying and developing advanced engineering and scientific technologies and maintaining our talented staff of geologists; hydrologists; earth scientists; and mining, petroleum, environmental, and civil engineers.

The roots of MM&A originated with professional services provided to the coal, aggregate, industrial minerals, unconventional gas, financial, and insurance industries. Professional services include mining engineering, coal and petroleum geology, petroleum engineering, mining-related environmental services, expert witness and litigation support, valuation and appraisals, financial and operations assessment, advisory services, permitting/regulatory services, and wireline geophysics. As the leading consulting firm in the United States working in the coal and coalbed methane industries, our energy-related client base consists of over 250 companies. Since 2005 MM&A has been an active participant in a Department of Energy-sponsored Carbon Capture and Storage (CCS) project related to storage in thin, unmineable coal seams and other deep formations.

In the early 1990s MM&A added environmental services to diversify and to insulate the company from the cyclic nature of the energy business. Professional services include environmental risk assessment, remediation, environmental site assessments and impact studies, hazardous waste evaluation, compliance monitoring and reporting, permitting and emergency response. MM&A offers these services to the mining and transportation industries, federal and state government agencies, financial and insurance companies, and local industrial markets proximal to our regional office locations. Our environmental client base consists of over 500 companies.

In 2005 we combined the experience and technical expertise of our energy and environmental staff to focus on emerging carbon capture and storage projects. MM&A is actively participating in multiple scenarios, including the injection of 1,000 tons of CO<sub>2</sub> into a coalbed methane reservoir and various carbon footprint evaluations. Our staff is currently researching the mandatory reporting rules (MRR) related to greenhouse gases (GHG) as proposed by the US Environmental Protection Agency. MM&A engineering, geological, and environmental professionals are leaders in this newly developing field. This is a natural extension of MM&A services to business sectors where we have an excellent reputation and strong client contacts.



MM&A is well positioned to continue our growth in the challenging economic climate of 2009 and beyond. The strength and diversification of the MM&A staff gives us a solid base from which to capitalize on changing market conditions and to provide technical services to a wide variety of industries.

*Marshall S. Miller*

Marshall S. Miller  
Founder & Chairman Emeritus

*K. Scott Keim*

K. Scott Keim  
President

# SUMMARY OF SERVICES

## LOGICAL SERVICES

- Reserve Evaluation
- Geotechnical Evaluation of Roof & Floor Conditions
- Evaluation & Prediction of Underground Mining Hazards
- Coalbed Methane Evaluation
- Coalbed Methane Resource Evaluation
- Field Exploration/Core Description

## MINING ENGINEERING

- Mine Operations Evaluation
- Valuations of Reserves, Property, Plant & Equipment
- Mine Cost/Cash Flow Analysis
- Mine Planning/Feasibility Studies
- Geotechnical Engineering (Subsidence Prediction, Pillar Design, and Roof Support Design)
- Impoundment and Embankment Design, Permitting, Inspection, Operations & Monitoring Capabilities

## HYDROGEOLOGY

- Monitoring
- Water Supply Development
- Mine Inflow and Control
- Monitoring of Mine, Quarry or Construction Impact
- Mitigation of Hydrogeologic Impact
- Acid or Metal-Rich Drainage Prevention
- Mine Stream and Wetland Mitigation/Restoration

## ENVIRONMENTAL

- Site Investigation and Remediation
- Environmental Compliance
- Voluntary Remediation/Brownfield Redevelopment
- Real Estate Services
- Emergency Response
- Asbestos, Lead, Radon & Mold
- Mining Property Acquisitions - Phase I ESA
- Reclamation Liability Determination
- Mining & Reclamation Permitting
- Management of Idle Mine Sites

## CARBON MANAGEMENT

- Carbon Credit Verifier
- Greenhouse Gas Inventories and Reduction
- US EPA Methane-to-Markets Program
- Carbon Capture and Storage

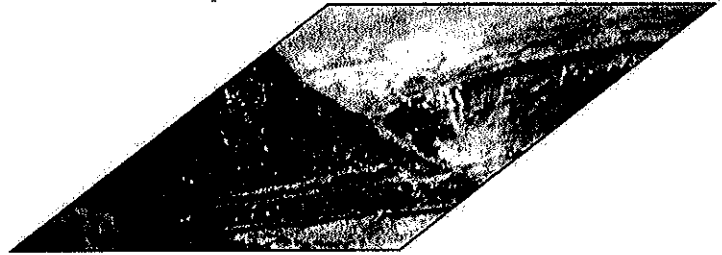
## PERT WITNESS

## GEOLOGICAL LOGGING SYSTEMS

# GEOLOGICAL SERVICES

## RESERVE EVALUATION

Marshall Miller & Associates (MM&A) performs reserve evaluations, geophysical logging, interpretation and engineering studies for land and mining companies and for insurance, banking, and investment firms. The reserve evaluations, prepared by professional geologists, are highly regarded in the industry for presenting complex geological data in a concise and understandable format. MM&A utilizes state-of-the-art computer software that is written solely for geologic applications and aids geologists in efficiently preparing coal, coalbed methane, mineral, ore, and oil and gas reserve evaluations.

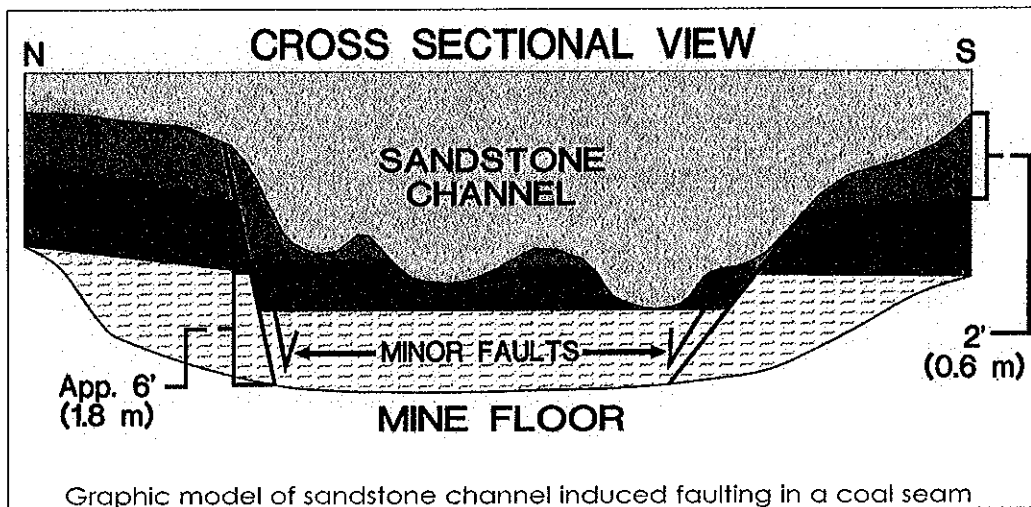


Differential compaction induced faulting observed in a mine

Geological evaluations by MM&A go beyond determining basic volumes or tonnage assessments of mineral deposits. The evaluations address the geological factors that control seam quality and mining conditions. By establishing scientific cause-and-effect relationships, our geologists reliably predict the potential productivity of a mining venture and classify reserves based on their economic viability.

MM&A geologists are recognized leaders in fields such as traditional coal and mineral evaluation and exploration, assessment of geologically-controlled mine productivity factors, evaluation of coal quality characteristics, coalbed methane exploration, and reserve analysis. Their geological expertise is fully integrated into reserve and engineering services including operations analysis, economic modeling, and environmental assessments. The largest mining companies and financial institutions in the United States and abroad use these composite services.

Since 1975, MM&A has been involved with coal reserve evaluations throughout the United States. Although the company had its beginnings primarily in the eastern U.S., the quality of our services allowed rapid expansion into the Midwestern (Illinois and Indiana) and Western (Wyoming, Colorado, Utah, Arizona, and New Mexico) coalfields. Additionally, MM&A works on an international basis in South America, Asia, Africa, and Europe.



## GEOTECHNICAL EVALUATION OF ROOF & FLOOR CONDITIONS

The delineation of geotechnical factors controlling mining conditions is an integral part of a comprehensive reserve evaluation. Geological and geotechnical complexities are analyzed and mapped to determine roof and floor strata impacts on mining conditions and to predict preferred areas for mine development. MM&A geologists assess the geotechnical properties of the critical roof and floor strata and then map the occurrence of these strata using their comprehensive knowledge of depositional environments and geological settings. This provides understanding and prediction of the geological impacts on mining.

Rock core is geotechnically logged and photographed by a certified professional geologist. Specific empirical analyses of each stratum are performed and include: Rock Mass Rating (RMR) based on uniaxial compressive strength and other critical rock mass properties; Rock Quality Designation (RQD); and fracture analyses (including average fracture spacing and fracture condition) calculated directly from the fracture log. The results of the empirical analyses are displayed on a computer-generated geotechnical log. These logs graphically represent the following data: strata lithology and thickness; visible strata defects; visual rock mass quality assessment; spacing of discontinuities; RQD percentage; weathering; and location of all strength test samples.

## EVALUATION & PREDICTION OF UNDERGROUND MINING HAZARDS

### HAZARDS ENCOUNTERED

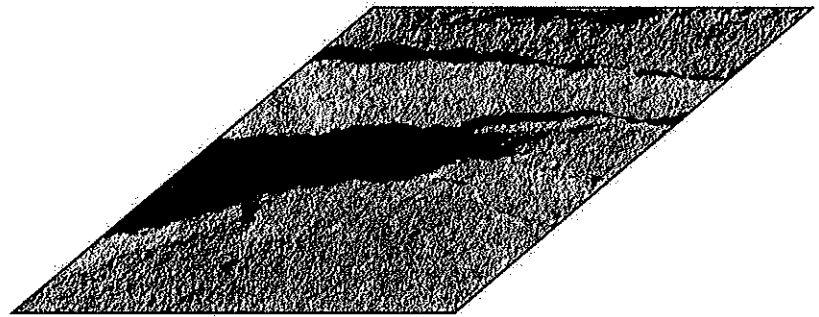
MM&A geologists are industry leaders in assisting mine operations impacted by unexpected geologic hazards. From the initial underground mapping of the impacted area by MSHA-certified mine geologists, through development of a predictive geologic model, MM&A provides rapid response to critical productivity interruptions.



Severe roof conditions

### HAZARDS UNDERSTOOD, PREDICTED AND MAPPED

A wealth of experience, teamed with strong computer capabilities for evaluation of complex geologic data, allow MM&A geologists to reliably predict the cause and occurrence of hazardous geologic anomalies resulting in interruption of mineral deposits, unstable roof and floor strata, high stress areas, faulted or fractured areas, and excessive ground water inflow. Graphics and 3-D computer simulation modeling are used as a tool for defining and presenting these complexities.



Geologic factors that could create hazardous conditions are used to create predictive maps, identifying potential problems for the total reserve area. These maps are an essential tool for optimizing mine plans and developing reliable mine cost forecasting.

## COALBED METHANE EVALUATION

MM&A geologists have extensive experience in the determination of coalbed methane quantity, quality, reservoir characteristics, and recovery technology. Services provided include drill hole site selection and supervision, on-site sampling, laboratory analysis of coal seam samples for desorption characteristics, residual gas determinations, coal seam mapping, and reserve evaluation. Because these reserves are often found in areas of concentrated stratigraphic fracturing, ability to locate and analyze these features is important not only in delineating reserves, but also in coal mine roof control and support. Professional petroleum mining and civil engineering personnel are available to assist with mine planning and production design and all phases of coalbed methane work, including commercial production of coalbed



methane and degasification of coal seams in advance of mining. All processing and procedures are fully computerized. MM&A has been active in both domestic and international coalbed methane projects.

#### COALBED METHANE DESORPTION LABORATORY

Located in our Bluefield, Virginia office, MM&A maintains a coalbed gas desorption laboratory that employs U.S. Bureau of Mines methodology for determining the gas content of coal samples. Field geologists are available to collect core or cutting samples at the drill site to be transported in a temperature-controlled environment during the entire desorption phase, which lasts from a few weeks to several months, as dictated by project requirements.

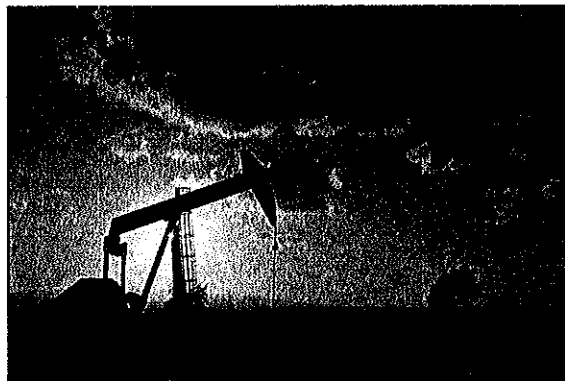
The gas content of coal samples from the eastern United States have been analyzed by our laboratory for more than two decades.

## COALBED METHANE RESOURCE EVALUATION

In addition to facilities for analyzing gas content, MM&A has conducted extensive coalbed methane (CBM) resource evaluations for hundreds of thousands of acres in the United States and abroad.

Areas of expertise within the United States include:

- Black Warrior Basin (Alabama)
- Central and Northern Appalachian Basins (Tennessee, Virginia, Kentucky, West Virginia, Ohio, and Pennsylvania)
- Illinois Basin (Indiana, Western Kentucky, and Illinois)
- Forest City and Arkoma Basins (Oklahoma, Kansas, and Arkansas)
- San Juan Basin (New Mexico and Colorado)
- Greater Green River Basin (Colorado and Wyoming)
- Powder River Basin (Wyoming and Montana)

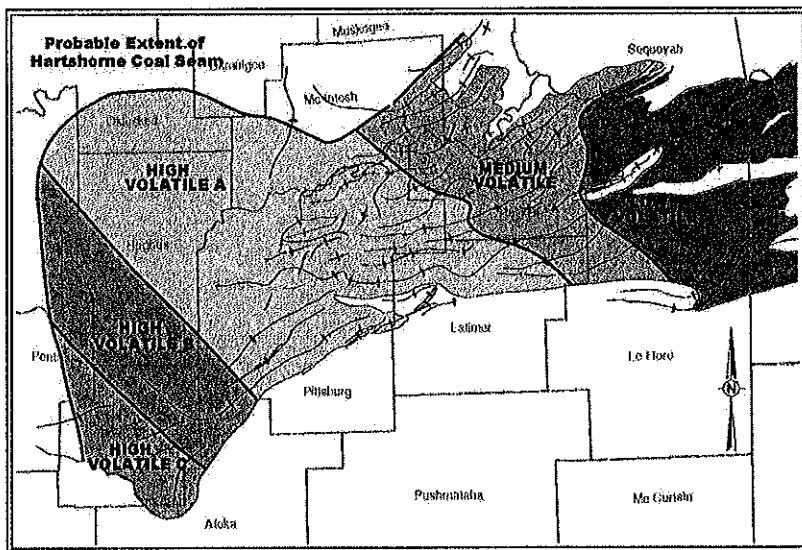


MM&A has been involved in an assessment of CBM potential in specific basins located within mainland China and has participated as a minority partner in CBM development projects there.

Experience in the development of geologic models for coal-bearing regions across the United States in conjunction with geophysical logging capabilities and laboratory facilities provides MM&A staff with a strong basis for identifying and quantifying CBM resource potential. Coal mining and CBM production companies have relied upon our high-resolution geophysical logs for over 20 years to precisely measure coal thickness for purposes of identifying the size and distribution of CBM reservoirs.

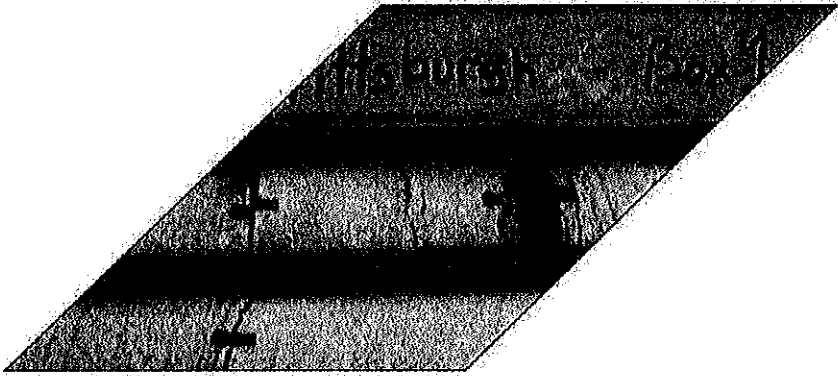
MM&A personnel have worked directly with companies in the development of both stand-alone "conventional" CBM wells and "degasification" wells which produce pipeline-quality coal mine methane (CMM) from either active or abandoned mining operations.

The staff has provided in-depth geologic assessments of mature, emerging, and frontier CBM regions to the energy industry for more than a decade. As interest in CBM production has accelerated in recent years, MM&A has been at the forefront of resource assessment from small-scale to regionally extensive properties.



# FIELD EXPLORATION/CORE DESCRIPTION

MM&A geologists are experts in planning, permitting, and managing field exploration projects. The exploration phase of a reserve evaluation can be one of the most important factors in determining the areal extent of a potential reserve and in defining its quality and mining characteristics. The data generated by field exploration generally serve as the basis for subsequent reserve evaluations and mining assessments. Field exploration can provide additional information, supplementing existing data in order to predict mining trends, define roof and floor problem areas, and provide samples for mining permits.



# MINING ENGINEERING

## INTRODUCTION

A majority of MM&A mining engineers are seasoned professionals with broad-based experience in mine management, operations and in meeting client needs. A majority of our senior mining engineers have the following qualifications: master's degrees from major universities, technical proficiency, and years of experience in coal and associated industries. In addition, all are registered professionals in major coal-producing states. They specialize in the following areas:

- Mining Engineering
- Rock Mechanics
- Mineral Economics
- Environmental Reclamation

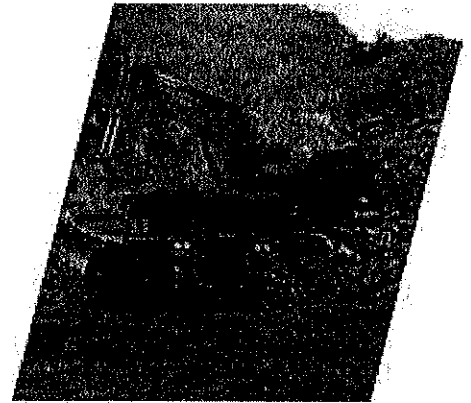
### MM&A ENGINEERS HAVE EXPERIENCE IN THE FOLLOWING:

- Mine Operations Evaluations
- Valuation of Reserves, Property, Plant, and Equipment
- Mine Cost and Cash Flow Analysis
- Mine Planning, Construction Studies and Related Services
- Geotechnical Engineering (Subsidence, Slope Stability, Pillar Design, and Roof Support Design)
- Expert Witness

## MINE OPERATIONS EVALUATION

The recent economic climate in the coal industry has been one of merger, acquisition, consolidation, and re-engineering. It is within this environment that banks, financial institutions, capital management groups, insurance companies, financial brokers, and mining companies seek assistance in evaluating the probable success of active mining operations and proposed mining ventures. In meeting this need, MM&A engineers and geologists evaluate those parameters critical to the success of a mining venture. Analysis of this information provides an overall audit of the operation, allowing any existing strengths and weaknesses to be identified.

Multiple factors and contingencies are considered when evaluating a mining operation, each of which can be examined singularly or collectively as needed. Areas of concern include reserves, quality parameters, mining methods, management and manpower, mine plan assessment, operating costs, and supply contracts.



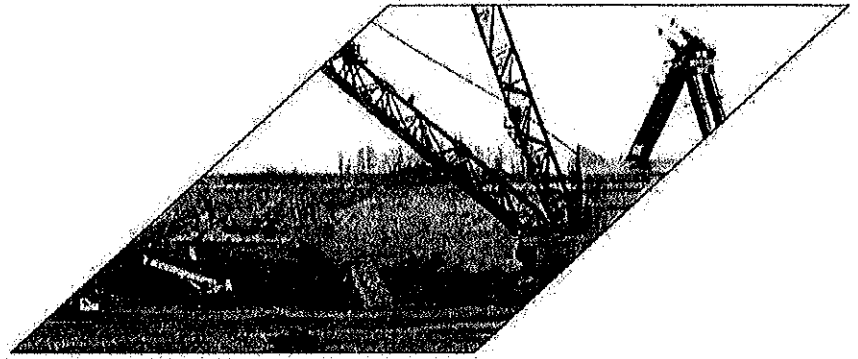
## VALUATIONS OF RESERVES, PROPERTY, PLANT, & EQUIPMENT

Valuations are performed in accordance with the Uniform Standards of Professional Appraisal Practice and the Uniform Appraisal Standards for Federal Land Acquisition, where applicable. Valuations are prepared for banks, financial groups, mining companies, and insurance companies, and conform to the standards and requirements of the Financial Accounting Standards Board, where required.

Mineral reserve and resource valuations are prepared for coal and other minerals recoverable by different mining methods. The objective of the valuation is to estimate the fair value of the mineral ownership, with consideration given to the type of mineral control. Mineral valuations are based upon classifications consistent with the U.S. Geological Survey, U.S. Securities and Exchange Commission, Canada's National Instrument 43-101, Australasia's JORC, and other accepted industry practices as performed during reserve evaluations.

Property valuations determine the value of a mineral property through the appropriate geological and financial investigations. Comparable sales, royalty, and operational income (discounted cash flow) methods are considered to determine the value of mineral holdings, infrastructure, coal supply contracts, and other tangible and intangible assets. Valuation studies of active and proposed operations are prepared in support of acquisitions and for financing.

Plant valuations determine the value of coal preparation and mineral processing plants and other material-handling facilities and related infrastructure. Through on-site investigation, the fair value is presented for the plant facility as a whole, on individual circuits, and on specific individual pieces of equipment as required by the appraisal. Parameters considered include the plant's capacity, replacement cost, age, amount of usage, type of material handled, proximity to markets, and other operating factors.



Equipment appraisals are prepared for all types of mining equipment at both surface and underground mines. When possible, comparable sales values are used. During on-site investigations, the equipment is inspected for its general condition, age, the amount of usage, maintenance history, and mechanical availability. MM&A maintains an extensive database of new and used equipment values for both surface and underground equipment to support the valuation process.

## **MINE COST/CASH FLOW ANALYSIS**

In addition to providing mine operations evaluation services, MM&A prepares economic analysis of coal, aggregates, industrial minerals, and other types of minerals to determine the net present value of projected after-tax cash flows and the rate of return on the invested capital. Based upon the physical parameters of the mineral reserve, estimates are prepared of the productivity, production, manpower, capital requirements, and operating cost for the proposed mining venture or the ongoing mining operations. Included in the economic analysis are the evaluation of manpower costs, royalty, depreciation, depletion, and interest charges (cash flows are calculated on a pre- or post-tax basis). These evaluations are prepared in accordance with the criteria for scoping-level, preliminary feasibility and bankable feasibility studies.

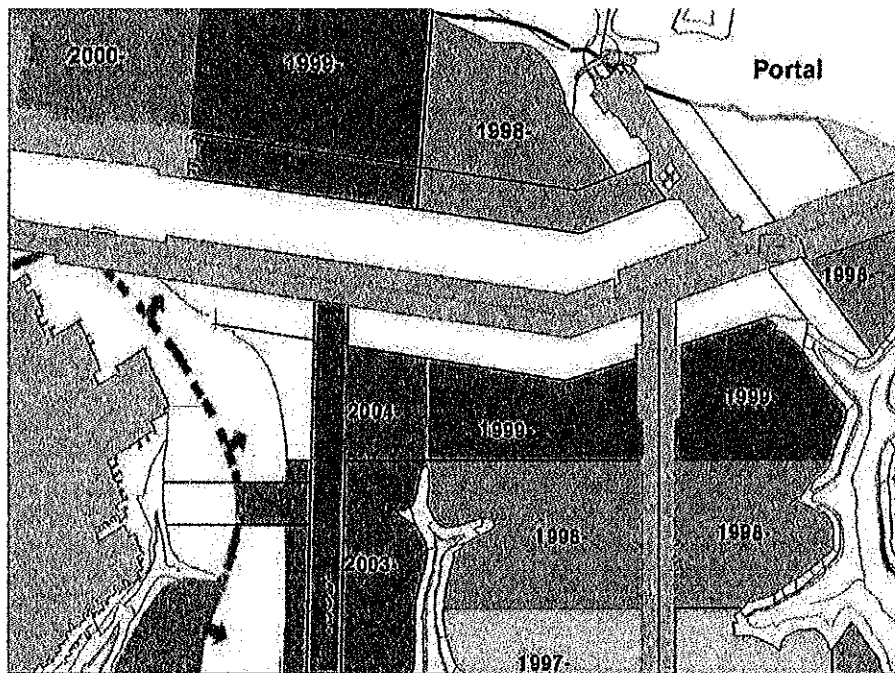
A proprietary financial model incorporates productivity parameters with manpower, equipment, and supply costs to generate a comprehensive cost analysis. Analyses routinely include forecasts of revenue, direct cash mining cost, total mining cost, EBITDA, depreciation, depletion and amortization, and projections of corporate income tax.

## **MINE PLANNING/FEASIBILITY STUDIES**

Consistent mine productivity depends on how thoroughly a mine plan adapts to the variations in geologic conditions and mineral deposition. MM&A engineers and geologists combine skills and experience to develop a mine plan that considers all relevant geologic and mining factors. Using the physical factors identified during geologic and geotechnical evaluations, MM&A engineers design a mine plan to take advantage of favorable mining conditions, and to minimize the impact of any adverse mining conditions.

## MINE PLANNING CRITERIA ESSENTIAL FOR DETERMINING THE PRODUCTIVITY AND PRODUCTION OF A MINE INCLUDE:

- Geologic Factors
- Consistent Approach
- Productivity
- Access
- Manpower
- Equipment Selection
- Operating Constraints
- Material Handling
- Electrical Power Distribution
- Ventilation
- Drainage Control
- Market Forecasting



Underground mine plan detail

## GEOTECHNICAL ENGINEERING

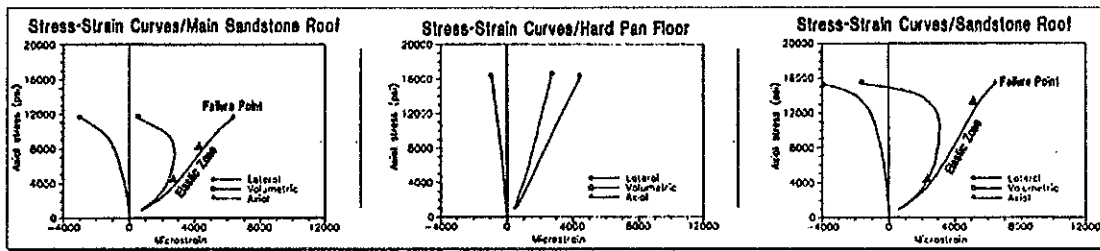
### (SUBSIDENCE PREDICTION, PILLAR DESIGN, AND ROOF SUPPORT DESIGN)

#### LONGWALL MINE AND SUBSIDENCE PLANNING

Longwall and mine subsidence evaluations are specialized services analyzing the impacts of mining operations on surface lands and on man-made structures, perennial streams, aquifers, large impoundments, and public facilities. With the increasing use of longwall mining in the United States, mine subsidence prediction, planning, and investigation have become important aspects of MM&A's consultancy. Development of mitigation measures to reduce the effects of subsidence initially relies on subsidence prediction. MM&A provides support to mining companies, landowners, pipeline companies, and many others. These services include:

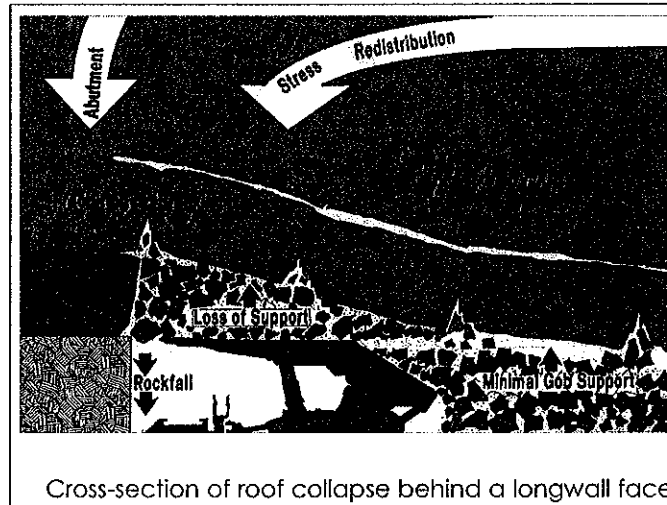
## LONGWALL MINE AND SUBSIDENCE PLANNING

- Design of subsidence remediation includes backfilling of surface depressions and underground voids, surface drainage diversion and de-watering, and stream channel restoration.
- Reclamation of the subsidence site includes, but is not limited to, drainage restoration, topsoil placement, revegetation, wetland construction, and erosion control.



## GROUND CONTROL AND ROCK MECHANICS

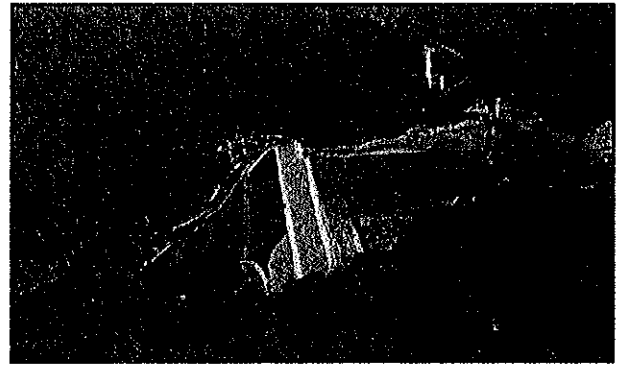
- MM&A has considerable experience in advising the mining and construction industries in ground control issues, particularly on the location of geologic hazard zones, feasibility studies, and field monitoring. Mining design capabilities include: slope stability; mine portal slope and shaft construction; mine roof support; pillar stability; mine planning and layout; multi-seam mining interaction; and bearing capacity of floor plans. The interaction and consequence of these aspects can be monitored by sophisticated instrumentation packages installed and operated by qualified engineers.
- Stability issues addressed by our professional staff include roof, rib, pillar, and highwall. Stability techniques are developed to maximize personal safety and recovery of mineral reserves. Professional engineers and geologists evaluate strata control relative to subsidence potential, roof stability, support design, floor heave, longwall panel design, conventional and continuous mining, room and pillar design, and surface mining.
- Roof support requirements are analytically evaluated for the range of strata types, overburden depths, and horizontal stress fields prevalent at the mine site. This information can then be used by MM&A mining engineers to optimize the design of pillars and entries, roof support systems, and the overall mine plan.



## IMPOUNDMENT AND EMBANKMENT DESIGN, PERMITTING, INSPECTION, OPERATIONS & MONITORING CAPABILITIES

MM&A's senior staff of qualified professionals has more than 30 years of experience with the design, permitting, inspection, operations, testing and monitoring of coal fly ash and bottom ash disposal facilities located in the Appalachian coalfields and the eastern United States. At some sites, we have designed impoundments for containment of the fly ashurry behind soil and rock fill dams, while others have involved dewatering of the fly ash for combined disposal with the bottom ash and/or co-mingled with fine and coarse coal refuse from mine-mouth coal operations.

The basic engineering principals and practices associated with the design and operation of coal refuse impoundments, embankments and earthen dams are nearly identical to fly ash and bottom ash disposal facilities. The primary exception is an understanding of the unique physical and chemical characteristics of the waste materials. Because of our extensive experience with the testing, materials placement, and construction monitoring of these waste operations, we are in a unique position to assist Owners and Operators in evaluating the suitability of their disposal operations to ensure adherence to sound engineering practices consistent with appropriate local, state, and federal regulations.



Clearly, as a result of the recent failure of the fly ash slurry containment structure at the TVA fossil fuel power plant located west of Knoxville, TN, there is increased concern for the integrity of similar structures located at many other power stations throughout the U.S. MM&A is in a unique position to evaluate such facilities because of our extensive experience and hands-on knowledge of the design and construction procedures required to ensure long-term stability while satisfying the disposal requirements for the plant facilities.

We have developed detailed checklists for site inspection of disposal operations to identify potential stability problems related to excessive slope movements, large or changed seepage flows, possible uncontrolled contamination of surface and ground water, changes to the flood routing structures, improper placement practices of the waste materials, and more. These checklists provide the responsible operations and engineering personnel with a tool for identifying impending problems that must be addressed to minimize risk of future releases of waste materials into downstream watercourses.

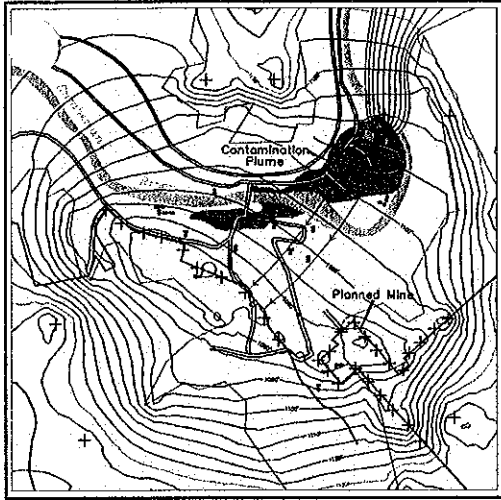
The following key service areas summarize our capabilities and expertise in design, operational support and construction monitoring. These are specifically related to fly ash and bottom ash disposal:

- Geotechnical evaluations including slope stability analyses under both static and earthquake loading conditions; the potential of mine subsidence; breaching of mine seals related to abandoned or active mines in proximity to the disposal facility; excessive settlement of the waste materials; and the impact on surface structures, pipelines, decant systems and internal drain systems.
- Hydrologic and hydraulic analyses pertaining to storm water diversion and flood routing and the discharge of slurried waste, and the return of clarified water to the plant facilities.
- Erosion and sedimentation control systems to prevent or minimize uncontrolled discharges from the disturbed areas associated with the disposal facility.
- Reclamation and abandonment considerations throughout the life of the facility and after closure.
- Installation of instrumentation systems for monitoring slope movements, groundwater pressures, seepage flow quality and quantity, and settlement (i.e., slope inclinometers, piezometers, settlement plates, etc.).
- Laboratory testing of the waste materials to determine its physical and chemical characteristics and sensitivity to water content, varying compaction procedures, or use of additives or amendments to mitigate problems with placement and compaction of the waste materials.
- Evaluation of the optimal materials handling and placement procedures of the waste materials.

It is noteworthy that our senior staff has been intimately involved with the development of the two engineering design manuals prepared by the Mine Safety and Health Administration (MSHA) which specifically address procedures to be followed in designing and operating coal refuse impoundments and embankments. The first manual was published in 1975 and an updated version is scheduled to be released in 2009. These documents are extremely useful to designers and operators responsible for siting, design, permitting, and operation of coal ash disposal facilities.

Our staff has also been involved with forensic studies of major waste impoundments that have experienced uncontrolled releases of fine slurry and slope instability within the embankment portions of both fly ash embankments and impoundments and coarse coal refuse dams.

# HYDROGEOLOGY



## INTRODUCTION

MM&A has a wealth of experience in evaluating the interactions between both underground and surface mining and the hydrogeologic regime. Understanding the hydrogeologic framework not only provides the basis for assessment of probable hydrogeologic consequences of mining, but also allows anticipation of mining conditions. MM&A hydrogeologists investigate the stratigraphic, structural, and geotechnical controls influencing the subsurface hydrogeologic system to determine the nature and degree of interaction between that system and mining. Applications of these investigations have included: pre-mining assessment of hydrogeologic impact for permitting and hydrogeologic reclamation planning purposes; assessment of probable mining conditions beneath stream valleys, and impact of mining upon the stream; post-mining evaluation of stream-crossing impacts; assessment of impact to domestic water supplies; evaluation of conditions to

be encountered in shaft and slope construction; and remediation of drainage impacts from flooded underground workings and/or surface disturbed areas.

Hydrogeologic evaluation begins with detailed geologic evaluation of the subsurface from cores and geophysical logs to identify fractures, evidence of weathering, and aquifer or aquitard potential of the various strata. MM&A maintains comprehensive geophysical logging capabilities, including acoustic televiewer, borehole video camera, and fluid conductivity/temperature probes to assist in hydrogeologic investigations. Hydrogeologically important strata are delineated in maps and cross-sections, and structural influences are identified. Photolineament analysis is employed to identify potential fracture traces that may enhance hydrogeologic interactions with the mine.

Subsurface hydrogeologic conditions are assessed using monitoring wells and piezometers to confirm ground water flow paths, horizontal and vertical gradients, and degree of intercommunication between horizons. Aquifer conductivity is evaluated by means of in-situ pressure tests ("packer tests"), aquifer pumping tests, and slug tests. From these data, flow nets and hydrogeologic models are constructed to define the hydrogeologic regime, and the effects of mining upon the regime are evaluated. MM&A maintains in-house aquifer testing and well installation capabilities.

## MONITORING

Monitoring provides early detection of impacts resulting from mining and quarrying so that corrective action can be taken if needed. Monitoring also provides evidence of whether impact has occurred. A prerequisite for a meaningful, defensible monitoring program is an understanding and delineation of hydrogeologic controls, flow paths, and flow rates, and interactions between the subsurface and surface components of the hydrogeologic regime. MM&A hydrogeologists are experts in monitoring system design and installation, employing scientific understanding and modeling of the hydrogeologic system as the basis for monitoring system development.

## WATER SUPPLY DEVELOPMENT

MM&A assists industry in the selection and development of ground water supplies for industrial and domestic use. Evaluation of potential ground water sources involves understanding of ground water movement and flow paths, and the controls on both quantity and quality imposed by geologic factors such as rock type, structural attitude, occurrence of fractures, and recharge/discharge relationships within the hydrogeologic system. MM&A employs sound geological, geophysical, and hydrogeological techniques to develop such understanding.



## **MINE INFLOW AND CONTROL**

Our hydrogeology staff is proficient in predicting, identifying causative factors, and developing mitigation, control, and handling means for waters encountered in surface mining and quarrying operations, underground mines, and slope and shaft facilities for mine access. We have developed many pregrouting and grouting plans that have proven effective in preventing unmanageable water inflow to mines in shallow overburden settings beneath streams, while affording continuing function of aquifers and stream underflow zones. We have assisted numerous clients in the application of water control measures in slopes and shafts, and in predicting where such measures will be needed prior to construction.

## **MONITORING OF MINE, QUARRY OR CONSTRUCTION IMPACT**

MM&A hydrogeologists are industry leaders in monitoring applications, from initial conceptual modeling to system design to statistical and other analysis of monitoring results. Our monitoring designs are based on understanding water movement controls at each site, and typically meet with ready approval of regulatory reviewers. Evaluations of results consider not only the hydrogeologic and operational factors, but also entail sound statistical and/or trend analysis approaches.

## **MITIGATION OF HYDROGEOLOGIC IMPACT**

Any significant ground disturbance could exert some influence on hydrologic conditions at or near the point of disturbance. MM&A can evaluate which influences may occur from a proposed operation, and which impacts have or have not resulted from previous or existing operations, through sound application of scientific principles.

## **ACID MINE OR METAL-RICH DRAINAGE PREVENTION**

MM&A assists clients in delineating acid-producing materials that may be encountered in mining, and in designing handling and disposal approaches to prevent acid drainage. We also assist clients in determining appropriate treatment techniques to mitigate poor-quality drainage. Our understanding of hydrogeologic controls on drainage degradation and migration has led to effective alternative mitigations, preventing water quality impacts and removing the need for ongoing treatment.

## **STREAM AND WETLAND MITIGATION/RESTORATION**

MM&A's hydrogeologists, hydrologists, civil engineers, and biologists work as a team to determine stream mitigation requirements and design restoration programs.

# ENVIRONMENTAL

## SITE INVESTIGATION AND REMEDIATION

MM&A's scientists and engineers use cost-effective, focused investigations to design remedial programs that consistently meet our clients' needs. These projects often involve regulatory compliance, site closure, redevelopment and litigation support. We offer the following services:

- Negotiating Site Enrollment in Applicable Local, State or Federal Regulatory Programs
- Environmental Site Assessments and Environmental Impact Assessments
- Remedial Investigations and Feasibility Studies
- Multimedia Sampling, Analysis and Monitoring
- Light Non-Aqueous Phase Liquid (LNAPL - Fuels and Fuel Mixtures) Mobility Studies
- LNAPL Recoverability Modeling and Assessments
- Contaminant Fate and Transport Modeling
- Ecological and Human Health Risk Assessments
- Development of Risk-Based Cleanup Goals
- Geographic Information Systems (GIS)
- Litigation Support and Expert Witness



MM&A routinely employs innovative investigative technologies and successfully navigates local, state and federal regulatory frameworks to bring sites into compliance. In many cases, we have obtained site closures. Specific investigative technologies include:

- Light-induced Fluorescence (LIF) Spectroscopy
- Membrane Interface Probe (MIP) Investigations
- Soil Conductivity and Hydraulic Profiling Studies
- Non-Aqueous Phase Liquids (NAPL) Fluid Mobility Investigations
- Portable X-Ray Fluorescence (XRF) Spectroscopy
- Immunoassay Analyses
- Surface and Downhole Geophysical Investigations

In the last decade, a systematic shift towards risk-based cleanup standards has altered the regulatory framework at the local, state and federal levels. The ability to develop site-specific remedial goals provides standards protective of human health and the environment while greatly diminishing the burden on business and industry. Using the latest toxicological data, MM&A's scientists have prepared site-specific risk assessments and have developed site-specific remedial goals using Risk Assessment Guidance for Superfund (RAGS) as well as state-mandated risk assessment protocols, thereby matching the intended property use with future exposure scenarios.

Because site closure is not always attainable through human health and ecological risk analysis, MM&A engineers can design the appropriate cost-effective remedy to address virtually any contaminant in a variety of environmental media. Our geologists and hydrogeologists provide crucial information to the engineering team regarding free-phase and dissolved-phase contaminant mobility to affect an appropriate design, facilitating closure within a reasonable time frame. Our expertise in remediation design includes the following technologies:

- Practicable LNAPL and DNAPL Recovery
- Excavation and Off-site Disposal
- In-situ and Ex-situ Bioremediation and Phytoremediation
- Chemical Destruction (in-situ chemical oxidation/reduction)
- On-Site Thermal Treatment
- Capping in Place
- Pump and Treat
- Vapor and Fluid Extraction
- Encapsulation
- On-Site Landfilling/Management
- Monitoring of Natural Attenuation (MNA)
- Use of Institution Controls

## ENVIRONMENTAL COMPLIANCE

MM&A's strength in environmental compliance lies in helping our clients foresee regulatory requirements before they become management issues.

Our success in serving energy, transportation, and government sector clients gives MM&A the ability to assist in managing environmental requirements for any large corporation with numerous facilities throughout a broad geographic area. MM&A's staff researches and anticipates the regulatory requirements that arise from facility operation, property acquisition or transfer, building, repair and renovation of structures. If an emergency arises, we quickly respond to our clients with the appropriate support.

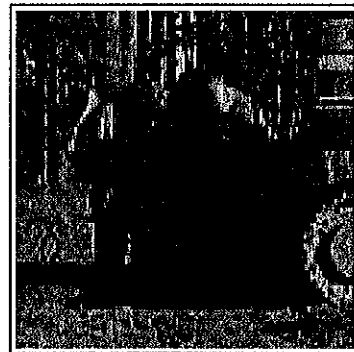


Each action our clients take potentially triggers another environmental challenge. Accordingly, we deliver comprehensive solutions. Our track record proves it. Since 1998, MM&A has prepared and updated over 5,000 plans and permits for our clients. Our extensive history of handling compliance-related issues includes:

- Storm Water Pollution Prevention Planning and Permitting
- Spill Prevention Control & Countermeasures (SPCC) Assessments and Plans
- Oil Discharge and Contingency Assessments and Plans
- Facility Response Planning
- Waste Management and Reduction
- Sediment & Erosion Control Planning & Permitting
- National Environmental Policy Act Compliance
- National Pollution Discharge Elimination System
- Environmental Compliance Audits
- Reclamation Liability
- Environmental Site Assessments
- Wetland Delineation
- Noise Assessments

## VOLUNTARY REMEDIATION/BROWNFIELD REDEVELOPMENT

Over the last decade and a half, state Voluntary Remediation Programs (VRP) have directed industry toward site closures with minimal regulatory oversight. MM&A has hands-on experience guiding companies through VRP programs in numerous states and acquiring certificates of completion. MM&A maintains the necessary licenses and credentials to perform work under a variety of state programs. VRP services routinely offered include:

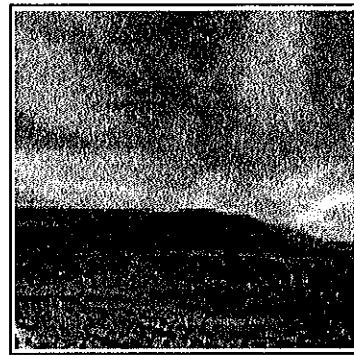


- Negotiation of Consent Agreements
- Selection or Creation of Remediation Goals Based on Intended Property Use
- Preparation of Program-Specific Plans and Documents
- Preparing Public Notices and Conducting Public Meetings
- Obtaining Covenants or Certificates of Completion

## REAL ESTATE SERVICES

MM&A has a proven track record working directly with real estate interests and real estate transactions. Whether a client is acquiring or selling property, or simply managing real estate assets already in possession, we can provide support. Our experience ranges from environmental due diligence for properties the size of one acre or less to those upwards of 100,000 acres (timber and mining properties). Over the last decade, MM&A has assisted clients with real estate management at hundreds of facilities. These services have included:

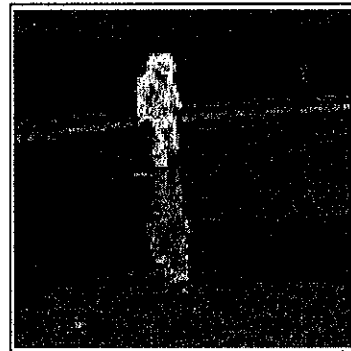
- Performing Due Diligence Assessments in Accordance with ASTM Standards
- Performing Environmental Audits of Leased Property
- Assisting Lessees in Becoming Compliant with Environmental Regulations
- Reviewing Due Diligence Audits and Investigations Performed by Other Consultants to Confirm or Refute Findings
- Performing Corrective Actions to Facilitate Property Transactions
- Supporting Redevelopment and Sale of Property under Brownfield and State Voluntary Remediation Programs
- Evaluating Potential Impact to Natural Resources



## EMERGENCY RESPONSE

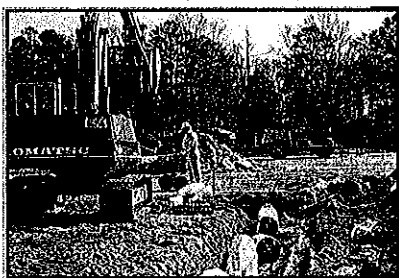
MM&A's Bluefield and Ashland, Virginia offices provide emergency response services for petroleum or hazardous materials releases. From these offices, we can respond to emergency calls anywhere in Virginia and much of Appalachia within one to three hours. MM&A's emergency response team not only performs first response and cleanup, but also provides incident managers who act as the clients' liaison with on-scene agencies. In many instances, aggressive short-term remedial actions guided by these environmental professionals can minimize long-term liability and eliminate the regulatory "red tape" commonly associated with environmental remediation. MM&A emergency responders have experience in the following service areas:

- HAZMAT Spill Response and Incident Management
- Emergency Response and Containment
- Site Cleanup and Restoration
- Hazardous Materials Testing, Management and Disposal
- Level A and B Personal Protective Equipment (PPE)
- Regulatory Negotiations and Site Closure
- Litigation Support for Insurance Claims
- Post ER Site Characterization and Restoration



MM&A's environmental professionals are HAZWOPER trained. Those involved in emergency response have received additional Haz-Mat response training.

## ASBESTOS, LEAD, RADON & MOLD



### ASBESTOS

MM&A maintains licensed asbestos inspectors, management planners, and project designers in Virginia, West Virginia, North Carolina, and South Carolina. MM&A performs all asbestos work in accordance with NESHAP and AHERA regulations. All asbestos personnel attend routine refresher courses and training seminars to stay current on new regulations and technologies. MM&A provides turnkey asbestos project management using our network of certified and licensed abatement contractors.

### LEAD

MM&A provides lead-based paint (LBP) services for inspections, risk assessments, abatement and training. Our experience with LBP includes inspection of residential and commercial buildings, water tanks, bridges, and superstructures; we provide turnkey LBP work from inspection to abatement, including the repainting or demolition of a structure. We also offer lead ballistic material remediation from firing range media, including both indoor and outdoor ranges. MM&A provides cost-effective controls and environmentally sound practices to recycle and dispose of lead-impacted materials.

### RADON

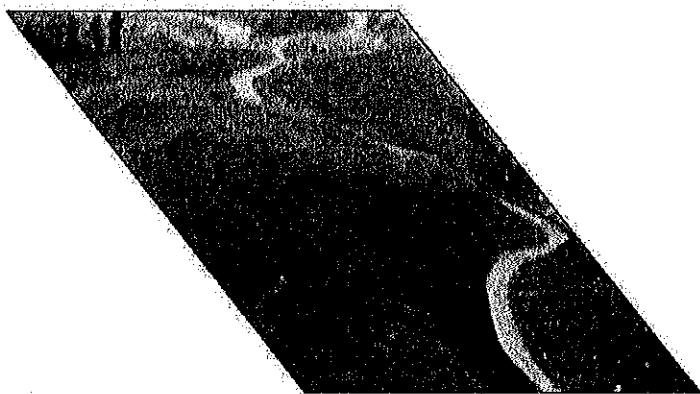
MM&A has on staff Radon Measurement Specialists and Radon Mitigators certified by the National Radon Safety Board (NRSB). Since the EPA stopped the Radon Management Proficiency (RMP) program, the accreditation process was transferred to two national trade organizations, NRSB and National Environmental Health Association (NEHA). NRSB certification is recognized by most State Radiological Health Boards. MM&A personnel attend 16 hours of

biannual recertification training for each discipline. MM&A mitigation personnel are adept at creating aesthetic solutions to any radon problem in a home or commercial structure.

#### **MOLD INVESTIGATIONS**

MM&A develops and implements successful strategies for evaluating residential and commercial structures to determine the origin, cause, effect, and extent of mold growth. Our success lies in relating mold conditions to specific water damage incidents. These investigations combine detailed data accumulation, sampling of indoor contaminant when necessary, and thorough analysis of all information obtained. Following the evaluation, recommendations for remediation can be provided. Regarding analytical services, MM&A contracts only with third party laboratories and works solely with those considered leaders in the microbiology field. Our staff includes members of the Indoor Air Quality Council who continuously review new developments in IAQ investigations. MM&A's goal is to provide our clients the technical support to assess and properly address environmentally sensitive issues, while minimizing the potential for costly exposures and/or litigation.

## **MINING PROPERTY ACQUISITIONS - PHASE I ESA**



MM&A prepares Phase I Environmental Site Assessments (ESA) for mining properties and related facilities, modified specifically to address those unique mining-related issues of surface reclamation and surface and ground water. The purpose of a modified Phase I ESA is to review previous and current practices at the mining site, material handling facility, coal preparation or mineral processing plant. The Phase I ESA helps to determine if any operations or activities have created a recognized environmental concern on the property that would not meet federal, state, and local regulations, and/or be a potential threat to the environment or the surrounding population in years to come.

The assessment is one of several tasks MM&A addresses in its "due diligence" activities prior to an intended joint venture or acquisition. A reserve audit and an operations overview are usually but not always conducted concurrently with the ESA, and are reported under separate cover. MM&A is generally asked to complete the ESA in less than one month, except for very large properties involving multi-state activities.

To meet the pressing schedule associated with the entire due diligence process, MM&A typically partitions its assignment into the following three areas for coal mining properties:

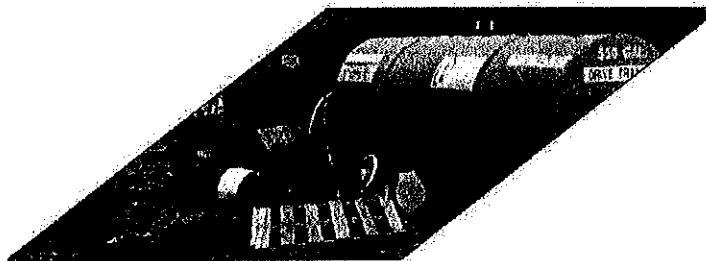
- Surface Coal Mining and Reclamation Act (SCMRA)-Related Issues
- Environmental Protection Agency (EPA)-Related Issues
- Water Treatment and NPDES Issues

The investigation typically addresses the results of an expedited field reconnaissance of operations, conducted to identify any readily discernible and reasonably ascertainable environmental conditions. The mining and reclamation area accommodates a review of regulatory compliance issues relating to state- or federal-sanctioned (via approved permits and licenses) activities conducted by the operating company, its agents, or its contractors. In the EPA arena, particular emphasis is directed to a preliminary assessment of the property, and to the identification of chemical usage, petroleum spills, contamination, and/or storage issues that may require cleanup under regulatory authority. The final area deals with ground and surface water treatment, and whether water treatment activities impact the cost and viability of future mining operations. The hydrology of the ground water and surface water regimes is evaluated during field reconnaissance.

The ESA report prepared by MM&A addresses SCMRA-related issues, EPA-related issues, water treatment, and NPDES issues. Potential environmental issues including hazardous chemicals such as perchlorethylene and waste oil (usually found at the laboratory and shop facilities, respectively) are identified. The status of any contractor's environmental practices is compared to industry practice.

## RECLAMATION LIABILITY DETERMINATION

The Federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) requires that land disturbed by surface mining or by the surface effects and facilities of underground mining be restored to its pre-mining condition or an "equal or better economic or public use." MM&A identifies outstanding reclamation liabilities for mining operations based upon site reconnaissance, permit evaluations, analysis of aerial photographs, and performance reviews. The reclamation liability determination is prepared in accordance with Federal Accounting Standards Board (FAS 143) and includes costs associated with restoration of the land to the approximate original contour, unless waived, and the successful establishment of the approved vegetative cover. Each reclamation assessment performed by MM&A is unique and site specific, taking into account structures, permit variances (where applicable), drainage, and sediment control systems. The site is evaluated with respect to the mine plan, the local geography and geology, and the approved post-mining land use. Financial considerations such as abatement of violations, water supply replacement, surface damage repair, and perpetual water treatment are identified. Issues specific to each state, permit, and operator are examined.



MM&A assembles a team of experienced engineers, geologists, and scientists to complete the reclamation liability determination. Representatives of regulatory agencies with knowledge of or authority over the subject site are routinely interviewed. Pending enforcement issues and appropriate corrective measures are identified.

The reclamation liability determination will provide an estimate of present and future financial responsibilities, which are suitable for the following:

- Determination of the Market Value of a Property
- Preparation of Mine Plans and Cash Flow Projections
- Inclusion on the Corporate Balance Sheet as an Asset Retirement Obligation

The reclamation liability determination may be performed as an independent analysis or may be included as part of a Mine Environmental Site Assessment.

## MINING & RECLAMATION PERMITTING

Changing regulations and increasing environmental laws and constraints are challenging the mining industry. This is occurring even though the mining industry has an exceptional record of diligently protecting the environment while extracting the resources necessary to sustain the economy of our country.

MM&A's staff of geologists, hydrogeologists, mining and civil engineers, environmental scientists, biologists, chemists, and wetlands specialists possess the requisite skills and knowledge to assist the mining industry during this time of changing laws and increasingly complex environmental regulations. The collective expertise of these professional disciplines has been combined into a mine-permitting unit within MM&A.

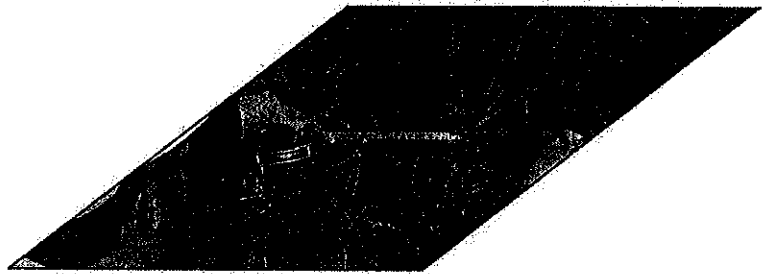
MM&A offers complete surface and deep mine permitting services to the coal, aggregates, and mineral mining industries. Our qualified professionals have significant experience in the permitting of surface mines, refuse disposal facilities, deep mines, and associated mining-related facilities.

## PERMITTING AND RELATED SERVICES

- Surface and Deep Mine Permitting
- NPDES Permitting
- U.S. Army Corps of Engineers Permitting
- Coal Refuse Disposal Design and Permitting
- Mine Siting and Development Studies
- Mine Planning and Design
- Surface Water Runoff Analysis (SWROA)
- Stream Mitigation Restoration Design
- Geologic and Hydrogeologic Investigations
- Probable Hydrologic Consequences (PHC) Evaluations
- Hydrologic Reclamation Plans (HRP)
- Slope Stability Analysis
- Blasting Designs and Surveys
- Mine Subsidence Evaluations and Control Plans
- Valley and Hollow Fill Design
- Erosion and Sediment Control Design
- Mine Drainage Control and Treatment Design
- Wetland Delineation and Stream Determination
- End-of-Mine Closing Cost Estimates
- Expert Witness/Litigation Support Services

## MANAGEMENT OF IDLE MINE SITES

A trend in the industry indicates many mining interests are focused on both active operations and developing new projects, while facing the challenges associated with idle mine property management. MM&A is uniquely suited to offer environmental and engineering services to assist clients with these responsibilities in a cost-effective manner, optimizing the use of the mine operators' internal professional resources on higher priority objectives.



With a skilled staff of environmental scientists, biologists, hydrologists, wetlands specialists, foresters, engineers and biologists experienced from both regulatory and operational perspectives, MM&A has created a team that can handle post-mining management needs to efficiently expedite SMCRA bond release.

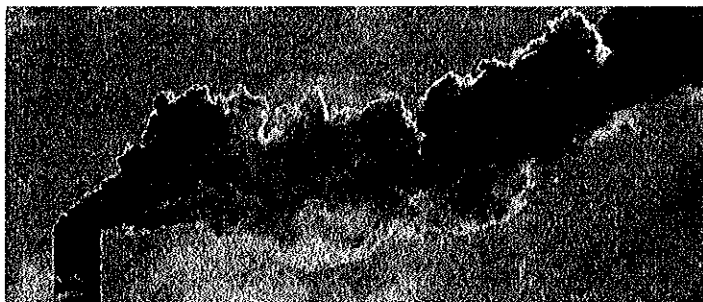
MM&A's staff is always available to assist coal operators with active mine design, permitting, and reclamation services. Our personnel can also assist clients with the identification and placement of spoil material, grading techniques, and approved ground cover applications necessary to achieve optimum site conditions. This includes the successful establishment of trees and shrubs required for final bond release in accordance with the approved post-mining land use.

### ENVIRONMENTAL MANAGEMENT SERVICES OF BONDED MINE PROPERTIES SERVICES INCLUDE:

- Submitting Phase I, II, and III Bond Release Packages to state regulatory agencies
- Performing field inspections on a routine basis to monitor ground cover along with tree-shrub survival and development
- Providing supplemental seeding or planting as needed to comply with post-mine and use criteria of forest, land, or fish and wildlife habitat
- Evaluating and identifying any problems associated with a mine site
- Maintaining and repairing any sub-standard erosion control structures, and regrading slopes or roads during the bond maintenance period
- Meeting with inspectors and other regulatory personnel on behalf of the client regarding any post mining issues
- Managing post-mining water quality treatment facilities
- Compiling and submitting NPDES monitoring reports
- Providing sediment control structure and valley fill certifications, as required
- Seeking approval from state regulatory authorities for minor revisions to existing permits on behalf of the client

# CARBON MANAGEMENT

MM&A's Carbon Management Division (CM) provides a wide range of consulting, engineering and environmental services. Committed to achieving the highest standards in carbon-related projects, MM&A's staff of 200 professional geologists, hydrogeologists, engineers and scientists work in tandem with clients to identify needs, analyze opportunities, prevent problems and respond to the constantly evolving carbon market.



In an increasingly "carbon-conscious" society, our awareness, management and growth will be measured by our carbon footprint or output. As power producers and their fuel suppliers, manufacturers and government agencies fight the battle of carbon reduction, one of the essential tools will be capture and storage (e.g. sequestration) of carbon. From business and engineering managers to legislators and end users, understanding GHG emissions and strategies will encourage open dialogue and better understanding of the implications of carbon management.

By providing a comprehensive set of services, MM&A makes it possible for its clients to minimize costs associated with permitting and regulatory compliance issues, reduce environmental risks, and maximize investments in new or existing operations or ventures.

The Carbon Management division of MM&A is a national leader and a significant international participant in areas including GHG inventorying, reporting and reduction, carbon capture & storage (carbon sequestration) and carbon off-set credit verification. Our talented and experienced staff, combined with the pool of support services at MM&A strive to deliver accurate and relevant analysis, consultation and recommendations to our clientele.

## CARBON CREDIT VERIFIER

MM&A is approved by the Chicago Climate Exchange (CCX) as a qualified, independent verifier for carbon credits for a variety of markets including coal mine methane (CMM) and abandoned mine methane (AMM) projects. CCX is the world's first legally binding rules-based greenhouse gas emissions trading system. Carbon credits can be earned (and traded on the exchange) for documented reductions in methane emissions occurring during the mining process if the gas that would have otherwise been emitted to the atmosphere is rather (1) sold as high quality gas on a natural gas pipeline system, or (2) used as mid-quality gas in electricity generation.

In order to qualify for the carbon credits, the methane extraction technique must first be approved for use by the Mine Safety and Health Administration (MSHA) and meet the following eligibility requirements:

### PRE-MINING ACTIVITIES

- CMM collected from wells drilled after January 1, 1999, and mined around or through after January 1, 2003, can be registered and traded on the CCX up to the sales limits sets for years 2003-2006 (Phase I reporting).
- CMM collected from wells drilled after January 1, 1999, and mined around or through after January 1, 2007 can be registered and traded on the CCX (Phase II reporting).

### POST-MINING ACTIVITIES

- CMM from any well drilled at any time, collected after January 1, 2003, which is processed/refined through a low quality gas facility, constructed after January 1, 1999, or utilized in a low quality combustion process, constructed after January 1, 1999, can be registered and traded on the CCX up to the sales limits set for years 2003-2006 (Phase I reporting).
- CMM from any well drilled at any time, collected after January 1, 2007, which is processed/refined through a low quality gas facility, constructed after January 1, 1999, or utilized in a low quality combustion process, constructed after January 1, 1999, can be registered and traded on the CCX (Phase II reporting).

MM&A is currently in the process of verifying CMM carbon credits for mining operations located in the Appalachian Basin and the Black Warrior Basin for a U.S.-based mining company. MM&A has also been approached by a number of other firms to potentially verify CMM carbon credits from mining operations located in the U.S. and Europe. MM&A is well positioned to assist in these types of projects due to our extensive experience in mining engineering,



coalbed methane (CBM) production, and carbon sequestration technologies. We look forward to assisting mining and CBM owners and producers to verify the carbon credits eligible through the CCX trading system.

## GREENHOUSE GAS INVENTORIES AND REDUCTION

MM&A's staff has considerable experience in the accounting, collection, assembly and reporting of GHG emissions. This experience is translated from the reporting to Reduction Plans for our clients allowing goals to be set, met and exceeded, affording carbon off-set trading options. MM&A has worked with a wide variety of protocols including WRI, WBCSD, or CA General Reporting Protocol. With the impending regulation from the USEPA's Mandatory GHG Reporting Rule (MRR), the option to participate in the collection and reporting of GHG emissions is soon to be a thing of the past. The new rules require some two dozen industries to provide specific reporting of GHG emissions to the government on a yearly basis. MM&A's staff has reviewed and evaluated the impact of this new rule and we have the cutting-edge experience to offer compliance services to all of MM&A's clients

MM&A, through our Carbon Management Division, offers categorized GHG services in the following areas:

- Carbon Footprint Analysis
- Greenhouse Gas (GHG) or Emission Inventories (1605b Format)
- Inventory Reduction Plans (IRP) and Inventory Management Plans (IMP)
- Project Off-Set and Aggregation Services

## US EPA METHANE-TO-MARKETS PROGRAM

MM&A participates in the USEPA's Methane-to-Markets Program providing Coal Mine Methane (CMM) reduction and guidance documentation for the coal mining market in China. MM&A is assessing multiple drilling techniques to produce methane in advance of mining. The purpose of the project is to define improved methods for recovery of CBM and CMM in regions previously thought to hold little promise for methane production.

## CARBON CAPTURE & STORAGE

The Carbon Management Division is also a prime contractor and lead researcher for the Southern States Energy Board's (SSEB) management of the United States Department of Energy's (USDOE) Southeastern Regional Carbon Sequestration (SECARB) Central Appalachian coal seam project. The objective of this program is to assess and verify the sequestration capacity and performance of mature CBM and enhanced CBM reservoirs in the region.

Currently, 1,000 tons of CO<sub>2</sub> has been injected into a CBM production well. This test site is being monitored at depth and on the surface for gas migration. Additionally, MM&A is assessing the feasibility for a large scale injection project involving stacked reservoirs (unmineable coalbeds, depleted gas producing formations, and saline aquifers).

The carbon capture and storage project is receiving industry support from coal and gas producing companies, and large land- holding companies.

## OVERVIEW OF CARBON CONSULTING SERVICES

- Greenhouse Gas Inventory & Reduction
- Carbon Credit Verification
- Off-Sets and Aggregation Services
- US EPA Methane-to-Markets Program
- Carbon Capture & Storage (Sequestration)
- Geologic Evaluations
- Conventional Oil and Gas
- Coalbed Methane
- Organic Shales
- Coal Mine Methane
- Due Diligence
- Reservoir Engineering
- Economics and Reserves
- Production Engineering
- Field Services

# EXPERT WITNESS

) MM&A is a member of the Eastern Mineral Law Foundation, and our professional geologists and engineers routinely provide expert witness services for private industry and state and federal government agencies. MM&A professionals have provided depositions, court exhibits, and testimony to assist with case presentations in the areas of hydrogeology; mineral property evaluations; mining; mineral condemnation; insurance and lost coal cases; geotechnical engineering; and in subsidence, construction, and accidents requiring engineering expertise. MM&A can develop court exhibits, create video productions, and perform still frame photo editing. Expanding the field of visual presentations, MM&A offers sophisticated 3-D graphics and animation. Using cutting-edge technology in software and hardware, MM&A can produce broadcast-quality video and photo-realistic computer-generated animation and still frames. Supported by strong in-house graphics capabilities, our professionals deal with complex scientific and engineering issues in a manner that aids the layman in understanding the factors involved and the basis for the conclusions. MM&A engineers have provided expert witness testimony in cases involving:

- Lost Coal Claims
- Fatalities/Serious Injuries
- Blasting Damage
- Water Loss Damage
- Subsidence Damage
- Mine Fires and Explosions
- Equipment Loss
- Roof Collapse
- Reserve Estimation
- Longwall Entrapment
- ) • Business Interruption
- Mine Property Damage
- Legal Suits and Labor Costs
- Mineral Condemnation

We have a proven track record as expert witnesses in both state and federal courts.

# GEOLOGICAL LOGGING SYSTEMS

Geological Logging Systems (GLS), a division of MM&A, began providing borehole geophysical logging services in 1975. GLS senior staff have nearly 100 years of combined logging experience and adhere to the safety regulations required by the Nuclear Regulatory Commission. A large fleet of Logging Units serves the Appalachian and Midwestern coal fields as well as other regions. Safety classes are attended on a regular basis and a radiation safety officer oversees activities that require use of licensed materials in the logging process. Our safety record and OSHA ratings are well above industry standards and we value customer service as one of our major assets. We continually expand our services to meet the requirements of a large client base.

GLS personnel can assist in determining which log responses are best suited for various applications. Below are types of logs that GLS can provide:

- Density (High Resolution)
- Density (Bulk or dual spaced)
- Natural Gamma
- Electromagnetic Flowmeter
- Acoustic Televiwer
- Borehole Deviation /Orientation, Magnetic and Gyroscopic Orientations
- Borehole Video Camera
- Fluid Conductivity
- Neutron
- Various Resistivity Logs
- Temperature
- Spontaneous Potential
- Caliper
- Induction
- Resistance (Single Point)

