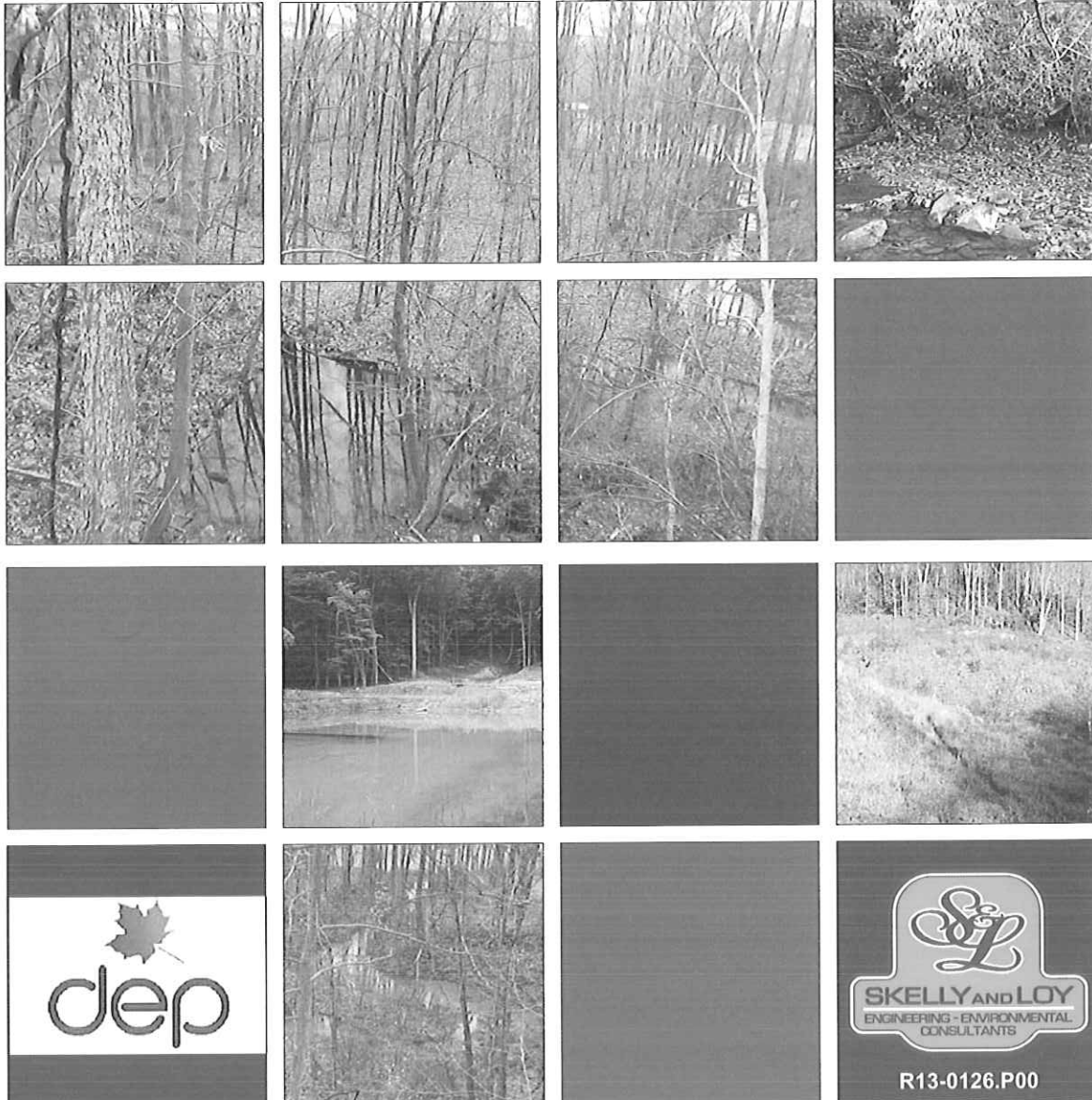


Expression of Interest #DEP16077

Professional Engineering Design Services and Construction Monitoring Services at the Amigo Portals Project, Raleigh County, WV

March 11, 2013



Prepared For
West Virginia Department of Environmental Protection
Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130
Charleston, WV 25305-0130

Prepared By
Skelly and Loy, Inc.
6615 West Main Street
Wise, VA 24293

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AML Consultant Qualification Questionnaire

AML and Related Project Experience Matrix

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MISSION STATEMENT

*Skelly and Loy is determined
to exceed total client
expectation in the
performance of quality
engineering and
environmental services.*

CORE VALUES

*To Produce Quality Work
On-Time & Within Budget
To Keep Staff Members
Gainfully Employed
To Earn A Reasonable Profit*

*At Skelly and Loy, you will
find extraordinary people.
And you can expect
extraordinary results.*

AML Consultant Qualification Questionnaire



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

Attachment "B"

PROJECT NAME Engineering Design Services and Construction Monitoring Services at the Amigo Portals Project		DATE (DAY, MONTH, YEAR) 8, 3, 13		FEIN 25-1645583	
1. FIRM NAME Skelly and Loy, Inc.		2. HOME OFFICE BUSINESS ADDRESS 449 Eisenhower Boulevard, Suite 300, Harrisburg, PA 17111		3. FORMER FIRM NAME	
4. HOME OFFICE TELEPHONE 717-232-0593	5. ESTABLISHED (YEAR) 1969	6. TYPE OWNERSHIP Individual X Corporation Partnership Joint-Venture		6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) YES X NO	
7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE					
ADDRESS		TELEPHONE		PERSON IN CHARGE	
6615 West Main Street Wise, VA 24293		276-328-3128 FAX 276-395-1310		Rex A. Peppler, P.E.	
				NO. PERSONNEL 6	
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM					
8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS					
Sandra Loy Bell, Chief Executive Officer John W. Gunnett, PG, President & Chief Operating Officer Mark A. Williams, Executive Vice President, Engineering Services 449 Eisenhower Boulevard, Suite 300 Harrisburg, PA 17111 717-232-0593 Robert E. McClure, Executive Vice President, Environmental Services 19741-B Leitersburg Pike Hagerstown, MD 21742 301-766-4236					
9. PERSONNEL BY DISCIPLINE => Numbers reflect participating Skelly and Loy, Inc. offices. Numbers in parentheses () reflect personnel in entire company.					

0 ADMINISTRATIVE (18) 0 ARCHITECTS (0) 0 BIOLOGIST (8) 1 CADD OPERATORS (7) 0 CHEMICAL ENGINEERS (0) 0 CIVIL ENGINEERS (7) 1 CONSTRUCTION INSPECTORS (2) 0 DESIGNERS (0) — DRAFTSMEN	0 ECOLOGISTS (0) — ECONOMISTS (0) 0 ELECTRICAL ENGINEERS (1) 0 ENVIRONMENTALISTS (23) 0 ESTIMATORS (1) 0 GEOLOGISTS (7) 0 HISTORIANS (3) 0 HYDROLOGISTS (0)	0 LANDSCAPE ARCHITECTS (1) 0 MECHANICAL ENGINEERS (0) 2 MINING ENGINEERS (5) — PHOTOGRAMMETRISTS 0 PLANNERS: URBAN/REGIONAL (3) — SANITARY ENGINEERS (0) 0 SOILS ENGINEERS (1) 0 SPECIFICATION WRITERS (1)	0 STRUCTURAL ENGINEERS (1) 1 SURVEYORS (2) 0 TRAFFIC ENGINEERS (0) 1 OTHER (47) 6 TOTAL PERSONNEL (130)
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 2 *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			

11. OUTSIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Qualification Questionnaire".

[illegible]

12. A. Is your firm experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering?

X YES Description and Number of Projects: Skelly and Loy has broad and diverse experience in all aspects of mine closure projects. This experience has included dozens of recent projects as well as approximately 70 other projects dating back to the early 1970's associated with abandoned surface and underground mines, wet mine seal design, reclamation planning, grading plans, and development of bid documents. Our experience includes soup to nuts ability from evaluation, to design and bid specifications, and through construction inspection. Skelly and Loy is a recognized leader in mine planning and abandoned mine reclamation providing mining and civil engineering, environmental, and water resources including passive and active treatment of acid mine drainage to the mining industry, state agencies, and federal government.

Please refer to our list of projects included herein. Specifically our work for Virginia AML on the Pole Bridge Road project was focused on reclamation, subsidence, and AMD treatment for an abandoned mine site. Our permitting for Circle L Land Company on their Red Ash strip mine and Gob Pile Reclamation project involved two targeted areas: re-mining of an old strip pit and reclamation of several old gob piles on the same property. Permitting was obtained for the gob reclamations and the client has been working on this project. The re-mining strip permit is anticipated to be approved by March 31, 2013 and the client plans to begin work immediately.

NO

B. Is your firm experienced in Soil Analysis?

X YES Description and Number of Projects: Soil analysis is an integral part of many abandoned mine reclamation projects conducted by Skelly and Loy. These soil analyses typically include evaluation of soils for wetland determination to soil chemistry evaluation related to revegetation requirements. From this standpoint, soil analysis is a component of nearly every abandoned mine land project Skelly and Loy completes and every newly permitted surface mining site. Additionally, our engineers and technicians have experience at soil testing and evaluations for foundation and fill designs and for many typical construction projects.

NO

C. Is your firm experienced in hydrology and hydraulics?

X YES Description and Number of Projects: Skelly and Loy has completed many hydraulic and hydrologic engineering service for the mining industry and governmental agencies. Skelly and Loy is well versed in computer applications and routinely uses computer software applicable to hydrologic and hydraulic engineering, including HEC-1, HEC-2, HEC RAS, HEC HMS, ARCINFO, as well as GIS, CADD, SedCAD, and Skelly and Loy's proprietary software.

NO

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

YES Description and Number of Projects: _

X NO Skelly and Loy does not have Aerial Photography capabilities, however; we have a working agreement with Tuck Mapping Solutions, Inc., to provide this service.

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

X YES Description and Number of Projects: Skelly and Loy has completed many projects for Pennsylvania Department of Environmental protection that included evaluation of mining impacts to private wells, determined that the mining impacts were caused by pre-SMCRA mining activities based on evaluation of aerial photos, and completed the design of a water line extension to serve the impacted homes. Skelly and Loy uses AMDTreat and the Geochemical modeling program, Geochemist Workbench for AMD Treatment Design.

NO

F. Is your firm experienced in Acid Mine Drainage
Evaluation and Abatement Design?

X YES Description and Number of Projects: Skelly and Loy is a national leader in the design of passive treatment systems for Acid Mine Drainage (AMD). Skelly and Loy is a national leader in the design of passive treatment systems for Acid Mine Drainage (AMD). Skelly and Loy staff have completed approximately 100 passive treatment system designs for mining companies, state agencies, and the federal government. Approximately 50 of these designs have gone through to construction in West Virginia, Pennsylvania, Maryland, and Tennessee. A typical project includes evaluation of the mining activity that created the AMD, AMD discharge chemistry and flows, available space to construct a system, projected life of system, projected water quality, and operation and maintenance plans such as the Virginia AML Pole Bridge Road project where drainage was expected and shown to be acidic and Skelly and Loy provided an appropriate design feature to manage the discharge.

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		
Peppler, Rex A.	YEARS OF AML DESIGN EXPERIENCE: 2	YEARS OF AML RELATED DESIGN EXPERIENCE: 18	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 1
Brief Explanation of Responsibilities Mr. Peppler was hired by Skelly and Loy, Inc. in September 2011 to manage the firm's office in Wise, Virginia. He is responsible for the day-to-day operations of the office, staff management, project management, and business development. The Wise, Virginia, office offers engineering design, permitting, computer-aided drafting, surveying, and field inspection work services. The professional engineers and technicians at this location are highly skilled and provide exemplary client services to the coal, utilities, and transportation industries. Mr. Peppler managed projects for clients such as Alpha Natural Resources and Circle L Land - including slope stabilities, drainage, ponds, impoundment inspections, road construction, civil/environmental work; administered coal supply, waste disposal, environmental supervision, and project management functions for American Electric Power; impeccable record with Virginia Dept. of Environmental Quality maintaining air, water, and waste permits for AEP; offered professional design, construction, and project management services as a civil engineer for industrial clients such as utilities, paper mills, contractors, and government entities since 1975. Supported sewer and water projects from commercial to residential in nature; supervised concrete, masonry, steel, and timber construction and inspection services for commercial, industrial, and residential projects in the region.			
EDUCATION (Degree, Year, Specialization) B.S., Civil Engineering, 1975, West Virginia Institute of Technology, Montgomery, West Virginia M.S., Engineering Management, 1991, University of Tennessee, Kingsport, Tennessee			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Professional Engineer, 1993, VA Professional Engineer, 1975, TN Professional Engineer, 1976, WV Professional Engineer, 2012, KY	

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.) Longenecker, Gerald, W.	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 3	YEARS OF AML RELATED DESIGN EXPERIENCE: 3	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 4
Brief Explanation of Responsibilities A licensed Professional Engineer, Mr. Longenecker has 30 years experience dealing with the regulatory approval process in the environmental consulting field. This experience has been gained through the management and technical participation in a broad range of projects including stream restoration, watershed assessments, stormwater management, solid waste handling, industrial and sanitary wastewater treatment, dam safety, water resources engineering, and wetland-related evaluations. As a Vice President of the firm, Mr. Longenecker directs the Environmental Engineering Service Group. RELEVANT TRAINING: Rosgen Level I, "River and Stream Classification/Fluvial Geomorphology Stream Restoration" Short Course, Dave Rosgen, Professional Hydrologist, 1996 Rosgen Level II, "River Morphology and Applications" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997 Rosgen Level III, "River Assessment and Monitoring" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997 Rosgen Level IV, "River Restoration and Natural Channel Design" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997			
EDUCATION (Degree, Year, Specialization) M.S., Agricultural Engineering, 1980, The Pennsylvania State University B.S., Agricultural Engineering, 1979, The Pennsylvania State University			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Professional Engineer, 1985, PA Professional Engineer, 2010, WV Professional Engineer, 1986, NJ Professional Engineer, 1997, MD Professional Engineer, 1988, DE Professional Engineer, 1998, TN Professional Engineer, 1998, NC	

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		
Golkosky, Robert E.	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
	10	43	0
Brief Explanation of Responsibilities Mr. Golkosky is a registered professional engineer with extensive experience in the coal mining industry. He has worked in senior management, operations, engineering, project management, acquisitions and consulting for several major mining and consulting companies. He has provided technical support and expert testimony in several litigation cases. Mr. Golkosky's areas of specialization include international projects, project management/planning, economic evaluations, due diligence, mining engineering, and litigation support services. Mr. Golkosky managed a major coal acquisition for a prominent company in the industry; planning for coal processing and handling, load out, slurry impoundment, and mines for another major producer; performed due diligence, life-of-mine plans, and reserve studies; served in a senior leadership position at several companies; and performed significant mine permitting in the region.			
EDUCATION (Degree, Year, Specialization) B.S., Mining Engineering, 1966, The Pennsylvania State University SOHIO Program for Middle Managers, 1984, University of New Hampshire			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Professional Engineer, 1975, WV Professional Engineer, 2002, VA Professional Engineer, 2002, KY Professional Engineer, 2002, PA Professional Engineer, 2007, IN	

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		
Schmidt, Terry, W.	YEARS OF AML DESIGN EXPERIENCE: 17	YEARS OF AML RELATED DESIGN EXPERIENCE: 22	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities A leading authority on mine reclamation practices including the treatment of acid mine drainage (AMD), Mr. Schmidt has served as Engineer-In-Charge of many assessment and mitigation projects. Mr. Schmidt's responsibilities have included directing the development and implementation of comprehensive field investigations, managing the data evaluation process, determining Best Available Technologies (BAT), developing engineering design packages, obtaining necessary permits, supervising construction inspection activities, and overseeing long-term monitoring and system operation and maintenance requirements. As a result of his extensive experience, Mr. Schmidt has developed a unique understanding of the interrelationships between active and abandoned mine complexes, water quality, particularly pH and elevated metal concentrations, local geology and hydrogeology, and flow rates and their impact on the selection of the most appropriate abandoned mine reclamation practices. In addition to his project responsibilities, Mr. Schmidt is a well-published author on AMD issues. He has presented his technical papers at professional conferences held throughout the United States.			
EDUCATION (Degree, Year, Specialization) M.S. Mining Engineering, 1984, The Pennsylvania State University B.S. Mining Engineering, 1985, The Pennsylvania State University			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS The Society of Mining Engineers of America - Institute of Mining Engineers The American Society for Surface Mining and Reclamation American Institute of Mining Engineers Penn Anthracite American Institute of Mining Engineers Acid Drainage Technology Initiative (ADTI)		REGISTRATION (Type, Year, State) Professional Engineer, 1994, PA Professional Engineer, 1997, NC Professional Engineer, 1995, TN Professional Engineer, 1996, VA Professional Engineer, 1997, MD Professional Engineer, 1997, OH	

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		
Shultz, Bradley, R.	YEARS OF AML DESIGN EXPERIENCE: 9	YEARS OF AML RELATED DESIGN EXPERIENCE: 9	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Mr. Shultz joined Skelly and Loy with a strong foundation of water chemistry and water/wastewater treatment experience having worked for over eight years in the environmental consulting and laboratory industries. As a result, he is adept at assessing mine drainage problems utilizing a watershed approach and relating to the chemistry for treating AMD discharges. During his investigations of various water quality related issues and associated remediation efforts, he has performed water sample collection and analysis, evaluated flow rates, evaluated aeration system and chemical treatment efficiency for hydrogen sulfide odor abatement, tracer studies for water quality and hydraulic evaluations, set-up and maintained databases, performed water quality modeling efforts, and analyzed the results to determine applicable treatment technologies. In addition, he has maintained and monitored the performance of water quality enhancement and treatment systems to ensure compliance with permit requirements as well as optimizing treatment effectiveness.			
EDUCATION (Degree, Year, Specialization) B.S., Biology-with option on Marine/Aquatic, 1993, Millersville University M.E.P.C., Environmental Pollution Control, 2002, The Pennsylvania State University			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Engineer In Training, 2011, PA	

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		
Sturgill, Jr., R.H. (Holland)	YEARS OF AML DESIGN EXPERIENCE: 12	YEARS OF AML RELATED DESIGN EXPERIENCE: 20	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 2
Brief Explanation of Responsibilities As an Engineering Technician, Mr. Sturgill prepares maps, plans, cross sections, and other types of drawings; and drainage, excavation, site plans; and computes earthwork cut and fill volumes; designs drainage structures, valley fills, and roads; assists in preparing permit applications, reserve studies, and other technical reports; and performs GPS, RTK, and conventional field surveys. For more than 27 years, he has been providing various professional services to the mining, oil, and gas industries. As the past owner of a full-service construction company, Mr. Sturgill is also accomplished in construction planning, design, and cost estimation. He has served in various capacities to industries in the region for over 27 years; extensive experience in VA permitting, erosion & sediment control, surveying and mapping, earthwork, and technical reporting. Operated commercial and residential construction and property management business for many years and well versed in construction techniques and cost estimation for projects. Designed site drainage features, septic systems, concrete building slabs and foundations, and masonry work including construction inspection of same for commercial and residential clients throughout the region.			
EDUCATION (Degree, Year, Specialization) A.A.S., Drafting and Design, 1985, Mountain Empire Community College			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

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		
Balthis, Roy, K.	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
	0	30	4
Brief Explanation of Responsibilities Roy Balthis is a Land Surveyor providing support service to the Wise, Virginia office of Skelly and Loy, Inc. In this role, Mr. Balthis' responsibilities include providing field services with complete responsibility to lead survey parties performing boundary surveys, mapping, and gathering data and information to establish plans, cross sections, drainage plans and other engineering and technical documents. His work may also involve measuring volumes for earthwork; stockpile measurements; verifying drainage and structural features; layout and verification of roads, ditches, culverts, and other technical aspects of plans and permits as required by clients of the firm. Mr. Balthis has over forty years of responsible experience in the field of surveying. He has performed work for various entities throughout Southwest Virginia and Eastern Kentucky to the complete satisfaction of municipal, federal, and private clients in the region. He is a respected surveyor who understands all aspects of modern surveying and mapping technology.			
EDUCATION (Degree, Year, Specialization)			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Registered Land Surveyor, Virginia and Kentucky	

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		
White, Darryl, L.	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 4	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Mr. White has four years of experience developing maps and mine plans operations in WV and VA; performed volumetric calculations, grading and drainage designs, coal reserve studies, and pond inspections for certification for various clients in SW Virginia; Assisted with bridge designs and other civil features for clients.			
EDUCATION (Degree, Year, Specialization) A.A.S., Computer-Aided Drafting & Design 2011, Mountain Empire Community College			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

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																										
Lesny, Edward, M.	YEARS OF AML DESIGN EXPERIENCE: 5	YEARS OF AML RELATED DESIGN EXPERIENCE: 10	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0																								
Brief Explanation of Responsibilities Mr. Lesny has a total of 50 years experience in the geotechnical aspects of numerous projects. He also has pre-graduation experience gained through employment with a geotechnical engineering consultant. Mr. Lesny has been involved with the following types of projects: <table border="0"> <tr> <td>High and low-rise buildings</td> <td>Warehouses</td> </tr> <tr> <td>Bridges</td> <td>Highways</td> </tr> <tr> <td>Dams</td> <td>Retaining Walls</td> </tr> <tr> <td>Soil and Rock Cut Slopes</td> <td>Pavement Design</td> </tr> <tr> <td>Waste Treatment Plants</td> <td>Sinkhole Repairs</td> </tr> <tr> <td>Embankment Stability</td> <td>Waste Disposal Permits</td> </tr> <tr> <td>Quarry Permits</td> <td>Reclamation Plans</td> </tr> </table> These projects included the design and/or construction employing the following: <table border="0"> <tr> <td>Spread footings</td> <td>End bearing piles</td> </tr> <tr> <td>Caissons</td> <td>Shoring</td> </tr> <tr> <td>Underpinning</td> <td>De-watering</td> </tr> <tr> <td>Structural fills</td> <td>Blasting</td> </tr> <tr> <td>Rock anchors</td> <td>Friction piles</td> </tr> </table> One of Skelly and Loy's significant projects was for the United States Bureau of Mines (USBOM) in the evaluation of valley fill construction performed in concert with mountaintop removal mining methods. Skelly and Loy was initially contracted to perform engineering/economic evaluations of alternative approaches for construction of valley fills for disposal of excess fill generated during mountaintop removal mining. The investigations identified economic advantages associated with durable rock end-dumped valley fill construction compared with standard haul-and-place procedures. Skelly and Loy's contract was expanded to include in-depth geotechnical investigations related to design criteria for construction of stable durable rock end-dumped valley fills. As the final phases of the project, Skelly and Loy designed and permitted the first durable rock end-dumped valley fill in West Virginia. The research and development contract continued throughout construction of the valley fill and included stability monitoring, environmental monitoring, and documentation of findings. As a result of the firm's efforts, durable rock end-dumped valley fill construction became the standard practice in Central Appalachia due to its proven stability and economic advantages. Mr. Lesney was the Project Engineer for Skelly and Loy on the valley fill projects in West Virginia. He has worked for Skelly and Loy as an employee and a contractor. Over the last six years Mr. Lesny has been employed by several consultants, on a part time basis, to inspect the work performed by drilling contractors. The subsurface investigation work was associated with commercial projects and county or township bridges.				High and low-rise buildings	Warehouses	Bridges	Highways	Dams	Retaining Walls	Soil and Rock Cut Slopes	Pavement Design	Waste Treatment Plants	Sinkhole Repairs	Embankment Stability	Waste Disposal Permits	Quarry Permits	Reclamation Plans	Spread footings	End bearing piles	Caissons	Shoring	Underpinning	De-watering	Structural fills	Blasting	Rock anchors	Friction piles
High and low-rise buildings	Warehouses																										
Bridges	Highways																										
Dams	Retaining Walls																										
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Spread footings	End bearing piles																										
Caissons	Shoring																										
Underpinning	De-watering																										
Structural fills	Blasting																										
Rock anchors	Friction piles																										
EDUCATION (Degree, Year, Specialization) B.S. Civil Engineering, 1962, The Pennsylvania State University																											
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Professional Engineer, 1967, PA Professional Engineer, 2004, MD																									

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

Software: AMDTreat, Geochemist Workbench, CADD, SedCAD,

Survey Equipment:

TOPCON Total Station Model GPT-3200NW with non-prism technology, 1 ea.
GR5 GPS receivers with Real Time Kinematics (RTK) technology, 4 ea.
Prism poles, 2 ea.
Allegro CX Survey Data Collector
Battery Chargers, Trickle Charger
Sokkia Level with Philly and CST level rods
Level/Transit/Tripod/Rod
Measuring Tape, Field, 300'
Metal Detector
Motorola Radios
Philly Stadia Rod
Schoenstedt or LST models Metal Detector (Stick)
Sokkia Level
Survey Rods - 2 each
GPS Data Logger, Static with Tripod, Antenna, and Cables
Trimble R-6 RTK System
GPS, Hand-Held
GST Stadia Rod
Level, Dumpy, and Rod (for surveying elevations)
Level, Laser, Invisible Beam with Tripod, Detector, and Rod
Lietz Transit (CSI) Model 110
Lietz Transit BT-20
Measuring Rod
Sokkia Auto Level C32
Sokkisha Electronic Distance Meter - Red Mini 2 D7017
Sokkisha Theodolite DT-6
Trimble GeoExplorer 6000 XH
Trimble Pro XR Receiver with a Trimble TSCe Datalogger
Tools, Hand (shovels, picks, sledge hammer, post hole digger, rakes, etc.)
Topcon GTS-211D Total Station (EDM)
Tripods - 10 each
Backpack for surveying equipment, 1 ea.
Level/stadia rod, adjustable to 25 ft., 1 ea.
Hand held rechargeable radios, 3 ea.
Tape measure, 300 ft., 1 ea.
Tape measure, 100 ft., 1 ea.
Digital Camera, 1 ea.

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
Red Ash Strip Mine and Gob Pile Reclamation Projects; Application for permit representing lessee to Re-mine Jewell Coal Seam; Buchanan County, VA	Circle L Land Company, Inc. P.O. Box 1244 Raven, VA 24639	Engineering design as well as permitting research and package coordination, composition, and submission to secure a strip mining permit	\$160,000 (fees)	99%
Sugar Cove Gob; Permitting and engineering support for Coal Gob reclamation; Buchanan County, VA	Circle L Land Company, Inc. P.O. Box 1244 Raven, VA 24639	Engineering design and project management support for the client in such activities as obtaining reclamation permit and associated permits with MSHA and VA DEQ (air permit for screening. We have provided additional engineering associated with detailed quality studies and drainage details in order for client to continue operations	\$65,000 (fees)	98%
Middle Creek Gob Pile Reclamation Project; Application for permit representing Lessee for Coal Gob Reclamation; Buchanan County, VA	Circle L Land Company, Inc. P.O. Box 1244 Raven, VA 24639	Engineering design as well as permitting research and package coordination, composition, and submission to secure a gob reclamation permit	\$150,000 (fees)	90%

Virginia AML Refuse Reclamation and AMD Corrections at Pole Bridge Road; Wise County, VA Project to eliminate certain hazards associated with abandoned mine site including dangerous highwall, dangerous impoundment, subsidence issues, acid mine drainage, and site drainage	Commonwealth of Virginia AML, P.O. Box 900 Big Stone Gap, VA 24219	Engineering design and project management to the client for site surveying, exploratory drilling, and remediation of problem areas	\$50,000 (fees)	75%
Seng Camp Fork #1; Application for permit representing Lessee to strip mine four coal seams on property; Buchanan County, VA	Revelation Energy, 160 Lark Branch, Suite 2, Pikeville, KY 41501	Engineering design as well as permitting research and package coordination, composition, and submission to secure a strip mining permit	\$160,000 (fees)	75%
Road Fork #6 Surface Mine; Renewal of permit representing Mid Vol Coal Company; McDowell County, WV	Mid Vol Coal Sales, Inc., 640 Clover Dew Dairy Road, Princeton, WV 24740.	Engineering and AutoCAD services for client to renew subject permit	\$5,000 (fees)	0%
Sequatchie Valley Coal Corporation, Comprehensive Engineering, Environmental and Permitting Services, Sequatchie County, TN	Sequatchie Valley Coal Corporation HCR 65, Box 364 Dunlap, TN 37327	Comprehensive Engineering, Environmental, and Permitting Services	\$2,000,000 (fee)	80%
Rausch Creek Land, L.P., Schuylkill County, PA	Rausch Creek Land, L.P. 978 Gap Street Valley View, PA 17983	Surface Mine Reclamation and Ash Management Services	\$1,000,000 (fee)	90%
Mine Ventilation Mapping and Control Stakeout, Old Castle Industrial Minerals, Thomasville, PA	Oldcastle Industrial Minerals 550 S. Biesecker Road Thomasville, PA 17364 Mr. Doyle Hurst (717) 792-2631	Mine Ventilation Mapping and Control Stakeout	\$25,000 (annually)	NA

Landree Mine Project, IN	LILY Group, Inc. 130 North Court Street Sullivan, IN 47882	Due Diligence, Mine Valuation	\$40,000	95%
Progress Energy (Duke Energy) Government Imposition Claim, IN	Progress Energy 410 S. Wilimington Street Raleigh, NC 27601	Mine Plans and Operating Audits	\$47,000	80%
Mine Ventilation Mapping and Control Stakeout Old Castle Industrial Minerals Thomasville, PA	Oldcastle Industrial Minerals Mr. Doyle Hurst 550 S. Biesecker Road Thomasville, PA 17364	Mine Ventilation Mapping and Control Stakeout	\$25,000 (annually)	NA
Statewide Open-End Contract for Natural Resources, WV (2009)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305- 0430	Natural Resources	\$1,500,000 (fee)	36%
Statewide Open-End Contract for Natural Resources, WV (2011)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305- 0430	Natural Resources	\$1,500,000 (fee)	6%

Philadelphia Water Department Stream Channel Restoration and Wetland Design Services	Philadelphia Water Department Aramark Tower 1101 Market Street 2 nd Floor Philadelphia, PA 19107	Natural Stream Channel Restoration and Wetland Design	\$2,000,000	33%
Central Susquehanna Valley Thruway Environmental Impact Statement, Snyder, Union & Northumberland Counties, PA	PENNDOT Engineering District 3-0 P.O. Box 218 Montoursville, PA 17754	Environmental Impact Study	\$19,700,000 (fee)	96%
Statewide Open-End Contract Cultural Resources Studies/Services, WV (2011)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	Cultural Resources Studies/Services	\$750,000	90%
Statewide Open-End Contract for Compliance with Highway Traffic Noise Requirements, WV (2011)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	Noise Analysis	\$1,500,000 (fee)	5%
NHS Corridor Between I-68 and Corridor H Tier One Draft EIS, WV	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	Environmental Impact Statement	\$1,355,000 (fee)	96%

Statewide Open-End Contract for Management of Environmental and Engineering Activities, PA (Agreement E02192)	PENNDOT Bureau of Design P.O. Box 3161 Harrisburg, PA 17105-3161	Environmental and Engineering Activities	\$3,000,000 (fee)	8%
PA Turnpike Commission Open-End Contract Storage Tank Program Services Systemwide, PA (Agreement 3208)	PA Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106-7676	Storage Tank Management Program	\$2,000,000 (fee)	75%
PENNDOT District 4-0 Cultural Resources Open End, PA	PENNDOT District 4-0 55 Keystone Industrial Park Dunmore, PA 18512	Cultural Resources	\$1,000,000 (fee)	85%
SPC On-Call Consultancy Services Agreement	Southwestern Pennsylvania Corporation Regional Enterprise Tower 425 Sixth Avenue, Suite 2500 Pittsburgh, PA 15219-1852	Environmental Consulting	\$100,000 (fee)	75%
PENNDOT Environmental Remediation Services (Statewide), PA (Agreement 4400008267)	PENNDOT Bureau of Office Services P.O. Box 3060 Harrisburg, PA 17105	Remediation Services	\$4,950,000	81%
Statewide Open-End Contract for Environmental Training - Natural Resources, PA (Agreement 4400003172)	PENNDOT Bureau of Design P.O. Box 3161 Harrisburg, PA 17105-3161	Environmental Training	\$110,000 (fee)	23%
MD SHA 2011 Cultural Resource Open-End, MD (Agreement BCS2010-02B)	MD State Highway Administration 707 N. Culvert Street Baltimore, MD 21202	Cultural Resources	\$2,000,000 (fee)	40%

Bureau of Public Transportation Environmental Support Open-End Contract (Agreement E02468)	PENNDOT Bureau of Public Transportation P.O. Box 3161 Harrisburg, PA 17105- 3161	Environmental Consulting	\$2,000,000 (fee)	0%
TOTAL NUMBER OF PROJECTS: 27			TOTAL ESTIMATED CONSTRUCTION COSTS: \$47,642,000 (Estimated fees)	

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
U.S. Route 35 Improvements, Mason and Kanawha Counties, WV	Cultural Resource Studies	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A- 416 Charleston, WV 25305-0430	2013	NA	\$3,400,000 (fee)
Greene County Bridge No. 99, Greene County, PA	Environmental Studies/ Documentation	Greene County Board of Commissioners 93 E. High Street Waynesburg, PA 15370	2013	NA	\$57,000 (fee)
S.R. 0422 Improvement Project, Armstrong and Indiana Counties, PA	Environmental Studies	PENNDOT District 10- 0 2550 Oakland Avenue P.O. Box 429 Indiana, PA 15701	2013	NA	\$126,000 (fee)
S.R. 1001, Section C01, Farrandsville Road Reconstruction / Realignment, Clinton County, PA	Wetland Mitigation	PENNDOT District 2-0 1924 Daisy St. Extension Clearfield, PA 16830	2013	NA	\$51,000 (fee)
S.R. 0127, Sec. B01, Hunters Station Bridge Rehabilitation, Forest County, PA	Environmental Studies/Documentatio n	PENNDOT District 1-0 255 Elm Street P.O. Box 398 Oil City, PA 16301	2013	NA	\$307,000 (fee)
Freedom Road Improvement Project, Allegheny and Beaver Counties, PA	NEPA Document, Cultural Resources, Wetland and Stream Mitigation	PENNDOT District 11- 0 45 Thoms Run Road Bridgeville, PA 15017-2853	2013	NA	\$550,000 (fee)
S.R. 0019, Section P02, Morrisville Widening and Relocation Project, Greene County, PA	Environmental Studies, Cultural Resources, NEPA Document, Permitting	PENNDOT District 12- 0 P.O. Box 459 825 North Gallatin Avenue Ext., Uniontown, PA 15401	2013	NA	\$260,000 (fee)

16. PRESENT ACTIVITIES ON WHICH YOU ARE ASSOCIATED WITH OTHERS

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONTRACT VALUE	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
S.R. 0021, Section H10, Roadway Improvement, Fayette County, PA	Environmental Studies and NEPA Document, Natural Resources Mitigation	PENNDOT District 12-0 P.O. Box 459 825 North Gallatin Avenue Ext., Uniontown, PA 15401	2014	NA	\$277,000 (fee)
S.R. 0119, Section 499, Wake Robin Curve, Indiana County, PA	Environmental Studies/Documentatio n	PENNDOT District 10-0 2550 Oakland Avenue P.O. Box 429 Indiana, PA 15701	2017	NA	\$60,000 (fee)
I-70 South Junction to PA 519, Washington County, PA	Environmental Studies	PENNDOT District 12-0 P.O. Box 459 825 North Gallatin Avenue Ext., Uniontown, PA 15401	2013	NA	\$85,000 (fee)
Greene County Bridge No. 15, Greene County, PA	Environmental Studies/Documentatio n	Greene County Board of Commissioners 93 E. High Street Waynesburg, PA 15370	2013	NA	\$58,855 (fee)

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Leslie Branch Haulroad Renewal of Permit, McDowell County, WV	Mid Vol Coal Sales, Inc. 640 Clover Dew Dairy Road Princeton, WV 24740.	\$5000 (fees)	2012	Y
Environmental Site Assessment; Complete assessment of site environmental history and liabilities to satisfy transfer of ownership per contractual obligation of operating company; Hawkins County near Rogersville, TN.	Tennessee Valley Authority 1101 Market Street Chattanooga, TN 37402	\$10,000 (fees)	2012	Y
Dry Fork Surface Mine; Strip mining permit revision representing client in Wise County, VA	Paramont Coal Company LLC 5703 Crutchfield Drive Norton VA 24273	\$40,000 (fees)	2012	Y
Osaka Wilson Mitigation Project; Temporal stream loss mitigation project management and coordination with various agencies to secure approval associated with Osaka Wilson mine; in Wise County, VA.	Maggard Branch Coal LLC P.O. Box 2560 Wise, VA 24293	\$65,000 (fees)	2012	Y
I81 Exit 10 Development; Provided civil engineering and surveying services including erosion and sediment control for site permitting; Washington County, VA	Barnette Contractors LLC P.O. Box 1190 Wise, VA 24293	\$2,100 (fees)	2012	Y
Rock Switch Road; Provided civil engineering and permitting services for site permitting; Wise County, VA.	Barnette Contractors LLC P.O. Box 1190 Wise, VA 24293	\$6,000 (fees)	2012	N (planned for 2013)
Valley Point #12 Abandoned Mine Drainage Remediation Project, Preston County, WV	Friends of Deckers Creek P.O. Box 877 Dellslow, WV 26531	\$37,000	2008	Y

Six Mile Run, Sandy Run and Longs Run AMD Assessment and Remediation Plan, Bedford County, PA	Broad Top Township P.O. Box 57 Defiance, PA 16633	\$1,750,000	2009	Y
Blackleggs Creek Watershed Acid Mine Drainage Remediation Projects, Indiana County, PA	Blackleggs Creek Watershed Association P.O. Box 59 Clarksburg, PA 15725	\$2,000,000	2009	Y
Block Model and Detailed Mine Plan	Confidential Client	\$139,000	2008	NA
Charger Underground Mine Due Diligence Investigations, Petersburg, IN	Solar Sources, Inc. 1592 North State Road 61 P.O. Box 567 Petersburg, IN 47567	\$54,000	2008	NA
Cumberland Resource Corporation - Roda Dust Monitoring and Abatement, Roda, VA	Cumberland Resource Corporation P.O. Box 2560 Wise, VA 24293	\$125,000	2010	NA
PPL ROW Mineral Valuation, PA	Progress Energy 410 S. Wilimington Street Raleigh, NC 27601	\$8,000	2012	NA
Due Diligence Investigations at Blaschak Coal Corporation Columbia, Northumberland, and Schuylkill Counties, PA	Milestone Partners 595 East Lancaster Avenue, Suite 303 St. Davids, PA 19087	\$246,000	2009	NA
Martins Creek Reserve Due Diligence, PA	Delaware Quarries, Inc. 6603 Route 202 New Hope, PA 18938	\$10,000	2008	NA
Investigations of Solar Mine Costs, IN	Hoosier Energy REC, Inc. 7398 North State Road 37 Bloomington, IN 47304	\$9,000	2011	NA
Prairie State Due Diligence Addendum, IL	R.W. Beck 1801 California Street, Suite 2800 Denver, CO 80202	\$50,000	2008	NA
Fatal Flaw Investigations, MT	AES Corporation 130 E. Seneca Street, Suite 505 Ithaca, NY 14850	\$50,000	2008	NA

Baron Reserve Economic Re-evaluation, IN	MGMT Energy, Inc. 3203 Third Avenue N, Suite 300 Billings, MT 59101	\$20,000	2009	NA
IPL/Prosperity Mine Force Majeure, IN	Indianapolis Power and Light Company 1 Monument Circle Indianapolis, IN 46204	\$37,000	2009	NA
Regulatory Compliance Study, OH	Dayton Power and Light 1065 Woodman Drive Dayton, OH 45432	\$10,000	2008	NA
Statewide Open-End Contract for Natural Resources, WV (2003)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	NA	2007	NA
WV Route 9, Charlestown to VA Line, EIS Re-evaluation, Jefferson County, WV	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	\$153,000,000	2009	Y
Natural Resources Services Statewide, WV (2007)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	NA	2009	NA
Statewide Open-End Contract for Cultural Resources Studies/Services, WV (2009)	WV Division of Highways State Capitol Complex 1900 Kanawha Blvd., East Building 5, Room A-416 Charleston, WV 25305-0430	NA	2011	NA
Open-End District-Wide Contract for Environmental and Engineering Services, PA (Agreement E00336)	PENNDOT Engineering District 12-0 P.O. Box 459 825 North Gallatin Avenue Extension Uniontown, PA 15401	NA	2008	NA
Mon/Fayette Expressway, Uniontown to Brownsville, Fayette and Washington Counties, PA	PA Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106-7676	\$192,000,000	2008	Y

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Statewide Open-End Archaeological Resources, DE (Agreement 1274)	Delaware Department of Transportation 800 Bay Road Dover, DE 19903	NA	2009	NA
Statewide Open-End Archaeological, DE (2007) (Agreement 1418)	Delaware Department of Transportation 800 Bay Road Dover, DE 19903	NA	2010	NA
PENNDOT Agencywide - Western Waste Management, PA (Agreement 354A02-2)	PENNDOT Bureau of Office Services P.O. Box 3060 Harrisburg, PA 17105	NA	2011	NA
PENNDOT Agencywide - Eastern Waste Management, PA (Agreement 354A02-1)	PENNDOT Bureau of Office Services P.O. Box 3060 Harrisburg, PA 17105	NA	2011	NA
PA Turnpike Commission Open-End Contract Environmental Services, Systemwide, PA	PA Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106-7676	NA	2011	NA
PA Turnpike Commission, Open-End Contract for Waste Management System-Wide, PA (Agreement 2914)	PA Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106-7676	NA	2011	NA
Statewide Open-End Contract for Management Services, PA (Agreement E00668)	PENNDOT Bureau of Design P.O. Box 3161 Harrisburg, PA 17105-3161	NA	2011	NA

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)					
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
T.R. 711 Improvement Project EIS, Westmoreland County, PA	PENNDOT District 12-0 P.O. Box 459 825 North Gallatin Avenue Ext. Uniontown, PA 15401	\$650,000 (fee)	2008	NO	Sucevic, Piccolomini & Kuchar Engineering, Inc.
Western Parkway, Sussex County, DE	DelDOT 800 Bay Road PO Box 778 Dover, DE 19903	\$301,000 (fee)	2009	NO	Whitman Requardt & Associates
Painters Run Road Roadway Widening and Reconstruction, Allegheny County, PA	Allegheny County Dept. of Public Works 501 County Office Bldg. 542 Forbes Avenue Pittsburgh, PA 15219	\$213,000 (fee)	2010	NO	HDR, Inc.
Route 531 Extension Study, Route 36 to Redman Road, Monroe County, NY	NYSDOT Region 4 1530 Jefferson Road Rochester, NY 14623	\$94,000 (fee)	2010	NO	Stantec
PA Project of the Magnetic Levitation (MAGLEV) Transportation Project, Allegheny and Westmoreland Counties, PA	Port Authority of Allegheny County 345 -Sixth Avenue, 3 rd floor Pittsburgh, PA 15222-2527	\$1,500,000 (fee)	2010	NO	MSM Group Joint Venture
Barretts Chapel Road (SR 1 to McGinnis Pond Road), Kent County, DE	DelDOT 800 Bay Road PO Box 778 Dover, DE 19903	\$66,600 (fee)	2010	NO	Century Engineering
Mon/Fayette Expressway, PA Route 51 to I-376, Allegheny County, PA	PA Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106-7676	\$500,000 (fee)	2011	NO	Mackin Engineering Company

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)					
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
S.R. 0286, Golden Mile Highway Improvements, Allegheny and Westmoreland Counties, PA	PENNDOT District 11-0 45 Thoms Run Road Bridgeville, PA 15017-2853	\$225,000 (fee)	2011	NO	AECOM
ID/IQ Contract for Geotechnical and Environmental Services, USACE, Pittsburgh District	USACE, Pittsburgh District 1000 Liberty Avenue W.S. Moorehead Federal Bldg. Pittsburgh, PA 15222	\$320,000 (fee)	2012	NA	D'Appolonia
ID/IQ Contract for Geotechnical and Environmental Services, USACE, Pittsburgh District	USACE, Pittsburgh District 1000 Liberty Avenue W.S. Moorehead Federal Bldg. Pittsburgh, PA 15222	\$293,000 (fee)	2012	NA	Rhea Engineers and Consultants, Inc.
Altoona Transportation Improvement Project, Blair County, PA	PENNDOT District 9-0 1620 North Juniata Street Hollidaysburg, PA 16648	\$146,000 (fee)	2012	NA	Sucevic, Piccolomini & Kuchar Engineering, Inc.

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.

Skelly and Loy is working with TenCate Geosynthetics, a global leader in geotextile products, to offer an extremely unique product and service, a method of providing stable material placement with continual monitoring for a variety of projects where earthen impoundments and/or fills are required.

TenCate Geosynthetics has developed GeoDetect®, a proven sensor-enabled geotextile system for monitoring critical earth structures. TenCate's focus has been to provide geotextile solutions for reinforcement, filtration, drainage, and separation for both infrastructure and water and environment applications. TenCate GeoDetect® is the first intelligent geotextile that is able to monitor strain for stability and temperature for leak detection in critical earth structures. Using a composite geotextile fabric with customizable fiber optics lines connected to proper instrumentation equipment, GeoDetect® is easy to use, highly accurate, and long-lasting. Unlike fiber optic-only solutions, GeoDetect® employs a distributed anchoring technology that prevents slippage for continuous, convenient, and reliable monitoring. And, unlike other monitoring systems measuring specific points that are established at distance, GeoDetect® offers continuous, convenient, and reliable monitoring by employing distributed anchoring technology that prevents slippage and delivers results along an entire installation.

GeoDetect® has six years of proven effectiveness and dependability in the field. The product was commercially introduced in the United States in 2010, and has been used all over the world since 2005, completing successful projects in road, rail, wall/slope/embankment, hydraulic works, landfill, and mining applications. Skelly and Loy, with its rich mining, civil, and environmental history, is providing engineering expertise to clients having a need for GeoDetect® solutions.

20. The foregoing is a statement of facts.

Signature: Mark A. Williams Title: Executive Vice President, Engineering

Printed Name: Mark A. Williams

Date: March 8, 2013

AML and Related Project Experience Matrix



AML and RELATED PROJECT EXPERIENCE MATRIX																							
PROJECT	Exp. Basis C=Corp. P=Personal *	Additional Info Provided in Section (s) **	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY ***M=Management P=Professional				
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Terry W. Schmidt, P.E.	Rex A. Peppier, P.E.	Bradley R. Shultz, E.I.T.	Mark A. Williams		
Kelly's Creek Watershed AMD Survey and Restoration Plan, Kanawha County, West Virginia	C	X									X		X		X		M		P				
Valley Point #12 AMD Remediation Project, Preston County, West Virginia	C	X	X		X	X				X	X	X	X		X		P		P				
North Fork Greens Run AMD Remediation Project, Preston County, West Virginia	C	X				X				X	X	X	X		X		P						
Midde Creek Gob Pile Reclamation Project, Cedar Bluff, Virginia	C	X				X	X	X		X	X				X	X		M/P					
Pole Bridge Road AML Remediation Project, Wise County, Virginia	C	X		X	X	X		X		X	X		X			X		M/P					
Red Ash Strip Mine & Gob Reclamation Project, Buchanan County, Virginia	C	X				X	X	X		X	X	X	X					M/P					
Government Financed Construction Contract AML Reclamation Projects, Clearfield County, Pennsylvania	C	X	X				X		X				X			X	M		P				
Armstrong Energy Comment Letter to PA DEP, Armstrong County, Pennsylvania	C	X				X			X											M/P			
Sequatchie Valley Coal Corporation, Sequatchie County, Tennessee	C	X	X			X	X			X	X	X	X				M		P				

AML and RELATED PROJECT EXPERIENCE MATRIX																		PRIMARY STAFF PARTICIPATION/CAPACITY				
PROJECT	Exp. Basis C=Corp. P=Personal *	Additional Info Provided in Section (s) **	PROJECT EXPERIENCE REQUIREMENTS															***M=Management P=Professional				
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability	Terry W. Schmidt, P.E.	Rex A. Peppler, P.E.	Bradley R. Shultz, E.I.T.	Mark A. Williams	
Rausch Creek Land, L.P., Schuylkill County, Pennsylvania	C	X		X	X	X				X	X	X	X	X	X		X	M				
Six Mile Run, Sandy Run and Longs Run AMD Assessment and Remediation Plan, Bedford County, Pennsylvania	C	X	X	X	X	X						X	X	X		X				M/P		
Blackeggs Creek Acid Mine Drainage Discharge Treatment Projects, Indiana County, Pennsylvania	C	X	X	X	X	X	X				X		X	X				M/P				
Boyce Park Acid Mine Drainage Remediation Project, Allegheny County, Pennsylvania	C	X	X	X		X					X	X	X	X				M/P				
Gallentine AMD Remediation Project, Fayette County, Pennsylvania	C		X			X					X	X	X	X	X	X	X	P				
Sagamore/Max B. Noble AML/AMD Remediation Project, Fayette County, Pennsylvania	C		X			X					X	X	X	X	X	X	X	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.

Supporting Information

Staff Qualifications and Experience (Resumes)



REX A. PEPPLER, P.E., Engineering Manager



EDUCATION:

M.S., Engineering Management, 1991,
University of Tennessee,
Kingsport, Tennessee

B.S., Civil Engineering, 1975,
West Virginia Institute of
Technology, Montgomery,
West Virginia

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Professional Engineer
registered in Virginia,
Tennessee, West Virginia,
Kentucky

Class 2 Wastewater Works
Operator, Virginia

Class II Waste Management
Facility Operator, Virginia

YEARS OF EXPERIENCE:
37 Years

Mr. Peppler was hired by Skelly and Loy, Inc. in September 2011 to manage the firm's office in Wise, Virginia. He is responsible for the day-to-day operations of the office, staff management, project management, and business development. The Wise, Virginia, office offers engineering design, permitting, computer-aided drafting, surveying, and field inspection work services. The professional engineers and technicians at this location are highly skilled and provide exemplary client services to the coal, utilities, and transportation industries.

PROFESSIONAL EXPERIENCE

MACTEC Engineering - Senior Principal Engineer - Mr. Peppler developed the client base for landfill construction inspection and designed inspection documentation for team use. He managed construction quality assurance for industrial and commercial projects. He reviewed field reporting and documented progress summary reporting for clients. Mr. Peppler managed budgets and assignments for field technicians and engineers and reviewed designs. He administered the safety program for the office and brought the program into acceptance by major clients, causing the entire staff to participate and become accountable. This work actually saved the relationship with the largest client in the area. Mr. Peppler developed the activity program, including participation by client representatives and developed bids and client contacts.

American Electric Power Clinch River Plant, Carbo, Virginia - Materials Handling Supervisor - Mr. Peppler managed coal delivery to three generating units and disposal of solid waste from process. He developed accurate operating and capital improvements budgets. He planned and managed all landfill expansion and closure activities and also brought landfill activities back into acceptance by regulatory standards. Mr. Peppler accomplished installation for new truck and conveyor belt coal scales which enabled accurate measurements in accordance with SARBOX and company rules. He directed subordinates, contractors, and 16 members of the union workforce to control \$9 million of budget and 300+ acres. He led these various groups to perform complete and proper safety training resulting in a safer work place, and he was instrumental in new landfill site selection, saving the company significant costs over alternatives.

Supervising Environmental Engineer - Mr. Peppler measured and reported all air, water, and waste data in accordance with approved permits; collected and analyzed water samples for plant sewage treatment facility and industrial WWTP; compiled and submitted monthly DMRs for both water treatment facilities; communicated directly with Virginia regulatory personnel with regard to all air, water, and waste issues; documented special waste removal quantities with manifests; and created files and measurements which resulted in a successful environmental audit and established respected contact with local regulators. He instituted regular ash disposal pond inspections with appropriate record-keeping, developed forms and regiment for ash landfill inspections and monitoring, and performed regular inspections of water treatment systems and established a maintenance program for these areas. He conducted fugitive emissions evaluations throughout the plant yard, led the plant security force, and became trained as an Incident Commander and established annual training drills for response readiness including coordination with local fire and rescue services. Mr. Peppler established an agreement, which was published by AEP, to utilize waste material in a new way, saving the company a projected \$10M, led plant teams focusing on training and safe work practices, and developed a monthly newsletter for all plant personnel delivering safety and environmental messages for performance improvement.

REX A. PEPPLER, P.E., Engineering Manager



Project Engineer - Mr. Peppler completed capital improvement projects for a landfill, new truck scales, and a new sewage treatment facility. He directed the work of various contractors to complete these projects on time and under budget. He developed forms for landfill and ash pond inspections and supervised grounds maintenance contractors. Mr. Peppler achieved facilitator status and assisted with training of teams for continuous improvement work. He led Behavior Based Safety efforts and Community Involvement Teams. He developed and implemented an innovative idea to manage ash waste ponds, enabling closure of one pond and eliminating a potential environmental hazard.

Mead Corporation, Kingsport, Tennessee, Wood Yard/Landfill Supervisor - Mr. Peppler managed a union team of 22 employees processing raw wood products for pulp mill and disposing of all solid waste at a captive landfill. He budgeted and planned the maintenance of equipment. He established 13 new production records in the first year through process improvements, including doubling production with no new equipment. These records were recognized throughout the mill. Mr. Peppler communicated with Tennessee Solid Waste regulatory personnel and implemented innovative method of managing landfill leachate.

Project Engineer - Mr. Peppler designed and implemented many improvement projects including pumps and piping systems, tanks and foundations, paper machine equipment foundations, conveyors and trusses, building and crane improvements and repairs, and complete change to main power boiler ID/FD fan arrangement. He was selected to attend ASME boiler and pressure vessel code repair training. He budgeted and purchased equipment and managed projects from start to finish. All projects met time and budgetary constraints. Mr. Peppler supervised the work of contractors and mill maintenance personnel on these projects and assisted other engineers as needed for civil and structural features. He reconstructed a critical section of the mill underground sewer during a brief outage, requiring temporary bypass of entire flow to the WWTP. He designed and installed a 200-foot pipe bridge spanning the mainline railroad.

Tennessee Valley Authority, Various Locations, Nuclear Construction Quality Control Engineer - Mr. Peppler led a group of concrete inspectors at Phipps Bend Nuclear Plant. He oversaw all concrete placement including construction of the 16-foot-thick reactor base mat.

Office Engineer - Mr. Peppler oversaw the reactor island construction on (what was to become) the world's largest nuclear power plant. He was responsible for design and drafting all construction features associated with this area of the facility. He designed enabling features including complex reinforced structure details which became a model for several similar nuclear plants under construction. He purchased code materials and inspected them for compliance.

RELEVANT TRAINING

Approved OSHA 500 Construction Trainer - 10-hour and 30-hour courses

REX A. PEPPLER, P.E., Engineering Manager

GERALD W. LONGENECKER, P.E.,
Vice President, Environmental Engineering



EDUCATION:

M.S., Agricultural Engineering, 1980, The Pennsylvania State University

B.S., Agricultural Engineering, 1979, The Pennsylvania State University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Professional Engineer, PA, NJ, MD, DE, TN, NC

RELEVANT TRAINING:

Rosgen Level I, "River and Stream Classification/Fluvial Geomorphology Stream Restoration" Short Course, Dave Rosgen, Professional Hydrologist, 1996

Rosgen Level II, "River Morphology and Applications" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997

Rosgen Level III, "River Assessment and Monitoring" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997

Rosgen Level IV, "River Restoration and Natural Channel Design" Short Course, Dave Rosgen, Professional Hydrologist, Pagosa Springs, Colorado, 1997

YEARS OF EXPERIENCE:
32 Years

A licensed Professional Engineer, Mr. Longenecker has 30 years experience dealing with the regulatory approval process in the environmental consulting field. This experience has been gained through the management and technical participation in a broad range of projects including stream restoration, watershed assessments, stormwater management, solid waste handling, industrial and sanitary wastewater treatment, dam safety, water resources engineering, and wetland-related evaluations. As Vice President of the firm, Mr. Longenecker directs the Environmental Engineering Service Group.

PROFESSIONAL EXPERIENCE

Natural Stream Restoration - Completed more than 40 projects using fluvial geomorphology (FGM) methodologies and natural stable channel techniques for stream restoration and relocation. Stream designs have incorporated pools, runs, and riffles into the stream bottom to enhance aquatic life and dissipate energy. Stabilization designs have included cross rock weirs, rock vanes and restoration techniques consisting of streambank grading, fencing, and establishment of riparian buffer zones. Managed the engineering design of the restoration and relocation of approximately 4,000 linear feet of stream through carbonate geology utilizing a fluvial geomorphology approach. Directed the classification of three miles of stream using FGM to identify locations for stabilization and restoration. Provided training sessions to introduce Department of Transportation (DOT) personnel to FGM principles in both Pennsylvania and New York. Served as Project Manager for a mitigation project for North Carolina DOT which evaluated the restoration of 22,000 linear feet of stream.

Erosion and Sedimentation Control - Prepared Erosion and Sedimentation Control Plans for a variety of developments. These have included temporary and permanent control features and have involved the use of several stabilization techniques. Performed an assessment of upstream tributaries to a recreational lake to evaluate sedimentation sources and loading and designed a water quality monitoring program which will result in the development of mitigation measures to address sedimentation pollution and other water quality impacts.

Stormwater Management - Managed the design of numerous stormwater runoff control facilities to minimize downstream impacts. Impacts included the control of flooding events and peak runoff rates, as well as to limit the pollutant and sediment loads experienced by downstream areas. Directed the analysis of stormwater control facilities applied to a 1,400-acre development site. Analysis was focused on evaluating innovative and alternative techniques which would enhance groundwater recharge while controlling pollutant loads. Supervised numerous watershed modeling projects using HEC-II models for developing design bases for culverts and bridge crossings.

Stormwater Retrofit Projects - Managed NPDES stormwater retrofit projects including all phases of the projects from site assessment, design, permitting and construction oversight. Projects consisted of stormwater retrofit facilities including wet ponds, infiltration systems, bioretention ponds, rain gardens, and other Best Management Practices. In completing these services, responsibilities included obtaining property owner approvals, reviewing design drawings, coordinating with all applicable permitting agencies and overseeing construction contractor performance.

Wetland Delineation, Mitigation, and Restoration - Directed numerous wetland restoration projects under enforcement actions by the U.S. Army Corps

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of Engineers for compliance with the Clean Water Act. These project sites have involved unpermitted fill placement at a townhouse development and construction site. Supervised numerous wetland mitigation projects in conjunction with obtaining permits from regulatory agencies. Activities have included modification and modeling of the site to support hydrology, planting/seeding specifications, construction supervision, and long-term monitoring to evaluate success. Managed more than 150 wetland delineations in coastal tidal marsh and inland undisturbed areas in accordance with state and federal methodologies and requirements.

PROJECT EXPERIENCE

Wissahickon Valley Stormwater Mitigation and Sediment Reduction Project, Philadelphia, PA - Friends of the Wissahickon (FOW) has retained Skelly and Loy, Inc. to provide site-specific restoration plans, specifications, and construction implementation and oversight services for work on several sites in Wissahickon Valley Park, Philadelphia, Pennsylvania. These work efforts involve improvements to a number of streams, stormwater drainage systems, gullies, and trail systems within Wissahickon Valley Park. On this design/build project, Mr. Longenecker serviced as the Project Manager and had responsibilities related to oversight and direction of project restoration concept development, detailed features design and layout, permit coordination, construction management and oversight and client coordination. In addition to diverting and infiltrating storm runoff from roads and trails, disturbed hillside slopes will be "re-naturalized" by slope roughening and decompaction, restoring downed woody debris (of all sizes), and planting native herbaceous groundcovers, shrubs, and trees. Construction is currently underway, with a completion date projected for December 2011.

Quittie Creek Nature Park, Annville, PA - Project Manager - Skelly and Loy was contracted to provide engineering and environmental clearance services for this linear stream corridor restoration project along 3,500 feet of Quittapahilla Creek within the Quittie Creek Nature Park in Lebanon County, Pennsylvania. Due to the location of the project within a detailed FEMA flood study area, a hydrologic and hydraulic study was required to determine if the project would create any increases in the flood elevations.

Chestnut Hill College Stream Corridor Restoration, Philadelphia, PA - Using funds provided by both the Growing Greener program and the College, Skelly and Loy is developing a design which will transform this reach of the Wissahickon into a stable and renaturalized stream segment, providing a multiplicity of benefits to both the property owners and the treasured Wissahickon Valley portion of Fairmount Park just downstream. A major project element throughout the reach is the stabilization of severely eroding streambanks (which are as much as 12 feet high) through regrading, surface soil rehabilitation, and replanting with indigenous riparian vegetation. Channel planform will not be materially altered. The most comprehensive intervention is the recreation of several large functional floodplain areas along the stream, including a walled-in former playing field which has long been abandoned because of repeated flood impacts.

Eden Street Stream Restoration, Philadelphia, PA - The restoration approach for this project considered the high energy, stormwater controlled flow regime which is characteristic of urban streams. Skelly and Loy's design challenge was to select effective stabilization techniques that would also retain the environmental components of in-stream habitat and project aesthetics. The approach selected was to extend the existing outfall structure and reconstruct a deep scour hole off the end of the concrete apron in order to prevent further headwall undermining, maintain energy dissipation, and provide deep water pool habitat for the aquatic community.

Willow Park Stream Restoration Design, Cumberland County, PA - Skelly and Loy prepared a concept design for this city-center park with 1,400 feet of unraveling channel in the Borough of Camp Hill. The design focused on accommodating heavy pedestrian pressure (the park is heavily used by schoolchildren), with the major design goals of reinstating channel stability and amenity values for the community. The design and permitting for this project completed using grant funding.

Wise's Mill Run, Philadelphia, PA - Currently providing channel assessment and design services to the City of Philadelphia for this step-pool (B-type) stream within Fairmount Park. Already impacted by urban runoff, the channel was catastrophically eroded by major storms in 2004. Stream corridor re-naturalization/stabilization in this area must remain consistent with the historic character of the Park and cope with severe site constraints (e.g. road encroachment) imposed by the stream's location within a narrow ravine. Plans are underway to extend Skelly and Loy's design protocol to other steep streams in the Wissahickon/Fairmount Park system.



St. Martin's Bridge Fairmount Park Stream Restoration, Philadelphia County, PA - The St. Martin's bridge site was prioritized for early repairs because of the clear risk of eminent collapse of an old stone arch bridge and consequent rupture of the sanitary sewer line contained within the bridge span. The formerly buried potable water line crossing at this location, which had been exhumed by stream erosion, was also at risk of failure due to either continued stream erosion or collapse of the remaining bridge structure on top of it, or both. The existing sanitary sewer line embedded within the bridge will be abandoned and rerouted to an aerial sewer crossing suspended from a new pedestrian bridge (with a nominal span of 100 feet) both removing the risk of failure of this sewer line and providing a safe stream crossing for pedestrians. At the same time, the water main will be relocated downstream of the existing bridge and channel-spanning cross rock vanes will be installed to ensure the stability of the new water main crossing. These rock grade-control structures will also 1) promote sediment conveyance through this reach, 2) provide in-stream aquatic habitat, and 3) provide an aesthetic focal point for the Fairmount Park trail users. These structures were designed using the principles of fluvial geomorphology and natural channel design.

Black Run, Harrisburg, PA - To restore this actively eroding reach of stream in the Paxton Creek watershed, Mr. Longenecker and the design team used natural channel design principles for the design of this stream relocation and reconstruction project. Once constructed, this portion of Black Run will serve to remove sediment from the stream system, helping to preserve Wildwood Lake. A complete riparian restoration and floodplain wetland creation are key components of this project as well.

Broadneck Road Stream Repair, Anne Arundel County, MD - The restoration approach for this project location was to construct what is known as a coastal plain outfall-type system. This approach offers the opportunity to exploit native basin soil conditions to both attenuate and filter storm flows from urban runoff while simultaneously enhancing substrate conditions favorable to the reestablishment of an Atlantic white cedar wetland community. This seepage wetland approach establishes a series of cobble-veneered sandy berms separating small backwater zones in suitable portions of the project area. Such an arrangement promotes shallow ponding upgradient of the berms, shallow subsurface flow through the berm, and a persistently high groundwater table in peripheral areas on the valley floor.

Urbana High School Retrofit Study, Frederick County, MD - Converted the centralized stormwater management facilities to decentralized small scale LID retrofits to improve water quality from parking lot area and to promote infiltration from roof drainage. Completed design, permitting, and construction of retrofit alternatives for immediate implementation.

Letort Spring Run Watershed Assessment and Stream Restoration, Carlisle, PA - Served as project director for this watershed assessment management project and identified priority impacted reaches within the Letort Spring Run Watershed. Watershed assessment included classifying all streams using the principle of fluvial geomorphology as described by Mr. David Rosgen, P.H. Managed data collection activities, preparation of concept level design, and completed presentations to Trout Unlimited and permitting agencies. Prepared detailed design drawings using the principles of natural stream channel design to restore approximately 1,200 feet of impaired stream on the Letort Spring Run.

Mount Rock Spring Creek Restoration, Cumberland County, PA - Managed the field investigations and engineering design of this stream relocation/rehabilitation project utilizing fluvial geomorphology methods. Directed field view meetings to discuss project work scope and design criteria associated with project. Designs included plans, profiles, sections, and details for the proposed stream route, width, depth, and slope, habitat structures, and energy dissipating structures. Supervised construction activities related to the implementation of the natural stream channel design, which included proper placement and implementation of in-stream structure, verifying proper channel dimension, pattern and profile and assisted with the implementation of the riparian planting plan. Supervised the preparation of federal and state permits. Also, provided oversight for the required erosion and sedimentation pollution control.

Boyce-Mayview Park, Upper St. Clair, PA - Stormwater runoff onto this township park property originated from an established upstream residential community. Severe channel erosion and sediment problems within the park boundary were studied and linked to the fact that these residential area stormwater flows greatly exceeded the receiving streams stable channel flow capacity. A stormwater retrofit detention basin was designed with the specific criteria of reducing the critical storm runoff event (approximately equally to the 1 ½ year storm event) to the stable

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bankfull discharge of the receiving stream in order to meet channel protection standards and water quality improvements.

Darby Creek Integrated Stormwater Management Plan, DE Valley, PA - The approach to completing this Act 167 stormwater management plan included integrating fluvial geomorphological characteristics (e.g., accessibility of flood plain areas, entrenched or confined stream channel conditions, eroding or unstable stream reaches, hydraulically modified or straightened stream reaches, etc.) into the stormwater modeling of the watershed. This approach improved the ability to consider the need to incorporate stream bank erosion, water quality and groundwater recharge standards into the stormwater ordinance structure for the municipalities within the watershed.

Stormwater Retrofit Project - PCWEA - This project consisted of three separate stormwater retrofit facilities including two bioretention ponds and one rain garden. In completing these services, Skelly and Loy was responsible for obtaining property owner approvals, coordinating with all applicable permitting agencies and overseeing construction contractor performance. Final project responsibilities included providing assistance in the development of educational brochures to describe the projects and to help establish appropriate post-construction monitoring efforts.

Valley Creek Watershed Assessment, Chester County, PA - This watershed assessment was performed to provide background fluvial geomorphic data to incorporate into the watershed-wide stormwater modeling and management plan development. In assessing stream condition, both cause and level of impairment were identified with special focus given to identifying reaches that could benefit from improved stormwater management retrofits in this urbanized watershed. With the level and cause of impairment identified, a prioritization of stream reaches was developed to aid in directing future restoration activities.

Paxton Creek Stormwater Management Plan, City of Harrisburg, PA - Flooding problems, high sediment supply and degraded water quality were among the primary concerns associated with this urbanizing watershed. HEC-HMS modeling was used to complete both a FEMA updated flood modeling effort and an Act 167 stormwater management update plan. Skelly and Loy was able to integrate knowledge gained from the performance of the watershed assessment for the benefit of these other two major analysis efforts.

Schoharie Creek Stream Stabilization Project, Schoharie County, NY - Applying the principles of fluvial geomorphology (FGM), Skelly and Loy completed a natural stream channel stabilization project on approximately 3,600 feet of the Schoharie Creek in Schoharie County, NY. This design involved excavation and removal of flood-deposited sediment from the stream's flood plain in order to restore stable stream cross-section dimensions and reconnect the bankfull channel. The design also entailed use of rock vanes and development of a 100-foot stream riparian buffer. Mr. Longenecker served as project manager and lead engineer for this project.

Ellen Run Stream Restoration, Mansfield, PA - Skelly and Loy developed a natural stream channel design, based on geomorphic principles, for this 1,000 foot section of a tributary to the Tioga River. This project is located within the glaciated regions of the Northern Tier and incorporated a combination of in-stream cross rock vanes, reconstruction of channel geometry and bank stabilization using stacked boulder bank revetment. Mr. Longenecker served as project manager and lead engineer for this project.

South Branch Mehoopany Creek, Wyoming County, PA - This project is located within the glaciated terrain region of the NE United States in the Upper Susquehanna River Basin. Project reach length is approximately 5,000 linear feet, incorporated a combination of a number of natural stream channel design techniques. These techniques involved the use of cross-rock vanes, flood plain sills, rock barbs, boulder bank revetment, channel plugs and historical stream channel reconstruction in order to restore stability to the project stream reach. Mr. Longenecker served as project manager, lead engineer and construction inspector for this project.

Corey Creek Stream Restoration, Tioga County, PA - Corey Creek is a tributary to the Tioga River in Pennsylvania's Northern Tier Region, an area where surficial geology and geomorphic characteristics reflect both past glacial episodes and past land use practices. Restoration activities within this watershed were designed and implemented in a phased approach as grant funding became available. Natural stream restoration techniques were used to provide increased stream channel stability and viable habitat for naturally reproducing indigenous trout species. Mr. Longenecker served as project manager, lead engineer and construction inspector for this project.

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North Branch Mehoopany Creek Stream Restoration, Wyoming County, PA - The overall project included the restoration of more than 3,800 linear feet of actively eroding and unstable stream channel. The design included the relocation for a stream reach approximately 1,165 linear feet in length and restoration of the stream channel in its original location for an additional 2,695 feet. The reach is just north of State Route 87 and northwest of the town of Forkston, Pennsylvania, just upstream of the confluence with the main stem of Mehoopany Creek. The goal of this project was to make this a more stable C4 type stream, according to the Rosgen Classification of Natural Rivers. Mr. Longenecker served as project manager, lead engineer and construction inspector for this project.

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ROBERT E. GOLKOSKY, P.E., Mining Engineer



EDUCATION:

B.S., Mining Engineering,
1966, The Pennsylvania State
University

SOHIO Program for Middle
Managers, 1984, University of
New Hampshire

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Professional Engineer
registered in West Virginia,
Virginia, Kentucky,
Pennsylvania and Indiana

CONTACT INFORMATION:

(276) 698-6474 - Mobile
rgolkosky@gmail.com

YEARS OF EXPERIENCE:

46 Years

Mr. Golkosky is a registered professional engineer with extensive experience in the coal mining industry. He has worked in senior management, operations, engineering, project management, acquisitions and consulting for several major mining and consulting companies. He has provided technical support and expert testimony in several litigation cases.

Mr. Golkosky's areas of specialization include international projects, project management/planning, economic evaluations, due diligence, mining engineering, and litigation support services.

PROFESSIONAL EXPERIENCE

- **Associate Consultant** - Skelly and Loy, Inc. (2011-Present)
- **President** - GRE Mineral Services, LLC, Bristol, VA (2010-Present)
- **Senior Consultant** - ATS, Inc., Abingdon, VA (2001-2010)
- **Financial Advisor** - Prudential Securities, Inc. (1999-2001)
- **Senior Engineer** - Peabody Energy (1998-1999)
- **Director - Underground Services** - Marston & Marson, Inc. (1996-1998)
- **Vice President** - Anderson & Schwab, Inc. - Management Consultants (1995-1996)
- **Vice President** - Weir International Mining Consultants (1992-1995)
- **Associate Consultant** - Anderson & Schwab, Inc. (1990-1992)
- **Vice President of Exploration** - Royal Land Co. (1980-1990)

Mr. Golkosky has also held the following positions.

- Manager of Mine Planning
- Chief Engineer
- Vice President of Engineering
- Assistant Mine Superintendent
- Production Engineer

PROFESSIONAL ASSOCIATIONS

- Society of Mining Engineers of AIME
- National Mining Association
- West Virginia Coal Association
- West Virginia Coal Mining Institute
- Kanawha Valley Mining Institute

TERRY W. SCHMIDT, P.E., Vice President, Engineering



EDUCATION:

M.S., Mining Engineering,
1994, The Pennsylvania State
University

B.S., Mining Engineering,
1985, The Pennsylvania State
University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Professional Engineer, PA,
NC, TN, VA, MD, OH

YEARS OF EXPERIENCE:
26 Years

As an Associate of the firm and Vice President (VP) of Skelly and Loy's Engineering Group, Mr. Schmidt has served as VP-in-Charge of many complex projects, coordinating project and activities on a corporate basis. Mr. Schmidt has more than 26 years of diversified experience in the engineering disciplines, including 22 as an employee of Skelly and Loy. His areas of expertise include: mine planning and analysis; mineral property reserve assessments; land development; planning and analysis; assessments; permit preparation; surface and groundwater hydrologic investigations and modeling; water treatment system evaluations; stormwater management; and NPDES permit negotiation. He has prepared detailed life-of-quarry mining plans for large aggregate producers and mine plans for coal producers. In addition, he has prepared numerous coal and non-coal surface mine permit applications.

PROFESSIONAL EXPERIENCE

Maryland State Highway Administration - Rehabilitated two leachate treatment systems that had been installed to treat highway runoff and groundwater discharge from the embankment of U.S. Route 68. Responsibilities included evaluation of systems operations, analyses of water quality data, development of rehabilitation and operation and maintenance plans, supervision of construction, preparation of as-built drawings, and long-term monitoring of systems performance.

Cloud Peak Energy Resources - Served as VP-In-Charge in surface mine reclamation planning and an acid mine drainage assessments in Tennessee. Conducted laboratory and on-site treatability studies to define effective chemical treatment approaches and assisted in the design of passive treatment systems. Defined and mapped groundwater basin recharge areas and evaluated the impacts of pumping activities on the regional groundwater flow. Evaluated the hydrologic impacts of the surface coal mine reclamation activities on the receiving streams. Developed interim and long term reclamation plans for over 1,000 acres of surface mine area.

C/G Electrodes - Investigated 42 water discharge locations from a large graphite producer which discharges a combination of acid mine drainage, industrial process wastewater, stormwater, and various other flows which enter the site. Conducted dye tests, performed flow measurements, implemented a sampling and testing program, prepared reports of findings, prepared an Industrial Process Wastewater NPDES Permit, and attended negotiation meetings with the State regulatory agency.

Tennessee Valley Authority - Served as Principal Investigator in an evaluation of chemical and passive treatment systems for mine drainage in Alabama. Evaluated current treatment systems and suggested potential cost-effective improvements to existing and planned treatment systems. Conducted treatment studies for fluoride reduction in mine reclamation area runoff water. Two methods of fluoride reduction were studied in the laboratory: ion exchange and uptake by soil materials. Assisted in the design of the full scale treatment system using uptake by soil materials.

Quarry Development Projects - Served as Engineer-In-Charge for numerous quarry development projects in North Carolina, Pennsylvania, Virginia, Maryland, and Tennessee. Projects in North Carolina have included Benson Quarry, 115 Quarry, Enka Quarry, North Quarry, Statesville Quarry, and Shelton Quarry. Mr. Schmidt's responsibilities in these projects have included the

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completion of local and State permit applications with complete site layouts, erosion and sediment control plans, and drainage system designs.

Cogeneration Projects - Mr. Schmidt completed several bituminous and anthracite coal refuse cogeneration projects in West Virginia and Pennsylvania. Project tasks included developing and carrying out drilling programs for available coal refuse piles and determining the quantity and quality of fuel confirmed at each of the coal refuse sites investigated. Mr. Schmidt also assisted in an anthracite silt pelletizing project. In addition, Mr. Schmidt analyzed material handling systems and developed a listing of limestone producers capable of supplying high calcium carbonate limestone for use in fluidized beds.

Confidential Client - Mr. Schmidt completed an audit of computer systems used for mine planning at a large surface coal mine in South Africa. This audit included an evaluation of the geologic database, the use of the database within software packages employed, and the use and validity of computer generated output.

Confidential Client - Mr. Schmidt completed a computer assisted mine plan analysis of a large midwest coal producer. He assessed in-place reserve quality and quantity, estimated recoverability based on existing structural conditions, estimated coal quality dilution, and analyzed alternative mine planning scenarios. He conducted quarterly mine audits to assess the reasonableness of costs associated with mining practices utilized. Additionally, Mr. Schmidt provided legal assistance during disputes between the coal producer and a large midwest utility.

Confidential Client - Mr. Schmidt performed a detailed surface coal mining regulatory review in the state of Indiana. He also assisted in assessing the impact of changing regulations on reclamation costs and performance at a large Indiana surface coal mine.

Confidential Client - Mr. Schmidt completed the valuation of all coal holdings of a sizeable U.S. coal producer. The project included: development of mine planning scenarios, review and verification of the coal reserve database; a summary of all reserves and operations; and a valuation of coal reserves and long term contracts.

Confidential Client - Mr. Schmidt completed an evaluation of contract price increases based on increasing mining costs for a major mid-west utility. He also supplied legal assistance to that utility during a Public Service Commission hearing concerning contract price escalations.

Woodduck Chapter of Trout Unlimited - On behalf of the Woodduck Chapter of Trout Unlimited with funding provided by Pennsylvania's Growing Greener program, Mr. Schmidt managed the design and construction of an acid mine drainage treatment system. Based on a thorough evaluation of site conditions and water quality data, he designed a Vertical Flow Reactor (VFR) to treat the main AMD seep known as "Chiller Seep". Components of the system include a layer of compost to strip oxygen followed by contact with limestone to impart alkalinity. The net alkaline water is then routed through pond and wetland cells for precipitation of metals. The system also includes a passive flushing technology for removal of aluminum.

West Branch Sportsmen - Evaluated AMD treatment alternatives for this tributary to the Susquehanna River under a contract with The Freshwater Institute, an arm of The Conservation Fund. Project activities included comprehensive field investigations, data evaluations, and engineering design package preparation. Engineered a passive, periodic flushing system that maintains the hydraulic conductivity and treatment performance of an open limestone pond system. The treatment system consists of independent open limestone cells for alkalinity addition and two wetland cells in series for settling precipitated metals.

Friedline Mine Site, Pennsylvania - Currently directing the assessment and rehabilitation of an operating passive AMD treatment system. Managing the evaluation of water quality data, review of SAPS engineering drawings, and coordination with regulatory agencies. Supervising system restoration to include installation of an aluminum recovery loop, removal and replacement of iron/compost layer, inspection of limestone layer and replacement if necessary, upgrade of flushing system, and lining the outflow channel with limestone. Developed a plan to capture newly formed seeps and direct them to a new open limestone pond.

Raccoon Creek Watershed Association - Completed a Watershed Abandoned Mine Drainage (AMD) Survey and Preliminary Restoration Plan for the Raccoon Creek watershed located in western Pennsylvania. Working closely

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with local groups, concerned citizens and government agencies, Mr. Schmidt identified significant AMD discharge sources and quantified impacts to the watershed. As a result, remediation methods were identified and cost estimates were developed for future remediation actions for the seven highest prioritized AMD discharges.

Port Matilda Borough – As Borough Engineer, Skelly and Loy is responsible for Borough roads, streets, and water system. Working closely with the Borough, Skelly and Loy is determining future water and wastewater needs, identifying needed improvements to streets and roads, and providing land surveying as well as other professional services. Completed design for Little League baseball field.

South Lebanon Township – As Township Engineer, Skelly and Loy was responsible for reviewing the plans for the AES Ironwood Facility, a 700 megawatt gas-fired electricity generated facility. Responsibilities included reviewing the engineering site plans including stormwater management, erosion and sedimentation plans, and zoning and land development issues. Also, directed construction inspection duties and provided construction inspection reports.

West Donegal Township – As Township Engineer, Skelly and Loy was responsible for completion of the Act 537 Official Sewage Facilities Plan. Worked closely with the Township in supporting the development of zoning ordinance as well as subdivision and land development ordinances. Responsibilities encompassed transportation planning, with specific projects including intersection redesign and obtainment of Highway Occupancy Permits. Completed numerous miscellaneous municipal engineering projects involving as the design of a salt shed, surveying, and grading.

Intercon Systems, Inc. - Managed the preparation of site development plans prepared for this industrial facility which included 5 buildings to house both office and light manufacturing for a total of 105,000 square feet under roof and 350 parking spaces. The project included general layout, grading plans, parking lot layout, and erosion and sediment control plans. The project also included a hydrologic assessment report which evaluated a parking lot drainage network and other stormwater drainage.

Palmer Facilities - Directed this site development project which involved general layout, grading plans, parking lot layout, and erosion and sediment control plans. The project also included a hydrologic report which addressed special concerns associated with work performed within the floodplain.

Duncan Smith Dam - Managed the completion of a dam design for the Duncan Smith project in Maryland. Special concerns addressed in the project include innovative pond inlet and outlet structures designed to minimize thermal impacts to the receiving stream. The project also involved surface hydrology, grading, erosion and sediment control, and associated plans and specifications.

Dover Road Dam - Directed the project team responsible for the dam design for the Dover Road Residence project in Maryland. The project involved surface hydrology, grading, outlet structure design, erosion and sediment control, and associated plans and specifications. Additionally, recommendations were made to reduce the potential for pond leakage into a pinnacle limestone formation which outcrops near the base of the pond.

Whitetail Ski Resort - Provided design engineering for the site development planning for Whitetail Ski Resort, Montadale Crest housing development, and Chester Industrial Highway. Mr. Schmidt's responsibilities on these projects have included erosion and sediment control design, construction supervision, wetland mitigation design, and review of plans, specifications, and engineering drawings.

Tyco Electronics - Provided site development planning and engineering design services for several AMP, Inc. facilities including Harrisonburg, Fulling Mill Road, and Rapho Township. Mr. Schmidt's responsibilities in these projects have included general site layout, drainage system design, erosion and sediment control design, and permit procurement.

Graduate Studies - While working towards an M.S. in Mining Engineering at Penn State University, assisted in the development of the software package "REMINE." Responsible for writing the Basic computer code and associated user's manual sections for one module. "REMINE" is a commercially available software package used for Best Professional Judgment Analysis required by the Federal Clean Water Act to obtain a surface mining permit for remining of abandoned mine lands with pre-existing pollutional discharges. "REMINE" was developed under the

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cooperation of the Environmental Protection Agency, the Pennsylvania Department of Environmental Resources, and Penn State University.

Surface Coal Mine Operator, W. Schmidt Coal Company. - Mr. Schmidt operated surface coal mines for W. Schmidt Coal Company for approximately four years. He was responsible for all aspects of mining operation from property evaluation through job completion. More specifically, Mr. Schmidt's duties included the implementation of drilling programs, permitting, erosion and sedimentation design, bookkeeping, environmental compliance, and mine planning.

PUBLICATIONS

"Acid Rock Drainage Prevention Aided by LKD", published in Industrial WaterWorld magazine, July/August, 2008 (author)

"Assessment of ECOTITE for Use in Acid Rock Drainage Treatment" presented at the 2007 National Meeting of the American Society for Surface Mining and Reclamation, Gillette Wyoming (principal author)

"Evaluation of Aeration Techniques for Mine Water Treatment in Passive Systems", presented at the 2004 National Meeting of the American Society for Surface Mining and Reclamation and The 25th West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, West Virginia (author)

"Dry Creek Abandoned Mine Restoration Demonstration Project: A Cooperative Effort", presented at the 2003 National Meeting of the American Society for Surface Mining and Reclamation and The 9th Billings Land Reclamation Symposium, Billings, Montana, (co-author)

"Evaluating Successes in Passive Treatment at Sequatchie Valley Coal Corporation in East Central Tennessee", presented at the 2001 National Meeting of the American Society for Surface Mining and Reclamation, Albuquerque, New Mexico, (principal author)

"Passive, Periodic Flushing Technology for Mine Drainage Treatment Systems", presented at the 2001 National Meeting of the American Society for Surface Mining and Reclamation, Albuquerque, New Mexico, (co-author)

"Prediction of Water Quality at Surface Coal Mines", published by National Mine Land Reclamation Center, Morgantown, West Virginia, 2001, (contributing author)

"Assessment of the Applicability of an Anoxic Limestone Drain for a Surface Mine in East Central Tennessee", presented at the 1996 National Meeting of the American Society for Surface Mining and Reclamation, Knoxville, Tennessee, (principal author and presenter).

"Coal Remining Analysis for Maximum Resource Recovery and Environmental Improvement", Master of Science Thesis, The Pennsylvania State University, 1994.

"Remine: A Computer Program for the Analysis of Abandoned Mine Lands Projects in the United States": presented at the Surface Coal Mining and Reclamation Symposium in Alberta, Canada, 1988 (coauthor).

PROFESSIONAL AFFILIATIONS

Pennsylvania Association of Environmental Professionals
The Society of Mining Engineers of America - Institute of Mining Engineers
The American Society for Surface Mining and Reclamation
American Institute of Mining Engineers
Penn Anthracite American Institute of Mining Engineers
Acid Drainage Technology Initiative (ADTI)

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Skelly and Loy, Inc.
Harrisburg, PA

BRADLEY R. SHULTZ, E.I.T., Senior Acid Rock Drainage Specialist**EDUCATION:**

B.S., Biology with option on Marine/Aquatic, 1993, Millersville University

M.E.P.C., Environmental Pollution Control, 2002, The Pennsylvania State University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Engineer In Training, PA

YEARS OF EXPERIENCE:

15 Years

Mr. Shultz joined Skelly and Loy with a strong foundation of water chemistry and water/wastewater treatment experience having worked for over eight years in the environmental consulting and laboratory industries. As a result, he is adept at assessing mine drainage problems utilizing a watershed approach and relating to the chemistry for treating AMD discharges. During his investigations of various water quality related issues and associated remediation efforts, he has performed water sample collection and analysis, evaluated flow rates, evaluated aeration system and chemical treatment efficiency for hydrogen sulfide odor abatement, tracer studies for water quality and hydraulic evaluations, set-up and maintained databases, performed water quality modeling efforts, and analyzed the results to determine applicable treatment technologies. In addition, he has maintained and monitored the performance of water quality enhancement and treatment systems to ensure compliance with permit requirements as well as optimizing treatment effectiveness.

PROFESSIONAL EXPERIENCE

Treatment Evaluation of the Askam Borehole AMD, Nanticoke, PA - Mr. Shultz served as the lead scientist for the bench-scale testing evaluation of treatment options for the net alkaline AMD flowing from the Askam Borehole directly into Nanticoke Creek. The Askam Borehole AMD was characterized as a high flow net alkaline discharge with high levels of dissolved ferrous iron. Mr. Shultz oversaw the field data collection efforts and bench-scale testing for alkaline addition, aeration, and a combination of the two for the most cost effective treatment for iron removal of the AMD. Mr. Shultz also conducted extensive research on the history of the borehole, associated mine pool, and mining activities in the area to better understand the system hydrology.

PennDOT I-99 Sections A-12 and C-12, State College, PA - The acid rock drainage (ARD) created by the placement of unearthed pyritic material into fill areas, required chemical treatment systems in the existing sediment basins for increasing the pH and removing the metals of the ARD streams. Mr. Shultz helped coordinate the placement and operation of the active chemical treatment systems as well as providing the design and operational procedures for additional chemical treatment basins at the site. Mr. Shultz also coordinated the set-up and initiation of the sludge removal and handling process for the six basins used for chemical treatment of the ARD streams. Additionally, he coordinated the design and construction of the grading, contouring, and covering of two of the pyritic fill areas to prevent runoff infiltration and helped design the associated stormwater runoff handling system for the impervious areas. As part of the final remediation efforts at the site following the final placement of a majority of the pyritic material within a constructed landfill, Mr. Shultz helped lead the design team for the long-term passive and semi-active treatment of the remaining ARD from the entire site, which included both flushable limestone-based treatment components and chemical treatment processes to meet effluent limits.

Broad Top Township, PA - Mr. Shultz has served as the project manager for the design, permitting, and construction of more than a dozen passive AMD treatment systems in Broad Top Township. Initially, Mr. Shultz was assigned as the project manager for the Longs Run Phase II AMD remediation projects funded under Growing Greener grants in 2004. As the project manager for this project, Mr. Shultz was responsible for the design, permitting, construction monitoring, and final system effectiveness testing work associated with the passive treatment systems necessary for the six AMD discharges. Mr. Shultz

BRADLEY R. SHULTZ, E.I.T., Senior Acid Rock Drainage Specialist



helped perform the final system effectiveness testing on the Longs Run Phase I AMD passive treatment systems for seven AMD discharges in the watershed. Mr. Shultz was also the project manager for the Finleyville site AMD passive treatment system project for three aluminum laden AMD discharges in the Six Mile Run watershed, funded by a Growing Greener grant. The Finleyville project involved the design, construction monitoring, and final system effectiveness testing work associated with the passive AMD treatment systems for the site. Mr. Shultz has most recently managed the design, permitting, and construction of multiple AMD projects within the Six Mile Run and Sandy Run watersheds that required the use of mine seals, mine pool manipulation, and treatment technologies capable of treating high flow and/or high level acidity discharges. Mr. Shultz continues to work with Township on system improvements, maintenance, and the refinement of passive treatment technologies using an anticipated maintenance approach to maintain system effectiveness for highly contaminated AMD discharges.

Blackleggs Creek Watershed Association & Trout Nursery, Indiana County, PA - Mr. Shultz assisted and directed the design of two of the final treatment systems to restore Big Run and lower half of Blackleggs Creek for a put-and-take trout fishery. The Big Run #8 passive AMD treatment system addressed the largest AMD contributor in the Big Run watershed and required the design of a sophisticated capture system of the AMD from the old underground mine tunnel at least twenty feet in elevation below the available treatment area. Two large oxic limestone beds and a settling pond were designed within the available area to provide passive alkaline treatment for the net acidic and high flow Big Run #8 AMD discharge. The outfall from the Big Run #8 along with the Big Run #7 passive AMD treatment system were incorporated into the design of a semi-active chemical treatment system to further remediate the two discharges and provide excess alkalinity in Big Run due to the accessibility issues for trying to capture and treat the Big Run #3 AMD discharge. Mr. Shultz led the design team for the Big Run #3 system to incorporate a hydraulically driven tipping bucket hydrated lime dispensing unit along with a 30-ton silo for the addition of alkalinity into the passively treated Big Run #7 and #8 AMD. A rock-lined mixing channel, large settling pond, polishing wetland, and sludge dewatering basin were the other key components of the Big Run #3 treatment system design that is scheduled for construction completion in 2011.

Huntingdon County Conservation District, Huntingdon, PA - Mr. Shultz was assigned as the project manager for the Miller Run, and Old Never Sweat AMD passive treatment projects. Both projects were funded under Pennsylvania's Growing Greener Grant program. The Miller Run project involved the design of two passive treatment systems for two discharges, both characterized as acidic seeps or discharges with elevated aluminum concentrations. The Old Never Sweat AMD projects involved the design and construction oversight of a passive treatment system at the site to remove the aluminum and associated acidity through the departing of alkalinity through the use of a large flushing limestone pond.

Passive AMD Treatment System Effectiveness Testing - Mr. Shultz has performed and trained personnel in the water chemistry testing work associated with the field evaluation of passive AMD treatment systems designed by Skelly and Loy and other firms in both Pennsylvania and Maryland. Mr. Shultz has also worked on projects to incorporate alkaline chemical treatment technologies as needed within an existing passive treatment system in order for the client to meet effluent permit limits on both an interim and permanent basis. Mr. Shultz has also conducted routine operations and maintenance activities for a passive treatment system in western Pennsylvania in order to maintain the system effectiveness and permeability of the limestone-based treatment system components.

Lake Wallenpaupack Hydrogen Sulfide Remediation Project, Hawley, PA - At his previous employer as a Water Quality Scientist, Mr. Shultz managed the hydrogen sulfide evaluation study at PPL's Lake Wallenpaupack Hydroelectric Project. Mr. Shultz handled the contracting and management of field staff, budget and technical oversight, design and construction of the field testing system for the hydrogen sulfide treatment evaluation using either or both chemical and aeration techniques to reduce or eliminate hydrogen sulfide odors. Following the 2002 evaluation, in 2003 Mr. Shultz coordinated a study on the use of an in-lake aeration system for reducing the hydrogen sulfide odors associated with operation of the hydroelectric project, which provided further insight on the effectiveness of this type of abatement system. Tracer studies were conducted using both pH and conductivity in the lake and discharge to understand the hydraulic withdrawal zone of the project.

Various Hydroelectric Project Water Quality Evaluations and Assessments, USA - At his previous employer as a Water Quality Scientist, Mr. Shultz handled numerous water quality investigation, evaluations, and assessments related to various issues at several hydroelectric projects throughout the country. As part of the assessment, water quality modeling was necessary to accurately predict water quality in both the impoundment and project discharge to

BRADLEY R. SHULTZ, E.I.T., Senior Acid Rock Drainage Specialist



help understand what improvements tools were best suited for improving the discharge water quality to meet state limits. The evaluations included tracer studies using temperature, pH, and conductivity as parameters for understanding the withdrawal zones for the various hydroelectric projects and how the in-lake and discharge profiles were related. Other related experiences involved assessing multiple year data collection efforts for comparison to state discharge requirements and using those results to evaluate water quality improvement measures at projects.

RELEVANT TRAINING

In the summer of 2003, Mr. Shultz attended a week long training workshop sponsored by the US Army Corps of Engineers and Portland State University for CE-QUAL-W2, a two-dimensional hydrodynamic and water quality model.

PUBLICATIONS

Proceedings of the 2002 HydroVision Conference in Portland, Oregon:

Paper Title - "Water Quality Enhancements of the PPL Lake Wallenpaupack Project Hydroelectric Discharge Into the Lackawaxen River"

Keystone Water Quality Manager (Publication of PWEA):

Paper Title - "Using Acid Mine Drainage Sludge for Metals Removal in Wastewater"

Keystone Water Quality Manager (Publication of PWEA):

Paper Title - "Preliminary Studies on Hydrogen Sulfide Removal"

Aquatic Geochemistry

Paper Title - "Iron and sulfur chemistry in a stratified lake system"

Proceedings of the 2007 American Society of Mining and Reclamation Conference in Gillette, Wyoming:

Paper Title - "Assessment of ECOTITE™ for Use in Acid Rock Drainage Treatment"

Proceedings of the 2010 American Society of Mining and Reclamation Conference in Pittsburgh, Pennsylvania:

Paper Title - "Assessment of the Applicability of Steel Slag for Alkaline Addition to Acidic Streams in South Central Pennsylvania"

PROFESSIONAL AFFILIATIONS

Previous Member of the Following Organizations:

North American Lake Management Society (NALMS)

Water Environment Federation (WEF)

American Water Resources Association (AWRA)

Society for Environmental Toxicology and Chemistry (SETAC)

HONORS AND AWARDS

Pennsylvania Water Environment Association (PWEA): 2002 and 2003 Student Research Award Recipient

BRADLEY R. SHULTZ, E.I.T., Senior Acid Rock Drainage Specialist

R. H. (HOLLAND) STURGILL, JR., Engineering Technician**EDUCATION:**

A.A.S., Drafting and Design,
1985, Mountain Empire
Community College

YEARS OF EXPERIENCE:

27 Years

As an Engineering Technician, Mr. Sturgill prepares maps, plans, cross sections, and other types of drawings; and drainage, excavation, site plans; and computes earthwork cut and fill volumes; designs drainage structures, valley fills, and roads; assists in preparing permit applications, reserve studies, and other technical reports; and performs GPS, RTK, and conventional field surveys. For more than 27 years, he has been providing various professional services to the mining, oil, and gas industries. As the owner of a full-service construction company, Mr. Sturgill is also accomplished in construction planning, design, and cost estimation.

PROFESSIONAL EXPERIENCE

Owner/Manager, R.H. Sturgill Construction Co. Inc., Pound, VA - A full service construction company providing new construction and remodeling. Ability to provide clients with pre-construction planning, design and cost estimation. Also providing construction scheduling, coordination, and management. Services also provided for residential and commercial property maintenance.

Owner/Manager, DLS & Associates, Pound, VA - Provided contract services to Marshall Miller & Associates. Services included all layout/surveying/design of gas well sites, roads, and pipeline routes for largest CBM producer in Southwest Virginia.

Performed GPS control surveys/monumentation in order to perform integrity studies of major distribution pipelines. Worked closely with company land agents and property owners to locate and acquire well site locations, and road and pipeline right-of-ways. Field layout/flagging of all pipeline routes prior to permitting and the preparation of "as-built" drawings once completed.

Project Manager, Marshall Miller & Associates, Norton, VA (WS&A was acquired by MM&A) - Responsibilities included the supervision and management of all DMLR and DG&O permitting for MM&A's Norton office. Duties included the design/layout/surveying of well sites, associated access roads, and pipeline right-of-ways. Also responsible for the preparation of all construction plans and drawings necessary to obtain DG&O approval. Also performed "as-built" surveys for completed pipeline routes and provided design and permit services for various mining operations including deep mines, ventilations shaft sites, and strip mining operations.

Senior Engineering Technician, Willis-Skeen & Associates, Norton, VA - Responsibilities included preparation of all DMLR permits and revisions. Assisted project engineer with preparation of construction plans and drawings for various civil projects including airports, landfills, and golf courses. Performed construction inspection including building and site stakeout and, cut/fill and nuclear density compaction testing. Also responsible for the coordination and scheduling of outside surveying services used in the preparation of oil and gas permits for local gas companies.

Owner/Contractor, R.H. Sturgill Construction Co. Inc. - All types of new residential construction and remodeling including carpentry, masonry, concrete, tile, hardwood, electrical, and plumbing services; also provide residential and commercial property maintenance.

Engineering Technician, Tuck Engineering and Aerial Mapping, Big Stone Gap, VA - Responsibilities included the preparation of narratives, plans,

R. H. (HOLLAND) STURGILL, JR., Engineering Technician



drawings, and maps required for DMLR permitting of underground and surface operations. Conducted water supply inventories, surface and groundwater sampling, and impoundment inspections. Also assisted engineer with flight planning and establishment of control surveys for aerial mapping projects. Also compiled data from aerial survey mapping in the preparation of volumetric computations for inventory of various types of stockpiles including coal, magnetite, and sand/gravel.

Permit/Drafting Technician, Part Time-College Co-Op, Tuck Engineering, Big Stone Gap, VA - Responsibilities included the preparation of narratives, plans, drawings, and maps necessary to obtain mining permits and revisions from DMLR for various mining companies located in Wise County, VA, and surrounding counties.

Drafting Technician, Part Time-College Co-Op, Joy Manufacturing, Duffield, VA - Responsible for preparing full-scale templates for the engineering department to be used in the total in-house rebuild of all of Joy Manufacturing miners, shuttle cars, and cutting machines.

R. H. (HOLLAND) STURGILL, JR., Engineering Technician

ROY K. BALTHIS, Registered Land Surveyor



PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Registered Land Surveyor,
Virginia and Kentucky

YEARS OF EXPERIENCE:

41 Years

Roy Balthis is a Land Surveyor providing support service to the Wise, Virginia office of Skelly and Loy, Inc. In this role, Mr. Balthis' responsibilities include providing field services with complete responsibility to lead survey parties performing boundary surveys, mapping, and gathering data and information to establish plans, cross sections, drainage plans and other engineering and technical documents. His work may also involve measuring volumes for earthwork; stockpile measurements; verifying drainage and structural features; layout and verification of roads, ditches, culverts, and other technical aspects of plans and permits as required by clients of the firm.

Mr. Balthis has over forty years of responsible experience in the field of surveying. He has performed work for various entities throughout Southwest Virginia and Eastern Kentucky to the complete satisfaction of municipal, federal, and private clients in the region. He is a respected surveyor who understands all aspects of modern surveying and mapping technology.

PROFESSIONAL EXPERIENCE

Mr. Balthis has performed large boundary surveys for the U.S. Forest Service. He has provided surveying services for the Industrial Development Authorities of Wise County and the Town of St. Paul; property and boundary work for the Towns of St. Paul, Pound, and Wise; and surveying for Wise County. Mr. Balthis has successfully completed projects for such private clients as Paramount Land Company, Barnette Contractors, Paramount Coal Company, Barnette Enterprises, Double Kwik Markets, and A&G Coal Company over the years.

He has regularly performed deed research; preparation of survey plats; and deed descriptions for property purchases associated with banks and lending institutions. Mr. Balthis has performed important flood insurance surveys as well. Much of his work has been in the Virginia counties of Wise, Dickenson, and Buchanan and in Letcher County, Kentucky.

ROY K. BALTHIS, Registered Land Surveyor

Skelly and Loy, Inc.
Wise, VA

DARRYL L. WHITE, Design Technician



EDUCATION:

Associate Degree,
Computer Aided Drafting
and Design, 2011,
Mountain Empire
Community College

YEARS OF EXPERIENCE:

4 Years

Mr. White responsibilities include developing maps and mine plans operations in West Virginia and Virginia, performing volumetric calculations, grading and drainage designs, coal reserve studies, and pond inspections for certification for various clients in Southwest Virginia. Mr. White also assisted with bridge designs and other civil features for clients.

PROFESSIONAL EXPERIENCE

Appalachian Technical Service, Design Technician - Use of AutoCAD and Carlson Programs to design maps; calculate volumes for mining plans, and use of SedCAD for drainage designs.

MidMountain Foods, Abingdon, VA, Order Selector - Essential Functions include data entry (Input daily work orders into a computer database), machine inspection, forklift operation, and warehouse safety. Other responsibilities consist of shipping, pulling orders, and loading trucks. In addition, I have great attention for detail, have the ability to handle time restraints and can interact courteously with managers, customers, and vendors.

Bristol Compressors, Bristol, VA, Machine Operator - Study blueprints, layout, or chary, to visualize work and determine materials needed, sequence of operations, dimensions, and tooling instruction. Compute specific dimensions and machine settings, using knowledge of metal properties and shop mathematics. Position, secure, and align cutting tools I tool holders on machine, using hand tools, and verify their position with measuring instruments

U.S. Army, Topographic Analyst - Trained for nine weeks of Basic training learning basic Soldering skills, and 18 weeks of Advanced Individual Training. This included practice on operating topographical equipment. Part of this time was spent in the classroom and in the field where learning surveying and drafting techniques (Making scale drawings of roads, airfields, buildings and other military projects), aerial photo interpretation and architectural and structural drawings.

DARRYL L. WHITE, Design Technician

EDWARD M. LESNY, P.E., Consulting Geotechnical Engineer

**EDUCATION:**

B.S., Civil Engineering, 1962,
The Pennsylvania State
University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:

Professional Engineer,
Commonwealth of
Pennsylvania, 1967

Professional Engineer, State
of Maryland, 2004

SHORT COURSES:

Impoundment Inspection:
Mining Enforcement and
Safety Administration

Underground Coal Mining, An
Overview: The Pennsylvania
State University

Fundamentals of Rock
Mechanics: The Pennsylvania
State University

Design and Analysis of
Railroad Tracks Program:
Princeton University

Training Course for the Use
of Nuclear Testing Equipment:
Troxler Electronic Laboratory,
Inc.

YEARS OF EXPERIENCE:
50 Years

Mr. Lesny has a total of 50 years experience in the geotechnical aspects of numerous projects. He also has pre-graduation experience gained through employment with a geotechnical engineering consultant.

Mr. Lesny has been involved with the following types of projects:

- High and low-rise buildings
- Bridges
- Dams
- Soil and Rock Cut Slopes
- Waste Treatment Plants
- Embankment Stability
- Quarry Permits
- Warehouses
- Highways
- Retaining Walls
- Pavement Design
- Sinkhole Repairs
- Waste Disposal Permits
- Reclamation Plans

These projects included the design and/or construction employing the following:

- Spread footings
- Caissons
- Underpinning
- Structural fills
- Rock anchors
- End bearing piles
- Shoring
- De-watering
- Blasting
- Friction piles

PROFESSIONAL EXPERIENCE

Over the last six years, Mr. Lesny has been employed by several consultants, on a part time basis, to inspect the work performed by drilling contractors. The subsurface investigation work was associated with commercial projects and county or township bridges.

Slope Stability Analysis - Mr. Lesny's experience with respect to slope stability dates to 1964, when computer programs were not available. He performed the analyses using a combination of graphics and a handheld or desktop calculator. The process was tedious and several hours were spent doing the calculations for one failure arc. He performed such analyses for highway embankments situated over deep glacial deposits located in western and northern Pennsylvania.

With the passing of time, Mr. Lesny learned to use the computer programs which became available. The early programs were not user-friendly and preparing the input for complex dam embankments was challenging.

The following enumerate Mr. Lesny's slope stability analysis experience by category.

PROJECT EXPERIENCE**Earth Dam Design Projects**

Old Ben Coal Company - As a project engineer with Skelly & Loy of Harrisburg, Pennsylvania, Mr. Lesny was in charge of analyzing the subsurface conditions at two large coal slurry ponds to determine if the embankments could be heightened to increase storage capacity.

Sunbury Fly Ash Basin - This project involved the testing of soil and fly ash samples for Pennsylvania, Power and Light Company to provide data to their engineers to analyze if it was possible to raise the height of a major fly ash



storage dam. Mr. Lesny assisted in the slope stability analysis

Brunner Island SES - Mr. Lesny provided geotechnical engineering services and developed a soil testing program for the design of Ash Basin Nos. 6 and 7 at the PP&L, Brunner Island, Steam Electric Station. Upon completion of the testing, he analyzed the stability of the proposed containment structure.

Camp Small Valley - Camp Small Valley is a girl-scout camp located in northern Dauphin county, Pennsylvania. Mr. Lesny prepared the investigation and soil testing programs for this dam. His work on the design included analyzing the slope stability and providing data for the prime consultant to incorporate in the design.

Silver Creek Reservoir - This project was completed with Mr. Lesny's partner, Philip C. Kitlinksi, P.E., and included the re-design of an earth water supply dam declared unsafe by PADEP Division of Dam Safety. The work required performing numerous slope stability calculations because of the configurations studies.

East Stroudsburg Water Supply Reservoir - The East Stroudsburg dam was declared unsafe by the PADEP Division of Dam Safety. Mr. Lesny was engaged by the prime consultant to assist in analyzing the test boring results and prepare the slope stability analysis.

Highway Design Projects

U.S. Route 322, Port Matilda to Philipsburg, Pennsylvania - Mr. Lesny analyzed the cut slopes for this project by plotting the bedrock geometry on stereonets. To perform the analysis, he researched the geology of the area and reviewed the results of the core borings drilled to investigate the roadway alignment. The goal of the study was to determine if pre-split blasting could be used to steepen the slopes and reduce the potential waste.

Section A-12, S.R. 0015, Williamsport, Pennsylvania - The analysis of the test borings data accumulated by the PADOT District 3-0 office over a period of several years, and the preparation of the geotechnical engineering report for Section A-12 of S.R. 0015, north of Williamsport, Pennsylvania. The work included the analysis of several deep cuts using stereonet analyses and the analysis of several sliver fills using a computer program for a sliding block failure. This work was performed under a open end contract with District 3-0 and the highway design was completed by District personnel.

U.S. Route 322, Lewistown Narrows - In June of 1992, Mr. Lesny participated in the study of the widening of the Lewistown Narrows. This section of roadway located in Mifflin and Juniata counties forms one of the last bottlenecks along U.S. Route 322 between Harrisburg and State College. The recommendation made in the Soils and Geologic Reconnaissance Report was to have the roadways separated by mechanically stabilized walls such as the patented Reinforced Earth Wall. The Lewistown Narrows area has been investigated several times and the conclusion is that the existing talus slopes must not be disturbed otherwise catastrophic slope failures could occur. The design proposed by Larson Design Group would accomplish widening of the roadway with no impact on the existing slopes covered with rock rubble.

PA Route 45, Spring Mills, Pennsylvania - As a part of an open end contract with the PADOT District 2-0 office located in Clearfield, Pennsylvania, Larson Design Group was assigned the task to design the widening of Pennsylvania Route 45 immediately east of the town of Spring Mills, in Centre County. At this location the roadway and its narrow shoulders followed a sharp curve through a deep rock cut that impaired the sight distance. Vehicles traveling at high speeds had difficulty negotiating the curve and numerous accidents occurred. Mr. Lesny developed a test-boring program to investigate the rock cut and applied stereonet analysis to the geometry of the rock to determine the most suitable slope for the rock cut. His recommendation was to put the natural bedding planes of the rock to control the direction of benching of the slope and eliminate the potential for massive slides. The construction of the widening has been completed and the benching technique recommended has resulted in an attractive, stable slope.

S.R. 0015, Tioga County, Pennsylvania - Mr Lesny analyzed the geotechnical data for the design of the Mansfield By-Pass, Section E-61 of S.R. 0015 and section F-12 of S.R. 6015, located to the north of Mansfield. The work included analyzing the widening of fills and cuts, the evaluation of storm water detention ponds, studying the use of conventional spread footings to support bridge abutments. The significant challenge associated with the project is



proving that the slide that occurred in 1976 as a result of the construction of the nearby Tioga-Hammond Dam is safe. Mr. Lesny utilized the PCSTABL computer program to perform the slope stability of the embankment slopes associated with the project.

Landfill and Flyash Disposal

Throughout his career Mr. Lesny has provided geotechnical services to consultants requiring slope stability analyses of landfills and fly ash disposal facilities.

Steeltown-Highspire Class III Demolition Waste Landfill - This project included preparation of the permit application and plans for the expansion of an existing landfill. The landfill is located near the Steeltown-Highspire High School and includes an area of 3.5 acres. In addition to the design of the landfill, certification of the construction at various stages was also performed.

Harrisburg Incinerator Waste Area B-2 - The work performed at the site of the B-2 waste area included the excavation of test pits to identify the soil and collect samples for laboratory testing. Soil classification, soil compaction and permeability tests were performed as a part of the permit application. Engineering services provided included the stability analysis of the slopes of the containment embankment and the evaluation of the bearing capacity of the soil/rock that would support the landfill.

Harrisburg Incinerator Waste Area B-3 - In 1994, Mr. Lesny performed the stability analysis and bearing capacity analysis for the B-3 waste disposal area as a sub-consultant to Brinjac-Kambic of Harrisburg.

Clinton County Landfill, Clinton County, Pennsylvania - As a sub-consultant to the firm of Cummings and Smith of Lewisburg, Pennsylvania, Mr. Lesny provided soil-testing services to evaluate soil which was to be used as attenuating soil base in a construction/demolition waste landfill. The testing included grain size, standard compaction and consolidation tests. The purpose of the testing was to determine the change in the permeability of the soil with an increase in load simulating the load due to the landfill.

Rock Run Fly Ash Disposal Pit, Tioga County, Pennsylvania - Mr. Lesny performed slope stability analyses for the permit application at this site for the firm of Walter W. Kaufman Associates of Camp Hill, Pennsylvania. The primary containment for the fly ash is a former coal strip mine in north central Pennsylvania. The final height of the fill above the surrounding ground surface was approximately 60 feet.

Mine 24 Fly Ash Disposal Site, Cambria County, Pennsylvania - The Mine 24 Fly Ash Disposal Site is associated with several coal fired co-generation plants. The final design height of the pile for which we performed slope stability analyses is 250 feet. This work was performed for RNS Services through Walter W. Kaufman Associates.

Greentree Landfill, Jefferson County, Pennsylvania - Mr. Lesny was retained by Blazosky Associates, Inc., in 1992, to perform a slope stability analysis for the Greentree Landfill in Jefferson county to satisfy the requirements of the Department of Environmental Protection.

Federal Mine No.1 Fly Ash Disposal Site, Granttown, West Virginia - At the request of Ross Consulting Engineers, Mr. Lesny performed a slope stability analysis for the Federal Mine No. Fly Ash Pile which is to be constructed of fly ash generated by a nearby co-generation facility. The analysis was part of the permit application submitted to the West Virginia Department of Natural Resources.

Antrim Construction/Demolition Landfill, Tioga County, Pennsylvania - The slope stability analysis for the Antrim Construction/Demolition Landfill is Mr. Lesny's most recent project in the area of demolition waste disposal. He completed a detailed slope stability analysis in February of 1996.

Robindale Energy, Johnstown, Pennsylvania - Mr. Lesny is currently performing soil tests to certify the suitability of the on-site soil for liner construction for a fly-ash disposal site that will cover 180 acres. He has also performed a slope stability analysis of the proposed ash pile.



Quarries

Mr. Lesny has completed stereonet analyses of the following quarries. The stereonet analysis is a graphical procedure for analyzing the safety of the high-walls based on the orientation of the bedding planes and joint system. The result does not yield a specific factor of safety. Its purpose is to reveal whether there are bedding and joint planes that are potentially un-stable.

Such analyses have been performed for the following quarries:

- HANSON, Penns Park Quarry, Bucks County, Pennsylvania
- HANSON, Downingtown Quarry, Chester County, Pennsylvania
- HANSON, Glen Mills Quarry, Chester County, Pennsylvania
- Eureka Stone Quarry, Chalfont, Pennsylvania
- Warrington Quarry, Warrington, Pennsylvania
- Rushland Valley Quarry, Rushland, Pennsylvania

References



REFERENCES



**Mr. Randy R. Casey, P.E. – Director
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Alpha Natural Resources**

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276-739-5308

Staff Certifications or Degrees





STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

To all to whom these presents shall come, Greeting
Know Ye That The State Board of Registration for Professional Engineers,
of the State of West Virginia, reposing special confidence in
the Intelligence, Integrity and Discretion of
Rex Allen Pepler

DOES, IN PURSUANCE OF AUTHORITY VESTED IN IT
by law, hereby certify that he, having submitted
satisfactory evidence of his ability and experience, is a
REGISTERED PROFESSIONAL ENGINEER

Registration Number 8412

To Hold and use such title in the practice of his profession,
subject to the conditions prescribed by law.



Given under the hand and the Seal
of the Board at the Capitol in the
City of Charleston
this 18th day of July in the
year of our Lord One Thousand
Nine Hundred and Eighty
and of the State the One Hundred
Seventeenth.

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

By

William E. Morris II Secretary

Robert E. Schmidt President

[Signature]

[Signature]

Bill L. Atchley

The State of West Virginia



STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

To all to whom these presents shall come, Greeting.

Know Ye, that The State Board of Registration for Professional Engineers, of the State of West Virginia, expressing special confidence in the Intelligence, Integrity and Dexterity of

Robert E. Golkosky

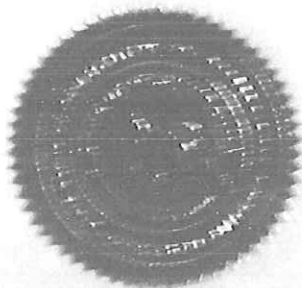
Does, in Pursuance of Authority Vested in it

by law, hereby certify that he having submitted satisfactory evidence of his ability and experience is a

REGISTERED PROFESSIONAL ENGINEER

Registration Number 12454

To hold and use such title in the practice of his profession, subject to the conditions prescribed by law.



Given under the hand and the seal of the Board at the Capitol in the City of Charleston this 21st day of Feb in the year of our Lord One Thousand Nine Hundred and Ninety-five and of the State the One Hundred Thirty-first.

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

W. C. [Signature]
Secretary

[Signature]
President

Robert E. Golkosky

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PO Box 268 Harrisburg PA 17105-0268



License Type
Professional Engineer

License Status
Active

Exam Stamp
10/22/2013
HARRISBURG, PA 17105

Initial License Date
02/22/1984

License #



Expiration Date
09/30/2013

[Signature]

[Signature]

ALTERATION OF THIS DOCUMENT IS A CRIMINAL OFFENSE UNDER 18 P.A.C.S. § 4911



STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

To all to whom these presents shall come Greeting
"Know Ye" That The State Board of Registration for Professional Engineers
of the State of West Virginia, reposing special confidence in
the Intelligence, Integrity and Discretion of

Gerald M. Longenecker

DOES IN PURSUANCE OF AUTHORITY VESTED IN IT
by law hereby certify that he having submitted
satisfactory evidence of his ability and experience is a

REGISTERED PROFESSIONAL ENGINEER

Registration Number 18491

To Hold and use such title in the practice of his profession,
subject to the conditions prescribed by law.



Given under the hand of the
Seal of the Board at the Capitol in the
City of Charleston,
This 11th day of January
in the year of our Lord 2010
and of the State
the One Hundred Forty-Sixth

Members of the Board

Leonard J. Timms, Jr. Richard E. Dwyer

Blair S. Schiffrin William E. Dwyer



**West Virginia State Board of Registration
for Professional Engineers**

GERALD W LONGENECKER
[REDACTED]

This is to certify that the above named PROFESSIONAL ENGINEER
has met the requirements of the law, is duly registered and is
entitled to practice engineering in the State of West Virginia.

EXPIRES JUNE 30, 2013

Commonwealth of Pennsylvania
Department of State
Bureau of Professional and Occupational Affairs
PO Box 2649 Harrisburg PA 17105-2649

10 0544645

License Type

Professional Engineer

License Status

Active

Initial License Date

08/04/1967

License Number



Expiration Date

09/30/2013

EDWARD MICHAEL LESNY
218 N 17TH ST
CAMP HILL PA 17011

Katie True

Commissioner of Professional and Occupational Affairs

Edward M Lesny
Signature

Proposed Staffing Plan



PROPOSED STAFFING PLAN



Project Manager - Rex Peppler, P.E., West Virginia Registered Professional Engineer

AutoCAD - Darryl L. White

Mining Engineers – Robert E. Golkosky, P.E., West Virginia Registered Professional Engineer and Terry Schmidt, P.E.

Geotechnical Engineer - Edward M. Lesney, P.E.

Engineering Technician – Holland Sturgill

Environmental Engineer – Gerald Longenecker, P.E., West Virginia Registered Professional Engineer

Surveying – Roy L. Balthis, Registered Land Surveyor

Other support staff as needed.

Descriptions of Past Projects



Middle Creek Gob Pile Reclamation Project Cedar Bluff, Virginia

Client/Owner

Circle L Land Company, LLC

Estimated Project Value

Total: \$150,000

Completion Date

March 2013 (acquiring final permit for re-mining)

Key Components

Stream Crossing; Drainage Control; Thermal Energy Evaluations

Reference Contact

Mr. Tim Anders
Circle L Land Company, LLC
241 Circle T Drive
Raven, VA 24639
P: 276-345-1401



Circle L Land Company owns coal rights to coal refuse in an area known as Middle Creek located near Cedar Bluff, Virginia. The site supported a coal processing plant many years ago and the rejected material from that operation was stockpiled on-site. This refuse/gob stockpile is planned as a reclamation and reprocessing project by Circle L Land. The operator will selectively reclaim the higher quality portion of the existing coal gob as fossil fuel. Skelly and Loy, Inc. has provided engineering services to Circle L Land Company to permit this reclamation project.

The Middle Creek site is made up of sloping terrain containing two significant coal refuse piles. Sampling and analysis of these gob piles indicate that significant BTU value and potential recovery

of the energy available as a viable fuel will be cost-effective. In fact, the mining company has been able to secure buyers with the assistance of Skelly and Loy through our research and evaluation of material testing for the site.

A permit for reclamation of existing refuse piles is anticipated to be issued by the end of March 2013. Once that permit is approved, Circle L will immediately begin reclamation and reprocessing of this coal which is destined for the utility market. The value of the coal on this relatively small site of about 50 acres is in the multi-millions of dollars, and there are several customers interested in purchasing the desirable product.

Skelly and Loy has provided assistance to our client along the way by



- evaluating coal quality and recoverable quantity,
- establishing water sampling stations and parameters based on available data to reduce permit costs,
- developing drainage control for the site which could be readily approved by the regulators,
- coordinating the entire approval process with the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and other governing groups such that plans were readily accepted,
- offering expertise to develop a significant stream crossing based on extensive flow calculations, and
- delivering permittable plans and support information to regulatory agencies including DMLR, MSHA, and DEQ.

Skelly and Loy personnel further provided assistance to Circle L Land by offering sales and transportation contacts for development of the business side of the operation. Our expertise has included providing necessary air quality permitting for an on-site screening plant. Skelly and Loy team members delivered technical assistance through our own personnel and through our established relationships with other important members of the permit team, such as the water quality testing laboratory.

Circle L Land Company is extremely pleased with the permit package, and Skelly and Loy is proud to say that we delivered.



Virginia AML Refuse Reclamation and AMD Corrections at Pole Bridge Road Wise County, Virginia

Client/Owner

Virginia Department of Mines,
Minerals, and Energy -
Abandoned Mine Land Group

Estimated Project Value

Total: \$50,000

Completion Date

February 2013

Key Components

Acid Mine Drainage; Impounded
Mine Water; Site Drainage
Control

Reference Contact

Mr. Richard Davis
Virginia DMME - AML Project
Coordinator
3405 Mountain Empire Road
P.O. Drawer 900
Big Stone Gap, VA 24219
P: 276-523-8216

Project Manager

Rex Pepler, P.E.



The Virginia Department of Abandoned Mine Lands selected Skelly and Loy, Inc. for this complicated project to eliminate a dangerous highwall; eliminate a dangerous impoundment of water within an abandoned mine; eliminate subsidence issues; reclaim an old mine spoils pile on-site; and establish drainage control which would include managing an acid mine drainage.

Skelly and Loy established an exploratory drilling program and offered a conceptual plan for completing all of the goals associated with the project.

The Pole Bridge Road site is situated immediately adjacent to a heavily traveled thoroughfare. Several residents in the area were complaining of subsidence problems, and traffic traveling the state-maintained road was subjected to a potentially dangerous highwall. This site had experienced a major blowout of mine discharge in the 1980s, and the present drainage was obviously acidic with very difficult drainage control issues.

Skelly and Loy personnel surveyed the site, selected an experienced drill team and worked closely with them during exploratory efforts, and evaluated all conditions related to the project objectives. We were able to recognize some potentially serious problems associated with the impounded mine water and to firmly establish pH control and drainage control in the area. Our team developed a conceptual plan and worked closely with the Virginia AML group to decide the best possible solution for managing water issues, highwall elimination, AMD, and surface drainage control.

After a thorough evaluation, Skelly and Loy and VAML personnel concluded the design phase of this project February 28, 2013. Skelly and Loy will enter the next phase by offering advice for the selection of an appropriately qualified contractor to finalize construction.

Virginia AML management and supervisory personnel are pleased with the services that Skelly and Loy has provided on this project.

Red Ash Strip Mine and Gob Pile Reclamation Project Whitewood, Virginia

Client/Owner
Circle L Land Company, LLC

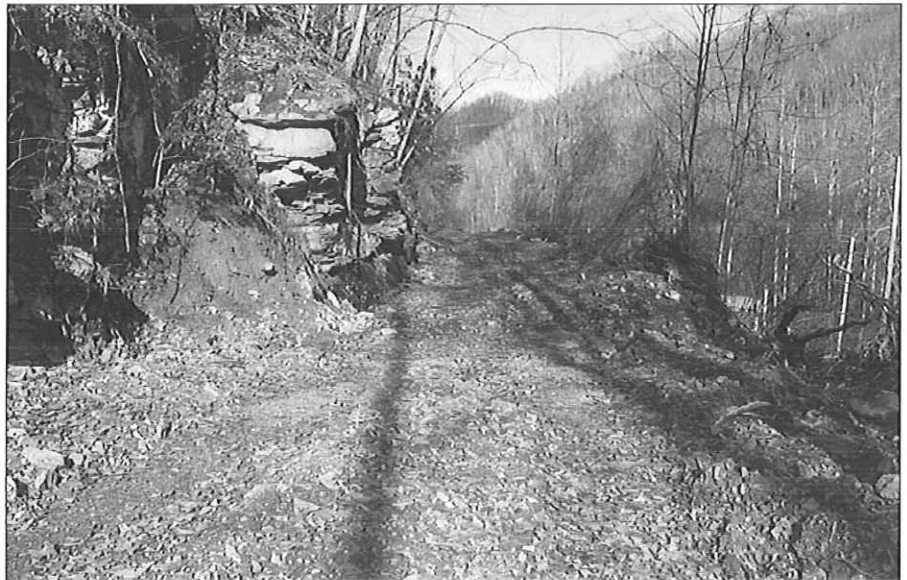
Estimated Project Value
Total: \$225,000

Completion Date
January 2013

Key Components
Stream Crossing; Drainage
Control; Management of Mine
Discharge

Reference Contact
Mr. Tim Anders
Circle L Land Company, LLC
241 Circle T Drive
Raven, VA 24639
P: 276-345-1401

Project Manager
Rex Peppler, P.E.



Circle L Land Company owns coal rights over an area known as Sugar Cove near Whitewood, Virginia. The site under permit was mined many years ago within the Jewell coal seam, and this project offers the mining company the opportunity to remine this high-quality coal seam. **Skelly and Loy, Inc. has provided engineering services to Circle L Land Company to permit this site for remining and refuse reclamation.**

The Sugar Cove site is made up of steep terrain with an existing narrow bench. Several old gob piles were deposited on-site by more than one mining company prior to the 1977 SMCRA Act, and the first phase of this project permitted the reclamation of those piles. In fact, the mining company has been able, through our research and assistance, to reprocess a portion of the gob for sale as fossil fuel. Other inert materials have been managed appropriately in an approved

spoils area.

A permit for remining of the Jewell coal seam is anticipated to be issued by the end of January 2013. Once that permit is approved, Circle L will immediately begin stripping this high-quality coal for the metallurgical market. The value of the coal on this relatively small site of about 80 acres is in the multi-millions of dollars, and there are several customers waiting in line to purchase the desirable product.

Skelly and Loy has provided assistance to our client along the way by

- evaluating coal reserves and coal quality;
- obtaining reference geologic information to reduce permit costs;
- establishing water sampling stations and parameters based on available data also reducing permit costs;



- developing technically innovative drainage control for the site, thereby offering plans which could be approved by the regulators;
- coordinating the entire approval process with the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and other governing groups such that plans were readily accepted;
- offering expertise to develop a significant stream crossing based on extensive flow calculations; and

delivering permittable plans and support information to regulatory agencies including DMLR, MSHA, and DEQ.

Skelly and Loy personnel further provided assistance to Circle L Land by offering sales and transportation contacts for development of the business side of the operation. We were able to provide necessary air quality permitting for a screening plant established on-site. Skelly and Loy team members delivered technical assistance through our own personnel and through our established relationships with other important members of the permit team, such as the water quality testing laboratory.

Circle L Land Company is extremely pleased with the permit package, and Skelly and Loy is proud to say that we delivered.



Government Financed Construction Contract (GFCC) Subsidence AML Reclamation Projects, Clearfield County, Pennsylvania

Client/Owner

R. H. Dotts Contracting, LLC

Estimated Project Value

Firm Responsibility: \$15,340

Completion Date

Ongoing

Key Components

AML Reclamation; Permitting
Services; Engineering Design

Reference Contact

Mr. Joe Cusick
5527 Glen Hope Boulevard
Glen Hope, PA 16645
P: 814-378-7802
F: 814-672-4262

Project Manager

Bradley R. Shultz, E.I.T.



Skelly and Loy has performed engineering design and permitting services for R.H. Dotts Contracting, LLC for two GFCC projects located in Clearfield County, Pennsylvania. The two GFCC projects, located in Woodward Township, immediately outside of the Borough of Brisbin along State Route 153, involved reclamation and coal removal associated with abandoned underground mine complexes for the Upper Freeport coal seam. The shallow underground mine workings at the two adjacent sites, **resulted in significant subsidence features on the two properties.** Skelly and Loy was retained by R.H. Dotts Contracting in 2008 for the three acre Dunlap site to provide all of the necessary permitting and design information for submission as a GFCC project to the Pennsylvania Department of Environmental Protection Bureau of Mining and Reclamation (PA DEP BMR) Moshannon Office. Following PA DEP BMR approval of the GFCC application, R.H. Dotts Contracting, LLC performed the coal removal and reclamation work that was completed in 2010.

In 2011, R.H. Dotts Contracting, LLC retained Skelly and Loy to conduct the engineering design and permitting services for the five acre Machipongo site adjacent to the Dunlap project site. Upon development of the necessary engineering drawings using publicly available LIDAR mapping for the site, the GFCC application including all the necessary forms, drawings, and supporting information were submitted to PA DEP BMR Moshannon Office for review and comment. Skelly and Loy worked closely with the client to develop the responses to comments and upon final approval from PA DEP BMR, R.H. Dotts Contracting began the coal removal and reclamation activities at the site in July 2011. Reclamation work at the project site is expected to continue until early 2012. **The results of the Machipongo and Dunlap GFCC projects will have reclaimed roughly eight acres of abandoned underground coal mines that had created significant subsidence features on the properties, which will allow for the safe future use of each site.**



Armstrong Energy Subsidence Evaluation and Comment Letter to PA DEP Armstrong County, Pennsylvania

Client
Tenaska, Inc.

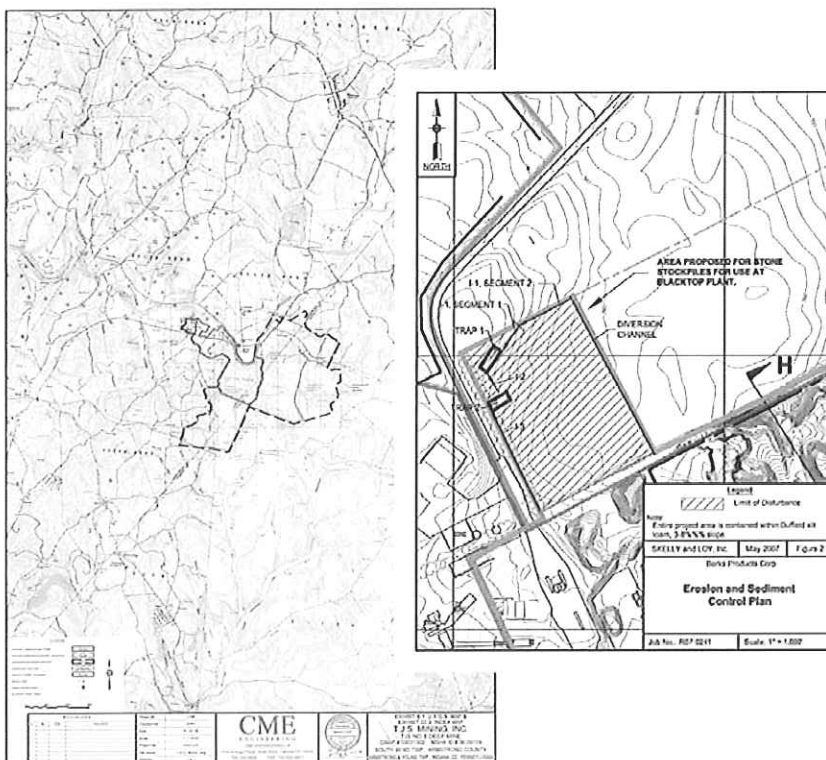
Estimated Project Value
Total: \$12,000
Firm Responsibility: \$12,000

Completion Date
May 2008

Key Components
Permit Review; Hydrogeologic
Analysis; Subsidence Analysis

Reference Contact
Mr. James D. Stallmeyer
P.O. Box 12259
Pittsburgh, PA 15231-0259
P: 860-693-1740

Project Manager
Mark A. Williams



Skelly and Loy was engaged by Tenaska, Inc. to prepare a letter to convey to the Pennsylvania Department of Environmental Protection (PA DEP) comments and objectives that Armstrong Energy Limited Partnership, an affiliate company of Tenaska, had pertaining to a coal mine permit application. The nature of the concern is that Armstrong Energy operates a power plant overlying a portion of the proposed TJS Mining's No 5 Mine underground mine permit expansion area located near South Bend, Pennsylvania. Skelly and Loy concentrated its review on the adequacy of the evaluation completed by TJS Mining's consultant with regard to the impact of mining on the hydrology of the area and the potential for subsidence at the Armstrong facility.

The comment letter was prepared by Skelly and Loy based on our review of available published hydrogeologic data, the original mine permit, and revised permit information regarding the development of the proposed TJS Mining No. 5 Deep Mine. Skelly and Loy concluded that future deep mining operations may impact Armstrong's groundwater supplies. Skelly and Loy also recommended that a more detailed analysis of subsidence potential for the No. 5 Mine in the area of the Armstrong Power plant should be completed by TJS Mining. As a preferred alternative, Skelly and Loy suggested that the coal company maintain a mutually agreed upon mining setback from the plant area (such that the Armstrong Power Plant property is outside of the 35 degree angle of draw from the limit of mining) so that there could be no potential impact to the plant from subsidence.

Abandoned Mine Drainage Remediation Project Valley Point #12 Preston County, West Virginia

Client/Owner

Friends of Deckers Creek

Estimated Project Value

Total: \$37,000

Firm Responsibility: \$34,000

Completion Date

2008

Key Components

Site Topographic Survey;
Aquatic Resource Investigations;
Water Quality Sampling and
Testing; Engineering Design;
State and Federal Agency
Coordination

Reference Contact

Mr. Martin Christ
P.O. Box 877
Dellslow, WV 26531-0877
P: 304-292-3970

AMD Project Manager

Bradley Shultz, E.I.T.



The Valley Point #12 Abandoned Mine Drainage (AMD) Remediation Project is located outside of Kingwood, West Virginia on a headwater tributary to Kanes Creek, which is a named tributary to Deckers Creek. Skelly and Loy, Inc. was hired by Friends of Deckers Creek to provide engineering and environmental services to remediate the AMD from two discharges located at this site. These services included site topographic survey, aquatic resource investigations (wetland and stream), water quality sampling and testing, engineering design (including plans, cost estimation, and bid package preparation), state and federal agency coordination, and assistance in preparing the state and federal permits.

At this site, the two mine portals are discharging low flows that have a low pH, and high concentrations of acidity, iron, and aluminum. These discharges have eliminated aquatic life from portions of Kanes Creek.

The engineering design for this project calls for the collection of the discharges in a limestone leach bed for pre-treatment. This effluent is then moved down slope via a channel to a retention pond, prior to treatment in one or two sulfate-reducing bioreactors depending on the flow. From there, the effluent receives tertiary or polishing treatment in a second retention pond and aerobic wetland. Construction of this project was completed in spring 2008.

North Fork Greens Run AMD Treatment Design Preston County, West Virginia

Client

Friends of the Cheat

Estimated Project Value

Total: \$12,500

Firm Responsibility: \$12,500

Completion Date

December 2003

Key Components

AMD Treatment Design;
Construction Inspection

Reference Contact

Mr. Keith Pitzer
119 South Price Street
Suite 206
Kingwood, WV 26537
P: 304-329-3621
F: 304-329-3622

AMD Project Manager

Terry Schmidt, P.E.



The North Fork Greens Run Abandoned Mine Drainage (AMD) Treatment Project is located outside of Kingwood, West Virginia, on a headwater tributary of North Fork of Greens Run near Dinkenberger Road. In 2003, Skelly and Loy assisted Friends of the Cheat by turning a conceptual design of the AMD treatment option prepared by the West Virginia University (WVU) - National Mine Land Reclamation Center into an engineering design and bid specifications package for construction. Skelly and Loy also provided construction inspection services for this project.

At this site, a mine portal is discharging a low flow AMD seep that has a low pH and is high in acidity, iron, and aluminum, that eventually flow into the tributary stream. As indicated in the

provided conceptual design by WVU National Mine Land Reclamation Center for the project, the discharge was collected in a small limestone leach bed on a hillside bench before being discharged into an 860-foot open limestone channel that parallels Dinkenberger Road until it eventually flows into North Fork of Greens Run.

Since construction of this remediation project, WVU and Friends of the Cheat have reported the following water quality improvements:

Parameter	Pre-Construction	Post-Const.
pH	2.7	3.2
Acidity	1,598 mg/l	549 mg/l
Fe	309 mg/l	65 mg/l
Al	104 mg/l	53 mg/l



Comprehensive Engineering, Environmental, and Permitting Services Sequatchie Valley Coal Corporation, Sequatchie County, Tennessee

Client

Sequatchie Valley Coal Corporation

Project Value

Total: \$1,000,000

Firm Responsibility: \$1,000,000

Completion Date

Ongoing

Key Components

Watershed Assessment; Land Management Plan; Acid Rock Drainage Remediation

Reference Contact

Mr. Ken Milmine
Cloud Peak Energy Resources
P.O. Box 3009
555 South Gillette Avenue
Gillette, WY 82717
P: 307-687-6028

Project Manager

Terry Schmidt, P.E.



The Sequatchie Valley Coal Corporation (SVC) is a +1,000-acre surface coal mine operation located in Sequatchie and Van Buren Counties, Tennessee, in a physiographic area known as the Cumberland Plateau. Mining operations were initiated in 1982 under the ownership of the Nerco Coal Corp. In 1993, Nerco decided to close the mine as part of an effort to divest itself of eastern United States coal mining operations. SVC, along with other Nerco land holdings, was purchased in 1995 by Kennecott Energy, presently represented as Cloud Peak Energy Resources LLC (CPE). Reclamation activities were initiated in 1993 and are ongoing at the site. All backfilling, final grading, and seeding have been completed. Current reclamation activities deal primarily with mine drainage and water quality problems. Throughout this reclamation process since 1993, Skelly and Loy has continuously provided engineering and environmental support.

As part of the National Pollutant Discharge Elimination System (NPDES) permit discharge requirement for the property, Skelly and Loy (in conjunction with CPE) developed a watershed assessment and land management plan to address the acid rock drainage and water quality issues across the SVC property. Skelly and Loy designed and oversaw the construction of numerous acid rock drainage remediation measures across the SVC property within both the Dry Creek and Rocky River watersheds. The planning efforts have included a comprehensive evaluation of the water chemistry across the groundwater and surface waters regimes for the property in an effort to develop a strategic planned approach to remediating the water quality concerns for the SVC property. Remedial measures have included the installation of passive wetland treatment, limestone ponds, and anoxic limestone drains. Skelly and Loy designed



and provided construction oversight for dozens of these systems. Skelly and Loy's efforts have also included permit negotiations with Tennessee Department of Environment and Conservation (TDEC),

To assess the recovery of the receiving streams within the respective watersheds, Skelly and Loy completed an annual aquatic survey and water quality analysis of the Dry Creek and Rocky River watersheds as part of the SVC NPDES permit requirements. An extensive aquatic investigation was designed to determine baseline conditions of the Dry Creek watershed. The water quality of these streams had already been degraded by acid mine drainage from prior mining operations within the watershed. Typical annual sampling of Dry Creek watershed streams included 14 sites for populations of benthic macroinvertebrates, organisms which are sensitive to changes in habitat, water quality,

and sediment load and composition. Water samples were collected at 33 sites within the watershed and analyzed both in the field and in the laboratory for 14 different chemical parameters. Several of the streams were traversed to collect data at 27 sampling sites regarding the volume and velocity of stream flow and identification of point source discharge locations. The low flow and normal flow conditions were evaluated for all receiving streams within the scope of proposed SVC mining operations. The stream flow and water quality data were used in the determination of a loading analysis for receiving streams. The data obtained through the aquatic survey and the water quality evaluation, in comparison with historic data, are used in assess degradation of these streams and compare biological recovery associated with the ARD remediation efforts.





Surface Mine Reclamation and Ash Management Service Rausch Creek Land, L.P., Schuylkill County, Pennsylvania

Client/Owner

Rausch Creek Land, L.P.

Estimated Project Value

Total: \$500,000

Firm Responsibility: \$500,000

Completion Date

Ongoing

Key Components

Reclamation of Surface Mines;
Waste Characterization of Coal
Ash; Permitting for Coal Ash
Disposal; Regulatory Permitting
and Negotiations

Reference Contact

Mr. Matt Postupack
978 Gap Street
Valley View, PA 17983
P: 570-682-4600

Project Manager

Terry Schmidt, P.E.



Rausch Creek Land, L.P. owns surface, coal, and mineral rights over a large area in the western portion of Schuylkill County, Pennsylvania. The mining of anthracite coal has historically been performed throughout this region over the last 150 years. Areas that were mined prior to the Reclamation Act of 1977 were not reclaimed. For developing portions of its property, Skelly and Loy has provided services to Rausch Creek Land, L.P. to reclaim and restore a portion of these historical surface mined areas.

These reclamation services have included performing assessments to determine the total potential volume of ash storage/disposal areas within its property holdings. Skelly and Loy estimated that over ten million cubic yards of space is available for the storage/disposal of ash materials. This estimate accounted for the disposal of ash while maintaining the ability to meet the original topographical contour requirements and other regulatory reclamation obligations. In addition, Skelly and Loy also developed a list of potential ash storage areas, prioritizing prospective sites based on access, permitting, and water-handling challenges.

Skelly and Loy has also assisted Rausch Creek Land, L.P. with the preparation of permit modifications for the addition of new ash sources and a "request for determination" for innovative ash handling equipment associated with the beneficial use of ash. The permitting process included collecting samples of the ash and determining the physical and chemical characteristics of the materials. This information was used to determine the ash quality disposal requirements. Skelly and Loy also evaluated existing and potential ash generators and compared the quality of ash generated to new draft guidelines with particular emphasis on meeting the lower concentration limits for arsenic.

During an incident when ash was placed on a permitted area which did not meet beneficial use criteria, Skelly and Loy led the negotiations between the Pennsylvania Department of Environmental Protection, the permit holder, and the ash generator to resolve the outstanding compliance issues. As part of the negotiation process, Skelly and Loy prepared compliance plans to ensure that the ash fill materials would meet the ash quality placement requirements.



Six Mile Run, Sandy Run, and Longs Run AMD Assessment and Remediation Plan Broad Top Township, Bedford County, Pennsylvania

Client

Broad Top Township

Estimated Project Value

Total: \$1,750,000

Firm Responsibility: \$300,000

Completion Date

2004-2009

Key Components

Growing Greener Grant;
Abandoned Mine Design;
Engineering Design; Permitting;
Mine Seal Design

Reference Contact

Mr. Ernest Fuller
P.O. Box 57
Defiance, PA 16633
P: 814-928-5253

Project Manager

Terry Schmidt, P.E.



For more than 20 years, Broad Top Township has worked to improve the quality of life for its citizens by addressing the negative environmental impacts related to abandoned mine land (AMLs) and abandoned mine drainages (AMD). In 2001, serving as the Township's environmental consulting firm, Skelly and Loy, Inc. completed an AMD assessment of the combined Six Mile Run and Sandy/Longs Run watersheds. The purpose of this evaluation was to update existing water quality information and establish a priority list for AMD remediation projects. The focus of this project was a year-long field survey and water quality sampling of the three watersheds to record flow and water quality parameters typical for AMD, ranging from net acidic with high iron and aluminum concentrations to net alkaline discharges containing elevated ferrous iron concentrations.

This investigation resulted in the identification of 80 discharges: 41 discharges located along Six Mile Run, 24 discharges along Sandy Run, and 15 discharges along Longs Run. The majority of these discharges are associated with abandoned underground coal mines, but some areas of abandoned or partially reclaimed surface mines have also resulted in AMD discharges within the watersheds. In addition, water

quality data indicated that cumulatively the monitored AMDs contribute a total of 63 tons per year of iron, 42 tons per year of aluminum, and 542 tons per year of acidity to the watersheds. Skelly and Loy estimated the cost for construction of passive treatment systems to remediate all the monitored AMDs at \$6,680,000 and that an additional \$4,000,000 would be needed for operation, maintenance, and replacement of the systems. Skelly and Loy developed a comprehensive remediation plan that identified passive treatment of 26 discharges and relocation of one discharge as top priorities in this 28-square-mile study area.

Skelly and Loy completed the design and supervised the construction of the high-priority remediation projects, entitled "Longs Run Regional AMD Remediation Project Phase 1 and 2." The engineering design details the specifications for the construction of 12 passive treatment systems to effectively abate 13 discharges. This elaborate set of passive treatment systems restored nearly the entire main stem or approximately 5.25 miles of Longs Run.

Within the Six Mile Run watershed, Skelly and Loy completed the engineering design and performed



construction oversight of 9 passive AMD treatment systems to remediate 13 AMD discharges. These constructed passive treatment systems have helped to restore approximately three miles of Six Mile Run and an entire tributary known as Shreves Run.

The components of these 21 passive treatment systems included channel modifications to reroute discharges and/or stormwater, mine seals within exposed mine entries, limestone and settling ponds to impart alkalinity and capture the precipitated heavy metals, dosing siphons, inline and inlet control structures to completely drain the ponds for removal of the metal precipitates and sludge, and aerobic wetlands for tertiary treatment. Due to the presence of aluminum in most of the discharges, innovative flushing technologies were incorporated into the design for many of the passive treatment systems to manage the accumulation of metal precipitates in the limestone void spaces.

In completing the designs, Skelly and Loy's engineering team completed surveying and mapping, conceptual engineering design, erosion and sediment control planning, and permits. These professionals determined limestone pond, vertical flow wetland, aerobic wetland, and settling pond configurations; specified pond and wetland berm heights, types, and outlet structures; calculated storage volumes; estimated retention times and surface areas; and detailed grading of topographic features. Skelly and Loy computed expected treatment conditions, sludge accumulation volumes, and clean-out methods.

All construction work was completed by Broad Top Township personnel with Skelly and Loy

providing construction oversight and final design as-builts.

Throughout the design and construction process, Skelly and Loy as the engineering design firm and Broad Top Township as the construction entity worked closely together to achieve the individual objective at each AMD discharge site and to complete each project within the funding budget.

These individual projects were part of the larger Broad Top Township/Coaldale Borough Wastewater Management and Environmental Restoration Program, which is working to solve problems associated with non-point pollution throughout the two municipalities, especially abandoned mine drainage and failing on-lot sewer systems. Partnership cooperation and stakeholder communication have been essential elements of the continued success of this large-scale ecosystem restoration program. Skelly and Loy worked closely on these projects with the Broad Top Township Supervisors, Penn State University Environmental Resources Research Institute, Pennsylvania Department of Environmental Protection Bureau of District Mining Operations, Bedford County Conservation District, Western Pennsylvania Coalition for Abandoned Mine Reclamation, and Bedford County Planning Commission.



Blackleggs Creek Watershed Acid Mine Drainage Remediation Projects Indiana County, Pennsylvania

Client

Blackleggs Creek Watershed
Association

Estimated Project Value

Total: \$2,000,000
Firm Responsibility: \$300,000

Completion Date

2005-Present

Key Components

AMD Treatment System;
Engineering Design; Permitting;
Mine Seal Design; Abandoned
Mine Reclamation

Reference Contact

Mr. Art Grguric
P.O. Box 59
Clarksburg, PA 15725-0059
P: 724-639-9572

Project Manager

Terry Schmidt, P.E.



In 2001, the Blackleggs Creek Watershed Association (BCWA) received funding from Pennsylvania's Growing Greener Grant and Section 319 programs to design and construct three passive and one semi-active abandoned mine drainage (AMD) treatment systems to address the iron, aluminum, and acidity loading of the Big Run #2, #3, #7, and #8 discharges into Big Run, a tributary to Blacklegs Creek. Upon receiving the funding for each individual project, Skelly and Loy, Inc. was contracted by BCWA to complete the engineering design and permitting of the treatment systems. The ultimate goal of the watershed restoration efforts is to restore Blacklegs Creek watershed to a put-and-take trout fishery through the remediation of these high flow AMD discharges.

The goal of the Big Run #2 project was to construct and operate a passive AMD treatment system to reduce the aluminum and acidity loads while adding some excess alkalinity into Big Run and ultimately Blacklegs Creek. The Big Run #2 discharge originates from a deep mine drainage heading along Big Run in Conemaugh Township, Indiana County. While the water chemistry, specifically the aluminum and acidity concentrations, are not severe, the average flow rate of the discharge is 1,250 gallons per minute (gpm), which translates to 252 tons of acidity and 42 tons of aluminum



discharge entering Blacklegs Creek annually.

The Big Run #2 passive treatment system includes a piping network to direct the discharge from a deep mine drainage heading underneath Big Run and to the treatment location, which includes an oxic limestone pond containing 3,400 tons of limestone and a settling pond/wetland which includes inline water control structures to adjust the surface water elevations in the limestone bed and wetland. The limestone pond inline structure is also used to manually flush metal precipitates from the void spaces of the limestone. In addition, BCWA with the help of Skelly and Loy submitted a Growing Greener Grant in 2005 for additional limestone due to the increase in average flow rates for the discharge. The grant was awarded and BCWA added the additional limestone to the pond in 2006.

The Big Run #7 passive treatment system targeted an AMD discharge from an exposed underground mine entry, with average flows of 800 gpm and moderate concentrations of aluminum and acidity. A passive treatment system design was completed that utilized a 4,000-ton oxic limestone pond and settling pond to fit in the site constraints. A wet mine seal was designed and



installed at the exposed mine entry to either direct the AMD into the limestone pond or into a diversion channel that bypasses the system. The limestone pond incorporates inline structures for the purpose of manually flushing the aluminum precipitates from the void spaces of the limestone. Prior to completion of the Big Run #7 AMD passive treatment system in 2006, the discharge contributed approximately 275 tons of acidity and 26 tons of aluminum annually to Big Run/Blacklegs Creek.

The Big Run #8 AMD discharge was the most complex and difficult to remediate due to the drainage heading that was installed by blasting approximately 1,000 feet horizontally through bedrock from Big Run into a low point in the underground mine complex for dewatering. A mine seal and control valve were designed and installed at a reduction point in the drainage heading from the mine in order to hydraulically control outflow from the underground mine complex. This mine seal allowed raising the mine pool elevation over 20 feet to discharge the AMD into a passive AMD treatment system that included two 2,400-ton limestone ponds and one settling pond. Due to the significant increase in the mine pool elevation, AMD discharged from an adjacent mine entry location. This mine entry was stabilized and sealed with a hydraulic outlet pipe that conveyed the AMD and bypassed the Big Run #8 treatment system. In addition to the design and construction of the limestone-based passive treatment system, the existing highwall feature at the site that resulted from the incidental coal removal as part of the project was filled with the excavated material from the Big Run #8 treatment system and stabilized. The system and site improvements were completed in 2009-2010. The Big Run #8 AMD was characterized as net acidic with high aluminum and moderate to high iron and acidity concentrations and an average flow of approximately

1,000 gpm. Annually, the Big Run #8 raw AMD discharge contributes approximately 57 tons of aluminum, 33 tons of iron, and 584 tons of acidity.

Because of the high aluminum loading rates for each AMD discharge into the constructed limestone-based passive treatment systems, inline structures and perforated piping networks with the limestone beds were designed and installed to manually flush the metal precipitates from the void spaces periodically by BCWA personnel. Inlet structures were installed for most of the settling ponds to allow control of the retention time for maximum treatment efficiency and dewatering of the basin for maintenance purposes such as sludge removal.

The Big Run #3 AMD discharge was not capable of treatment due to location, which required the addition of excess alkalinity to an existing treatment system outfall for in-stream remediation of the untreated discharge. A semi-active alkaline chemical feed system was designed and constructed in 2010 using the outfalls from the Big Run #7 and #8 passive treatment systems. Hydrated lime will be added to the two system outfalls using a hydraulically driven tipping bucket dispensing mechanism with a 30-ton silo storage unit. This alkaline chemical addition is expected to provide final polishing to the two passive system outfalls, which can average approximately 1,800 gpm combined, and impart excess alkalinity into Big Run and ultimately Blacklegs Creek. A rock-lined mixing channel, settling pond, aerobic wetland, and sludge dewatering pond were the additional major components of the treatment system, which will be maintained by BCWA. The treatment system construction will be completed and operation initiated in 2011.



Boyce Park Acid Mine Drainage Remediation Project Allegheny County, Pennsylvania

Client/Owner

Jeff Zell Consultants, Inc.

Allegheny County Department of
Public Works

Estimated Project Value

Total: \$55,000

Completion Date

2003-Present

Key Components

AMD Passive Treatment System
Design; Operations and
Maintenance Services; OM&R
Plan Development; Construction
Inspection

Reference Contact

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Severe Acid Mine Drainage (AMD) enters Piersons Run located within the Allegheny County portion of the Turtle Creek watershed and Abers Creek, both of which are classified as trout-stocked fisheries. Skelly and Loy, Inc. assisted in the preparation of a Growing Greener Grant subsequently awarded to the Allegheny County Conservation District (ACCD) for the design and construction of passive treatment systems at these high-priority AMD discharges using one central site within the county/regional park known as Boyce Park. The AMD discharges lower the naturally low pH and produce elevated dissolved metals concentrations in the receiving streams.

ACCD selected Skelly and Loy to design the passive treatment system(s) for an estimated 20- to 25-year life and to supervise their construction in 2007. Based on water quality and flow data and site surveys prepared by Skelly and Loy, AMD design experts evaluated alternatives for treating and routing

the three AMD discharges. One elaborate passive treatment system was proposed and constructed for treating all three of the discharges due to the close proximity of the discharges and the county park-imposed site constraints.

TREATMENT SYSTEMS

All three discharges were treated separately using independent limestone-based treatment ponds but were combined in the final polishing wetland to create one final treated discharge from the site. The treatment systems included limestone ponds, vertical flow wetlands, settling ponds, and wetlands. The design for the passive treatment system(s) included the determination of the configurations of limestone/VFW and settling ponds for routing and treating the discharges based on site topography and the characteristics of each discharge.

In the limestone pond used for treating the BP2 discharge, the



AMD passes through the high calcium carbonate limestone (typically greater than 80% CaCO₃) and dissolves the limestone to impart alkalinity and neutralize acidity. Similarly, in the VFWs for BP3 and BP4, a layer of compost material is placed on top of a limestone bed to help to control the precipitation and coating of iron within the limestone bed and to enhance the limestone dissolution by trapping carbon dioxide. The net alkaline water is then routed out of the limestone bed via piping networks at the bottom of the ponds and through settling or retention ponds for precipitation of the metals, primarily iron and aluminum. Skelly and Loy designed both manual flushing systems and automatic dosing siphons to aid in the removal of aluminum and iron precipitates from the void spaces in the limestone ponds and VFWs. Finally, the water from all three discharges is combined in a final polishing wetland before discharge to an existing wetland area in the headwaters of Piersons Run. Before their treatment, the individual AMD discharges were characterized as follows in Figure 1.

After construction of the passive treatment systems, the water quality was dramatically improved. Flows remained fairly consistent and the typical combined final

effluent quality is provided below in Figure 2.

Skelly and Loy was subsequently retained by the Allegheny County Department of Public Works starting in 2003 to the present to perform operation and maintenance (O&M) checks and to ensure that all systems continue to function as designed. Skelly and Loy continues to perform O&M services including system flushing, water quality and flow monitoring and maintaining hydraulic structures.

FIGURE 1: BOYCE PARK RAW AMD DISCHARGES CHARACTERIZATION

SITE	FLOW (GPM)	PH (SU)	ALKALINITY (MG/L)	ACIDITY (MG/L)	TOTAL IRON (MG/L)	TOTAL ALUMINUM (MG/L)	TOTAL MANGANESE (MG/L)
BP2	19	4.6	12.4	55.8	0.48	13.4	0.29
BP3	29	3.3	0.0	257.0	5.0	25.3	0.7
BP4	7	3.5	1.7	467.5	15.0	71.9	1.7

FIGURE 2: BOYCE PARK SYSTEM FINAL OUTFALL

SITE	PH (SU)	ALKALINITY (MG/L)	ACIDITY (MG/L)	TOTAL IRON (MG/L)	TOTAL ALUMINUM (MG/L)	TOTAL MANGANESE (MG/L)
ALL	8	82	-70	0.06	<0.05	0.16

Black Run Stream Restoration Harrisburg, Pennsylvania

Client

City of Harrisburg, PA

Estimated Project Value

Total: \$175,000

Firm Responsibility: \$65,000

Completion Date

Fall 2007

Key Components

Fluvial Geomorphology; Natural
Channel Design; Construction
Oversight

Reference Contact

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P: 717-255-3091

Project Manager

Gerald W. Longenecker, P.E.



Funded by the Department of Environmental Protection's Growing Greener program, the construction of the Black Run Stream Restoration project was completed in the fall of 2007. This is the first large scale natural stream channel design stream corridor restoration project in the Paxton Creek watershed, the principal watershed within the Commonwealth's capital. Located on private land, the project is immediately upstream of the Black Run and Paxton Creek confluence and is less than a mile upstream of the Wildwood Lake Sanctuary, which is within Harrisburg City limits. The project was sponsored by the City of Harrisburg as part of its ongoing efforts to reduce sedimentation in Wildwood Lake.

The Black Run project site was identified in the 2003 Paxton Creek Stream Corridor and Watershed Assessment (conducted by Skelly and Loy for the City of Harrisburg) as one of the most severely eroded channel segments in the entire 27-square mile

heavily urbanized Paxton Creek basin. It was therefore a significant sediment source for Wildwood Lake. The lake remains a vital - and restorable - community resource even though its capacity (and therefore flood attenuating ability) has been severely compromised by infilling with stream-borne sediment.

Black Run is a good example of how the "legacy effects" of past land use practices are at the root of why we need to rehabilitate and stabilize urban streams. As the upstream watershed was deforested and farmed, sediment was originally deposited behind the dam for the original grist mill at this location (dating back to at least 1816). This dam was subsequently replaced by an old roadway, which crossed the stream corridor in about the middle of the project area. Compounding these older disturbances, additional sediment was added to this area as a result of suburban development in Black Run's watershed in the 1960s and 70s, when construction site



erosion control practices were rudimentary at best. Before restoration, the incised, eroding channel of Black Run snaked through a five-foot thick wedge of highly erodible sandy and silty "legacy sediments" extending upstream of Paxton Church Road, which forms the downstream project limit. The road berm and undersized culvert at this crossing acted as an effective dam (the culvert was previously replaced with a larger one to reduce local flooding).

The Black Run Restoration Project installed a new, 600-foot long meandering channel within a reconstructed flood prone zone. Design constraints on the location of the new channel and the extent of the reconstructed floodplain included a closely-adjacent sewer line (with several manholes), the presence of a marginal wetland along one side of the old floodplain, and the need to retain as many existing trees as possible. Since restoration of a fully forested corridor was a priority, floodplain width and location were adjusted to favor the selective removal of weedy tree species (such as locust) and the preservation of natives, especially large specimen trees. Fast-growing pioneer species such as sycamore, alder and ash were also preferentially planted on the constructed floodplain.

A number of structures, including cross rock vanes, j-hooks, and boulder-protected banks, were installed within the new channel to resist the erosive streamflows associated with rapid stormwater runoff within Black Run's still-developing basin. Finally, a portion of the channel that was abandoned (thereby protecting Shutt Mill Road, which was being eroded by the original channel alignment) was converted into a 'beaded swale', which now conveys stormwater runoff over a long path from a stormwater outfall to the main channel. This planted wetland swale now provides habitat diversity, energy dissipation and a measure of stormwater pre-treatment during storm events. More than 1200 native trees and shrubs were installed by community volunteers during the final phase of this project.

Skelly and Loy provided design, permitting, and construction management services for this project (the latter include bid package development, construction oversight, and post-construction as-built surveys and monitoring for permit compliance). Skelly and Loy also organized and supervised the volunteer planting effort.



Stream Restoration North Branch Mehoopany Creek, Wyoming County, Pennsylvania

Client

Mehoopany Creek Watershed
Association

Estimated Project Value

Total: \$600,000
Firm Responsibility: \$120,000

Project Completed

2007

Key Components

Growing Greener Grants;
Glaciated Terrain; Historic
Channel Alignment; Grade-
Control Structures; Bank
Stabilization; Habitat
Enhancement Structures; "W"
Weir for Sediment Transport at
Bridge; Construction Oversight

Reference Contact

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Project Manager

Gerald W. Longenecker, P.E.



The North Branch Mehoopany Creek Stream Restoration Project is located in Forkston Township, Wyoming County, Pennsylvania within the area of continental glaciation region of NE United States. The overall project included the restoration of more than 3,800 linear feet of actively eroding and unstable stream channel. The design included the relocation for a stream reach approximately 1,165 linear feet in length and restoration of the stream channel in its original location for an additional 2,695 feet. The reach is just north of State Route 87 and northwest of the town of Forkston, Pennsylvania, just upstream of the confluence with the main stem of Mehoopany Creek. The goal of this project was to make this a more stable C4 type stream, according to the Rosgen Classification of Natural Rivers.

Historically, the watershed has been highly affected by past glaciations. Because of this, the soils in the watershed tend to be coarsely textured and highly erosive. The erosive nature of the soil, combined with past land use, has caused the channel of the



North Branch Mehoopany Creek to be highly unstable in localized sections of the watershed.

The design approach chosen for this stream restoration/stabilization effort was based on the principles of natural stream formation outlined in "Applied River Morphology" by Dave Rosgen (1996). Application of the principles of natural channel formation has resulted in the creation of a 40-step design process for the restoration of impacted stream reaches. The 40-step approach uses natural channel formation principles to provide a stable stream channel, adequate floodwater routing, and improved aquatic habitat.

Restoration efforts designed for this reach included channel relocation to the historic channel alignment, a "W" weir grade-control structure to enhance sediment transport in the vicinity of the State Route 3001 bridge, in-stream structures to create pools and riffles and enhance aquatic habitat, bank stabilization measures to protect and restore the existing failing right bank, and riparian plantings to provide

St. Martin's Bridge, Fairmount Park Stream Restoration Philadelphia County, Pennsylvania

Client

Philadelphia Water Department

Estimated Project Value

Total: \$1,583,000

Firm Responsibility: \$142,367

Completion Date

2011

Key Components

Natural channel design; Fluvial geomorphology; Cross rock vanes

Reference Contact

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Project Manager

Gerald W. Longenecker, P.E.



Skelly and Loy, Inc. has prepared designs for a number of sites in Fairmount Park where stream erosion caused by increased stormwater runoff volumes from the surrounding urban areas is threatening Philadelphia Water Department's (PWD) utility systems. The St. Martin's bridge site was prioritized for early repairs because of the clear risk of further collapse of the old stone arch bridge and consequent rupture of the sanitary sewer line contained within the remaining bridge span. The formerly buried potable water line crossing beneath the bridge at this location, which had been exhumed by stream erosion, was also at risk of failure due to either continued stream erosion or collapse of the remaining bridge structure on top of it or both.

The existing sanitary sewer line embedded within the bridge was designed to be abandoned and replaced with 200 linear feet of new sanitary vitrified clay and ductile iron sewer. Through a preliminary feasibility study, it was determined that a standard buried stream crossing was infeasible. To meet the varied needs of the public (sanitary sewer service, pedestrian passage over the creek, and light vehicle traffic for park maintenance), the new aerial sewer crossing was designed to be suspended from a new pedestrian bridge with a nominal span of 100 feet.



In addition to carrying the sanitary sewer over Cresheim Creek, the old stone arch bridge was constructed with outfalls from the separate storm sewer within its wingwalls. In conjunction with the design of the sanitary sewer relocation, new stormwater outfalls were designed to discharge conveyed runoff onto the floodplain of Cresheim Creek in boulder-framed stilling wells to dissipate energies. Also as part of this project, the water main was designed to be rebuilt within its existing alignment but at a lower burial depth in Cresheim Creek, and channel-spanning cross rock vanes were designed to ensure the stability of the new water main crossing. These rock grade-control structures will also 1) promote sediment conveyance through this reach, 2) provide in-stream aquatic habitat, and 3) provide an aesthetic focal point for the Fairmount Park trail users. These structures were designed using the principles of fluvial geomorphology and natural channel design.

Removal of the existing bridge structure has mitigated the risk of further significant channel erosion associated with a large-scale failure of the structure. Additionally, the new bridge has been constructed with a span that approximately doubles the hydraulic capacity of the existing structure, thus greatly reducing the 100- and 500-year FEMA flood elevations by eliminating this flow restriction.



additional bank stabilization and aesthetic appeal. The total area of riparian corridor restoration for the project was approximately 4.5 acres.

A total of 12 in-stream rock structures were part of the original design to increase channel stabilization and provide aquatic habitat. The most significant design challenge for this project related to location of the project within the glacially influenced region of the Northern Tier of Pennsylvania. Soils in this region possess very low natural structure and cohesiveness and tend to be very easily eroded and scoured. This condition made all proposed structural improvements highly susceptible to undermining and failure. To adapt to this natural condition, the design of individual structures was modified to include additional, more deeply-footed structures; extended floodplain sills (or groins); and more massive individual boulders to construct

the various in-stream structures. The construction of the project had to be completed in two phases due to limitations in grant funding. Phase 1 was completed in 2006, and Phase 2 was completed in 2007.

This project is not only in agreement with the watershed initiatives of the Mehoopany Creek Watershed Association and its partners, but it also complements Pennsylvania's Non-Point Source (NPS) Management Program 1999 update. The NPS Management Program recognizes erosion and sedimentation impacts on our waterways as a leading cause of water quality impairment and that erosion and sedimentation reduce the productivity and utilization of our soil resources. This project will continue to improve the water quality of Mehoopany Creek and reverse the damages caused by increased sediment load and erosion to this creek.



Carpenter's Woods Stormwater Attenuation and Gully Stabilization Design Philadelphia, Pennsylvania

Client

Philadelphia Water Department

Project Value

Total: \$200,000

Firm Responsibility: \$55,000

Completion Date

May 2009

Key Components

Urban Stormwater Management (SWM); Watershed Best Management Practices (BMPs); Low Impact Development (LID) Applications; Erosion Control; Flood Control

Reference Contact

City of Philadelphia Water Department
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Ms. Joanne Dahme
P: 215-685-4944



Carpenter's Woods is in a heavily-visited part of Wissahickon Valley Park within the Mount Airy neighborhood of Philadelphia. The Woods are traversed by an unnamed tributary of Wissahickon Creek. Three stormwater outfalls located along Greene Street, constructed in the early part of the 20th century, created deep gullies in what had formerly been the unchanneled headwaters of the stream. The major storms of the last several decades (especially those of 2004) had enlarged the gullies to a point that they were eroding even under moderate-sized storm events.

These gullies were not only causing extra sediment delivery to the stream (and thereby to Wissahickon Creek downstream) but were marring the scenic quality of this popular, heavily wooded hiking area. (Gully enlargement and channel migration were also threatening a number of very large trees in this wooded area.) The total length of steep gully channel requiring stabilization was in excess of 400 feet.

'Conventional' stabilization of these moderately steep, deeply incised gullies would have consisted of laying back banks to a stable angle and installing sequential grade control devices, such as gabion or rock check dams. However, bank regrading in this area would have required the removal of a number of very large trees which were close to being undermined by gully channel enlargement.

Skelly and Loy, Inc. recognized in this situation a design opportunity to both 1) stabilize the system from an erosion standpoint and 2) address the root cause of the gullies, namely uncontrolled discharge from stormwater outfalls. To do this, the three gully channels were converted into a unique stormwater control application which we have labeled a "stepped infiltration swale." These features boil down to largely filling the channels with mostly cobble-sized fragmental rock. This deep rocky fill is interrupted along the channel profile by a sequence of stacked boulder sills, which span the channel and provide long-term stability to the fill. These boulder



sills will also provide a stable stepped channel profile during rare storm events, when surface flow might potentially be generated.

With this arrangement, stormwater discharged from the three outfalls now drains subsurface through the coarse rock filter material. This not only prevents any further channel erosion, but greatly retards the rate of flow, creating a reduction in the peak rate of flow at the bottom end of the installations. This gully retrofit therefore not only provides energy dissipation and stability, but functions as an infiltration-based stormwater management facility. Reduction in flow rate from the stormwater outfalls also helps to reduce channel erosion along the unnamed watercourse immediately downstream, which is seriously eroded all the way down to the Wissahickon.

After filling, gully banks above the rock were regraded to a lower angle capable of being planted. Both new forest plantings and placed large woody debris were used to disguise and naturalize the treatment. Lower gradient gully channel and streambanks downstream of steep gully outlets were stabilized using low, stacked rock walls along outside bends, leaving the more stable inside bends and lower alluvial benches (which were reasonably well protected by vegetation) intact.

Efforts to make this rehabilitation project both structurally reliable and as 'green' as possible were taken

throughout the project. In one case, a portion of a gully channel was moved over to spare several native trees, which were beginning to be undercut. Large boulders were placed below undercut bankline trees deemed salvageable. Large logs and 'random' boulders were also placed along the reconstructed gully channels to help further renaturalize the area. Finally, construction access routes were obliterated by ripping the soil, placing native woody mulch, scattering large woody debris, and planting. Further naturalization will occur as the site 'seasons,' with leaf and other natural litter covering those portions of the rocked channelways not subject to surface flow. (Despite a number of very large storms since construction, only minimal surface flow has been observed at the lower ends of the treatments.)

Along with project permitting, Skelly and Loy provided oversight during construction, which was completed by the Philadelphia Water Department's in-house Waterways Restoration Team. Permitting of this project established a useful, cost-saving precedent in recognizing these stormwater-created gullies as man-made features and not regulated "waters" requiring a joint United States Army Corps of Engineers/Pennsylvania Department of Environmental Protection permit. This precedent has since been applied elsewhere in the Philadelphia area.

South Branch Mehoopany Creek, Windy Valley Section Stream Restoration Wyoming County, Pennsylvania

Client

Mehoopany Creek Watershed
Association

Estimated Project Value

Total: \$2,000,000
Firm Responsibility: \$300,000

Project Completed

Ongoing

Key Components

Growing Greener Grants;
Glaciated Terrain; Historic
Channel Alignment; Cross Rock
Vane and Other Grade-Control
Structures; Bank Stabilization;
Habitat Enhancement
Structures; Construction
Oversight

Reference Contact

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Project Manager

Gerald W. Longenecker, P.E.



The project site is on the South Branch of Mehoopany Creek in the Upper Susquehanna River Basin (direct tributary to the Susquehanna River) in Wyoming County along State Route (S.R.) 3001, approximately ¾ mile south of S.R. 0087 near the town of Forkston, Pennsylvania. The watershed is located within the glaciated terrain region of NE United States and has been highly affected by past glaciations. Because of this, the soils in the watershed tend to be coarse-textured and highly erosive. The erosive nature of the soil, combined with past land uses, has caused the channel of the Mehoopany Creek to be highly unstable in localized sections of the watershed.

Skelly and Loy completed a comprehensive watershed assessment in 2003 and identified the Windy Valley area as a high priority reach for immediate restoration intervention activities to address threats to public

infrastructure and the safety of area residents caused by channel instabilities and active stream channel migrations that were occurring. Lack of available funding postponed the initiation of these restoration activities until a series of hurricanes and tropical storms moved through the area. In the wake of these extreme recent events, Skelly and Loy was successful at obtaining a series of grants which provided adequate funding to complete the design, permitting, and the initial construction phase work for this 5,000 linear feet Windy Valley project site. The permitting phase was completed with the Joint Permit from the Pennsylvania Department of Environmental Protection (PA DEP)/U.S. Army Corps of Engineers issued in early 2010. The initial construction phase efforts were completed in the Fall of 2010 with additional phases being constructed as additional grant funding became available.



Restoration efforts in the project area are based on using a natural stream channel approach which incorporates fluvial geomorphic principles. In order to provide protection of area residents, personal property and public infrastructure, the objectives of the work effort include channel relocation to its historical location, correcting bank instabilities which contributed to the original channel migration, and reshaping of the channel to correct stream cross-sectional instabilities. These restoration efforts have included the use of cross-rock grade-control structures to manage

stream energies and sediment transport, in-stream rock barb structures to protect constructed boulder bank revetments, create pools and riffles and enhance aquatic habitat, other bank and erodible floodplain stabilization efforts, and roadway protection measures to provide additional bank stabilization and aesthetic appeal.

Skelly and Loy has also been involved throughout the project duration to provide construction oversight for the various phases of construction work.



Wissahickon High Level Sewer Crossing Stabilization at Old Hartwell Lane Philadelphia, Pennsylvania

Client/Owner
Philadelphia Water Department

Project Value
Total: \$53,000

Completion Date
November 2009

Key Components
Steep Channel and Sewer
Crossing Stabilization;
Stabilization Design;
Construction Supervision

Reference Contact
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The rapid deterioration of a sanitary interceptor (the Wissahickon High Level Sewer) servicing a large part of Philadelphia was the critical problem at this location. Crossing a small, steep, and narrow ravine located within Wissahickon Valley Park, the small flow conveyance opening below this elevated 4.25-foot-diameter brick sewer pipe tends to plug with floated wood during storms. Sediment accumulation behind this "dam" puts immense pressure on the already seriously weakened, 112-year-old brick structure. (The concrete covering was added later to help to preserve the deteriorating pipe crossing, although this repair unfortunately reduced the area of the culvert opening by 50%.)

Stream erosion of the sewer crossing was focused on its downstream side, with hydraulic action undermining its downstream face by plucking out the now weakly cemented bricks and stone. Overtopping of the structure and road erosion were also contributing to erosion around the crossing.

A Skelly and Loy, Inc. "Problem Area Assessment" conducted for the Philadelphia Water Department

(PWD) indicated the high probability of catastrophic failure in the near future, resulting in the severing of the sewer line, sewage discharge to Wissahickon Creek, and major stream and road erosion downstream of the breached crossing. A smaller connecting sewer and potable water main, shallowly buried under the narrow and now-abandoned roadway bordering the stream (Old Hartwell Lane), were also threatened by both fluvial erosion and surface erosion of the road prism. The road near the crossing had eroded to the point that it was nearly impassable to construction and utility maintenance vehicles.

Skelly and Loy's assessment indicated the need for a new structure providing a much enlarged stream conveyance opening, along with stabilization of the stream channel in this vicinity. However, because designing, permitting, and implementing such a major project would require at least several years, the assessment emphasized the need for immediate 'interim' repairs to mitigate the extremely hazardous situation.

With PWD's quick approval for this



approach, Skelly and Loy employed a streamlined and expedited design process predicated on construction by PWD's in-house Waterways Restoration Team. An emergency permit was provided by the Pennsylvania Department of Environmental Protection, and Skelly and Loy conducted a simple dimensional survey of the site in order to develop basic stabilization prescriptions and rock quantity estimates. Skelly and Loy then provided direct and continuous field supervision during construction.

As part of this effort, two large leaning trees judged highly susceptible to windthrow were removed from the vicinity of the crossing (stumps were retained for anchoring). The toppling of these trees would have destroyed the brick interceptor and made the road fully impassible for maintenance vehicles.

Structural work consisted of constructing a high stacked blockstone retaining wall along the failing road embankment immediately upstream of the sewer crossing. Another wall was constructed along the opposing bank to protect an exposed manhole stack. Several channel-spanning rock steps were also constructed to prevent undermining of the rock walls and fully stabilize the steep streambed.

On its downstream side, rock was stacked into the eroded junctions between the sewer crossing structure and the native slope. These were supported by a large boulder apron

that spanned the channel below the culvert opening, eliminating the scour pool here and preventing further undermining of the crossing structure. Two closely spaced boulder weirs were then installed at the downstream end of the rock apron to provide grade control. Once all of this work was complete, PWD had a separate contractor veneer the crossing structure (and adjacent rock surfaces) with shotcrete.

Completion of this project within this narrow ravine involved significant logistical hurdles. Rock had to be ferried in from the stockpile at the park entrance, a distance of more than 2,000 feet over a deteriorating roadway. Special care had to be taken in operating equipment around the old pipes buried in the road, and the eroding access road itself had to be stabilized as the roadside retaining wall was being constructed. Construction was further hampered by a bedrock streambed and by the need to preserve park trees to the maximum extent possible.

Skelly and Loy's recommended upstream maintenance measures - designed to reduce debris plugging at the still-vulnerable crossing structure - have been implemented through the stream corridor up to an old filled mill dam. These maintenance Best Management Practices include pre-emptive removal of streamside trees undercut by stream erosion, removal of larger floatable wood pieces within the 'floodway' (within six vertical feet of the streambed), and inspection of the crossing after large storms, removing any accumulated woody debris here.



Valley Green Road Stream Channel Stabilization Philadelphia, Pennsylvania

Client

Philadelphia Water Department

Project Value

Total: \$65,000

Firm Responsibility: \$12,000

Completion Date

Ongoing

Key Components

Gully and Stream Channel
Stabilization and Enhancement;
Step-Pool Stream Design

Reference Contact

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Project Manager

Gerald W. Longenecker, P.E.



This problem site in Wissahickon Valley Park was evaluated under one of the many "Prioritization Assessments" conducted over the last several years by Skelly and Loy, Inc. for the Philadelphia Water Department (PWD). At this site, a steep, unnamed creek traversing a narrow ravine is experiencing accelerated bank and bed erosion. This is not only damaging a key visitor parking area and threatening the elevated sewer line crossing over the stream not far downstream, but is causing fine sediment to be discharged to Wissahickon Creek during storm events. The site was evaluated in 2008 and planning is now underway to implement the recommended stabilization measures.

Channelization and flow confinement associated with Valley Green Road and the parking area, along with unconstrained stormwater runoff from the urbanized area

upstream, has caused the progressive erosion of the channel in this area. The assessment also found that the check dams and gabion bank structures which had been installed in this area previously to help stabilize the stream are no longer effective and are gradually being dismantled by both channel erosion and erosion due to stormwater runoff from the parking area. These old conservation structures are now actually exacerbating channel erosion in this area. Without direct intervention, channel erosion and associated damage to the parking area will certainly continue and will probably increase.

The recommended approach to stabilizing and enhancing this section of stream channel is to rebuild the channel as a stable step-pool stream (see the drawing). Native plantings would add to the attractiveness of the repairs at this very visible and much-used location.

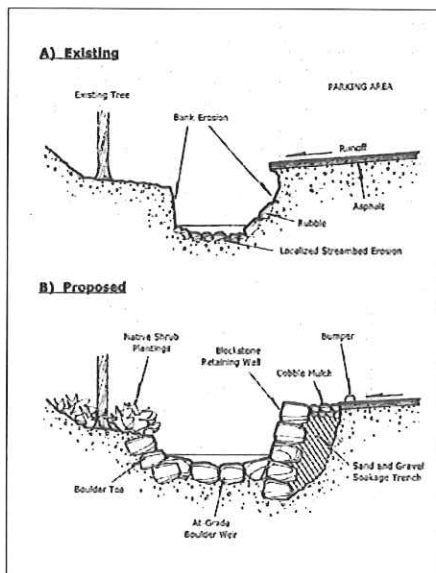


Although the system is smaller, this project would be similar to that installed along lower Wise's Mill Run nearby in the Park. The installed channel-spanning boulder weirs would dissipate flow energy while at the same time forming an attractive park feature in their own right.

Because parking is scarce in the Park already, this parking area probably cannot be substantially reduced in size. Therefore the channel must remain in its existing location (close to the opposing hillside), with the channel margin along the parking lot stabilized with a dry stacked boulder retaining wall (drawing).

The close juxtaposition of the stream margin retaining wall and the parking area also suggests an opportunity to

install a simple and inexpensive infiltration-based stormwater management facility at this site. This would entail retaining a large enough gap between the back of the rock wall and the parking lot fill so that this can be filled with gravel and sand, creating a narrow soakage trench between the stream and the parking area (see drawing). This would accept and infiltrate storm runoff from the parking area, routing this through the sand and gravel filter and out the ungrouted wall face. This treatment would provide a small but incremental amount of flow attenuation, complementing the stream flow attenuation resulting from the reconstructed stepped bed channel. Both of these best management practices would incrementally improve conditions downstream.

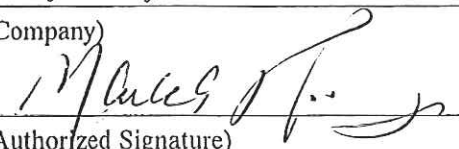


CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

Skelly and Loy, Inc.

(Company)


(Authorized Signature)

Mark A. Williams, Executive Vice President, Engineering

(Representative Name, Title)

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March 4, 2013

(Date)