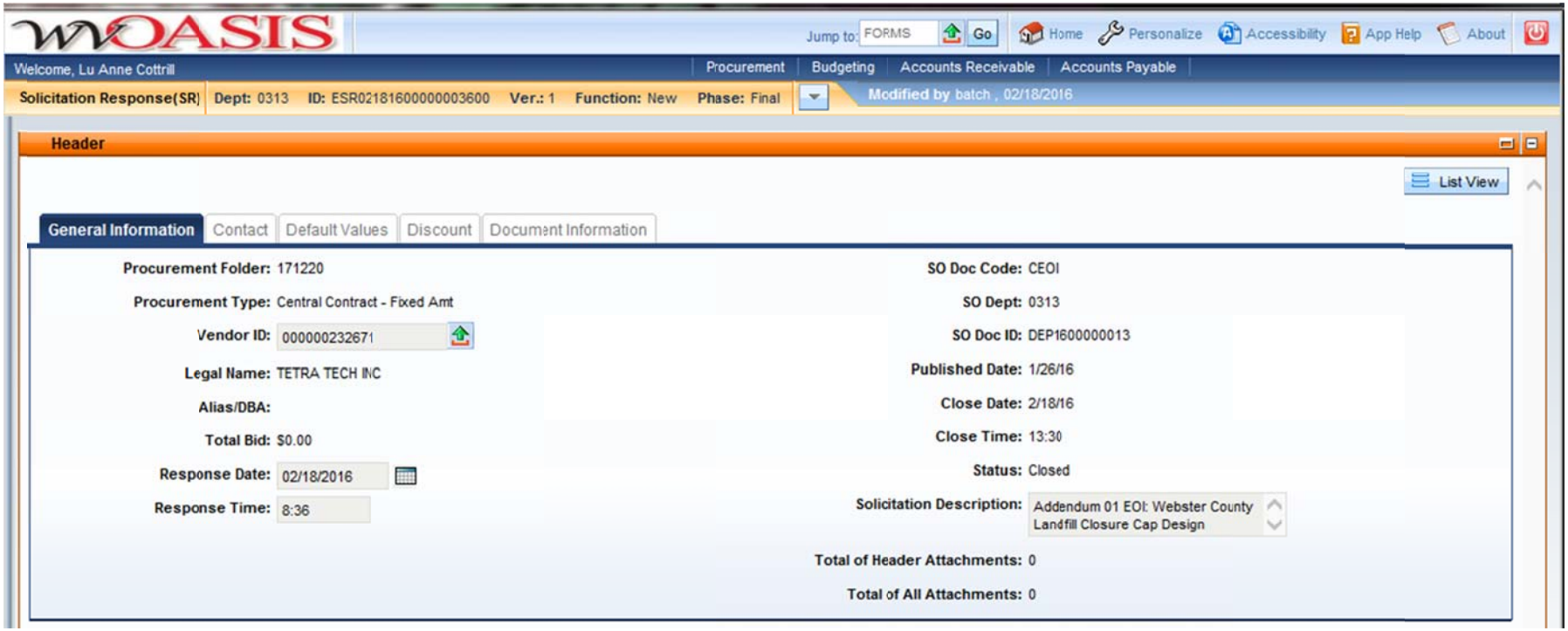
The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.


WVOASIS
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About
Welcome, Lu Anne Cottrill
Procurement
Budgeting
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Accounts Payable
Solicitation Response(SR) Dept: 0313 ID: ESR02181600000003600 Ver.: 1 Function: New Phase: Final
Modified by batch , 02/18/2016
Header
List View
General Information
Contact
Default Values
Discount
Document Information
Procurement Folder: 171220
Procurement Type: Central Contract - Fixed Amt
Vendor ID: 000000232671
Legal Name: TETRA TECH INC
Alias/DBA:
Total Bid: $0.00
Response Date: 02/18/2016
Response Time: 8:36
SO Doc Code: CEOI
SO Dept: 0313
SO Doc ID: DEP1600000013
Published Date: 1/26/16
Close Date: 2/18/16
Close Time: 13:30
Status: Closed
Solicitation Description: Addendum 01 EOI: Webster County Landfill Closure Cap Design
Total of Header Attachments: 0
Total of All Attachments: 0

Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder : 171220

Solicitation Description : Addendum 01 EOI: Webster County Landfill Closure Cap Design

Proc Type : Central Contract - Fixed Amt

Date issued	Solicitation Closes	Solicitation No	Version
	2016-02-18 13:30:00	SR 0313 ESR02181600000003600	1

VENDOR

000000232671

TETRA TECH INC

FOR INFORMATION CONTACT THE BUYER

Beth Collins

(304) 558-2157
beth.a.collins@wv.gov

Signature X **FEIN #** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Water testing services				$0.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :

Site Characterization Study, Leachate Management and Closure Cap Design for the Webster County Landfill per the attached specifications, bid requirements, and terms and conditions, incorporated here by reference and made a part hereof.

Purchasing Divison
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Expression of Interest
02 — Architect/Engr

Proc Folder: 171220

Doc Description: Addendum 01 EOI: Webster County Landfill Closure Cap Design

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2016-01-26	2016-02-18 13:30:00	CEOI 0313 DEP1600000013	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

Tetra Tech, Inc.
1000 Green River Drive
Fairmont, WV 26554
(304)534-4021

FOR INFORMATION CONTACT THE BUYER

Beth Collins
(304) 558-2157
beth.a.collins@wv.gov

Signature X Mark P. Speranza **FEIN #** 954660169 **DATE** 02/18/2016

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

Addendum No. 01
This addendum is issued to modify the solicitation per the attached documentation and the following:
1. To publish answers to vendor submitted questions.
2. To modify the bid opening date to February 18, 2016 at 1:30 PM, EST.
No other changes.

The West Virginia Purchasing Division, for the Agency, the West Virginia Department of Environmental Protection, is soliciting Expressions of Interest for professional mapping and design services for the Webster County Landfill Closure Cap Design project located in Webster County, West Virginia, per the attached bid requirements and specifications.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF ENVIRONMENTAL REMEDIATION 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION 601 57TH ST CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
1	Water testing services	NA	NA

Comm Code	Manufacturer	Specification	Model #
81100000	NA	NA	NA

Extended Description :

Site Characterization Study, Leachate Management and Closure Cap Design for the Webster County Landfill per the attached specifications, bid requirements, and terms and conditions, incorporated here by reference and made a part hereof.

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Question Submittal Deadline at 5:00 PM EST	2015-01-08

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Tetra Tech, Inc.

Company

Mark P. Speranza

Authorized Signature

02/18/2016

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 11/03/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

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

PRODUCER	CONTACT NAME:	
Aon Risk Insurance Services West, Inc. Los Angeles CA Office 707 Wilshire Boulevard Suite 2600 Los Angeles CA 90017-0460 USA	PHONE (A/C. No. Ext): (866) 283-7122	FAX (A/C. No.): (800) 363-0105
	E-MAIL ADDRESS:	

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	National Union Fire Ins Co of Pittsburgh	19445
INSURER B:	The Insurance Co of the State of PA	19429
INSURER C:	AIG Europe Limited	AA1120841
INSURER D:	Lexington Insurance Company	19437
INSURER E:		
INSURER F:		

INSURED

Tetra Tech, Inc.
661 Andersen Drive
Pittsburgh, PA 15220 USA

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

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

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** [ ] CLAIMS-MADE [X] OCCUR X Contractural Liability X X,C,U GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [X] LOC [ ] OTHER:			GL3372258	10/01/2015	10/01/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$2,000,000 $1,000,000 $10,000 $2,000,000 $4,000,000 $4,000,000
A	**AUTOMOBILE LIABILITY** X ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS X HIRED AUTOS [X] NON-OWNED AUTOS			CA3194397	10/01/2015	10/01/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$2,000,000
C	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** [ ] CLAIMS-MADE [ ] DED [ ] RETENTION			TH1500079	10/01/2015	10/01/2016	EACH OCCURRENCE AGGREGATE	$5,000,000 $5,000,000
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		WC014267906 WC014267907 WC014267908 WC014267912	10/01/2015 10/01/2015 10/01/2015 10/01/2015	10/01/2016 10/01/2016 10/01/2016 10/01/2016	X PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
D	Professional Liability and Contractor's Pollution Liability			028182375	10/01/2015	10/01/2016	Each Claim Aggregate	$5,000,000 $5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required) Includes Stop Gap: OH, ND, WA, WY

CERTIFICATE HOLDER

Tetra Tech, Inc.
661 Andersen Drive
Pittburgh, PA 15220 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Insurance Services West, Inc.

ENDORSEMENT

This endorsement, effective 12:01 A.M. 10/01/2015 forms a part of

policy No. GL3372258

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

CONTRACTOR'S COMMERCIAL PRIME ENDORSEMENT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

Coverage afforded under this endorsement does not apply to any person or organization covered as an additional insured on any other endorsement now or hereafter attached to this Coverage Part.

I. ADDITIONAL INSUREDS

Section II - WHO IS AN INSURED, 1. is amended to include as an insured any person or organization described in paragraphs A through I below, whom you are required to add as an additional insured under a written contract or agreement. The written contract or agreement must be:

1. Currently in effect or becoming effective during the term of this policy; and
2 Executed prior to "bodily injury", "property damage," or "personal injury and advertising injury".

A. BY CONTRACT

Any person or organization to whom you become obligated to include as an additional insured under this policy, as a result of any contract or agreement you enter into which requires you to furnish insurance to that person or organization of the type provided by this policy, but only with respect to liability arising out of your operations or premises owned by or rented to you. However, the insurance provided will not exceed the lesser of:

1. The coverage and/or limits of this policy, or
2. The coverage and/or limits required by said contract or agreement.

B. CONTROLLING INTEREST

1. Any person or organization having a greater than a 50% interest in you, but only with respect to their liability arising out of:
   a. Their financial control of you; or
   b. Premises they own, maintain or control while you lease these premises.
2. The insurance afforded to these additional insureds under Paragraph I.B.1 does not apply to structural alterations, new construction or demolition operations performed by or for that person or organization.

C. CO-OWNER OR INSURED PREMISES

A Co-owner of insured premises co-owned by you and covered by this insurance but only with respect to their liability as co-owner of the premises.

D. LESSOR OF LEASED EQUIPMENT

1. Any person or organization from whom you lease equipment, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your maintenance, operation or use of such equipment leased to you by such person(s) or organization(s).

2. With respect to the insurance afforded to these additional insureds under Paragraph I.D.1, this insurance does not apply to any "occurrence" which takes place:

    a) after the equipment lease expires, or

    b) after the equipment is returned or no longer in your possession,

    whichever takes place later.

E. MANAGERS OR LESSORS OF PREMISES

Managers or Lessors of premises but only with respect to liability arising out of the ownership, maintenance or use of that part of the premises leased to you and subject to the following additional exclusions:

This insurance under this paragraph does not apply to:

1. Any "occurrence" which takes place after you cease to be a tenant in that premises.

2. Structural alterations, new construction or demolition operations performed by or on behalf of such Managers or Lessors.

F. MORTGAGEE, ASSIGNEE, OR RECEIVER

1. A mortgagee, assignee, or receiver but only with respect to their liability as mortgagee, assignee, or receiver and arising out of the ownership, maintenance, or use of the premises by you.

2. The insurance afforded to the additional insureds under Paragraph I.F.1 does not apply to structural alterations, new construction or demolition operations performed by or for that mortgagee, assignee, or receiver.

G. OWNERS, LESSEES, OR CONTRACTORS - COMPLETED OPERATIONS

(1) Any Owner, Lessee or Contractor, but only with respect to liability arising out of "your work" performed for that additional insured and included in the "products-completed operations hazard".

H. OWNERS, LESSEES, OR CONTRACTORS - ONGOING OPERATIONS

Any Owners, Lessees, or Contractors, but only with respect to liability arising out of your ongoing operations performed for that additional insured.

This insurance does not apply to "bodily injury" or "property damage" occurring after:

(1) all work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) has been completed; or,

(2) that portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

I. STATE OR POLITICAL SUBDIVISION - PERMITS

Any State or Political Subdivision, subject to the following provisions:

1. This insurance applies only with respect to operations performed by you or on your behalf for which the state or political subdivision has issued a permit.

2. This insurance does not apply to:

   a. "Bodily injury," "property damage" or" personal and advertising injury" arising out of operations performed for the state or municipality; or

   b. "Bodily injury" or "property damage" included within the "products-completed operations hazard".

II. PRIMARY INSURANCE - ADDITIONAL INSUREDS

Where persons or organizations have been added to your policy as additional insureds to comply with insurance requirements of written contracts mandating primary coverage for such additional insureds relative to:

a) the performance of your ongoing operations for the additional insureds; or

b) "your work" performed for the additional insureds and included in the "products-completed operations hazard,

then with respect to these additional insureds as defined above in this Section only, **SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, Paragraph 4. - Other Insurance, a. - Primary Insurance,** is deleted in its entirety and replaced with the following:

This insurance is primary over any similar insurance available to any person or organization we have added to this policy as an additional insured to comply with insurance requirements of written contracts mandating primary coverage for such additional insureds relative to (a) the performance of your ongoing operations for the additional insureds, or (b) "your work" performed for the additional insureds and included in the "products-completed operations hazard. However, this insurance is primary over any other similar insurance only if the additional insured is designated as a named insured of the other similar insurance. We will not require contribution of limits from the other similar insurance if the insurance afforded is primary.

III. INCIDENTAL MEDICAL MALPRACTICE LIABILITY COVERAGE

SECTION II - WHO IS AN INSURED, 2. a. (1) (d) is deleted in its entirety and replaced with the following:

(d) Arising out of his or her providing or failing to provide professional health care services, except for "bodily injury" arising out of "Incidental Medical Malpractice Injury" by any physician, dentist, nurse or other medical practitioner employed or retained by you unless such "bodily injury" is covered by another primary policy. However, the insurance provided hereunder to such persons will not apply to liability arising out of services performed outside of the scope of their duties as your "employees." Any series of continuous, repeated or related acts will be treated as the occurrence of a single negligent professional healthcare service, which will be assignable to the same policy and policy year in which the originating act occurred.

SECTION V - DEFINITIONS - is amended to add:

"Incidental Medical Malpractice Injury" means "Bodily Injury" arising out of the rendering of or failure to render the following services:

a. medical, surgical, dental, x-ray or nursing service or treatment or the furnishing of food or beverages in connection therewith; or

b. the furnishing or dispensing of drugs or medical, dental or surgical supplies or appliances.

The Coverage provided by this endorsement does not apply to you or any insured if you are engaged in the business or occupation of providing any of the services described in the definition of "Incidental Medical Malpractice Injury".

IV. JOINT VENTURES / PARTNERSHIPS / LIMITED LIABILITY COMPANIES

The paragraph under **SECTION II - WHO IS AN INSURED** which states:

No person or organization is an insured with respect to the conduct of any current or past partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

is hereby deleted and replaced with the following:

No person or organization, other than you, is an insured with respect to the conduct of any current or past partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

Coverage under this policy, however, will not apply:

a. Prior to the termination date of any joint venture, partnership or limited liability company; or

b. If there is valid and collectible insurance purchased specifically to insure the partnership, joint venture or limited liability company.

V. SUPPLEMENTARY PAYMENTS

Under **SECTION I - SUPPLEMENTARY PAYMENTS - COVERAGES A AND B**, Paragraph **1.b.**, is deleted in its entirety and replaced with the following:

b. Up to $2,500 for cost of bail bonds required because of accidents or traffic law violations arising out of the use of any vehicle to which the Bodily Injury Liability Coverage applies. We do not have to furnish these bonds.

VI. LIBERALIZATION CLAUSE

If we revise or replace our standard policy form to provide more coverage, your policy will automatically provide the additional coverage as of the day the revision is effective in your state.

VII. UNINTENTIONAL ERRORS AND OMISSIONS

SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 6. - Representations is amended by adding:

d. The unintentional failure by you or any Insured to provide accurate and complete nonmaterial representations as of the inception of the policy will not prejudice the coverages afforded by this policy.

VIII. AMENDMENT OF DUTIES IN THE EVENT OF OCCURRENCE, OFFENSE, CLAIM OR SUIT

SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 2. - Duties in the Event of Occurrence, Offense, Claim or Suit, a. is hereby deleted and replaced with the following:

a. You must see to it that we are notified as soon as practicable of any "occurrence" or an offense, which may result in a claim. Knowledge of an "occurrence" or an offense by your agent, your servant, or your employee will not in itself constitute knowledge to you unless the Director of Risk Management (or one with similar or equivalent title) or his/her designee will have received such notice. To the extent possible notice should include:

(1) How, when and where the "occurrence" or offense took place;
(2) The names and addresses of any injured persons and witnesses; and
(3) The nature and location of any injury or damage arising out of the "occurrence" or offense.

IX. AMENDMENT OF EXPECTED OR INTENDED INJURY EXCLUSION

SECTION I - COVERAGES, COVERAGE A - BODILY INJURY AND PROPERTY DAMAGE LIABILITY, 2. - Exclusions, a. - Expected or Intended Injury, is deleted and replaced by the following:

a. "Bodily injury" or "property damage" expected or intended from the standpoint of the insured. This exclusion does not apply to "bodily injury" or "property damage" resulting from the use of reasonable force to protect persons or property.

X. CONTRACTUAL LIABILITY - RAILROADS

Only with respect to (i) operations performed within 50 feet of railroad property and (ii) for which a Railroad Protective Liability Policy in the name of the railroad has been provided, then

A. **SECTION V - DEFINITIONS, Paragraph 9,** is deleted in its entirety and replaced with the following:

9. "Insured Contract" means:

a. A contract for a lease of premises. However, that portion of the contract for a lease of premises that indemnifies any person or organization for damage by fire to premises while rented to you or temporarily occupied by you with permission of the owner is not an "insured contract";

b. A sidetrack agreement;

c. Any easement or license agreement;

d. An obligation, as required by ordinance, to indemnify a municipality, except in connection with work for a municipality;

e. An elevator maintenance agreement;

f. That part of any other contract or agreement pertaining to your business (including an indemnification of a municipality in connection with work performed for a municipality) under which you assume the tort liability of another party to pay for "bodily injury" or "property damage" to a third person or organization. Tort liability means a liability that would be imposed by law in the absence of any contract or agreement.

Paragraph **f.** does not include that part of any contract or agreement:

(1) That indemnifies an architect, engineer or surveyor for injury or damage arising out of:

(a) Preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or

(b) Giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage; or

(2) Under which the insured, if an architect, engineer or surveyor, assumes liability for an injury or damage arising out of the insured's rendering or failure to render professional services, including those listed in Paragraph (1) above and supervisory, inspection, architectural or engineering activities; and

B. **SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 4. - Other Insurance, b. Excess Insurance, (1) (a),** is amended to include the following:

(v) That is a Railroad Protective Insurance Policy or similar coverage.

XI. **COVERAGE FOR YOUR SUPERVISORY OR MANAGERIAL EMPLOYEES RELATING TO CO-EMPLOYEE INJURIES**

SECTION II - WHO IS AN INSURED, 2.a. (1), (a) and **(b)** are clarified to hold that:

Your supervisory or managerial "employees" are insureds for "bodily injury" to "co-employees" while in the course of their employment or performing duties related to the conduct of your business if claims or suits arise out of liability assumed by an insured under an "insured contract" as provided by **SECTION I - COVERAGES, COVERAGE A BODILY INJURY AND PROPERTY DAMAGE LIABILITY, 2. Exclusions, e. Employer's Liability.**

XII. **WAIVER OF TRANSFER OF RIGHTS OR RECOVERY AGAINST OTHERS TO US**

SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 8. - Transfer of Rights of Recovery Against Others To Us, is amended by the addition of the following:

We waive any right of recovery we may have against any person or organization pursuant to applicable written contract or agreement you enter into because of payments we make for injury or damage arising out of your ongoing operations or "your work" done under a contract with that person or organization and included in the "products-completed operations hazard".

XIII. **AMENDMENT OF OTHER INSURANCE**

A. **SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 4.- Other Insurance, b. - Excess Insurance, (1),** is amended to include the following:

This insurance shall not be excess where (i) such other insurance is specifically purchased to apply as excess of this policy, or (ii) where you are obligated by contract to provide primary insurance to an additional insured, unless there is other additional insurance coverage available to that additional insured.

B. **SECTION IV - COMMERCIAL GENERAL LIABILITY CONDITIONS, 4.- Other Insurance, b. - Excess Insurance, (2),** is deleted in its entirety and replaced with the following:

When this insurance is excess, we will have no duty under Coverages A or B to defend any claim or "suit" that any other insurer has a duty to defend. If no other insurer defends, we will undertake to do so, but we will be entitled to the insured's rights against all those other insurers.

XIV. **AMENDMENT AGGREGATE LIMITS PER PROJECT**

A. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERAGE **A** (SECTION **I**), offense under COVERAGE **B** (SECTION 1) and for all medical expenses caused by accidents under COVERAGE **C** (SECTION **I**), which can be attributed only to ongoing operations at a single designated construction project:

1. A separate Per Construction Project General Aggregate Limit applies to each construction project, and that limit is equal to the amount of the General Aggregate Limit shown in the Declarations.

2. The Per Construction Project General Aggregate Limit is the most we will pay for the sum of (i) all damages under COVERAGE **A**, except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard", (ii) all damages under COVERAGE **B** and (iii) all medical expenses under COVERAGE **C** regardless of the number of:

   a. Insureds;

   b. Claims made or "suits" brought; or

   c. Persons or organizations making claims or bringing "suits".

3. Any payments made under COVERAGE **A** or **B** for damages or under COVERAGE **C** for medical expenses shall reduce the Per Construction Project General Aggregate Limit for that construction project. Such payments shall not reduce the General Aggregate Limit shown in the Declarations nor shall they reduce any other Per Construction Project General Aggregate Limit for any other construction project covered under this policy.

4. The limits shown in the Declarations for Each Occurrence, Fire Damage and Medical Expense continue to apply. However, instead of being subject to the General Aggregate Limit shown in the Declarations, such limits will be subject to the applicable Per Construction Project General Aggregate Limit.

B. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under COVERAGE **A** (SECTION **I**), offenses under COVERAGE **B** (SECTION 1) and for all medical expenses caused by accidents under COVERAGE **C** (SECTION **I**), which cannot be attributed only to ongoing operations at a single construction project:

1. Any payments made under COVERAGE **A** or **B** for damages or under COVERAGE **C** for medical expenses shall reduce the amount available under the General Aggregate Limit or the Products-Completed Operations Aggregate Limit, whichever is applicable; and

2. Such payments shall not reduce any Construction Project General Aggregate Limit.

C. When coverage for liability arising out of the "products-completed operations hazard" is provided, any payments for damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard" will reduce the Products-Completed Operations Aggregate Limit, and not reduce the General Aggregate Limit nor the Construction Project General Aggregate Limit.

D. If the applicable construction project has been abandoned, delayed, or abandoned and then restarted, or if the authorized contracting parties deviate from plans, blueprints, designs, specifications or timetables, the project will still be deemed to be the same construction project.

E. The provisions of Limits of Insurance (SECTION **III**) not otherwise modified by this endorsement shall continue to apply as stipulated.

RFQ No. DEP1600000013

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Tetra Tech, Inc.

Authorized Signature: Matt P. Sperry Date: 02/18/2016

Commonwealth
~~State~~ of Pennsylvania

County of Allegheny, to-wit:

Taken, subscribed, and sworn to before me this 18 day of February, 2016.

My Commission expires August 8, 2017.

AFFIX SEAL HERE

NOTARY PUBLIC Cynthia K Haluszczak

Purchasing Affidavit (Revised 07/01/2012)

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Cynthia K. Haluszczak, Notary Public
Green Tree Boro, Allegheny County
My Commission Expires Aug. 8, 2017
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Expression of Interest

WVDEP Landfill Closure assistance Program

Expression of Interest: DEP1600000013 Site Characterization Study, Leachate Management, & Closure Cap Webster County Landfill

TETRA TECH

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.

Tetra Tech, Inc.
(Company)

Mark P. Speranza
(Authorized Signature)

Mark P. Speranza, Operations Manager
(Representative Name, Title)

412-921-8916 412-921-4040
(Phone Number) (Fax Number)

02/185/2016
(Date)

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February 18, 2016

Ms. Beth Collins
Department of Administration, Purchasing Division
2019 Washington Street East, Charleston, West Virginia 25305-0130

Dear Ms. Collins:

Tetra Tech is pleased to provide this Statement of Qualifications (SOQ) to provide the necessary services to perform a Site Characterization Study, Leachate Management, & Closure Cap at the Webster County Landfill. We understand that DEP is seeking a qualified consultant to delineate extents of waste, complete engineering & design of the capping system, preparation of construction contract drawings and specifications, permitting, right of ways, right of entries, and approvals for this project.

In this SOQ, Tetra Tech provides the information requested by the West Virginia DEP including:

- Company experience
- Landfill project experience descriptions, including listing of clients with contact information
- Personnel resumes

Tetra Tech possesses the resources and necessary expertise to self-perform all services for an environmental study of the Webster County Landfill. We provide the following range of services to our clients in support of their landfill projects. The ability to provide these services, coupled with our financial strength and corporate resources, qualifies us as a low risk/performance based contractor in the landfill services industry. Tetra Tech understands that construction is not a part of this scope of work, but we have provided a brief summary of our construction capabilities, to provide DEP with the depth and breadth of our landfill services. Tetra Tech is cognizant of ensuring that our landfill cap engineering and design is practical, implementable, and cost-effective during the construction phase.

1. Initial Evaluation

- Site assessment
- Regulatory review
- Records search
- Risk assessment
- Feasibility studies
- Environmental impact assessment, including NEPA documentation

2. Design Services

- Alternatives analysis
- Regulatory negotiations
- Closure system permitting and design
- Gas collection system design
- Gas-to-energy/cogeneration system design
- Bid specification preparation

3. Permitting

- Air

- NPDES
- Construction
- Quarterly/monthly reporting

4. Construction Services

- Design/build
- Bid process management
- Construction management
- Excavation, grading, cell construction
- Waste management/relocation
- Soil conditioning/screening
- Gas probe and well installation
- Geosynthetic liner installation
- Leachate collection/treatment systems
- Active/passive gas collection systems
- Source containment, slurry walls, horizontal curtains
- Stormwater and erosion controls
- Wetland and ecological area restoration
- Closure report
- Commissioning

5. Operation and Maintenance

- Sampling and analysis
- Waste placement
- Cap maintenance
- Gas monitoring and statistical analysis

6. Environmental Services

Tetra Tech has a reputation for quickly responding to client requests for environmental services regardless of job size. We provide specialized discipline services as separate or integrated services. Tetra Tech has the ability to draw on staff in our offices and additional resources both nationally and internationally through our corporate affiliates. Our project experience includes preparation of numerous baseline environmental investigations, licensing studies, environmental reports, and NEPA EAs and EISs. Our services include:

- **Environmental / Engineering** – expertise in a broad spectrum of environmental engineering disciplines and experience at balancing environmental engineering requirements with other project objectives, such as satisfying the aesthetic design concerns of local planning authorities.
- **Regulatory Compliance and Permitting** – innovative and practical solutions to development and environmental management issues with focus on managing and preparing NEPA environmental assessments (EAs) and environmental impact statements (EISs), risk assessments, and permit applications.
- **Air Services** – comprehensive air quality and meteorological services including air pollution control, air permitting, ambient and emissions monitoring, dispersion modeling, air toxics sampling/reporting, special studies, sampling and monitoring.
- **Water and Wastewater Engineering** – complete conceptual and detailed design for various types of water and wastewater treatment scenario including support through the start-up phase to ensure smooth and efficient operation.
- **Water resource Studies -** watershed management, resource planning, surface water and groundwater services, water systems and climate change modeling.
- **Ecological Studies** – terrestrial, aquatic, wetland, and other ecological investigations for evaluating the effects of physical and chemical impacts on the environment.
- **Geoscience Studies** – geophysical and geological investigations, aquifer testing, groundwater modeling, and soil gas investigations.
- **Economic, Social, and Cultural Services** – socioeconomic analyses, land use/recreation planning, cultural resource management, visual/aesthetic impact assessment, and public participation/community relations.
- **Occupational Safety and Health** – evaluations and audits, environmental/health and safety program integration, customized training programs, exposure assessment, and lead and asbestos abatement.

As a firm, Tetra Tech also has significant experience working for the WVDEP. Our offices recently managed several OSR and AML projects for the WVDEP, and Tetra Tech's Charleston office is currently managing TMDL projects for the WVDEP. As requested by the RFP we have uploaded our Expression of Interest onto WV Oasis. We appreciate this opportunity to provide this proposal, and look forward to answering any questions you may have. If you should require any additional information, please contact Ms. Warino, the Fairmont, WV Operations Manager, at (304) 534-4021.

Sincerely,

Stephanie Warino

Ms. Stephanie Warino, Fairmont, WV, Operations Manager

Section B: Consultant Questionnaire

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
LANDFILL CLOSURE CONSULTANT QUALIFICATION QUESTIONNAIRE

PROJECT NAME	DATE (DAY, MONTH, YEAR)	FEIN
Site Characterization Study, Leachate Management & Closure Cap for Webster County landfill	18, February, 2016	95-4660169

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
Tetra Tech, Inc.	Foster Plaza 7, 661 Andersen Drive Pittsburgh, Pennsylvania 15220	NUS Corporation NUS Environmental Corporation Brown & Root Environmental

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP INDIVIDUAL, CORPORATION, PARTNERSHIP, JOINT-VENTURE	6A. WV REGISTERED DBE (DISAVANTAGED BUSINESS ENTERPRISE)
(304)534-4021	1960	Corporation	No

7. PRIMARY OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. (name particular type) PERSONNEL EACH OFFICE

Foster Plaza 7, 661 Andersen Drive, Pittsburgh, PA 15220 / (412) 921-7090 / Mr. Mark Speranza, PE / 186

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM	8a. NAME, TITLE, & TELEPHONE NUMBER-OTHER PRINCIPALS
Mr. Mark Perry, PE – President	Mr. Mark Speranza, PE – Vice President

9. NUMBER OF PERSONNEL BY DISPLINE **(Bold Lettering Indicates Minimum Design Team Members) Detailed information On Team To Be Included**

46 ADMINISTRATIVE	2 ECOLOGISTS	__ LANDSCAPE ARCHITECTS	__ STRUCTURAL ENGINEERS
__ ARCHITECTS	__ ECONOMISTS	3 MECHANICAL ENGINEERS	*** SURVEYORS** (Handled by Triad)
1 BIOLOGIST	1 ELECTRICAL ENGINEERS	2 MINING ENGINEERS	40 OTHER
4 CADD OPERATORS	17 ENVIRONMENTALISTS	__ PHOTOGRAMMETRISTS	
13 CHEMICAL ENGINEERS	**1 ESTIMATORS**	__ PLANNERS: URBAN/REGIONAL	191 TOTAL PERSONNEL
33 CIVIL ENGINEERS	**14 GEOLOGIST**	__ SANITARY ENGINEERS	
2 CONSTRUCTION INSPECTORS	__ HISTORIANS	**2 SOILS ENGINEERS**	
4 **DESIGNERS**	**4 HYDROLOGISTS**	2 SPECIFICATION WRITERS	
__ DRAFTSMEN			

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 4

***RPEs other than Civil must provide supporting documentation that qualifies them to supervise and perform this type of work.**

10. If submittal is by joint venture, list participating firms & outline specific areas of responsibility (including administrative, technical, & financial) for each firm. Each participating firm must complete a "Consultant Confidential Qualification Questionnaire".

10a. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? □YES □ NO

11. OUTSIDE KEY CONSULTANTS/ SUB-CONSULTANTS ANTICIPATED TO BE USED.		
NAME AND ADDRESS: Triad Engineering 219 Hartman Run Rd Morgantown, WV 26505	SPECIALTY: Drilling/Surveying	WORKED WITH BEFORE YES
NAME AND ADDRESS: Geotechnics 544 Braddock Avenue Pittsburgh, PA 15112	SPECIALTY: Geotechnical Laboratory	WORKED WITH BEFORE Team members have in their work experience with other firms
NAME AND ADDRESS: Severn Trent Services 1746 Irwin Sportsman Rd. Manor, PA 15665	SPECIALTY: Analytical Laboratory	WORKED WITH BEFORE YES
NAME AND ADDRESS: Keddal Aerial Mapping 1121 Boyce Rd, Ste. 3100 Pittsburgh, PA 15241	SPECIALTY: Aerial Mapping	WORKED WITH BEFORE Team members have in their work experience with other firms
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE □YES □NO
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE □YES □NO
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE □YES □NO
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE □YES □NO
NAMEAND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE □YES □NO

12. ***Note: Personnel refers to those who will be working directly on the project:

A. Are your firm's personnel experienced in Solid Waste Landfill Closure Design?

☒ **YES Description and Number of Projects:**

Tetra Tech personnel have been involved in a wide variety of landfills closure projects at **over 50 landfills** (many of which have included site characterizations and leachate management) at which design work was performed for landfill closure. Landfill closure designs have included soil caps, geomembrane caps, evapotranspiration covers, explosion-resistant caps, paved cap areas, phytoremediation, waste consolidation to reduce landfilled area, selective waste removal, groundwater extraction, replacement of wetlands, upgrading of leachate treatment facilities, and cut-off walls. Each Tetra Tech closure design was developed to address site specific needs and regulatory requirements with the best value solution.

☐ **NO**

B. Are your firm's personnel experienced in Solid Waste landfill site characterization assessment and evaluation?

☒ **YES Description and Number of Projects:**

Tetra Tech has performed environmental site investigations at **over one hundred landfill sites** throughout the country. Site evaluations have included development of planning documents to collect data; sampling soil, sediment, groundwater, and LNAPL; evaluation of data; interpretation of the nature and extent of the contamination; ecological and human health risk evaluation (including vapor intrusion) for contaminated media; and implementation of remedial actions necessary to address contaminated soil, sediment, surface water, and groundwater. Evaluation also includes, as necessary, modeling of contaminant fate and transport from the source area to receptor locations and the development of remedial goal options. Biologists often contribute as necessary and required to perform screening level ecological risk assessments (SLERAs), full scale baseline ecological risk assessments (BERAs) and other biological assessments. Geologists often perform media sampling, design and installation of compliance monitoring groundwater networks, and evaluations of contaminant transport through in-depth aquifer characterizations and analyses of various groundwater flow models.

Tetra Tech employs biologists, chemists, field sampling personnel, civil and chemical engineers, geologists and hydrogeologists, risk assessors, and numerous other personnel to scope and perform site investigations, evaluations, and remedial actions, at **over 20 landfills** at which site investigations were performed by Tetra Tech. This attachment also identifies sites where laboratory analyses of soil and water, as well as subsurface investigations to determine the limit of waste, were performed.

☐ **NO**

C. Are your firm's personnel experienced in landfill closure construction inspection?

☒ **YES Description and Number of Projects:**

Jay Santa, Tetra Tech's Construction Manager, and Larry Deutch, construction QA/QC, has experience with landfill closure construction inspection and will manage this aspect of the project. In addition, team members also routinely provide technical review of construction submittals and variance requests in conjunction with landfill closure projects. Tetra Tech has experience at **over 20 landfill** closures at which QA/QC following

design approval was performed.

☐ **NO**

D. Is your firm experienced in Aerial Photography and the Development of Contour Mapping?

☒ **YES Description and Number of Projects:**

Tetra Tech routinely hires subcontractors for aerial photography to develop contour maps. In most cases the contour mapping was developed through aerial photography and ground truthing but on some projects land surveyors were used for mapping. Tetra tech employs six GIS/CADD operators in the Pittsburgh office and has all necessary GIS/CADD software for map development, at **over 15 landfills**.

☐ **NO**

E. Are your firm's personnel experienced in evaluating ground water contamination, such as may be associated with landfills?

☒ **YES Description and Number of Projects:**

Tetra Tech has performed **hundreds** of environmental site investigations and has evaluated groundwater contamination at approximately **90% of these sites**. Tetra Tech employs chemists who routinely perform validation of groundwater data. Tetra Tech has also performed hydrogeologic modeling, as appropriate, for site evaluation and closure design. In addition, team member Stephanie Warino, WV LRS, PG, has performed hydrogeologic evaluations of groundwater monitoring systems for a significant number of sites.

☐ **NO**

F. Are your firm's personnel experienced in Landfill Closure cost estimating?

☒ **YES Description and Number of Projects:**

Tetra Tech has performed conceptual design cost estimates including capital costs, operation and maintenance costs, and present worth analyses, for **over 50 sites** to assist in determining the best-value solution. In addition, detailed cost estimates are prepared to serve as the owners engineer's estimate based on the final landfill closure design.

☐ **NO**

13. PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (describe project)** (Furnish Complete data but keep to essentials)

NAME& TITLE (Last, first, Middle Int.)	YEARS OR EXPERIENCE		
	YEARS OF ENGINEERING EXPEIRENCE:	YEARS OF LANDFILL CLOSURE EXPEIRENCE:	YEARS OF LANDFILL CONSTRUCTION MONITORING EXPEIRENCE:
Baker, Bob., PE Project Manager	21	21	5

Mr. Baker specializes in geoenvironmental engineering and geosynthetic applications and design, with an emphasis in residual, industrial, and municipal solid waste (MSW) management facilities. During his 21 year career, he's served as the Design Engineer, Lead Engineer, and Project Manager for the planning, siting, design, and permitting of multiple coal combustion residual (CCR), MSW, and coal mine refuse landfills and disposal impoundments; leachate and stormwater management impoundments; and other associated geoenvironmental and civil engineering facilities. Mr. Baker also has extensive field construction experience and has served as the Resident Engineer, Project Manager, and Construction Quality Assurance (CQA) Certifying Engineer for over 20 CCR and MSW landfill cells and ancillary works including stormwater and erosion and sedimentation controls (channels, culverts, ponds, and other BMP's); leachate storage impoundments and above-ground tanks; pump stations; force mains; and haul roads.

EDUCATION (DEGREE, YEAR, SPECIALIZATION)

MS, 1993, Civil Engineering, West Virginia University
BS, 1991, Civil Engineering, West Virginia University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:	REGISTRATION (Type, Year, State)
North American Geosynthetics Society, Member International Geosynthetics Society, Member	Professional Engineer, 2001, PA Professional Engineer, 1998, NC (Inactive)

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:		
Gesk, Mike, PE Deputy Project Manager	9		

Brief Explanation of Responsibilities:

Mr. Gesk is a Professional Engineer registered in Pennsylvania with over 9 years of experience specializing in geoenvironmental and civil engineering with an emphasis on Coal Combustion Residual (CCR) disposal facilities. Mr. Gesk has provided engineering support primarily to the electric generation sector with experience in engineering, design, permitting, construction management, construction quality assurance/certification, and project management. Mr. Gesk has extensive field construction experience and has served in technical support, field advisory, and Resident Engineer capacities for the construction of several CCR landfill cells and ancillary facilities such as haul roads and leachate, process water, and stormwater impoundments as well as other major civil engineering projects. His technical responsibilities have included planning, coordinating, and directing subsurface investigations, soil resource evaluations, and geosynthetic and geotechnical testing programs; facility layouts, grading plans and details; performing geosynthetic liner and leachate collection and conveyance system design; performing slope stability and settlement analyses; reviewing contractor submittals, RFIs, schedules and pay requests; and preparation of

permit applications and supporting documentation for regulatory review and approval. Other responsibilities have included developing project work scopes and budgets; assembling, coordinating, and directing multidisciplinary office and field investigation teams; communicating and meeting with local, county, and state planning and regulatory agencies; and tracking and reporting project progress and budget status.

EDUCATION (Degree, Year, Specialization)

BS, 2005, Civil & Environmental Engineering, University of Pittsburgh
BA, Physics, 2005, Duquesne University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers	Professional Engineer, 2009, PA GCI Certified CQA Geosynthestic Materials and Compacted Clay Liner Inspector, 2009

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:	YEARS OF LANDFILL EXPERIENCE	
Lenhart, Lee, EIT Technical Advisor	16		

Brief Explanation of Responsibilities:

Mr. Lenhart specializes in design and construction of Coal Combustion Residual (CCR) landfills and ponds with focus on task management, construction quality assurance, investigations, analyses, and civil design for power generation facilities, mining sites, landfills, ponds, and haul roads.

EDUCATION (Degree, Year, Specialization)

B.S. Civil Engineering Technology, 1999, University of Pittsburgh

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	Engineer-In-Training, 1998, PA Certified ACI Concrete Field Testing Technician, Grade 1, 2013

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:		
Micikas, Joseph, L., PE	34		

Brief Explanation of Responsibilities:

Mr. Micikas has over 34 years of managerial and technical experience in civil, structural and foundation engineering, and forensic investigations. His managerial and "hands-on" experience is spread across all phases to include sales and marketing, project development, estimating, scheduling/tracking, engineering/design, contract negotiations, and construction. His experience includes performing and managing preliminary and detailed design, structural design, and cost estimating services for heavy industrial projects. He is skilled at

working with clients, technical and business teams to provide information and solutions to existing and potential issues. He has directed teams, projects, and departments, and is familiar with managerial functions and corporate operations. Industries served include: oil and gas production and refining, landfill gas to energy, chemical and petrochemical processing plants, steel manufacturing, fossil fuel power generation, pulp and paper processing, building materials manufacturing, activated carbon and field support.

EDUCATION (Degree, Year, Specialization)

BS, 1978, Civil Engineering, Pennsylvania State University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Chi Epsilon – Civil Engineering Honor Society American Society of Civil Engineers – National and Pittsburgh Section American Institute of Steel Construction Pennsylvania Society of Professional Engineers	Professional Engineer, 1990, PA

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
Zubal, David P., P.E.	YEARS OF ENGINEERING EXPERIENCE: 9		

Brief Explanation of Responsibilities:

Mr. Zubal specializes in civil and environmental engineering project management, including overseeing development of environmental permits including erosion and sedimentation control and stormwater site development plans. He is a Professional Engineer in six states including Pennsylvania, Ohio, West Virginia, Connecticut, Iowa and Nebraska. He has experience with Federal Energy Regulatory Commission (FERC) projects, both large and small scale. He also has field experience including pipeline installation, meter station installation, landfill liner installation, earthwork development monitoring, roadway construction monitoring, material sampling and monitoring, erosion and sedimentation control monitoring and planning, and materials analysis. He is experienced using Global Positioning System (GPS) applications and other field surveying equipment.

EDUCATION (Degree, Year, Specialization)

BS, Civil and Environmental Engineering, 2006, University of Pittsburgh

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	Professional Engineer, 2012, PA Professional Engineer, 2014, WV, OH, CT, IA, NB Certified Professional in Erosion and Sediment Control, 2011 ACI Field Testing Technician, Grade I, 2006-Present Erosion and Sediment Control Certification, Maryland, 2006-Present

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:	YEARS OF ENVIRONMENTAL EXPEIRENCE:	YEARS OF LANDFILL CLOSURE EXPEIRENCE:
Witt, Daniel C., PE Project Engineer	20	17	13

Brief Explanation of Responsibilities:

Mr. Witt is experienced in closure designs for uncontrolled landfills. He served as the project manager, project engineer, and design engineer on landfill closure designs in PA, VA, NJ, and CT. As Project Manager, Mr. Witt was responsible for all aspects of the design including pre-design investigation; final design; coordination with the client, regulatory agencies, and the public; budgets; and schedules. Mr. Witt has also developed and implemented investigations to delineate uncontrolled landfills for closure. Mr. Witt has managed two Superfund sites in Pennsylvania for U.S. EPA Region III and provided remedial design/remedial action oversight for the closure of these uncontrolled landfills.

EDUCATION (Degree, Year, Specialization)

BS, 1987, Civil Engineering, Penn State University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	Professional Engineer, 1993, PA

13a.PERSONAL HISTORY STATMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE DESIGN (name type of design or work)** (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:	YEARS OF ENVIRONMENTAL EXPEIRENCE:	
Warino, Stephanie A, PG, WV LRS Project Geologist	10	10	

Brief Explanation of Responsibilities:

Ms. Warino is the Operations Manager for the Fairmont, WV office. Her responsibilities include resource allocation, budgeting, project oversight, and business development. She has nearly 10 years of experience specializing in environmental site assessment, remediation, and project management. During this time, she has managed and supported projects for oil & gas, mining, commercial, and government sectors, and has been

responsible for identifying and conducting work in accordance with the various regulatory programs and guidance governing them. She has experience providing geologic and hydrogeologic technical support including data analysis, interpretation and statistical analyses, and has experience in collecting water, waste, sediment, soil, and air samples, as well as experience in overburden and rock logging and well installation oversight. Ms. Warino leads project planning efforts, including proposals, budgeting, design and execution of field sampling events, and management of subcontractors. Ms. Warino currently manages projects for Oil & Gas clients in West Virginia, and also manages projects for the United States Navy, including underground storage tank (UST) sites, waste disposal (RCRA) sites, and Superfund (CERCLA) sites.	
EDUCATION (Degree, Year, Specialization) MS, 2004, Geology, University of Akron BA, 2002, Geology, University of Akron	
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State) Licensed Remediation Specialist, 2014, WV Professional Geologist, 2010, PA

13b. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR LANDFILL CLOSURE QA/QC** (Furnish complete data but keep to essentials)			
NAME & TITLE (last, first, middle Int.)	YEARS OF EXPEIRENCE		
	YEARS OF ENGINEERING EXPERIENCE:	YEARS OF CONSTRUCTION QA/QC EXPEIRENCE:	
Deutch, Larry N. Construction Superintendant	41	41	
Brief Explanation of Responsibilities Mr. Deutsch has spent more than 41 years working in the geotechnical, civil, environmental and steel industries. His areas of expertise include engineering, construction, mining and trades, energy/utilities, environmental services, project/program management, QA, and health and safety.			
EDUCATION (Degree, Year, Specialization) Advanced Mathematics, University fo Pittsburgh, 1980-1981			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

13c. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES **RESPONSIBLE FOR HEAVY EARTH WORK CONSTRUCTION PROJECTS** (Furnish complete data but keep to essentials)			
NAME & TITLE (last, first, middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF ENGINEERING EXPERIENCE	YEARS OF HEAVY EARTHWORK EXPERIENCE	
Santa, Jay Construction Manager	20		
Brief Explanation of Responsibilities Mr. Santa has more than 20 years of experience performing construction project and site management, the last three years for Marcellus Shale projects. His experience includes large earth moving projects, superfund site remediation, landfill construction and closure, utility installation and pipe work, soil remediation, water management and groundwater barrier construction.			
EDUCATION (Degree, Year, Specialization) BS, Earth and Mineral Sciences			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS N/A		REGISTRATION (Type, Year, State) N/A	

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE THIS PROJECT (City of Kingwood Landfill Closure Project)
Microsoft Office Professional (includes Excel and Word)
Microsoft Project
Photoshop
Adobe Acrobat Version 8.0
AutoCAD Map 3D 2008 / AutoCAD 2008
AutoDesk Civil 3D 2007
ESRI ArcGIS 9.2
ESRI ArcView 3.3
Bentley PondPack (Haestad Methods) Version 9.0
Bentley Flow Master (Haestad Methods)
Bentley HEC-Pack
STABL5M
Hydrologic Evaluation of Landfill Performance (HELP)
Groundwater Vistas Version 3.5 (MODFLOW based 3D finite difference model, including MT3D, RT3D, MODPATH, MODFLOWT, and SWIFT components)
GMS (MODFLOW based 3D finite difference model, including MT3D, RT3D, MODPATH and 3-D spatial analysis components)
Visual MODFLOW (MODFLOW based 3D finite difference model, including MODPATH)
SWANFLOW (3D finite difference model specializing in 3-phase fluid flow in porous media – water, NAPL, air)
Several analytical-based software packages including BIOCHLOR, BIOSCREEN, and SESOIL

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD ASSOCIATED WITH OR RELATING TO LANDFILL CLOSURE OR CONSTRUCTION.

PROJECT NAME,TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
Environmental Review, Due Diligence, and Post-Closure Services, Pinelands Park Landfill (Closed)	Atlantic County Utilities Authority 6700 Delilah Road, Egg Harbor Township, New Jersey	Environmental Review and Due Diligence, Post-Closure Cost Estimates, Monitoring and Reporting, and Financial Plan Updates	Confidential	75%
Remediation and Closure Services, Tantalo Waste Disposal Site	IESI – Seneca Meadows, Inc. 1786 Salcman Road, Waterloo, New York	Focused RI/FS, Fractured Rock Aquifer/Tracer Test, Remedial Design, Remedial Construction, Natural Attenuation Demonstration, Operation, Maintenance, and Monitoring Services	Confidential	75%
Post Closure Monitoring Annual Engineer's Report and Cost Estimating, Eastern, Central, and C&D Landfills, New York	Montgomery-Otsego-Schoharie Solid Waste Management Authority (MOSA) South Route 7, Howes Cave, New York	Post closure monitoring and annual reporting. Post closure cost estimates for 30 year post closure term, Engineering evaluations landfill and leachate management systems	Confidential	75%
Landfill Closure/Brownfield	Walter's Homes 246 Stafford Park	Landfill closure	Confidential	75%

Redevelopment and Post-Closure Monitoring, Stafford Township Landfills, New Jersey	Blvd, Manahawkin, New Jersey	Geomembrane final cover Development of yard waste compost facility Major waste disruption Excavation and beneficial reuse of waste materials Brownfield redevelopment Post-closure monitoring and maintenance		
TOTAL NUMBER OF PROJECTS: #4			TOTAL ESTIMATED CONSTRUCTION COSTS: Confidential	

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS RELATING TO LANDFILL CLOSURE AND CONSTRUCTION.

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
N/A					

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD (List 5 to 7)

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Bayer New Martinsville South End Remediation Design-Build	Bayer New Martinsville, WV	Confidential	Construction Completed: May 2013 Construction	

			Start: Oct. 2011	
New Asset Facility Planning, Design, and Permitting, Confidential Project, Pennsylvania	Confidential Client	Confidential	Currently Ongoing Start: 2009	No
Pollution Control Financing, Pennsauken Sanitary Landfill	Authority of Camden County (PFCA) 9600 River Road Pennsauken, New Jersey	Confidential	Currently Ongoing Start: 2010	N/A
Engineering Services and Environmental Services (Groundwater and Landfill Gas Migration, emissions permitting, and stormwater pollution prevention monitoring), MAC Landfill	MAC Sanitary Landfill Route 41 Deptford, New Jersey	Confidential	Currently Ongoing Start: 2006	N/A
Wetland Leachate Treatment for Haley Pike Solid Waste Landfill Closure, Fayette County, Kentucky	Lexington-Fayette Urban County Government 4216 Hedger Lane, Lexington, Kentucky	$900,000	2006 -2011	Yes
LFG System Development Plans, Keystone Sanitary Landfill Expansion, Scranton, Pennsylvania	Keystone Sanitary Landfill, Inc. 249 Dunham Drive, Scranton, Pennsylvania	Confidential	2001 - 2009	Yes

18. COMPLETED WORK WITHIN LAST 5 YEARS IN WHICH YOUR FIRM HAS BEEN A SUBCONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK WHICH YOUR FIRM WAS RESPONSIBLE) LIST 5 TO 7.

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

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the WV Department of Environmental Protection.

Tetra Tech is a recognized engineering company with an extensive pool of resources. In addition to the approximately 200 people in our Pittsburgh office, our firm has the ability to utilize the skills of over 10,000 Tetra Tech employees across 275+ offices worldwide in the United States, France, Germany, India, South Korea, Philippines, Republic of Panama, and United Arab Emirates. Tetra Tech has over 750 registered Professional Engineers and Professional Geologists and in 2008, had sales totaling over $2 billion. The firm's federal government clients have included the US Environmental Protection Agency, the Army, Navy, Air Force, US Department of Homeland Security, NASA, US Department of Energy, and the US Postal Service.

While this project would be managed out of our Pittsburgh office, Tetra Tech also has an office location in Charleston, West Virginia, which can support the project. Tetra Tech has been dedicated to the state of West Virginia and The WV Department of Environmental Protection is our Charleston office's largest client. In addition, our subconsultant, Triad Engineering, is located in Morgantown, West Virginia.

The skill of Tetra Tech is evidenced by the firm's 2008 Engineering News Record (ENR) rankings, which include **#1 rankings** in Water Supply and Treatment and Desalination. The firm is also ranked in the **top ten companies** for site assessment and compliance, chemical and soil remediation, environmental science, environmental management, and consulting/studies. Tetra Tech is ranked as the **6th largest** environmental firm and the 8th largest design firm.

The U.S. Navy has noted Tetra Tech's quality work with landfills. On the White Oak Sites 1 & 2 Landfill projects, the Navy commented ***"Tetra Tech exhibited knowledge, good experience and professionalism throughout the design stages"*** while offering several 'Outstanding' ratings on various aspects of the project.

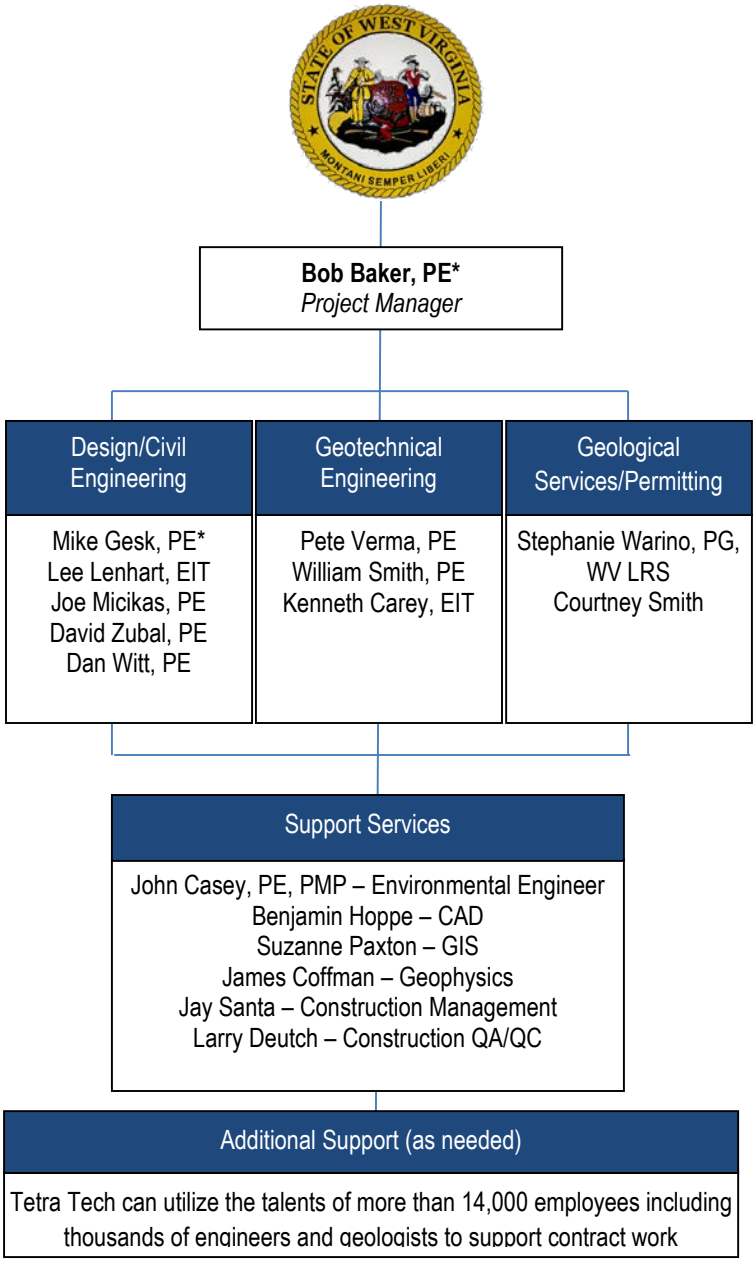
20. The foregoing is a statement of facts Signature: Stephanie Warino Title: Fairmont Operations Manager Printed Name: Stephanie Warino, WV LRS, PG	Date: February 18, 2016

Section C: Personnel

Project Team Resumes

Over the next several pages, we have included full-page resumes of our project team's key personnel to supplement our proposal. Our project team is led by Mr. Bob Baker, PE, a registered Professional Engineer. Mr. Baker has more than 20 years of experience and has supported a significant number of landfill cap closures and designs.

In addition, an organization chart of our engineering team professionals has been provided below. All staff members are located in local West Virginia and Pennsylvania offices.



ROBERT C. BAKER, P.E.

Senior Geoenvironmental Engineering Manager

EXPERIENCE SUMMARY

Mr. Baker specializes in geoenvironmental engineering and geosynthetic applications and design, with an emphasis in residual, industrial, and municipal solid waste (MSW) management facilities. During his 21 year career, he's served as the Design Engineer, Lead Engineer, and Project Manager for the planning, siting, design, and permitting of multiple coal combustion residual (CCR), MSW, and coal mine refuse landfills and disposal impoundments; leachate and stormwater management impoundments; and other associated geoenvironmental and civil engineering facilities. Mr. Baker also has extensive field construction experience and has served as the Resident Engineer, Project Manager, and Construction Quality Assurance (CQA) Certifying Engineer for over 20 CCR and MSW landfill cells and ancillary works including stormwater and erosion and sedimentation controls (channels, culverts, ponds, and other BMP's); leachate storage impoundments and above-ground tanks; pump stations; force mains; and haul roads.

RELEVANT EXPERIENCE

Siting, Design, Permitting, and Construction Bid Package Preparation

Mr. Baker has served as the Lead Engineer and Project Manager for siting, design, permitting, and construction bid package preparation for several landfills, impoundments, and other geoenvironmental and civil engineering projects. His technical responsibilities have included planning, coordinating, and directing subsurface investigations, soil resource evaluations, and geotechnical testing programs; preparing facility layouts, grading plans and details; performing liner and leachate collection system design, slope stability and settlement analyses; preparing CQA Plans and technical specifications; developing stabilization plans for abandoned underground mine workings; and assisting with seismic stability and liquefaction susceptibility evaluations of coal refuse disposal impoundments. His management responsibilities have included developing project work scopes and budgets; assembling, coordinating, and directing multidisciplinary office and field investigation teams; communicating and meeting with local, county, state, and federal planning and regulatory agencies; tracking and reporting project progress and budget status; and organizing,

EDUCATION

M.S. Civil Engineering, 1993, West Virginia University

B.S. Civil Engineering, 1991, West Virginia University

REGISTRATIONS

Professional Engineer, PA, 2001, P[redacted] PA

Professional Engineer, NC (Inactive), 1998, [redacted]

TRAINING/CERTIFICATIONS

30-Hour OSHA Construction Safety and Health Training, 2010

PSMJ Advanced Project Management Training, 2009

Troxler Nuclear Gauge Operator

OFFICE

Monroeville, PA

YEARS OF EXPERIENCE

21

YEARS WITH TETRA TECH

1

preparing, reviewing, and issuing permit applications and supporting documentation for regulatory review and approval. Representative projects include:

- Armstrong New CCB Landfill - Residual Solid Waste and Section 404/Chapter 105 Joint Permit Application for a new 64 acre CCB landfill (First Energy, Armstrong Power Station, PA).
- Reiker Hill Road Landfill - Siting Study and Residual Solid Waste Permit Application for a new 140 acre CCB landfill (AEP, Conesville Power Station, OH).
- Piggot's Run Landfill - Solid Waste/NPDES Permit Application for a 244 acre lateral expansion of an existing CCB landfill (First Energy, Harrison Power Station, WV).
- West Valley Disposal Site - Residual Solid Waste and Section 404/Chapter 105 Joint Permit Application for a 108 acre lateral expansion of an existing CCB landfill (NRG, Keystone Power Station, PA).
- Monongahela South No. 1 - Reclamation/stabilization of a highwall adjacent to a church and school building and installation of an acid mine drainage (AMD) collection system (PaDEP BAMR, Monongahela, PA) - Received the OSM's 2006 Eastern Region Abandoned Mine Reclamation Award.

Construction Monitoring/CQA/Certification

Mr. Baker has served as the Resident Engineer, Lead Engineer, Project Manager and CQA/Certifying Engineer for the construction of several CCB and MSW landfill cells and ancillary facilities such as leachate/stormwater impoundments and tanks, pump stations, forcemains, and haul roads, as well as other major civil engineering projects for the electric generation sector such as material handling and conveyance systems, stormwater management controls, and switchyard equipment foundations. As a Resident Engineer his responsibilities have included verifying contractor layouts and reviewing survey data; performing and directing soil, aggregate, and rock CQA activities; performing and directing geosynthetic CQA activities; monitoring and inspecting the installation of HDPE and PVC piping systems, manholes, valves, pumps, and I/C systems; monitoring placement and performing and directing testing for cast-in-place concrete structures; monitoring erection of steel leachate storage tanks; logging groundwater monitoring well decommissioning and new well installations; reviewing soil, aggregate, grout, concrete, and geosynthetic laboratory test data; and reviewing and approving contractor submittals, schedules and pay requests. Representative projects include:

- West Valley Disposal Site, Stages IIIA, IIIB, and IIIC - 54 acres of PA Class 1 liner system for a CCB landfill (NRG, Keystone Power Station, PA).
- Conemaugh YDSM Pond - 2 acres of modified PA Class 1 liner system and a pump station for a stormwater yard drain equalization pond (NRG, Conemaugh Power Station, PA).
- Alamance County Landfill, Cell 2A - 8.5 acre MSW landfill cell and 375,000 gallon leachate storage tank (County of Alamance, NC).
- Wilder's Grove Landfill – 68 acre final cover system for an MSW landfill (City of Raleigh Department of Solid Waste Services, NC).
- Randolph County Landfill – 21 acre final cover system for an MSW landfill (Randolph County Public Works Department, NC).

As a Lead Engineer, Project Manager, and CQA/Certifying Engineer, Mr. Baker's responsibilities have included developing project work scopes and budgets; assembling, coordinating, and directing multidisciplinary office and field teams; attending construction progress and problem resolution meetings; planning, coordinating, and directing contractor submittal review, RFI response, and laboratory sampling/testing programs; communicating and meeting with local, county, state, and federal planning and regulatory agencies; tracking and reporting project progress and budget status; and organizing, preparing, reviewing, and issuing construction certification reports and supporting documentation for regulatory review and approval. Representative projects include:

- Hatfield's Ferry CCB Landfill, Phase 3, Step 1, 2, and 3 landfill cells, Leachate Storage Impoundment, and Haul Road – 63 acres of PA Class 1 liner system and approximately 1 mile of new concrete haul road for a CCB landfill (First Energy, Hatfield's Ferry Power Station, PA).
- Fort Martin CCB Landfill, Haul Road Stormwater Management Improvements and Settling/Equalization Pond – 2 acre lined impoundment for settling/equalization of haul road runoff and resurfacing of approximately 2 miles of gravel haul road for a CCB landfill (First Energy, Ft. Martin Power Station, WV).
- Armstrong New CCB Landfill Facility, Stage 1A and 1B landfill cells and South Leachate Pond – 18 acres of PA Class 1 liner system and approximately 0.5 miles of gravel haul road (First Energy, Armstrong Power Station, PA).

Keystone Flue Gas Desulfurization System (FGDS) Construction - Civil Design and Testing services – Subsurface investigation/foundation recommendations and civil construction monitoring and testing for all facilities related to an FGDS retrofit including an ew railroad spur and unloading building, combined chimney and absorbers, gypsum dome, FGD building, FGD wastewater treatment facility, limestone reclaimer, limestone and gypsum conveyor systems, and make-up water pump station and forcemain (NRG, Keystone Power Station, PA).

CHRONOLOGICAL HISTORY

Senior Geoenvironmental Engineering Manager; Tetra Tech, Inc.; 2013, Monroeville, PA
Senior Engineering Manager; GAI Consultants, Inc.; 2000-2013, Pittsburgh, PA
Principal Engineer; Hazen and Sawyer, PC; 1996-2000, Raleigh, NC
Assistant Project Engineer; Almes & Associates, Inc.; 1994-1996, Pittsburgh, PA
Engineer II; GAI Consultants, Inc.; 1993-1994, Pittsburgh, PA

SCIENTIFIC/TECHNICAL PUBLICATIONS

2000 Baker, R.C. and Bove, J.A. Design, Permitting, and Construction of a Polypropylene Geomembrane-Lined Coal Combustion Ash Monofill. Proceedings of the 32nd Mid-Atlantic Industrial and Hazardous Waste Conference.

1998 Baker, R.C. and Bove, J.A. Prediction of Leachate Generation in MSW Landfills. Proceedings of the SWANA 3rd Annual Landfill Symposium.

1996 Baker, R.C., Boury, E.M., and Chiado, E.D. Leachate Reduction Strategies for Municipal Solid Waste Landfills. Proceedings of the 12th International Conference on Solid Waste Technology and Management.

1994 Baker, R.C., Bowders, J.J., Gabr, M.A., and Boury, E.M. Engineering Evaluation of Amended Fly Ash for Hydraulic Barriers. Proceedings of the International Conference on Land Reclamation and Mine Drainage.

1992 Baker, R.C., Runner M.S., and Bowders, J.J. Fly Ash Seals and Grouts to Control Acid Mine Drainage. Proceedings of the 14th Annual Conference of the Association of Abandoned Mine Land Programs.

1992 Baker, R.C., Runner M.S., and Bowders, J.J. Waste Materials Applications for AMD Control. Proceedings of the 24th Mid-Atlantic Industrial Waste Conference.

MEMBERSHIPS

- North American Geosynthetics Society, Member
- International Geosynthetics Society, Member

AWARDS

- N/A

MICHAEL A. GESK, P.E.

Geoenvironmental Engineering Project Manager

EXPERIENCE SUMMARY

Mr. Gesk is a Professional Engineer registered in Pennsylvania with over 9 years of experience specializing in geoenvironmental and civil engineering with an emphasis on Coal Combustion Residual (CCR) disposal facilities. Mr. Gesk has provided engineering support primarily to the electric generation sector with experience in engineering, design, permitting, construction management, construction quality assurance/certification, and project management.

Mr. Gesk has extensive field construction experience and has served in technical support, field advisory, and Resident Engineer capacities for the construction of several CCR landfill cells and ancillary facilities such as haul roads and leachate, process water, and stormwater impoundments as well as other major civil engineering projects. His technical responsibilities have included planning, coordinating, and directing subsurface investigations, soil resource evaluations, and geosynthetic and geotechnical testing programs; facility layouts, grading plans and details; performing geosynthetic liner and leachate collection and conveyance system design; performing slope stability and settlement analyses; reviewing contractor submittals, RFIs, schedules and pay requests; and preparation of permit applications and supporting documentation for regulatory review and approval. Other responsibilities have included developing project work scopes and budgets; assembling, coordinating, and directing multidisciplinary office and field investigation teams; communicating and meeting with local, county, and state planning and regulatory agencies; and tracking and reporting project progress and budget status.

RELEVANT EXPERIENCE

Design, Permitting, and Construction Bid Preparation

American Electric Power – Glen Lyn CCR Landfill Closure (2011-2012); Glen Lyn Power Station; Glen Lyn, Virginia
Task Manager responsible for assisting with design of a geosynthetic liner system design, perimeter termination details, and stormwater conveyance piping and aggregate drainage envelopes.

EDUCATION

B.S. Civil and Environmental Engineering, 2005, University of Pittsburgh

B.A. Physics, 2005, Duquesne University

REGISTRATIONS

Professional Engineer, PA, [redacted]

GCI Certified CQA Geosynthetic Materials and Compacted Clay Liner Inspector; 2009

TRAINING/CERTIFICATIONS

Advanced Project Management Training; 2013

Risk Management Training; 2011

OSHA 30-Hour Construction Health and Safety; 2010

OSHA 10-Hour Construction Health and Safety; 2007

OSHA Fall Protection; 2007

Troxler Nuclear Gauge Operator

OFFICE

Monroeville, PA

YEARS OF EXPERIENCE

9

YEARS WITH TETRA TECH

1

First Energy Corp. – McElroy's Run Stage 1G CCB Landfill Facility (2009-2010); Pleasants Power Station; Pleasants County, West Virginia
Lead Engineer responsible providing design of an alternative geosynthetic liner system (HDPE geomembrane, GCL, and Geocomposite Drainage Net) in place of an existing clay liner system and geosynthetic technical specifications and CQA/CQC plan for the construction package for Stage 1G (13.7 acres).

NRG Energy Inc. – Annual Landfill Report Support (2005-2012); Keystone Generating Station; Indiana County, Pennsylvania
Task Manager responsible for coordinating and preparing an updated ash disposal site record drawing with new field survey mapping and estimating the volume of CCRs placed in the landfill during the ALR period to be submitted annually to the Pennsylvania Department of Environmental Protection by NRG. Online and offline hours for each unit were analyzed to determine weighted average CCR disposal rates on a weekly basis.

NRG Energy Inc. – Annual Landfill Report Support (2005-2012); Conemaugh Generating Station; Indiana County, Pennsylvania
Task Manager responsible for coordinating and preparing an updated ash disposal site record drawing with new field survey mapping and estimating the volume of CCRs placed in the landfill during the ALR period to be submitted annually to the Pennsylvania Department of Environmental Protection by NRG. Online and offline hours for each unit were analyzed to determine weighted average CCR disposal rates on a weekly basis. Prepared updated bonding worksheets for the 2012 submission.

American Electric Power – Possum Hollow Residual Solid Waste Landfill Permit Application (2007-2008); Clinch River Power Station; Carbo, Virginia
Engineer responsible for providing slope stability analyses, leachate collection system design, hydrological evaluation using EPA HELP modeling software, geosynthetic liner system components (HDPE geomembrane, GCL, GDN, and woven and non-woven geotextiles), leachate storage sump, conveyance gravity pipeline, and material volume and site life analyses submitted with the permit application for construction of the new facility.

American Electric Power – Glen Lyn Landfill Facility Permit Application (2007-2008); Glen Lyn Power Station; Glen Lyn, Virginia
Engineer responsible for providing geosynthetic liner system chemical compatibility analysis, geocomposite drainage net design, and technical specifications and CQA/CQC plan submitted with the permit application for construction of the facility.

American Electric Power – Reiker Hill Road Residual Solid Waste Landfill Permit Application (2006-2007); Conesville Power Station; Conesville, Ohio
Engineer responsible for providing slope stability analyses, leachate collection system design, hydrological evaluation using EPA HELP modeling software, and material volume and site life analyses submitted with the permit application for construction of the new facility.

American Electric Power – Great Bend Residual Solid Waste Landfill Permit Application (2006); Great Bend IGCC Plant; Meigs County, Ohio
Engineer responsible for providing leachate collection system design, hydrological evaluation using EPA HELP modeling software, and final closure cost estimate submitted with the permit application for construction of the new facility.

American Electric Power – John E. Amos Residual Solid Waste Landfill Permit Application (2005); John E. Amos Power Station; Winfield, West Virginia
Project Designer responsible for providing protective cover stability analyses and piezometer pump installation for groundwater sampling submitted with the permit application for construction of the new facility.

SCANA – Low Volume Wastewater Ponds Preliminary Engineering Study (2014-2015); Urquhart Generating Station; Beech Island, South Carolina
Project Manager responsible for the preparation of conceptual pond layouts and cost estimates and evaluating regulatory restrictions in support of a Preliminary Engineering Study for reconstructing existing unlined primary and secondary low volume wastewater ponds as lined ponds receiving additional wastewater flows.

Waste Management National Services – 8th Avenue Sediment Transload Facility (2013-2015); Seattle, Washington
Task Manager assisting with design, permitting, and construction of a new barge unloading facility located along the Duwamish River required to handle 3,000 tons of sediment per day. Tasks included coordination of field inspection by Ballard Marine Construction (subcontractor) and desktop structural evaluation of the existing pier to handle Sennebogen crane loadings, permitting support, stormwater system design, and site layout associated with the interim and permanent facility operations.

NRG Energy Inc. - Desilting Basin Reconstruction (2011-2013); Conemaugh Generating Station; Indiana County, Pennsylvania
Assistant Project Manager responsible for performing and assisting with design and preparation of a Design Engineer's Report, Water Quality Management Permit Application with Residual Solid Waste review, Chapter 105/106 Joint Permit Application, and an Erosion and Sedimentation (E&S) Control Plan for the reconstruction of a 1 acre stormwater/process water pond used for FGD system make-up water. Design oversight of the geosynthetic liner and groundwater collection systems and peer review of pond hydraulics and discharge systems, system description documents used in operations, Bill of Materials, cable schedules, and spare parts list. Other duties included preparation of project specifications and CQA/CQC plan and construction package bid documents as well as providing NRG Energy with technical review of bid proposals for contractor selection.

NRG Energy Inc. - Flue Gas Desulfurization (FGD) & Gypsum Area Sump (2012-2013); Conemaugh Generating Station; Indiana County, Pennsylvania
Assistant Project Manager responsible for performing and assisting with design and preparation of a Design Engineer's Report, Water Quality Management Permit Application, Chapter 105/106 Joint Permit Application, and an E&S Control Plan for the construction of a new 2 million gallon reinforced concrete sump collect stormwater runoff and pump to the FGD system as make-up water. Coordination and peer review of design and construction documents prepared by multiple engineering disciplines including system description documents used in operations, Bill of Materials, cable schedules, and spare parts list. Other duties included coordination and peer review of subsurface investigation work and preparation of the Geotechnical Engineering Report which also included rock anchor installation guidelines.

NRG Energy Inc. - Haul Road Runoff Improvements (2011-2013); Conemaugh Generating Station; Indiana County, Pennsylvania

Assistant Project Manager responsible for performing and assisting with design and preparation of a Design Engineer's Report, Water Quality Management Permit Application, Chapter 105/106 Joint Permit Application, and an E&S Control Plan for the regrading of the existing haul road (~1 mile) and construction of a runoff control barrier and a new 600,000 gallon reinforced concrete sump and dewatering pump system.

NRG Energy Inc. – Beneficial Use of Pond Ash (2012); Elrama Generating Station; Washington County, Pennsylvania
Lead Engineer responsible for researching potential beneficial reuse sites and facilitating discussions with portland cement end-users for removal of pond ash from two (2) closed lagoons to facilitate pond closures.

NRG Energy Inc. – Ash Water Recycle Sump Bypass (2011-2012); Conemaugh Generating Station; Indiana County, Pennsylvania
Task Manager responsible for assisting with coordination, design, and flow data collection for the redirection of flows from the Ash Water Recycle Sump to each Cooling Tower. The project consisted of two (2) cast-in-place concrete vaults installed over an existing pipe to house new electric actuated valves used to redirect flows to each cooling tower. Duties included flow rate data collection using portable flow meters and ultrasonic transducers, review and preparation of system description documents used in operations, Bill of Materials, spare parts list, construction drawings, and bid documents.

First Energy Corp. – Stormwater Pond Design (2011-2012); Meadow Brook Substation; Winchester, Virginia
Lead Engineer responsible for providing alternative geosynthetic liner and protective cover systems design in assistance with the design a new stormwater sedimentation pond and forebay.

NRG Energy Inc. – Acid Mine Drainage Vertical Flow Pond Rehabilitation (2010); Keystone Generating Station; Indiana County, Pennsylvania
Lead Engineer responsible for design of a temporary treatment system, new protective armoring, and construction sequencing for the rehabilitation of an existing anaerobic Acid Mine Drainage Vertical Flow Treatment Pond.

NRG Energy Inc. – Disposal Site Improvements and Cost Projections Evaluation (2010); Keystone Generating Station; Indiana County, Pennsylvania
Lead Engineer responsible for providing cost projections for the development of the West Valley disposal site, designing improvements to the leak detection system and leachate collection conveyance and cleaning structures, phase sequencing and ultimate pile development, and evaluation of existing facility permit modification impacts.

NRG Energy Inc. – East and West Valley CCB Disposal Site Improvements Evaluation (2009); Keystone Generating Station; Indiana County, Pennsylvania
Senior Engineer responsible for evaluating the leachate collection system and leachate chemistry and providing design and operation improvement alternatives for the existing East and West Valley CCB disposal sites. Also performed a site development/phasing analysis and pile grading layout.

Dominion Resources Services Inc. – Waste Characterization Study of Atmospheric Fluidized Bed Combustion (AFBC) Ash (2007); Curley Hollow Solid Waste Management Facility - Virginia City Hybrid Energy Center; Wise County, Virginia
Engineer responsible for field sampling CCRs from two (2) similar AFBC coal-fired power stations, developing and implementing physical and chemical testing programs, analyzing data, and preparing a waste characterization report to be used for the design of the Curley Hollow Landfill at the Virginia City Hybrid Energy Center.

Forward Industrial Development Corporation – Site Development of the Former Suchko Tire Processing Facility (2006); Belle Vernon, Pennsylvania
Project Designer responsible for providing slope stability analyses, site volume and composite material calculations, obtaining surrounding residential water supply information from door-to-door surveys, and obtaining water company information.

CONSTRUCTION MONITORING/CQA/CERTIFICATION

NRG Energy Inc. – Desilting Basin Reconstruction (2013); Conemaugh Generating Station; Indiana County, Pennsylvania
Assistant Project Manager responsible for supervising CQA monitoring installation of soil, aggregate and rock, PA Class 1 geosynthetic liner, and groundwater pump station components installed for the 1 acre stormwater/process water equalization pond. Other tasks included preparation of construction specifications and drawings, contractor submittal review, laboratory conformance test setup and data review, and Construction Certification Report for the Pennsylvania Department of Environmental Protection.

NRG Energy Inc. – Outfall 007 Wastewater Conveyance Upgrade (2010-2013); Conemaugh Generating Station; Indiana County, Pennsylvania
Lead Engineer/Task Manager responsible for reviewing contractor submittals, verifying and evaluating design details (profile elevations and grades, piping, and vaults), analyzing water chemistry and evaluation the chemical compatibility of construction materials, evaluation of sump pump performance and troubleshooting, and running bi-weekly construction progress meetings.

NRG Energy Inc. – Ash Water Recycle Sump Bypass (2011-2012); Conemaugh Generating Station; Indiana County, Pennsylvania
Task Manager responsible for engineering support, running bi-weekly construction progress meetings, and preparing record drawings associated with the construction of two (2) cast-in-place concrete vaults, installation of HDPE pipe and fittings, installation of electric actuated valves, and piping supports.

First Energy Corp. – Hatfield's Ferry CCR Landfill Expansion and Haul Road, Leachate Storage Impoundment and Phase 3 Steps 1 and 2 (2009, 2010, and 2011); Hatfield's Ferry Power Station; Masontown, Pennsylvania
Lead Engineer responsible for performing and supporting CQA monitoring of soil, aggregate and rock and 45 acres of PA Class 1 geosynthetic liner components installed for the Leachate Storage Impoundment (5 acres), Phase 3, Step 1 Expansion (17 Acres), and Phase 3, Step 2 Expansion (23 Acres). Other duties include providing office engineering support, contractor submittal review, laboratory conformance test setup and data review, and assisting with the preparation of the Construction Report submitted to the Pennsylvania Department of Environmental Protection.

First Energy Corp. – McElroy's Run Stage 1G CCR Landfill Facility (2009-2010); Pleasants Power Station; Pleasants County, West Virginia
Lead Engineer responsible providing construction technical support and training, office engineering support, contractor submittal review, laboratory conformance test setup and data review, and assisted with the preparation of the Construction Report submitted to the West Virginia Department of Environmental Protection associated with the CCR landfill 13 acre expansion.

NRG Energy Inc. – Flue Gas Desulfurization System Construction Civil Design and Testing Services (2006-2009); Keystone Generating Station; Indiana County, Pennsylvania
Engineer responsible for performing subsurface investigation/foundation recommendations, civil construction monitoring and testing for all facilities related to an FGDS retrofit including a new railroad spur and unloading building, combined chimney and absorbers, gypsum dome, FGD building, FGD wastewater treatment facility, limestone reclaimer, limestone and gypsum conveyor systems, and make-up water pump station and force main. Other duties included office engineering support, view of field inspection reports, laboratory conformance test setup and data review, and engineering support for repair and inspection of the exterior of the 543-foot concrete chimney.

NRG Energy Inc. – West Valley Disposal Site, Stage IIIC North (2006); Keystone Generating Station; Indiana County, Pennsylvania
Resident Engineer supervising CQA monitoring of soil, aggregate and rock and 10 acres of PA Class 1 geosynthetic liner components installed for the Stage IIIC North expansion of the West Valley CCR Disposal Site and tie-in to the PVC lined East Valley CCR Disposal Site. Other tasks included preparation of construction specifications and drawings, contractor submittal review, laboratory conformance test setup and data review, and Construction Certification Report for the Pennsylvania Department of Environmental Protection.

First Energy Corp. – Armstrong New CCR Landfill Facility, South Leachate Pond (2005); Armstrong Power Station; Indiana County, Pennsylvania
Engineer performing CQA monitoring of the installation of 5 acres of PA Class 1 geosynthetic liner components installed in the new leachate pond. Other tasks included assisting with preparation of Construction Certification Report for the Pennsylvania Department of Environmental Protection.

CHRONOLOGICAL HISTORY

Geoenvironmental Engineering Project Manager; Tetra Tech, Inc.; 2013-Present, Monroeville, PA,
Assistant Project Manager; GAI Consultants Inc.; 2005-2013, Pittsburgh, PA,
Civil Engineering Summer Intern; Pennsylvania Department of Transportation; 2002-2004, Bridgeville PA

MEMBERSHIPS

- American Society of Civil Engineers

LEE G. LENHART, E.I.T.

Civil Engineering Project Manager

EXPERIENCE SUMMARY

Mr. Lenhart specializes in design and construction of Coal Combustion Residual (CCR) landfills and ponds with focus on task management, construction quality assurance, investigations, analyses, and civil design for power generation facilities, mining sites, landfills, ponds, and haul roads.

RELEVANT EXPERIENCE

Energy Waste - QA/QC

Task Manager; PBS Coals, Inc.; Cambria Refuse Pile Cap; Somerset, PA; 3/2014 to 6/2014. Construction of a 28-acre coal refuse pile cap that had been redesigned due to failure of the previous cap design. Cap geosynethics included a layer of Agru's Super Gripnet and a non-woven geotextile. Mr. Lenhart assisted with the redesign and construction documents and also served as task manager for the CQA testing and documentation during geosynthetics deployment. His duties included overseeing the CQA technician sub-contractor, reviewing the installer's field records, and preparation of the certification documents for PaDEP Mining review.

Task Manager; First Energy; Hatfield CCB Landfill Expansion Phase 3 – Step 3; Masontown, PA; 1/2013 to 9/2013. Intended to be a 29-acre expansion, the project was amended during construction to a 10-acre cell. Construction included a 6-inch thick soil subbase and a double-geomembrane (Class 1) liner system with a sh protective cover. Mr. Lenhart served as the lead on the construction package development and preparation of the certification report and supervised the Resident Engineer and field staff. His duties also involved weekly site meetings with the client, resolution of design-construction conflicts, management and review of as-built data, CQA testing of geosynthetic materials, and reviewing submittals.

Project Coordinator; LG&E/KU; Ghent Phase 1A Landfill; Ghent, KY; 5/2012 to 3/2013. New construction of a 50-acre landfill and 1-acre leachate pond with a single geomembrane liner system, leachate force-main and pump station, perimeter channels, and new haul road. Mr. Lenhart represented the design engineer during construction by coordinating and assisting in the review of RFI's, submittals, and design modification addendums with the civil, electrical, and

EDUCATION

B.S. Civil Engineering Technology, 1999, University of Pittsburgh

REGISTRATIONS

Engineer-In-Training, Pennsylvania, 1998

Certified ACI Concrete Field Testing Technician, Grade I, Renewed 2013

Troxler Certified Nuclear Gauge Operator, Renewed 2013

TRAINING/CERTIFICATIONS

OSHA 30-Hour Construction Safety Training, 2010

OSHA 10-Hour Construction Safety Training, 2006

OFFICE

Monroeville, PA

YEARS OF EXPERIENCE

16

YEARS WITH TETRA TECH

1

mechanical engineers involved in the project. Mr. Lenhart also participated in weekly project conference calls and design-construction conflict resolution with the contractor and owner.

Resident Engineer; First Energy; Hatfield CCB Landfill Expansion Phase 3 – Step 2; Masontown, PA; 5/2011 to 12/2011. Expansion included 30-acres of Class 1 liner system over a 6-inch thick soil/fly ash subbase, sampling chambers, and fabricform perimeter channels. Mr. Lenhart assisted with submittal review, CQA testing of geosynthetic materials, supervised up to three field technicians during construction, and was the lead preparer of the certification report. This project also involved weekly site meetings with the client, resolution of design-construction conflicts, reviewing as-built data, and weekly communication with PaDEP.

Lead Engineer; First Energy; Hatfield CCB Landfill Expansion Phase 3 - Step 1; Masontown, PA; 6/2010 to 12/2010. New construction of a 17-acre cell over top of an existing unlined cell with a 6-inch thick layer of soil/fly ash subbase and a Class 1 liner system. Mr. Lenhart coordinated and reviewed as-built survey data and assisted with submittal and RFI review.

Lead Liner Technician; Allegheny Energy; Hatfield CCB Landfill Expansion Leachate Storage Impoundment; Masontown, PA; 9/2009 to 12/2009. New construction of a 5-acre leachate pond with a 6-inch soil subbase, a Class 1 liner system, and fabricform or flowable fill protective cover. Mr. Lenhart was responsible for CQA of the liner system, supervising up to two field technicians, resolving design-construction conflicts, and coordinating with the installer, contractor, client, and Resident Engineer.

Resident Engineer; Allegheny Energy; Armstrong New CCB Landfill Stage 1B; Adrian, PA; 2/2009 to 8/2009. Expansion included 5-acres of Class 1 liner system over a 6-inch thick compacted clay liner and extension of perimeter channels. Mr. Lenhart assisted with submittal review, CQA testing of geosynthetic materials, supervised up to two field technicians during construction, and was the lead preparer of the construction package and certification report. This project also involved weekly site meetings with the client, resolution of design-construction conflicts, reviewing as-built data, and weekly communication with PaDEP.

Resident Engineer/Soils Technician; Allegheny Energy; Armstrong New CCB Landfill South Pond and Stage 1A; Adrian, PA; 5/2005 to 12/2005 and 5/2006 to 12/2006. New construction of a 1+ acre leachate pond and 10-acre landfill with a Class 1 liner system over a 6-inch thick compacted clay liner, new discharge and conveyance pipelines, sampling chambers, access/haul roads, fabricform protective cover and channel lining, mining of soil subbase, and soft subgrade repair. Mr. Lenhart assisted with submittal review, CQA sampling and testing of geosynthetic materials, supervised up to two field technicians during construction, and was the lead preparer of the construction package and certification report. This project also involved weekly site meetings with the client, resolution of design-construction conflicts, reviewing as-built data, and weekly communication with PaDEP.

Liner/Soils Technician; Reliant Energy; Conemaugh Station New Yard Pond; New Florence, PA; 9/2004 to 11/2004. New construction of a 1+ acre yard drainage pond with a Class 1 liner system over a soil subbase and also included sampling and pump stations and a fabricform protective cover. Mr. Lenhart assisted the Resident Engineer during liner installation and inspected piping installation and backfilling, fabricform grout placement, and a live tie-in to an existing forcemain. He also assisted with preparation of the certification report.

Energy Waste – Design

Task Manager; Waste Management; 8th Avenue Mixed Media Transload Facility; Seattle, WA; 12/2013 to 2015. This project is the design and construction of both a temporary and permanent transload facility to receive dredged sediments and construction wastes via barge and truck; dewater the materials; and load onto rail cars for shipment to a waste facility. Mr. Lenhart is serving as Task Manager to oversee and coordinate the basemapping development, traffic study, rail spur design, new electrical service design, operating area layout, and utility relocations. Mr. Lenhart is also coordinating the temporary track installation, utility relocation activities, and associated permitting for temporary operation of the facility. This project involves the collaboration of civil, electrical, structural, and process engineers; architects; surveyors; and remediation experts from five different operating units and ten different offices across the United States.

Lead Engineer; First Energy; Bruce Mansfield Station CCR Management Options Study; Shippingport, PA; 10/2014 to 2/2015. Project involved evaluation of potential disposal alternatives for coal combustion residuals at abandoned mine lands and an existing landfill facility. Mr. Lenhart was responsible for evaluating the AML's for potential disposal viability, identifying and evaluating potential haul routes, cost estimation of landfill expansion and operations, and capital improvements for the installation of unloading operations and upgrade of existing haul routes.

Task Manager; First Energy; Ft. Martin Lagoon Leakage Assessment; Maidsville, WV; 6/2014 to 10/2014. This project was to devise a method to convey decant water to the outlet structure utilizing a fabricated stainless steel trough. Mr. Lenhart investigated alternate methods for upgrading the existing piping and coordinated the structural design of the trough and supporting structural steel and concrete.

Lead Engineer; First Energy; Armstrong Old CCB Landfill Cover Soil Evaluation; Adrian, PA; 9/2013. This project was to assist the client with final closure of the facility. Mr. Lenhart performed depth checks of the final cover soil and collected soil samples using a grid sampling system, reviewed lab data, summarized the data and reported the results to the client for submission to PaDEP.

Lead Engineer; First Energy; Ft. Martin Old Landfill Drainage Evaluation; Maidsville, WV; 2012. This project involved evaluation of existing leachate ponds and forcemain operations, landfill regrading to control site drainage, elimination of an NPDES outfall by rerouting stormwater, consolidating various site drainage features onto one complete map, and designing a gravity discharge line for and existing pond. Mr. Lenhart worked closely with surveyors, CAD designers, and H&H engineers to complete the site evaluation, offer recommendations to the client, and oversee construction of new features and site regrading.

Lead Engineer; NRG Energy; Conemaugh Desilting Basin; New Florence, PA; 12/2010 to 4/2011. Permitting of a new 1+ acre pond to replace an existing facility. Responsibilities involved initial permitting research and planning with PaDEP and client, initial layout of site, leachate compatibility analysis for geosynthetic clay liners (GCLs), and research on the inflows/outflows of the facility and site constraints.

Lead Engineer; First Energy; Ft. Martin Haul Road Stormwater Management Improvements; Maidsville, WV; 2010. Project involved regrading of an existing haul road, design of new stormwater management controls (i.e. channels, pipe lines, etc.); design and permitting of an approximately 1 acre lined sediment pond. Mr. Lenhart was responsible for layout of the facilities, preparation of the permit application

and construction package, review of submittals and RFI's, supervising field staff, resolving procurement and construction issues, reviewing as-built data, performing cone penetrometer testing for haul road foundation stability evaluation, and preparation of a certification report.

Lead Engineer; NRG Energy; Keystone Stage 3 Disposal Site; Shelocta, PA; 2010. Responsible for monitoring inspection of piping cleanouts and redesign of cleanout orientation and access for a major permit modification and installing leachate level indicators.

Sr. Engineer; AEP; John E. Amos Landfill; Winfield, WV; 2006 to 2007. Design engineer of geosynthetic liner construction details and site grading for construction packages. Duties included review and modification of project specifications, CQA Plans, and working closely with CAD designers.

Sr. Engineer; Dominion; Curley Hollow Landfill; Wise County, VA; 2007. Design engineer of geosynthetic liner construction details and site grading for permit applications and construction packages. Duties included review and modification of project specifications, CQA Plans, and working closely with CAD designers.

Sr. Engineer; AEP; Conesville Site 2/3 Design; Conesville, OH; 2006. Design engineer of geosynthetic liner construction details and site grading for a permit application. Duties included review and modification of project specifications, CQA Plans, and working closely with CAD designers.

Mining

Engineer; Bechtel; Edwardsport Power Station; Edwardsport, IN; 2005. Layout of borehole drilling plan and cost estimate for a deep mine stabilization program of a former coal mine upon which a new power station was to be constructed.

Engineer; PaDEP; Ninevah Coal Mine; Seward, PA; 2005. Deep mine assessment of a flooded, former mine underneath the town. Assisted with mine assessment and explored innovative technologies for mine sealing and reclamation.

Engineer; Duquesne Light; Warwick Mine Surface Remining Permit; Greensboro, PA; 2005. Deep and strip mine assessment and preparation of a Surface Remining Permit. Explored innovative technologies for mine reclamation and the beneficial use of approved discarded materials (coal combustion residual, bulk grading materials, mine spoil amendments).

QA/QC

Lead Engineer; GenOn, Keystone FGD Scrubber Project; $3M; Shelocta, PA; 2007-2009. Mr. Lenhart coordinated field staff and performed construction monitoring of the new chimney, soils, concrete, and asphalt testing for FGD scrubber installation at the Keystone Power Station. Duties included tracking and reporting field and lab test results and coordinating with contractors, project managers, and the client. Design responsibilities included the layout of cover soil stockpiles and borrow areas within a permitted landfill site.

Sr. Engineer; Allegheny Energy; Harrison Landfill Pipe Inspections; Harrison County, WV; 2008. Planned, coordinated, monitored and reported on pipe inspection and cleaning work at the Harrison Coal Combustion Byproduct (CCB) landfill. Mr. Lenhart was responsible for coordinating the cleaning company, monitoring inspection of leachate collection and detection / underdrain piping, and preparation of final report and procedure manual.

Sr. Engineer; GenOn; Cheswick FGD Scrubber Project; Cheswick, PA; 2007. Mr. Lenhart performed construction monitoring of the new chimney, including: reinforcement installation; concrete testing and placement; and general layout of the structure.

Sr. Engineer; First Energy; Little Blue Run Dam Emergency Spillway; Beaver County, PA; 2006. Design and construction of a trapezoidal, labyrinth weir emergency spillway to accommodate new coal combustion waste disposal practice. Mr. Lenhart was responsible for CQA monitoring of weir construction and concrete testing.

Engineer; Allegheny Energy; Armstrong Clay Mine Stabilization; Adrian, PA; 2005. Mine stabilization project consisting of pumping a concrete grout mixture into mine voids to eliminate the potential for subsidence on property to be used as a CCB landfill. Mr. Lenhart worked closely in the field with a hydro-geologist responsible for CQA monitoring of borehole drilling program and grout injection into abandoned deep mine and preparation of certification report.

Transportation

Construction Technician; PennDOT, District 11-0; Etna Interchange - Phase 3; Etna, PA; 2004. Construction monitoring for an interchange reconstruction project with rehabilitated bridges and ramps, new retaining walls, and rehabilitation of inbound Route 28. Mr. Lenhart's responsibilities included monitoring and documenting the installation of soil nail walls, piling for bridge foundations and retailing wall construction, 38 rock anchors for a retaining wall, and preparation of soil and existing concrete foundations for new structures.

Construction Technician; PennDOT, District 10-0; Cranberry Connector; Cranberry Township, PA; 5/2002 to 12/2003. Construction monitoring for an interchange realignment and reconstruction project under a condensed 27-month schedule. CDS and office management, and construction monitoring for utility relocations, extensive lighting and signalization, work on three highly congested major roadways, construction of 10 structures and reconstruction of the southbound lane of the interstate. Mr. Lenhart was on the structures team and focused on monitoring cast-in-place concrete culvert extensions, structural steel and concrete coatings, bridge demolition, steel erection, and bridge deck construction.

Construction Technician; PA Turnpike; Mon/Fayette Expressway, Section 52K; $27M; Allegheny County, PA; Spring 2002. Project included many characteristics similar to section 52H described next. Mr. Lenhart was responsible for closing out project documentation, completing as-builts, and finalizing closeout records in the field office.

Construction Technician; PA Turnpike; Mon/Fayette Expressway, Section 52H; $50M; Washington County, PA; 6/1999 to 4/2002. Project included the construction of 3.2 miles of concrete paved expressway, seven multiple span bridges, four pipe culverts structures, 1.5 miles of rehabilitated side roads, one

interchange with two toll facilities, 8 million cubic yards of excavation, over 300 drainage structures supporting 50,000 lf. of drainage pipe, four permanent detention basins, various temporary erosion and sedimentation (E&S) controls, highway lighting, signing, pavement marking, and mine stabilization. Mr. Lenhart was responsible for design takeoffs for pavement base drain, subbase, concrete pavement, excavation, bridge construction, electrical conduit and wiring, toll facilities, structural and drainage rebar, and signing. Provided services for plan and contract interpretation, design analysis, plan versus field quantity comparisons, payment calculation and justification, daily contractor interaction, project as-built and field documentation, force accounts recording and review, and project record review as part of a crew of up to 14 inspectors. Spent one year as assistant to the lead structure inspector and spent 1.5 years under the lead roadway inspector, requiring involvement in almost every aspect of the project.

Field Inspector Intern; PennDOT, District 12-0; 3R Projects; Summer 1998. Assisted with multiple rehabilitation projects included PA State Routes: 0030, 0031, 0051, and 0711. Assignments on different resurfacing projects and most experience related to asphalt paving over existing or milled pavement.

Field Inspector Intern; PennDOT, District 12-0; SR 0030 at Mountain View; $1.2M; Greensburg, PA; Summer 1997. Highway rehabilitation project for 1.3 miles of 2-lane highway. Assisted with highway resurfacing, concrete and drainage rehabilitation, lane widening, and other related aspects of the project.

CHRONOLOGICAL HISTORY

Civil Engineering Project Manager; Tetra Tech, Inc.; 2013-Present, Monroeville, PA
Senior Project E.I.T.; GAI Consultants, Inc.; 2002-2013, Murrysville, PA;
Construction Technician; Maguire Group, Inc.; 1997, 1999-2002; Pittsburgh, PA;
Engineering Intern; Pennsylvania Department of Transportation, District 12-0; 1998

SCIENTIFIC/TECHNICAL PUBLICATIONS

- N/A

MEMBERSHIPS

- N/A

AWARDS

- N/A

JOSPEH L. MICIKAS, P.E.

Senior Structural Engineer

EXPERIENCE SUMMARY

Mr. Micikas has over 34 years of managerial and technical experience in civil, structural and foundation engineering, and forensic investigations.

His managerial and "hands-on" experience is spread across all phases to include sales and marketing, project development, estimating, scheduling/tracking, engineering/design, contract negotiations, and construction. His experience includes performing and managing preliminary and detailed design, structural design, and cost estimating services for heavy industrial projects.

He is skilled at working with clients, technical and business teams to provide information and solutions to existing and potential issues. He has directed teams, projects, and departments, and is familiar with managerial functions and corporate operations.

Industries served include: oil and gas production and refining, landfill gas to energy, chemical and petrochemical processing plants, steel manufacturing, fossil fuel power generation, pulp and paper processing, building materials manufacturing, activated carbon and field support.

RELEVANT EXPERIENCE

Legal Liability/Expert Witness

Vice President/Owner; Numerous forensic engineering investigations; $500,000 per year; PA, OH and WV; September 2000 to December 2009. Provided technical services (forensic engineering investigations) to attorneys, insurance companies, independent adjusters, restoration companies, contractors, municipalities, and individuals in the areas of civil engineering design; structural design; structural distress; property loss/damage claims; personal injury accidents; slip/trip and fall accidents; playground installation and safety; and construction claims.

Forensic Structural Engineer; Numerous forensic engineering investigations; PA, OH and WV; June 1998 to September 2000. Provided structural engineering technical services to attorneys, insurance companies, municipalities, and contractors in the areas of

EDUCATION

B.S. Civil Engineering, 1978, Pennsylvania State University

REGISTRATIONS

Professional Engineer, PA, 1990, [redacted]

TRAINING/CERTIFICATIONS

30 Hour OSHA Construction Safety and Health

10 Hour OSHA Construction Safety and Health

AK Steel - Butler, PA Site specific training

Ergon West Virginia, Inc. - Newell, WV Site specific training

Momentive Performance Materials - Sisterville, WV Site specific training

TWIC (Transportation Workers Identification Credentials) - Feb 2009 thru Feb 2014

OFFICE

Monroeville, PA

YEARS OF EXPERIENCE

34

YEARS WITH TETRA TECH

2

civil, construction defects and accidents, civil and structural engineering; structural distress; blasting damage; earthquake damage; property loss/damage claims; personal injury accidents; slip/trip and fall accidents; and construction claims.

Design / Plant Engineering

Manager of Several Civil / Structural Departments; Various Industrial and Landfill Gas to Energy Facilities; United States and Europe; May 2007 to November 2012. Responsibilities included managing the daily activities of the civil / structural department (engineers and designers), coordinate with other discipline departments and oversight on all civil and structural projects. Met with clients to determine project requirements and develop conceptual civil and structural business solutions. Develop engineering and construction estimates, preparation of proposals for engineering services, and preparation of specifications. Review engineering calculations and construction documents prior to issue. Work with contractors during the construction phase of projects. Provide field observation, and engineering representation as necessary.

Manager of Civil and Construction Engineering; Various Plate, Strip and Rolling Mills; United States and Taiwan; 1996 – 1998. Directed the construction engineering activities relating to civil, piping, HVAC and, electrical for Rolling Mill and Process lines produced by the company. Duties included planning, scheduling, development of capital budgets, preparation of estimates and proposals, contracting with outside engineering services, coordination between mechanical suppliers, construction engineering and the client; onsite construction engineering assistance and oversight of work performed by domestic and foreign outside engineering firms.

Senior Structural Engineer; Heavy Industrial Project Services; Various Locations; 1990 - 1996. Mr. Micikas served as a senior structural engineer for the design of structural and foundation requirements on numerous heavy industrial projects. He was responsible for preparation of engineering estimates, proposals, and cost estimates, completed preliminary and detailed design of foundations and structural steel structures, was responsible for field inspections of existing structures and facilities, trouble shooting of construction problems and interfaced with clients. Typical projects included gas cleaning facilities, carbon bake facilities, pulverized coal injection, benzene emissions removal at coke facilities, biological wastewater treatment plants, and steel mills.

Structural Engineer; Heavy Industrial Project Services; Various Locations; 1978 - 1990. Mr. Micikas served as a structural engineer for the design of required structural and foundation requirements of numerous heavy industrial projects. He was responsible for performing preliminary and detailed design of foundations (buildings, equipment, and tanks) and structural steel structures, was responsible for field inspections of existing structures and facilities, and interfaced with clients. Projects included green site and existing site renovations. Typical projects included:

- Structural renovation of a skip hoist for AK Steel;
- Design of crane runway girder and bridge modifications;
- Investigation into increasing crane runway capacity;

- Foundation and structural steel design for a gas cleaning facility, a carbon bake facility, a pulverized coal injection system, glass plants, paper mills, steel mills, aluminum facilities, and chemical plants;
- Thermal stress analysis of furnace and bath refractory block to determine the thermal effect on surrounding structures, developed heat-up and cool-down procedures, and developed damage curve diagrams;
- Designed two (2) slant leg bridges for the Pennsylvania Turnpike Commission;
- Designed temporary stringer support system to assist in the replacement of floor beams during the renovation of the Highland Park bridge, developed a procedure for replacement of the sidewalk support brackets; and designed new stringers and floor beam splices;
- Performed dynamic testing of air compressors, wheel balancing equipment for a tire manufacturer, and miscellaneous manufacturing equipment;
- Performed analytical calculations on a wide range of mechanical and structural systems utilizing ANSYS Finite Element software, conducted large deflection stress analysis of a sludge disposal tramway cable system, numerous static, dynamic and thermal finite elements analyzes of various mechanical equipment and structures, and performed pressure vessel recertification's for NASA;
- Performed field walk-downs of Class I/II small bore piping systems at Beaver Valley nuclear power Plant to determine if routing interferences existed, performed piping analysis of seismic Class I/II small bore piping systems and designed or redesigned pipe supports for the Class I/II piping;
- Performed foundation / pile cap design for liquid oxygen, nitrogen and natural gas low temperature liquid storage facilities. This included tank design piping flexibility analysis and design, pipe support design, tank thermal analysis, tank volume surveys, and structural design of stairways and towers.
- Conducted numerous structural inspections of damaged/undamaged residential, commercial and industrial structures and foundations;
- Directed the structural inspection of the cantilever arm supporting the Mellon Arena roof structure; and oversaw numerous repair projects for the arena, and designed and oversaw the work for repairing the brine water piping system (system which freezes the ice);
- Acted as field engineer on numerous projects;
- Designed two additions to residential structures – a 2600 s.f. detached building connected to the main structure by an enclosed walkway, and an addition cantilevered out 8'-0" from the rear of a residential structure;
- Installed and inspected dozens of commercial playground structures, pavilions and safety surfacing systems;
- Performed numerous personal injury investigations, slip/trip and fall incidents, property loss/damage investigations and construction injury claims and injuries

Landfill Gas Installation

Design of buildings (pre-engineered and masonry) and building foundations, equipment foundations, structural steel design for steel structures required on the projects, pipe supports/racks structural steel design and pipe support/racks foundations, electrical cable tray support, construction specifications, pre-engineered building specifications, architectural details, fencing, and roadway/parking lot layout on several landfill gas to energy projects while at Venture Engineering.

Assisted the mechanical department with layout/GA for such projects.

CHRONOLOGICAL HISTORY

Senior Structural Engineer; Tetra Tech, Inc.; 2012-Present, Monroeville, PA
Manager-Civil /Structural Department; Venture Engineering & Construction; 2010- 2012, Pittsburgh, PA
Manager-Civil/Structural D epartment; C arnegie S trategic D esign E ngineers, L LC (CSD); 2008 -2010, Carnegie, PA,
Manager-Civil / Structural Department; Loftus Engineers, LLC; 2007-2008, Carnegie, PA
Founder/Vice President; Keystone Engineering Consultants, Inc.; 2000-2009, Venetia, PA
Founder/President; Keystone R ecreational C onsultants, L LC (Subsidiary of K eystone E ngineering Consultants, Inc.); 2002-2005, Venetia, PA,
Forensic Structural Engineer; Robson Lapina, Inc.; 1998-2000, Cranberry Township, PA
Manager of Civil and Construction Engineering; Danieli United, 1996-1998, Pittsburgh, PA
Assistant Manager of Civil, Structural and Architectural Department/Senior Structural Engineer; ICF Kaiser Engineers, Inc.; 1990-1996, Pittsburgh, PA
Structural Engineer; Finite Design, Inc.; 1988-1990, Washington, PA
Structural Engineer; Tensor, Inc.; 1985-1988, Pittsburgh, PA
Stress Analyst/Structural Dynamics Test Engineer; O'Donnell and Associates, Inc.; 1984 -1985, Pittsburgh, PA
Salesman; Morgan's Computer and Education Center; 1984-1984, Pittsburgh, PA
Stress A nalyst/Structural E ngineer/Field E ngineer; S chneider C onsulting E ngineers; 1 983-1984, Bridgeville, PA
Structural Engineer & Field Engineer; 1978-1983, Pittsburgh, PA

SCIENTIFIC/TECHNICAL PUBLICATIONS

- N/A

MEMBERSHIPS

- Chi Epsilon – Civil Engineering Honor Society
- American Society of Civil Engineers – National and Pittsburgh Section
- American Institute of Steel Construction
- Pennsylvania Society of Professional Engineers

AWARDS

- Chi Epsilon Award

DAVID P. ZUBAL, P.E. CPESC

Assistant Civil and Environmental Engineering Department Manager

EXPERIENCE SUMMARY

Mr. Zubal specializes in civil and environmental engineering project management, including overseeing development of environmental permits including erosion and sedimentation control and stormwater site development plans. He is a Professional Engineer in six states including Pennsylvania, Ohio, West Virginia, Connecticut, Iowa and Nebraska. He has experience with Federal Energy Regulatory Commission (FERC) projects, both large and small scale. He also has field experience including pipeline installation, meter station installation, landfill liner installation, earthwork development monitoring, roadway construction monitoring, material sampling and monitoring, erosion and sedimentation control monitoring and planning, and materials analysis. He is experienced using Global Positioning System (GPS) applications and other field surveying equipment.

RELEVANT EXPERIENCE

OIL AND GAS

Project Manager; Dominion Transmission, Inc. Project Manager for Dominion Transmission Inc.'s (DTI) Lebanon West II Federal Energy Regulatory Commission (FERC) 7(c) Filing Project. The Project spanned two states, Ohio and Pennsylvania and included multiple review agency and team coordination.

Project Manager; EQT Corporation. Project Manager for the Allegheny Valley Connector's Vinco II Meter Site Development and Permitting Project. FERC clearances were required for the Project, including Threatened and Endangered Species consultations and cultural resource clearances. The Project was located in Johnstown, Pennsylvania.

Project Manager; Peoples Natural Gas. Project Manager for the Smail Demarcation Site Development Project. The Project included survey, design and permitting of new valve setting for a demarcation site located in Armstrong County, Pennsylvania.

Deputy Project Manager; Sunoco Pipeline L.P. Project Coordination for Sunoco Pipeline L.P. Mariner East Project. The Project is an approximately 350 mile pipeline across Ohio and Pennsylvania. The Project also includes the upgrading of several pump stations and the addition of multiple new pump stations along the line.

EDUCATION

B.S. Civil and Environmental Engineering, 2006, University of Pittsburgh

REGISTRATIONS

Professional Engineer, Pennsylvania, 2012-Present

Professional Engineer, West Virginia, Ohio, Connecticut, Iowa, and Nebraska, 2014

Certified Professional in Erosion and Sediment Control, 2011-Present

ACI Field Testing Technician, Grade I, 2006-Present

Erosion and Sediment Control Certification, Maryland, 2006-Present

TRAINING/CERTIFICATIONS

Risk Management Training, GAI Consultants, Inc., May 2012

24-hour Mine Safety and Health Administration Training, U.S. Department of Labor, January 2012

FERC Environmental Review and Compliance for Natural Gas Facilities Training, Chicago, IL. August 2011.

Chapter 102 Update Training for the Regulated Community, PaDEP, February 2011

PennDOT Basic Construction Inspection Part 1, PennDOT, July 2009 Confined Space Awareness Training, GAI Consultants, Inc., March 2009 High Performance Management Training, GAI Consultants, Inc., October 2008

Geosynthetic Best Management Practices for Stormwater Management, ACF Environmental, May 2008

OSHA 10-hour Safety Training, 2007

OFFICE

Monroeville, PA

YEARS OF EXPERIENCE

9

YEARS WITH TETRA TECH

2

Deputy Project Manager; Peoples Natural Gas. Project Coordination for the Peoples Natural Gas TP-7215 Pipeline Replacement Project. The Project was located between Delmont and Greensburg, Pennsylvania, and was a full design/build Project including survey, engineering, land acquisition, permitting, and construction.

Project Task Manager; Dominion Transmission, Inc. Project coordination for Dominion Transmission Inc.'s (DTI) Brush Creek Levee Replacement and Monongahela River MSE Wall design for restoration efforts involved with the Appalachian Gateway Project.

Project Task Manager; CNX. Preparation and coordination of multiple ESCGP-1 permits applications for CNX. Development of E&S alignment sheets and Highway Occupancy Permits in West Virginia and Pennsylvania.

Project Task Manager; Dominion Transmission, Inc. Erosion and Sedimentation Control Plan (E&SCP) preparation and project coordination for Dominion Transmission, Inc.'s Appalachian Gateway Project. Responsible for permitting 140 miles of new gas pipeline spanning West Virginia and Pennsylvania. Oversaw planning and design of seven Stormwater Pollution Prevention Plans (SWPPP) for compressor stations and associated pipelines including E&SCP, and stormwater management calculations. Assisted with environmental compliance for FERC.

Project Task Manager; Dominion Transmission, Inc. Coordination and Technical lead for the Notice of Intent (NOI) preparations for multiple DTI sites associated with the FERC regulated Ellisburg to Craigs Project which included stormwater management and E&S design for compressor stations and pipeline upgrades in New York and Pennsylvania.

Senior Engineer-In-Training; Dominion Transmission, Inc. USA Storage Project, PL-1 Retest Sections Project for Dominion Transmission, Inc. Duties included verifying compliance with local and state regulations for E&SCP and construction activities for the project and obtaining the necessary permits to proceed with construction.

Engineer-In-Training; Equitable Gas. Equitable Gas Big Sandy Pipeline Project Construction Stakeout Survey. Assisted with construction stakeout using Global Positioning System (GPS) equipment for the Equitrans 68-mile natural gas pipeline project in eastern Kentucky.

Engineer-In-Training; Dominion Transmission, Inc. Stream and Wetland Impact Analysis for Dominion Transmission, Inc. Determined locations of impacted streams and wetlands due to pipeline construction. Used Global Positioning System (GPS) to delineate impacted areas.

PERMITTING

Engineer-In-Training; American Electric Power. Hydrology and Hydraulics (H&H) analysis for American Electric Power Glen Lyn and Amos landfill sites. Assisted with hydrologic and hydraulic engineering for site drainage design. Also assisted with lifecycle cost analysis of facility.

Engineer-In-Training; Allegheny Power. Allegheny Power Doubs-Aqueduct-Dickerson 203 kV Transmission Line Upgrade Project. Assisted with grading plan design and construction permitting associated with new towers and the stringing of new overhead power lines.

Senior Engineer-In-Training; Allegheny County. North Park Lake Aquatic Ecosystem Restoration Project in Pennsylvania's Allegheny County is a habitat restoration and mitigation design project. Involved with stormwater and erosion control permitting for a landfill area associated with lake dredging to remove sediment.

Senior Project Engineer-In-Training; Duquesne Light Company. Multiple on-site Erosion and Sedimentation Control Plan (E&SCP) for the Duquesne Light Company in the Pittsburgh area. The projects involved removal and replacement of underground electric conduits and lines. E&SCPs were prepared for on-site use to comply with local and state regulations.

CONSTRUCTION QA/QC

Lead Engineer-In-Training; Ralph A. Fabo, Inc. Responsible for engineering support for site development associated with the new Kane Regional Center building. Foundation placement was of particular concern to have a uniform material that footers were placed on. Other duties included verification of testing reports from a third party testing firm.

Engineer-In-Training; Dominion Cove Point, LNG. Dominion Cove Point Expansion Project Field Monitoring. Conducted field monitoring of erosion and sedimentation control construction and maintenance of a Phase III archeological site located in Waldorf, Maryland.

Engineer-In-Training; Dominion Cove Point, LNG. Construction Quality Assurance Plan for Dominion Sedimentation Pond Construction. Performed soil sampling of materials used during construction of sedimentation pond and identified materials unsuitable for construction. Tested density and moisture content of compacted materials with the Troxler moisture/density gauge and observed pond construction to assure the quality of the final product.

Senior Engineer-In-Training; Allegheny Energy. Allegheny Energy Hatfield's Ferry Station. Construction monitoring of a landfill, sedimentation pond, and haul road to comply with environmental regulations for a new scrubber system that was installed at the power plant. Duties included Quality Assurance monitoring for all phases of the project.

Engineer-In-Training; Reliant Energy. Low Permeability Cementitous (LPC) Material Grouting for Reliant Energy at the Cheswick Power Station, Scrubber Project. Performed tests to determine content and consistency of mix and transported samples.

Senior Engineer-In-Training; Reliant Energy. Concrete Field Testing at Reliant Energy Keystone Power Station for the Flue Gas Desulphurization (FGD) Systems Project. Performed concrete testing on mass pours (1,000 to 2,700 cubic yards) for the project, and field testing on mass pours for Shaw, Stone, and Webster. Tests performed included slump, air-content, unit weight, and temperature in accordance with ASTM C94 and molding 6-inch by 12-inch cylindrical specimens in accordance with ASTM C31.

PERMITTING AND CONSTRUCTION

Senior Engineer-In-Training; Allegheny Power. Spill Prevention Control and Countermeasure Retrofit for Allegheny Power Substations in West Virginia, Pennsylvania and Maryland. Involved with design and construction from start to finish for 61 substation projects.

SAMPLING

Engineer-In-Training; West View Water Authority. Sludge Sampling and Analysis for West View Water Authority. Conducted sludge sampling for Bankson Engineers, Inc. by digging boreholes and collecting jar samples to determine moisture content and transport to the laboratory for chemical analysis.

Engineer-In-Training; Urban Redevelopment Authority of Pittsburgh. Soil Analysis for the Urban Redevelopment Authority of Pittsburgh at Nine Mile Run. Augered holes at and collected samples to ensure ample clean soil coverage over the slag material. Also, sampled materials from various topsoil stockpiles from locations throughout the Pittsburgh area.

Engineer-In-Training; US Airways. Airplane Water Sample Collection. Collected water samples, checked temperature and tested samples for the amount of chlorine residual in pre- and post-disinfection processes. Received security clearance to be in restricted airport locations for July 19, 2007 until July 19, 2008.

OTHER

Engineering, Scientific and Technical Intern; Pennsylvania Department of Transportation, District 9-0. Responsible for running surveying equipment in the field and importing field data into computer programs for analysis and reports. Exposed to construction sites and safety factors, and worked with inspectors and independent consultants.

CHRONOLOGICAL HISTORY

Assistant Civil and Environmental Engineering Department Manager; Tetra Tech, NUS, Inc.; 2012-Present; Pittsburgh, Pennsylvania
Senior Project Engineer, GAI Consultants, Inc.; 2006-2012; Homestead, Pennsylvania,
Engineering, Scientific and Technical Intern; Pennsylvania Department of Transportation, District 9-0; 2003-2005 (Part-time)

SCIENTIFIC/TECHNICAL PUBLICATIONS

- N/A

MEMBERSHIPS

- ASCE

AWARDS

- N/A

DANIEL C. WITT, P.E.
PROJECT MANAGER/CIVIL ENGINEER
PITTSBURGH, PENNSYLVANIA

EDUCATION: B.S., Civil Engineering, The Pennsylvania State University, 1987
Graduate Courses toward M.S., Water Resources, Civil Engineering, University of Pittsburgh, 1990 – 1991

CERTIFICATIONS/ REGISTRATIONS: Professional Engineer, Pennsylvania, 1993

TRAINING: OSHA 1910.120 40-Hour Health and Safety Training, 1992
OSHA 1910.120 8-Hour Annual Refresher Training; May, 2014
OSHA 1910.120 8-Hour Supervisory Training; May, 2014
SafelandUSA Training December 2014

Designing with Geosynthetics, Short Course, Drexel University, 1997
Computational Methods in Storm Water Management, Short Course, The Pennsylvania State University, 1989
Comparison of Hydrologic Models HEC-1, PSRM, and TR-20, The Pennsylvania State University, 1988

EXPERIENCE SUMMARY:

Mr. Witt is a project manager/project engineer with 26~~5~~ years of environmental and civil engineering experience. Mr. Witt has managed work assignments to provide final design packages, investigative studies, construction oversight, remedial pilot studies, third party remedial design/remedial action oversight, and public meeting support. Several of the Sites that Mr. Witt has been involved with contained or potentially contained unexploded ordnance (UXO). As project manager Mr. Witt has supervised junior engineers, support staff, managed subcontracts, and coordinated staffing needs within and between offices. Mr. Witt has been responsible for preparing cost proposals, schedules, negotiation of contracts, and management of budgets. Mr. Witt has served as the primary point of contact between the company and client as well as representing the client to regulatory agencies and the public. Mr. Witt has coordinated the design and construction of water pipelines to support natural gas drilling operations. Mr. Witt has prepared Feasibility Studies and assisted to the preparation of Remedial Investigations and Site Investigations. As project engineer/modeling specialist, Mr. Witt has contributed expertise to hydrologic and hydraulic studies, surface water and groundwater fate and transport computer modeling studies.

As project manager, Mr. Witt was responsible for the final design of four landfill caps/covers, four soil removal actions, and one air sparging/soil vapor extraction system at a Naval facility in Virginia. Served as the project manager for two work assignments from the USEPA to provide oversight assistance for the remedial design, construction, and long-term monitoring at a Superfund site in Pennsylvania. The remedial action included the construction of a multilayer landfill cap which was opened to the public as a sports complex following remediation and

development. Mr. Witt has also managed projects involved in the preparation of Design/Build request for proposal, associated pre-design studies, and cost estimates.

As project engineer, Mr. Witt coordinated and supervised the production of construction drawings, specifications, cost estimates, and contract documents for landfill closure and highway design projects. Prepared value engineering/feasibility study for a coal fired power plant in Virginia. The feasibility study for the power plant included evaluation of several methods to achieve discharge limits from runoff from the plants coal combustion byproducts (CCB) landfills including piping the water via several routes. Served as technical lead and coordinator of numerous landfill cap designs. Responsible for geometric design of highways, hydrologic and hydraulic design of bridges and culverts, and design and analysis of storm-water control facilities. Performed backwater and scour analyses from bridges and culverts in various states.

Mr. Witt served as task lead for surface water and infiltration fate and transport modeling at a large Department of Energy facility in Ohio. Mr. Witt performed fate and transport modeling accounting for biodegradation at a government facility in Texas. Mr. Witt conducted a hydrologic and hydraulic analysis for a Superfund site including design of flood retention basin and associated spillways and levees. Mr. Witt conducted slope stability analyses at several sites. Mr. Witt designed storm-water controls and facilities for remediation activities at several closed uncontrolled landfills on the National Priority List.

PROJECT EXPERIENCE:

Oil and Gas

Operations Advisor Asset Development, Chevron – Marshall County West Virginia; August 2014 through Present. Responsible for providing the asset team with direction on scope, cost, and schedule to functional groups within Chevron with specific focus on permitting, civil facilities engineering, site construction, water management/logistics and remediation. Assignment involves being fully dedicated to Chevron and working in the client offices (staff augmentation). Mr. Witt is responsible for assisting in managing all issues above ground. The asset team is responsible for developing an area (Marshall County) including coordinating land position, siting well pads, obtaining all permits, and coordinating with drilling, completions, facilities, and commercial to ensure that a project is proceeding from concept until the gas and condensate enters the sales line.

Water Acquisition Specialist, Chevron – Marshall County West Virginia; November 2012 through July 2014~~Present~~. Responsible for identifying potential water sources, pipeline routes and coordination of design and construction of water supply pipelines to support natural gas drilling operations. Assignment involves being fully dedicated to Chevron and working in the client offices (staff augmentation). Responsible for the coordination of the design and construction of what is anticipated to be 28 miles of trunk pipeline with additional spurs running to well pads. When fully developed the water supply system will be capable of supplying 4-5 million gallons of water per day for drilling operations. Responsible for coordination with design consultants, construction contractors, permitting, and various groups within the clients organization to meet fast track schedules. The first 2.5 miles of 24" pipeline was successfully

installed from concept through testing within 9 months over very challenging terrain. The pipeline was constructed incident free. Later that year, the pipeline was used to supply over 22 million gallons of water to three wells using a temporary pump station. Permanent water intake is being investigated which may involve radial collector wells which will draw water from the alluvial deposits under the Ohio River.

As the project grew Mr. Witt also began working with a Chevron project manager and another project engineer to manage and direct the various phases of the development of the water pipeline system. Also became embedded with the core asset team and assisted in planning the asset development as it related to the water use. The timing of well pad development is now closely aligned with the development of the water distribution system. Assisted in various phases of the Chevron Project Development & Execution Process (CPDEP) including preparing for decision support packages and decision review boards.

Project Engineer; Pipeline Stream Crossing Repair; -- United Refining Company, New Albion Township, Cattaraugus County, New York; February 2008 to October 2008. As a project engineer designed a grade control structure to stabilize a streambed crossing over a 12" crude oil pipeline. Unauthorized construction activity in the vicinity of the stream crossing destabilized the streambed causing it to erode to the top of the pipeline. The design raised the streambed over the pipeline and then used a grade control structure to drop the stream back to the existing streambed downstream of the pipeline crossing. The design used a rock lined chute and a depressed outlet apron to stabilize the crossing.

Remediation

Project Manager; Design Documents, Soil Cover – Naval Station Newport, Newport Rhode Island; May 2010 through November 2012. Prepared preliminary design submittals for a soil cover at this 8 acre site. The soil cover is being constructed as part of a remedial action, however, four other construction projects related to capital improvements to the facility were being constructed on the site. The design required close coordination with various entities in the Navy and other consultants. The cover area includes 1,600 feet of shoreline, an active training building, an under construction fitness facility, a bridge to the mainland, and a large parking facility. The project also includes the preparation of a Land Use Control Remedial Design, and Long Term Monitoring Plan, 1 year of long term monitoring and inspections and an annually monitoring report.

Lead Engineer; Design Documents, Shoreline Stabilization – Naval Station Newport, Newport Rhode Island; September 2006 through 2011. Prepared Design Submittals including shoreline stabilization plans for 1,600 feet of shoreline located on the northern end of Coaster Harbors Island. Shoreline stabilization design included the evaluation of storm-surges, the flood plain, and wave energy associated with various storm events to adequately size the granite stone to be used for the stabilization of the islands northern shoreline. Fieldwork included a site condition assessment, utility location/verification, geotechnical investigation, and attending site meetings. The project involved regarding of the shore line, protection of endangered eel grasses just off shore, reestablishing a coastal beach, placing granite stone at various thicknesses to provide adequate shoreline protection, performing wave energy analysis using the CEDAS

(Coastal Engineering and Design Analysis System), preparing stone size and shoreline stabilization system calculations, restoring disturbed areas up-slope of the shoreline protection structure, preparation of construction specifications, and erosion and sedimentation control calculations. Provided post construction award services (PCAS) during construction including answering requests for information (RFI), submittal reviews, assisting the Navy and contractor when unanticipated conditions arose such as the discovery of asbestos during the revetment construction.

Lead Engineer; Design Documents, Landfill Cap – Naval Station Annapolis, Annapolis Maryland; February 2009 through November 2012. Coordinated the development of design packages to close this 38 acres site that includes an operating Naval Commissary and Exchange. The project involves capping and consolidation of an approximately 9 acre landfill. Portions of the landfill are located beneath the parking areas associated with the naval exchange and other areas are located in a steep ravine. The project also includes rehabilitation of a berm impounding a 8 acre lagoon at the base of the landfill. The berm separates the lagoon from the Severn River. The project included wetland delineation, geotechnical field investigation, site work (including paving design, and utility replacement). Work also included offsetting an increase in paved area of the parking lots by incorporating environmental site design (ESD) into the design using non-rooftop disconnection to treat runoff from a portion of the parking lot. Provided support during construction including engineering associated with the discovery of additional areas to be capped and asbestos in the landfill.

Project Manager; Operable Unit 2 Design Documents, soil cover, and soil removal, Portsmouth Naval Shipyard—Kittery Maine; April 2009 through November 2012. Developed design documents for the removal of contaminated soil from a portion of this 8 acre site. Another portion of the site involves the placement of a soil cover of waste materials. The project evaluated soil washing as a potential alternative to removal of the soil from the site, however it was ultimately not chosen. The remediation will occur around three active buildings and will involve excavation along the shoreline with the Piscataqua river. The project also include the preparation of the Record of Decision for the site, a pre-design investigation to delineate the limit of contamination and the development of site topography.

Project Manager; Operable Unit 1 Long Sampling Plan Post Soil Removal Action, Portsmouth Naval Shipyard—Kittery Maine; June 2009 through May 2011. This project involved the preparation of a long term groundwater sampling plan which was to confirm that a soil removal action did not adversely affect the groundwater. The sampling plan incorporated data quality objectives and included an exit strategy. The removal of soil took place in crawl space beneath an active building adjacent to the Piscataqua River. The Piscataqua River is tidal and at high tide, the excavation area becomes flooded. The excavation area is a confined space. This project was originally scoped as a design for the removal action, however, Tetra Tech worked with the Navy to prepare preliminary design documents which allowed the formal design to be omitted and for the project to move directly to the remedial action/remedial action work plan which greatly shorten the remediation schedule and level of effort for the overall project.

Project Manager; Operable Unit 4 Design Documents, Sediment Remediation, Portsmouth Naval Shipyard—Kittery Maine; June 2009 through November 2012. This project involves the

dredging of contaminated sediment from a portion of the Piscataqua River and the development of a Long Term Monitoring Plan for the off-shore areas of the Portsmouth Naval Shipyard. Work also includes the development of No Further Action Decision Documents for Several off shore areas. The work also involved collection of one round of sediment samples from several monitoring stations at the shipyard. The sampling was conducted from a boat and involved extensive coordination with the shipyard including the development of a Marine Safety Plan.

Project Manager; Remedial Design for Site 37 Lead Contamination Area, Naval Support Facility Dahlgren, Virginia. May 2004 to November 2008. Served as the task lead for the remedial design at this site which involves the removal of gun butt sands and installation of shoreline revetment. The site is located adjacent to an active indoor/outdoor firing range. The shoreline revetment was designed to resist a 4 foot design wave and a 100 year storm surge. Wetlands were also be restored as part of this project. After the original design was completed, the remedy at the site was changed to covering of the contaminated soil and gun butt sands and leaving them on site. The remedy was changed due to the UXO concerns with excavation and off-site disposal of the gun butt sand materials. The design incorporated specialized materials (polymeric marine mattresses) to serve as the foundation for the shoreline revetment since the UXO concerns at the site precluded excavation. The Navy presented the project at a conference as an example for other similar projects.

Design Engineer; Groundwater Treatment System Modifications; Butz Landfill Superfund Site; Jackson Township, Monroe County, PA; USEPA RAC III; April 2006 – September 2006. Responsible for the design of additional groundwater extraction piping and pumps for an existing groundwater pump and treatment system. Determined if the existing treatment system and discharge piping were adequate for additional flow from new extraction wells.

Project Engineer; Methane Monitoring System Design Build; Site 17 Naval Support Facility Dahlgren, Virginia; April 2006 – January 2009. Responsible for procuring and overseeing a subcontractor to design and build a methane monitoring system at a Naval research building. The system was required to detect methane which could potentially migrate from an adjacent landfill. The detection system was connected to the existing emergency warning system in the building and required coordination with many entities with the Navy. Tetra Tech provided operations and maintenance support for the system and upgraded the original methane monitoring system in 2008.

Project Engineer; Landfill Gas Migration Mitigation Plan; Site 17 Naval Support Facility Dahlgren, Virginia; July 2006 – March 2008. Prepared a landfill gas migration mitigation plan for this closed landfill. The mitigation plan included compiling and a summarizing years of landfill gas investigations results, evaluating gas migration pathways and proposing gas mitigation measures. The report made recommendations for a permanent passive gas collection trench, installation of real time monitors in adjacent buildings, and installation of additional permanent gas monitoring points.

Lead Engineer; Bulkhead Evaluation – Former Naval Construction Battalion Center Davisville, North Kingston, Rhode Island; May 2008. Prepared a technical memorandum documenting the evaluation of existing and proposed bulkheads to contain a contaminant plume of chlorinated volatile organic compounds traveling toward the bulkheads. The evaluation included a review of the hydrogeologic properties of the aquifer, the contaminant plume location, and the construction details of approximately 1700 feet of bulkhead separating the shore facilities from berthing areas for fishing and container ships. The bulkheads were constructed of various materials and designs including steel sheet pile, timber sheet piles, and bulkhead rehabilitations involving riprap, concrete and additional steel sheet piles.

Project Manager; Remedial Designs for Sites 6 and 46; EE/CA for Site 47a and 47b, Naval Support Facility Dahlgren, Virginia. September 2001 to 2006. Served as the project manager for this task order which involved the design of two soil removal action at former waste disposal areas (Site 6 – Terminal Range Airplane Park, and Site 46 Stump Dump Landfill). Both of these Sites are located in former bombing ranges so that UXO was a concern during investigation and design. The task order also included extensive pre-design sampling throughout a marsh area adjoining the sites.

In addition, this task order included the investigation and the development of an engineering evaluation/ cost analysis (EE/CA) for Site 47a the World War I Munitions Burial Mound and Site 47b the EOD Scrap area. The investigation of Site 47a was unique because it is located in an active range. The project included the investigation of a large pile (approximately 0.75 acre, 10-15 feet high) of buried munitions. The munitions were buried in the 1930's. Investigation of Site 47 involved mapping the site using geophysics and later test trenching the site using a remote controlled excavator. Tetra Tech provided verification sampling and evaluation services for the Navy during the remediation. The adjacent Site 47b was also remediated at the same time with Tetra Tech providing verification sampling support.

Project Manager; Design/Build Request For Proposal Development and construction oversight for Sites 13, Naval Weapons Station Earle, Colts Neck New Jersey. March 2003 to October 2009. Served as project manager for this task which involved the development of specifications and documentation to allow the Navy to solicit a bid for design and build construction services for a multilayer cap at Site 13 NWS Earle. Provided support through out the bidding process and construction. Coordinated full time oversight of the project and coordinated the excavation and clearance work related to unexploded ordinance (UXO) work provided by Tetra Tech when the design/build contractor was unable to provide these services.

In addition, Mr. Witt managed the development of a long term monitoring plan, verification sampling plan, documentation for a groundwater Classification Exception Area (CEA) and a operation and maintenance plan for this site. In support of the design and establishment of the CEA, Mr. Witt managed a groundwater investigation to confirm the extent of a groundwater plume. Work on this project also included construction oversight and review of the contractors design and construction submittals.

Engineer; Development of a Operation and Maintenance Manual for OU5, Portsmouth Naval Shipyard, U.S. Navy, Kittery, ME, February 2004 to August 2004. Developed the Operation and Maintenance manual for Operable Unit 5. The remedy for OU5 included the installation of a multi-layer cap, shoreline revetment, and wetland replacement. Also included in the final use of the site was a parking lot, fitness track, and a softball field with associated scoreboard, fencing and bleachers.

Project Engineer; Remedial Design for Site 20, Former Rifle Ranges, Marine Corps Base Quantico, U.S. Navy, Quantico, Virginia. September 2002 to March 2003. Served as the task lead for the remedial design at this 50 acre site encompassing 8 former ranges at this marine facility. The remedy involves the removal of lead contaminated soil, bullet piles/fragments, clay pigeon fragments, and infrastructure associated with the ranges (e.g., building foundations, tunnel, target mechanisms).

Project Engineer; Verification Sampling Plan for Site 59 Octagon Bombing Pad Dump, Naval Surface Warfare Center Dahlgren Site, U.S. Navy, Dahlgren, Virginia. December 2000 to January 2001. As project engineer coordinated the development of a verification sampling and analysis plan for the removal of debris located adjacent to the Octagon Bombing Pad located within an active test range. Given the proximity of the bombing pad, UXO was of high concern.

Project Manager; Remedial Designs for Sites 2, 3/44, 9, and 12, Naval Surface Warfare Center Dahlgren Site, U.S. Navy, Dahlgren, Virginia. September 1998 to 2007. Served as the project manager for this task order which involved the design of three separate final design packages including design of a landfill cap over an unexploded ordinance burial area (Site 2), a landfill cap partially located within a tidal marsh with very soft soil conditions (Site 9), and a contaminated soil removal (Site 3/44 Ordnance Burn Structure and Rocket Motor Pit). In addition, this task order included the design, installation, and operation of an air sparging/soil vapor extraction system (Site 12) for an area of contaminated groundwater. Work involved pre-design investigations to determine extent of contamination and to obtain geotechnical design information. Unique design features included a geotextile reinforced cap system to insolate waste buried in the marsh, a system to cover sediments within a tidal creek, an upgradient groundwater cutoff (soil-bentonite slurry wall), and wetland restoration. Managed numerous subcontracts including four analytical laboratories, two geotechnical laboratories, a geotechnical sub-consultant, risk assessment sub-consultant, drilling contractors, waste disposal contractors, and surveying contractors. Negotiated several extensions to the projects for additional services than were not originally in scope. Coordinated staffing between various offices and subcontractors. Projects included providing continuous construction oversight and submittal reviews. Construction at Sites 2, 3/44, and 9 has been completed.

Project Manager; Remedial Design/Remedial Action Oversight, Ohio River Park Superfund Site, USEPA, Neville Island, PA, September 1997 to 2006. Served as the project manager for two work assignments from the USEPA to provide third party oversight assistance

for the remedial design, construction, and long-term monitoring of a Superfund site in Pennsylvania. The remedial action included the construction of a multilayer landfill cap at the site which will be opened to the public as a sports complex following remediation and development. The sports complex will include ice skating rinks, indoor driving range, mini-golf, and batting cages with several structures being placed on the cap. The tasks involved reviewing PRP design submittals and providing written comments on behalf of the USEPA, providing community relation support, and providing remedial construction oversight. Tetra Tech provided support to the EPA during the long term monitoring of the Site.

Project Engineer; Removal Design Site 50, Naval Surface Warfare Center Dahlgren Site, U.S. Navy, Dahlgren, Virginia. May 2000 to September 2001. Served as project engineer for the final design for removal of contaminated soil and debris. The project also involved the creation of 1.5 acres of wetland to off-set loses of wetlands at other Sites on the base. The project manager was located in another office and all documents and drawings were coordinated by the project engineer. Assisted in the direction of post removal sampling and construction oversight.

Project Manager; Remedial Design Site 17, Naval Surface Warfare Center Dahlgren Site, U.S. Navy, Dahlgren, Virginia. October 1998 to September 1999. Served as project manager of the final design for the closure of a 7 acre landfill. The design employs phyto-remediation to act as an equivalent hydraulic barrier to a solid waste landfill cap. Coordinated pre-design studies and staffing of pre-design activities among three offices. Managed several subcontracts. Responsible for cost proposal, negotiations, and budgets.

Project Engineer; Site 6 Closure Design, Naval Air Station Patuxent River, U.S. Navy, Lexington Park, Maryland, February 1998 to June 1999. Served as technical lead for this preliminary design which included pavement design and layout of a parking area to accommodate aircraft refueler trucks. The parking lot was to cover a contaminated waste site. Researched Navy guidance manuals and coordinated with various departments within the Navy to establish the design requirements. Designed parking lot considering truck turning movements, turning radiuses, various offset requirements, and limits of contaminated soils. This work also involved the design of containment from the parking lot in case of a fuel spill and oil/water separators.

Project Engineer; Naval Weapons Station Earle, Landfill Cap Design for Sites 4 and 5, U.S. Navy, Colts Neck, NJ, March 1997 to January 1998. Coordinated the final design of two landfill caps including pre-design investigations, preparation of drawings, specifications, cost estimates, Design Basis report, Environmental Permits report, and Erosion and Sediment Control Plan and Report. Coordinated design work for a project manager located in separate office including writing the cost proposal, scheduling, assigning project staff and acting as liaison to various departments within the company. Design included multilayer landfill caps at two sites. The design for one of the landfill caps included the design of a Skeet Range facility on top the landfill cap including associated utilities, walkways, parking areas, and provisions for a clubhouse.

Modeling Specialist; On-Shore/Off-Shore Contaminant Fate and Transport Modeling OU2, OU3 and OU5, Portsmouth Naval Shipyard, U.S. Navy, Kittery, ME, May 1996 to October 1999. Researched and developed a contaminant fate and transport model to predict the contaminant concentrations in the off-shore environment based on on-shore contaminant sources. Wrote the accompanying reports explaining the modeling concepts, theory, results, and conclusions. Prepared the presentations for the clients, regulators and the public. The project involved predicting the contaminant loading to the river, mixing in the river, and estimation of contaminant concentrations in the surface water and sediments. The facility is located on an island in a tidally influenced river.

Task Lead; Operable Unit 5 RI and FS, DOE Fernald Environmental Management Project; Fernald, OH, June 1993 to December 1997. Served as task lead for surface water and infiltration fate and transport modeling at this 1000-acre, former uranium processing facility in Fernald, Ohio. Primary author of the accompanying report. The analyses involved the use of the HEC-1 program to calculate runoff, the U.S. Geological Survey's program VS2DT to quantify the amount of infiltration from streams on site to the underlying aquifer. Modeling included the simulating of transport, for nearly 100 constituents in the surface water at the site, to the underlying aquifer and other exposure points. Work involved the development of cleanup goals for surface soil based on the migration of contaminants in surface water and sediment, and on the infiltration of surface water to the groundwater.

Engineer; Hudson Run Surface Impoundment, PPG, Barberton, OH, August 1996 to November 1996. Responsibilities included evaluating the hydraulic capacity of an existing privately owned dam and evaluating several alternatives to improve channel conditions upstream of the dam and to install a new downstream dam. The intention of the project was to install a new dam to raise surface water level and reverse a hydraulic gradient in which contaminated ground water was currently entering the stream channel. The proposed dam would raise the surface water elevations so that clean surface water would infiltrate to the groundwater.

Engineer; Area A Landfill Design, New London Naval Submarine Base, U.S. Navy, Groton CT, February 1995 to June 1995. Performed stability analyses for the construction of a low permeability cap on an existing landfill. Analyses involved infinite slope calculations, deep circular and sliding block analyses using the computer code PCSTABL5M. Both effective and total stress analyses were performed.

Modeling Specialist; Rocky Flats Environmental Technology Site, DOE, Golden Colorado, January 1995 to May 1995. Developed waste acceptance criteria for the placement of contaminated materials in the proposed disposal cells for the Solar Evaporation Ponds Operable Unit. Development of the waste acceptance criteria involved using the HELP model to evaluate the infiltration through the disposal cell cap and groundwater modeling in the aquifer beneath the cell.

Modeling Specialist; Mill Creek Dump Superfund Site; PRP Group; E rie C ounty, P A, September 1992 to May 1993. Performed an analysis and redesign of a flood retention basin, resulting in a cost savings of approximately one million dollars in construction costs over the previous design. Analysis involved the use of U.S. Army Corps of Engineers' computer packages HEC-1 and HEC-2 as well as incorporating the advanced Interconnected Channel and Pond Routing (adICPR) model. The analysis involved flood routing through several interconnected ponds and a proposed flood retention structure to limit flooding to properties adjacent to the site. The adICPR was required to allow for flow reversals in the system, a feature which was beyond the capability of the HEC-1 and HEC-2 models.

Remedial Investigation/Feasibility Study

Lead Engineer; Feasibility Study – Naval Station Newport, Newport Rhode Island; October 2008 to 2010. Prepared a feasibility study for the Old Fire Fighting Training Area including alternatives for contaminated groundwater, soil, and sediments. The site was a former fire training are that was contaminated with petroleum and metals. The site covers approximately 8.5 acres and is located on Narragansett Bay near sensitive eel grass beds. The eelgrass beds were to be protected in all of the sediment remediation alternatives. Prepared cost estimates, text, and figures for the study.

Project Engineer; Storm Water Outfall Relocation Feasibility Study for Coal Combustion By-products (CCB) Landfill, Clover Power Station, Dominion Power, Clover Virginia, May 2001 to September 2001. Served as the task lead for a feasibility study to relocate permitted storm water outfalls from the CCB landfills at this coal fired power plant. The runoff from the CCB landfills entered a small stream/marsh that did not afford any mixing capacity with the permitted runoff. Tetra Tech evaluated the possibility of waivers from the plant's Virginia Pollutant Discharge Elimination System (VDPES) permit, source reduction of contaminants in the runoff via stabilization of the CCB waste, relocation of the current outfall location to a nearby river which would provide dilution for the runoff. Tt also evaluated the mixing of the runoff in the river and various diffuser configurations. Mr. Witt was in charge of the relocation feasibility study which involved 5 alternative alignments including both gravity and pumped pipelines to the river. For the feasibility study and associated cost estimates, Tetra Tech performed preliminary engineering to size pumps, pipelines, pipe material compatibility, wet wells, electrical requirements, electrical service lines to pump stations, and operation and maintenance requirements for the pump stations and associated pipelines. Tetra Tech also evaluated the alternatives with respect to time to implement the relocation, wetland impacts, archeological impacts (several alignment bordered a Civil War battle field park), and operational constraints of the power plant.

Project Engineer; EE/CA for Site 31 Airplane Park Dump, Naval Surface Warfare Center Dahlgren S ite, U.S. N avy, D ahlgren, V irginia. D ecember 2000 t o M arch 2001. As project engineer coordinated the development of the EE/CA and verification sampling and analysis plan for the removal of debris buried at this site. During the initial investigation of this Site live fuses were discovered over a significant portion of the site. The site was excavated by the Navy using workers in protected machinery. Following excavation, the soil/debris/UXO was sent though a separator and debris and ordnance items removed. The sieved soil was then sampled and

placed back into the excavation. Tetra Tech performed the verification sampling of the excavation and the soil piles.

Project Engineer; Feasibility Study Addendum for Site 9, Naval Surface Warfare Center Dahlgren Site, U.S. Navy, Dahlgren, VA, February 1998 to July 1998. Prepared and wrote the addendum to a feasibility study which included new data, new alternatives and options from the previous feasibility study report. The project involved the capping of a five acre landfill located adjacent to and in a tidal marsh. Orally presented the feasibility study to regulators and clients.

Engineer; Phase II Remedial Investigation, New London Naval Submarine Base, U.S. Navy, Groton CT, September 1996 to January 1997. Developed database for the New London Naval Submarine base which included all environmental data collected for two phases of a base wide Remedial Investigation. Coordinated the consolidation of data from paper format, and several electronic formats into a comprehensive data base using a standard database management software.

Regulatory Compliance

Project Manager; Base Instruction Development, Naval Station Newport – Newport, Rhode Island; August 2008 through November 2009. Served as project manager for this project to develop a base instruction for Naval Station Newport. The base instruction specifies procedures for management of excess soil resulting from construction projects on the facility with respect to arsenic. The State of Rhode Island has promulgated regulation for handing arsenic in the soil since the statewide background concentrations are in excess of risk based numbers. The majority of the soil on the facility is jurisdictional and must be managed according to the State Arsenic rules.

Lead Engineer; Explanation of Significant Differences – Site 12 the Chemical Burn Area, Naval Support Facility Dahlgren, Dahlgren, Virginia. April 2007 to August 2007. Prepared an Explanation of Significant Differences (ESD) to the Site 12 Record of Decision (ROD). The ESD documented the changes to the ROD to include excavation of soil/debris from the former burn pit. The selected remedy in the ROD included an air sparging and soil vapor extraction system to remediate volatile organic compounds at the site in soil and groundwater. Persistent groundwater contamination directly beneath the former burn pit had led the project team (including the Navy and regulators) to believe that source material my still exist in the pit and that excavation of this area and offsite disposal was an appropriate measure for this site. Worked closely with the Navy and regulators to develop language in the ESD acceptable to all.

Project Manager; Remedial Action Oversight, Mill Creek Dump Superfund Site, USEPA, Mill Creek Township, PA, January 2005 to 2006. Served as the project manager for this work assignment from the USEPA to provide third party oversight assistance for the long term groundwater monitoring and monitoring of the on site groundwater treatment system. The tasks also involves reviewing PRP submittals and reports related to the expansion of the Erie International Airport onto the site, collection of split groundwater samples, the evaluation of the split samples, and completion of a five-year review report.

Project Manager; Remedial Action Oversight, Mill Creek Dump Superfund Site, USEPA, Mill Creek Township, PA, January 2005 to 2006. Served as the project manager for this work assignment from the USEPA to provide third party oversight assistance for the long term groundwater monitoring and monitoring of the on site groundwater treatment system. The tasks also involves reviewing PRP submittals and reports related to the expansion of the Erie International Airport onto the site, collection of split groundwater samples, the evaluation of the split samples, and completion of a five-year review report.

CHRONOLOGICAL WORK HISTORY:

Project Manager; Tetra Tech, Inc.: Pittsburgh, Pennsylvania, June 1993 to Present.

Project Engineer; Paul C. Rizzo Associates: Monroeville, Pennsylvania, January 1992 to May 1993.
Served as a project engineer in charge of surface water controls for a 60-acre landfill in Pennsylvania. Conducted a hydrologic and hydraulic analysis for a Superfund site including design of flood retention basin and associated spillways and levees. Assisted in the preparation of several feasibility studies. Designed surface water energy dissipaters using a clients specialized construction materials

Research Assistant/Teaching Assistant; University of Pittsburgh, Department of Civil Engineering Pittsburgh, Pennsylvania, September 1990 to December 1991.
Researched and developed a Dynamic Programming Computer Model to optimize the pump scheduling for the City of Pittsburgh's water distribution system. Managed the operation of the undergraduate Fluid Mechanics Laboratory and served as a teaching assistant for the undergraduate fluid mechanics courses.

Project Engineer/Engineer; Gannett Fleming Engineers, Inc., Harrisburg, Pennsylvania, June 1987 to August 1990.
Responsible for geometric design of highways, hydrologic and hydraulic design of bridges and culverts, and design and analysis of storm-water control facilities. Performed backwater and scour analyses from bridges and culverts in Pennsylvania, Maryland, and North Carolina. Coordinated and wrote construction specifications for several toll plaza designs for the Pennsylvania Turnpike Commission.

PUBLICATIONS:

D. Witt, W. Yu, and J. D. Chiou, "Surface Water Flow and Infiltration Modeling to Support a Large Scale Contaminant Fate and Transport Study," presented at Emerging Technologies in Hazardous Waste Management VI sponsored by the American Chemical Society, Atlanta, Georgia, September 19 - 21, 1994.

PRABHA S. (PETE) VERMA, P.E.
DIRECTOR – GEOTECHNICAL STRUCTURES AND ENGINEERING
PITTSBURGH, PENNSYLVANIA

EDUCATION:
M.S., Civil Engineering, University of Pittsburgh, 1994
M.S., Mining Engineering, Pennsylvania State University, 1980
B.S. Honors, Integrated Engineering and Mining Engineering, Indian Institute of Technology (IIT-BHU), 1976

CERTIFICATIONS/ REGISTRATIONS:
Professional Engineer, Pennsylvania, [redacted], 1989
Professional Engineer, Maryland, [redacted] 2003
Professional Engineer, Virginia, [redacted] 2003

TRAINING:
Geotechnical Instrumentation, American Society of Civil Engineers, 2012
Annual Oil and Gas Industry Training, Pa Department of Environmental Protection, 2012
Analysis and Installation of Helical Anchor Systems, PierTech Systems, 2010
Computational methods in Stormwater Management, Penn State University, 2005
Construction Quality Management, U.S. Army Corps of Engineers, 2000
Ground Modifications, Hayward Baker, 1997
Design of Erosion and Sediment Controls, International Erosion Control Association (IECA), 1996
Design and Construction of Driven Pile Foundations, Federal Highway Administration, 1987
Slope Stability Analysis of Hollow Fills and Spoil Banks, University of Kentucky, 1982
OSHA 29CFR1910.120 40-Hour Hazardous Waste Operations and Emergency Response, 1991
OSHA 29CFR1910.120 8-Hour Hazardous Waste Operations and Emergency Response Refresher, 2012 (July)

EXPERIENCE SUMMARY:

Mr. Verma has over 30 years of diversified experience in geotechnical and civil design for infrastructure, environmental and power plant projects. He has extensive experience in the areas of geotechnical engineering, municipal, hazardous and residual waste landfill designs, materials handling, surface water hydrology, hydrogeological analysis, general civil and concrete design, subsurface investigation, foundations design, retaining walls, sheet pile design, cellular structures and cofferdam design, slurry walls, MSE walls, groundwater analysis and dewatering, materials processing, site work, pipeline/gas industry related grading plans and E&S plans, and construction support.

Mr. Verma is uniquely qualified with a blend of experience in design, construction as well as research projects. He developed a process for extracting magnetite from fly ash which became the basis of the first magnetite extraction plant by TVA. He also developed a technical procedure to analyze multiple pumps feeding into a common force main.

Mr. Verma has worked on engineering designs and supported construction for diversified array of projects, ranging from commercial projects as small as $4,000 to large projects up to $26 million dollars in value. His commercial clients include Exxon-Mobil Corporation, International Paper Corporation, Ashland Oil Corporation, Arco Chemicals, and International Fuel Harvester, while the government clients include the Department of Energy, Department of the Navy, U. S. Army Corps of Engineers, and Department of the Interior.

He has prepared design packages for general civil (hydrology, grading plans, site work, pumps/piping and others) and geotechnical structures projects, permit application, erosion and sediment control plans, storm water management plans, specifications, bid packages and proposals.

He has offered short courses on the Design of Levees, and on Pennsylvania Erosion & Sediment Control manual, 2012. He was an adjunct professor at the University of Pittsburgh for one year teaching a graduate level course.

PROJECT EXPERIENCE:

Certifying/Lead Design Engineer; 2011-2014. Various projects that included gas drilling pad design, gas pipeline alignment, road/rail road crossings, E&S plans and permits, centralized impoundment dam design in Pennsylvania and Ohio. This included embankment design, grading plans and development of constructions standards. Provided critical evaluation (confidential) to PADEP's design criteria in regard to exposed liners in ponds.

Subsurface investigations and slope stability analysis for a 50-ft high slope that was designed for constructing a gas drilling pad in Ohio.

Performed concrete pavement design for a loading facility at a packaging plant in Pittsburgh which included concrete layout details for pavement and associated concrete retaining structure.

Performed evaluation and load rating certification for six overhead cranes supported on steel structures in a molybdenum plant in Pennsylvania.

Designed concrete foundations for buildings, high capacity tanks, slug catchers, and silo redesign project (at a glass and materials plant in Pennsylvania.)

Designed Reinforced Soil Slopes (RSS), and Mechanically Stabilized Earth (MSE) walls for drilling pad and pump stations. .

Developed design standards and design drawings for a remediation project at Portsmouth Naval Shipyard in Maine. This included excavation of soils and removal of shoreline revetments, backfilling and site restoration, and pavement design. The challenges included the large amount of active utilities that existed in the project area, and potential excavation next to the building.

Lead Design Engineer, US Coast Guard, Baltimore, Project Construction Cost: $2 million, 2012-13. Designed and provided construction support for a 320-foot long bulkhead wall which involved subsurface investigation, establishment of geotechnical parameters and design of the sheet pile wall. The design included stability/deflection analysis, anchor/wale design, and corrosion analysis for 50-year life of the project. This $2 million facility design included alternate design evaluations and sensitivity analysis in order to optimize the design and cost. Established material specifications for wall, anchor wall, tie rods, wales, backfill and fenders. Developed construction drawings and construction cost estimates. The design challenges included driving in hard clay with SPT blow counts up to 100/ft, and sequencing, to accommodate dredging, anchor wall construction and backfilling. Designed and provided construction support for 60-foot long concrete retaining wall.

Lead Design Engineer, Anchor Drilling Fluids, Inc., Wellsville, OH, Project Design Cost: $250,000, 2012. Developed multiple foundation concepts and related costs, and designed foundation for the gas drilling fluids manufacturing facility consisting of 22, 35-ft high tanks in 85 ft x 110 ft. area. The design challenge at the site included the presence of 15 ft. of fill over very soft clay (W.O.H. consistency) which was overlying the bedrock at 28 ft. depth. Provided innovative and very uncommon foundation design to a *surprised* client that saved $3 million in construction and delay costs.

Technical Lead; Vogtle Nuclear Power Plant - The Southern Company; River Water Intake Structure, Nuclear Island Excavation design; Project subtask Value: $26 million; Burke County, Georgia; 2007-2010. As a part of the nuclear power plant design and construction, designed a cellular cofferdam structure supporting 35 feet of hydraulic head in order to facilitate the construction of River Water Intake Structure. This included subsurface investigations, geotechnical and structural designs, and seepage analysis to fully assure the cofferdam performance. Designed foundations for the building housing three 72-inch piping/pump systems, and developed grading plans. The challenges included poor soil conditions, excavating 10 feet below the bottom of the Savannah River protected by the cofferdam, uplift pressures during construction and preserving the navigation channel. Designed ground improvement measures to address liquefaction. Developed design criteria for pipe crossings under heavy design loads. Developed construction drawings, specifications and bid package.

Analyzed and designed a 90 feet deep sloped excavation involving 0.7 million cubic yard of soil removal, and associated drainage/dewatering system in order to stabilize slopes in the nuclear island area. Designed a 40 feet high mechanically stabilized earth (MSE) wall using metallic strips in order to support heavy equipment and expedite construction schedule. The challenges included minimal or no deflection of the wall and the installation of impermeable liner at the wall face.

Technical Lead; Vogtle Nuclear Power Plant - The Southern Company; Barge Slip Structure Design; Project Subtask Value: $8 million; Burke County, Georgia; 2008-2010. Led a team of civil, structural and geotechnical designers for developing design concepts, calculations, drawings and specifications for Barge Slip structure to handle unloading of the heavy nuclear equipment from Savannah River. Design features included 30,000 sq. ft. of sheet piles and King piles, 40 deadman anchorages, 180 ft. long concrete retaining structure, crane pad structure including foundation piles, fender and mooring dolphins, and scour/erosion protection. The challenges to design included high water table, close vicinity to existing structures, poor soil conditions and heavy loadings due to equipment as heavy as 2000 kips.

Senior Consultant; U. S. Army Corps of Engineers, Kansas City District; Formerly Utilized Sites Remedial Action Program; Project Value: $600 million; St. Louis, Missouri; 1999-2011. The project, located within the still active Mallinckrodt Chemical Company facility and also near the airport, included the engineering and construction necessary for the remediation of more than 500,000 cubic yards of low-level radioactive soil at fourteen different site locations. The project highlights included:

As a design consultant to the project, Mr. Verma performed several design analyses for excavations, retaining walls, sheet pile walls, foundations, soil nails, grouted soil anchors, helical soil anchors and MSE walls. More than 200,000 sq. ft. of sheet piles and more than 165 helical anchors were designed and installed including those for supporting a 28 feet tall 300 ft x 300 ft building while excavating next to it. He also closely coordinated construction to make necessary changes during the course of the project. Each remedial action site presented an engineering

challenge due to the proximity of building foundations, utilities, active paved roadways, rolling soils and live rail traffic. Utilities were a special concern in this more than 100-year-old facility because many as-builts were not available, and required the design team to consider a wide variety of contingencies to handle unexpected site conditions during construction.

Developed a mathematical model and a corresponding computer program was written for the design of MSE walls. The program was used for the design of MSE walls including a 12-foot high MSE wall supporting an active railroad spur.

Senior Project Engineer/Consultant; U. S. Department of the Navy, NAVFAC Washington; LANTDIV REC – Several Projects; Project Value: >$1000 million; Several Sites in Maryland, Virginia, New England States, N. Carolina and Canada; 1994-2011. Reviewed and **c**oordinated design for construction of more than 80 environmental projects that included landfill caps, grading plans, drainage and hydrological designs, geotechnical designs, erosion control structures, and permitting over a period of 15 years. Provided alternate designs to improve technical effectiveness, constructability and costs. Conducted forensic analysis of seven failed landfills and dams, and proposed unique and workable remedial solutions. The some of the scope of work is highlighted in the following. Lead engineer for more than 12 design-build contracts that included landfills, deep excavations and redesigned repairs.

Lead engineer (1994-95) for the preparation of erosion and sediment control plan to secure MDE permit for a landfill at Naval Training Center, Bainbridge, Maryland. The scope included seven sediment basins and traps, several channel designs, and diversions. The cap that was designed by others in 1995 which failed in 1998 in despite of 5H:1V slopes and apparently credible cap design. Mr. Verma performed forensic analysis (with a well known national expert and USACE-Omaha) and developed design criteria for new construction (Redesign and reconstruction cost: $9 million).

Resident Technical Consultant (1998) for the construction of ocean-front McAllister Landfill, Rhode Island. The project involved cap construction, armor wall construction, and portable dam in order to provide a clean dry work area against the tidal height of up to 10 feet. Mr Verma worked directly with the Navy in order to work out design simplifications and task eliminations to expedite the project. Designed and supervised the construction of a 600-foot long gabion wall retaining structure that supported a slope and adjacent roadway above.

Senior engineer (1997) for geotechnical investigations and testing for deep and shallow foundation designs for the treatment facility and other structures at Camp Allan, Virginia. The deep foundation included the design of 96 tapered driven piles and associated pile cap with a tolerable settlement potential to support the loadings inside the building under conditions of high water table and poor soil conditions. The shallow foundations in the post design phase during construction encountered difficulties in compaction due to rolling soils. Developed protocol for handling construction on rolling soils.

Designed a 1800-foot long sheet pile wall, breakwater structure, and a leachate collection system for the remediation of an ocean-front landfill at Argentia Naval Base, Newfoundland, Canada (1996). Developed grading plans and cap design for the 12-acre landfill. Monitored construction at site during critical phases. The challenges included up to 15 ft high waves and high winds. Prepared construction drawings, specification, work plans and developed quantity estimates.

Senior engineer (1998) for the complete redesign of a cap system, grading plans, surface and infiltration water system design, deep leachate collection trenches, and gas collection and flare

system. The cap redesign was to accommodate the availability of the materials locally and also limited available work space. The redesign effort and subsequent construction saved the client $1.5 million. The landfill slopes, cap and water handling systems performed impeccably during a 500-year storm event two years after the construction.

Senior consultant (2003) for the redesign of a cap that was built in 2001 and had failed in one portion of the 10-acre MCB-2 landfill at Marine Corps Base, Quantico, Virginia. The portions of the landfill (designed and built by others) failed at three other locations in years 2004 through 2010, which were rebuilt using the initial (2001) design concepts and procedures. The challenges included 2.6H:1V slopes and limited availability of the suitable construction materials.

Geotechnical Lead; Pennsylvania Power and Light Corp.; Brunner Island Power Plant Rail Yard Renovations; Project Value: $16 Million; Central Pennsylvania; 2006 to 2007. As a part of a $300 million flue gas desulfurization project, performed design of retaining structures and foundations to support construction 35 to 40 feet below ground surface in an ash basin. The project included the design of 15-acre geosynthetics cap removal and reconstruction, conveyor tunnels, 5-acre new landfill cap, excavation dewatering and underground infiltration system design, E&SC, and site support facilities for limestone rail car unloading, limestone and gypsum stockpiles, and gypsum truck & rail loadout. The design challenges included poor soil conditions, high water table, boiling potential at the bottom of excavation in fly ash environment and relatively deep location of bedrock.

Senior Consultant; US Army Corps of Engineers, Baltimore District, FUSRAP Program; Linde Remedial Site; Total Project Value: $200 million; Buffalo, New York; 2001 to 2010. As a part of the long term USACE project for the excavation of low level radioactive waste, served as a senior consultant for various design and construction tasks such as relocation of utilities, excavations up to 15 feet deep next to tall buildings, excavations underneath and next to tunnels, excavations under the existing footings, sheet piles retaining structures and piping systems. Designed the excavation inside a warehouse and underneath the footings. Provided technical support for the design and installation of 400 feet long modular concrete tunnel which also involved the development of specifications for flowable fill for the project.

Design Manager; Bechtel Jacobs LLC – US Department of Energy; Gaseous Diffusion Plant Remediation Design; Project Value: $3.2 million; Portsmouth, Ohio; Jan 2002 to Dec 2002. Managed the design and coordinated construction for two hazardous waste landfill closures, groundwater extraction and conveyance system, and a 1250 feet long and 40 feet deep slurry wall. The design effort included subsurface investigation and sampling, laboratory testing, and determination of final design parameters to achieve desired project objectives for the slurry wall. Developed slurry wall performance criteria and monitoring plan.

Senior Consultant; ExxonMobil Corporation; Monterrey Coal Company Mine Reclamation; Project Value: $24 million; Southern Illinois; Sept 2003 to Dec 2004. Performed design analysis for the installation of 2 ft soil cover over an area of 80 acres of fine coal refuse. The fine coal refuse had very low undrained shear strength of 100 psf (or less) and was not able to sustain the equipment loading designated for the construction. The water table was high and within a few feet of the existing ground surface. Performed design for the reinforcing material, and performed equipment selection such that they can operate on the low strength soil to install the cap. Established procedures for the reinforcing material installation and soil cover. Developed design criteria and specifications for the high strength reinforcing element and quality control documents.

Forensic Consultant; Client – Confidential; Dam Construction Review and Failure Analysis; Abilene, Texas; Estimated Total Project Value: $50+ million; 2004. A 60-foot high and 0.6 miles long earth dam was constructed to store the dredged material transported via a 72-inch pipe line from the river a few miles away. The dam was constructed with clay "CL" soil. About two years after construction, several inches wide and several feet deep desiccation cracks developed prominently in the embankment and there was severe erosion on the upstream side resulting in up to 6 feet high cuts. These two observations jeopardized the integrity of dam and threatened the multi-million dollar housing plan downstream. Analyzed construction data, reviewed construction methods, and analyzed soil for useful parameters. The issues identified with the problems were low shrinkage limits and highly dispersive clay. These issues were not addressed in the design documents and applied during construction. Recommended remedial measures to overcome serious design issues to abate the problems.

Senior Consultant; Client: Confidential; Harbor-at-Hastings Remediation Design & Analysis; Project Value: Confidential; New York; 01/2003 to 12/2003. For a large chemical/oil company, as part of a billion dollar law suit, performed a design review and critique of a design provided by a large consulting firm, developed alternate designs with cellular cofferdam structure and sheet pile walls for two locations on the project. Analyzed various scenarios for uplift and piping in order to determine the stability of structures. The design involved sheet pile penetration through loose sand and silt in order to support up to 25 feet of soil behind sheeting. The use of sheeting/structures with large section modulus was contemplated to materialize the design. The design challenges included very high water table, poor soil conditions and proximity to the river. Assisted lawyers with the development of technical argument.

Senior Consultant; US Army Corps of Engineers; Pine Bluff Arsenal, Project Value: $1.5 million; Pine Bluff, Arkansas; 01/2002 to 6/2003. Designed a multilayer capping system for the hazardous waste facility that was existing under roof (canopy) and a part of it was under fire. Developed design drawings and specifications, prepared bid packages for subcontract work and coordinated construction.

Senior Consultant; US Army Corps of Engineers; Landfill Nos. 1 and 6; Project Value: $6.5 million; Fort Chaffee, Arkansas; 06/2000 to 12/2002. Lead designer for two projects at an old U.S. Army base facility. The project included the closure of a 6-acre landfill with multilayer cap and the closure of a 36-acre landfill with clay cap. An extensive borrow area investigation and characterization was necessary prior to the construction. Operational performance parameters were established for the clay cap installation using Daniel's window and test pad construction, so that the desired permeability criteria of the clay cap construction could be assured with a minimum field testing during the actual clay cap installation. Designed drainage system, and infiltration gallery for the disposal of on-site contaminated water.

Senior Consultant; Pennsylvania Department of Environmental Protection; Landfill Slope Repair & Landfill Cap Design and Construction – American Fuel Harvester; Project Value: $0.75 million; East Bangor, Pennsylvania; 05/2002 to 10/2003. Signs of cracking in the utility road threatened the stability of the road and the landfill located above. Analyzed the stability of 80-foot high slope that supported the utility road. Provided design recommendations and specifications. Coordinated with construction to successfully achieve project objectives and site stability.

Developed grading plans, drainage plans including channels, diversions and sediment traps, and HDPE cap configuration for the containment of the 7-acre landfill that had a significant amount of

woody material buried in it and was undergoing spontaneous combustion. The other concern in addition to spontaneous combustion included long term settlements. The remedy involving excavation, quenching and replacement was prohibitively expensive. A unique simple solution was implemented so that the air supply to the spontaneous combustion would be cut off, and at the same time would not allow gas pressure to build up. The system appeared to have worked successfully and the spontaneous combustion issue was controlled.

Senior Consultant; International Paper Corp.; Masonite Wood Fiber Facility Capping; Project Value: $0.40 million; Central Pennsylvania; 2/1998 to 8/1998. The project involved capping a 13-acre above ground wood fiber pile with an exposed geosynthetics liner. The design incorporated many innovative aspects, including features against uplift due to high winds, surface water management and underground disposal, and liner selection to withstand weather extremes and environmental stress. The surface water runoff handling faced the situation of low time of concentration and resulting high peak runoffs, topography surrounded by high hills, high groundwater and the requirement of no visible features on the ground for surface water storage. The completed project design was awarded a top performance rating by the client that led to subsequent project construction award to the design company.

Senior Consultant; Special Request by the Office of the Governor of Virgin Islands; St. Thomas Hospital Incinerator; Project Value: Unknown; St. Thomas, Virgin Islands; 1996. Performed analysis, provided construction recommendations, and field directed the construction of an extension of the 60-foot incinerator stack in the U.S. Virgin Islands. The complications included design for 200 mph wind loadings, 15,000 pounds of additional weight of the extension stack, and the existing condition where the entire stack was seated on a cylinder chamber. This quick response and high risk project (which the original designer and contractor refused to work on) successfully withstood the wind loadings in the subsequent hurricane seasons.

Consultant; Bechtel Bettis; Confidential - Nuclear Research Facility; Project Value: Confidential; Pennsylvania; 2000. As a part of the internal audit, collected data, reviewed and analyzed hydraulic flow computations methodology for the tank and siphon system at the facility. It was determined that the affluent has been grossly underreported over the past 30 years since the flow measurement system was built.

Technical Manager; Ashland Oil; Martha landfill; Project Value: $0.6 million; Ashland, Kentucky; 2/2002 – 11/2002. Managed the design and construction for the remediation of a failing slope located immediately below the low level radioactive waste landfill cell. The scope included site investigation, design, and preparation of construction documents for the remediation measures in order to prevent the progress of the slope failure. Supervised quality control and provided technical support during construction on this design-build project. Installed inclinometers and monitored the movement over a period of 6 months.

Lead Engineer/Project Manager; Waste Management of Ohio, Inc.; Countywide Landfill; Project Value (design only): $1.5 million; East Sparta, Stark County, Ohio; 1991-1992. Project manager and lead design engineer for the design of a 90-acre municipal waste landfill in Ohio. The project involved geotechnical and hydrogeological testing and analysis, development of grading plans, leachate management systems design, phase development plans, liner system design, surface water management design, and gas extraction systems design. Led a team of nine professionals to prepare construction level permit drawings and systems design for this 15-million cubic yard landfill. Developed plans, specifications and bid documents for the first 12-acre cell construction of the landfill, and coordinated construction.

As a part of the leachate management systems design for the above project, Mr. Verma developed a pump network analysis system to analyze the performance of pumps where two or more pumps feed into a common force main.

Design Manager; Mostoller Landfill; Project Value (design only): $0.4 million; Somerset County, Pennsylvania; 1993-94. Managed major modifications in the design of a 100-acre landfill in western Pennsylvania to accept both residual and municipal wastes. The design modifications pertained to regulatory compliance of both residual and municipal landfill regulations, constructability issues and increasing the capacity of the landfill.

Principal Engineer; Waste Management of Ohio, Inc.; Landfill Siting and Borrow Source Characterization, and Gas Extraction Systems Design; Project Value (design only): $1.8 million; Southeastern Ohio; 1992-1994. A 250-acre landfill was proposed at a location that had been mined. Landfill siting included an extensive and sophisticated array of geotechnical instrumentation, methods and analysis, including settlement pad/tubes, in-situ shear testing and in-situ unit weight. The borrow source evaluation included soil borings, test pits and vertical/horizontal delineation of the clay source that was very tightly specified in the State regulations. During design phase, designed an active gas management system which included 140 extraction wells, 18 horizontal wells and 9 header loops.

Engineering Consultant; Client: Confidential; Dam Failure Analysis; Project Value: Confidential; West Virginia; 1994. Provided consulting design services for a 23-ft. high dam in West Virginia that had failed three times immediately after construction (while the reservoir was being filled in), under previous Engineer's supervision. The previous failures' observations included about 12-inch wide and several feet deep cracks in the embankments leading to failure and blocking a creek downstream and flooding the area and the farmland. The issue identified with failure was the use of expansive clay in embankment that was swelling when exposed to moisture/water.

Senior Engineer/Project Manager; Municipal Authority of Westmoreland County; Westmoreland County, Pennsylvania; 3/ 1991 – 9/1991. Designed a 30-cfs active gas management system as a part of the 12-acre cell closure. Developed bid documents and administered the bid process. Monitored construction of the gas collection system. Managed the preparation of a liner system design and QA/QC documents for this landfill in Pennsylvania.

Senior Engineer/Project Manager; Landfill Design; Puerto Rico; 3/1991 - 9/1991. Coordinated geotechnical testing program, performed liner design calculations, settlement analysis and developed grading plans for the landfill.

Section Manager; Federal Emergency Management Agency (FEMA); **Total Project Value – $10 million/year; 1986 - 1991;** Section Manager in charge of geotechnical evaluations of design calculations, construction plans and specifications of all flood control projects including dams, levees, flood/retaining walls etc in the Western USA for a period of five years.

Asst. Engineer to Project Engineer; Average Design Revenue - $0.15 million /year; 1979 - 1991; Design Engineer for geotechnical designs and analyses including subsurface investigations, deep and shallow foundation design, stability analysis, and settlement analysis for various structures including buildings, impoundments, roadways, bridge abutments, retaining structures, tunnels, river cells, and earth dams. This included the design of a river front unloading facility

involving grading plans, sheet piling, and stabilization of slopes for APS-Mitchell Power Station in Pennsylvania.

Design engineer for the pavement design of Rte 60 bypass (now I-376) leading to new Pittsburgh International airport terminal. This included subsurface investigations, soil testing, traffic projection analysis, alternate pavement designs, report preparation and presentations to Pennsylvania DOT.

Developed a process for the resource recovery of magnetite from fly ash as a part of an Electric Power Research Institute (EPRI) project. Mr. Verma was informed that the publication of this process became the basis for the first magnetite recovery plant of TVA.

Performed coal reserve analysis, developed pit dimensioning computer program to facilitate mine planning and equipment selection, and developed critical path method schedules for open pit mining operation optimization at Hobet Mine of Ashland Coal Company, Kentucky. Developed computer software based on National Coal Board's model for the prediction of subsidence as a part of several mine permitting projects. Designed plant modifications to add fine coal processing circuits in an existing coal preparation plant for Westmoreland Coal. Performed feasibility study and preliminary operations design for a surface coal mining project in Indiana for the purpose of securing financing.

Field/design engineer for several subsidence remediation, coal refuse and spoil pile remediation, bridge abutments, and up to 180 ft. high dam design projects in Ohio and West Virginia. These projects involved subsurface investigations, field testing, grading plans, hydrogeological analysis, construction drawings and specifications.

Design engineer for the feasibility study of transportation alternatives of construction-demolition waste for Waste Management of Ohio. The alternates that were considered were rail, several truck routes and aerial. The railroad was designed with a maximum of 3 percent slope and still had a reasonable breaking distance. All truck routes were designed for the anticipated truck load. The conclusion included different options for different levels of waste handling.

CHRONOLOGICAL WORK HISTORY:

Principal Engineer; Tetra Tech NUS, INC.; Pittsburgh, Pennsylvania, July 5, 2011 – Present.

Senior Project Engineer to Senior Engineering Consultant; SHAW GROUP, INC.; Monroeville, Pennsylvania, September 1994 – May 2011.

Senior Engineer/Technical Manager; GOLDER ASSOCIATES, INC.; Wexford, Pennsylvania, September 1991 – August 1994.

Senior Project Engineer; RIZZO ASSOCIATES, INC.; Monroeville, Pennsylvania, March 1991 - September 1991.

Assistant Engineer to Senior Engineer; MICHAEL BAKER CORPORATION; Beaver, Pennsylvania, August 1979 – March 1991.

PROFESSIONAL AFFILIATIONS:

Member - American Society of Civil Engineers

Member – International Society for Soil Mechanics and Geotechnical Engineers

PRESENTATIONS:

P.S. Verma, and John A. Dziubek., "Seminar on Geotechnical Aspects of the Levees", Organized by Federal Emergency Management Agency, Washington D.C., 1988.

PUBLICATIONS/ARTICLES:

Verma, P.S. and Kurgan, J., "Technical and Economic Evaluation of Magnetite Recovery from Fly Ash," Electric Power research Institute, 1986.

Verma, P.S., and Dziubek, J. A., "Surface Mining Facilities Design and Mine Planning Techniques," Mining Symposium, University of Kentucky, 1985.

Verma, P.S. and Balistino, J., "Technology and Economics of Magnetite Extraction from Coal Combustion Fly Ash and Magnetite Market Potential," Proceedings of the Second Conference of Management of Municipal, Hazardous, and Coal Wastes, U.S. Department of Energy, U.S. Environmental Protection Agency, and University of Miami, 1984.

Verma, P.S., "Application of Computers in New Mine Development," Diamond Jubilee Symposium on New Mining Techniques, Institute Of Technology, Banaras Hindu University, 1982.

WILLIAM C. SMITH, P.E.
SENIOR PROJECT MANAGER
PITTSBURGH, PENNSYLVANIA

EDUCATION: Masters of Public Management (Concentration in Information System Management and Finance), Carnegie Mellon University, Heinz School of Public Policy and Management

B.S., Civil Engineering (Geotechnical Concentration), University of Pittsburgh, 1982

TRAINING: OSHA 29 CFR 1910.120 HAZWOPER Health and Safety Training
SafeLand Training

CERTIFICATIONS/ REGISTRATIONS: Professional Engineer, Pennsylvanial, U.S. Virgin Islands

Mr. Smith has more than 30 years of engineering experience, including managing the design and construction of multi-million dollar construction projects. His remediation expertise includes engineering design and permitting of site construction and environmental remediation projects. He has served as a construction contractor and project manager for site development and environmental remediation projects. Mr. Smith's experience also includes various pipeline projects and other support for E&P clients operating in the Appalachian Basin Shale Plays. He has served as a construction contractor and project manager for site development and environmental remediation projects.

PROJECT EXPERIENCE:

Civil E ngineer/Project M anager; Fr eshwater and Fl owback W ater P ipeline D esign and Construction Management; Noble Energy; West Virginia. Managing the design and construction management of water transfer piping system. System design includes two pump stations, piping and associated equipment between pump stations, impoundments/storage tanks, and well pads. Prepared permits and design for surface water intake structure. Other key aspects of the project include:

- Developed as-built documents for legacy pump stations.
- Evaluated two existing pump stations and designed equipment and controls system upgrades.
- Evaluated the existing water distribution system and identified weak points in the system that would be exceeding their maximum allowable working pressure as the system was expanded.
- Performed an analysis of future water demands versus their available water supplies and storage capability, identifying a need to secure additional sources of water.

- Performed hydraulic analysis of 40 miles of water supply piping.
- Detailed design of water supply piping, including stream and road crossings.
- Construction of temporary water line to tank farm.
- Completed freshwater mussel relocation in advance of surface water intake construction.
- Provided supplemental staff to Noble to develop Water Management Plans for well pads in West Virginia.
- Provided on-site construction supervision during construction of four pipelines.
- Hydraulic modeling for the entire future water distribution system in the northern West Virginia lease area.

Project Manager; Fr eshwater and Fl owback W ater P ipeline D esign; CONSOL Energy; Pennsylvania. Managing the modeling and evaluation of an existing water transfer piping network and desing of upgraded pipelines. Project included modeling 260 miles of exisiting and interconnected pipeline, recommendations for upgrades and new pipeline, pump station recommendations, and design of new pipelines.

Project Manager; Permitting Nine Pump Stations; Confidential Client; Western and Central P ennsylvania. Managed the township land development and subdivision permitting for nine NGL pump stations across Pennsylvania.

Project M anager; Block V alve S ites; C onfidential C lient; T hroughout P ennsylvania. Managed the acquisition of building permits for 36 new or upgraded block valve sites along an NGL pipeline across Pennsylvania.

Project Manager; HDD Frac-out Remediation; Confidential Client; Western Pennsylvania. Managed the remediation of two residential wells that were impacted by drilling fluid during two separate HDDs. The plugged wells were cleaned out and rehabilitated. An innovative onsite treatment system was used to treat the impacted water purged from the wells and eliminated offsite disposal of the purged drilling mud.

Project M anager; Fly A sh I mpoundment C losure; AEP; West V irginia Managed the investigation and design for the closure of an 80 acre fly ash impoundment and a 12 acre bottom ash impoundment. Project included identification and investigation of nearby borrow areas.

Project Manager; Site Development Design and Permitting; Castlebrook Development; Monaca, Pennsylvania. Managed the design and township land development and subdivision

permitting for this commercial site development project. Sanitary design included provisions for significant future residential development in subsequent phases of the project.

Project Manager; Bauxite Residue Site Remediation; St. Croix Alumina; St. Croix, US Virgin Islands. Managed the investigation, design, QA, and construction monitoring for this site remediation under a Consent Decree with the Government of the USVI. This project involved a new 1,500 foot access road, regrading 500,000 cubic yards of bauxite residue, revegetation pilot studies, archaeological studies, identification and characterization of six onsite borrow areas, capping 118 acres of bauxite residue, and consolidation of 40,000 cubic yards of bauxite residue under the cap. The site is located in a facility subject to MARSEC security regulations.

Civil Engineer/Project Manager; Compressor Station Siting Studies; Williams; PA. Screening multiple locations to site two compressor stations. Initially performed desktop review of sites to identify issues that would eliminate sites. Geotechnical and cultural resource investigations and wetland surveys were performed at candidate sites that passed the initial screening.

Civil Engineer/Project Manager; Well Pad Design; Stone Energy; Northern WV. Performed site reconnaissance, conceptual layout, and geotechnical investigation for three well pads. Prepared well pad and access road design.

Project Manager; Sludge Impoundment Capping for RCRA Corrective Action; Confidential Client; Ashtabula, OH; $6,000,000. Construction of 30-foot deep groundwater/DNAPL collection trenches using bio-polymer slurry trenching techniques, waste relocation, 70,000 CY of earthwork using onsite borrow area, wick drain installation and geogrids for ground stabilization, and geosynthetic capping of five areas (two sludge impoundments and three disposal areas) totaling 22 acres using GCL, smooth and textured LLDPE, and single- and double-sided geocomposite.

Project Manager; Marcellus Shale Freshwater Impoundment Lining; Confidential Client. Project included subgrade preparation, subbase placement, double-lined, leak detection, conductive liner, and HDPE piping.

Project Manager; Seep Collection System Construction; Confidential Energy Client. Project included new access roads, multiple seep collection drains, fusion weld two-inch through ten-inch HDPE pipe, installation of eight pumps, three collection vaults, and one combined flow manhole. Mr. Smith prepared the budgetary construction estimate for an additional pipeline and collection system planned as a future capital project.

Project Manager; Westinghouse Building #4 Construction; Turner Construction; Cranberry Township, PA. Mass excavation of 100,000 cy of soil and rock, storm and sanitary sewers, water and gas lines, communication lines, and foundation excavations under an

expedited schedule. Delivered building pad seven days ahead of schedule even though rock was encountered.

Project Manager; New Kensington Treatment Facility Excavation and Underground Piping; New Kensington Sanitary Authority; New Kensington, PA. Excavation and underground piping for a new pump station at the New Kensington Sanitary Authority treatment facility. Excavation included a 55-foot deep, 110-foot diameter cofferdam; installation of 48-inch ductile iron piping at a depth of 35 feet; 4,000 lf of intra-unit piping; and dewatering.

Project Manager; Former Pullman Standard/Trinity Site Removal and Offsite Disposal; Confidential Client; Butler, PA. Removal and offsite disposal of lead, arsenic, and PCB-contaminated soils from the former Pullman Standard/Trinity site in Butler, Pennsylvania. Removed and crushed 8,800 square yards of concrete slabs and foundations that were recycled for onsite road subbase materials.

Project Manager; Grove City College SEB Project; PJ Dick Corporation; Grove City, PA. Demolition of auditorium and hazardous material storage building and greenhouse. Mass excavation adjacent to existing building using soldier beam and lagging with tiebacks. Project was for a new science and engineering building.

Senior Project Manager and Project Coordinator; Geosynthetic Landfill Cap Construction Management; B&E Landfill PRP Group; Circleville, OH. Design, contractor procurement, and construction management of a 22-acre geosynthetic landfill cap, value engineering, borrow area identification and development, and phytoremediation of groundwater seeps. Negotiated technical issues with EPA and performed budget control and forecasting cost to completion.

Senior Project Manager; Design and Construction Management; CBS Corporation. Design and construction management for a 118-acre facility with two landfill caps, two groundwater treatment systems, a SCADA system, polychlorinated biphenyl (PCB)-impacted soil removal, and paving as an engineered barrier to create additional leasable property.

Senior Project Manager; Landfill Gas Pipeline Design; Confidential Client; Pine Grove, PA. Design of a one-mile low pressure landfill gas pipeline from a landfill gas collection system to a local manufacturing facility.

Senior Project Manager; Impoundment Closure Plan Design/Permitting; MAXX Environmental; Bulger, PA. Performed the closure plan design and permitting for a 35-acre sludge impoundment. Project involved piggy-backed disposal cells over existing disposal areas. The presense of soft sludge required stabilization for the increased laoding and slope stability analysis and slope buttressing to account for the vertical expansion. A beneficial waste permit was obtained to use waste for daily cover.

Senior Project Manager; Landfill Closure Design and Construction and Subaqueous Cap O&M; Indiana Steel & Wire, Muncie, IN. Designed the closure for two landfills in the flood plain of the White River, waste consolidation, XRF screening, and construction monitoring

during capping. For the quarry pond sludge, performed bathymetric surveys and subbottom profiling to document the construction of a subaqueous cap over the soft sediment. Routine bathymetric surveys and sediment pore water sampling were performed as part of annual monitoring of the subaqueous cap condition and performance.

Senior Project Manager; Landslide Investigation and Repair Design; PPG Industries; Ford City, PA. Performed geotech investigation of a slope failure at a 117-acre sludge impoundment that contained high pH, high salt content sludge. Conducted slope stability analysis based in the results of the geotechnical investigation and provided recommendations for repairs.

Senior Project Manager; Remediation of Contaminated Sediments; CBS Corporation; Horseheads, NY. Design and construction management for the remediation of contaminated sediments from a 2,300-feet drainage way that were impacted with PCBs and metals.

Senior Project Manager; Blosenski Landfill Superfund Site Design and Construction Support; Blosenski Landfill PRP Group. Design and construction support included value engineering of an existing EPA design; remedial design; capping an eight-acre hillside landfill; excavation, characterization, and disposal of over 500 buried drums; and field construction monitoring.

Senior Project Manager; GIS Development. Conceptualized and developed prototype GIS-based software for retail property management.

Project Engineer; Multi-Layer Synthetic Cap; New Castle, DE. 52-acre, multi-layer synthetic cap, associated E&S control structures, and approximately 350,000 cy of engineered fill.

Project Engineer; Superfund Site Cap and Slurry Wall; New Castle, DE. Design of geosynthetic cap and slurry wall at a top ten Superfund site.

Project Engineer; Sanitary Landfill Expansion Project; Confidential Client. Site characterization, design, and permitting for a proposed 300-acre sanitary landfill expansion project.

Project Engineer; Landfill Conceptual Design and Cost Estimating; Confidential Client; Puerto Rico. Performed conceptual design and construction cost estimating services for two landfills in Puerto Rico.

CHRONOLOGICAL WORK HISTORY:

Senior Project Manager; Tetra Tech, Inc.; Pittsburgh, PA; February 2012 to Present.

Project Manager/Vice President; Thomas Construction, Inc.; January 2008 – October 2011.

Responsible for the environmental remediation division and project management on both civil construction and environmental remediation projects. Managed multiple construction projects simultaneously along with bidding new projects. Instituted GPS surveying and GPS machine control that improved field efficiency and reduced re-work by field crews. Led effort to install computer server and integrated takeoff, estimating, and bidding software. Project management efforts contributed to a 30% increase in gross revenue despite the poor economy.

Senior P roject M anager/Principal; Cummings/Riter Consultants, Inc.; A ugust 1993 – January 2008.
Managed regional office operations for five years and served as Senior Project Manager in Pittsburgh on design and construction projects for industrial clients under RCRA, CERCLA, and PA Act 2 programs. Responsible for managing the investigation, preparing work plans, engineering design, construction documents, contractor procurement, and construction management/construction quality assurance (CQA).

Assistant Project Engineer to Branch Manager/Project Manager; Paul C. Rizzo Associates, Inc.; 1985 – August 1993.
Responsible for solid waste permits and the development and supervision of site characterization and remedial design programs under both RCRA and CERCLA including value engineering and regulatory agency technical negotiations. Managed regional office operations and a staff of eight engineers, geologists, and support staff.

PROFESSIONAL AFFILIATIONS/HONORS:

N/A

PUBLICATIONS/PRESENTATIONS:

N/A

STEPHANIE WARINO, P.G., WV LRS
OPERATIONS MANAGER
FAIRMONT, WV

EDUCATION: B.A.; Geology; The University of Akron, Akron, Ohio; December 2002
M.S.; Geology; The University of Akron; Akron, Ohio; December 2004

CERTIFICATIONS/ REGISTRATIONS: Professional Geologist [Pennsylvania; [redacted] 2010]
Licensed Remediation Specialist [West Virginia; [redacted] 2014]

TRAINING:
- Project Management II Training; December 2009
- Data Quality Objectives Training – Managing Uncertainty with Systematic Planning: Developing Defensible Sample designs for Environmental Decision-Making; September 2009
- Project Management Training – Cash Management and Contract Change Management; August 2009
- OSHA 1910.120 8-Hour Annual General Site Worker and Supervisor Refresher Training; February 2009
- Shipping Hazardous Materials Training; February 2009
- Project Management I Training, October 2008
- OSHA 1910.120(e)(4) Hazardous Waste Operations and Emergency Response Management/Supervisor Training; October 2008
- Innov-X Systems Radiation Safety & Operator Training for Field-Portable XRF Spectrum Analyzers; October 2007
- American Red Cross Standard First Aid Training; September 2007
- American Red Cross CPR/AED Adult Training; September 2007
- OSHA 1910.120 40-Hour HAZWOPER Training; September 2006

EXPERIENCE SUMMARY:

Ms. Warino is the Operations Manager for the Fairmont, WV office. Her responsibilities include resource allocation, budgeting, project oversight, and business development. She has nearly 10 years of experience specializing in environmental site assessment, remediation, and project management. During this time, she has managed and supported projects for oil & gas, mining, commercial, and government sectors, and has been responsible for identifying and conducting work in accordance with the various regulatory programs and guidance governing them. She has experience providing geologic and hydrogeologic technical support including data analysis, interpretation and statistical analyses, and has experience in collecting water, waste, sediment, soil, and air samples, as well as experience in overburden and rock logging and well installation oversight. Ms. Warino leads project planning efforts, including proposals, budgeting, design and execution of field sampling events, and management of subcontractors. Ms. Warino currently manages projects for Oil & Gas clients in West Virginia, and also manages projects for the United States Navy, including underground storage tank (UST) sites, waste disposal (RCRA) sites, and Superfund (CERCLA) sites.

PROJECT EXPERIENCE:

Oil & Gas

AST inspection and certification; Confidential Client; West Virginia; 2014-2015; $750,000. Program manager for West Virginia AST inspections and certifications, and production of SPRP and SPCC plans to comply with recently passed legislation.

AST Inspection and certification, Confidential Client; West Virginia, 2014-2015; $15,000. Project manager for West Virginia AST inspections and certifications, and production of SPR plans to comply with recently passed legislation.

AST Inspection and certification, Confidential Client; West Virginia, 2014-2015; $2,500. Project manager for West Virginia AST inspections and certifications, and production of SPR plans to comply with recently passed legislation.

Geotechnical Investigations for natural gas well pads; Confidential Client; West Virginia; 2013. Evaluated geotechnical boring logs installed for placement of natural gas well pads, access roads, and determination of slope stability. Reviewed geotechnical summary reports detailing results.

Water Management Planning; Multiple Clients; Southwestern Pennsylvania; 2013. Responsible collecting water velocity readings at several surface water sources in support of water management plans for natural gas well locations throughout southwestern Pennsylvania.

Mining

Longwall Mine Permitting. Responsible for collecting surface water and groundwater samples, and collecting water velocity readings at several surface water sources in support of an expansion permit for a subsurface coal mine. Also drafted the hydrogeology section of the permit.

Storage Tank

Project Manager; Long Term Monitoring for UST Sites 3, 9, 11, 13 and SWMU 8 at MCAS Beaufort, Beaufort South Carolina. $338,000; May 2011 to present. Responsible for producing planning documents, oversight of field investigations related to potential groundwater contamination, and reporting.

Project Manager; Well Installation and Sampling for Laurel Bay Military Housing Marine Corps Air Station Beaufort, Beaufort, South Carolina; $250,000; June 2009 to present. Responsible for producing planning documents, oversight of field investigations related to potential groundwater contamination, and reporting for a large UST site at Marine Corps Air Station Beaufort, South Carolina.

Regulatory Compliance/LTM Optimization

Project Manager; Groundwater Monitoring and Reporting for Site 7, Former Burn Pit at U.S. Coast Guard YARD, Baltimore, Maryland; 2011 to present. Manage technical execution for this fixed-price task order to perform quarterly groundwater monitoring and reporting and prepare draft and final reports for each site and each sampling event. Evaluate USCG requirements to properly allocate project resources (Tetra Tech and subcontractors); direct

fieldwork activities; direct report preparation and resolve technical issues impacting project success. Evaluated site data to recommend cost-effective reductions in the sampling program, which was approved by regulatory agencies. These changes resulted in significant cost savings to USCG.

Project Manager; Groundwater Monitoring and Reporting for Former Navy Dispensary and Barracks Release Site (FNDBRS) at U.S. Coast Guard Support Center Elizabeth City (SCEC) Elizabeth City, North Carolina; $150,000; 2008 to 2011. Manage all aspects of technical execution and administration for this fixed-price task order to perform semi-annual groundwater monitoring and reporting and prepare draft and final reports for each site and each sampling event. Evaluate USCG requirements to properly allocate project resources (Tetra Tech and subcontractors); direct fieldwork activities; direct report preparation; and resolve technical issues impacting project success. Ms. Warino recently evaluated historic and current site data to determine appropriate reduction in sampling frequency and analytical program, which was approved by regulatory agencies, resulting in significant cost savings to USCG.

Project Manager; Operation, Maintenance, and Monitoring Program for Operable Unit 3, U.S. Navy, EFANE/CLEAN; Portsmouth Naval Shipyard, Kittery, Maine; $450,000; 2008 to present. Ms. Warino serves as project manager for Post-remedial Operation, Maintenance, and Monitoring (OM&M) for a closed landfill at PNS in USEPA Region I and is responsible for allocation of project resources (Tetra Tech and subcontractors), direction of field activities, and preparation of technical reports. Ms. Warino is responsible for the update to the OM&M Plan data quality objectives, which impact long-term optimization of the sampling plan, and responsible for the update to the O&M Manual. The project also involves the data evaluation, reporting, and recommendation for long-term optimization based on the first nine rounds of monitoring.

Project Manager; Annual Monitoring Report, Naval Industrial Reserve Ordnance Plant Fridley, Fridley, Minnesota; 2006 to present. Responsible for the preparation of annual monitoring reports (AMR) summarizing sampling results of more than one-hundred site groundwater monitoring wells. AMR includes statistical trend analysis for each individual well plus an annual pumping system performance evaluation for one thousand GPM in capacity allocated across three aquifer zones. These evaluations have resulted in occasional reconfiguration of pumping capacity between aquifer zones as necessary to cost-effectively optimize contaminant recovery. Responsibilities include hydrogeological interpretation of a complex glacial drift and bedrock aquifer system and its interaction with the adjacent Mississippi River. Conducted assessments of extent and migration of dissolved contaminants (e.g., long-term data evaluation, trend analysis, plume delineation, etc.), evaluation of the effectiveness of the active pump and treat system for plume containment (e.g., mass flux calculations, analytical/numerical capture zone analysis), and optimization studies for long term monitoring (LTM), long term process optimization (LTO), and in-situ remedy selection and evaluation. Ms. Warino plays a lead role in summarizing these interpretations and representing the client in technical meetings between the federal and state regulatory agencies.

Field Technician; Performance Monitoring Field Sampling and Analysis; NAVFAC Southeast; Dallas, Texas; December 2006. Served as a field technician for sampling activities at NWIRP Dallas. Sampling tasks included measurement of groundwater elevations, well purging, and measurement of field parameters including pH and conductivity during purging. Performed decontamination of equipment per USEPA guidelines, assisted the FOL in sample QA/QC and with sample handling and shipment.

Field Technician; Groundwater Monitoring for Sites 3 and 7, Naval Submarine Base, New London; NAVFAC Atlantic; Groton, Connecticut; October 2006, January 2007. Served as a field technician for quarterly groundwater sampling activities at NSB New London. Sampling tasks included measurement of groundwater elevations, well purging, and measurement of field parameters including pH and conductivity during purging. Performed decontamination of equipment per USEPA guidelines, assisted the FOL in sample QA/QC and with sample handling and shipment.

RI/FS

Task Manager; Conceptual Site Model for Eastern Boundary TCE Plume Site, Clay National Guard Center, Marietta, Georgia; 2012 to present. Responsible for the development of the technical approach and conceptual site model for characterizing this site. The CSM considered routes and pathways of migration, such as movement through soil by leaching, flow through overburden groundwater, potential for flow into and through bedrock, migration to surface water via groundwater, and vapor intrusion. The CSM also considered potential receptors (workers exposed to contaminated soil and groundwater; exposure to volatile organic compounds through VI into existing buildings; exposure to VOCs through VI into future buildings; exposure to contaminants through consumption and/or use of groundwater; and exposure to ecological receptors via the drainage ditch). Development of the conceptual site model document led to identification of data gaps and development of the technical approach to characterize the site.

Task Manager; Remedial Investigation for Skeet Range Soils, Former Naval Air Station Brunswick, Brunswick, Maine; 2011 to present. Responsible for subcontracting, directing field work and completing the RI report. Field activities included sampling and analysis of surface soil (shallow and deep) and subsurface soil at the Skeet Range. The objective of this RI is to collect and evaluate sufficient data to fully characterize Skeet Range soil, including a complete characterization of the nature and extent of contamination. These data will be used to support an interim removal action.

Task Manager/Field Operations Leader; Site 34 Remedial Investigation, Portsmouth Naval Shipyard, Kittery, Maine; 2008 to 2010. Responsible for allocating project resources (Tetra Tech and subcontractors), coordinating and planning field events in support of the RI, and completion of the Data Package.

Task Manager/Field Operations Leader; Site 32 Remedial Investigation, Portsmouth Naval Shipyard, Kittery, Maine; 2008 to 2010. Responsible for completion of the Quality Assurance Project Plan, allocating project resources (Tetra Tech and subcontractors), coordinating and planning field events in support of the RI, and completion of the Data Package.

Project Geologist; OU2 Supplemental RI, Portsmouth Naval Shipyard, Kittery, Maine, 2007 – 2009. Played a role as a member of the Project Team in assembling project materials, historical information, current data, and producing technical assessment and writing for sections of the OU2 Supplemental RI report.

Task Manager/Field Operations Leader /Project Geologist; OU2 Additional Investigation, Portsmouth Naval Shipyard, Kittery, Maine 2007 – 2008. Coordinated and planned a series of field events to support the OU2 Additional Investigation in support of the OU2 Supplemental RI - procured and managed equipment, subcontractors, and personnel. Oversight of personnel

performing drilling, test pitting, monitoring well installation, DPT sampling, groundwater and surface water sampling.

Remediation

Project Manager; U.S. Navy, Naval Facilities Engineering Command Midwest/CLEAN; Remedial Design; $95,000; Naval Station Great Lakes, Illinois; 2010 to Present. Manages the long-term groundwater monitoring activities at a closed landfill (Sites 1 and 4 – Golf Course Landfill and the Fire Fighting Training Unit). Project involves completion of a Remedial Design, which will include a Sampling and Analysis Plan in the Uniform Federal Policy format, a Land Use Control Plan, and an Operations and Maintenance Manual for the landfill cover system.

Project Manager; U.S. Navy, Naval Facilities Engineering Command Mid-Atlantic/CLEAN; Groundwater Extraction System Design; Naval Industrial Reserve Ordnance Plant Fridley, Minnesota; 2010 - Present. Performed hydrogeologic analysis for pump-and-treat groundwater extraction system and designed new extraction wells to capture TCE plume. Involves analysis of the existing pumping system and its impact on the flow dynamics of a complex glacial outwash aquifer.

Project Geologist; NSA Mechanicsburg, Site 9 Stormwater Drainage Ditch; April 2007 – March 2009. Organized and performed sample collection in field events to support remediation evaluation, procured and managed equipment and field personnel, performed a lead role in technical interpretation and presentation of results in technical memo format.

Geoscientist; KARS Park I Pre-Pilot Study Report; NASA; Cape Canaveral, Florida; December 2006. Assisted in writing the PPS Report, assembling field data, figures, tables, and attachments to report, and assembling report for deliverable to client.

Field Technician; KARS Park I Pre-Pilot Study Phase IV; NASA; Cape Canaveral, Florida; November 2006. Served as a field technician for soil sampling activities at KARS Park I. Sampling tasks included collection of sediments by hand auguring. Samples collected within each defined sampling grid were then composited and packed according to US EPA standards and protocols. Performed decontamination of equipment per USEPA guidelines, assisted the FOL in sample QA/QC and with sample handling and shipment.

Site Assessments

Project Manager; Confirmatory Sampling for SWMU 76, 86, 87 and AOC P – Marine Corps Air Station Beaufort; Beaufort South Carolina; $381, 000; March 2011 to present. Responsible for the confirmatory sampling phase of RCRA corrective actions at the sites, including producing planning documents, conducting field work, and preparation of Confirmatory Sampling Report at Marine Corps Air Station Beaufort, Beaufort, South Carolina.

Task Manager; Interim Measures Groundwater Monitoring at SWMUs 16, 17, 66, 67, 68, 69, 72, 73, and 77 – Joint Base Charleston, Charleston, South Carolina; 2011. Successfully directed subcontracting, field work, and reporting for multiple sites within a very tight schedule. Soil and groundwater samples collected during multiple investigations indicated exceedances in the respective groundwater cleanup target levels and soil cleanup target levels for volatile organic compounds (VOCs), semivolatile compounds (SVOCs), metals, pesticides, and polychlorinated biphenyls (PCBs). The first objective was to gather interim monitoring data, as

compared to the Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFIs) for SWMUs 16 and 17 (Tetra Tech, 2006). The second objective was to install permanent monitoring wells in order to gather definitive delineation data such that the plumes are bound and a long-term monitoring strategy could be developed for all the subject IM SWMUs.

Project Manager; Confirmatory Sampling for SWMU 85 – Automotive Parts Debris Piles; Marine Corps Air Station Beaufort; Beaufort South Carolina; $75,000; June 2009 to July 2010. Responsible for the confirmatory sampling phase of a RCRA corrective action, including producing planning documents, conducting field work, and preparation of a Confirmatory Sampling Report at Marine Corps Air Station Beaufort, Beaufort, South Carolina.

Geoscientist; Phase I Environmental Site Assessments; Rayonier; New York, Texas, and Oklahoma; September 2006 to October 2006. Compiled field observations for writing reports and prepared mapping for the Phase I Environmental Assessments for individual selected sites in New York, Texas, and Oklahoma. Compiled and wrote hydrogeologic and topographic sections for the regional portions of the reports.

CHRONOLOGICAL WORK HISTORY:

Operations Manager; Tetra Tech, Inc.; Fairmont, WV, June 2014 – Present.

Deputy Operations Manager; Tetra Tech, Inc.; Fairmont, WV, October 2013 – June 2014.

Geoscientist; Tetra Tech, Inc.; Pittsburgh, Pennsylvania, and Fairmont, WV, September 2006 – October 2013.

Geotechnician II; Moody and Associates; Houston, Pennsylvania; May 2005 to September 2006.

JAMES D. COFFMAN
GEOPHYSICIST/GEOLOGIST
Pittsburgh, Pennsylvania

EDUCATION: University of Akron, Akron, OH, M.S. Geophysics, 1997

Edinboro University of Pennsylvania, Edinboro, PA, B.S. Geology, 1995, Graduation with Honors: Cum Laude

TRAINING: OSHA 1910.120 40 hr HAZWOPER

OSHA 1910 HAZWOPER 8-hour refresher courses annually

American Red Cross Adult 1st Aid / CPR (2010)

EXPERIENCE SUMMARY:

Mr. Coffman has 16 years of experience leading, performing, and interpreting results for hundreds of surface and borehole geophysical surveys. His experience in environmental geophysics is comprehensive, having routinely performed geophysical investigations from inception to completion (from client call, through proposal and survey, to report preparation). His geophysical concentration has been in surveys using electromagnetics (EM), ground penetrating radar (GPR), magnetics, seismic refraction, electrical resistivity, borehole geophysics, and utility location equipment. Geophysical targets have included UXO, landfill and disposal boundaries, buried drums, contaminant plumes, top of rock and rock fractures, voids, artifacts, underground storage tanks (USTs), septic tanks, and underground utilities among others. Mr. Coffman served as the New York City Area Office Manager for Hager-Richter Geoscience, Inc., while also serving as project manager, crew leader, and data interpreter for geophysical surveys. Mr. Coffman has 3 years of experience performing environmental media sampling and geological investigations, including drilling and monitoring well installation, stream flow surveys, and soil and water testing.

PROJECT EXPERIENCE

UXO GEOPHYSICS

Project Geophysicist; UXO Characterization of 19 Housing-subdivision Lots; D.R. Horton – Myrtle Beach, SC; Summer, 2013. Processed and interpreted all geophysical data, and summarized results in a client Report.

Project Geophysicist; UXO Remedial Investigation at 2 Sites; NAVFAC Southeast – NAS Jacksonville; MCAS Beaufort, SC; January, 2013. Performed geophysical surveys using EM31 and G-858G instruments at two sites to locate possible UXO. Processed and interpreted all geophysical data, and summarized the geophysical results in a report submitted to the Client.

Project Geophysicist; UXO Remedial Investigation at 3 Sites; NAVFAC Southeast – NAS Jacksonville; MCRD Parris Island, SC; June-August, November-December 2012, April, 2013. Performed geophysical surveys using G-858G magnetometer and EM61 instruments to

locate UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO RCRA Facility Investigation at 1 Site; NAVFAC Southeast; NAPR Ceiba, P.R.; September 2012. Performed geophysical surveys using EM61 (standard and hand-held models) to locate possible UXO and delineate potential disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 1 Site; NAVFAC Southeast – NAS Jacksonville; NAS Pensacola, FL; June 2012. Performed geophysical survey using G-858G instrument to reacquire anomalies possibly representing UXO. Summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 4 Sites; NAVFAC Washington; MCB Quantico, VA; February and March 2012. Performed geophysical surveys using EM61 and G-858G instruments at four sites to locate possible UXO. Processed and interpreted all geophysical data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Remedial Investigation at 1 Site; NAVFAC – NAS Jacksonville; NALF Cabaniss, TX; May-June 2011. Performed geophysical surveys using G-858G magnetometer, EM61, and EM31 instruments to locate possible UXO and delineate a sanitary landfill. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 9 Sites; NAVFAC Mid-Atlantic; NAES Lakehurst, NJ; November 2010. Provided technical oversight for geophysical reporting and surveys using EM61 and G-858G instruments at nine sites to locate possible UXO.

Project Geophysicist; UXO Site Inspection at 1 Site; NAVFAC – NAS Jacksonville; NAS Pensacola, FL; March 2010. Performed geophysical survey using G-858G instrument to locate possible UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 2 Sites; NAVFAC Southeast; MCAS Beaufort, SC; February 2010. Performed geophysical surveys using EM31 and G-858G instruments at two sites to locate possible UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 5 Sites; NAVFAC Southeast; MCRD Parris Island, SC; January - February 2010. Performed geophysical surveys using EM61, G-858G and SeaSPY (aquatic) instruments at five sites to locate possible terrestrial and underwater UXO. Processed and interpreted data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 6 Sites; NAVFAC Washington; NSF Indian Head, MD; December 2009 - January 2010. Performed geophysical surveys using EM61 and

G-858G instruments at six sites to locate possible UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 3 Sites; NAVFAC Mid-Atlantic; NAS Brunswick, ME; July-August 2008. Performed geophysical surveys using an EM61 and a multi-frequency EM instrument at three sites to locate possible UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; UXO Site Inspection at 3 Sites; NAVFAC Southwest; NWS Concord, CA; May-June 2008. Provided technical review of EM61 geophysical data and reporting for three sites, where targets included potential UXO.

Project Geophysicist; UXO Site Inspection at 3 Sites; NAVFAC Washington; NDW Solomons Complex, MD; October, 2007. Performed geophysical surveys using EM61 and G-858G instruments at three sites to locate possible UXO. Processed and interpreted all data, and summarized the geophysical results in a client Report.

GEOPHYSICS

QA Geophysicist; Industrial Facility Borehole Geophysical Investigation at 1 Site; PPG; Barberton, OH; July, 2013. Provided technical data review for borehole geophysical sonic and caliper logs for a well abandonment project.

Project Geophysicist; Disposal Area Investigation at 1 Site; NAVFAC Mid-Atlantic; Former NCBC Davisville, RI; June, 2013. Performed a geophysical survey using multi-frequency EM and GPR to locate drum disposal areas that were confirmed by follow-up removal operations. Processed and interpreted all data, and summarized the geophysical results in a client Report.

QA Geophysicist; Ammunition Disposal Geophysical Investigation at 1 Site; Native-American Society; Indian Township, ME; May, 2013. Provided technical data review of geophysical survey report, including EM and GPR methods in an investigation for possible ammunition disposal.

Project Geophysicist; Utility Locating Investigation at 1 Site; Seneca Resources; Williamsport, PA; March 2013. Performed geophysical survey using EM, and pipe locator instruments to locate a small network of natural gas utilities to support new construction. Processed and interpreted all data, and summarized the geophysical results on figure and by marking utilities in the field.

Project Geophysicist; UST Investigation at 1 Site; NAVFAC EFD South; NSA Crane; January 2013. Performed a geophysical survey using EM61 and GPR instruments to locate a probable UST grave matching a former UST location. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; BRAC Investigation at 9 Sites; NAVFAC Mid-Atlantic; NAS Brunswick, ME; November/December 2012. Performed geophysical surveys using multi-frequency EM, GPR, and magnetometer instruments to locate possible buried former building features, drums, and disposal areas. Processed and interpreted all data, and summarized the geophysical results for inclusion in a client Report.

Project Geophysicist; Utility Locating Investigation at 1 Site; NAVFAC Southeast; Orlando, FL; April 2012. Performed geophysical survey using GPR, EM, and pipe locator instruments to locate utilities for a proposed infiltration gallery remediation system. Processed and interpreted all data, and summarized the geophysical results on figure.

Project Geophysicist; Landfill Delineation Investigation at 1 Site; NAVFAC SE; NCBC Gulfport, MS; March, 2012. Performed a geophysical survey using EM31 and G-858G instruments to delineate a landfill. Processed and interpreted all data, and summarized the geophysical results in a client Report.

QA Geophysicist; Bedrock Geophysical Investigation at 1 Superfund Site; EPA Region 4; Catawba, SC; February, 2012. Provided technical oversight for geophysical surveys using seismic refraction and multi-frequency EM methods at one site to determine depth to bedrock, and search for electrically conductive features at the site.

Project Geophysicist; Landfill Investigation at 1 Site; NAVFAC Southeast; Joint Base Charleston, SC; January, 2012. Performed a geophysical survey using a multi-frequency electromagnetic instrument to locate landfill boundary. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; BRAC Investigation at 2 Sites; NAVFAC Mid-Atlantic; NAS Brunswick, ME; October 2011. Performed geophysical surveys using EM31, GPR, and magnetometer instruments to locate buried; landfill, slurry walls, and a former acid/caustic pit. Processed and interpreted all data, and summarized the geophysical results for inclusion in a client Report.

Project Geophysicist; Investigation at 1 Site; Confidential Client; New Martinsville, WV; October 2011. Performed time critical geophysical surveys using EM31, EM61, and GPR instruments to search for possible buried drums in a landfill. Processed and interpreted all data, and summarized the geophysical results for construction support and inclusion in a client Report.

Project Geophysicist; Utility Locating Investigation at 5 Sites; NAVFAC Washington; Indian Head, MD; September 2011. Performed geophysical surveys using GPR and pipe locator instruments to locate utilities for proposed borings. Processed and interpreted all data, and summarized the geophysical results for reporting.

Project Geophysicist; Utility Locating Investigation at 2 Sites; PPG; Jersey City, NJ; June-July 2011. Performed geophysical surveys using GPR and pipe locator instruments to

locate utilities for proposed borings. Processed and interpreted all data, and summarized the geophysical results for reporting.

Project Geophysicist; UST Investigation at 1 Site; Unimart; Clearfield, PA; May 2011. Performed a geophysical survey using EM61 and magnetic locator instruments to search for possible USTs. Processed and interpreted all data, and summarized the geophysical results for inclusion in a report.

Project Geophysicist; Disposal Area Investigation at 1 Site; NAVFAC Mid-Atlantic; Former NCBC Davisville, RI; April, 2011. Performed a geophysical survey using EM31, G-858G magnetometer, and GPR to locate a large disposal area. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; BRAC Investigation at 3 Sites; NAVFAC Mid-Atlantic; NAS Brunswick, ME; March 2011. Performed geophysical surveys using EM31, GPR, and magnetic locator instruments to locate possible underground; cesspools, drums, a leach field, and a dry well grave matching a former dry well location. Processed and interpreted all data, and summarized the geophysical results for inclusion in a client Report.

Project Geophysicist; Landfill Delineation Investigation at 1 Site; NAVFAC SE; NCBC Gulfport, MS; January-February, 2011. Performed a geophysical survey using EM31 and G-858G instruments to delineate a landfill. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Mining Investigation at 2 Sites; State of Virginia, Wise County, VA; December 2010. Performed GPR survey to search for potential mine openings (spaces). Processed and interpreted all data, and summarized results for inclusion in a report.

Project Geophysicist; Utility Locating Investigation at 2 Sites; NAVFAC - NAS Jacksonville; NAS Key West, FL; October 2010. Performed geophysical surveys using EM61, GPR, and pipe locator instruments at two sites to locate utilities for proposed borings. Processed and interpreted all data, and summarized the geophysical results on figures.

Project Geophysicist; UST Investigation at 1 Site; NAVFAC Mid-Atlantic; NAS Brunswick, ME; October 2010. Performed a geophysical survey using EM31 and GPR instruments to locate a possible UST and buried former building foundation boundaries. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Mining Investigation at 2 Sites; South Fayette Township; South Fayette, PA; September 2010. Performed a geophysical survey using a multi-frequency EM instrument to help locate possible bedrock fractures related to stream water loss. Processed and interpreted all data, and summarized the geophysical results on figures and in a brief narrative.

Project Geophysicist; Disposal Area Investigation at 1 Site; USDA; Beltsville, MD; March and June, 2010. Performed a geophysical survey using EM31 and electrical resistivity to locate

possible disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Landfill Delineation Investigation at 1 Site; NAVFAC Washington; NSF Indian Head, MD; December 2009. Performed geophysical surveys using EM31 and electrical resistivity instruments to help locate horizontal and vertical boundaries of a former landfill. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Utility Locating Investigation at 3 Sites; NAVFAC - NAS Jacksonville; NAS Key West, FL; October-November 2009. Performed geophysical surveys using EM61, GPR, and pipe locator instruments at two sites to locate utilities for proposed borings. Performed geophysical survey using EM61, GPR, and pipe locator instruments at one site to locate a possible UST. Processed and interpreted all data, and summarized the geophysical results on figures.

Project Geophysicist; UST Investigation at 1 Site; NAVFAC EFD South; NSA Crane; July 2009. Performed a geophysical survey using EM61 and GPR instruments to locate a UST. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Utility Locating Investigation at 4 Sites; NSF; Indian Head, MD; May 2009. Performed geophysical surveys using EM31, GPR, and pipe locator instruments at four sites to locate utilities for proposed borings. Processed and interpreted all data, and summarized the geophysical results on figures and in a brief narrative.

Project Geophysicist; Disposal Area Investigation at One Site; NAVFAC Southeast; NWS Charleston, SC; May, 2009. Performed a geophysical survey using EM38 and EM31 to locate possible disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Utility Locating Investigation at 2 Sites; NSF; Indian Head, MD; February 2009. Performed geophysical surveys using EM61, GPR, and pipe locator instruments to locate utilities for proposed borings and excavations. Processed and interpreted all data, and summarized the geophysical results on figures.

Project Geophysicist; Utility Locating Investigation at 1 Site; USCG; Indian River, DE; February 2009. Performed geophysical surveys using GPR and a pipe locator instrument around proposed boring locations to locate possible utilities. Processed and interpreted all data, and summarized the geophysical results on figures.

Project Geophysicist; UST Investigation at 1 Site; Fort Sheridan, IL; September 2008. Performed a geophysical survey using an EM31 instrument to locate a possible UST and other former site features. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Disposal Area Investigation at 2 Sites; Naval Station Great Lakes, IL; September 2008. Performed geophysical surveys using EM31 and GPR instruments at two sites to locate possible large disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Disposal Area Investigation at 1 Site; USDA; Beltsville, MD; April, 2008. Performed a geophysical survey using EM31 to locate possible drum caches/large disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Disposal Area Investigation at 2 Sites; NAVFAC SE; NCBC Gulfport, MS; January, 2008. Performed geophysical surveys using EM31 and G-858G instruments at two sites to locate possible drum caches/large disposal areas. Processed and interpreted all data, and summarized the geophysical results in a client Report.

Project Geophysicist; Utility Locating Investigation at 6 Sites; USCG; Baltimore Yard, MD; October/November 2007, September 2008, February, April, September, and October 2009, April, July, and August 2010, and November 2011. Performed geophysical surveys using EM61, GPR, and pipe locator instruments at six sites to locate utilities for proposed borings and excavations. Processed and interpreted all data, and summarized the geophysical results on figures.

Project Geophysicist; UST Investigation at 1 Site; NAVFAC SE; MCAS Beaufort, SC; August, 2007. Performed an EM61 and GPR survey to locate possible USTs and related piping in a 400 ft by 400 ft survey area. Also, performed a GPR survey to locate a potential UST transmission pipeline along about 2,000 feet of alignment. Afterwards, performed shallow groundwater sampling at approximately 25 locations in the UST search area. Processed and interpreted all geophysical data, and summarized the geophysical results in a client Report.

GEOLOGY

Stream Flow Measurements at 1 location; Noble Energy; Jefferson Run, WV; May, 2014. Performed stream flow and depth measurements in Middle Island Creek to provide stream flow monitoring.

Soil Sampler (Direct-Push Technology or DPT); Soil Delineation Investigation at 2 Sites; NSA Crane, Crane, IN; May 2014.

Groundwater Sampler; Long-Term Monitoring Event at 3 Sites; PPG, Circleville, OH; May, 2014. Part of 2-person crew sampling groundwater in approximately 20 monitoring wells using peristaltic pumps.

Soil Conductivity Testing Study at 4 locations; Range Resources; Washington County, PA; April, 2014. Performed in-situ soil measurements, and summarized results in a brief letter report.

Soil Infiltration Testing Study at 2 locations; Energy Corporation of America and Markwest; Greene and Westmoreland Counties, PA; April, 2014. Double-ring and Percolation tests performed in accordance with PADEP specifications. Summarized results in brief letter reports.

Groundwater Sampler; Long-Term Monitoring Event at 1 Site; NAVFAC Midwest; Naval Station Great Lakes, IL; March, 2014. Part of 2-person crew sampling groundwater in 10 monitoring wells using peristaltic pumps.

River Staff Gauge Installation and Stream Flow Measurements at 2 locations; Rex Energy; Butler County, PA; January, 2014. Installed river gauges and performed stream flow and depth measurements in Glade Run to provide stream flow monitoring.

Borehole and Monitoring Well Installation Oversight Geologist (DPT/Hollow-stem augering and air-rotary drilling); Phase II Follow-up Investigation at industrial facility, Johnstown, PA; **December 2013 and January 2014**. Also performed preliminary geophysical surveys for utility clearance and to map possible bedrock surface to aid in siting monitoring well locations.

Soil and Storm Sewer Sampler; BRAC Investigation at former petroleum farm; NAVFAC Mid-Atlantic; NAS Brunswick, ME; November, 2013.

Soil and Groundwater Sampler; BRAC Investigation at 9 Waste Disposal Sites; NAVFAC Mid-Atlantic; NAS Brunswick, ME; October, 2013.

Surface Water and Groundwater Sampler; Pre-drill Sampling Investigation at several residential and commercial sites; Gulfport Energy, Belmont County, OH; September, 2013.

River Staff Gauge Installation and Stream Flow Measurements at 2 locations; Noble Energy; West Finley, PA; June, 2013. Installed river gauges and performed stream flow and depth measurements in Robinson Fork to provide stream flow monitoring.

Soil/Sediment/Surface Water Sampler; Remedial Investigation at 2 UXO Sites; NAVFAC Southeast – NAS Jacksonville; MCAS Beaufort, SC; January, 2013.

Soil/Sediment Sampler; Corrective Measures Study at 1 Site; NAVFAC Southeast; former NWS Charleston, SC; October, 2012.

Soil Sampler; Site Inspection at 3 Bases; NAVFAC Southeast – NAS Jacksonville; NAS Pensacola, FL; May, 2012.

Groundwater Sampler; Long-Term Monitoring Event at 1 Site; NAVFAC Washington; MCB Quantico, VA; October, 2011. Part of 2-person crew sampling groundwater in approximately 20 monitoring wells using peristaltic pumps.

Stream Flow Measurements; Baseline Study at 1 location; Range Resources; Houston, PA; September, 2011. Performed stream flow and depth measurements in Chartiers Creek to provide stream flow monitoring.

Groundwater Sampler; Long-Term Monitoring Event at Multiple Sites; NAVFAC SE; MCLB Albany, GA; June, 2011. Part of 4-person crew sampling groundwater in approximately 80 monitoring wells using bladder pumps.

Soil Sampler; Remediation at 1 Site; USCG Baltimore; USCG Baltimore Yard, MD; 2009.

Soil Sampler; Site Inspection at 1 Site; NAVFAC Mid-Atlantic; Camp Lejeune, NC; 2009.

Groundwater Sampler; UST Investigation at 1 Site; NAVFAC SE; MCAS Beaufort, SC; August, 2007. Sampled groundwater in approximately 25 wells using a peristaltic pump.

CHRONOLOGICAL WORK HISTORY:

Geophysicist/Geologist: Tetra Tech, Inc., Pittsburgh, PA, June 2007 to Present. Mr. Coffman plans, performs and oversees environmental geophysical (subsurface) and geological projects focusing in particular on cleanup programs at military sites.

Geophysicist: Geophysical Applications, Inc. 215 Hopping Brook Road, Holliston, MA, July 2005 to June 2007. Project manager, crew leader and data interpreter for shallow subsurface investigations in a wide variety of environmental and engineering applications using seismic refraction (equipment operator/data processor), GPR, electromagnetics, magnetics, borehole geophysics and utility location equipment. Targets of the investigations included: landfill boundaries, buried drums, rock fractures/flow, bedrock surface, underground storage/septic tanks, and utilities. Worked directly with engineers and environmental professionals on a regular basis in project work and in renting geophysical equipment to our customers.

Geophysicist and NJ Office Manager: Hager-Richter Geoscience, Inc. - 8 Industrial Way, D-10, Salem, NH and 417 Berkeley Avenue, Orange, NJ, May 1998 – May 2005. New York City Area Office Manager, project manager, crew leader and data interpreter for a large environmental geophysics consulting service firm. Planned, managed, and implemented shallow subsurface investigations in a wide variety of environmental and engineering applications using seismic refraction (equipment operator), GPR, electrical resistivity, electromagnetics, magnetics, borehole geophysics and utility location equipment. Targets of the investigations included: landfill boundaries, buried drums, contaminant plumes, underground storage/septic tanks, bedrock surface, utilities, voids, artifacts, and rock fractures/flow among others. Worked with hundreds of environmental professionals, and on large engineering projects such as the 2nd Avenue and Number 7 Line subway tunneling projects in New York City.

PROFESSIONAL AFFILIATIONS:

Member, Environmental and Engineering Geophysical Society (13 years).

SPECIFIC JOB SKILLS:

Proficient in AutoCADLT for creating geophysical report figures (scaled plan maps), spreadsheets, word processors, Windows, DOS, Geosoft (Oasis montaj), Surfer, Grapher, SIP, EchoMapper, RADAN, WellCAD, DAT3IW, DAT 61W, MagMap, Res 2D and RESIX.

Expert geophysics operator / data interpreter of: GPR (Noggin Smart Cart and SIR3000), EM61, EM31, G856 and G858 magnetometers, Sting - Swift and IRIS Elrec T electrical resistivity meters, RD 4000 pipe and cable locator, MGX II borehole logging system using acoustic televiewer, HPFM, fluid temperature and resistivity, caliper, poly-gamma (natural gamma/SP/SPR), EM and normal resistivity (poly-electric) tools, and a Geovision downhole video camera. Experienced with seismic refraction and cross-hole seismic (Geometrics, ABEM and Bison seismographs, and accelerated weight drop seismic sources), EM34, EM38, VLF (Wadi), EMP-400, GEM 2 and SeaSPY marine magnetometer.

C. JAY SANTA

Construction Manager

EXPERIENCE SUMMARY

Mr. Santa has more than 20 years of experience performing construction project and site management, the last three years for Marcellus Shale projects. His experience includes large earth moving projects, superfund site remediation, landfill construction and closure, utility installation and pipe work, soil remediation, water management and groundwater barrier construction.

EDUCATION

- BS, Earth and Mineral Science

YEARS EXPERIENCE

20

REGISTRATIONS & TRAINING

- USACE Construction Quality Management Training
- OSHA 30-Hr. Construction Safety and Health Training

RELEVANT PROJECT EXPERIENCE

Construction Manager; Marcellus Shale Well Pad Permitting, Design and Construction Services; Confidential Client; North Central, PA. Evaluating constructability of existing terrain and designs for five drill pad sites and 15 million gallon impoundment. Review including wetlands delineation, constructabiltiy, access roads, transportation review and permitting, well pad permitting, ESCGP-1 planning and permitting.

Construction Manager; Marcellus Shale Well Pad Design and Construction Services; Confidential Client; Southwestern, PA. Evaluating constructability of existing E&S plans and designs for four drill pad sites. As a result of this evaluation we were able to make revisions to save substantial cost and reduce schedule through cut/fill balancing, material selection and other modifications. Interaction with PADEP staff on behalf of client regarding field adjustments and expedited approvals. Development of bid documents associated with drill pad construction and recommending contractors based on bid evaluation. Oversight of construction at four drill pad sites for erosion and sediment controls installation, mass earthwork and grading, installation of surface drainage, installation of infrastructure, onsite aggregate evaluation, and revegetation restoration to meet DEP standards.

Business Development Manager; Remediation and Construction Services. Responsibilities include marketing and business development for existing client base and identifying and marketing new clients. Acts as client, project or program manager for new opportunities based on client requests. Executes projects from cradle to grave with safety and performance in mind. Identifies new opportunities, prepares technical scopes and detailed cost proposals, manages all aspects of construction projects including fiscal and technical requirements. Interacts with client from inception to project closeout to ensure project is being conducted to meet client goals.

Construction Manager; New Martinsville Design Build Landfill Closure; Bayer; New Martinsville WV. Key member of the team to successfully and competitively bid the design build of an 8-acre soil cap to close and hazardous waste landfill and ash pond. Project consists of mass earthwork, geomembrane cap, cover soil, dewatering, and miscellaneous groundwater management and collection.

Construction Manager; Building Demolition; Confidential Client; Boston, MA. Demolition of a 5800 sf light industrial building and remediation of subsurface soils. Awarded several modifications to contract based on exemplary performance of field activities.

Larry N. Deutsch

Construction Superintendent

EXPERIENCE SUMMARY

Mr. Deutsch has spent more than 41 years working in the geotechnical, civil, environmental and steel industries. His areas of expertise include engineering, construction, mining and trades, energy/utilities, environmental services, project/program management, QA, and health and safety.

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PROJECT EXPERIENCE:

Lead Construction Superintendent; Closed Loop HDPE Waterline System, Noble Energy, Cameron, WV, 2012-2015. Serving as the Lead Construction Superintendent through installation of over 43 miles of waterline, servicing all Marcellus Gas Drill Pads for Noble Energy, this project is still under construction. The waterline construction consist of 12" & 16" HDPE DR7 pipes including CL 300 series valves, air reliefs and ancillary equipment through rough terrain and steep grades. To date, the system has been under operation to supply fresh water to several well pads during fracking operations and return production water for future fracs. Responsibilities as Lead for this project include managing multiple inspectors, contractor compliance, scheduling, and adherence to specifications, E&S controls, Hydro Testing, client communications and meetings, assisting Noble Water Coordinators, Engineering and Equipment Managers during proposed construction, new installations; frac stages, safety and "as-built" records.

EDUCATION

Coursework; Advanced Mathematics; University of Pittsburgh; 1980 – 1981

YEARS EXPERIENCE

41-Geotech & Environmental Engineering Fields Combined

11-Geotech & Environmental Drilling

4-Steel Industry

REGISTRATIONS & TRAINING

- OSHA 30-Hr. Construction Safety and Health Training
- OSHA 40-Hr. HAZWOPER
- Excavation-Competent Person Certification
- SafeLand USA Certified
- 2015 Noble Energy Safety
- MSHA 24-hour
- 2015 CNX Safety-ENV & GAS

Construction Superintendent; Permeable Reactive Barriers, NAVFAC Clean Program, Marine Corps Base Camp Lejeune, Jacksonville, NC. Mr. Deutsch served as the Tetra Tech contractor construction superintendent during the installation of two permeable reactive barriers. The barriers were constructed using one-pass technology to a depth of 37 feet and filled with a design media to remediate ground water contamination of volatile organic compounds (VOC's). The project was successfully completed under schedule and budget and continues to operate.

Construction Superintendent; RCRA Landfill Remediation, Bayer MaterialScience, New Martinsville, WV 2011-2012. Serving as the lead Construction Superintendent through design and implementation of an 8-acre RCRA Landfill Capping System, this project started design in 2011 with the construction of the approved remedy completed in April of 2012. The project consisted of approximately 14,000 cubic yards of waste excavation and consolidation, slurry stabilization using Calciment and the installation of a 40 mil textured HDPE liner system including geotextile and geocomposite layers; and a groundwater extraction and recovery well system. The 8-acre site closure was comprised of four (4) solid waste management units (SMWU's) including a 4-acre Landfill (SWMU 1), 2-acre Sludge Lagoon (SWMU 2), the 24 ft. by 36 ft. concrete Hydro Blasting Station (SWMU 3), and 1-acre Ash Lagoon (SWMU 4). During

the design phase of the project, I assisted the Project Engineer with design and the Construction Manager with contract negotiations and subcontracting. Authored the Construction Completion Report for submittal to WVDEP, USDEP and the USACE.

Construction Manager; Utilities Process Control Automation; Weirton Steel; Weirton, WV; February 1997 – November 1997. Responsible for the installation of all process instrumentation and upgrades to Weirton Steel's utilities process, including coordination of start-up and commissioning of seven high pressure boilers, two turbo blowers, four turbine generators, four air compressors, two desuperheaters, and one boiler feed water pump. Additionally, he managed ICF Kaiser's project site management team through construction at the BOP, boiler house, power house, blowing rooms and Foster Wheeler. Mr. Deutsch was responsible for the coordination of multiple sub-contractors and their adherence to the project's specifications, engineering design drawings and safety. Also provided daily documentation of construction activities and manpower; conducted and authored the daily construction meeting minutes; and tracked the projects scheduling, budget and change orders.

Construction Manager; Gas Isolation Valve Installation and Maintenance on No. 3 Blast Furnace; AK Steel; Middletown, OH; July 1996 – January 1997. Responsible for the implementation of the electrical subcontract to provide the power distribution, PLC, UPS, and computer monitoring systems for 11 gas isolation valves ranging in size from 36 inches to 96 inches in diameter. Mr. Deutsch assisted in the supervision of direct hire labor crafts consisting of laborers, pipefitters, boilermakers, ironworkers, carpenters and operators for ICF Kaiser's construction company, Henry J. Kaiser, during the installation of the valves. In preparation for this project, Mr. Deutsch played a major role as office manager, while opening the Henry J. Kaiser Construction Company office and setting up accounts with local vendors and suppliers. This project was scheduled for 4-1/2 months of pre-outage construction and an eleven day outage. The project was completed ahead of schedule and under budget. As a result of this effort, ICF Kaiser was awarded the yearly maintenance contract for AK Steel's No. 3 Blast Furnace and Basic Oxygen Facility.

Construction Manager; Coke Plant New Treatment Plant Utilities Process Distribution System; AK Steel; Ashland, KY; July 1995 – December 1995. Responsible for the contract administration of the electrical, mechanical and structural sub-contractor to install over 10,000 lineal feet of process piping and electrical substation for an anaerobic treatment plant which was being constructed simultaneously by others. The process piping consisted of ammonia liquor, natural gas, coke gas, cooling water, river water and low and high pressure steam. Due to unknown physical constraints and an expedited construction schedule which was set to meet dates set by the regulatory agencies, Mr. Deutsch was responsible for restructuring this project from a conventional engineer/design/construct concept to a design/build phase. As a result, he controlled engineering in the field while construction was ongoing. New techniques for underground piping installation were implemented and a 30 feet high structural pipe rack system was reduced to a low profile sleeper system. The project was completed under budget and on schedule.

Construction Manager; Lake Dorothy Dam Renovation; PPG; Barberton, OH; April 1994 – October 1994. Responsible for the coordination of contractor work schedules, construction, approval of contractor payment applications and change orders, approval of construction modifications, and coordinated the project's QA/QC program. This project was constructed using Roller Compacted Concrete (RCC), a relatively new engineering design application at the time. It was the first dam in the state of Ohio to use RCC, which gave it high visibility for the regulatory agencies involved. This project was successfully completed

under budget. Upon completion of this project, Mr. Deutsch authored a technical paper entitled "Compliance with New Design Storm Requirements using Roller Compacted Concrete," which was presented at ICF Kaiser's First Annual Technical Conference in Denver, the Society of Military Engineers (SAME) in Tennessee, the Water Management Association Officers (WMAO) Annual Meeting in Columbus, Ohio, and the 1995 Annual Conference for the American Society of Dam Safety Officers (ASDSO) in Atlanta, Georgia.

Construction Manager; Tri-County Commerce Park; New Sewickley Township; Cranberry, PA. Responsibilities included coordination of all ICF Kaiser site personnel while also coordinating contractor and subcontractor schedules and activities. Mr. Deutsch prepared the construction documents including contracts, bid documents, and related specifications. He conducted the pre-bid, pre-construction and weekly progress meetings and assisted the senior project manager in the management of a $1.4 million state B.I.D. grant. The contracted work included three phases: Phase I - Site Work (consisting of over 250,000 cubic yards of earthwork, construction of two access roads, and the installation of all site utilities); Phase II - Off-Site Waterline (consisting of the installation of over 1.3 miles of 12" D.I.P waterline through two counties to service the site); and Phase III - Sewage Treatment Plant (consisting of a 50,000 gallons/day package treatment plant, with an expansion capacity of 150,000 gal./day and a 768 sf control building with equipped laboratory for required NPDES testing).

Construction Manager; Washington's Landing, Herr's Island, Urban Redevelopment Authority, Pittsburgh, PA. Responsible for the management, oversight and coordination of ICF Kaiser's on-site staff and contractors. Monitored and inspected the installation of a double-lined synthetic RCRA encapsulation cell with leachate collection and leak detection systems to meet requirements as set forth by the Pennsylvania Department of Environmental Resources (PADER). This cell consisted of approximately 90,000 sq. ft. of high density polyethylene (HDPE), which was designed to hold an estimated 15,000 cubic yards of PCB-contaminated soils and building debris that was later modified to accept an additional 3,000 cy. Guided the contractor in the excavation and removal of 18,000 cy of these contaminated soils and debris that were then placed into the cell. Other responsibilities included assisting the client in conducting weekly progress meetings and the preparation of the contractor's monthly payment applications. This project was completed in the spring of 1990 and since its completion, the site has been developed with condominiums, tennis courts and equipment manufacturing, parks recreational boating wharfs and offices, which include the PADER.

Section D: Project Descriptions

Relevant Project Experience

Over the next several pages, we have included project descriptions to supplement our proposal. These project examples provide detailed descriptions of some of our recent work performed.

TETRA TECH

Bayer New Martinsville Remediation

KEY FEATURES

- RCRA corrective action
- Design-build
- Design under fast-track conditions
- Project construction completed in 2012

CLIENT

Bayer

LOCATION

New Martinsville, WV

PROJECT DESCRIPTION

Tetra Tech was selected by Bayer in 2011 to complete the South End Remediation design-build RCRA Corrective Action project in New Martinsville, West Virginia. The South End Remedition Project encompassed closure of Solid Waste Management Unit (SWMU) Group A by capping plus the installation of recovery wells for the purpose of enhancing hydraulic containment of sitewide groundwater. Solid Waste Management Unit (SWMU) Group A is comprised of 4 SWMUs that occupy 8 acres area including the South End Landfill (SWMU 1), the Sludge Lagoon (SWMU 2), the Hydroblasting Station (SWMU 3) and the Ash Lagoon (SWMU 4).

The area was used for disposal of hazardous waste from the mid-1950s until prior to 1980 and for disposal of non-hazardous iron oxide waste until 1989. Waste disposed in the landfill area exceeds 40 feet in places and included waste plastics (e.g. solidified resins), construction/ demolition debris, waste metal and wire, waste iron oxide pigment, sludges, and process-related residues. The sludge lagoon, received wastewater treatment (clarifier) sludge and the ash lagoon received ash slurry from the incineration of clarifier sludge. After placement of waste ceased in 1989, a soil cap was placed over the landfill and sludge lagoon area while the ash lagoon remained an open water-filled impoundment. The hydroblasting station was a small concrete structure built on top of the landfill that had been used as an equipment cleaning pad. When the South End Landfill was actively being used, the waste fill area was operated above the local water table.

However, the water table conditions changed as a result of an approximate 20 foot rise in the Ohio River pool elevation caused by the Hannibal Dam construction in 1973. This rise in the water level resulted in a portion of the base of the waste being up to 12 to 16 ft below the normal Ohio River pool elevation and below the alluvial aquifer water table. As a result of the waste being below the water table, a groundwater collection and hydraulic containment system was deemed necessary to hydraulically contain and capture groundwater impacts from the SWMU Group.

Tetra Tech prepared a modified, more technically sound and cost-effective design than originally specified for the cap and groundwater collection system, which also met the overall project remedial goals. Tetra Tech incorporated the use of geosynthetic cap materials that are lighter weight than normally used both to minimize the potential for future settlement of the cap and reduce cost. A geonet was placed to replace the 12-inch sand layer, and a geomembrane liner was used to replace the 24-inch compacted clay layer. In addition,

Tetra Tech's design included regrading of the non-hazardous iron oxide materials present in the upper portion of the South End Landfill and Ash Lagoon thereby minimizing the volume of materials needed from off-site sources for landfill grading.

Tetra Tech also performed Hydrologic Evaluation of Landfill Performance (HELP) computer modeling to evaluate cover system infiltration rates. The HELP evaluation determined that the cover system would effectively minimize precipitation and recharge to perched groundwater zones, thereby eliminate the installation of a perched groundwater collection trench around the landfill perimeter. The remedial design was prepared by Tetra Tech on a fast-track schedule to meet regulatory and client needs to allow construction to be started in the same year. The project required close coordination with Bayer and regulators including the U.S. EPA, U.S. Army Corps of Engineers, and the West Virginia Department of Environmental Protection. The design of a RCRA geomembrane cap system was successfully completed in July of 2011.

> *"Jason and I couldn't get over how detailed and nicely put together (the Draft CMIP for SWMU Group A South End Remediation Project) was. We only had minimal comments and wish other contractors were as thorough as you all were. Thanks again."*
>
> *U.S. Army Corps of Engineers*

Construction planning, procurement and ash lagoon dewatering were implemented immediately and full-scale construction began in October 2011. Construction field work consisted of dewatering the ash lagoon of more than one million gallons of water, site preparation and clearing, installation of erosion and sediment (E&S) controls, subgrade regrading, and Calciment® stabilization of 12,000 cy of ash and landfill material. Stabilization of the dewatered ash lagoon consisted of Calciment® stabilization and geogrid placement with 2,000 tons of fill. The cap incorporated three layers of geosynthetic materials including geotextile cushion, 40 mil HDPE geomembrane liner, and a geocompsite drainage layer. More than 35,000 tons of stone cover material was placed over the cap followed by a 6-inch topsoil layer. The cap was vegetated in the 2012 growing season. A groundwater collection system with two deep recovery wells, piping, and controls to regulate flow to 100 gpm were installed for hydraulic containment of sitewide groundwater. Monitoring wells were also added to supplement the existing site network to provide for demonstration of hydraulic containment of site constituents. The Construction Completion Report was submitted to the U.S. EPA and WVDEP in May 2013.

Northern Panhandle Landfill Closure Design

Northern Panhandle, WV

Client Name
Confidential Industrial Client

Project Highlights

- *Landfill closure work plan including drawings and specifications*
- *Evaluation of remedial alternatives*
- *Permitting*
- *Design of erosion and sedimentation controls*
- *Annual Groundwater Monitoring Report*

Project Cost
$200,000

Tetra Tech was retained by a confidential client to perform an evaluation and prepare a design and Remedial Action Work Plan for the closure of a landfill located along the Ohio River in West Virginia. The 5-acre landfill contained wastes from past disposal operations at the client's plant that, based on previous investigation, were impacting groundwater.

Tetra Tech:

- Prepared technical and economic evaluations of various options and recommended a preferred solution
- Designed a landfill cap consisting of a multi-layer system that included a geomembrane and geocomposite drainage layer
- Prepared a Remedial Action Work Plan for submittal to USEPA and the West Virginia Department of Environmental Protection (WVDEP)
- Designed stormwater management and sedimentation and erosion control facilities, including a basin to serve both functions
- Prepared a work plan for the installation of a recovery well and conveyance system for groundwater extraction and containment
- Prepared design drawings and technical specifications for bidding and construction of the closure system
- Prepared and submitted a Site Registration Application Form - Construction Storm Water - WV/NPDES General Permit
- On-going annual reporting of groundwater monitoring

Project Title: Butz Landfill Site Long-Term RA

Project Location: Tannersville, PA
Client Name: U.S. EPA Region 3
Project Description: Long-Term RA, including RA improvements

Project Highlights

- ✓ Fund-lead RI/FS and long-term RA involving long-term O&M of groundwater pump and treat remedy.
- ✓ Consistently implemented measures to optimize performance of the remedy, including revisions to the long-term groundwater performance monitoring plan.
- ✓ Reduced annual O&M costs by more than 20% over a 2-year period.
- ✓ Routinely received outstanding performance evaluations from EPA.
- ✓ Monthly system operating rates regularly were greater than 95%.
- ✓ Total project value: $1.3 million (ongoing).

Description: Since 2002, Tt has performed long-term RA work involving O&M activities at this 13-acre site in the Pocono Mountains. Tt previously performed a fund-lead RI/FS under an EPA ARCS contract. The site includes a former municipal dump which contaminated groundwater with a solvent (TCE) and other organic compounds. After the groundwater remedy was constructed (consisting of an air stripper and vapor-phase carbon units), Tt immediately assumed operating responsibilities. The area of groundwater contamination is now stationary and the plume is stable. This project demonstrates Tt's expertise in providing long-term O&M activities to successfully optimize the performance of groundwater remedies.

Relevance: O&M tasks performed include routine and non-routine corrective actions to improve system performance, evaluating/ implementing measures to optimize the system in terms of costs/functionality, and conducting groundwater monitoring/ reporting. Tt has consistently applied innovative administrative approaches to minimize costs and increase the response time to emergencies. To reduce site visit costs, Tt procured a local subcontractor to help monitor the treatment system and restart the system as required. Tt regularly evaluated the remedy and made recommendations that EPA accepted to reduce monthly operating costs and long-term monitoring/reporting costs. Annual O&M costs were reduced from $153,000 to $128,000 over a 2-year period.

Tt implemented measures to save money and improve the efficiency of the treatment system. For example, new flow meters were installed to remotely monitor flow rates instead of visiting the site, and the groundwater performance monitoring plan was revised by Tt to reduce sampling costs by $50,000 per year, including eliminating monitored natural attenuation (MNA) parameters. The groundwater monitoring program uses multi-port wells to evaluate water chemistry at discrete depths within each borehole. Tt has considerable experience in sampling and troubleshooting multi-port equipment, which eliminates purging groundwater prior to sampling, thus reducing IDW disposal costs. Biotrap sampling devices were installed in several wells to evaluate the feasibility of using bacteria and other microbes to potentially speed up the groundwater restoration time.

Tt regularly operated the groundwater treatment system at greater than a 95% run rate, despite delays in troubleshooting certain components of the system. The site's location resulted in periodic power failures during lightning storms and high winds. Noteworthy corrective actions involved replacing electrical wiring due to mice gnawing on the insulation; installing sonic devices and using a subcontractor to eradicate the problem; and replacing well pumps for extraction wells, the circuit board for the fire protection system, the on-site remote check device, and other minor components.

Tt assisted EPA in responding to an independent evaluation of optimizing the remedy. In most cases, Tt had already implemented the necessary measures recommended by this evaluation. Tt developed cost estimates for possible system improvements, including increasing the height of the air stack to discharge untreated VOC vapors thus eliminating the use of vapor-phase carbon to treat emissions from the air stripper, and estimates to convert a well and add a new well to the extraction well network.

Tt's performance consistently exceeding expectations and frequently was outstanding. " Tt responded immediately when EPA requested additional work. Both field and technical reports were thorough, exhibiting great technical skills and knowledge" (EPA 8/04). "Tt continued to be very responsive to EPA requests and presented recommendations and initiatives to correct equipment failures and introduce improvements" (EPA 1/04).

Site Description: The Butz Landfill site is located in rural Monroe County, Pennsylvania. The site spans about 13 acres. A former municipal dump contaminated the groundwater with a solvent, trichloroethylene (TCE) and other organic compounds. The area of groundwater contamination is stationary and the contamination is stable. In 1986, the Commonwealth of Pennsylvania requested EPA's assistance in defining and resolving the site's contamination problems. At the time of EPA's initial involvement with the site, groundwater from home wells was the only source of drinking water for the rural area, and a number of households had been consuming contaminated groundwater for more than a decade. EPA has installed a waterline to supply drinking water to approximately 50 residences. However, some contaminated residential wells are still used for non-potable water.

Groundwater in the area contains volatile organic contaminants (VOCs), mainly trichloroethylene (TCE). No residents are currently threatened by the groundwater contamination because EPA installed a complete municipal water supply system.

In 1986, approximately 50 residences were supplied with bottled water or carbon filtration systems. Additionally, two of these homes were supplied with air-stripping units that remove contaminants from the water. EPA also did geological studies and installed 17 groundwater monitoring wells. In September 1990, EPA issued a formal decision, or Record of Decision, on how to address site contamination. The decision was to install a complete public water supply system to provide drinking water to the residents of the affected area. Construction started in June 1992 and was completed in December 1992. The system consisted of groundwater supply wells, pumps, a large water storage tank, and approximately seven and a half miles of water line. All affected residents desiring to be put on the municipal water supply system were provided connections free of charge. This completely eliminated any endangerment to those residents. In addition, EPA operated the system for two years, at no expense to residents. After those two years, the local water authority took over the EPA-built system.

In order to contain and reduce the size of the contaminant plume, EPA issued another Record of Decision in June 1992. Groundwater pumping and treatment was the method selected to achieve this goal. Engineering plans and design specifications for this work were completed in June 1997. EPA completed a round of groundwater monitoring/sampling in December 1997. That sampling confirmed that the concentrations of contaminants were not increasing and that the area of contamination was not enlarging. Residential water was tested again in September 1999 and results again showed no movement or increase of contamination. Construction of the groundwater pump-and-treat system is complete and the system is operating. Functionality of the remedy was confirmed in the 5-year Review issued by EPA in September 2002.

Periodic groundwater monitoring will continue to ensure that the cleanup is working. In 2004 and 2005 EPA revised the monitoring and started evaluation of the optimization of the remedy. It resulted in the second revision of the monitoring plan, which included switch from semi-annual to annual monitoring events.

TETRA TECH NUS PROJECT DESCRIPTION DATA FORM
(Attach additional pages, if required.
For areas not applicable to project or task order, mark with "NA")

Discuss applicable project activities (e.g., investigations/assessments/studies, RD, RA, and O&M) *in detail*. Quantify to the maximum extent possible. Include cost and schedule achievements and unique aspects of work:

Long-Term Remedial Action (RA); Operation and Maintenance (O&M) of Groundwater Treatment System; Groundwater Optimization Study; Groundwater Sampling and Analysis

List major contaminants of concern, media, special conditions (like buried drums, agent orange, "shapes," etc.:

Primarily VOC-contaminated groundwater, including TCE, cis-1,2-DCE, and vinyl chloride.

List types of reports and/or plans prepared:

Groundwater performance monitoring reports; monthly groundwater treatment system operating reports; remedial designs for air stack modifications and adding new extraction wells to the existing treatment system; long-term performance monitoring plans; five-year review (FYR) report.

Discuss any challenges and/or difficulties encountered during project and subsequent corrective action (if any):

TtNUS has continued to operate the groundwater treatment system at a 90% run rate, despite several delays in troubleshooting certain components of the system. The more significant corrective actions have involved replacing damaged wiring due to mice, replacing several well pumps for extraction well EW-2, replacing the circuit board for the fire protection system, and replacing the on-site computer modem.

TtNUS also assisted EPA in responding to EPA HQs evaluation of optimizing the overall system. In most cases, TtNUS had already implemented the necessary measures recommended by EPA HQs evaluation.

The evaluation of hydrogeologic data was difficult due to the presence of multiple hydrostratigraphic layers. TtNUS made a concerted effort to develop potentiometric surface maps for layer in both horizontal and vertical profiles. This work required close interaction with the EPA geologist who was not convinced the maps adequately portrayed groundwater flow.

Discuss innovative solutions (technological or managerial):

To reduce the cost of site visits, TtNUS procured a local subcontractor to assist with monitoring the groundwater treatment system and restarting the system as required.

TtNUS implemented several measures to save money and improve the efficiency of the treatment system. TtNUS has evaluated the overall system on several occasions and made recommendations that were accepted by EPA to reduce operating costs and long-term monitoring and reporting costs. For example, new flowmeters were installed to remotely monitor flow rates instead of visiting the site, and the groundwater performance monitoring plan was revised to reduce sampling costs by about $50,000 per year.

The groundwater monitoring program uses multi-port monitoring wells (Westbay™) to evaluate water chemistry at up to 5 discrete depths within a single borehole. TtNUS has considerable experience in sampling and troubleshooting multi-port equipment, which reduces the amount of groundwater to be purged during sampling, thus reducing disposal costs.

Biotrap sampling devices were installed in several wells to evaluate the feasibility of using bacteria and other microbes to potentially speed up the groundwater restoration time.

Describe site characteristics, including area geology:

The site is located along the western edge of the Glaciated Low Plateaus section of the Pocono Plateau, within the Appalachian Plateau Physiographic Province. The bedrock at the site consists of alternating fine-grained sandstone and red shale and lesser amounts of siltstone and mudstone. The rocks were probably deposited in a lower delta plain. The bedrock was later folded and faulted.

In 1994, the Bureau of Reclamation conducted a borehole geophysical logging survey to describe the lithology of rock units for selected wells and evaluate lithologic units for correlation between wells. This work and the results are described in the Interim Geology Report for Geophysical and Survey Work Plan, Stage II, Phase I, Volume 2 (Bureau of Reclamation, June 1995). Stratigraphic units were correlated by overlaying the natural gamma logs from each and visually comparing curve signatures. Due to the wide separation of the wells selected for logging and the moderately dipping strata in the study area, a correlation log was generated by combining natural gamma logs from several wells. The gamma logs were then matched to the correlation log, and three major stratigraphic unit boundaries were defined as follows:

- Unit 1 (Unit 1-A, Unit 1-B, Unit 1-C, Unit 1-D, Unit 1-E). Alternating silty sandstones and shales characterized by well developed, fining-upward cyclic movements.

- Unit 2 (Unit 2-F, Unit 2-G, Unit 2-H). Alternating silty sandstones and shales characterized by poorly developed cyclic sequences composed mostly of shale and siltstone.

- Unit 3 (Unit 3-I, Unit 3-J). Alternating silty sandstones and shales characterized by well developed fining-upward cyclic sequences composed mostly of massive-bedded silty sandstone.

Describe estimating, cost and schedule control methods and systems (include innovative techniques):

NA

Discuss how *productivity* (quantity of work) was tracked and measured and frequency (daily, weekly, etc.):

NA

Discuss how *performance* (quality of work) was tracked and measured and frequency (daily, weekly, etc.):

NA

Discuss methods to promote and maintain relationships with regulators:

Frequent communications were conducted with EPA to keep them informed regarding the progress of the RA and recommendations for improving the performance of the remedy.

Discuss regulatory achievements:

NA

Discuss health and safety achievements including awards, if any:

NA

Discuss any recordable incidents as well as reportable lost time, etc:

None

Discuss QA/QC achievements including awards, if any:

NA

(Select One) Tetra Tech NUS is/was: Prime
Client Name and Address: U.S. EPA, Philadelphia, PA
Client Contract No.: 68-S6-3003
Type of Contract (e.g., Cost Plus Fixed Fee, Time & Materials, etc.): CPAF
Project Performance Dates (Month/Day/Year) **Start:** Sep. 2001 **Est. Completion: Dec. 2006 Actual Completion: Dec. 2006** **If estimated and actual completion dates differ, explain reason(s) for schedule change:** **NA** **List number of change orders, types of scope changes, and reason(s) why:**

Change orders for additional design work and RA improvements.

Project Cost Data

Initial/Estimated Value: $900,000 **Final/Actual Value:** $750,000

If value differs, explain reason(s) for cost variance:

Was not able to complete RA improvements before the project ended since contract expired.

Client Contact(s)

***Technical* Contact Name and Title:** Rom Roman, EPA Remedial Project Manager
Address: 1650 Arch Street **City:** Philadelphia **State:** PA **ZIP:** 19103
Telephone Number: 215-814-3212
E-mail: roman.romuald@epamail.epa.gov

***Procurement* Contact Name and Title:** Andy Blaney
Address: 1650 Arch Street **City:** Philadelphia **State: PA** **ZIP:** 19103
Telephone Number: (215) 814-5196
E-mail: blaney.andy@epa.gov

***Administrative* Contact Name and Title:** Elaine Spiewak
Address: 1650 Arch Street **City:** Philadelphia **State: PA** **ZIP:** 19103
Telephone Number: (215) 814-3336
E-mail: spiewak.elaine@epa.gov

Last time reference was verified: Dec. 2006

Can contact(s) be used as a reference: Yes, but with reservations.

Did client submit a letter of commendation: No

Performance Rating: Exceeds expectations; award fee of 75%

If applicable, discuss any existing problems between the client and Tetra Tech NUS and resolution:
None

Key Project Personnel

Name	*Office*
Program Manager: Neil Teamerson,	King of Prussia, PA
Project Manager: Neil Teamerson,	King of Prussia, PA
Lead Engineer: Bob Mertz,	Pittsburgh, PA
Lead Site Superintendent: Gordon Araujo,	King of Prussia, PA
Others: Neb Dedic, Kirk Weir, Megan Ritchie, Don Whalen,	King of Prussia, PA

Subcontracting Data

Percent of work completed by Tetra Tech NUS: 100%

Services subcontracted (%/$ for each):

Well drilling - $65,000
Waste management - $15,000
Snow removal - $9,000
Surveying - $2,000
Electrical upgrades - $7,000
Borehole geophysics - $1,500
System engineering - $6,000
Rodent control - $1,500
Carbon exchange - $40,000
Fencing - $1,000
Local security assistance - $2,000
Structural engineering - $9,000

Why were services subcontracted: NA

Achievement of SB/SDB/WOSB goals, if applicable (list actuals/ goals in %): NA

Methods used to promote/maintain harmonious labor relations: NA

List major equipment used and supplier(s): NA

Tetra Tech subsidiaries involved: None

Regulatory Interaction Data

Contact Name and Title: Paul Panek, PA Dept. of Environmental Protection
Address: **City:** **State:** **ZIP:**
Telephone Number:

Contact Name and Title: Rom Roman, U.S. EPA Region 3, Remedial Project Manager
Address: 1650 Arch Street **City: Philadelphia** **State: PA** **ZIP: 19103**
Telephone Number: (215) 814-3212

USEPA Region: 3

Did this site achieve closure? If yes, list regulation(s): NA

Name of Person Completing Form and Telephone No.: Neil Teamerson, 610-491-9688
Date: 23 Jan 2007

East Mount Zion Landfill Design and Closure Activities

York County, PA

Client Name
U.S. EPA Region 3

Project Highlights

- *Design for an impermeable cap for the landfill*
- *Landfill closure activities*
- *Technical support to the EPA and regulatory compliance*

Tetra Tech was authorized by the U.S. EPA to perform Remedial Design for an impermeable cap for a 10-acre landfill in central Pennsylvania. The design services included evaluation and selection of suitable construction materials for a flexible membrane liner.

Landfill closure activities included deed restrictions, collection and venting of landfill gases, and stormwater management. Trichlorethylene, benzene, and dichlorobenzene were causes of contamination on the site. Tetra Tech provided technical support to the EPA for all of the following tasks:

- Site survey
- Wetlands study
- Groundwater sampling and analysis
- Preparation of Quality Assurance, Health and Safety, and Field Sampling Plans
- Design plans and specifications for a multi-layer, impermeable cap; a passive gas vent system with capability for odor control; an appropriate contour for surface water control/site drainage; access roads for movement of construction vehicles, and a groundwater monitoring program to evaluate the effectiveness of the remedy through the post closure period including:
    - Detailed operation and maintenance plan
    - Bid and contract documents for remedial construction
    - Compliance with all applicable requirements and regulations.

TETRA TECH

Black Hawk County Landfill Closure Oversight

Blackhawk County, IA

Client Name
U.S. EPA Region 7

Project Highlights

- *Oversight of closure activities of the landfill*
- *Project fulfilled all of the RCRA closure requirements*
- *Regular site visits to deal with complications caused by weather*

Project Cost
$26,000

The Black Hawk County Landfill is a municipal landfill, which is managed by the Black Hawk County Solid Waste Management Commission. This landfill previously accepted Resource Conservation and Recovery Act hazardous waste among its municipal and industrial refuse.

Tetra Tech was assigned to oversee closure activities at this landfill. Those activities included:

- placing 2 feet of compacted clay over the graded landfill
- installation of a PVC liner, Geonet, and Geotextile fabric over the compacted clay
- placing 3 feet of select fill on the synthetic liner
- placing a 6-inch layer of topsoil over the select fill.

During the closure, Tetra Tech sent personnel to the site 11 times to oversee closure activities. Several complications occurred during installation of the landfill cap. Wind, rain, cold temperatures and difficulties with compaction of the clay resulted in delays in completion of the project and in the need for daily coordination between Tetra Tech personnel and the EPA work assignment manager.

Also, when the cap was nearly completed, several Shelby tube samples of the clay cap failed the permeability tests. The liner in those areas then had to be removed, and the clay in those portions of the landfill had to be recompacted.

Tetra Tech's inspections, which were documented with photographs and trip reports, ultimately determined that the cap met all of the RCRA closure requirements.

Fort Worth District Army Corps of Engineers- Western Landfill Closure Plans and Specifications, Fort Wingate Depot Activity, New Mexico

Project Title: **Western Landfill Closure Plans and Specifications**
Site Location: **Fort Wingate Depot Activity, New Mexico**
Client Name: **Fort Worth District U.S. Army Corps of Engineers**
Confidential Client: **No**
Primary Services: **Engineering Design Analysis – Plans and Specifications**

Project Description:

TtNUS has been tasked to develop complete plans and specifications for the general construction closure of the Western Landfill. Closure is to be accomplished by removal and proper disposal of the landfill material in accordance with New Mexico Environment Department (NMED) regulations, especially solid waste management regulations and surface water quality regulations. Suspect unexploded ordnance (UXO) and UXO-related scrap have also been found in the Western Landfill. In order to develop adequate plans for the project, a topographic survey of the project site, identifying all relevant surface features was conducted.

The plans and specifications prepared by TtNUS will provide for UXO clearance and avoidance activities associated with performing the closure and certifying any debris to be free from UXO prior to transfer of the material from DoD control. The plans and specifications will provide the basis for awarding a service contract to execute closure of the Western Landfill. TtNUS is producing all necessary documentation for a service contract-bidding package, with the exception of the COE contract clauses. The service contract bidding package will include complete plans and specifications, construction cost estimate, design drawings, standard operating procedures (SOP), submittal registers, basic storm water pollution prevention plan (SWPPP), bid schedule, and a Design Analysis Report documenting the engineering foundation for the design as specified by the Corps of Engineers, Southwestern Division Architectural and Engineering Instructions Manual (SWD-AEIM). Per FWCOE direction, the plans and specifications will be produced in a COE guide specification format.

The design of the plans and specifications address tasks required to complete the closure of the landfill by excavating, transporting, and disposing of the refuse and associated soil comprising the landfills to a licensed off-site disposal facility. In addition, the specifications address the completion of verification sampling at the bottom of the landfill to ensure that all waste materials are properly removed and that no contaminated materials are left on-site. Development of extensive soil screening and handling techniques related to UXO clearance and avoidance is also included as part of the deliverable.

Project challenges include lack of definitive landfill disposal records due to the age of the facility and potential presence of unexploded ordnance (UXO), asbestos or other hazardous materials in the landfill. Design of the closure documents address excavation, handling, transportation and disposal of suspect excavated material.

In addition to completing the plans and specifications, the work requires the preparation of a Design Analysis Report documenting the engineering foundation for the design as specified in the COE SWD-AEIM. As part of the project, TtNUS is producing a construction cost estimate for the project of sufficient detail to serve as the Independent Government Estimate. A construction cost estimating program (Envest 3.1), along with actual contractor estimates, were used to provide the COE with a closure cost estimate that appropriately addresses the particular issues at the site

Discuss applicable project activities (e.g., investigations/assessments/studies, RD, RA, and O&M) *in detail*. Quantify to the maximum extent possible. Include cost and schedule achievements and unique aspects of work:
The project required a topographic survey to identify all relevant surface features and an evaluation of historical information (aerial photography, site investigation reports, personnel interviews, and environmental assessments). The lack of definitive landfill disposal records due to the age of the facility and the potential for unexploded ordnance (UXO), asbestos or other hazardous materials in the landfill material provided a unique situation that required TtNUS to develop plans and specifications that would allow for these elements and provide a meaningful design package to the Government. Design of the closure documents address excavation, handling, transportation and disposal of the suspect excavated material.

List major contaminants of concern, Media, Special conditions (like buried drums, agent orange, "shapes," etc.:
Due to the age of the facility and based upon a limited site assessment UXO, asbestos or other hazardous materials may potentially be present within the landfill and thus require special consideration and handling within the documentation.

List types of reports and/or plans prepared:
The Service contract bidding package included complete plans and specifications, construction cost estimate, design drawings, standard operating procedures (SOP), submittal registers, basic storm water pollution prevention plan (SWPPP), bid schedule, and a Design Analysis Report documenting the engineering foundation for the design as specified by the Corps of Engineers, Southwestern Division Architectural and Engineering Instructions Manual (SWD-AEIM). Per FWCOE direction, the plans and specifications were produced in a COE guide specification format. TtNUS prepares milestone progress reports to the COE. TtNUS is also actively participates in design review meetings and comment address protocols set forth by the Government.

Discuss any challenges and/or difficulties encountered during project and subsequent corrective action (if any):
The most challenging aspect of this project has been the lack of definitive information within the initial site investigation, environmental assessment and historical documentation regarding the contents and extent of the Western Landfill. The engineering analysis involved site personnel interviews, evaluation of historical site documentation (EA, site assessment reports) and aerial photography to determine the extent of the Landfill for use in the closure cost estimate. TtNUS also conducted a topographic survey of the site in order to pinpoint landfill trench and sampling locations, and topographic features not established during previous investigations. This was a particular challenge since it required TtNUS to interpret incomplete information and

investigative protocols from sources other than the COE or TtNUS.

Discuss innovative solutions (technological or managerial):
None

Describe site characteristics, including area geology:
The climate at Ft. Wingate is generally dry with seasonal changes, consistent with the classification of a semi-desert biotic zone. The FWDA is located within the Puerco River Valley and in the foothills of the Zuni Mountains and bounded by a ridge of steeply dipping sedimentary rocks. The sedimentary soils are primarily made up of claystone, sandstone, limestone and shale. The Western Landfill area is flat with site drains to the north-northeast at a slope of one to two percent towards a dry arroyo located to the north and west of the site.

Describe estimating, cost and schedule control methods and systems (include innovative techniques):
Fixed rates were used to prepare the project proposal and the contract awarded as a firm-fixed price. The project is on schedule and within budget.

Discuss how *productivity* (quantity of work) was tracked and measured and frequency (daily, weekly, etc.):
Weekly and bi-monthly tracking of cost summary reports (CSR), work in progress (WIP) reports, and activity reports are used to monitor project productivity. Project cost and milestones achieved are measured against the project schedule to evaluate and adjust resources depending upon project requirements.

Discuss how *performance* (quality of work) was tracked and measured and frequency (daily, weekly, etc.):
TtNUS SOPs and QA/QC procedures are used to ensure quality and maintain project continuity. The Lead Engineer is responsible for daily monitoring of project tasks. Prior to completion of milestone deliverables, peer and senior review are used to measure the overall level of performance and evaluate final delivery items. Per COE instruction, TtNUS prepares milestone Progress Reports outlining completed activities.

Discuss methods to promote and maintain relationships with regulators:
N/A

Discuss regulatory achievements:
None

Discuss health and safety achievements including awards, if any:
As part of the Design Report, site specific Health and Safety specifications, including a Storm Water Pollution Prevention (SWPP) Plan were developed for the COE.

Discuss any recordable incidents as well as reportable lost time, etc:

None

Discuss QA/QC achievements including awards, if any:
N/A

<table>
<tr><td colspan="2">N/A(Check one) Tetra Tech NUS was: Prime 3 Subcontractor</td></tr>
<tr><td>Client Name and Address:
U.S Army Corps of Engineers – Fort Worth District
P.O. Box 17300
Fort Worth, Texas, 76102-0300</td><td>Project Name and Location:
Western Landfill Closure Plans and Specifications, Fort Wingate Depot Activity, New Mexico</td></tr>
<tr><td>Client Contract No.: DACA 63-97-D-0030
Task Order NO. 0007</td><td>Tetra Tech NUS Project No.: HY91</td></tr>
<tr><td colspan="2">Type of Contract (e.g., Cost Plus Fixed Fee, Time & Materials, etc.): Firm-Fixed Price</td></tr>
<tr><td colspan="2">Project Performance Dates (Month/Day/Year)
Start: September 1998 Est. Completion: December 1998 Actual Completion: 1st Quarter 2000

If estimated and actual completion dates differ, explain reason(s) for schedule change:
Budget restraints have postponed government from completing bid package/process. Government anticipates bidding in 1st Quarter 2000 and has asked TtNUS to assist on final bid package preparation.

List number of change orders, types of scope changes, and reason(s) why:
None – Project is on schedule and within budget.</td></tr>
<tr><td colspan="2">Project Cost Data
Initial/Estimated Value: $57,429 Final/Actual Value $57,429

If value differs, explain reason(s) for cost variance:</td></tr>
<tr><td colspan="2">Client Contact(s)
Technical Contact Name and Title: Mr. Dwayne Ford, Technical Manager
Address: U.S. Army Corps of Engineers,
Environmental Design Branch, CESWF-EV-D
P.O. Box 17300 (for letters)
819 Taylor Street, Room 4C02 (for packages) City: Ft. Worth State Texas ZIP 76102-0300
Telephone Number: (817) 978-9924 ext. 1644

Procurement Contact Name and Title:
Address: City: State ZIP :
Telephone Number: ( )

Administrative Contact Name and Title: Mr. Henry Kasten, Project Manager
Address: U.S. Army Corps of Engineers,
A-E Management Branch, CESWF-ED-MA
P.O. Box 17300 (for letters)
819 Taylor Street, Room 4C02 (for packages) City: Ft. Worth State Texas ZIP 76102-0300</td></tr>
</table>

Telephone Number**: (817) 978-2762**

Last time reference was verified:

Can contact(s) be used as a reference: Yes

Did client submit a letter of commendation: Yes No

Performance Rating:

If applicable, discuss any existing problems between the client and Tetra Tech NUS and resolution:

Key Tetra Tech NUS Personnel

	Name	*Office*
Program Manager:	Mike Meenan, P.E.	Houston, Texas
Project Manager:		
Lead Engineer:	Diane Lindsay, P.E.	Houston, Texas
Lead Site Superintendent:		
Others:	Theresa Thompson, P.E.	Houston, Texas, Joe Flesch – Houston, Texas

Subcontracting Data

Percent of work completed by Tetra Tech NUS: 100%

Services subcontracted (%/$ for each): None

Why were services subcontracted: N/A

Achievement of SB/SDB/WOSB goals, if applicable (list actuals/ goals in %): N/A

Methods used to promote/maintain harmonious labor relations: N/A

List major equipment used and supplier(s): N/A

Tetra Tech subsidiaries involved: None

Regulatory Interaction Data

Contact Name and Title: Butch Tongate
Address: New Mexico Environment Department (NMED) - Solid Waste Bureau
City: State ZIP Telephone Number: **(505) 827-2952**

Contact Name and Title: Glenn Saums
Address: New Mexico Environment Department (NMED) – Surface Water Quality Bureau
City: State ZIP Telephone Number**: (505) 827-2827**

Contact Name and Title: Chris Whitman
Address: New Mexico Environment Department (NMED) - Ground Water Quality Bureau
City: State ZIP Telephone Number: **(505) 827-1044**

Contact Name and Title: Phillip Solano
Address: New Mexico Environment Department (NMED) – Hazardous and Radio Active Materials Bureau City: State ZIP Telephone Number: **(505) 827-1561**

USEPA Region: VI

Did this site achieve closure? If yes, check if applicable: RCRA CERCLA

Name of person completing form/office location/phone no.:
Diane Lindsay/Houston, Texas/713-647-8324
Date: November 5, 1999

Wetland Leachate Treatment for Haley Pike Solid Waste Landfill Closure

Fayette County, KY

Client Name
Lexington-Fayette Urban County Government

Project Highlights

- *Largest landfill closure to-date in the state of Kentucky*
- *Use of a natural system to treat landfill leachate reduced disposal and treatment costs and conventional pollutants – this technique could be used and result in significant savings*
- *Provided construction quality assurance and certification services*

Project Cost
$900,000

Tetra Tech planned and is providing engineering and environmental science consulting services for the largest landfill closure to date in the Commonwealth of Kentucky. This project is the multi-phase closure of Lexington's 105-acre Haley Pike Solid Waste Landfill.

Tetra Tech prepared engineering plans and specifications suitable for bidding and in addition to managing the large size of the project, Tetra Tech's regulatory specialists are guiding the incremental closure concept through the state's regulatory program. The concept is to close the landfill in roughly equal increments over a five-year period, spreading the closure expense over time, while continuing to operate the construction/demolition debris (C/DD) landfill located on a portion of the closure site.

Closure planning and design addressed the various environmental requirements of the Kentucky Division of Waste Management and Air Quality, including:

- Leachate collection and treatment
- Tier 2 gas monitoring
- Methane gas collection system
- Groundwater assessment and monitoring plan

Because of the long term cost consequences of transporting and treating leachate, Tetra Tech conducted a further investigation into the use of constructed wetlands for wastewater treatment. Use of a natural system to treat landfill leachate reduces disposal and treatment costs and reduces conventional pollutants in the landfill property. The investigation concluded that this technique could be used and would result in significant savings.

TETRA TECH

Haley Pike Landfill Closure Design

Fayette County, KY

Client Name
Lexington-Fayette Urban County Government

Project Highlights

- *Largest landfill closure to-date in the state of Kentucky*
- *Use of synthetic materials in the closure cap reduces the client's cost by 25%*
- *Provided construction quality assurance and certification services*

Project Cost
$9.4 Million

This innovative closure plan is for a 97-acre landfill, **making it the largest landfill closure to-date in Kentucky**. The closure design has to meet the newest and most stringent landfill regulations for municipal solid waste landfills. Although the landfill had operated historically as a municipal solid waste landfill, a portion of the area on top of the fill remains in use as a construction debris (CD/D) landfill.

Key features of the proposed closure are:

- Use of synthetic materials in the closure cap eliminates the need to purchase and transport large volumes of expensive gravel and clay and **reduces cost by about 25%.**
- Design of an equalization basin and man-made wetlands to treat large quantities of leachate during the post-closure life of the facility. This system replaces the practice of pumping leachate from 30 manholes and hauling it 20 miles to LFUCG's treatment plant, resulting in significant savings over the post-closure life of the facility.
- Development of an incremental closure approach, allowing the continued operation of the CD/D disposal cell for four additional years. The incremental closure spreads costs over a five-year period and provides a continuing revenue stream from the CD/D operation.
- Initial Tier I calculations indicated that the landfill would require an active methane collection system. Tetra Tech performed Tier II testing, which showed that gas generation has peaked and is at a level that allows the use of a passive versus active methane collection system.

Tetra Tech provided construction quality assurance and certification services for constructing nearly 42 acres of closure cap, as well as the leachate handling and treatment system.

TETRA TECH

Northern Panhandle Landfill Closure Design

Northern Panhandle, WV

Client Name
Confidential Industrial Client

Project Highlights

- *Landfill closure work plan including drawings and specifications*
- *Evaluation of remedial alternatives*
- *Permitting*
- *Design of erosion and sedimentation controls*
- *Annual Groundwater Monitoring Report*

Project Cost
$200,000

Tetra Tech was retained by a confidential client to perform an evaluation and prepare a design and Remedial Action Work Plan for the closure of a landfill located along the Ohio River in West Virginia. The 5-acre landfill contained wastes from past disposal operations at the client's plant that, based on previous investigation, were impacting groundwater.

Tetra Tech:

- Performed a site characterization
- Prepared technical and economic evaluations of various options and recommended a preferred solution
- Designed a landfill cap consisting of a multi-layer system that included a geomembrane and geocomposite drainage layer
- Prepared a Remedial Action Work Plan for submittal to USEPA and the West Virginia Department of Environmental Protection (WVDEP)
- Designed stormwater management and sedimentation and erosion control facilities, including a basin to serve both functions
- Prepared a work plan for the installation of a recovery well and conveyance system for groundwater extraction and containment
- Prepared design drawings and technical specifications for bidding and construction of the closure system
- Prepared and submitted a Site Registration Application Form - Construction Storm Water - WV/NPDES General Permit
- Ongoing annual reporting of groundwater monitoring

TETRA TECH

East Mount Zion Landfill Design and Closure Activities

York County, PA

Client Name
U.S. EPA Region 3

Project Highlights

- *Design for an impermeable cap for the landfill*
- *Landfill closure activities*
- *Technical support to the EPA and regulatory compliance*

Tetra Tech was authorized by the U.S. EPA to perform Remedial Design for an impermeable cap for a 10-acre landfill in central Pennsylvania. The design services included evaluation and selection of suitable construction materials for a flexible membrane liner. Landfill closure activities included deed restrictions, collection and venting of landfill gases, and stormwater management. Trichlorethylene, benzene, and dichlorobenzene were causes of contamination on the site. Tetra Tech provided technical support to the EPA for all of the following tasks:

- Site survey
- Wetlands study
- Groundwater sampling and analysis
- Preparation of Quality Assurance, Health and Safety, and Field Sampling Plans
- Design plans and specifications for:
    - a multi-layer, impermeable cap
    - a passive gas vent system with capability for odor control
    - an appropriate contour for surface water control/site drainage;
    - access roads for movement of construction vehicles, and
    - a groundwater monitoring program to evaluate the effectiveness of the remedy through the post closure period
- Detailed operation and maintenance plan
- Bid and contract documents for remedial construction
- Compliance with all applicable requirements and regulations

TETRA TECH

Haley Pike Landfill Closure Design

Fayette County, KY

Client Name
Lexington-Fayette Urban County Government

Project Highlights

- *Largest landfill closure to-date in the state of Kentucky*
- *Use of synthetic materials in the closure cap reduces the client's cost by 25%*
- *Provided construction quality assurance and certification services*
- *Leachate management*

Project Cost
$9.4 Million

This innovative closure plan is for a 105-acre landfill, **making it the largest landfill closure to-date in Kentucky.** The closure design met the newest and most stringent landfill regulations for municipal solid waste landfills. Although the landfill had operated historically as a municipal solid waste landfill, a portion of the area on top of the fill remains in use as a construction debris (CD/D) landfill.

Key features of the proposed closure are:

- Use of synthetic materials in the closure cap eliminates the need to purchase and transport large volumes of expensive gravel and clay and **reduces cost by about 25%.**
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- Development of an incremental closure approach, allowing the continued operation of the CD/D disposal cell for four additional years. The incremental closure spreads costs over a five-year period and provides a continuing revenue stream from the CD/D operation.
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Tetra Tech provided construction quality assurance and certification services for constructing nearly 42 acres of closure cap, as well as the leachate handling and treatment system.

Wetland Leachate Treatment for Haley Pike Solid Waste Landfill Closure

Fayette County, KY

Client Name
Lexington-Fayette Urban County Government

Project Highlights

- *Largest landfill closure to-date in the state of Kentucky*
- *Use of a natural system to treat landfill leachate reduced disposal and treatment costs and conventional pollutants – this technique could be used and result in significant savings*
- *Provided construction quality assurance and certification services*

Project Cost
$900,000

Tetra Tech provided engineering and environmental science consulting services for the largest landfill closure to date in the Commonwealth of Kentucky. This project is the multi-phase closure of Lexington's 105-acre Haley Pike Solid Waste Landfill.

Tetra Tech prepared engineering plans and specifications suitable for bidding and in addition to managing the large size of the project. Tetra Tech's regulatory specialists guided the incremental closure concept through the state's regulatory program. The concept is to close the landfill in roughly equal increments over a five-year period, spreading the closure expense over time, while continuing to operate the construction/demolition debris (C/DD) landfill located on a portion of the closure site.

Closure planning and design addressed the various environmental requirements of the Kentucky Division of Waste Management and Air Quality, including:

- Leachate collection and treatment
- Tier 2 gas monitoring
- Methane gas collection system
- Groundwater assessment and monitoring plan

Because of the long term cost consequences of transporting and treating leachate, Tetra Tech conducted a further investigation into the use of constructed wetlands for wastewater treatment. Use of a natural system to treat landfill leachate reduces disposal and treatment costs and reduces conventional pollutants in the landfill property. The investigation concluded that this technique could be used and would result in significant savings.

Kim Stan Landfill Closure Site Design and Construction

Selma, Allegheny County, VA

Client Name
U. S. EPA Region III

Project Highlights

- *Investigation, study, design, permitting, and construction of landfill closure*
- *Remedial design includes a landfill cap, leachate collection trench, leachate pipeline, sanitary sewer line upgrades, new pump stations and treatment plant upgrades*
- *Managed 10 subcontractors who all met schedule, cost and technical requirements*
- *Interfaced with federal, state, and county officials, utility companies, a local organization, and residents*

Project Cost
$1.3 Million

Tetra Tech performed the site investigation, feasibility study, remedial design, and remedial action at the Kim-Stan Landfill. This National Priorities List site in southwestern Virginia operated as a sanitary/industrial waste landfill and reportedly received 865,000 tons of waste between 1972 and 1990. Waste included PCB-contaminated oils, medical waste, and aluminum sludges.

Tetra Tech developed a cost-effective solution, including:

- A 26.5-acre, multi-layer landfill cap
- 45,250 square feet of leachate collection trench, installed using an innovative biopolymer slurry
- A comprehensive stormwater management system
- Native plant landscaping to blend the cap with surrounding terrain
- Engineered subsurface wetlands system for leachate pre-treatment
- Over 4,600 feet of force main sewers and upgrading over 3,000 feet of sanitary sewer
- Three new major pump stations and upgrading an existing pump station
- Upgrading 250,000-gallon sequence batch reactor at the Publicly Owned Treatment Works

The management approach of dividing the work into three separate designs (landfill; leachate pipeline/sewer upgrade; POTW upgrade) contributed to meeting technical requirements on an accelerated schedule.

EPA noted that the remedial design was *"an overwhelming success … this was a very critical project that was accomplished in an extremely expedited time frame, 6 months, that led to a final design being submitted on-time and under budget."*

Disposal/Burn Area Landfill and Marsh Cap Closure Design

Naval Support Facility, Dahlgren, VA

Client Name
Naval Facilities Engineering Command

Project Highlights

- *3-D groundwater and contaminant transport modeling to optimize remedy and achieve remediation goals*
- *Minimized potential for migration of contamination to adjacent tributary*
- *Remedy used cost-effective passive approach*

Project Cost
$2.7 Million

Tetra Tech provided groundwater and contaminant transport modeling, remedial design, and engineering support and oversight for closure of an uncontrolled landfill located at a naval facility. The Disposal/Burn Area is a 12 acre inactive landfill located adjacent to a tidally influenced tributary of the Potomac River and wetlands. Historic information indicated that the area was used as a sanitary landfill from the early 1940s until 1984 for disposal of approximately 100,000 cubic yards of chemical, municipal, and miscellaneous waste.

Tetra Tech performed modeling to simulate pre-remediation and post-remediation scenarios, including capping the landfill, covering the marsh and back channel area, and installing an upgradient cut-off wall. The goal of the modeling was to determine the remedy that minimized long-term groundwater impacts to the tributary, protected ecological receptors, and achieved remediation goals. Tetra Tech:

- Completed a remedial investigation, feasibility study, pre-design investigation, and remedial design and provided continuous oversight during remediation.
- Designed a 6-acre multilayered cap over the landfill. The multilayered cap consisted of vegetative soil cover, separation geotextile, gravel drainage layer, cushion geotextile, 60-mil LLDPE geomembrane, geosynthetic clay liner, and bedding/gas venting layer.
- Designed a soil cover for the contiguous marsh (2 acres) and tributary back channel area (1 acre), and shoreline protection. The design incorporated geogrid, high strength stabilization geotextile, riprap, and gabions.
- Designed a passive gas management system.
- Designed a large basin as a borrow source for the landfill cap materials, as a sediment pond for erosion control during construction, and finally as a high marsh wetland to offset wetland losses from capping.
- Dug a continuous test pit to determine the limit of waste adjacent to the cut-off wall alignment.
- Planned and supervised the drilling of soil borings to determine the location and depth of a 640-foot long soil-bentonite cut-off wall.

City of Manistique Landfill Waste Delineation and Closure Design

Schoolcraft County, MI

Client Name
City of Manistique

Project Highlights

- *Use of state-of-the-art multi-port wells and dedicated sampling equipment to analyze groundwater samples from various depths from single monitoring wells*
- *Work Plans developed for each phase of hydrogeological investigation received MDEQ approval*
- *Design of cost-effective closure cap*

The Manistique Landfill is a Type II landfill that was used by local townships, industry and the City of Manistique.

Tetra Tech performed initial hydrogeological studies and identified environmental contamination consisting of groundwater impacted by volatile and semivolatile organic compounds and metals. The contaminants percolated as dissolved phase leachate to the groundwater surface and appear to have migrated to the bedrock surface below the permeable sand. Bedrock depth varies from 110 to 150 feet below grade.

As an unlined landfill, Tetra Tech's initial tasks included determining whether any leachate was leaving the site. The hydrogeological investigation indicated that leachate had migrated off-site and was impacting local, private property. Tetra Tech completed a Work Plan for each subsequent phase of the hydrogeological investigation. Each received MDEQ review and approval.

Because the chlorinated organic compounds, dissolved metals and volatile organic compounds are near bedrock, Tetra Tech used state-of-the-art multi-port wells and dedicated sampling equipment to collect and analyze groundwater samples from various depths from single monitoring wells. Soil sampling and lithological evaluation was conducted during well installation.

Tetra Tech also excavated around the perimeter of the landfill to determine the outer limits of the buried waste. Using a backhoe, the debris limits were delineated through excavation and visual confirmation, then flagged for later surveying and mapping. This information was used to develop a design to cap the landfill. Tetra Tech sought to design the most cost-effective closure cap possible. Tetra Tech evaluated three options: imported clay, a PVC cap, and a cap constructed of a composite liner.

Landfill Closure Design Using Soil Cover with Phytoremediation

Naval Support Facility, Dahlgren, VA

Client Name
Naval Facilities Engineering Command

Project Highlights

- *Soil cover coupled with phytoremediation was functionally equivalent to State closure standards at a lower cost*
- *Created 1 acre of additional wetland*
- *Consolidated the landfill footprint and made 1.5 acres available for future development*

Project Cost
$1.7 Million

Tetra Tech provided site investigation, feasibility study, pre-design investigation, remedial design, and consulting services during construction for the 1400 Area Landfill. This site was a sand and gravel borrow pit, bordered on two sides by wetlands, that was filled with municipal waste during the 1970s. This 5-acre landfill is underlain by a sand layer and a laterally persistent clay layer.

The design addressed risks associated with semi-volatile organic compounds, PCBs, pesticides, and metals at concentrations that were generally below industrial screening levels. Contaminated wetland area sediments were excavated and disposed offsite due to unacceptable ecological risk. Based on client preference, landfill waste was consolidated into a smaller area, providing 1.5 acres for future development. The waste was capped with a 2-foot thick soil cover which was planted with hybrid poplar trees. The soil cover, coupled with phytoremediation, was designed to provide the functional equivalence of a Virginia sanitary landfill cap. The trees on and around the soil cover also serve to reduce off-site migration of mercury in groundwater by reducing the hydraulic gradient and associated discharge of groundwater to surface water.

Tetra Tech prepared calculations to: 1) demonstrate that the 2-foot soil cover with phytoremediation would be hydraulically equivalent to a Virginia sanitary landfill cap; 2) determine the number and spacing of trees to achieve hydraulic equivalence to a Virginia sanitary landfill cap; and 3) determine the number and spacing of trees required to reduce the hydraulic gradient beneath the site and associated groundwater-to-surface water flow.

Client Name
U.S. EPA Region 7

Project Highlights

- *Oversight of closure activities of the landfill*
- *Project fulfilled all of the RCRA closure requirements*
- *Regular site visits to deal with complications caused by weather*

TETRA TECH

Project Cost
$26,000

Black Hawk County Landfill Closure Oversight

Blackhawk County, IA

The Black Hawk County Landfill is a municipal landfill, which is managed by the Black Hawk County Solid Waste Management Commission. This landfill previously accepted RCRA hazardous waste among its municipal and industrial refuse.

Tetra Tech was assigned to oversee closure activities at this landfill. Those activities included:

- placing 2 feet of compacted clay over the graded landfill
- installation of a PVC liner, Geonet, and Geotextile fabric over the compacted clay
- placing 3 feet of select fill on the synthetic liner
- placing a 6-inch layer of topsoil over the select fill.

During the closure, Tetra Tech sent personnel to the site 11 times to oversee closure activities. Several complications occurred during installation of the landfill cap. Wind, rain, cold temperatures and difficulties with compaction of the clay resulted in delays in completion of the project and in the need for daily coordination between Tetra Tech personnel and the EPA work assignment manager.

Also, when the cap was nearly completed, several Shelby tube samples of the clay cap failed the permeability tests. The liner in those areas then had to be removed, and the clay in those portions of the landfill had to be recompacted.

Tetra Tech's inspections, which were documented with photographs and trip reports, ultimately determined that the cap met all of the RCRA closure requirements.

TETRA TECH

Landfill Site Investigation, Evaluation, and Soil Cover Design

Naval Support Facility, Indian Head, MD

Client Name
Naval Facilities Engineering Command

Project Highlights

- *Negotiated variance to State landfill closure regulations*
- *Effective cap at a substantial cost savings*
- *Restored 0.4 acre wetland*

Project Cost
$938,600

Tetra Tech completed a site investigation, evaluation, and remedial design for the Town Gut Landfill. This 4-acre site was operated between 1968 and 1980 for the disposal of approximately 70,000 cubic yards of landscaping waste, fill material, and rubble. Unauthorized items reportedly dumped at the site included paints, varnishes, and other chemical wastes.

A pond bisects the northern and southern portions of the site, and a tidally-affected pond adjacent to the southern portion of the site governed the groundwater table at the landfill. The adjacent ponds were not affected by groundwater contamination from the landfill.

A variance to Maryland landfill closure regulations was successfully negotiated. The variance allowed the landfill to be closed with a 2-foot thick soil cover in lieu of an impervious cap. Construction of the soil cover greatly reduced the capital cost while conforming to State requirements. Contaminated soil and accumulated debris were removed from 0.4 acres of wetlands to allow the installation of the 2-foot thick soil cover. The original shoreline contours were maintained and the pre-existing habitat was restored.

Tetra Tech also provided general consulting services throughout construction, including reviewing contractor submittals and variance requests. Deed restrictions were prepared to prohibit residential development on the landfill and use of site groundwater as a source of drinking water.

City of Manistique Landfill Closure Design

Schoolcraft County, MI

Client Name
City of Manistique

Project Highlights

- *Use of state-of-the-art multi-port wells and dedicated sampling equipment to analyze groundwater samples from various depths from single monitoring wells*
- *Work Plans developed for each phase of hydrogeological investigation received MDEQ approval*
- *Design of cost-effective closure cap*

The Manistique Landfill is a Type II landfill that was used by local townships, industry and the City of Manistique.

Tetra Tech performed initial hydrogeological studies and identified environmental contamination consisting of groundwater impacted by volatile and semivolatile organic compounds and metals. The contaminants percolated as dissolved phase leachate to the groundwater surface and appear to have migrated to the bedrock surface below the permeable sand. Bedrock depth varies from 110 to 150 feet below grade.

As an unlined landfill, Tetra Tech's initial tasks included determining whether any leachate was leaving the site. The hydrogeological investigation indicated that leachate had migrated off-site and was impacting local, private property. Tetra Tech completed a Work Plan for each subsequent phase of the hydrogeological investigation. Each received MDEQ review and approval. A fourth phase of this investigation is in progress.

Because the chlorinated organic compounds, dissolved metals and volatile organic compounds are near bedrock, Tetra Tech used state-of-the-art multi-port wells and dedicated sampling equipment to collect and analyze groundwater samples from various depths from single monitoring wells. Soil sampling and lithological evaluation was conducted during well installation.

Tetra Tech also excavated around the perimeter of the landfill to determine the outer limits of the buried waste. Using a backhoe, the debris limits were delineated through excavation and visual confirmation, then flagged for later surveying and mapping. This information was used to develop a design to cap the landfill. Tetra Tech sought to design the most cost-effective closure cap possible. Tetra Tech evaluated three options: imported clay, a PVC cap, and a cap constructed of a composite liner. Once closure funds are available, the cap will be installed.

STANTON ENERGY CENTER COAL COMBUSTION PRODUCT LANDFILL DESIGN/BUILD PROGRAM

Orlando, Florida

CLIENT:

Orlando Utilities Commission

PROJECT HIGHLIGHTS:

- Detailed design completed under a compressed schedule
- Received regulatory approval on first design submittal with no comments

Tetra Tech performed design/build services under a $14M contract to help the Orlando Utilities Commission (OUC) expand its Stanton Energy Center coal combustion product landfill in Orlando, Florida. Tetra Tech is providing all project management, field exploration, design, permitting, construction, and construction quality assurance services as part of this design/build program. This landfill expansion will allow OUC to manage wastes from its onsite power plant in anticipation of the proposed U.S. Environmental Protection Agency rule for coal combustion residuals, as developed subsequent to the Tennessee Valley Authority Kingston ash impoundment failure in 2008.

Tetra Tech constructed the first 30 acre cell. Each cell was constructed to meet Class I, RCRA Subtitle D Standards (i.e., double lined with leachate collection system). Tetra Tech also constructed a 22-acre stormwater pond and 2-acre lined "decanting cell" intended to stockpile saturated ash. Project highlights included:

- Detailed design completed under a compressed design schedule (i.e., 6 to 12 months).
- Received regulatory approval on first design submittal with no comments

TETRA TECH

Landfill Site Investigation, Evaluation, and Soil Cover Design

Naval Support Facility, Indian Head, MD

Client Name
Naval Facilities Engineering Command

Project Highlights

- *Negotiated variance to State landfill closure regulations*
- *Effective cap at a substantial cost savings*
- *Restored 0.4 acre wetland*

Project Cost
$938,600

Tetra Tech completed a site investigation, evaluation, and remedial design for the Town Gut Landfill. This 4-acre site was operated between 1968 and 1980 for the disposal of approximately 70,000 cubic yards of landscaping waste, fill material, and rubble. Unauthorized items reportedly dumped at the site included paints, varnishes, and other chemical wastes.

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A variance to Maryland landfill closure regulations was successfully negotiated. The variance allowed the landfill to be closed with a 2-foot thick soil cover in lieu of an impervious cap. Construction of the soil cover greatly reduced the capital cost while conforming to State requirements. Contaminated soil and accumulated debris were removed from 0.4 acres of wetlands to allow the installation of the 2-foot thick soil cover. The original shoreline contours were maintained and the pre-existing habitat was restored.

Tetra Tech also provided general consulting services throughout construction, including reviewing contractor submittals and variance requests. Deed restrictions were prepared to prohibit residential development on the landfill and use of site groundwater as a source of drinking water.

Atlantic County Utilities Authority

Pinelands Park Landfill
Egg Harbor Township, NJ

Cornerstone provided environmental review and due diligence services to the Atlantic County Utilities Authority (ACUA) for the acquisition of the Pinelands Park Landfill, a closed municipal solid waste (MSW) landfill located in Atlantic County, New Jersey. The landfill is now a public golf course. Cornerstone continues to perform post-closure monitoring and regulatory reporting, including certification of cost submittals for withdrawals from the site's escrow funds, and biennial updates to the post-closure care financial plan. The work also includes preparation of independent estimate of post-closure maintenance and monitoring activities, with recommendations for approaches to maintain environmental compliance while reducing post-closure operations and maintenance cost.

Cornerstone landfill gas technicians manage the active landfill gas collection and control systems, operating the system to control fugitive emissions; and, maintenance of the system.

Cornerstone field technicians periodically collect groundwater, leachate, and stormwater samples in accordance with permit conditions. Cornerstone environmental scientists review analytical results for compliance and report results to the ACUA and regulatory agency.

Cornerstone is performing repair and replacement work to maintain operation and functionality of all environmental systems. Cornerstone is reviewing and recommending modification of permit conditions, to more effectively match environmental monitoring requirements to the environmental conditions. The modifications result in a reduced monitoring frequency and cost to the client.

Key Project Activities

- Environmental review and due diligence
- Post-closure cost estimates
- Post-closure monitoring and reporting
- Post-closure care financial plan updates

Project Manager:

Arie P. Kremen, PhD

Client Contact:

Brian Lefke

Tel # 609.272.6950

Start/End Date:

2010 – Ongoing

IESI - Seneca Meadows, Inc.

Tantalo Waste Disposal Site
Seneca Falls, NY

Cornerstone personnel provided remediation services to IESI Seneca Meadows, Inc. (SMI) at the Tantalo Waste Disposal Site, in the Town of Seneca Falls, NY on a 600-acre site occupied by the Part 360-permitted Seneca Meadows Landfill. The work included site investigation, feasibility study, design, construction services, and operation and maintenance activities. The site had been classified as a Class 2 inactive hazardous waste site by the NYSDEC, but as a result of the remediation efforts is now a Class 4 site.

The work started with a focused remedial investigation and feasibility study along with an aquifer/tracer test for further characterization of bedrock hydrogeology. This work was successful in identifying two distinct water-bearing zones that others had mapped as a single unit, explaining the site plume configuration and also providing data that was used to demonstrate that the extent of the plume is being naturally attenuated.

Cornerstone then developed a remedial design for the site's two operable units. For Operable Unit No. 1, site closure included a geocomposite cap, drainage controls, gas controls, a leachate collection system, waste pullback, a cutoff wall along adjacent Black Brook, and relocation of the site access road and scale. For this aspect of construction, the project utilized a new grading material termed comparable structural fill, which helped defray the costs of remediation. For Operable Unit No. 2, Cornerstone prepared the engineering design and all required documents for enhanced monitored natural attenuation (electron donor injection for enhanced reductive dechlorination of VOCs), which avoided a more costly pump and treat alternative originally preferred by state regulators.

During implementation, Cornerstone personnel provided construction observation and certification services and currently Cornerstone is continuing its work with operation, maintenance and monitoring services. Both remedies are performing as designed.

Key Project Activities

- Focused RI/FS
- Fractured rock aquifer/tracer test
- Remedial design
- Remedial construction
- Natural attenuation demonstration (reductive dechlorination)
- Operation, maintenance and monitoring services

Project Manager:

Robert Holmes, PE

Gary DiPippo, PE

Client Contact:

Thomas P. Hasek, Jr.

Tel # 315-539-5624

Start/End Date:

1999 – Ongoing

MAC Landfill

MAC Landfill
Deptford Township, New Jersey

Cornerstone provides a variety of environmental engineering and compliance services to MAC Landfill, a closed municipal solid waste (MSW) landfill located in Deptford Township, New Jersey. Services include environmental compliance support for groundwater, landfill gas migration, landfill emissions permitting, and stormwater pollution prevention monitoring.

The landfill accepted MSW from Gloucester County, New Jersey, and other surrounding communities. It ceased waste acceptance in 1977, and was finally certified closed in the 1980s. Cornerstone employees had previously been providing services at the site for past 30 years.

Each year Cornerstone performs a site inspection to document both post-closure landfill maintenance and stormwater pollution prevention monitoring. The results of this annual inspection are published in a site inspection report that is kept on file at the offices of United Environmental Services (UES). In accordance with the state-approved closure plan for the site, landfill gas migration monitoring is performed quarterly by UES. Cornerstone staff reviews the landfill gas monitoring results and transmit the findings to NJDEP.

MAC landfill has a system of passive landfill gas vents. Because of the quantity of landfill gas that is emitted, the landfill has an Air Pollution Control Operating Permit issued by NJDEP. This permit requires regular monitoring and reporting of the air emissions produced by the landfill gas vents.

Key Project Activities

- Engineering services
- Environmental compliance services, including groundwater, landfill gas migration, emissions permitting, and stormwater pollution prevention monitoring
- Annual site inspection report

Project Manager:

Mark Swyka

Client Contact:

Gary De Franco

Start/End Date:

February 2006 – Ongoing

cornerstone environmental

Post Closure Monitoring Annual Engineer's Report and Cost Estimating

Montgomery-Otsego-Schoharie Solid Waste Management Authority

Eastern Landfill, Central Landfill, C&D Landfill
NY

Cornerstone Engineering and Land Surveying, PLLC is providing Montgomery-Otsego-Schoharie Solid Waste Management Authority (MOSA) with landfill engineering services, including post-closure site visits and monitoring, engineering evaluation of existing systems, and annual reporting for 3 MOSA landfills, Eastern Landfill, located in the Town of Amsterdam, Central Landfill, located in the Town of Root, and the C&D landfill, located in the Town of Otsego.

Cornerstone prepared an Annual Engineer's Report (AER) for each site to meet Post Closure Monitoring and Maintenance Agreement requirements between MOSA and its member counties. The AER reports, prepared in accordance with the requirements of 6NYCRR Part 360-2.15 and the Post Closure Monitoring and Maintenance Agreement, will include:

- A review and summary of Monthly Inspection forms.
- Summary of maintenance that has been performed at each site during the past year.
- Summary of the leachate, groundwater, and gas sampling and monitoring that has been performed in the last year.
- Visual condition survey of the monitoring point network, cap system, surface drainage system, leachate and gas collection system (where present) and site access.
- Identification of any current or impending conditions at the Landfills which may require additional expenditures

The data, inspection, and maintenance summaries and visual condition survey are compiled into a narrative report and presented as the AER.

Key Project Activities

- Post closure monitoring and annual reporting
- Post closure cost estimates for 30 year post closure term
- Engineering evaluations landfill and leachate management systems

Project Manager:

Robert A. Holmes, PE

Client Contact:

Dennis Heaton

Tel # 917.669.334

Start/End Date:

2010 – Ongoing

cornerstone environmental

Engineering, Permitting, Air Compliance, and Environmental Monitoring

Ocean County Landfill Corporation

Ocean County Landfill
Manchester, NJ

Cornerstone's principals have worked with Ocean County Landfill Corporation on the Ocean County Landfill (OCLF) in Manchester, NJ, since the 1980s, providing environmental engineering and consulting services, including landfill design and systems analysis, civil and site work, permitting, air compliance, environmental monitoring services and general engineering oversight. OCLF consists of approximately 300-acres of landfill area and annually processes roughly 500,000 tons of municipal solid waste (MSW). The facility uses a double composite baseliner and collected leachate is directed to an onsite pre-treatment plant. Thirty-six groundwater monitoring wells surround the OCLF.

To control landfill gas (LFG) emissions, Cornerstone has developed a horizontal gas collection system to capture the LFG, which is delivered to two independent LFG-to-energy facilities where it is treated and used to produce electricity. Combined, the two facilities have the capacity to generate approximately 13.9 MW of electricity.

Cornerstone developed the facility's Title V operating permit renewal applications and prepared NSPS/NESHAP/Title V semi-annual reporting and annual emission statements for the past five years. Cornerstone has also participated in negotiations with NJDEP and USEPA on Prevention of Significant Deterioration (PSD)/Nonattainment New Source Review (NNSR). Air compliance work also included assisting OCLF to develop legal arguments regarding common control issues with regard to combining regulatory and liability issues between OCLF and the on-site LFG-to-energy facility.

OCLF conducts interim operations using temporary cell capping, which allows for future permitted overfilling. Cornerstone has developed a program that allows OCLF to install a leachate recirculation system within the temporary cap system. OCLF has installed leachate recirculation lines on more than 130 acres of the landfill.

Cornerstone designed and permitted an on-site transfer station to be used to handle municipal solid waste and construction and demolition debris, which is currently under construction.

Key Project Activities

- Engineering, design, and permitting
- Leachate recirculation design and evaluation
- Title V operating permit renewal applications
- NSPS/NESHAP/Title V reporting
- Environmental monitoring, including facility emissions
- GHG reduction reports
- Soil gas sampling and reporting, gas collection system monitoring
- Groundwater monitoring, statistical analysis, and reporting
- Stormwater analysis and reporting

Project Manager:

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Client Contact:

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Start/End Date:

February 2006 – Ongoing

Pollution Control Financing Authority of Camden County (PCFA)

Pennsauken Sanitary Landfill
Pennsauken Township, New Jersey

Cornerstone is completing the facility Master Plan for the Pollution Control Financing Authority of Camden County (PCFA)'s Pennsauken Landfill. The work is focused on assisting PCFA to derive the maximum benefit from the landfill.

Located in the town of Pennsauken, New Jersey along the Delaware River, the Pennsauken Landfill has been providing for the disposal needs of the local community for more than 30 years. The landfill was developed in discrete phases constructed within the available land area to meet the requirements of the regulations in effect at the time.

Cornerstone evaluated the existing landfill footprint and conditions at the site to identify practical, cost effective landfill expansion opportunities. Although lateral footprint expansion alternatives are limited, Cornerstone experts determined that selective height increases, coupled with the use of overliners and perimeter berms, can achieve adequate additional air-space well beyond the facility's current planning horizon.

To demonstrate the effect of various development approaches, Cornerstone prepared multiple grading plans, each of which demonstrated an incremental approach to landfill air-space addition. Each plan was also accompanied by an air-space volume calculation. Viewing the plans comparatively allowed for a clear graphic depiction of how to best utilize the available resources at the project site. The final development sequence is currently being incorporated into the final Master Plan for the facility.

To assist in selection of the appropriate development strategy, Cornerstone prepared engineering cost estimates for each option, including capital cost, closure cost, and long-term operation, maintenance and monitoring. Costs were identified as total present worth as well as unit of capacity.

Key Project Activities

- Alternative landfill grading plans
- Comparative landfill air-space calculations
- Evaluation to enhance air-space volume
- Comprehensive cost estimation
- Unit of capacity cost value determinations

Project Manager:

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Start/End Date:

2010 – Ongoing

Town of Carmel, NY

Town of Carmel Landfill
Putnam County, NY

Cornerstone performed a variety of closure and post-closure services for the Town of Carmel Landfill, located in the Town of Carmel, Putnam County, New York. The work included a closure investigation, engineering design for closure, and construction quality assurance services in accordance with 6 NYCRR Part 360 regulations.

The site is a 14-acre inactive landfill facility co-located with the Town's recycling center. It began operation in 1946 as a site to dispose of ash waste from an on-site incinerator. In 1976, the Town ceased the regular placement of solid waste at the site and began accepting only land-clearing debris, yard waste, and construction and demolition debris. This continued until July 2001, when the Town ceased accepting waste at the landfill.

Per an Order on Consent issued by the New York State Department of Environmental Conservation (NYSDEC), present day Cornerstone staff prepared the following documents:

- *Closure Investigation Report*
- *Engineering Design Report*
- *Closure Plans for Town of Carmel Landfill*
- *Operations & Maintenance Manual*
- *Bid Documents and Technical Specifications*
- *Construction Quality Assurance and Construction Quality Control Plan*
- *Construction Contingency Plan*

Construction of the final closure began in 2005 and was completed in 2007. Cornerstone provided professional engineering services during construction, including contract administration, shop drawing review, construction observation, and engineering certification.

Key Project Activities

- Waste consolidation to reduce landfill footprint
- Design of final cover on 2H:1V landfill sideslopes
- Geogrid reinforced perimeter soil berm allowed waste placement within a reduced footprint
- Closure investigation services
- Engineering design services
- Construction quality assurance services
- Post-closure environmental monitoring and reporting

Project Manager:

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Client Contact:

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Start/End Date:

May 2006 - 2009

Walter's Homes

Stafford Township Landfills
Stafford Township, NJ

Current Cornerstone Environmental Group staff supported Walter's Homes on the closure of two inactive landfills in Stafford Township, New Jersey and subsequent redevelopment for commercial and residential uses. The work included waste and debris excavation and relocation, construction of final cover, and ongoing environmental monitoring.

The site, originally owned by Stafford Township, and located in the sensitive Pinelands region of New Jersey, included two separate areas where landfills had historically been operated. Closure included the complete excavation and relocation of the old, unlicensed landfill area and the regrading and capping of the newer, formerly licensed landfill area.

Cornerstone staff prepared the design plan and completed the permitting for the excavation, relocation, and beneficial reuse of 500,000 cubic yards of waste and debris from the unlicensed landfill, which was used to regrade and contour the formerly licensed landfill.

Closure of the licensed landfill included the construction of an impermeable final cover, which incorporated a polyethylene geomembrane, subsurface drainage layer, and a unique passive landfill gas venting system with provisions to simplify future conversion to active collection if desired. Post-closure use of the landfill includes open space, a Class B recycling center for yard and leaf compost, and a solar electric generating field.

Excavation of waste from the unlicensed landfill area paved the way for the commercial redevelopment of this portion of the site. The waste relocation was successful, and the site is performing as expected.

Cornerstone continues to provide environmental monitoring as a component of the post-closure care at the landfill facility.

Key Project Activities

- Landfill closure
- Geomembrane final cover
- Development of yard waste compost facility
- Major waste disruption
- Excavation and beneficial reuse of waste materials
- Brownfield redevelopment
- Post-closure monitoring and maintenance

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Start/End Date:

February 2006 – Ongoing