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Engineers and
Scientists

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Mr. Maurice F. Moore
Engineering Geologist 1
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2915

Re: Technical Impracticability Waiver
Supplemental Field Studies Work Plan
Steel Winds I Wind Facility
Tecumseh Redevelopment Site (Site No. C915205)
Lackawanna, New York

Dear Mr. Moore:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide this Technical Impracticability (TI) Waiver Supplemental Field Studies Work Plan (Work Plan), for the Steel Winds I portion of the Tecumseh Redevelopment Site (Site) to the New York State Department of Environmental Conservation (DEC). This Work Plan details sampling, laboratory analysis, data evaluation and reporting in support of a TI Waiver request for the Site, in accordance with GZA's May 9, 2012 letter to DEC. This Work Plan has been prepared on behalf of the Site operator, Niagara Wind Power, LLC (NWP) an affiliate of First Wind Energy, LLC (First Wind).

BACKGROUND AND OBJECTIVES

In November 2011, Benchmark Environmental Engineering and Science, PLLC (Benchmark) submitted an ***Operation, Monitoring and Maintenance Request for Modification*** (OM&M Request) to the DEC for the Site, prepared on behalf of First Wind. The OM&M Request was submitted to the Department, as a petition requesting a change in the then ongoing groundwater remedy for the WT-01 portion of the Site. This remedy, involved deployment of oxygen releasing compound (ORC®) socks in select wells, to promote aerobic bioremediation of petroleum hydrocarbons in groundwater.

The DEC provided comments to the OM&M Request on April 10, 2012 and GZA responded to these comments on May 2, 2012. In this response letter, GZA stated that a Technical Impracticability (TI) Waiver Application would be submitted for the Site, once remedies at the broader Bethlehem Steel Site had been implemented. On May 31, 2012,

DEC provided a follow up letter requesting that the TI Waiver Application be submitted by April 1, 2014. In a June 22, 2012 email, GZA requested that the submittal date be moved to November 1, 2014 because some of the field work involved in preparing the evaluation requires sampling within Smokes Creek and Lake Erie, which is most appropriately conducted in summer. The Department granted this request in a May 1, 2013 email.

As described in the OM&M Request and GZA's May 2, 2012 letter, the ORC® sock remedy has not been effective in reducing volatile organic compound (VOC) concentrations in groundwater in the vicinity of WT-01. Our initial evaluation indicated that the most applicable groundwater remedy for the WT-01 vicinity is monitored natural attenuation (MNA).

Therefore, the sampling, analysis and data evaluation described in this Work Plan will be used to further support the preparation of a TI Waiver Application for the Site. Specifically the data from this study will be used to:

- Evaluate the feasibility of additional groundwater remedial alternatives;
- Evaluate the contaminant contribution from the Site to surface water;
- Evaluate the ecological impacts to benthic invertebrates; and
- Assess whether a MNA is a valid remedy for on-site groundwater.

PROPOSED SCOPE OF WORK

The following specific tasks are proposed to address the study data needs and objectives described above.

Task 1: Groundwater Sampling and Analysis

GZA will sample eight existing wells (four on-site and four off-site) in the WT-01 vicinity for contaminants of concern (COCs), primarily benzene, toluene, xylenes and naphthalene, general chemistry and water quality parameters, to evaluate:

1) the current COC distribution and concentrations in groundwater;
2) the potential influence on the WT-01 area from upgradient sources; and
3) the efficacy of applicable groundwater remedial technologies (i.e., insitu chemical oxidation (ISCO), enhanced reductive dechlorination (ERD), etc.)

Proposed sampling locations are shown on Figure 1. Groundwater monitoring well sampling will be conducted in June 2014, in conjunction with the annual Site-Wide Long Term Groundwater Monitoring.

Consistent with the September 2007 Site Management Plan (SMP), groundwater samples will be collected in general accordance with EPA's January 19, 2010 Low Stress (low

flow) Purging and Sampling Procedure. Groundwater samples will be collected using either a peristaltic pump or submersible pump with the down-hole tubing or pump intake placed at the approximate midpoint of the well's screened interval. At the ground surface, the water will pass through a sealed flow through cell containing probes which will measure the water temperature, pH, specific conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO). Samples of water discharging from the flow through cell will be collected at regular intervals and analyzed for turbidity using a hand-held field meter.

Groundwater analytical samples will be collected once water quality parameters have stabilized. Stabilization is defined by three successive readings which should be within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for ORP, and ± 10% for turbidity and DO. The groundwater samples will be analyzed for:

- CP-51 Soil Cleanup Guidance list (CP-51 list) VOCs via USEPA Method 8260B,
- Base-Neutral semi-VOCs (SVOCs) via USEPA Method 8270C,
- Methane, ethane and ethene via USEPA Method RAK 175,
- Dissolved iron via USEPA Method 6010B,
- Nitrate via USEPA Method 353.2,
- Sulfate via USEPA Method 300.0,
- Alkalinity via USEPA 2320B, and
- Total organic carbon (TOC) via USEPA Method 5310/9060.

Proposed data quality objectives and laboratory reporting limits are shown Table 1. Analytical results will be compared to the DEC Class GA groundwater criteria[1]. These new results, in conjunction with recent annual Site-wide Long Term Groundwater Monitoring and semi-annual WT-01 vicinity groundwater monitoring, will be used to evaluate the potential effectiveness of select groundwater remedial technologies.

Task 2: Limited Surface Water and Sediment Evaluation

GZA will collect eight surface water samples (three from Smokes Creek and three from Lake Erie), as shown on Figure 1. Samples will be analyzed for CP-51 list VOCs and Base-Neutral SVOCs via the methods described above in Task 1. Samples will generally be collected from shore using a dip pole and will be collected from the approximate center of the water column as measured on the day of sample collection. Care will be taken to not disturb bottom sediments during sampling. Proposed data quality objectives and laboratory reporting limits for surface water are shown on Table 2.

[1] New York State Department of Environmental Conservation (NYSDEC), Division of Water Technical Operational Guidance Series (TOGS 1.1.1), Class GA criteria, dated October 1993 (revised June 1998, January 1999 errata sheet, and April 2000 addendum).

Co-located with the surface water sampling locations, GZA will attempt to install passive diffusion bag samplers within the bottom sediments of Smokes Creek and Lake Erie; which will be installed after surface water samples have been collected. The diffusion bag results will be used to evaluate pore water VOC concentrations within the sediment of Smokes Creek and Lake Erie. Passive diffusion bag samplers are low density polyethylene (LDPE) bags filled with deionized water. When a passive diffusion bags are placed in the sediment, VOCs, excluding certain ketones, ethers, and alcohols, diffuse through the semi-permeable LDPE bag. Generally, a minimum of two weeks is required for equilibrium to form between the VOC concentration within the water inside and outside the bag.

Analytical results from diffusion bag samplers buried in the sediment will be indicative of pore water quality (groundwater seeping into the creek and lake) not surface water concentrations. Dilution, volatilization and other attenuation mechanisms greatly reduce the concentration of constituents detected in the river compared to that observed in pore water. However, the pore water is representative of the water quality to which benthic invertebrates are exposed.

Where conditions permit, passive diffusion bags will be buried approximately 1-foot into creek/lake sediments, five to 10 feet from shore line. The samplers will be left in place for a minimum of three weeks. Once retrieved, the samplers will be tested for CP-51 list VOCs. Proposed data quality objectives and laboratory reporting limits are shown in Table 1. As noted above, the diffusion bag results will be evaluated as ground water. If bottom conditions are not conducive to the installation of passive diffusion bags, temporary shallow steel piezometers may be installed in Smokes Creek and Lake Erie.

Sediment samples will be collected from the vicinity of each surface water/diffusion bag sampling locations. Sediment samples will be collected following surface water sampling and concurrent with diffusion bag installation. Care will be taken to collect undisturbed sediment samples. Sediment samples will be collected by manually driving a 3-inch ID stainless-steel sediment sampler, lined with a clear Lexan® tube, to the maximum practical push depth, up to 24 inches. The sediment sampler will be thoroughly decontaminated between samples and a new Lexan® tube will be used at each sampling location. Samples will be analyzed for CP-51 list VOCs, Base-Neutral SVOCs and TOC via USEPA Method 5310/9060. Proposed data quality objectives and laboratory reporting limits are shown in Table 3.

The above described sampling will occur in July 2014, as surface water levels should be at/near seasonal low, which will allow for an evaluation of worst case (i.e., highest) groundwater COC loading to surface water. Seasonal low surface water conditions are also the most appropriate sampling time based on health and safety considerations. The sample locations shown on Figure 1 are approximate and sampling locations may be modified based on observed field conditions.

Task 3: Area Wide Geohydrologic Evaluation

GZA will evaluate groundwater and surface water COC mass loadings to Smokes Creek and Lake Erie using the data collected in Tasks 1 and 2, along with relevant previous data from the Steel Winds Site and the Bethlehem Steel Site, and data from ongoing monitoring at the Bethlehem Steel Site. This evaluation will include:

- An evaluation of the total surface water and groundwater watershed draining to Smokes Creek and Lake Erie in the vicinity of WT-01;
- An evaluation of the total COC loading to Smokes Creek and Lake Erie from the Bethlehem Steel Site, including post remedial Acid-Tar Pit slurry wall and Agitator Sludge removal groundwater results;
- An evaluation of the groundwater flux from the WT-01 vicinity; and
- An evaluation of the COC contribution from the WT-01 vicinity relative to other COC inputs.

This task will include pneumatic hydraulic conductivity testing on five overburden wells in the WT-01 vicinity. Testing locations will be selected based on observations during groundwater sampling, i.e. well yield, well drawdown, etc., to capture the potential hydraulic conductivity range during testing. Pneumatic hydraulic conductivity testing will be conducted by placing an apparatus over a well, which will be pressurized using a handheld air pump, producing a slug of compressed air in the well. The pressure will then be released to initiate a rising head test. A programmable pressure transducer with data logging capabilities will be installed in the well and used to record pressure change indicative of water level fluctuations. Pneumatic hydraulic conductivity testing can only be conducted if the entire well screen is submerged. If a well screen is not completely submerged, a solid slug will be used to conduct rising head and/or specific capacity test.

Task 4: Fish and Wildlife Resources Impact Analysis

GZA will conduct a Fish and Wildlife Resources Impact Analysis (FWRIA) Part 1 (a) through (d): Resource Characterization ("Part 1") pursuant to the Guidelines Provided in DER-10 Section 3.10. Specifically, the work to be conducted will include the following steps:

- Step 1: Identification of fish and wildlife resources;
- Step 2: Characterization of fish and wildlife resources;
- Step 3: Identification of contaminant migration pathways and any fish and wildlife exposure pathways, based on Tasks 1 through 3;
- Step 4: Identification of contaminants of ecological concern, based on Task 1 through 3; and
- Step 5: Development of conclusions regarding the actual or potential adverse impacts to fish and wildlife resources resulting from conditions at the WT-1 Site.

The FWRIA will be documented in the TI Waiver Application, described below. Proposed data quality objectives for the FWRIA are shown in Tables 2 and 3.

Task 5: TI Waiver Application

GZA will prepare and submit a TI Waiver Application for the Steel Winds WT-01 vicinity. The application will include:

- The results of Tasks 1 through 4 described above;
- A data usability summary report (DUSR), in accordance with DER-10 Appendix 2B;
- An evaluation of COC mass loadings from the Site to Smokes Creek and Lake Erie;
- A feasibility analysis of potential groundwater remedies; and
- A recommendation that MNA be implemented for impacted groundwater in the WT-01 vicinity, if warranted;

In order to provide a consistent platform for the evaluation of potential groundwater remedies the following criteria described in DER-10 Section 4.2 will be utilized in the groundwater remedy feasibility analysis:

- Overall protection of human health and the environment;
- Conformance with promulgated standards, criteria and guidance;
- Long-term effectiveness and permanence;
- Reduction of waste toxicity, mobility, or volume;
- Short-term impact and effectiveness;
- Implementability;
- Cost effectiveness; and
- Landuse

Between three and six groundwater remedies, such as hydrodynamic containment, ISCO, air sparge, etc., will be evaluated as part of the application.

Task 6: Meeting with DEC

GZA will meet with the DEC to review the submitted, TI Waiver Application, if required.

Task 7: Public Participation

Once the DEC has approved the TI Waiver Application, GZA will distribute public notice describing the remedy change.

QUALITY ASSURANCE QUALITY CONTROL PROCEDURES

Samples collected as part of this study will be placed in laboratory provided containers, preserved as appropriate per the laboratory method requirement, placed in a cooler, kept on ice, and transported under chain-of-custody to Spectrum Analytical Laboratory, of North Kingstown, Rhode Island, a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) facility.

Groundwater, surface water and sediment samples will be analyzed for VOCs and SVOCs by the following methods:

- CP-51 list VOCs by EPA Method;
- Base-Neutral SVOCs by EPA Method 8270; and
- TOC by EPA Method 5310/9060.

Diffusion bag samples will be tested for CP-51 list VOCS only. As part of the study, GZA will collect Quality Assurance/Quality Control (QA/QC) samples in order to:

(1) check sample bottle preparation;
(2) evaluate contamination introduced during transport;
(3) evaluate the effectiveness of field decontamination procedures; and
(4) evaluate the reproducibility: and accuracy of the laboratory analytical procedures.

QA/QC samples will consist of trip blanks, equipment blanks, and blind duplicate samples. One trip blank per cooler will be analyzed for VOCs, in order to assess contamination introduced to the samples during the transportation process. For the sediment sampling program, GZA will collect one (1) equipment blank of the sediment sampler. The equipment blank will be prepared by pouring laboratory-provided, analyte-free water through the sampling device after the completion of field decontamination procedures.

In addition, one co-located blind duplicate sample per media will be collected during the groundwater, surface water, passive diffusion bag and sediment sampling programs, described above, to evaluate sampling and laboratory variability. These blind duplicates will be split from the target sample, but provided with a unique identification.

Non-dedicated reusable equipment (i.e., sediment sampler) will require field decontamination. Acids and solvents will not be used in the field decontamination of such equipment. Decontamination typically involves scrubbing/washing with a laboratory grade detergent (e.g., alconox) to remove visible contamination, followed by potable (tap) water and analyte-free (deionized organic free) water rinses. Tap water may be used for this purpose from any treated municipal water system. Equipment will be allowed to dry, or will be wiped dry with clean paper towels, prior to reuse.

PROJECT SCHEDULE

A proposed project schedule is provided below. As required by a May 1, 2013 communication from the Department, the TI Waiver Application will be submitted to the Department by November 1, 2014.

Task	Estimated Completion Date
Task 1: Groundwater Sampling and Analysis	June 30, 2014
Task 2: Limited Surface Water and Sediment Evaluation	July 15, 2014
Task 3: Area Wide Geohydrologic Evaluation	August 1, 2014
Task 4: FWRIA	September 1, 2014
Task 5: TI Waiver Application Submission to DEC	November 1, 2014
Task 6: Meeting with the Department	As needed
Task 7: Public Participation	As needed

We trust this Work Plan addresses your needs. If you have any question or comments, or would like to discuss the proposed study, please feel free to contact Ed or Rick at (401) 421-4140 or via email at edward.summerly@gza.com or richard.carlone@gza.com. We look forward to your approval of the proposed work.

Respectfully,

GZA GEOENVIRONMENTAL, INC.

Richard A. Carlone, P.E.
Project Manager

Christopher Boron, CPG
Consultant Reviewer

Edward A. Summerly, P.G.
Principal

RAC/EAS:lal

cc: Josh Bagnato, First Wind Energy, LLC (electronic copy)
Claude Cote, First Wind Energy, LLC (electronic copy)

Attachments Figure 1
Tables 1 through 3

Table 1: Analytical Parameters an Data Quality Objectives-Groundwater and Passive Diffusion Bag Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Regulatory Criteria Class GA groundwater (ug/L)	Project Quantitation Limit (ug/L)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
VOCs	Benzene	1[s]	1	8260B	1	0.33	1
VOCs	n-Butylbenzene	5*	1	8260B	1	0.33	1
VOCs	sec-Butylbenzene	5*	1	8260B	1	0.28	1
VOCs	Ethylbenzene	5*	1	8260B	1	0.35	1
VOCs	Isopropylbenzene	5*	1	8260B	1	0.38	1
VOCs	p-Isopropyltoluene	5*	1	8260B	1	0.46	1
VOCs	Methyl-Tert-Butyl-Ether	NC	1	8260B	1	0.24	1
VOCs	Naphthalene	10	1	8260B	1	0.80	1
VOCs	n-Propylbenzene	5*	1	8260B	1	0.64	1
VOCs	Tert-Butylbenzene	5*	1	8260B	1	0.37	1
VOCs	Toluene	5*	1	8260B	1	0.32	1
VOCs	1,2,4-Trimethylbenzene	5*	1	8260B	1	0.40	1
VOCs	1,3,5-Trimethylbenzene	5*	1	8260B	1	0.45	1
VOCs	Xylene (mixed)	5*	1	8260B	1	0.36	1
SVOCs	1,2,4-Trichlorobenzene	5*[s]	10	8270C	10	0.93	10
SVOCs	1,2-Dichlorobenzene	3[s]	10	8270C	10	0.84	10
SVOCs	1,3-Dichlorobenzene	3[s]	10	8270C	10	0.71	10
SVOCs	1,4-Dichlorobenzene	3[s]	10	8270C	10	1.1	10
SVOCs	2,2´-oxybis(1-Chloropropane)	5*[s]	10	8270C	10	0.78	10
SVOCs	2,4-Dinitrotoluene	5*[s]	10	8270C	10	0.41	10
SVOCs	2,6-Dinitrotoluene	5*[s]	10	8270C	10	0.52	10
SVOCs	2-Chloronaphthalene	10	10	8270C	10	0.81	10
SVOCs	2-Methylnaphthalene	NE	0.1	8270C-SIM	0.1	0.018	0.1
SVOCs	2-Nitroaniline	5*[s]	20	8270C	20	0.71	20
SVOCs	3,3´-Dichlorobenzidine	5*[s]	10	8270C	10	1.7	10
SVOCs	3-Nitroaniline	5*[s]	20	8270C	20	0.97	20
SVOCs	4-Bromophenyl-phenylether	NC	10	8270C	10	0.54	10
SVOCs	4-Chloroaniline	5*[s]	10	8270C	10	2	10
SVOCs	4-Chlorophenyl-phenylether	NC	10	8270C	10	0.41	10
SVOCs	4-Nitroaniline	5*[s]	20	8270C	20	0.96	20
SVOCs	Acenaphthene	20	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Acenaphthylene	NC	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Anthracene	50	0.1	8270C-SIM	0.1	0.017	0.1

Table 1: Analytical Parameters an Data Quality Objectives-Groundwater and Passive Diffusion Bag Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Regulatory Criteria Class GA groundwater (ug/L)	Project Quantitation Limit (ug/L)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
SVOCs	Benzo(a)Anthracene	0.002	0.1	8270C-SIM	0.1	0.042	0.1
SVOCs	Benzo(a)Pyrene	ND[s]	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Benzo(b)Flouranthene	0.002	0.1	8270C-SIM	0.1	0.056	0.1
SVOCs	Benzo(g,h,i)perylene	NC	0.1	8270C-SIM	0.1	0.021	0.1
SVOCs	Benzo(k)Flouranthene	0.002	0.1	8270C-SIM	0.1	0.02	0.1
SVOCs	Bis(2-chloroethoxy)methane	5*[s]	10	8270C	10	1.1	10
SVOCs	Bis(2-chloroethyl)ether	1.0[s]	10	8270C	10	0.75	10
SVOCs	Bis(2-ethylhexyl)phthalate	5.0[s]	10	8270C	10	1.3	10
SVOCs	Butylbenzylphthalate	50	10	8270C	10	0.32	10
SVOCs	Carbazole	NC	10	8270C	10	0.64	10
SVOCs	Chrysene	0.002	10	8270C	10	0.42	10
SVOCs	Dibenzo(a,h)Anthracene	NC	0.1	8270C-SIM	0.1	0.018	0.1
SVOCs	Dibenzofuran	NC	10	8270C	10	0.52	10
SVOCs	Diethylphthalate	50	10	8270C	10	0.45	10
SVOCs	Dimethylphthalate	50	10	8270C	10	0.37	10
SVOCs	Flouranthene	50	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Flourene	50	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Hexachlorobenzene	0.04[s]	10	8270C	10	0.44	10
SVOCs	Hexachlorobutadiene	0.5[s]	10	8270C	10	0.75	10
SVOCs	Hexachlorocyclopentadiene	5*[s]	10	8270C	10	1	10
SVOCs	Hexachloroethane	5*[s]	10	8270C	10	0.55	10
SVOCs	Indeno(1,2,3-cd)Pyrene	0.002	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Isophorone	50	10	8270C	10	0.47	10
SVOCs	Naphthalene	10	0.1	8270C-SIM	0.1	0.05	0.1
SVOCs	Nitrobenzene	0.4	10	8270C	10	1.6	10
SVOCs	Phananthrene	50	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Pyrene	50	0.1	8270C-SIM	0.1	0.016	0.1
Other	Methane	NC	0.58	RSK 175	1	0	1
Other	Ethane	NC	1.2	RSK 175	1	1	1
Other	Ethene	NC	1.5	RSK 175	2	1	2
Other	Dissolved Iron	300	200	6010B	200	31	200
Other	Nitrate	10,000	130	300	130	2	130
Other	Sulfate	250,000[s]	5,000	300.0	5,000	610	5,000
Other	Alkalinity	NC	20000	2320B	20,000	20,000	20,000
Other	Total Organic Carbon	NC	10000	5310/9060	10,000	2,000	10,000

General Notes:

* Principle organic contaminant standard of 5 ug/L applies to this compound.

[s] Limits are regulatory standards as opposed to guidance value.

NC No ambeint water quality standards have been established for any class of water for this compound.

NE The compound is regulated, however there is no criteria established for this class of surface water.

ND Indicates that the regulatory criteria is equal to a notn-detected concentration by the approved laboratory method.

Table 2: Analytical Parameters and Data Quality Objectives-Surface Water Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Regulatory Criteria (Class C Waterbody)		Surface Water Screening Benchmarks (ug/l)		Project Quantitation Limit (ug/L)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
		Fish Propogation FreshWater (ug/L)	Fish Survival Fresh Water (ug/L)							
VOCs	Benzene	210	760	130	[d]	5	8260B	5	0.33	5
VOCs	n-Butylbenzene	NE	NE	NA		5	8260B	5	0.33	5
VOCs	sec-Butylbenzene	NE	NE	NA		5	8260B	5	0.28	5
VOCs	Ethylbenzene	17	150	7.3	[d]	5	8260B	5	0.35	5
VOCs	Isopropylbenzene	2.6	23	NA		5	8260B	5	0.38	5
VOCs	p-Isopropyltoluene	NE	NE	NA		5	8260B	5	0.46	5
VOCs	Methyl-Tert-Butyl-Ether	NC	NC	NA		5	8260B	5	0.24	5
VOCs	Naphthalene	13	110	193	[e]	5	8260B	5	0.80	5
VOCs	n-Propylbenzene	NE	NE	NA		5	8260B	5	0.64	5
VOCs	Tert-Butylbenzene	NE	NE	NA		5	8260B	5	0.37	5
VOCs	Toluene	100	480	9.8	[d]	5	8260B	5	0.32	5
VOCs	1,2,4-Trimethylbenzene	33	290	NA		5	8260B	5	0.40	5
VOCs	1,3,5-Trimethylbenzene	NE	NE	NA		5	8260B	5	0.45	5
VOCs	Xylene (mixed)	65	590	13		5	8260B	5	0.36	5
SVOCs	1,2,4-Trichlorobenzene	5[s]	NE	NA		10	8270C	10	0.93	10
SVOCs	1,2-Dichlorobenzene	5[s]	NE	14	[d]	10	8270C	10	0.84	10
SVOCs	1,3-Dichlorobenzene	5[s]	NE	71	[d]	10	8270C	10	0.71	10
SVOCs	1,4-Dichlorobenzene	5[s]	NE	15	[d]	10	8270C	10	1.1	10
SVOCs	2,2´-oxybis(1-Chloropropane)	NE	NE	NA		10	8270C	10	0.78	10
SVOCs	2,4-Dinitrotoluene	NE	NE	NA		10	8270C	10	0.41	10
SVOCs	2,6-Dinitrotoluene	NE	NE	NA		10	8270C	10	0.52	10
SVOCs	2-Chloronaphthalene	NE	NE	NA		10	8270C	10	0.81	10
SVOCs	2-Methylnaphthalene	4.7	42	70	[n]	0.1	8270C-SIM	0.1	0.018	0.1
SVOCs	2-Nitroaniline	NE	NE	NA		20	8270C	20	0.71	20
SVOCs	3,3´-Dichlorobenzidine	NE	NE	NA		10	8270C	10	1.7	10
SVOCs	3-Nitroaniline	NE	NE	NA		20	8270C	20	0.97	20

Table 2: Analytical Parameters and Data Quality Objectives-Surface Water Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Regulatory Criteria (Class C Waterbody)		Surface Water Screening Benchmarks (ug/l)		Project Quantitation Limit (ug/L)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
		Fish Propogation FreshWater (ug/L)	Fish Survival Fresh Water (ug/L)							
SVOCs	4-Bromophenyl-phenylether	NC	NC	NA		10	8270C	10	0.54	10
SVOCs	4-Chloroaniline	NE	NE	NA		10	8270C	10	2	10
SVOCs	4-Chlorophenyl-phenylether	NC	NC	NA		10	8270C	10	0.41	10
SVOCs	4-Nitroaniline	NE	NE	NA		20	8270C	20	0.96	20
SVOCs	Acenaphthene	5.3	48	55.85	e	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Acenaphthylene	NC	NC	306.9	e	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Anthracene	3.8	35	20.73	e	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Benzo(a)Anthracene	0.03	0.23	2.227	e	0.1	8270C-SIM	0.1	0.042	0.1
SVOCs	Benzo(a)Pyrene	NE	NE	0.9573	e	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Benzo(b)Fluoranthene	NE	NE	0.6774	e	0.1	8270C-SIM	0.1	0.056	0.1
SVOCs	Benzo(g,h,i)perylene	NC	NC	0.4391	e	0.1	8270C-SIM	0.1	0.021	0.1
SVOCs	Benzo(k)Fluoranthene	NE	NE	0.6415	e	0.1	8270C-SIM	0.1	0.02	0.1
SVOCs	Bis(2-chloroethoxy)methane	NE	NE	NA		10	8270C	10	1.1	10
SVOCs	Bis(2-chloroethyl)ether	NE	NE	NA		10	8270C	10	0.75	10
SVOCs	Bis(2-ethylhexyl)phthalate	0.6	NE	3	d	10	8270C	10	1.3	10
SVOCs	Butylbenzylphthalate	NE	NE	19	d	10	8270C	10	0.32	10
SVOCs	Carbazole	NC	NC	4	t	10	8270C	10	0.64	10
SVOCs	Chrysene	NE	NE	2.042	e	10	8270C	10	0.42	10
SVOCs	Dibenzo(a,h)Anthracene	NC	NC	0.2825	e	0.1	8270C-SIM	0.1	0.018	0.1
SVOCs	Dibenzofuran	NC	NC	4	p	10	8270C	10	0.52	10
SVOCs	Diethylphthalate	NE	NE	210	d	10	8270C	10	0.45	10
SVOCs	Dimethylphthalate	NE	NE	NA		10	8270C	10	0.37	10
SVOCs	Fluoranthene	NE	NE	7.109	e	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Fluorene	0.54	4.8	39.3	e	0.1	8270C-SIM	0.1	0.017	0.1
SVOCs	Hexachlorobenzene	NE	NE	NA		10	8270C	10	0.44	10
SVOCs	Hexachlorobutadiene	1.0	10	NA		10	8270C	10	0.75	10

Table 2: Analytical Parameters and Data Quality Objectives-Surface Water Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Regulatory Criteria (Class C Waterbody)		Surface Water Screening Benchmarks (ug/l)		Project Quantitation Limit (ug/L)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
		Fish Propogation FreshWater (ug/L)	Fish Survival Fresh Water (ug/L)							
SVOCs	Hexachlorocyclopentadiene	0.45s	4.5[s]	NA		10	8270C	10	1	10
SVOCs	Hexachloroethane	NE	NE	NA		10	8270C	10	0.55	10
SVOCs	Indeno(1,2,3-cd)Pyrene	NE	NE	0.275	[e]	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Isophorone	NE	NE	NA		10	8270C	10	0.47	10
SVOCs	Naphthalene	13	110	193	[e]	0.1	8270C-SIM	0.1	0.05	0.1
SVOCs	Nitrobenzene	NE	NE	NA		10	8270C	10	1.6	10
SVOCs	Phenanthrene	5	45	19.13	[e]	0.1	8270C-SIM	0.1	0.019	0.1
SVOCs	Pyrene	4.6	42	10.11	[e]	0.1	8270C-SIM	0.1	0.016	0.1

General Notes:

NE The compound is regulated, however there is no criteria established for this class of surface water.

NC There are no ambient water quality limits for any class of water for this compound.

s The limits are regulatory standards as opposed to guidelines.

d Tier II, Secondary Chronic value from Suter & Tsao, 1996.

n Target surface water concentrations presented in MassDEP (2013) Development of MCP Risk-Based Levels for Soil and Groundwater.

p These surface water screening benchmarks are from a list of screening values used by the US Environmental Protection Agency (EPA) Region 5. These screening values are intended to be protective of sensitive ecological receptors. The EPA Region 5 screening level document can be found at: http://www.epa.gov/reg5rcra/ca/edql.htm.

e Final Chronic Value (FCV) developed in Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. US Environmental Protection Agency, Office of Research and Development. EPA-600-R-02-013.

t Michigan Water Quality Value, Final Chronic Value for the protection of aquatic life. Available at: http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-11383--,00.html

Table 3: Analytical Parameters and Data Quality Objectives-Sediment Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Sediment Guidance Values[1] (ug/kg)	Freshwater Sediment Guidance Values[2] SGV at 0.1% TOC (ug/kg)	Ecological Criteria (ug/kg)		Project Quantitation Limit (ug/kg)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
VOCs	Benzene	530	NA	142	n	5	8260B	5	0.61	5
VOCs	n-Butylbenzene	NC	NA	NA		5	8260B	5	0.67	5
VOCs	sec-Butylbenzene	NC	NA	NA		5	8260B	5	0.62	5
VOCs	Ethylbenzene	430	NA	175	n	5	8260B	5	0.50	5
VOCs	Isopropylbenzene	210	NA	NA		5	8260B	5	0.58	5
VOCs	p-Isopropyltoluene	NC	NA	NA		5	8260B	5	0.71	5
VOCs	Mthyl-Tert-Butyl-Ether	NC	NA	NA		5	8260B	5	0.61	5
VOCs	Naphthalene	NC	385	176	g	5	8260B	5	0.78	5
VOCs	n-Propylbenzene	NC	NA	NA		5	8260B	5	0.44	5
VOCs	Tert-Butylbenzene	NC	NA	NA		5	8260B	5	0.52	5
VOCs	Toluene	930	NA	1,220	n	5	8260B	5	0.47	5
VOCs	1,2,4-Trimethylbenzene	3,400	NA	NA		5	8260B	5	0.57	5
VOCs	1,3,5-Trimethylbenzene	NC	NA	NA		5	8260B	5	0.61	5
VOCs	Xylene (mixed)	590	NA	NA		5	8260B	5	0.47	5
SVOCs	1,2,4-Trichlorobenzene	35,000	NA	5,062	n	330	8270C	330	46	330
SVOCs	1,2-Dichlorobenzene	280	NA	294	n	330	8270C	330	42	330
SVOCs	1,3-Dichlorobenzene	1,800	NA	1,315	n	330	8270C	330	40	330
SVOCs	1,4-Dichlorobenzene	720	NA	318	n	330	8270C	330	36	330
SVOCs	2,2´-oxybis(1-Chloropropane)	NC	NA	NA		330	8270C	330	51	330
SVOCs	2,4-Dinitrotoluene	NC	NA	NA		330	8270C	330	23	330
SVOCs	2,6-Dinitrotoluene	NC	NA	NA		330	8270C	330	28	330
SVOCs	2-Chloronaphthalene	NC	NA	NA		330	8270C	330	38	330
SVOCs	2-Methylnaphthalene	NC	447	NA		3.3	8270C-SIM	3.3	1	3.3
SVOCs	2-Nitroaniline	NC	NA	NA		670	8270C	670	21	670
SVOCs	3,3´-Dichlorobenzidine	NC	NA	NA		330	8270C	330	35	330
SVOCs	3-Nitroaniline	NC	NA	NA		670	8270C	670	24	670
SVOCs	4-Bromophenyl-phenylether	NC	NA	NA		330	8270C	330	32	330
SVOCs	4-Chloroaniline	NC	NA	NA		330	8270C	330	24	330
SVOCs	4-Chlorophenyl-phenylether	NC	NA	NA		330	8270C	330	40	330
SVOCs	4-Nitroaniline	NC	NA	NA		670	8270C	670	25	670

Table 3: Analytical Parameters and Data Quality Objectives-Sediment Testing
Techncial Impracticability Waiver Work Plan
Steel Winds I
Lackawanna, New York

Chemical Family	Analyte	Sediment Guidance Values[1] (ug/kg)	Freshwater Sediment Guidance Values[2] SGV at 0.1% TOC (ug/kg)	Ecological Criteria (ug/kg)		Project Quantitation Limit (ug/kg)	Laboratory Analytical Method	Analytical Method QLs (ug/L)	Laboratory MDLs (ug/L)	Achievable Laboratory QLs (ug/L)
SVOCs	Acenaphthene	NC	491	6.71	n	3.3	8270C-SIM	3.3	0.9	3.3
SVOCs	Acenaphthylene	NC	452	5.87	n	3.3	8270C-SIM	3.3	0.88	3.3
SVOCs	Anthracene	NC	594	57.20	g	3.3	8270C-SIM	3.3	0.95	3.3
SVOCs	Benzo(a)Anthracene	NC	841	108	h	3.3	8270C-SIM	3.3	1.3	3.3
SVOCs	Benzo(a)Pyrene	NC	965	150	h	3.3	8270C-SIM	3.3	0.95	3.3
SVOCs	Benzo(b)Fluoranthene	NC	979	10,400	n	3.3	8270C-SIM	3.3	1.6	3.3
SVOCs	Benzo(g,h,i)perylene	NC	648	170	n	3.3	8270C-SIM	3.3	1.1	3.3
SVOCs	Benzo(k)Fluoranthene	NC	981	240	n	3.3	8270C-SIM	3.3	1.3	3.3
SVOCs	Bis(2-chloroethoxy)methane	NC	NA	NA		330	8270C	330	39	330
SVOCs	Bis(2-chloroethyl)ether	NC	NA	NA		330	8270C	330	42	330
SVOCs	Bis(2-ethylhexyl)phthalate	360,000	NA	182	n	330	8270C	330	29	330
SVOCs	Butylbenzylphthalate	NC	NA	1,970	n	330	8270C	330	26	330
SVOCs	Carbazole	NC	NA	NA		330	8270C	330	28	330
SVOCs	Chrysene	NC	826	166	g	330	8270C	330	29	330
SVOCs	Dibenzo(a,h)Anthracene	NC	1,123	33	g	3.3	8270C-SIM	3.3	1.1	3.3
SVOCs	Dibenzofuran	NC	NA	449	n	330	8270C	330	36	330
SVOCs	Diethylphthalate	NC	NA	295	n	330	8270C	330	24	330
SVOCs	Dimethylphthalate	NC	NA	NA		330	8270C	330	30	330
SVOCs	Fluoranthene	NC	707	423	g	3.3	8270C-SIM	3.3	1.5	3.3
SVOCs	Fluorene	NC	538	77	g	3.3	8270C-SIM	3.3	0.87	3.3
SVOCs	Hexachlorobenzene	NC	NA	20	n	330	8270C	330	32	330
SVOCs	Hexachlorobutadiene	1,200	NA	NA		330	8270C	330	45	330
SVOCs	Hexachlorocyclopentadiene	810	NA	26.5	n	330	8270C	330	96	330
SVOCs	Hexachloroethane	NC	NA	NA		330	8270C	330	35	330
SVOCs	Indeno(1,2,3-cd)Pyrene	NC	1,115	200	n	3.3	8270C-SIM	3.3	1.1	3.3
SVOCs	Isophorone	NC	NA	NA		330	8270C	330	34	330
SVOCs	Naphthalene	NC	385	176	g	3.3	8270C-SIM	3.3	1	3.3
SVOCs	Nitrobenzene	NC	NA	NA		330	8270C	330	38	330
SVOCs	Phenanthrene	NC	596	0	g	3.3	8270C-SIM	3.3	0.98	3.3
SVOCs	Pyrene	NC	697	0	g	3.3	8270C-SIM	3.3	1.1	3.3
Other	Total Organic Carbon	NA	NA	NA		100,000	5310/9060	100,000	38,000	100,000

General Notes:

NC No Criteria established

NA Not Applicable

[1] Taken from Table 1a of NYSDEC's Draft "Screening and Assessment of Contaminated Sediments", dated January 24, 2013.

[2] These are PAH-specific effects concentrations in ug/g organic carbon from the US EPA document EPA-600-R-02-013. These values are equivelent to sediment-specific benchmarks for sediment containing 0.1 percent Total Organic Carbon.

[n] Benchmarks taken from a compilation of ecological screening benchmarks from U.S. EPA Region 5, available at http://www.epa.gov/reg5rcra/ca/ESL.pdf.

[g] Threshold Effect Concentrations (TECs) presented in MacDonald et al. 2000.

LAKE ERIE

W
S
N
E

NO SAMPLES IN THIS AREA
DUE TO SHEET PILE WALL

SMOKES CREEK

WT1-06
WT1-05
BCP-ORC-2
MWN-01
MWN-01B
WT-01
BCP-ORC-1
WT1-04
WT1-02
STEEL WINDS 1 SITE

LEGEND:

MWN-01 PROPOSED GROUNDWATER SAMPLING LOCATION

PRESUMED WATER FLOW DIRECTION

PROPOSED SURFACE WATER, DIFFUSION BAG AND SEDIMENT SAMPLING LOCATIONS

NOTES:

1. BASE MAP ADAPTED FROM AN AERIAL PHOTO DOWNLOADED FROM GOOGLE EARTH AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

0 50 100 200
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

STEEL WINDS I FACILITY
ROUTE 5
LACKAWANNA, NEW YORK

WT-1 AREA TECHNICAL IMPRACTICABILTY WAIVER WORK PLAN

PREPARED BY:
GZA GeoEnvironmental of N.Y.
Engineers and Scientists
535 WASHINGTON STREET 11th FLOOR
BUFFALO, NEW YORK 14203
(716) 685-2300

PREPARED FOR:
FIRST WIND ENERGY, LLC.

PROJ MGR: DJT	REVIEWED BY:	CHECKED BY:	FIGURE 1
DESIGNED BY:	DRAWN BY: MDK	SCALE: AS SHOWN	
DATE SEPTEMBER 2013	PROJECT NO. 03.0033579.06	REVISION NO.	SHEET NO. 1 OF 1