

BROWNFIELD CLEANUP PROGRAM APPLICATION
ISLAND DOCK
308-322 ABEEL STREET
KINGSTON, NEW YORK

October 2005

Prepared for:

Kingston Historical Waterfront, Island Dock, LCC

For Submittal to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, NY 12233

Prepared by:

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A. Application

B. Purpose and Scope of the Project

The owner and Volunteer Applicant of the above referenced property is considering an integrated residential and commercial redevelopment for the property. The Applicant intends to build between 250 and 350 apartments or condominiums as multi-story residential units with parking and other amenities at ground level. The Applicant is aware that the historic use has resulted in contamination of soil and possibly groundwater at the site. The Applicant intends to take the appropriate steps to ensure that the future residents and visitors are not exposed to the contaminants of concern. The Applicant intends to move forward simultaneously with redevelopment and environmental cleanup of the property. Portions of the property lie within the 100-year flood plain, and redevelopment plans will be engineered accordingly. The applicant will obtain permit approvals from the various City, Town, State and Federal agencies as required. The Applicant intends to cooperate with the City of Kingston and other interested parties to ensure that the waterfront remains accessible after redevelopment of the property is complete.

C. Site Description

A site location map is included as Figure 1. The site consists of three (3) separate parcels of land, totaling 17.8-acres. The mainland portion is a 0.7-acre parcel is located on the south side of Abeel Street, and is part of the Rondout Creek Shoreline. A storage lot, separated from the mainland parcel by Island Dock Road, is located east of the main entrance. Both lots on this parcel consist of fill material. The lots are currently vacant with the exception of numerous concrete block piles.

The mainland parcel contains one structure; an abandoned building formerly used for manufacturing concrete blocks. The first floor of the building contains three large concrete block kilns, and the former processing area. A boiler room with one large boiler and a water tank are located on the second floor. The site is widely littered with wooden pallets, metal shelving, piles of concrete blocks and construction debris. At least three discarded transformer casings have been observed. An abandoned trailer that may have historically been used as office space is also located on the main parcel adjacent to the former block manufacturing factory.

The other two parcels, upper and lower Island Dock, form an Island in the Rondout Creek. The island portion of the site contains a number of debris piles and broken pieces of equipment used in the concrete block-making process. An unpaved access road runs through the center of the island. A large building foundation, an abandoned trailer, and other of piles of crushed block and construction debris have been observed on the island during recent visits. A site plan is included as Figure 2.

The lots near the former block factory, and on the east side of the parcel are mostly covered with gravel, asphalt or concrete pads and contain several debris piles.

D. Site History

The historic use of the site and properties in the surrounding area has been commercial or industrial in nature. The mainland portion of the site is cut-and-fill land initially established as a coal storage yard prior to 1887. The island portion of the site is an artificial island constructed circa 1898, which was also initially used as a coal storage yard. Figure 3 is a photograph circa 1900, in which large stockpiles of coal are visible throughout the site.

Historical aerial photographs indicate that the Rondout Creek formerly flowed freely between the island and the mainland, which was prior to the construction of Island Dock Road. After 1930, the site was used as a boat and lumber storage facility and concrete block manufacturing facility.

Phase I and Phase II environmental site assessments have been completed on the property. The investigations have revealed significant impacts to soil and groundwater resulting from historic use of the property. The investigation reports are included as an attachment to this narrative.

E. Adjacent Land Use

The properties surrounding the proposed BCP site are of mixed use. The adjacent parcels to the east and west are privately owned marinas. Also located east of the site is a recreational park owned by the City of Kingston (Block Park). The properties to the north along Abeel Street are zoned either commercial or residential. With the exception of one residence, the buildings seem to be abandoned storage garages. The Rondout Creek forms the southern property boundary.

Based on the sloping topography and proximity to the Creek, surrounding residential and commercial units are located upgradient of the property.

F. Geography, Geology, and Groundwater

The property is located along the Rondout Creek, a tributary of the Hudson River. The site is primarily flat with much of the land lying within the 100-year flood plain.

The Surficial Geologic Map of New York identifies the soils in the area as either fluvial sand and gravel deposits (along the Hudson River) or glacial till consisting of sand, silt and gravel. These deposits exhibit variable texture. The till deposits are typically poorly sorted and consist primarily of clay, silt-clay and boulder-clay mixes with sporadic bedrock outcrops intertwined.

Soils in the vicinity of the site are likely fill material. If not fill, the soils are listed as either laustrine deposits or glacial till. The Ulster County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. There is also an area of some "Bath-Nassau-Rock outcrop complex, hilly" soils located near the northwest edge of the site.

According to the Geologic Map of New York, bedrock below the site is likely to consist of Undifferentiated Lower Devonian and Silurian Rocks, with some of the Austin Glen Formation.

The Austin Glen formation consists of interbedded layers of greywacke and shale. The outcrops observed on site were more consistent with interbedded greywacke and shales. The outcrops appeared to consist of interbedded competent siltstone layers alternating with less competent shale.

The surficial topography of the subject site is relatively flat fill material, but gradually slopes southward toward the Rondout Creek. The regional topography slopes down noticeably to the southeast, toward the Hudson River.

During the Phase II ESA conducted by Fuss & O'Neill, groundwater was typically encountered at depths of 2 to 9 feet below the ground surface. Given regional topography and the immediate proximity of surface water bodies, it is assumed that shallow groundwater flows from east to west across the site and discharges to the Rondout Creek. Because the reach of Rondout Creek adjacent to the site is tidally influenced, it is likely that groundwater flow at the site is affected by tides.

Groundwater exists in the shallow sediments and bedrock formation underlying the site; however groundwater is not used as a potable water supply in the area. Little information is available to date regarding groundwater quality beneath the site. Impacts to groundwater typically associated with industrial or commercial use would be based on the historical use of this land and the surrounding properties. Any petroleum or other spills that have occurred in the Rondout Creek could possibly have influenced groundwater quality beneath the site.

G. Potential Issues of Concern

As part of the Phase I and II Environmental Site Assessments, some issues related to compliance with applicable regulations were identified. The potential issues of concern fall into three categories, including: (1) petroleum-related SVOCs, VOCs, and heavy metals contamination from coal storage, (2) concrete block manufacturing, lumber production and storage, and (3) disposal of concrete block and other construction debris.

The Applicant is committed to determining if the site is in compliance with the applicable regulations, and promptly addressing any issues not in compliance. There are no existing or potential enforcement actions or conditions that could lead to the issuance of an enforcement action in relation to this property.

Regulatory Database Information

A variety of state and federal regulatory databases were searched (through Environmental FirstSearch Technologies Corporation) to identify potential incidents that have occurred at the subject site. The following list summarizes the search results.

- One (1) spill has been reported to the NYSDEC spills database for the subject site. The spill achieved a closed status as of June, 1953.
- The Emergency Response Notification System responded to apparent petroleum spills twice in the Rondout Creek, but the exact location was not noted.

- The site is listed as a RCRA Generator of hazardous waste (#NYR000123208), and has a Small Quantity Generator (SQG) status for corrosive waste, ignitable waste, and 2,4-Dichlorophenoxyacetic acid.
- The subject property is listed as having two (2) aboveground storage tanks. The first, a 10,000-gallon tank used to store #1, 2, or 4 fuel oil was installed in April of 1980, and has not achieved a closed status with the NYSDEC. From information gathered during a site visit, it is known that this tank has been removed and is no longer present at the facility. The second tank is a 1,000-gallon tank used to store Sodium dodecylbenzene sulfonate, and has been closed and removed (no date given). The chemical was likely used as part of a cleaning solvent, or in certain pesticides.

Summary of Phase II Results

During the Phase II environmental site assessment, soil borings and test pits were installed, and a limited number of surficial and sub-surface soil samples were submitted for laboratory analysis. See the attached Phase II report for the full text and figures depicting sample locations.

Volatile and Semi-Volatile Organic Compounds

- Samples collected from soil borings SB01 and SB02, in the vicinity of the block factory building and former fuel oil tank location, exhibited concentrations of benzo(a)anthracene, benzo(a)pyrene, naphthalene and chrysene exceeding the TAGM 4046 Guidance Values. These samples also exhibited low levels of petroleum-related VOC compounds toluene, o-xylene, isopropylbenzene, n-propylbenzene, sec-butylbenzene, 1,3,5-trimethylbenzene, p-isopropyltoluene and 1,2,4-trimethylbenzene; however, none of these compounds exceeded the TAGM 4046 Guidance Value.
- Samples collected from island soil borings SB03 ' SB05 'and SB09 'exhibited concentrations of benzo(a)pyrene exceeding the TAGM 4046 Guidance Values.
- Island borings SB05 ' and SB09 ' exhibited concentrations of benzo(a)anthracene and chrysene exceeding the TAGM 4046 Guidance Values.
- Island soil boring SB05 ' also exhibited concentrations of benzo(a)pyrene and benzo(k)fluoranthene exceeding the TAGM 4046 Guidance Values.
- Samples collected from test pit TP-02, from a 0-0.5 ft. depth, exhibited a concentration of benzo(a)pyrene exceeding the TAGM 4046 Guidance Value.

Heavy Metals

- The surface sample from TP-02 had elevated chromium concentrations, exceeding the TAGM cleanup standard.
- Samples collected from soil borings on the Island were analyzed for RCRA 8 Metals. Samples from SB03 'and SB05 'exhibited chromium and selenium concentrations exceeding TAGM cleanup standards. Samples from SB07 ' and SB09 ' contained only selenium concentrations exceeding TAGM cleanup standards.

Other Analyses

- Cyanide was not detected in the sample from TP-05 (ND<1.1 mg/kg). The pH of the sample was neutral at 6.97. The pH of the sample from TP-01 was also tested, and the soil was moderately basic at 10.99.

Mitigation

The Applicant is committed to ensuring that any potential environmental issues associated with the above are addressed. Although not responsible for any of the potential outstanding issues, the Applicant will resolve the issues related to the above, assuming that the Applicant can and will be accepted into the BCP. The NYSDEC will be consulted on the proposed investigation or mitigation measures, and no action will be taken without NYSDEC approval.

H. Schedule

The Applicant intends move forward with the proposed investigation immediately upon NYSDEC approval of this Application. The Applicant intends to complete the investigation within six to nine months of authorization to proceed. The Applicant would like to implement remediation and begin construction in 2006. The estimated timeline is outlined below:

Task	Anticipated Date
Submission of Work Plan to NYSDEC	October 2005
NYSDEC approval of Work Plan	October 2005
Initiation of Field Investigation	November 2005
Submission of Investigation Report to NYSDEC	January 2006

Note that the schedule is subject to change based on results of field assessment activities and conditions encountered in the field.

I. Previous Owners and Operators

The site is currently owned and operated by Historic Kingston Waterfront, Island Dock, LLC. According to property record cards reviewed at the Kingston Tax Assessor's Office, this property was transferred from Miron Building Products, Incorporated in 2003. There was no relationship between the two entities. The current address of Miron Building Products, Inc. can be seen below. There was no relation to the previous owner. Other historic owners include Island Dock Lumber Company, Incorporated and Cornell Boat & Lumber Company.

Miron Building Products
260 Titusville Rd
Poughkeepsie, NY 12603
(914) 462-2000

All previous owners operated at the site. There are no separate operators to report.

J. Contact List

CITY OF KINGSTON CONTACTS

James M. Sottile
Mayor, City of Kingston
420 Broadway
Kingston, NY 12401
Ph (845) 334-3902
Fax (845) 334-3904

Daniel Mills
Community Development,
Executive Director
420 Broadway
Kingston, NY 12401
Ph 845-331-0080
Fax 845-334-3965

Suzanne Cahill
City Planner
420 Broadway
Kingston, NY 12401
Ph (845) 334-3955
Fax (845) 334-3958

Steve Gorsline
Board of Public Works,
Superintendent
25 East O'Reilly
Kingston, NY 12041
(845) 331-0682

Michael LeFevre
Building Safety Division,
Department Chief
(Zoning Department)
5 Garraghan Drive
Kingston, NY 12401
(845) 331-1217

John Kwak, P.E.
City Engineer
Kingston City Hall
420 Broadway
Kingston, NY 12401
Ph (845) 334-3969
Fax (845) 334-3958

Dennis Doyle, Director
Planning Board (Zoning)
County Office Building
244 Fair Street, 3rd Floor
Kingston, NY 12401
Ph (845) 340-3340
Fax (845) 340-3429

ADJACENT LAND OWNERS

Marina at 340 Abeel Street (Mailing address) P.O. Box 522 Kerhonkson, NY 12446	Dennis Furrow Hideaway Marina 170 Abeel Street Kingston, NY 12401	Block Park Abeel Street Kingston, NY 12401 (845) 338-3691
Autobody/Tire Sales (currently storage) at 315 Abeel Street 115 East Stout Avenue Port Ewen, NY 12466	Storage/Warehouse Facility 311-313 Abeel Street P.O. Box 3212 Kingston, NY 12402	

LOCAL MEDIA

Poughkeepsie Journal 85 Civic Center Plaza Poughkeepsie, NY 12601	Mid-Hudson News Network 42 Marcy Lane Middletown, NY 10941	Times Herald-Record 40 Mulberry Street Middletown, NY 10940
WWLE 1170AM Cornwall, NY 12602	WAMK - Northeast Public Radio 90.9 FM Kingston, NY 12402	

K. Local Document Repository

All pertinent work plans and reports can be stored at:

NYSDEC Region 3 Office 21 South Putt Corners Road New Paltz, New York 12561 Attn: Mr. Michael J. Knipfing (845) 256-3154	Kingston Library 55 Franklin Street Kingston, New York 12401 (845) 331-0507	NYSDEC Central Office 11 th Floor, 625 Broadway Albany, New York 12233 Attn: Mr. Bradley Brown (518) 402-9564

Figures

Figure 1: Site Location Map

Figure 2: Site Plan

Figure 3: Historical Photograph (circa 1900)

Previous Investigations

Phase I Environmental Site Assessment (Fuss & O'Neill of New York, P.C.)
Limited Phase II Environmental Site Assessment (Fuss & O'Neill of New York, P.C.)



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BROWNFIELD CLEANUP PROGRAM (BCP) APPLICATION

ECL ARTICLE 27, TITLE 14



Applicant Information					
NAME: Historic Kingston Waterfront, Island Dock, LLC					
ADDRESS: The Clocktower Building, 325 Gold Street, Suite #4					
CITY/TOWN: Brooklyn, New York		ZIP CODE: 11201			
PHONE: (718) 596-0504	FAX: (718) 596-6443	E-MAIL: rob@clocktowerproperties.com			
NAME OF APPLICANT'S REPRESENTATIVE: Fuss & O'Neill of New York, P.C.; James D. McIver, Jr., Associate					
ADDRESS: 80 Washington Street, Suite 301					
CITY/TOWN: Poughkeepsie, New York		ZIP CODE: 12601			
PHONE: (800) 394-8081	FAX: (845) 452-5186	E-MAIL: jmciver@fando.com			
THE APPLICANT MUST CERTIFY THAT IT IS EITHER A PARTICIPANT OR VOLUNTEER IN ACCORDANCE WITH ECL § 27-1405 (1) BY CHECKING ONE OF THE BOXES BELOW: <table border="0"><tr><td>☐ PARTICIPANT An applicant who either 1) was the owner of the site at the time of the disposal of hazardous waste or discharge of petroleum or 2) is otherwise a person responsible for the contamination, unless the liability arises solely as a result of ownership, operation of, or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum.</td><td>☒ VOLUNTEER An applicant other than a participant, including an applicant whose liability arises solely as a result of ownership, operation of or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum. NOTE: By checking this box, the applicant certifies that he/she has exercised appropriate care with respect to the hazardous waste found at the facility by taking reasonable steps to: i) stop any continuing discharge; ii) prevent any threatened future release; and iii) prevent or limit human, environmental, or natural resource exposure to any previously released hazardous waste.</td></tr></table>				☐ PARTICIPANT An applicant who either 1) was the owner of the site at the time of the disposal of hazardous waste or discharge of petroleum or 2) is otherwise a person responsible for the contamination, unless the liability arises solely as a result of ownership, operation of, or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum.	☒ VOLUNTEER An applicant other than a participant, including an applicant whose liability arises solely as a result of ownership, operation of or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum. NOTE: By checking this box, the applicant certifies that he/she has exercised appropriate care with respect to the hazardous waste found at the facility by taking reasonable steps to: i) stop any continuing discharge; ii) prevent any threatened future release; and iii) prevent or limit human, environmental, or natural resource exposure to any previously released hazardous waste.
☐ PARTICIPANT An applicant who either 1) was the owner of the site at the time of the disposal of hazardous waste or discharge of petroleum or 2) is otherwise a person responsible for the contamination, unless the liability arises solely as a result of ownership, operation of, or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum.	☒ VOLUNTEER An applicant other than a participant, including an applicant whose liability arises solely as a result of ownership, operation of or involvement with the site subsequent to the disposal of hazardous waste or discharge of petroleum. NOTE: By checking this box, the applicant certifies that he/she has exercised appropriate care with respect to the hazardous waste found at the facility by taking reasonable steps to: i) stop any continuing discharge; ii) prevent any threatened future release; and iii) prevent or limit human, environmental, or natural resource exposure to any previously released hazardous waste.				
Applicant Relationship to Property (check one): ☐ Previous Owner ☒ Current Owner ☐ Potential /Future Purchaser ☐ Other _____					
Property Owner Information					
OWNER'S NAME (if different from applicant): Same as applicant above.					
ADDRESS:					
CITY/TOWN:		ZIP CODE:			
PHONE:	FAX:	E-MAIL:			
OPERATOR'S NAME (if different from applicant):					
ADDRESS:					
CITY/TOWN:		ZIP CODE:			
PHONE:	FAX:	E-MAIL:			

SITE INFORMATION			
SITE NAME		Island Dock	
SITE ADDRESS CITY/TOWN		308-322 Abeel St., Kingston, New York	ZIP CODE 12401
COUNTY	Ulster	SITE SIZE (ACRES)	17.8 acres
LATITUDE (degrees/minutes/seconds) 41° 54' 46.44"		LONGITUDE (degrees/minutes/seconds) 73° 59' 31.92"	
PLEASE ATTACH A COUNTY TAX MAP WITH IDENTIFIER NUMBERS, ALONG WITH ANY FIGURES NEEDED TO SHOW THE LOCATION AND BOUNDARIES OF THE SITE. ALSO INCLUDE A USGS 7.5 MINUTE QUAD MAP IN WHICH THE SITE IS LOCATED.			
1. DO THE SITE BOUNDARIES CORRESPOND TO TAX MAP METES AND BOUNDS? IF NO, PLEASE ATTACH A METES AND BOUNDS DESCRIPTION OF THE SITE.		☒ YES	☐ NO
2. IS THE SITE PART OF A DESIGNATED BROWNFIELD OPPORTUNITY AREA PURSUANT TO GML970-R? IF YES, IDENTIFY AREA (NAME) <u>04D0S026</u>		☒ YES	☐ NO
3. IS THE SITE PART OF A DESIGNATED EN-Zone PURSUANT TO TL § 21(b)(6)? FOR MORE INFORMATION GO TO: http://www.nylovestoiz.com/BrownField_Redevlopment/default.asp		☐ YES	☒ NO
IF YES, IDENTIFY AREA (NAME) _____			
APPLICANT INFORMATION (Section 27-1407 of the ECL)			
1. ARE ANY ENFORCEMENT ACTIONS PENDING AGAINST THE APPLICANT REGARDING THIS SITE?		☐ YES	☒ NO
2. IS THE APPLICANT SUBJECT TO AN OUTSTANDING CLAIM BY THE SPILL FUND FOR THIS SITE?		☐ YES	☒ NO
3. HAS THE APPLICANT VIOLATED ANY PROVISION OF ECL ARTICLE 27?		☐ YES	☒ NO
4. HAS THE APPLICANT BEEN PREVIOUSLY DENIED ENTRY TO THE BCP?		☐ YES	☒ NO
5. HAS THE APPLICANT COMMITTED A NEGLIGENT OR INTENTIONALLY TORTIOUS ACT REGARDING HAZARDOUS WASTE OR PETROLEUM?		☐ YES	☒ NO
6. HAS THE APPLICANT BEEN CONVICTED OF A CRIMINAL OFFENSE THAT INVOLVES A VIOLENT FELONY, FRAUD, BRIBERY, PERJURY, THEFT, OR OFFENSE AGAINST PUBLIC ADMINISTRATION?		☐ YES	☒ NO
7. HAS THE APPLICANT KNOWINGLY FALSIFIED STATEMENTS OR CONCEALED MATERIAL FACTS IN A MATTER RELATED TO THE DEPARTMENT?		☐ YES	☒ NO
8. HAS THE APPLICANT, BASED ON THE PROVISIONS OF ECL ARTICLE 27-1407 (OR A SIMILAR PROVISION OF FEDERAL OR STATE LAW), COMMITTED AN ACT OR FAILED TO ACT, AND SUCH ACT OR FAILURE TO ACT COULD BE THE BASIS FOR DENIAL OF A BCP APPLICATION?		☐ YES	☒ NO
SITE CHARACTERISTICS (Section 27-1407 of the ECL)			
1. DOES THE SITE MEET THE DEFINITION OF A BROWNFIELD SITE (REAL PROPERTY, THE REDEVELOPMENT OR REUSE OF WHICH MAY BE COMPLICATED BY THE PRESENCE OR POTENTIAL PRESENCE OF A HAZARDOUS WASTE, PETROLEUM, POLLUTANT, OR CONTAMINANT)?		☒ YES	☐ NO
2. IS THE SITE LISTED ON THE NATIONAL PRIORITIES LIST?		☐ YES	☒ NO
3. IS THE SITE LISTED ON THE NYS REGISTRY OF INACTIVE HAZARDOUS WASTE DISPOSAL SITES? IF YES, PLEASE PROVIDE: SITE # _____ CLASS # _____		☐ YES	☒ NO
4. IS THE SITE SUBJECT TO A PERMIT UNDER ECL ARTICLE 27, TITLE 9, OTHER THAN AN INTERIM STATUS FACILITY?		☐ YES	☒ NO
5. IS THE SITE SUBJECT TO A CLEANUP ORDER UNDER NAVIGATION LAW ARTICLE 12 OR ECL ARTICLE 17 TITLE 10?		☐ YES	☒ NO
6. IS THE SITE SUBJECT TO A STATE OR FEDERAL ENFORCEMENT ACTION RELATED TO HAZARDOUS WASTE OR PETROLEUM?		☐ YES	☒ NO
PROJECT DESCRIPTION (Section 27-1407 of the ECL)			
PLEASE ATTACH A DESCRIPTION OF THE PROJECT WHICH INCLUDES THE FOLLOWING COMPONENTS:			
- PURPOSE AND SCOPE OF THE PROJECT - ESTIMATED PROJECT SCHEDULE			

Site Investigation Form

TO THE EXTENT THAT EXISTING INFORMATION/STUDIES/REPORTS ARE AVAILABLE TO THE APPLICANT, PLEASE ATTACH THE FOLLOWING:

1. ENVIRONMENTAL DATA

A PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT PREPARED IN ACCORDANCE WITH ASTM E 1527 (American Society for Testing and Materials: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process), AND ALL ENVIRONMENTAL REPORTS RELATED TO CONTAMINANTS ON OR EMANATING FROM THE SITE.

IF A FINAL INVESTIGATION REPORT IS INCLUDED, INDICATE WHETHER IT MEETS THE REQUIREMENTS OF ECL ARTICLE 27-1415(2):

☐ YES ☐ NO

• Phase II ESA, with supplemental data is also attached.

2. OWNERS

A LIST OF PREVIOUS OWNERS WITH NAMES, LAST KNOWN ADDRESSES AND TELEPHONE NUMBERS (DESCRIBE APPLICANT'S RELATIONSHIP, IF ANY, TO EACH PREVIOUS OWNER LISTED. IF NO RELATIONSHIP, PUT "NONE").

3. OPERATORS

A LIST OF PREVIOUS OPERATORS WITH NAMES, LAST KNOWN ADDRESSES AND TELEPHONE NUMBER (DESCRIBE APPLICANT'S RELATIONSHIP, IF ANY, TO EACH PREVIOUS OPERATOR LISTED. IF NO RELATIONSHIP, PUT "NONE").

4. COMMUNITY CONTACT INFORMATION

PLEASE ATTACH, AT A MINIMUM, THE NAMES AND ADDRESSES OF THE FOLLOWING:

1. THE CHIEF EXECUTIVE OFFICER AND ZONING BOARD CHAIRPERSON OF EACH COUNTY, CITY, TOWN AND VILLAGE IN WHICH THE SITE IS LOCATED.
2. RESIDENTS, OWNERS, AND OCCUPANTS OF THE SITE AND PROPERTIES ADJACENT TO THE SITE.
3. LOCAL NEWS MEDIA FROM WHICH THE COMMUNITY TYPICALLY OBTAINS INFORMATION.
4. THE PUBLIC WATER SUPPLIER WHICH SERVICES THE AREA IN WHICH THE SITE IS LOCATED.
5. ANY PERSON WHO HAS REQUESTED TO BE PLACED ON THE SITE CONTACT LIST.
6. THE ADMINISTRATOR OF ANY SCHOOL OR DAY CARE FACILITY LOCATED ON OR NEAR THE SITE.
7. THE LOCATION OF A DOCUMENT REPOSITORY FOR THE PROJECT (E.G., LOCAL LIBRARY)

5. CONTAMINANTS AND MEDIA AFFECTED

INDICATE KNOWN OR SUSPECTED CONTAMINANTS AND THE MEDIA WHICH ARE KNOWN OR SUSPECTED TO HAVE BEEN AFFECTED:

Contaminant Category	Soil	Groundwater	Surface Water	Sediment	Soil Gas
Petroleum	known	potential		potential	potential
Chlorinated Solvents					
Other VOCs	potential	potential		potential	potential
SVOCs	known	potential		potential	potential
Metals	known			potential	
Pesticides					
PCBs					
Other*					

*Please describe: _____

6. Land Use and Future Development

Current Use: ☐ Residential ☐ Commercial ☒ Industrial ☐ Other _____

Future Use: ☒ Residential ☒ Commercial ☐ Industrial ☐ Other _____

Please check the appropriate boxes and provide an explanation as an attachment if appropriate.

	Yes	No	Unknown
1. Do current historical and/or recent development patterns support the proposed use?	☒	☐	☐
2. Is the proposed use consistent with applicable zoning laws/maps?	☒	☐	☐

* Consistent with Kingston's Rondout Creek Waterfront Development Plans.

3. Is the proposed use consistent with applicable brownfield opportunity area designations? (See GML 970-r)	☒	☐	☐
4. Is the proposed use consistent with applicable comprehensive community master plans, local waterfront revitalization plans, other adopted land use plans?	☒	☐	☐
5. Are there any Environmental Justice Concerns? (See §27-1415(3)(p)).	☐	☒	☐
6. Are there any federal or State land use designations relating to this site?	☐	☒	☐
7. Do the population growth patterns and projections support the proposed use?	☒	☐	☐
8. Is the site accessible to existing infrastructure?	☒	☐	☐
9. Are there important cultural resources, including federal or state historic or heritage sites or Native American religious sites proximate to the site?	☐	☒	☐
10. Are there important federal, state or local natural resources, including waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species proximate to the site?	☐	☒	☐
11. Are there floodplains proximate to the site?	☒	☐	☐
12. Are there any institutional controls currently applicable to the site?	☐	☒	☐
13. Describe on attachment the proximity to real property currently used for residential use, and to urban, commercial, industrial, agricultural, and recreational areas.			
14. Describe on attachment the potential vulnerability of groundwater to contamination that might migrate from the site, including proximity to wellhead protection and groundwater recharge areas.			
15. Describe on attachment the geography and geology of the site.			
(Note: the 16 th criteria relates to comments from the public, which would not be received at the time of application)			

Section 16 - Affidavit

(By applicant who is an individual)
 I hereby affirm that information provided on this form and its attachments is true and complete to the best of my knowledge and belief. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to section 210.45 of the Penal Law.
 Date: _____ Signature: _____ Print Name: _____

(By an applicant other than an individual)
 I certify that I am Principal (title) of Historic Kingston Waterfront Island Dock, LLC (entity); that I am authorized by that entity to make this application; that this application was prepared by me or under my supervision and direction; and that information provided on this form and its attachments is true and complete to the best of my knowledge and belief. I am aware that any false statement made herein is punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.
 Date: 10-20-05 Signature: Robert Iannucci Print Name: Robert Iannucci, Principal

SUBMITTAL INFORMATION:

Three (3) complete copies are required.

- Two (2) copies, one hard copy with original signatures and one electronic copy in Portable Document Format (PDF) on a CD or diskette, must be sent to:

Chief, Site Control Section
 New York State Department of Environmental Conservation
 Division of Environmental Remediation
 625 Broadway
 Albany, NY 12233-7020

- One (1) hard copy must be sent to the DEC regional contact in the regional office covering the county in which the site is located. Please check our website for the address of our regional offices: <http://www.dec.state.ny.us/website/der/index.html>

FOR DEPARTMENT USE ONLY

BCP SITE NO: _____ BCP SITE T&A CODE: _____ PROJECT MANAGER: _____

APPENDIX B Persons Contacted

Maryann Bahruth
Tax Assessor
City of Kingston
420 Broadway
Kingston, NY 12401
Phone: (845) 334-3910
Fax: (845) 334-3913

James Beach
New York State Department of Environmental Conservation
625 Broadway Street
Albany, NY 12207
Phone: (518) 402-8132
Fax: (518) 402-9029

John Hornbeck
Miron Building Products, Incorporated

Gary M. Capella, Executive Director
Ulster County Soil & Water Conservation District
652 Route 299, Suite 103
Highland, NY 12528
Phone: (845) 883-7162 Ext. 5
Fax: (845) 883-7184
Office Hours: 8:00 AM to 4:30 PM Mon-Fri

New York State Department of Environmental Conservation, Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1620
Phone: (845) 256-3000
Fax: (845) 255-3042

Planner's Office
City of Kingston
420 Broadway
Kingston, NY 12401
Phone: (845) 334-3955
Fax: (845) 334-3958

Records Access Office
New York State Department of Health
Corning Tower Room 2348
Albany, NY 12237
Fax: (518) 486-9144
e-mail: foil@health.state.ny.us

Jane Thapa
New York State Department of Health
Bureau of Public Water Supply Protection
Flanigan Square
547 River Street
Troy, NY 12180
Phone: (518) 402-7711

Ulster County Health Department
300 Flatbush Avenue
Kingston, NY 12401-2740
Phone: (845) 340-3150
Fax: (845) 340-3045

Engineering Department
City of Kingston
420 Broadway
Kingston, NY 12401
Phone: (845) 334-3967
Fax: (845) 334-3958

City of Kingston Public Library
Reference Department
55 Franklin Street
Kingston, NY 12401
Phone: (845) 331-0507
Fax: (845) 331-0988



Abandoned concrete block factory. Wooden pallets with blocks are seen in the foreground, and adjacent to the building is a pile of scrap metal. Abeel Street is elevated behind the building, and private residences are shown on the left and behind the building.



Stains on the concrete floor of the building. An apparent oil spill on the left side of the photograph, and orange concrete dye powder on the right.



The concrete secondary containment walls for a former AST are shown here at the northwest corner of the building. Adjacent to the containment is an abandoned trailer likely used as office space.



A view from Abeel Street of the gated site entrance, small parcel used for storage, and entrance to the Island.



A view of the western portion of the yard surrounding the former block factory shows the silt covering on the ground. The silt was deposited during a recent flood. Metal racks and shelving sit in the yard.



The fill material used to create a portion of the parcel used for storage contains crushed block.



The entrance to the Island, and wooden pallets stacked in the yard. The pallets are randomly strewn about due to recent flooding.



The upper parcel of the Island has stacked piles of concrete blocks lining both sides of the access road. The blocks are on wooden pallets, which sit on concrete pads.



Crushed concrete block debris piles on the northern side of the Island. The piles contain minimal construction debris.



A construction debris pile containing wooden pallets, and roofing materials, among other items.



An abandoned, gutted trailer on the southern side of the Island with a construction debris pile adjacent. Large metal equipment has also been deposited here.



Abandoned, deteriorating transformers on the northern side of the Island. The transformers sit on a broken wooden pallet, on a concrete pad.



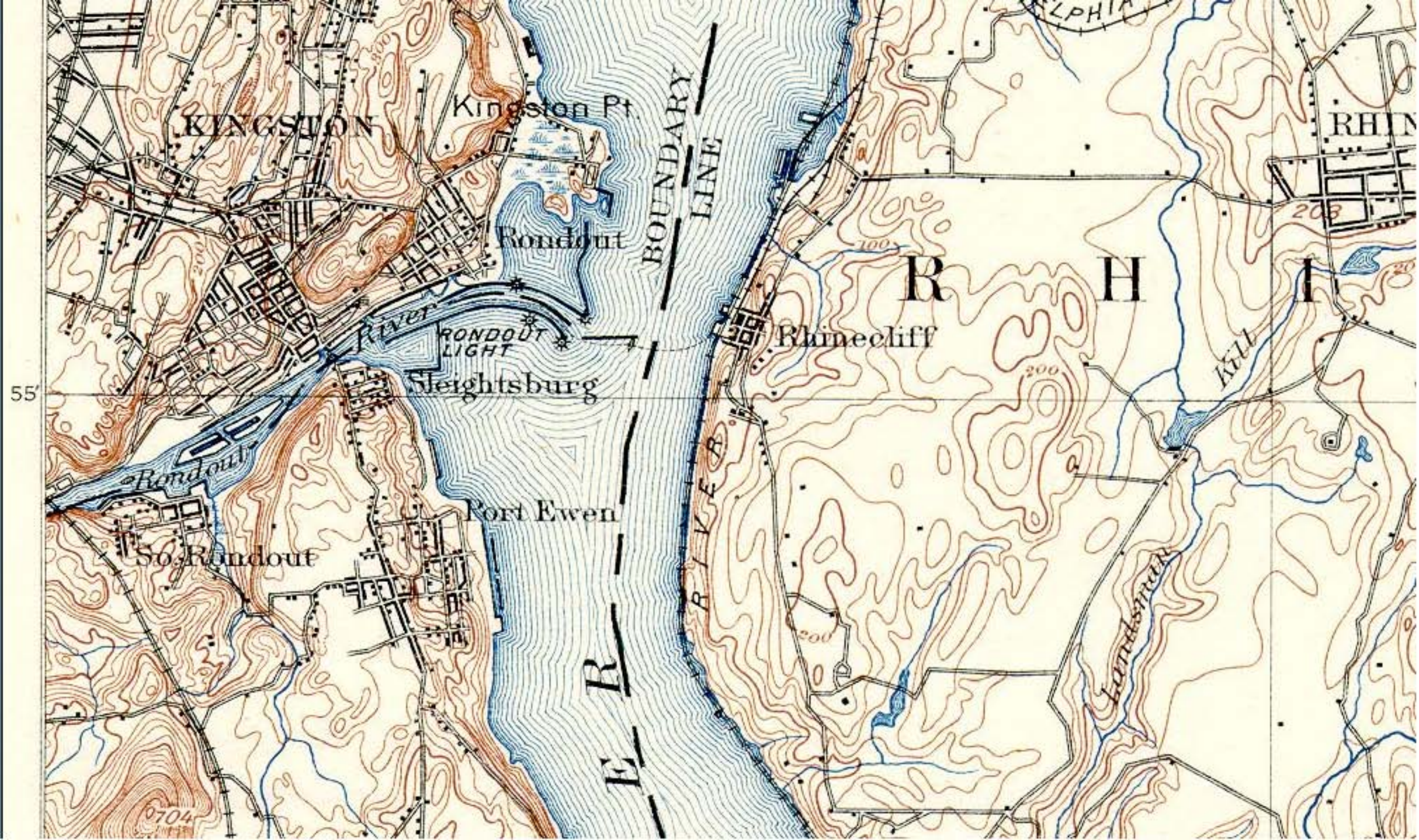
Aerial Photograph:
Weathered concrete block
debris piles on the lower
parcel of the Island.

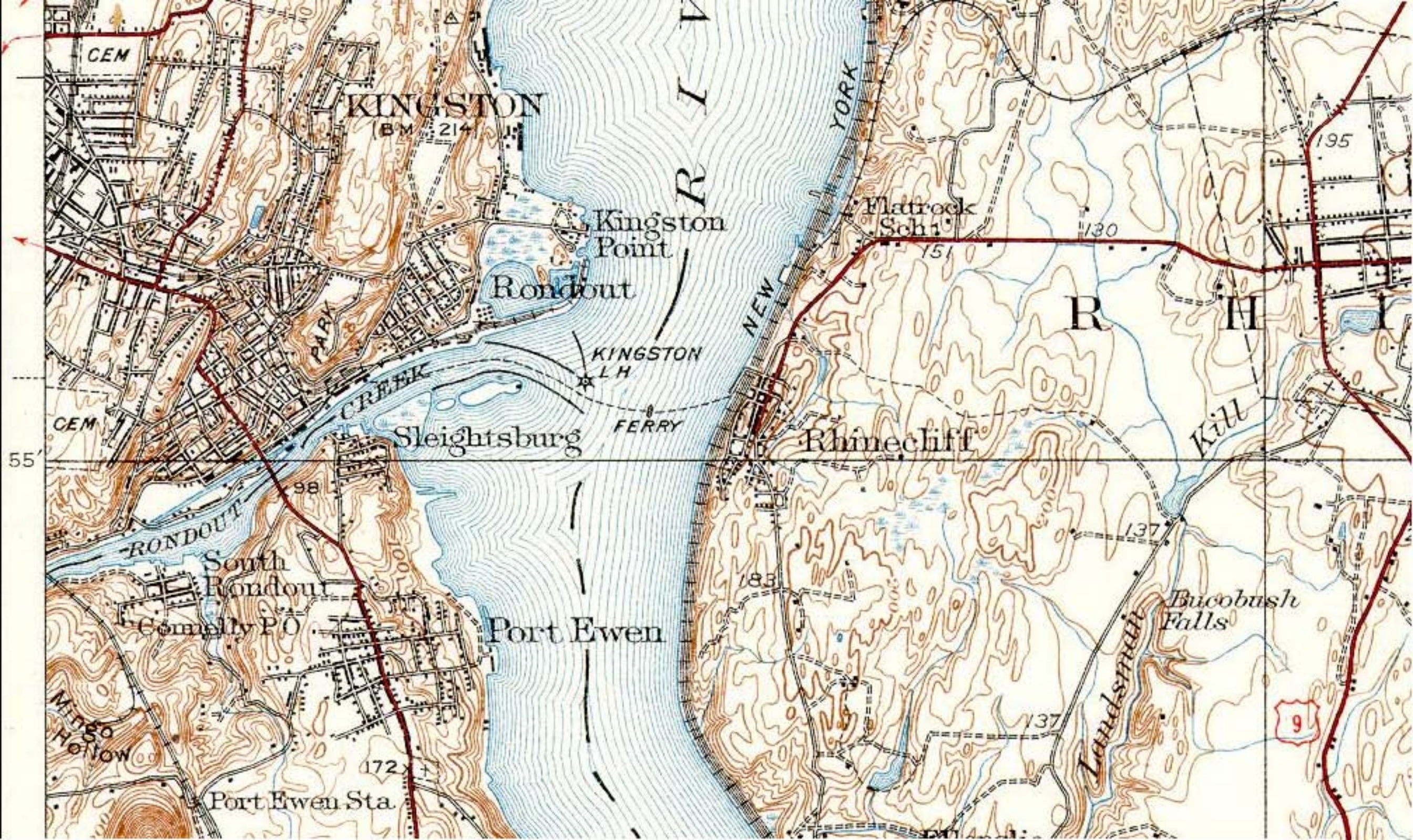


Aerial Photograph:
Easternmost point of the
Island showing minimal
debris, and the access road
to the tip of the Island.



Aerial Photograph:
South side of Island
showing the access road,
concrete block debris
piles, and the location of
a former loading dock in
the Creek.





FirstSearch Technology Corporation

Environmental FirstSearch™ Report

TARGET PROPERTY:

**322 ABEEL ST
KINGSTON NY 12401**

Job Number: 20050314

PREPARED FOR:

Fuss & O'Neill, Inc.
78 Interstate Drive
West Springfield, MA 01089

03-29-05



Tel: (781) 551-0470

Fax: (781) 551-0471

Environmental FirstSearch Search Summary Report

Target Site: 322 ABEEL ST
KINGSTON NY 12401

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	02-14-05	1.00	0	0	0	0	0	0	0
CERCLIS	Y	01-18-05	0.50	0	0	0	0	-	0	0
NFRAP	Y	06-23-04	0.25	0	0	0	-	-	0	0
RCRA TSD	Y	02-14-05	0.50	0	0	0	0	-	0	0
RCRA COR	Y	02-14-05	1.00	0	0	0	0	0	0	0
RCRA GEN	Y	02-14-05	0.25	0	1	0	-	-	0	1
RCRA NLR	Y	02-14-05	0.25	0	0	0	-	-	0	0
ERNS	Y	12-31-04	0.25	0	0	0	-	-	3	3
NPDES	Y	01-16-05	0.25	0	0	0	-	-	3	3
State Sites	Y	10-01-04	1.00	0	0	0	0	0	0	0
Spills-1990	Y	03-04-05	0.25	0	3	0	-	-	1	4
SWL	Y	01-01-04	0.50	0	0	0	0	-	0	0
REG UST/AST	Y	01-01-02	0.25	0	3	0	-	-	1	4
Leaking UST	Y	03-04-05	0.50	0	0	0	6	-	1	7
- TOTALS -				0	7	0	6	0	9	22

Notice of Disclaimer

Due to the limitations, constraints, inaccuracies and incompleteness of government information and computer mapping data currently available to FirstSearch Technology Corp., certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in FirstSearch Technology Corp.'s databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although FirstSearch Technology Corp. uses its best efforts to research the actual location of each site, FirstSearch Technology Corp. does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of FirstSearch Technology Corp.'s services proceeding are signifying an understanding of FirstSearch Technology Corp.'s searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

***Environmental FirstSearch
Site Information Report***

Request Date: 03-29-05
Requestor Name: Victoria Houle
Standard: ASTM

Search Type: COORD
Job Number: 20050314
Filtered Report

TARGET ADDRESS: 322 ABEEL ST
KINGSTON NY 12401

Demographics

Sites: 22	Non-Geocoded: 9	Population: NA
Radon: OF THE 240 HOMES TESTED, THE AVG. PCI/L LEVEL WAS 3.9		

Site Location

	<u>Degrees (Decimal)</u>	<u>Degrees (Min/Sec)</u>		<u>UTMs</u>
Longitude:	-73.995763	-73:59:45	Easting:	583283.918
Latitude:	41.913423	41:54:48	Northing:	4640437.923
			Zone:	18

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes: 1 Mile(s)

Services:

ZIP Code	City Name	ST	Dist/Dir	Sel
12466	PORT EWEN	NY	0.15 SE	Y

	Requested?	Date
Sanborns	Yes	03-29-05
Aerial Photographs	No	
Topographical Maps	No	
City Directories	No	
Title Search	No	
Municipal Reports	No	
Online Topos	No	

Environmental FirstSearch

Sites Summary Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

TOTAL: 22 **GEOCODED:** 13 **NON GEOCODED:** 9 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Page No.
	ERNS	415197/UNKNOWN (EPA REGIONS	ABEEL ST EDDYVILLE NY 12401	NON GC	16
	ERNS	585432/UNKNOWN	ROUNDOUT CREEK KINGSTON NY 12401	NON GC	17
	ERNS	592468/UNKNOWN	ROUNDOUT CREEK KINGSTON NY 12401	NON GC	17
6	LUST	JOHN STORM RESIDENCE 0405660/CLOSED	249 WEST CHESTNUT STREET KINGSTON NY 12401	0.28 NE	1
5	LUST	HOGAN RESIDENCE (RENTAL) 0307687/CLOSED	47 GERMAN ST KINGSTON NY 12401	0.32 NE	2
10	LUST	HIRSCHORN RESIDENCE 8802954/CLOSED	108 SECOND STREET CONNELLY NY 12466	0.33 SE	3
3	LUST	BESZE RESIDENCE 0108111/CLOSED 11/09/2001	132 SECOND AV PORT EWEN NY 12466	0.36 SE	4
7	LUST	KING MOBIL HOME PARK 9306384/CLOSED 11/29/1994	? PORT EWEN NY 12466	0.50 SE	5
4	LUST	FORMER CAB COMPANY 9811401/CLOSED 05/14/1999	12 WILBUR AV KINGSTON NY 12401	0.50 SW	6
	LUST	KINGSTON SCHOOL 8701816/CLOSED	W CHESTNUT ST KINGSTON NY 12401	NON GC	18
	NPDES	SEMI-FILMS DIVISION NY0214701/MINOR	KINGSTON NY	NON GC	19
	NPDES	NY0260134/MINOR	ULSTER /T/ NY 12401	NON GC	20
	NPDES	NY0028479/MINOR	KINGSTON NY 12401	NON GC	21
1	RCRAGN	MIRON ISLAND DOCKS NYR000123208/SGN	ISLAND DOCK RD & ABEEL ST KINGSTON NY 12401	0.02 NW	7
2	SPILLS	0004888/CLOSED 08/30/2000	340 ABBELL ST KINGSTON NY 12401	0.06 SW	9
2	SPILLS	ABEAL STREET MARINA 0405307/CLOSED	340 ABEAL STREET KINGSTON NY 12401	0.06 SW	10
2	SPILLS	340 ABEEL ST MARINA 0003836/CLOSED 06/29/2000	340 ABEEL ST KINGSTON NY 12401	0.06 SW	11
	SPILLS	BY FINNEYS SALVAGE 0212269/ACTIVE	ABELL ST KINGSTON NY	NON GC	22
8	UST	ISLAND DOCK LUMBER CORP PBS3-175994/ACTIVE PBS FACILITY	ABEEL ST KINGSTON NY 12401	0.04 SW	12
8	UST	ISLAND DOCK CO. CBS3-000175/INACTIVE	ABEEL ST. KINGSTON NY 12401	0.04 SW	13
9	UST	JOHN PANZELLA PBS3-601280/UNREGULATED BY PBS	351 ABEEL STREET KINGSTON NY 12401	0.09 SE	14

***Environmental FirstSearch
Sites Summary Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

TOTAL: 22 **GEOCODED:** 13 **NON GEOCODED:** 9 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Page No.
	UST	TOWN OF ULSTER PBS3-601394/UNREGULATED BY PBS	OLD HIGHWAY GARAGE KINGSTON NY	NON GC	23

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 12	DIST/DIR: 0.28 NE	MAP ID: 6

NAME: JOHN STORM RESIDENCE	REV: 12/8/04
ADDRESS: 249 WEST CHESTNUT STREET	ID1: 0405660
KINGSTON NY	ID2:
ULSTER	STATUS: CLOSED
CONTACT:	PHONE:

SITE INFORMATION:

SPILL DATE:	08/23/2004
DATE REPORTED:	08/24/2004
SPILL TIME:	05:00 PM
TIME REPORTED:	08:00 AM
SPILLED MATERIAL:	#2 FUEL OIL
 SPILLED AMOUNT:	 0 LBS.
SPILL CAUSE:	TANK FAILURE
SPILL SOURCE:	PRIVATE DWELLING
RESOURCE AFFECTED:	SOIL
WATERBODY:	
 REGION CLOSED DATE:	 09/30/2004

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 11	DIST/DIR: 0.32 NE	MAP ID: 5

NAME: HOGAN RESIDENCE (RENTAL)
ADDRESS: 47 GERMAN ST
KINGSTON NY 12401
ULSTER

REV: 5/10/04
ID1: 0307687
ID2:
STATUS: CLOSED
PHONE:

CONTACT:

SITE INFORMATION:

SPILL DATE: 10/21/2003
DATE REPORTED: 10/21/2003
SPILL TIME: 01:30 PM
TIME REPORTED: 01:42 PM
SPILLED MATERIAL: #2 FUEL OIL

SPILLED AMOUNT: UNKNOWN GAL.
SPILL CAUSE: TANK FAILURE
SPILL SOURCE: OTHER COMM/INDUSTRIAL
RESOURCE AFFECTED: ON LAND
WATERBODY:

REGION CLOSED DATE: 11/15/2003

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 10 **DIST/DIR:** 0.33 SE **MAP ID:** 10

NAME: HIRSCHORN RESIDENCE	REV: 1/1/02
ADDRESS: 108 SECOND STREET	ID1: 8802954
CONNELLY NY	ID2:
ULSTER	STATUS: CLOSED
CONTACT:	PHONE:

SPILL DATE: 07/03/88	DATE REPORTED: 07/05/88
SPILL TIME: 24:00	TIME REPORTED: 09:56

MATERIAL SPILLED: #2 FUEL OIL	AMOUNT SPILLED: 0 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0 G

CAUSE OF SPILL: TANK FAILURE
RESOURCE AFFECTED: ON LAND
WATERBODY AFFECTED: 1
SOURCE OF SPILL: PRIVATE DWELLING
REPORTED BY: RESPONSIBLE PARTY
CALLER REMARKS:
TANK LEAKING LAST DELIVERY MAY 1

REGION: 3 **UST TRUST?** F

SPILL INVESTIGATOR: WEHRFRITZ	TELEPHONE:
SPILL CONTACT:	

SPILLER: HIRSCHORN
ADDRESS:

SPILLER CONTACT:	TELEPHONE: (914) 339-6642

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: / /	CLOSE DATE: 07/21/88
DOES CLEAN UP MEET STANDARDS? T	PENALTY RECOMMENDED? F
DEC REMARKS:	

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 8 **DIST/DIR:** 0.36 SE **MAP ID:** 3

NAME: BESZE RESIDENCE	REV: 8/27/04
ADDRESS: 132 SECOND AV	ID1: 0108111
CONLEY NY	ID2:
ULSTER	STATUS: CLOSED 11/09/2001
CONTACT:	PHONE:

SPILL DATE: 11/09/01	DATE REPORTED: 11/09/01
SPILL TIME: 08:00	TIME REPORTED: 10:33

MATERIAL SPILLED: #2 FUEL OIL	AMOUNT SPILLED: 0 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 1 G

CAUSE OF SPILL: TANK FAILURE
RESOURCE AFFECTED: ON LAND
WATERBODY AFFECTED:
SOURCE OF SPILL: PRIVATE DWELLING
REPORTED BY: LOCAL AGENCY
CALLER REMARKS:
TANK FAILED - ALL CONTAMIANATED SOIL HAS BEEN REMOVED

REGION: 3 **UST TRUST?** F

SPILL INVESTIGATOR: O DEE	
SPILL CONTACT: GERALD BESZE	TELEPHONE: (845) 338-7671

SPILLER: BESZE RESIDENCE	
ADDRESS: 132 SECOND AV	
CONLEY ,	
SPILLER CONTACT: GERALD BESZE	TELEPHONE: (845) 338-7671

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 11/27/01	CLOSE DATE: 11/09/01
DOES CLEAN UP MEET STANDARDS? T	PENALTY RECOMMENDED? F
DEC REMARKS:	

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 13 **DIST/DIR:** 0.50 SE **MAP ID:** 7

NAME: KING MOBIL HOME PARK	REV: 8/27/04
ADDRESS: ?	ID1: 9306384
CONNELY NY	ID2:
ULSTER	STATUS: CLOSED 11/29/1994
CONTACT:	PHONE:

SPILL DATE: 08/24/93	DATE REPORTED: 08/24/93
SPILL TIME: 21:30	TIME REPORTED: 22:30

MATERIAL SPILLED: KEROSENE	AMOUNT SPILLED: 10 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0 G

CAUSE OF SPILL:	TANK FAILURE
RESOURCE AFFECTED:	ON LAND
WATERBODY AFFECTED:	
SOURCE OF SPILL:	PRIVATE DWELLING
REPORTED BY:	AFFECTED PERSONS
CALLER REMARKS:	

OIL SPILLED OUT OF TANK BENEATH TRAILER SORBENT PADS APPLIED CALLER WILL RETURN IN AM TO FURTHER INVESTIGATE
SPOKE WITH MR DIXON KOSCO WILL CLEAN UP APPEARS TO BE FROM RETURN LINE LEAK

REGION: 3 **UST TRUST?** F

SPILL INVESTIGATOR: RICCI	TELEPHONE:
SPILL CONTACT:	

SPILLER:
ADDRESS:

SPILLER CONTACT:	TELEPHONE:

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 11/29/94	CLOSE DATE: 11/29/94
DOES CLEAN UP MEET STANDARDS? F	PENALTY RECOMMENDED? F
DEC REMARKS:	

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 9 **DIST/DIR:** 0.50 SW **MAP ID:** 4

NAME: FORMER CAB COMPANY	REV: 8/27/04
ADDRESS: 12 WILBUR AV	ID1: 9811401
KINGSTON NY	ID2:
ULSTER	STATUS: CLOSED 05/14/1999
CONTACT:	PHONE:

SPILL DATE: 12/10/98	DATE REPORTED: 12/10/98
SPILL TIME: 10:30	TIME REPORTED: 11:02

MATERIAL SPILLED: GASOLINE	AMOUNT SPILLED: 0 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0 G

CAUSE OF SPILL:	TANK FAILURE
RESOURCE AFFECTED:	ON LAND
WATERBODY AFFECTED:	
SOURCE OF SPILL:	COMMERCIAL/INDUSTRIAL
REPORTED BY:	OTHER

CALLER REMARKS:

TANKS ARE BEING REMOVED FROM THE SITE OF AN OLD CAB COMPANY AND THERE WERE SEVERAL HOLES FOUND IN THE TANKS AND THE GROUND IS CONTAMINATED - AT THIS POINT THEY HAVE NOT FOUND GROUNDWATER CONTAMINATION YET BUT THE SITE IS NEXT TO THE RONDOUT CREEK

REGION: 3 **UST TRUST?** TRUE

SPILL INVESTIGATOR: RICCI	
SPILL CONTACT: MIKE MAZZUCA	TELEPHONE: (914) 331-3275

SPILLER: FORMER CAB COMPANY	
ADDRESS: 12 WILBUR AV	
KINGSTON , NY 12401-	
SPILLER CONTACT: MIKE MAZZUCA	TELEPHONE: (914) 331-3275

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 07/27/99	CLOSE DATE: 05/14/99
DOES CLEAN UP MEET STANDARDS? TRUE	PENALTY RECOMMENDED? FALSE

DEC REMARKS:
CLOSURE REPORT REVIEWED BY LR. NFA 5/14/99

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

RCRA GENERATOR SITE

SEARCH ID: 1 **DIST/DIR:** 0.02 NW **MAP ID:** 1

NAME: MIRON ISLAND DOCKS	REV: 2/14/05
ADDRESS: ISLAND DOCK RD & ABEEL ST	ID1: NYR000123208
KINGSTON NY 12401	ID2:
ULSTER	STATUS: SGN
CONTACT: GREGORY H STRONG	PHONE: 8453315507

SITE INFORMATION

SNC:	N - NO
BOYSNC:	N - NO
GPRA PERMIT:	N - NO
GPRA POSTCLOSURE:	N - NO
GPRA CA:	N - NO
GPRA CME:	N - NO
PERM PROG:	----
PREM WRKLD:	----
CLOSURE WRKLD:	----
P C WRKLD:	----
SUBJCA:	N - NO
SUBJCA TSD 3004:	N - NO
SUBJCA NON TSD:	N - NO
CA WRKLD:	N - NO
GEN STATUS:	SQG - SMALL QUANTITY GENERATOR: GENERATES 100 - 1000 KG/MONTH OF HAZARDOUS WASTE

UNIVERSE INFORMATION:

IMPORTER ACTIVITY:	N - NO	MIX WASTE GEN:	N - NO
RECYCLER ACT:	N - NO	TRANS ACT:	N - NO
TSD ACT:	N - NO	U GRND INJ ACT:	N - NO
UNIV WASTE FAC:	N	TRANSFER FAC:	
OS BURNER EXEMPT:	N - NO	FURNACE EXEMP:	N - NO

USED OIL INFORMATION

BURNER:	N - NO	PROCESSOR:	N - NO
REFINER:	N - NO	MARKET BURNER:	N
SPEC MARKETER:	N - NO	TRANSFER FAC:	N - NO
TRANSPORTER:	N - NO		
SECOND ID:		OFF SITE RECEIPT:	
ACCESSIBILITY:		COUNTY OWNER:	
FED WSTE GEN OWNER:	HQ	FED WASTE GEN:	2
STATE WSTE GEN OWNER:	NY	STATE WSTE GEN:	9

NAIC INFORMATION

327331 - CONCRETE BLOCK AND BRICK MANUFACTURING

ENFORCEMENT INFORMATION:

VIOLATION INFORMATION:

- Continued on next page -

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

RCRA GENERATOR SITE

SEARCH ID: 1	DIST/DIR: 0.02 NW	MAP ID: 1

NAME: MIRON ISLAND DOCKS
ADDRESS: ISLAND DOCK RD & ABEEL ST
KINGSTON NY 12401
ULSTER
CONTACT: GREGORY H STRONG

REV: 2/14/05
ID1: NYR000123208
ID2:
STATUS: SGN
PHONE: 8453315507

HAZARDOUS WASTE INFORMATION:

2,4-D (2,4-Dichlorophenoxyacetic acid)
Corrosive waste
Ignitable waste

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

STATE SPILLS SITE

SEARCH ID: 4 **DIST/DIR:** 0.06 SW **MAP ID:** 2

NAME: ADDRESS: 340 ABBELL ST KINGSON NY ULSTER CONTACT:	REV: 5/10/04 ID1: 0004888 ID2: STATUS: CLOSED 08/30/2000 PHONE:

SPILL DATE: 07/24/00	DATE REPORTED: 07/24/00
SPILL TIME: 16:45	TIME REPORTED: 16:59

MATERIAL SPILLED: UNKNOWN PETROLEUM	AMOUNT SPILLED: 0 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0 G

CAUSE OF SPILL:	UNKNOWN
RESOURCE AFFECTED:	SURFACE WATER
WATERBODY AFFECTED:	ROUNDOUT CREEK
SOURCE OF SPILL:	UNKNOWN
REPORTED BY:	CITIZEN

CALLER REMARKS:
PUMP AT RESIDENCE PUMPING MATERIAL POSSIBLY INTO WET LANDS. PUMP IS IN THE SEPTIC TANK. CALL BACK REQUESTED.

REGION: 3 **UST TRUST?** F

SPILL INVESTIGATOR: RICCI	TELEPHONE:
SPILL CONTACT:	

SPILLER: UNK	
ADDRESS: UNK	
SPILLER CONTACT: UNK	TELEPHONE: (000) 000-0000

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 09/13/00	CLOSE DATE: 08/30/00
DOES CLEAN UP MEET STANDARDS? F	PENALTY RECOMMENDED? F
DEC REMARKS:	

***Environmental FirstSearch
Site Detail Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

STATE SPILLS SITE

SEARCH ID: 3	DIST/DIR: 0.06 SW	MAP ID: 2

NAME: ABEAL STREET MARINA
ADDRESS: 340 ABEAL STREET
KINGSTON NY
ULSTER

REV: 12/8/04
ID1: 0405307
ID2:
STATUS: CLOSED
PHONE:

CONTACT:

SITE INFORMATION:

SPILL DATE: 08/14/2004
DATE REPORTED: 08/14/2004
SPILL TIME: 11:00 AM
TIME REPORTED: 11:37 AM
SPILLED MATERIAL: UNKNOWN MATERIAL

SPILLED AMOUNT: 0 LBS.
SPILL CAUSE: UNKNOWN
SPILL SOURCE: UNKNOWN
RESOURCE AFFECTED: SURFACE WATER
WATERBODY: RONDOUT CREEK

REGION CLOSED DATE: 08/16/2004

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

STATE SPILLS SITE

SEARCH ID: 2 **DIST/DIR:** 0.06 SW **MAP ID:** 2

NAME: 340 ABEEL ST MARINA	REV: 5/10/04
ADDRESS: 340 ABEEL ST	ID1: 0003836
KINGSTON NY	ID2:
ULSTER	STATUS: CLOSED 06/29/2000
CONTACT:	PHONE:

SPILL DATE: 06/28/00	DATE REPORTED: 06/28/00
SPILL TIME: 16:30	TIME REPORTED: 16:41

MATERIAL SPILLED: GASOLINE	AMOUNT SPILLED: 0 G
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0 G

CAUSE OF SPILL:	UNKNOWN
RESOURCE AFFECTED:	SURFACE WATER
WATERBODY AFFECTED:	ROUNDOUT CREEK
SOURCE OF SPILL:	UNKNOWN
REPORTED BY:	CITIZEN

CALLER REMARKS:
CALLER NOTICED AT THE MARINA A STRONG ODOR OF GASOLINE AND A SHEEN ON THE WATER - UNK SOURCE - STATES COMING FROM FURTHER UP THE CREEK

REGION: 3 **UST TRUST?** F

SPILL INVESTIGATOR: TRAVER	
SPILL CONTACT: NANCY NOLAN	TELEPHONE: (914) 399-4730

SPILLER: SALLY KERR	
ADDRESS: 31 HASBROUCK DRIVE	
POUGHKEEPSIE, NY 12603-	
SPILLER CONTACT:	TELEPHONE: (914) 462-2668

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 07/05/00	CLOSE DATE: 06/29/00
DOES CLEAN UP MEET STANDARDS? T	PENALTY RECOMMENDED? F
DEC REMARKS:	

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

REGISTERED UNDERGROUND STORAGE TANKS

SEARCH ID: 6 **DIST/DIR:** 0.04 SW **MAP ID:** 8

NAME: ISLAND DOCK LUMBER CORP	REV: 1/1/02
ADDRESS: ABEEL ST	ID1: PBS3-175994
KINGSTON NY 12401	ID2:
ULSTER	STATUS: ACTIVE PBS FACILITY
CONTACT: ISLAND DOCK LUMBER CORP	PHONE: (914) 331-1963

PETROLEUM BULK STORAGE FACILITY INFORMATION

TYPE OF SITE: MANUFACTURING	
TOTAL ACTIVE TANKS ON SITE: 1	
TOTAL FACILITY CAPACITY: 10000 GALLONS	
OLD PBS NUMBER:	CBS NUMBER:
ADDITIONAL ADDRESS INFO:	SPDES NUMBER:
TYPE OF OWNER: CORPORATE/COMMERCIAL	
OWNER SUB TYPE:	
OWNER ADDRESS: ABEEL ST	
KINGSTON NY 12401	
PHONE: (914) 331-1963	
EMERGENCY CONTACT: LOU NUZZO	
PHONE: (914) 336-6000	
MAILING NAME: ISLAND DOCK LUMBER CORP	
ADDRESS: ABEEL ST	
KINGSTON NY 12401	
ATTENTION: LOU NUZZO	
PHONE: (914) 331-1963	
CERTIFICATE DATE: 1/5/98	EXP. DATE: 1/7/03
RENEWAL DATE:	

TANK INFORMATION

TANK NUMBER: 1	TANK STATUS: IN SERVICE	
INSTALLED: 4/1/80	CLOSED:	
TANK CAPACITY: 10000 GALLONS		
PRODUCT: # 1, 2, OR 4 FUEL OIL		
TANK TYPE: STEEL/CARBON STEEL		
TANK LOCATION: ABOVEGROUND ON SADDLES, LEGS, STILTS, RACK, OR CRADLE		
INTERNAL PROTECTION: NONE		
EXTERNAL PROTECTION: PAINTED/ASPHALT COATING		
PIPE TYPE: GALVANIZED STEEL		
PIPE LOCATION: ABOVE GROUND		
INTERNAL PROTECTION: NONE		
EXTERNAL PROTECTION: NONE		
SECONDARY CONTAINMENT: NONE		
LEAK DETECTION: NONE		
OVERFILL PROTECTION: OTHER		
DISPENSER: SUCTION		
DATE TESTED:		
NEXT TEST:		
TEST METHOD:		

JOB: 20050314

Site Details Page - 13

JOB: 20050314

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

REGISTERED UNDERGROUND STORAGE TANKS

SEARCH ID: 7	DIST/DIR: 0.09 SE	MAP ID: 9

NAME: JOHN PANZELLA	REV: 1/1/02
ADDRESS: 351 ABEEL STREET	ID1: PBS3-601280
KINGSTON NY 12401	ID2:
ULSTER	STATUS: UNREGULATED BY PBS
CONTACT: JOHN PANZELLA	PHONE: (914) 562-1067

TANK CAPACITY:	2000 GALLONS
PRODUCT:	LEADED GASOLINE
TANK TYPE:	STEEL/CARBON STEEL
TANK LOCATION:	UNDERGROUND
INTERNAL PROTECTION:	NONE
EXTERNAL PROTECTION:	NONE
PIPE TYPE:	GALVANIZED STEEL
PIPE LOCATION:	UNDERGROUND
INTERNAL PROTECTION:	NONE
EXTERNAL PROTECTION:	NONE
SECONDARY CONTAINMENT:	NONE
LEAK DETECTION:	NONE
OVERFILL PROTECTION:	VENT WHISTLE
DISPENSER:	SUCTION
DATE TESTED:	10/1/98
NEXT TEST:	
TEST METHOD:	UNKNOWN

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

EMERGENCY RESPONSE NOTIFICATION SITE

SEARCH ID: 14 **DIST/DIR:** NON GC **MAP ID:**

NAME: ADDRESS: ABEEL ST EDDYVILLE NY	REV: 10/13/94 ID1: 415197 ID2: STATUS: UNKNOWN (EPA REGIONS) PHONE:
CONTACT:	

SPILL INFORMATION

DATE OF SPILL: 10/13/94 **TIME OF SPILL:** 0845

PRODUCT RELEASED (1): UNKNOWN OIL
QUANTITY (1): 0
UNITS (1): UNK

PRODUCT RELEASED (2):
QUANTITY (2):
UNITS (2):

PRODUCT RELEASED (3):
QUANTITY (3):
UNITS (3):

MEDIUM/MEDIA AFFECTED

AIR: NO	GROUNDWATER: NO	
LAND: YES	FIXED FACILITY: NO	
WATER: NO	OTHER: NO	
WATERBODY AFFECTED BY RELEASE: ROUND OUT CREEK		

CAUSE OF RELEASE

DUMPING: NO	EQUIPMENT FAILURE: NO	
NATURAL PHENOMENON: NO	OPERATOR ERROR: NO	
OTHER CAUSE: NO	TRANSP. ACCIDENT: NO	
UNKNOWN: YES		

ACTIONS TAKEN: NONE

RELEASE DETECTION: UNKNOWN / UNKNOWN SHEEN SIGHTING, SHEEN SIZE:SPREAD OUT FOR .75 MI/ RAINBOW COLOR
MISC. NOTES:

DISCHARGER INFORMATION

DISCHARGER ID: 415197	DUN & BRADSTREET #:
TYPE OF DISCHARGER: UNKNOWN	
NAME OF DISCHARGER:	
ADDRESS:	

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

EMERGENCY RESPONSE NOTIFICATION SITE

SEARCH ID: 15 **DIST/DIR:** NON GC **MAP ID:**

NAME: ADDRESS: ROUNDOUT CREEK KINGSTON NY ULSTER CONTACT:	REV: ID1: 585432 ID2: STATUS: UNKNOWN PHONE:

CERCLIS (Y/N):

MAT: UNKNOWN OIL **QUANT:** 0.00 UNKNOWN

LOCATION: ROUNDOUT CREEK
CITY: **REPORTED:** 07/03/98

SOURCE: UNKNOWN **MEDIUM:** WATER
SOURCE AND CAUSE ARE UNKNOWN/UNKNOWN OIL SHEEN SIGHTING
CAUSE: UNKNOWN

ACT: NY DEC AND KINGSTON FD AND PD ENROUTE TO EVALUATE AND WILL CALL
BY:

EMERGENCY RESPONSE NOTIFICATION SITE

SEARCH ID: 16 **DIST/DIR:** NON GC **MAP ID:**

NAME: ADDRESS: ROUNDOUT CREEK KINGSTON NY ULSTER CONTACT:	REV: ID1: 592468 ID2: STATUS: UNKNOWN PHONE:

CERCLIS (Y/N):

MAT: UNKNOWN OIL **QUANT:** 0.00 UNKNOWN

LOCATION: ROUNDOUT CREEK
CITY: **REPORTED:** 07/03/98

SOURCE: UNKNOWN **MEDIUM:** WATER
UNKNOWN SOURCE AND CAUSE ARE UNKNOWN/UNKNOWN OIL SHEEN SIGHTING
CAUSE: UNKNOWN

ACT: NY DEC AND KINGSTON FD AND PD ENROUTE TO EVALUATE AND WILL CALL
BY:

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

LEAKING UNDERGROUND STORAGE TANKS

SEARCH ID: 22 **DIST/DIR:** NON GC **MAP ID:**

NAME: KINGSTON SCHOOL	REV: 1/1/02
ADDRESS: W CHESTNUT ST	ID1: 8701816
KINGSTON NY	ID2:
ULSTER	STATUS: CLOSED
CONTACT:	PHONE:

SPILL DATE: 06/03/87	DATE REPORTED: 06/03/87
SPILL TIME: 19:30	TIME REPORTED: 20:34

MATERIAL SPILLED: #2 FUEL OIL	AMOUNT SPILLED: 0
MATERIAL CLASS: PETROLEUM	AMOUNT RECOVERED: 0

CAUSE OF SPILL:	TANK TEST FAILURE
RESOURCE AFFECTED:	GROUNDWATER
WATERBODY AFFECTED:	
SOURCE OF SPILL:	NON-COMMERCIAL/INSTITUTIONAL
REPORTED BY:	TANK TESTER
CALLER REMARKS:	
TTTF 5K	

REGION: 3	UST TRUST?	FALSE

SPILL INVESTIGATOR: OKESSON	
SPILL CONTACT:	TELEPHONE:

SPILLER: KINGSTON SCHOOL	
ADDRESS: SAME	

SPILLER CONTACT:	TELEPHONE: (914) 331-3480

CALLER:	NOTIFIER:
AGENCY:	AGENCY:
TELEPHONE:	TELEPHONE:

LAST DEC UPDATE: 09/24/87	CLOSE DATE: 09/24/87
DOES CLEAN UP MEET STANDARDS? TRUE	PENALTY RECOMMENDED? FALSE
DEC REMARKS:	
/ / : REFERRED TO PBS.	

***Environmental FirstSearch
Site Detail Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

NPDES SITE

SEARCH ID: 17	DIST/DIR: NON GC	MAP ID:

NAME: SEMI-FILMS DIVISION
ADDRESS: KINGSTON NY 12401
ULSTER

REV:
ID1: NY0214701
ID2:
STATUS: MINOR
PHONE:

CONTACT:

SOURCE: NPDES

CLASS: MINOR

REC WATER: GW

DES FLOW: MG/D

MAIL CONTACT:

COMPANY: SEMI-FILMS DIVISION
ADDRESS:

TELEPHONE:
ISSUE DATE: 02-03-93
EXPIRE DATE: 06-01-98

CITY:

NOV:

ACTION NO:

REV DATE:

TYPE:
TYPE:

ISS:
ISS:

TYPE:
TYPE:

ISS:

ISS:

***Environmental FirstSearch
Site Detail Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

NPDES SITE

SEARCH ID: 19	DIST/DIR: NON GC	MAP ID:

NAME: ADDRESS: ULSTER /T/ NY 12401 CONTACT:	REV: 1/16/05 ID1: NY0260134 ID2: STATUS: MINOR PHONE:

SITE INFORMATION

PERMIT ISSUED: 1/7/2004
PERMIT EXPIRED: 7/1/2009
RECEIVING WATERS: ESOPUS CK

SIC INFORMATION:

9511 - AIR & WATER RES & SOL WSTE MGT

MAILING CONTACT: AG PROPERTIES OF KINGSTON, LLC
TECH CITY 300 ENTERPRISE DRIVE
KINGSTON NY 12401

***Environmental FirstSearch
Site Detail Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

NPDES SITE

SEARCH ID: 18	DIST/DIR: NON GC	MAP ID:

NAME: ADDRESS: KINGSTON /CITY/ NY 12401 ULSTER CONTACT: DAVID MOTZKIN, VP	REV: 1/16/05 ID1: NY0028479 ID2: STATUS: MINOR PHONE:

SITE INFORMATION

PERMIT ISSUED: 4/3/2003
PERMIT EXPIRED: 9/1/2008
RECEIVING WATERS: RONDOUT CK

SIC INFORMATION:

5171 - PETROLEUM BULK STATIONS & TERM

MAILING CONTACT: KINGSTON OIL SUPPLY CORP
KOSCO - GAS PLANT TERMINAL 207 EAST STRAND
KINGSTON NY 12401

***Environmental FirstSearch
Site Detail Report***

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

STATE SPILLS SITE

SEARCH ID: 20	DIST/DIR: NON GC	MAP ID:

NAME: BY FINNEYS SALVAGE ADDRESS: ABELL ST KINGSTON NY ULSTER CONTACT:	REV: 8/27/04 ID1: 0212269 ID2: STATUS: ACTIVE PHONE:

SITE INFORMATION:

SPILL DATE:	03/13/2003
DATE REPORTED:	03/13/2003
SPILL TIME:	04:45 PM
TIME REPORTED:	04:53 PM
SPILLED MATERIAL:	UNKNOWN MATERIAL
SPILLED AMOUNT:	UNKNOWN GAL.
SPILL CAUSE:	UNKNOWN
SPILL SOURCE:	UNKNOWN
RESOURCE AFFECTED:	SURFACE WATER
WATERBODY:	RONDOUT CREEK
REGION CLOSED DATE:	NOT CLOSED

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

REGISTERED UNDERGROUND STORAGE TANKS

SEARCH ID: 21 **DIST/DIR:** NON GC **MAP ID:**

NAME: TOWN OF ULSTER	REV: 1/1/02
ADDRESS: OLD HIGHWAY GARAGE	ID1: PBS3-601394
KINGSTON NY 12401	ID2:
ULSTER	STATUS: UNREGULATED BY PBS
CONTACT: B. BONESTEEL	PHONE: (914) 331-4741

PETROLEUM BULK STORAGE FACILITY INFORMATION

TYPE OF SITE: OTHER	
TOTAL ACTIVE TANKS ON SITE: 0	
TOTAL FACILITY CAPACITY: 0 GALLONS	
OLD PBS NUMBER:	CBS NUMBER:
ADDITIONAL ADDRESS INFO: ALBANY AVE & WRENTHAS ST.	SPDES NUMBER:
TYPE OF OWNER: LOCAL GOVERNMENT	
OWNER SUB TYPE:	
OWNER ADDRESS: 584 E. CHESTER STREET	
KINGSTON NY 12401	
PHONE: (914) 331-4741	
EMERGENCY CONTACT: A. LABARGE	
PHONE: (914) 331-4741	
MAILING NAME: TOWN SUPERVISOR	
ADDRESS: TOWN HALL	
LAKE KATRINE NY 12449	
ATTENTION: ANDRUS J. LABARGE	
PHONE: (914) 331-4741	
CERTIFICATE DATE:	EXP. DATE: 1/3/05
RENEWAL DATE:	

TANK INFORMATION

TANK NUMBER:	01G	TANK STATUS:	CLOSED - REMOVED
INSTALLED:		CLOSED:	12/1/99
TANK CAPACITY:	2000 GALLONS		
PRODUCT:	UNLEADED GASOLINE		
TANK TYPE:	STEEL/CARBON STEEL		
TANK LOCATION:	UNDERGROUND		
INTERNAL PROTECTION:	NONE		
EXTERNAL PROTECTION:	NONE		
PIPE TYPE:	NONE		
PIPE LOCATION:	NONE		
INTERNAL PROTECTION:	NONE		
EXTERNAL PROTECTION:	NONE		
SECONDARY CONTAINMENT:	NONE		
LEAK DETECTION:	NONE		
OVERFILL PROTECTION:	NONE		
DISPENSER:	0		
DATE TESTED:			
NEXT TEST:			
TEST METHOD:			
TANK NUMBER:	02F	TANK STATUS:	CLOSED - REMOVED
INSTALLED:		CLOSED:	12/1/99

- Continued on next page -

Environmental FirstSearch
Site Detail Report

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

REGISTERED UNDERGROUND STORAGE TANKS

SEARCH ID: 21	DIST/DIR: NON GC	MAP ID:

NAME: TOWN OF ULSTER	REV: 1/1/02
ADDRESS: OLD HIGHWAY GARAGE	ID1: PBS3-601394
KINGSTON NY 12401	ID2:
ULSTER	STATUS: UNREGULATED BY PBS
CONTACT: B. BONESTEEL	PHONE: (914) 331-4741

TANK CAPACITY: 2000 GALLONS
PRODUCT: # 1, 2, OR 4 FUEL OIL

TANK TYPE: STEEL/CARBON STEEL
TANK LOCATION: UNDERGROUND
INTERNAL PROTECTION: NONE
EXTERNAL PROTECTION: NONE
PIPE TYPE: NONE
PIPE LOCATION: NONE
INTERNAL PROTECTION: NONE
EXTERNAL PROTECTION: NONE
SECONDARY CONTAINMENT: NONE
LEAK DETECTION: NONE
OVERFILL PROTECTION: NONE
DISPENSER: 0
DATE TESTED:
NEXT TEST:
TEST METHOD:

TANK NUMBER: 05D	TANK STATUS: CLOSED - REMOVED
INSTALLED:	CLOSED: 12/1/99
TANK CAPACITY: 5000 GALLONS	
PRODUCT: DIESEL	

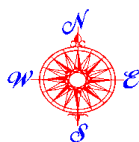
TANK TYPE: STEEL/CARBON STEEL
TANK LOCATION: UNDERGROUND
INTERNAL PROTECTION: NONE
EXTERNAL PROTECTION: NONE
PIPE TYPE: NONE
PIPE LOCATION: NONE
INTERNAL PROTECTION: NONE
EXTERNAL PROTECTION: NONE
SECONDARY CONTAINMENT: NONE
LEAK DETECTION: NONE
OVERFILL PROTECTION: NONE
DISPENSER: 0
DATE TESTED:
NEXT TEST:
TEST METHOD:

Environmental FirstSearch
Street Name Report for Streets within .25 Mile(s) of Target Property

TARGET SITE: 322 ABEEL ST
KINGSTON NY 12401

JOB: 20050314

Street Name	Dist/Dir	Street Name	Dist/Dir
Abeel St	0.01 NW		
Berrian St	0.20 SW		
Dewitt St	0.25 SW		
German St	0.18 NE		
Hudson St	0.04 NW		
Hunter St	0.20 NE		
Ridge St	0.24 NE		
Spruce St	0.17 NE		
W Chestnut St	0.20 NW		
WEST Chestnut St	0.20 NW		



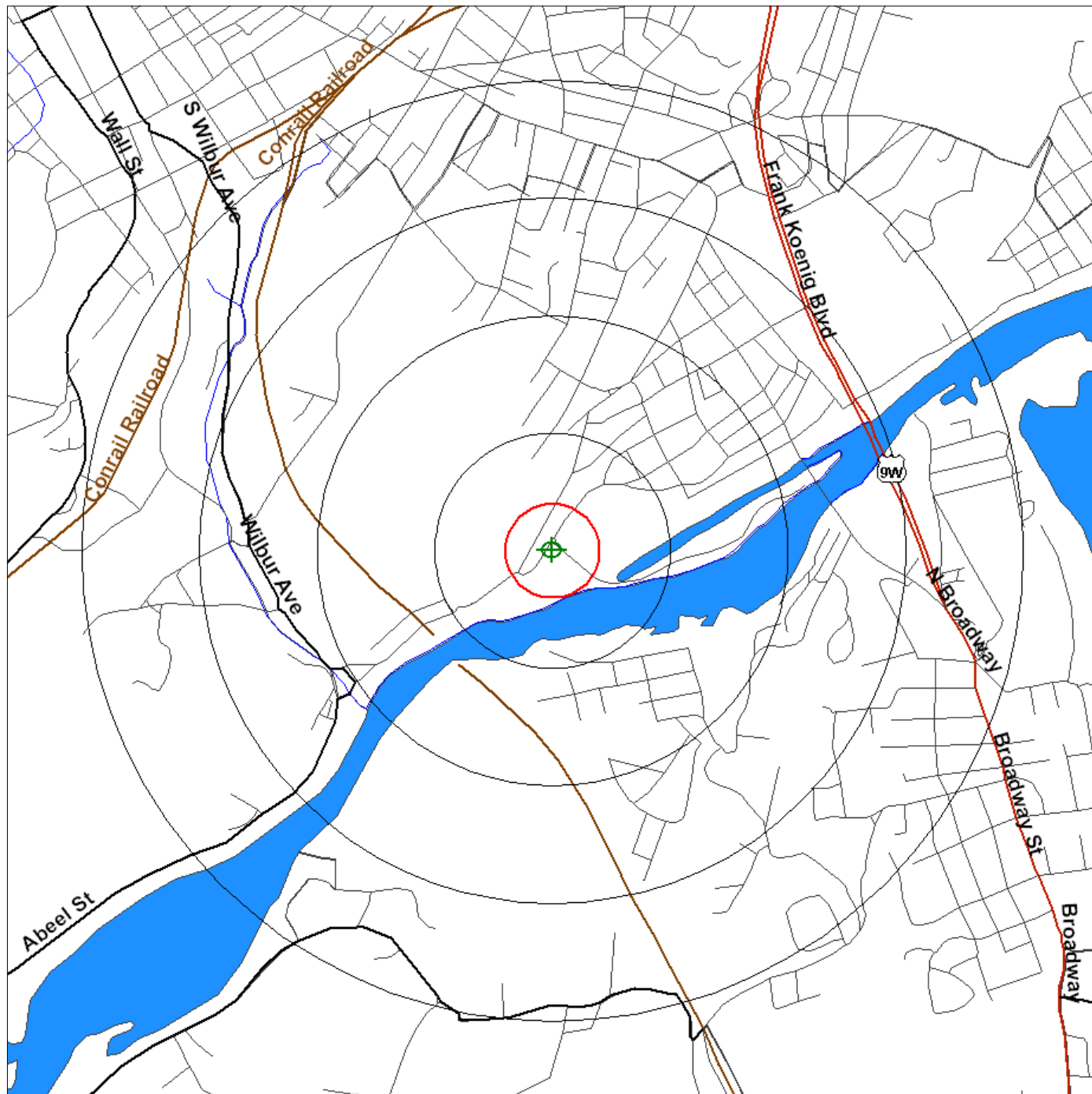
Environmental FirstSearch

1 Mile Radius

ASTM Map: NPL, RCRA COR, STATE Sites



322 ABEEL ST, KINGSTON NY 12401



Source: 2002 U.S. Census TIGER Files

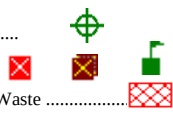
Target Site (Latitude: 41.913423 Longitude: -73.995763)

Identified Site, Multiple Sites, Receptor

NPL, Brownfield, Solid Waste Landfill (SWL) or Hazardous Waste

Railroads

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius



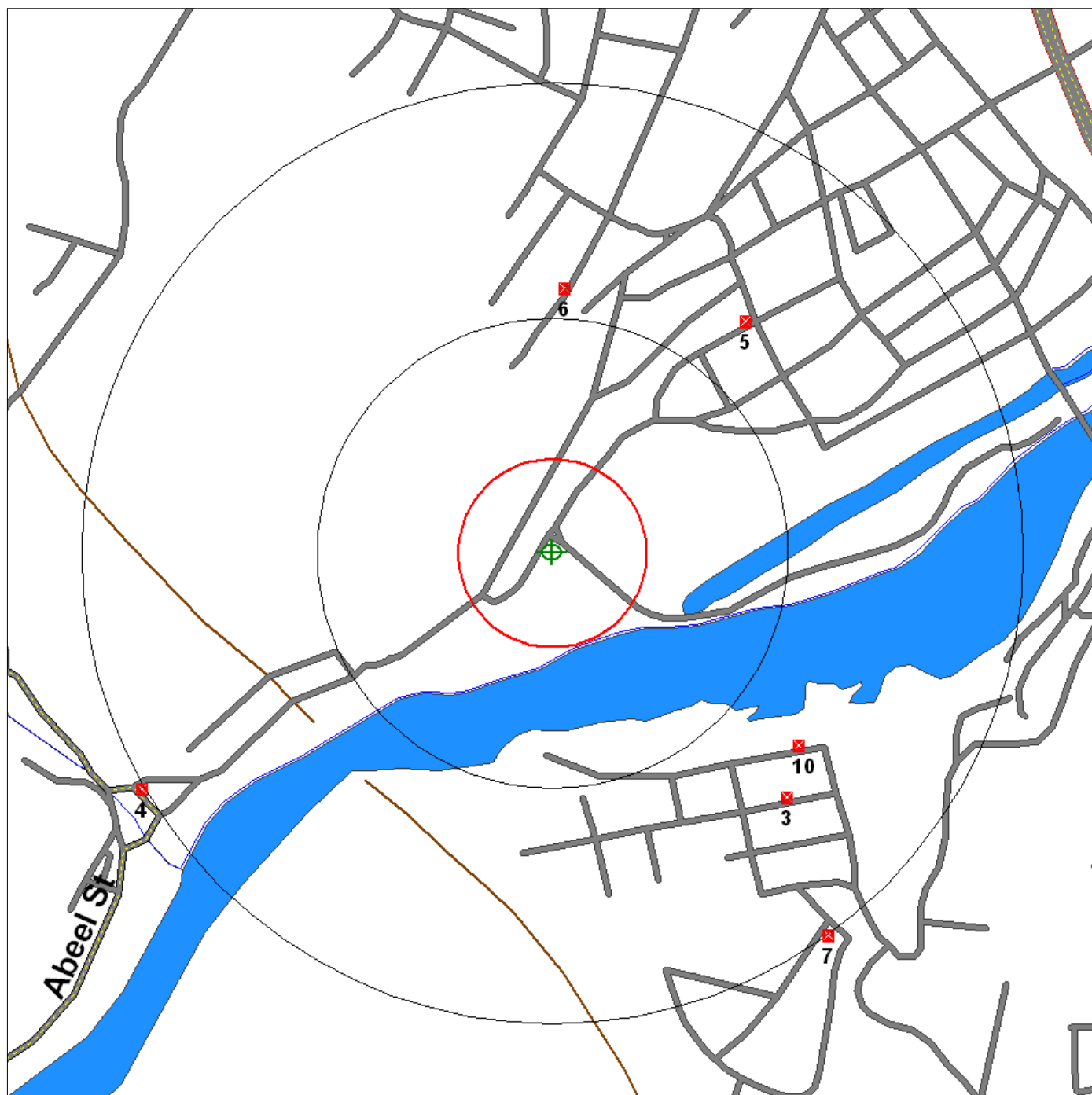


Environmental FirstSearch

.5 Mile Radius
ASTM Map: CERCLIS, RCRATSD, LUST, SWL



322 ABEEL ST, KINGSTON NY 12401



Source: 2002 U.S. Census TIGER Files

Target Site (Latitude: 41.913423 Longitude: -73.995763)

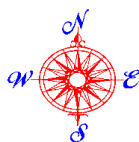
Identified Site, Multiple Sites, Receptor

NPL, Brownfield, Solid Waste Landfill (SWL) or Hazardous Waste

Railroads

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius



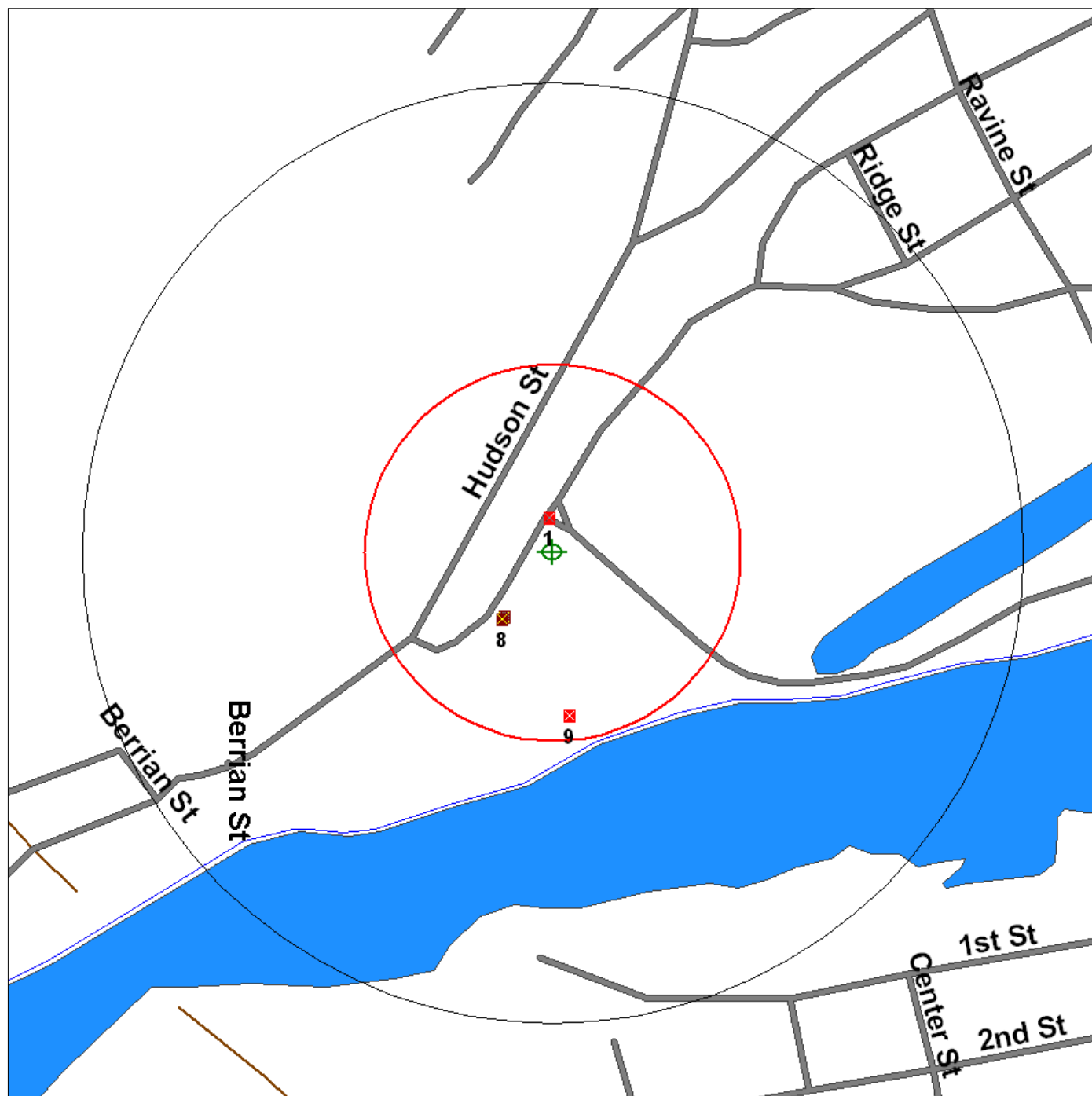


Environmental FirstSearch

.25 Mile Radius
ASTM Map: RCRAGEN, ERNS, UST



322 ABEEL ST, KINGSTON NY 12401



Source: 2002 U.S. Census TIGER Files

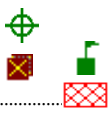
Target Site (Latitude: 41.913423 Longitude: -73.995763)

Identified Site, Multiple Sites, Receptor

NPL, Brownfield, Solid Waste Landfill (SWL) or Hazardous Waste

Railroads

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius



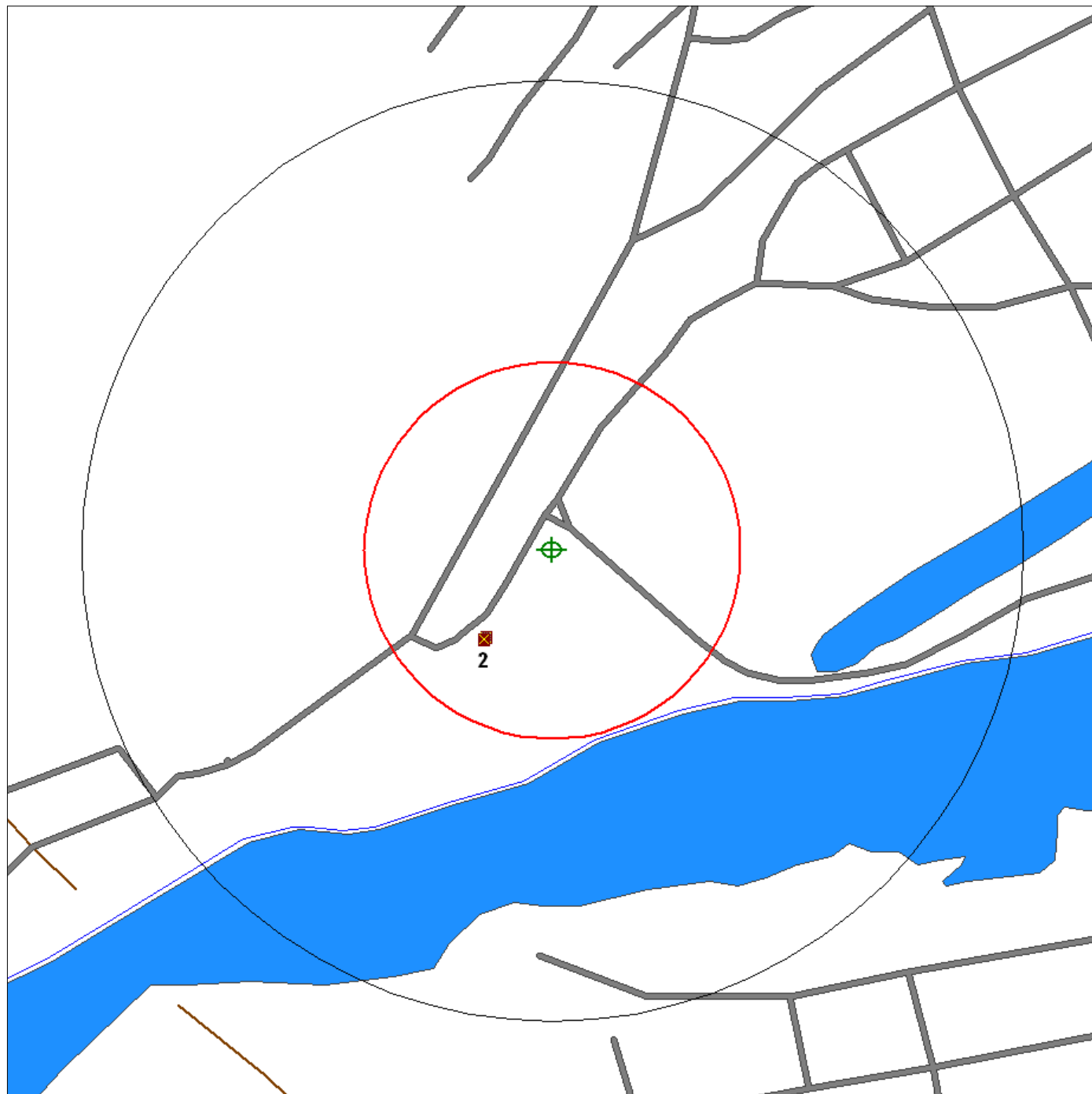


Environmental FirstSearch

.25 Mile Radius
Non-ASTM Map: Spills 90



322 ABEEL ST, KINGSTON NY 12401



Source: 2002 U.S. Census TIGER Files

Target Site (Latitude: 41.913423 Longitude: -73.995763)	
Identified Site, Multiple Sites, Receptor	
NPL, Brownfield, Solid Waste Landfill (SWL) or Hazardous Waste	
National Historic Sites and Landmark Sites	
Soil Sites	
Railroads	
Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius	

PHASE I ENVIRONMENTAL SITE ASSESSMENT

**FORMER CONCRETE BLOCK, INC. FACILITY
(ISLAND DOCK)
KINGSTON, NEW YORK**

JUNE 2005

Prepared By:

Lisa Gwiazdowski
Engineer

Date

Project Director:

Richard S. Totino
Project Manager

Date

June 14, 2005

Mr. Robert Iannucci
The Clocktower Building
325 Gold Street, Suite #4
Brooklyn, New York 11201

RE: Phase I Environmental Site Assessment
Former Concrete Block, Inc. Facility (Island Dock)
Kingston, New York
Job No. 20050314.A1N

Dear Mr. Iannucci:

On behalf of Kingston Historic Waterfront, Island Dock, LLC, Fuss & O'Neill of New York, P. C. (Fuss & O'Neill) is pleased to submit the enclosed report of the Phase I Environmental Site Assessment at the above-referenced site. The assessment was conducted using the Standard Practice E 1527-00 for Environmental Site Assessments by the American Society for Testing and Materials (ASTM, 2000) as general standards for the facility investigation.

Thank you for the opportunity to conduct this work. If you have any questions or need additional information, please do not hesitate to call me.

Sincerely,

Richard S. Totino
Senior Hydrogeologist

Enclosure

**PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER CONCRETE BLOCK, INC. FACILITY
(ISLAND DOCK)
308-322 ABEEL STREET
KINGSTON, NEW YORK**

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2.1.2 Potable Water Supply and Sewage Disposal.....	2
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**PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER CONCRETE BLOCK, INC. FACILITY
(ISLAND DOCK)
308-322 ABEEL STREET
KINGSTON, NEW YORK**

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(continued)**

FIGURES

END OF TEXT

- 1 Site Location Map
- 2 Site Plan

APPENDICES

END OF TEXT

- A Scope of Work
- B Persons Contacted
- C Property Description Cards
- D Environmental Database Search (FirstSearch)
- E NYSDEC File Information
- F Site Photographs
- G Historical Aerial Photographs
- H Historical Topographic Maps

1.0 INTRODUCTION

Fuss & O'Neill of New York, P.C. (Fuss & O'Neill) has been retained by Kingston Historic Waterfront, Island Dock, LLC to conduct a Phase I Environmental Site Assessment (ESA) of the property located at 308-322 Abeel Street (Island Dock) in the City of Kingston, Ulster County, New York (subject site). The objective of this Phase I ESA was to identify recognized environmental conditions (RECs) with regard to the subject site.

As defined by Standard Practice for Environmental Site Assessments E 1527-00 (ASTM Practice E 1527-00) developed by the American Society for Testing and Materials (ASTM, 2000), REC means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include minor conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

This Phase I ESA was performed using the ASTM Practice E 1527-00 as general standards for the facility investigation. Refer to [Appendix A](#) for the scope of work and limitations of this ESA and to [Appendix B](#) for a listing of the offices and persons contacted for this assessment, as well as relevant site information.

2.0 SITE OVERVIEW

2.1 Site Information

2.1.1 Property Location, Size of Parcel, and Site Plan

The subject site, commonly known as Island Dock, is located on the south side of Abeel Street in the City of Kingston, New York. A site location map is provided as [Figure 1](#).

According to the City of Kingston Tax Assessor's records, the subject site consists of three parcels. Parcel 1 is a 0.7-acre triangular-shaped parcel. Parcels 2 and 3 (Upper Island Dock, Lower Island Dock) make up Block Island, including Island Dock Road, which is used to access the island. Parcels 2 and 3 measured 9.2 and 7.9 acres, respectively.

Records at the City of Kingston Tax Assessor's office do not specify a zoning classification for the subject site. Surrounding properties are zoned as vacant and recreation and entertainment. Zoning for the site is Rondout Waterfront District.

Structures located on the subject site include an abandoned concrete block factory and an abandoned trailer on Parcel 1, and an abandoned trailer on Parcel 2.

A site plan is provided in [Figure 2](#). Copies of the property description cards available at the City of Kingston Tax Assessor's office are attached as [Appendix C](#). A detailed description of the subject site developed during the site inspection is presented in [Section 5.0](#) below.

2.1.2 Potable Water Supply and Sewage Disposal

The subject site has been served by municipal water according to personnel at the City of Kingston Engineering Department. The subject site is not serviced by municipal sewers. The sewer lines end approximately 100-200 feet on either side of the property along Abeel Street. It is unknown whether the site has a private septic system. There is no evidence of any restroom facilities or drains on the property.

2.1.3 Adjoining Land Use

Based on observations made during the site inspection and available mapping, properties adjoining the subject site include:

Address	Description	Direction from Subject Site
340 Abeel Street	Marina	West
323-329 Abeel Street	Residential – currently occupied	Northwest
315 Abeel Street	Auto Repair Shop	North
311-313 Abeel Street	Commercial Storage (garages)	North
305-309 Abeel Street	Vacant Residential Lots	North
299 Abeel Street	Residential – currently occupied	Northeast
128-136 Hudson Street	Residential – separated from the subject site by a large embankment	North
208-304 Abeel Street	Recreational - Block Park (Western boundary abuts subject site)	East (North of Island)
194-198 Abeel Street	Vacant Commercial Land (Western boundary abuts subject site)	East (North of Island)
170 Abeel Street	Marina (Western boundary abuts subject site)	East (North of Island)
N/A	Rondout Creek	South

2.2 Physical Setting of Site

2.2.1 Geologic and Physiographic Setting

The topography of the subject site is relatively flat, but gently slopes south toward the Rondout Creek (USGS, 1963). The regional topography generally slopes down gradually to southeast, toward the Hudson River.

Surficial material at the subject site is mapped as primarily recent deposits, with some bedrock at the northern edge of the site and kame deposits at the northeast corner of the site (Cadwell, 1989). The Ulster County Soils Survey shows the site as Cut and Fill Land with some "Bath-Nassau-Rock outcrop complex, hilly" located at the northwest edge of the site.

Bedrock beneath the subject site is mapped as primarily Undifferentiated Lower Devonian and Silurian Rocks with some Austin Glen Formation at the northeast end of the site (Davis, 1970, Reprinted 1995). Depth to bedrock is estimated to be approximately 4 feet at the north side of the site (based on field observations) and substantially deeper beneath the island portion of the property.

2.2.2 Groundwater

Groundwater is not used as a potable water supply in the area. No site specific information was available with respect to groundwater quality beneath the site since there are no potable wells on the property. Based on USGS mapping and field observations of the local topography and surface water hydrology, the inferred groundwater flow direction is to the south/southeast. Depth to groundwater is estimated to be 5 to 6 feet or less. Impacts to groundwater typically associated with industrial or commercial use are likely based on the historical use of this land and the surrounding properties.

2.2.3 Surface Water

The nearest surface water body, the Rondout Creek, is located directly south of the subject site (USGS, 1963). The Rondout Creek is classified by the New York State Department of Environmental Conservation as Class C (6 NYCRR §855.4).

The best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes (6 NYCRR §701).

2.2.4 Location of Public Water Supply Sources

Information was requested on March 29, 2005 from the New York State Department of Health regarding any public water supply sources within a one-half mile radius of the subject site. According to Mrs. Jane Thapa, a Senior Sanitary Engineer with the Bureau of Water Supply Protection, there are no public water supply sources within a one-half mile radius of the subject site.

2.3 Previous Environmental Investigations

According to representatives of the City of Kingston, an earlier Phase I Environmental Site Assessment (ESA) was completed by The Chazen Companies for the subject site in November of 2001. This previous Phase I ESA was available to Fuss & O'Neill during the preparation of the current assessment. Significant findings of the Chazen report were incorporated into this document as warranted.

3.0 SITE HISTORY

The following sources were used to develop the history of the subject site and, to the extent required by ASTM Practice E 1527-00, the nearby sites:

Reference

No.

Information Source

- 1 City street directories (available at the City of Kingston Library) reviewed at approximately five year intervals dating back to the year 1920.
- 2 Sanborn Fire Insurance Maps (available at through FirstSearch Technology Corporation) for the years 1887, 1899, 1950, 1957, 1972, 1984, and 1987.
- 3 Property description cards (available at the City of Kingston Tax Assessor's Office).
- 4 Aerial photographs (available at the Ulster County Soil and Water Conservation District) for the years 1959 and 1980.
- 5 Environmental FirstSearch Technologies. Search was requested on March 21, 2005 and contains information on any recorded environmental conditions within a 1-mile radius of the subject site.
- 6 Historical USGS Topographic Maps for the years 1898 and 1939, available on-line from the Documents Department and Data Center of the University of New Hampshire (<http://docs.unh.edu/nhtopos/nhtopos.htm>).

The following table summarizes the history of the subject site and nearby properties as determined from the above sources.

HISTORY			
Date(s)	Site	Nearby Sites	Source Reference Number
1887-1897	Coal storage yards, other storage buildings. Island not yet created.	Storage buildings.	2, 6
1898 – pre-1930	Apparent construction of island begins. John H. Fishers Ice House present. Island was historically used for coal storage (exact dates unknown).	Yacht landing/pier on property to the west. North and east properties seem vacant	2, 6
1930-1933	Kingston Dry Dock & Construction Company and Cornell Boat & Lumber Company.	Yacht landing/pier on property to the west. North and east properties seem vacant	1, 2

HISTORY			
Date(s)	Site	Nearby Sites	Source Reference Number
1933-1970	Lumber Company (Cornell Boat & Lumber changed to Island Dock Lumber Co., Inc. in 1946.) Island Dock entrance: Colonial Insurers Agency Inc from 1933-1952, Mutual Insurers Agency Inc from 1933-1953, Ideal Marina from 1960-1965. 1950 photo shows block factory and yard used to store blocks. Island: 1939 topo shows the island, wooden bridge, road throughout island, and shoreline similar to current conditions. Lower Island - Buildings, ship inlet/marina with docks, clearly developed. Upper Island – also developed, buildings, covered with concrete pads, likely for lumber storage (1959 photo). Island Dock Lumber owned and operated island from 1961-2000.	Property on west side is vacant, marinas located further west and east of the subject site (1959 photo), auto repair shop located across Abeel Street (north of site) at least as early as 1957.	1, 3, 4, 6
1970-1986	Entrance to Island Dock: State Fish Corp. Main lot: 1980 photo shows block factory and yard used for storing blocks. Island: Lower Island – undeveloped, broken block debris piles similar to current conditions. Upper Island – some small and one large building likely used for lumber storage (1980 photo).	Marinas located west and east of the subject site (1980 photo). Block park is northeast of subject site. Auto repair shop and residences to the north.	1, 4
1996	Great Hudson Sailing Co. at entrance to Island Dock Road. Block factory still in operation.	Block Park northeast of property, marinas located on west and east sides, storage garage and residence on north border across Abeel Street.	1, 3
2000-2003	Miron Building Products Company, Inc. owns the lower portion of the Island (eastern most side). Island Dock Lumber still present on upper (west) portion of Island.	Block Park northeast of property, marinas located on west and east sides, storage garage and residence on north border across Abeel Street.	3
2004-Present	Island Dock, LLC owns entire property including island.	Block Park northeast of property, marinas located on west and east sides, storage garage and residence on north border across Abeel Street.	3

- The following is a summary of RECs for the subject site based on the historical information identified in the preceding table: {OR - No RECs were identified in the history of the site.}
- Historical occupation of the site indicates that there is the potential for historical RECs to have existed and remain at the site.
- Due to the activities on nearby properties, there is the potential for contaminants to have been released and impact groundwater at the subject site.

4.0 FEDERAL, STATE, AND LOCAL FILE REVIEW

Files of Federal, State and local agencies were reviewed for environmentally-related issues pertinent to the subject site and nearby parcels, such as permits, inspection reports, enforcement history or documented releases of hazardous materials. The sources of information listed in the following table were researched to identify properties of concern within distances of the subject site specified by ASTM Practice E 1527-00. Additionally, County and City/Town departments were contacted as discussed in [Section 4.2](#). Please refer to [Appendix B](#) for a listing of the officials contacted.

Information Source*	Search Distance
Federal Files	
NPL site list	1 mile
RCRA CORRACTS TSDf list	1 mile
RCRA TSDf list	0.5 mile
CERCLIS list	0.5 mile
RCRA hazardous waste generator list	property and adjoining
ERNS list	property and adjoining
State Files	
Hazardous waste site list	1 mile
Landfill and solid waste site list	0.5 mile
Leaking UST list	0.5 mile
Oil & chemical spills	property and adjoining
UST list	property and adjoining

*Fuss & O'Neill used FirstSearch, an environmental database search service, to obtain the information referenced in the above table. FirstSearch provides access to publicly available environmental databases maintained by various Federal and State agencies. A copy of the information provided by FirstSearch relative to the subject site and nearby properties is included in [Appendix D](#). The listed information sources are defined and described in detail in the FirstSearch report.

4.1 Summary of Regulatory Database Information

- The environmental databases provide the following information for the subject site:
- Three (3) Emergency Response Notification System (ERNS) events were recorded within the property and adjacent properties.
- Seven (7) Leaking Underground Storage Tank (LUST) sites were located within 0.5 miles of the subject property.
- Three (3) National Pollutant Discharge Elimination System (NPDES) outfalls were located within the property and adjacent properties.

- One (1) Resource Conservation and Recovery Act Waste Generator (RCRAGEN) was located within the property and adjacent properties.
- Seven (7) State Spills (SPILLS) sites were located within the property and adjacent properties.
- Two (2) Underground Storage Tanks (UST) were located within the property and adjacent properties.
- One (1) regulated AST/UST site was located within the property and adjacent properties.
- The following table summarizes known or potential releases that could adversely impact the site. Concerns associated with these sites are discussed.

Site/Address	Databases*	Site ID/Status	Distance/ Direction	Map ID**
Rondout Creek/Kingston NY	ERNS (2 listings)	592468/Unknown 415197/Unknown	Unknown	NM
John Storm Residence/249 W. Chestnut St., Kingston NY	LUST	0405660/Closed	0.28 NE	6
Former Cab Company/12 Wilbur Ave., Kingston NY	LUST	9811401/Closed 5/1999	0.50 SW	4
Kingston School/W. Chestnut St., Kingston NY	LUST	8701816/Closed	Unknown	NM
Semi-Films Division/Kingston NY	NPDES	NY0214701/Minor	Unknown	NM
Unknown/Kingston NY	NPDES (2 listings)	NY0028479/Minor NY0260134/Minor	Unknown	NM
Miron Island Docks/Island Dock Rd. & Abeel St., Kingston NY	RCRAGEN, SPILLS, UST (2 listings)	NYR000123208/SGN 9108250/Closed 6/1953 CBS3-000175/Inactive PBS3-175994/Active	On Property	1, 11
Abeel Street Marina/340 Abeel St., Kingston NY	SPILLS (3 listings)	0004888/Closed 8/2000 0405307/Closed 0003836/Closed 6/2000	0.06 SW	2
John Panzella/351 Abeel St., Kingston NY	UST	PBS3-601280/Unreg.	0.09 SE	12

* Database acronyms are defined in [Appendix D](#).

** Refers to the map identification number assigned by the database service and shown on the database services maps ([Appendix D](#)). NM means that the site was not mapped by the database service.

Potential concerns associated with these nearby sites are provided below:

- The recorded activity of the Emergency Response Notification System is not specific with respect to this location, although each notification was the result of oil sheen

observed on the Rondout Creek. The subject property has a large shoreline that may have been impacted by these activities.

- Each identified LUST site has been inspected by the NYSDEC and has achieved closed status. A closed status indicates that cleanup activity is finished and all paperwork is completed. Therefore, it is unlikely that the identified LUST sites will have impacted the subject site.
- The two (2) NPDES outfalls to the Rondout Creek in close proximity to the subject site are not likely to impact the subject site due to their “minor” classification.
- The former activity on Island Dock by the Miron Lumber Company was classified as a RCRA Generator. It is likely that the generated waste consisted of crushed block and wood scraps; however, toxic concrete dyes or wood preservative chemicals may have been part of the generated waste. This activity is likely to have impacted the Island parcels.
- The four (4) listed releases identified in the NYS Spills Database have achieved a closed status. A closed status indicated that cleanup activity is finished and all paperwork is completed. Therefore, it is unlikely that the identified SPILLS sites have impacted the subject site.
- The registered petroleum bulk storage tanks located on the subject property and on a nearby property are listed as active. No records exist of the identified petroleum bulk storage tanks leaking. The chemical bulk storage tank located on the subject property has an inactive status. The tank has been removed, and no spills have been reported.

4.2 Local File Review

The New York State Department of Environmental Conservation Region 3, New York State Department of Health, and the Ulster County Department of Health were queried for information available under the Freedom of Information Law (FOIL).

No information on the subject site has been provided as of April 8, 2005 from the New York State Department of Health.

No environmental concerns were identified for the subject site or adjacent sites from the Ulster County Department of Health. A contact at the Department noted that the historical industrial nature of the area is likely to have impacted the soil and groundwater at the subject site.

The New York State Department of Environmental Conservation supplied spill records for the subject property and adjoining properties. This information was previously made available through the FirstSearch report. No new environmental concerns were identified.

5.0 SITE RECONNAISSANCE

The site reconnaissance was conducted by Fuss & O'Neill, on April 7, 2005. During the site visit, the subject site was inspected for RECs. Photographs taken during the site inspection are presented in Appendix F.

Each of the parcels associated with the Island Dock Parcel were visually inspected. It should be noted that the site was inspected shortly after a significant flood event that flooded the subject property and surrounding properties with 2-3 feet of water for approximately 3 days. As a result, the parcels were covered with 1 to 2 inches of wet silt. Observations at each location are described below.

Mainland Parcel

The parcel is on the south side of Abeel Street at Island Dock Road. The entrance to the subject property is fenced with a locked gate to prevent vehicular access to Island Dock Road. An abandoned concrete block manufacturing factory is on the parcel. The building is unlocked, and most doors are either missing or broken. The building is rectangular, with an approximate three (3) story tall tower on the northern side containing what may have been a cement or raw materials chute. The first floor of the building is completely vacant, with an area formerly containing an office, three large concrete block kilns, and the former processing area. The former processing area has disconnected wires, piping, and scales. A small pile of wooden pallets and concrete blocks sits by the south side entrance. Large (4 ft by 6 ft) metal plates were on the floor under the cement chute. It is unknown whether floor drains are located under the plates. The staircase to the second floor of the building was unsafe for use and, therefore, portions of the second floor were not inspected. From the outside of the building, a second-floor access door was open from the roof of the kilns. A restroom, small office area, and boiler room with one (1) large boiler and a water tank are located on the second floor. The boiler and water tank were not evaluated due to limited light in the building.

The first floor of the building had small spills of red or orange concrete dye powder. Also, two areas of the concrete floor had staining suggesting small oil spills.

Although the FirstSearch report indicated an active underground petroleum bulk storage tank (UST) on site, no evidence of a UST was observed. It is likely that the tank was removed in the late 1990's or early 2,000's when the facility was abandoned. The current facility owner has indicated that the tank was removed in 2004. Adjacent to the building on the western side is the former location of a large (unknown size) aboveground petroleum bulk storage tank (AST). The cradle where the tank sat and the secondary containment walls are still intact.

The yard surrounding the former block factory is mostly covered with a concrete pad. An apparent concrete truck washout area is located along the Rondout Creek near the entrance to the Island.

The west side of the yard is full of wooden pallets, metal shelving, and a small air compressor. Adjacent to the containment walls of the former AST is an abandoned trailer that may have been used as office space. A small pile of crushed concrete block debris is also in the area. Wooden pallets are randomly scattered about the yard, likely as a result of the recent flooding.

As shown on the site plan in Figure 2, a storage lot is located east of the main lot, on both separated by Island Dock Road. The southern half of the storage lot seems to consist mostly of fill material, as the Rondout Creek used to flow through the area (see historical aerial photographs, Appendix G). The lot is currently vacant with the exception of various sized concrete block piles on the outskirts.

Upper Island

This portion of the island is that located closest to the mainland. Stacked piles of concrete blocks – all shapes and various colors – are located on both sides of the access road for approximately the first 300 feet of the island. The south side of the island has a large foundation. The north side of the island has large debris piles of crushed block and construction debris. An abandoned, gutted trailer sits on the parcel, next to which is a large debris pile containing all the pieces removed from the trailer. Other debris consists of pieces of equipment used in the concrete block-making process, and steel shelving presumably used while drying the blocks.

There is no evidence of aboveground or underground petroleum bulk storage tanks on the parcel. The wastes disposed of on the parcel – crushed block construction debris – are unlikely to be considered hazardous waste. Since the origin of the debris is unknown, it is possible the construction debris contains items with lead-based paint or asbestos materials.

On the northern edge of the island near the construction debris piles, three (3) transformers are sitting on a broken wooden pallet, on a concrete pad. The metal transformer cases are rusted and no labels or utility company contact information was observed. Due to the deteriorated condition of the transformers and failure of the cases, it is likely that any dielectric fluid contained inside has leaked out. Dielectric fluid in older transformers is known to have contained polychlorinated biphenyls (PCBs). Since the age of these transformers is unknown, the surrounding area is likely to be impacted.

Lower Island

Approximately half-way down the length of the Island, the access road trends toward the northern side. At this point and continuing the remainder of the Island's length, the center of Island contains multiple broken concrete block debris pile. The piles are relatively extensive, and seem to consist exclusively of concrete blocks. Some other garbage exists (i.e. broken bicycles, automobile tires, other household garbage), but in very limited quantities. There is an apparent water line running the length of the Island. In at least three locations, the piping was exposed inside a 4 ft by 4 ft concrete shelter. It is unknown whether the pipeline is functional, or what it was used for.

There is no evidence of aboveground or underground petroleum bulk storage tanks on the parcel. It is unlikely that the concrete block debris piles contain any hazardous materials.

Adjoining Properties

On the northern side of the subject property, across Abeel Street, is a small storage garage and a private residence. As previously discussed, a former auto repair shop was located in the area. Although no areas of environmental concern were visually identified in the area, activities at the former auto repair shop could have resulted in the release of various automotive fluids to the soil. Marinas are located on the western and eastern sides of the subject property. Other than former petroleum spills reported at these locations (see Section 4.1), no areas of environmental concern were identified in these areas.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Fuss & O'Neill of New York, P.C. prepared this Phase I ESA report in conformance with the scope and limitations of ASTM Practice E 1527-00. Fuss & O'Neill has followed the guidelines described in ASTM E1527-00 to identify the RECs at this site in a manner consistent with standard practice in the industry. Any exceptions to, or deletions from, this practice are described in Appendix A of this report. This assessment has revealed the following environmental conditions (RECs) in connection with the subject property with corresponding recommendations:

- Historical usage of the subject site as a coal storage yard, lumber production company and storage yard, and concrete block manufacturing facility may have resulted in adverse impacts. Soil sampling is recommended to assess whether these historical activities impacted the site.
- The transformers located on the upper parcel of the Island are likely to have impacted the surrounding soil and possibly groundwater due to the apparent leaking of dielectric fluid. Sampling of soil and groundwater in the immediate area of the transformers is recommended to assess whether the transformers have impacted the site.
- The exact composition of construction debris and crushed block piles on the upper parcel of the Island is unknown. It is possible that the piles contain hazardous materials. Soil sampling is recommended in the immediate area of the piles to assess whether they have impacted the site.
- Significant amounts of scrap metal and wood debris were found throughout the site. This debris should be removed, and if any evidence of a release (including staining, stressed or dead vegetation, or odors) is found, soil sampling is recommended.
- Petroleum releases were identified in areas nearby and upgradient (inferred) of the subject site. These releases were generally small and appear to have been adequately addressed. Therefore, we believe that little risk of impact from these releases to groundwater at the subject site exists, and no additional action is recommended.

7.0 REFERENCES

American Society for Testing and Materials, 2000, Standard Practice for Environmental Site Assessments; Phase I Environmental Site Assessment Process: ASTM Practice E 1527-00.

Cadwell, Donald H., et. al, Surficial Geologic Map of New York, Lower Hudson Sheet, 1989.

Davis, James F., The University of the State of New York: The State Education Department, Geologic Map of New York State, Lower Hudson Sheet, 1970, reprinted 1995.

Rules and Regulations of the State of New York, Title 6 of the Official Compilation of Codes, 6 NYCRR.

United States Geological Survey, Kingston East Quadrangle New York - Ulster County, 7.5-Minute Series Topographic Map; United States Department of the Interior, U.S. Geological Survey, 1963, Photorevised 1980.

United States Geological Survey, Kingston West Quadrangle New York - Ulster County, 7.5-Minute Series Topographic Map; United States Department of the Interior, U.S. Geological Survey, 1964, Photorevised 1980.

APPENDIX A

SCOPE OF WORK

FUSS & O'NEILL - GENERAL PHASE I ESA SCOPE OF WORK

Fuss & O'Neill uses Standard Practice E 1527-00 as general standards for conducting Phase I ESAs. For consistency, this scope of work is generally presented based on the outline of our standard Phase I ESA report. The descriptions of the procedures and sources for obtaining the information for each section follow the section headings. As specified by Standard Practice E 1527-00, the scope of work described below allows for use of professional judgment to determine the extent to which specific sources are reviewed.

Unless otherwise specified, the following items are not considered in the course of completing an ASTM Phase I ESA:

- Asbestos
- Lead (paint/plumbing)
- Radon
- Regulatory Compliance
- Fluorescent Light Ballasts
- Wetlands

These items typically present little environmental risk to the grounds of a site; however, these items may be future liabilities during property transfer, regulatory audits, construction, renovation, or demolition projects.

1.0 Introduction

The purpose of the ESA and the party that this ESA was conducted for are identified in this section.

2.0 Site Overview

2.1 Site Information

2.1.1 Property Location, Size of Parcel, and Site Plan

Review of USGS topographic maps, local assessor and zoning maps and property description cards, field observations and sketches, and, if available, plans provided by a contact for the subject site. A site plan is included that is derived from these sources.

2.1.2 Potable Water Supply and Sewage Disposal

Query the local Department of Public Works, local Engineering Department, appropriate local utilities, and/or other local municipal sources and/or a knowledgeable site contact.

2.1.3 Adjoining Land Use

Site reconnaissance and assessor=s mapping.

2.2 Physical Setting of Site

2.2.1 Geologic and Physiographic Setting

Site reconnaissance, USGS topographic maps, and available geological maps.

2.2.2 Groundwater

Site reconnaissance, USGS topographic maps, and NYSDEC water quality standards.

2.2.3 Surface Water

Site reconnaissance, USGS topographic maps, and NYSDEC water quality maps and water quality standards.

2.2.4 Location of Public Water Supply Sources

Site reconnaissance, NYSDOH FOIL, and mapping available in local departments queried as part of the ESA.

2.3 Previous Environmental Investigations

Provided by the appropriate site contact or identified by other means during the course of conducting the ESA.

3.0 Site History

Site reconnaissance, knowledgeable site contacts, aerial photographs available at the New York State Office for Technology Center for Geographic Information, Sanborn fire insurance maps requested through FirstSearch Technology Corporation, street directories available at the State Library (note that street directories are reviewed at approximately five year intervals, but may be reviewed at smaller intervals for multi-tenant properties), and local municipal sources (local municipal Building Department, Engineering Department, Planning and Zoning Department, Health Department, and Fire Marshal).

An appropriate site contact is queried to determine if any environmental liens apply to the property.

A title search is generally not conducted because they can be very difficult and time consuming and because they generally only yield the owners of the property, not the occupants. However, if the history of a site cannot be otherwise identified, a limited title search may be attempted.

4.0 Federal, State, and Local File Review

4.1 Summary of Regulatory Database Information

Regulatory databases specified by Standard Practice E 1527-00 are reviewed using FirstSearch Technology Corporation, an environmental database search service.

The report provided by FirstSearch Technology Corporation is reviewed in detail. Sites that are inferred to present a significant risk to adversely impact the subject site are identified and explained within the ESA report. However, sites inferred to pose little risk to adversely impact the subject site are disclaimed within the attached FirstSearch Technology Corporation report.

4.2 Local File Review

Files for the local municipal Tax Assessor, Building Department, Planning and Zoning Department, Health Department, and Fire Marshal are reviewed. Information is requested as available under the Freedom of Information Law (FOIL) from the State and County Health Departments and the NYSDEC.

5.0 Site Reconnaissance

Field observations and in interview or interviews with appropriate, knowledgeable personnel familiar with the site.

6.0 Conclusions and Recommendations

Recognized environmental conditions are summarized in this section as well as recommendations for further investigation, if appropriate.

7.0 References

References used as part of the ESA are presented here.

8.0 LIMITATIONS OF WORK PRODUCT

All work product and reports provided in connection with the performance of Environmental Site Assessments are subject to the following limitations.

1.0 The observations described in this Report were made under the conditions stated therein. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services.

2.0 In preparing this report, Fuss & O'Neill of New York, P.C. has relied on certain information provided by state and local officials and information and representations made by other parties referenced therein, and on information contained in the files of state and/or local agencies made available to Fuss & O'Neill at the time of the site assessment. To the extent that such files are missing, incomplete or not provided to Fuss & O'Neill, Fuss & O'Neill is not responsible.

Although there may have been some degree of overlap in the information provided by these various sources, Fuss & O'Neill did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this site assessment

- 3.0 The purpose of this Report was to assess the physical characteristics of the subject site with respect to the presence in the environment of hazardous substances, waste or petroleum and chemical products and wastes. Unless otherwise noted, no specific attempt was made to check the compliance of present or past owners or operators of the subject site with Federal, State, or local laws and regulations, environmental or otherwise.
- 4.0 If water level readings have been made in observation wells, these observations were made at the times and under the conditions stated in the Report. However, it must be noted that fluctuations in the level of ground water may occur due to variations in rainfall, passage of time and other factors. Should additional data become available in the future, these data should be reviewed by Fuss & O'Neill, and the conclusions and recommendations presented herein modified accordingly.
- 5.0 Except as noted within the text of the Report, no quantitative laboratory testing was performed as part of the site assessment. Where such analyses have been conducted by an outside laboratory, Fuss & O'Neill has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these tests.
- 6.0 If the conclusions and recommendations contained in this report are based, in part, upon various types of chemical data, then the conclusions and recommendations are contingent upon the validity of such data. These data (if obtained) have been reviewed and interpretations made in the Report. If indicated within the Report, some of these data may be preliminary "screening" level data and should be confirmed with quantitative analyses if more specific information is necessary. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time and other factors. Should additional chemical data become available in the future, these data should be reviewed by Fuss & O'Neill and the conclusions and recommendations presented herein modified accordingly.
- 7.0 Chemical analyses may have been performed for specific parameters during the course of this site assessment, as described in the Report. However, it should be noted that additional chemical constituents not searched for during the current study may be present in soil and/or ground water at the subject site.

SPECIFIC EXCEPTIONS TO, OR DELETIONS FROM, THE GENERAL SCOPE OF WORK AND LIMITATIONS

- Silt from recent flooding limited observations of the grounds of the subject site.
- Access to the boiler room on the second floor of the block factory was limited because of safety concerns and inadequate lighting.
- The key site manager and occupants were not available for interview as part of this ESA.
- Due to the size of the subject site (approximately a 15-acre island), a random grid was used to walk accessible portions of the property. The access road on the northern side of the island was walked, and the southern shore was walked. The center of the island, mostly containing block debris piles, was not walked.

APPENDIX B

PERSONS CONTACTED

APPENDIX C

PROPERTY DESCRIPTION CARDS

APPENDIX D

ENVIRONMENTAL DATABASE SEARCH

FirstSearch Technology Corporation

APPENDIX E

NYSDEC FILE INFORMATION

APPENDIX F

SITE PHOTOGRAPHS

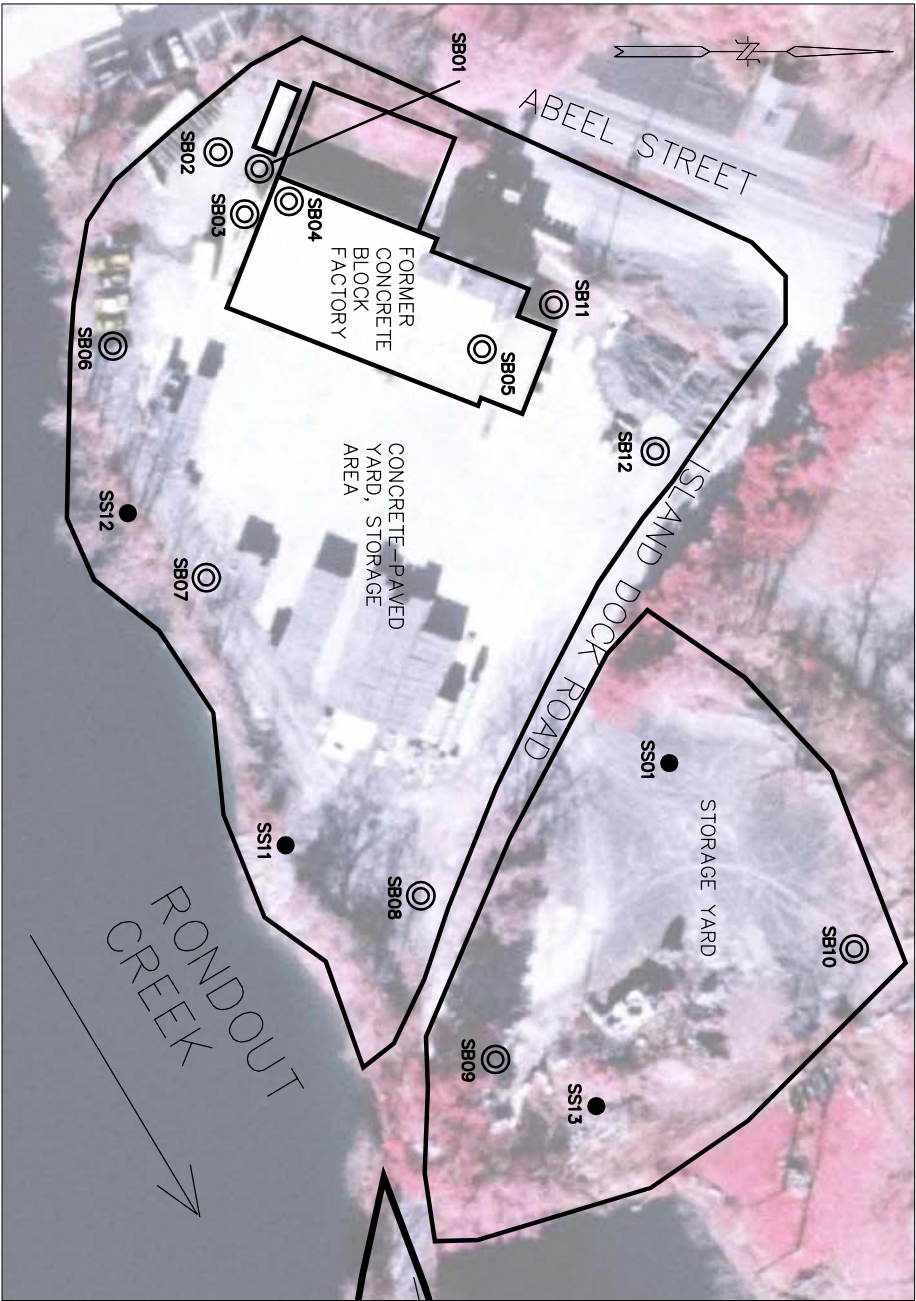
APPENDIX G

HISTORICAL PHOTOGRAPHS

APPENDIX H

HISTORICAL TOPOGRAPHIC MAPS

FIGURES

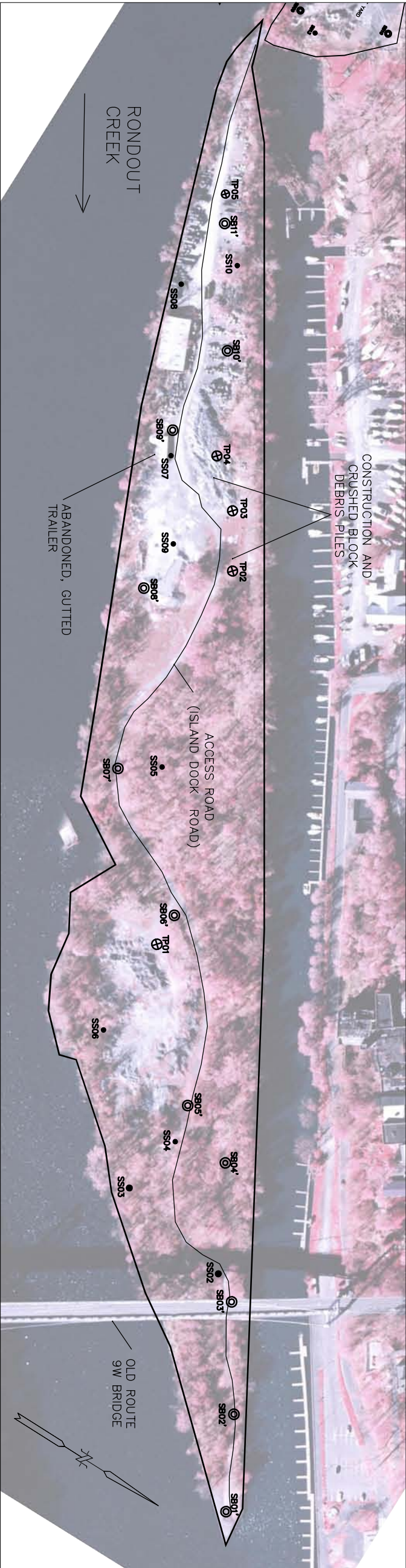


- LEGEND
- ⊙ SOIL BORING
 - ⊗ TEST PIT
 - SURFACE SAMPLE, 0.0 – 0.5 FT

NOTE
BUILDING LOCATIONS ON DRAWINGS REFLECT THE CONDITIONS NOTED ON A SITE VISIT MARCH 31, 2005. THE AERIAL PHOTOGRAPHS DATE BACK TO OCTOBER 2004 AND DO NOT NECESSARILY REFLECT THE CURRENT CONDITIONS.
PHASE II ESA SITE ACTIVITIES: TEST PITS WERE INSTALLED ON APRIL 8, 2005. SOIL BORINGS WERE ADVANCED ON MARCH 28 & 29, 2005. SURFACE SAMPLES WERE COLLECTED ON JUNE 2, 2005.

MAP REFERENCE
THIS MAP WAS CREATED USING AN AERIAL PHOTO FROM THE NEW YORK STATE GIS CLEARINGHOUSE, DATED OCTOBER 2004. THE SUBJECT SITE PROPERTY BOUNDARY WAS ALSO COMPARED TO A PROPERTY TAX BOUNDARY MAP FROM THE ULSTER COUNTY, NEW YORK WEBSITE.

1 MAIN LAND PARCELS
FIG. 3 SCALE: 1:40



1 ISLAND PARCEL
FIG. 3 SCALE: 1:100

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PROJ. No.: 20060314.A21
DATE: JUNE 2005

FIG. 2

**LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER CONCRETE BLOCK, INC. FACILITY
(ISLAND DOCK)
KINGSTON, NEW YORK**

JULY 2005

**PREPARED FOR
KINGSTON HISTORICAL WATERFRONT, ISLAND DOCK, LLC**

**LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT
FORMER CONCRETE BLOCK, INC.
(ISLAND DOCK)
308-322 ABEEL STREET
KINGSTON, NEW YORK**

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1.0 INTRODUCTION

Fuss & O'Neill of New York, P.C. (Fuss & O'Neill) conducted a Limited Phase II Environmental Site Assessment (ESA) at the former Concrete Block, Inc., Island Dock site, located at 308-322 Abeel Street in Kingston, New York (Ulster County). The objective of the Limited Phase II ESA was to provide information regarding the current environmental status and potential liability associated with areas of recognized environmental concern (REC) identified during a review of previous environmental investigations conducted at the facility.

2.0 SITE BACKGROUND

The subject site, commonly known as Island Dock, is located on the south side of Abeel Street in the city of Kingston, New York. A Site Location Map is provided in [Figure 1](#).

The site consists of three (3) separate parcels of land, totaling 17.8 acres. The mainland portion, a 0.7 acre parcel located on the south side of Abeel Street, is part of the Rondout Creek Shoreline. A storage lot, separated from the mainland parcel by Island Dock Road, is located east of the main entrance. Both lots on this parcel consist of fill material. The lots are currently vacant with the exception of numerous concrete block piles. The former concrete block factory building is located on the mainland parcel. The building is now dilapidated and abandoned.

The other two parcels, upper and lower Island Dock, form an island in the Rondout Creek. The island portion of the site contains a number of piles of debris and broken pieces of equipment used in the concrete block-making process. There is an unpaved access road running through the center of the island. There is a large building foundation, an abandoned trailer, and other of piles of crushed block and construction debris.

2.1 Geology

The Surficial Geologic Map of New York (Cadwell, 1989) identifies the unconsolidated deposits in the vicinity of the site as either fluvial sand and gravel deposits or glacial till consisting of sand, silt and gravel. These deposits exhibit variable texture. The till deposits are typically poorly sorted and consist primarily of clay, silt-clay and boulder-clay mixes with sporadic bedrock outcrops intertwined. Soils in the vicinity of the site are likely fill material. If not fill, the soils are listed as either lacustrine deposits or glacial till. The Ulster County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. There is also an area of some "Bath-Nassau-Rock outcrop complex, hilly" soils located near the northwest edge of the site.

Bedrock below the site reportedly consists of Undifferentiated Lower Devonian and Silurian Rocks of the Austin Glen Formation (Fisher et al. 1970). The Austin Glen formation consists of interbedded layers of greywacke and shale. The outcrops observed on site were interbedded greywacke and shale consistent with the published description. The outcrops appeared to consist of competent siltstone layers alternating with less competent shale.

2.2 Hydrogeology

During the Phase II ESA, groundwater was typically encountered at depths of 2 to 9 feet below the ground surface. Given regional topography and the immediate proximity of surface water bodies, it is assumed that shallow groundwater flows from east to west across the site and discharges to the Rondout Creek. Because the reach of Rondout Creek, adjacent to the site, is tidally influenced, it is likely that groundwater flow at the site is affected by tides.

Groundwater is not used as a potable water supply in the area. Little information is available to date regarding groundwater quality beneath the site. Impacts to groundwater typically associated with industrial or commercial use would be expected based on the historical use of this land and the surrounding properties.

3.0 **PHASE I ESA FINDINGS**

3.1 Historical Recognized Environmental Conditions

The historic use of the site and properties in the surrounding area has been commercial or industrial in nature. The mainland portion of the site is cut-and-fill land established prior to 1887 as a coal storage yard. The island portion of the site is an artificial island constructed circa 1898, which was also initially used as a coal storage yard. After 1930, the site was used as a boat and lumber storage facility and a concrete block manufacturing facility. The concrete block factory building is now an abandoned, dilapidated block building. The lots near the former block factory and on the east side of the parcel are mostly covered with gravel, asphalt or concrete pads and contain several debris piles.

3.2 Environmental Database Review Recognized Environmental Concerns

Files of Federal, State and local agencies were reviewed for environmentally-related issues pertinent to the subject site and nearby parcels, such as permits, inspection reports, enforcement history or documented releases of hazardous materials. Additionally, Ulster County and City of Kingston departments were contacted as discussed in the Phase I ESA.

The environmental databases provide the following information for the subject site:

- Three (3) Emergency Response Notification System (ERNS) events were recorded within the property and adjacent properties.
- Seven (7) Leaking Underground Storage Tank (LUST) sites were located within 0.5 miles of the subject property.
- Three (3) National Pollutant Discharge Elimination System (NPDES) outfalls were located within the property and adjacent properties.
- One (1) Resource Conservation and Recovery Act Waste Generator (RCRAGEN) was located within the property and adjacent properties.

- Seven (7) State Spills (SPILLS) sites were located within the property and adjacent properties.
- Two (2) Underground Storage Tanks (UST) were located within the property and adjacent properties.
- One (1) regulated AST/UST site was located within the property and adjacent properties

3.3 Site Inspection Recognized Environmental Concerns

The Phase I ESA revealed the following environmental conditions (RECs) in connection with the subject property:

- Historical usage of the subject site as a coal storage yard, lumber production company and storage yard, and concrete block manufacturing facility may have resulted in adverse impacts.
- Electrical transformer casings located on the upper parcel of the Island may have impacted the surrounding soil and possibly groundwater through the leaking of transformer fluid.
- Significant amounts of scrap metal and wood debris were found throughout the site. The exact composition of construction debris and crushed block piles on the site is unknown. It is possible that the piles contain hazardous materials.
- Petroleum releases were identified in areas nearby and upgradient (inferred) of the subject site. These releases were generally small and appear to have been adequately addressed.

4.0 **PHASE II FIELD INVESTIGATION FINDINGS**

4.1 Soil Sampling

In March 2005, the initial field investigation was conducted in order to determine what type of contamination is present in soils at the site. A Geoprobe Direct-Push Soil Sampler was used to collect soil cores to a depth of approximately 8 feet below ground surface (bgs). A hydraulic excavator was used to establish test pits in various locations across the island. Both surface and subsurface samples were collected from the test pits. Representative soil samples were collected from the borings and test pits and submitted for laboratory analysis for volatile organic compounds (VOCs) by EPA Method 8021 (either full list or as modified by STARS), semi-volatile organic compounds (SVOCs) by EPA Method 8270 (as modified by STARS), and for RCRA 8 metals by EPA Method 6010.

Following the initial investigation, a supplemental round of surficial soil sampling was performed. This sampling effort focused on metals analysis on soils from 0-1 ft. bgs and was submitted for laboratory analysis for RCRA 8 Metals by EPA Method 6010.

The following table summarizes samples submitted for laboratory analysis as part of the initial Phase II investigation and the supplemental surface soil sampling:

Sample No.	Sample Location	Depth (ft. bgs)	Soil Description	Analysis Performed
788050328-01	SB01	0-4	Silt, coal	8021 (STARS), 8270 (STARS)
788050328-02	SB01	4-8	Silt, gravel, ash, coal, organics, petroleum odor	8021 (STARS), 8270 (STARS)
788050328-03	SB02	0-4	Ash, organics, gravel	8021 (STARS), 8270 (STARS)
788050329-01	SB03	0-4	Sand, silt, coal layer	8021 (Full), 8270 (STARS), RCRA 8 Metals (6010)
788050329-02	SB05	0-4	Silt, sand, coal layer	8021 (Full), 8270 (STARS), RCRA 8 Metals (6010)
788050329-03	SB07	0-4	Gravel, coal, silt	8021 (Full), 8270 (STARS), RCRA 8
788050329-04	SB09	0-4	Sand/silt	8021 (Full), 8270 (STARS), RCRA 8 Metals (6010)
767050408-01	TP01	0-9	Fill material: sand, bricks, concrete blocks, clay at 8.5'	8270 (STARS), RCRA 8, pH
767050408-02	TP02	0-0.5	Organics, gravel, crushed block, sand	8270 (STARS), RCRA 8 Metals (6010)
767050408-03	TP02	1-10	Coal, crushed block, large and fine-grained sand, clay at 9.5'	8021 (STARS), 8270 (STARS), RCRA 8 Metals (6010)
767050408-04	TP03	0-0.5	Organics, sand	RCRA 8 Metals (6010)
767050408-08	TP04	0-0.5	Organics, sand, clay	8021 (Full), 8270 (STARS), RCRA 8 Metals (6010)
767050408-09	TP05	3-4	Sand/silt with coal chunks (1-2" dia.)	8270 (STARS), RCRA 8 Metals (6010), pH, Cyanide
804050602-01	SS-01	0-1	Crushed gravel, silt fill	RCRA 8 Metals (6010)
804050602-02	SS-02	0-1	Silt, gravel, f sand	RCRA 8 Metals (6010)
804050602-03	SS-03	0-1	Silt, gravel, f sand	RCRA 8 Metals (6010)
804050602-01	SS-04	0-1	Gravel, sand, tr org. silt	RCRA 8 Metals (6010)
804050602-02	SS-05	0-1	Silt, sand	RCRA 8 Metals (6010)
804050602-03	SS-06	0-1	Gravel, silt	RCRA 8 Metals (6010)
804050602-04	SS-07	0-1	Sand/silt	RCRA 8 Metals (6010)

804050602-01	SS-08	0-1	Silt, gravel, trace organics	RCRA 8 Metals (6010)
804050602-02	SS-09	0-1	Gravel, sand, silt	RCRA 8 Metals (6010)
804050602-03	SS-10	0-1	Gravel, coarse sand, cinders	RCRA 8 Metals (6010)
804050602-04	SS-11	0-1	Gravel, sand, silt	RCRA 8 Metals (6010)
804050602-08	SS-12	0-1	Gravel, coarse sand, cinders	RCRA 8 Metals (6010)
804050602-09	SS-13	0-1	Gravel, coarse sand, cinders	RCRA 8 Metals (6010)

4.2 Laboratory Analytical Results

A summary of analytical data compared with applicable New York State *Technical and Administrative Guidance 4046* (TAGM 4046) recommended soil clean-up values is presented in Table 1. Locations of soil borings, surface samples and test pits are shown on Figure 2. A copy of the laboratory analytical results is included as Appendix A. Soil Boring, Test Pit and Soil Sampling Logs are presented in Appendix B.

4.2.1 Volatile and Semi-Volatile Organic Compounds

Samples collected from soil borings SB-01 and SB-02, in the vicinity of the block factory building and former fuel oil tank location, exhibited concentrations of benzo(a)anthracene, benzo(a)pyrene, naphthalene and chrysene exceeding the TAGM 4046 Guidance Values. These samples also exhibited low levels of the petroleum-related VOC compounds toluene, o-xylene, isopropylbenzene, n-propylbenzene, sec-butylbenzene, 1,3,5-trimethylbenzene, p-isopropyltoluene and 1,2,4-trimethylbenzene. However none of these compounds exceeded the TAGM 4046 Guidance Value.

Samples collected from soil borings on the island portion of the site: SB-03, SB-05 and SB-09; exhibited concentrations of benzo(a)pyrene exceeding the TAGM 4046 Guidance Values. Borings SB-05 and SB-09 exhibited concentrations of benzo(a)anthracene and chrysene exceeding the TAGM 4046 Guidance Values. Soil boring SB-05 also exhibited concentrations of benzo(a)pyrene and benzo(k)fluoranthene exceeding the TAGM 4046 Guidance Values. Samples collected from test pit TP-02 at a 0-0.5 ft. depth exhibited a concentration of benzo(a)pyrene exceeding the TAGM 4046 Guidance Value.

4.2.2 RCRA 8 Metals

Samples collected from soil borings SB-03, SB-05, SB-07, and SB-09 exhibited concentrations of selenium exceeding the TAGM 4046 Guidance Value. Samples collected from soil borings SB-03 and SB-05, as well as test pit TP-02, exhibited concentrations of chromium exceeding the TAGM 4046 Guidance Value.

5.0 DISCUSSION OF FINDINGS AND CONCLUSIONS

Results from the Phase II ESA indicate that surface soils at the site have been impacted by metals, petroleum-related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) released through the use of the site in coal storage and concrete block manufacturing. (See Plate 1). Concentrations of metals and semi-volatile organic compounds (SVOCs) were found that exceeded their respective NYSDEC TAGM 4046 Criteria.

Analytical results suggest that the most significant heavy metal impacts to the site are in surface or near-surface soils. All of the TAGM 4046 metals exceedances occurred within the 0-4 ft. sample interval, and maximum levels of chromium were detected within the 0-0.5 ft. interval. Arsenic and chromium were also identified in shallow soils. Metals impacts were most noticeably present on, and generally evenly distributed across, the island portion of the site.

SVOC impacts were identified on both the mainland and island portions of the site. SVOCs were found in the vicinity of the former concrete block factory and near the former location of a large (unknown size) aboveground petroleum bulk storage tank (AST). The cradle where the tank sat and the secondary containment walls are still intact. On the island portion of the site, SVOCs were detected in eight (8) of twelve (12) samples generally distributed across the island, with the maximum value found in the central northern section of the island (e. g. SB-05). In several locations, coal and coal slag were observed in soil borings and test pits less than 2.0 feet below ground surface (bgs). The presence of SVOCs at the site is indicative of coal or coal slag impacts.

Petroleum impacted soil has also been identified in one area on the site. Low levels of petroleum-related volatile organic compounds (VOCs) were identified in the vicinity of the former AST, adjacent to the concrete block factory building. The extent of VOC impacts to the site has not been fully characterized; however, impacts appear to be concentrated around this area.

6.0 REFERENCES

American Society for Testing and Materials, 2000, Standard Practice for Environmental Site Assessments; Phase I Environmental Site Assessment Process: ASTM Practice E 1527-00.

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United States Geological Survey, Kingston West Quadrangle New York - Ulster County, 7.5-Minute Series Topographic Map; United States Department of the Interior, U.S. Geological Survey, 1964, Photorevised 1980.

FIGURES

TABLES

APPENDIX A

Laboratory Analytical Results

APPENDIX B

Soil Sampling Logs

TABLE 1
Summary of Soil Boring Sampling Analytical Data
Phase II ESA
 Fomer Concrete Block, Inc.(Island Dock)
 308-322 Abeel Street, Kingston, NY

PARAMETERS	Site ID	SB03'	SB05'	SB07'	SB09'	SB01	SB01	SB02	TAGM 4046
	F&O Sample #	788050329-01	788050329-02	788050329-03	788050329-04	788050328-01	788050328-02	788050328-03	Recommended Soil
	Sampling Date	3/29/2005	3/29/2005	3/29/2005	3/29/2005	3/28/2005	3/28/2005	3/28/2005	Clean-Up Objective
	Depth (feet)	0-4	0-4	0-4	0-4	0-4	8-Apr	8-Apr	
Metals (mg/kg)									
Arsenic		4.5	5.1	4.8	3.2	--	--	--	7.5
Barium		57.6	83.80	ND<47.1	51.7	--	--	--	300
Cadmium		ND<1.2	ND<1.2	ND<1.2	ND<1.1	--	--	--	1
Chromium		12.4	11.8	7.1	6.5	--	--	--	10
Lead		110	169	58.9	46.8	--	--	--	SB (200-500)**
Mercury		ND<0.060	ND<0.057	ND<0.058	ND<0.055	--	--	--	100
Selenium		4.6	4.7	3.3	3.5	--	--	--	2
Silver		ND<2.4	ND<2.5	ND<2.4	ND<2.2	--	--	--	SB
EPA Method 8270C - Modified STARS (ug/Kg)									
Acenaphthene		ND<400	ND<400	ND<380	ND<360	ND<360	ND<440	ND<480	50,000
Anthracene		ND<400	860	ND<380	100*	ND<360	1500	130*	50,000
Benzo(a)anthracene		59*	7800	45*	350*	ND<360	750	450*	224
Benzo(a)pyrene		77*	6200	56*	320*	ND<360	550	470*	61
Benzo(b)fluoranthene		260*	7900	190*	500	140*	690	580	1,100
Benzo(g,h,i)perylene		45*	3000	ND<380	140*	ND<360	350*	230*	50,000
Benzo(k)fluoranthene		47*	2800	ND<380	120*	ND<360	390*	260*	1,100
Chrysene		85*	8300	84*	420	ND<360	890	540	400
Dibenz(a,h)anthracene		ND<400	ND<400	ND<380	ND<360	ND<360	ND<440	ND<480	14
Fluoranthene		130*	19000	54*	510	51*	2200	790	50,000
Fluorene		ND<400	ND<400	ND<380	37*	ND<360	2200	56*	50,000
Indeno(1,2,3-cd)pyrene		44*	2700	ND<380	150*	ND<360	380*	200*	3,200
Naphthalene		ND<400	ND<400	41*	ND<360	ND<360	ND<440	ND<480	13,000
Phenanthrene		ND<400	290*	95*	500	41*	6700	640	50,000
Pyrene		120*	20000	160*	1100	76*	4600	1500	50,000
EPA Method 8021B - Modified STARS (ug/Kg)		FULL LIST ND	FULL LIST ND	FULL LIST ND	FULL LIST ND				
Benzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	ND<6.5	ND<1.4	60
Ethylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	ND<6.5	ND<1.4	5,500
Toluene		ND<1.2	1.7	1.1	1.7	ND<1.1	ND<6.5	206	1,500
o-Xylene		ND<1.2	ND<1.2	ND<1.2	0.60*	ND<1.1	5.5*	ND<1.4	1,200
m/p-Xylene		ND<1.2	ND<1.2	ND<1.2	1.1*	ND<1.1	ND<6.5	ND<1.4	
Naphthalene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	93	1.8	---
Methyl-tert-butyl-ether (MTBE)		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	ND<6.5	ND<1.4	---
Isopropylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	5.6*	ND<1.4	---
n-Propylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	16	ND<1.4	---
tert-Butylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	ND<6.5	ND<1.4	---
sec-Butylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	30	ND<1.4	---
1,3,5-Trimethylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	7.1	ND<1.4	---
p-Isopropyltoluene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	8.9	ND<1.4	---
1,2,4-Trimethylbenzene		ND<1.2	ND<1.2	ND<1.2	0.72*	ND<1.1	4.9*	ND<1.4	---
n-Butylbenzene		ND<1.2	ND<1.2	ND<1.2	ND<1.1	ND<1.1	ND<6.5	ND<1.4	---

Notes:**Results in Bold exceed TAGM 4046 Soil Clean-Up Value**

ND = Compound not detected above the indicated Method Detection Limit (MDL).

SB = Site Background

* Indicates an estimated value. This compound meets the identification criteria, but the result is less than the MDL.

** Average background levels in metropolitan or suburban areas or near highways typically range from 200-500 ppm



MAP REFERENCE
THIS MAP WAS CREATED USING AN AERIAL PHOTO FROM THE NEW YORK
STATE GIS CLEARINGHOUSE, DATED OCTOBER 2004.

		PROJ. MANAGER:			
		CHIEF DESIGNER:			
		REVIEWED BY:		DATE	
1.					
No.		DATE		BY	
		DESCRIPTION			
		REVISIONS			
TO MY KNOWLEDGE AND BELIEF, THESE MAPS ARE SUBSTANTIALLY CORRECT AS NOTED HEREON.					
SCALE:					
HORIZ. NTS.					
VERT.:					
DATUM:					
HORIZ.:					
VERT.:					
0 NTS					
GRAPHIC SCALE					
80 WASHINGTON STREET SUITE 301, FOUUGHKEPSIE, NY 12601					
945.452.6801					
www.fondco.com					
HISTORIC KINGSTON WATERFRONT, ISLAND DOCK, LLC					
ISLAND DOCK					
2004 AERIAL PHOTOGRAPH					
308-322 ABEL STREET AND ISLAND DOCK ROAD					
CITY OF KINGSTON					
NEW YORK					
PROJ. NO.: 20050314.42N					
DATE: AUGUST 2005					
PLATE 1					

HEALTH AND SAFETY PLAN

ISLAND DOCK
ABEEL STREET, KINGSTON
ULSTER COUNTY, NEW YORK

Prepared for:
Kingston Historic Waterfront, Island Dock, LLC

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

October 2005

Fuss & O Neill of New York, P. C. does not guarantee the health or safety of any person entering the site. Due to the potential hazards of this site and the activity occurring thereon, it is not possible to discover, evaluate and provide protection for all possible hazards which may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, not eliminate, the potential for injury at this site. The site-specific information in the plan was prepared specifically for this site and should not be used on any other site without prior research and evaluation by trained health and safety specialists.

This note applies to all personnel legally required to be covered under this HASP pursuant to OSHA regulation 29 CFR 1910.120 and 29 CFR 1926.65, as determined by their employer. Those personnel working within the Exclusion Zone as defined by the HASP must be trained and engaged in a medical surveillance program in accordance with the requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

SITE HEALTH & SAFETY PLAN
ISLAND DOCK
Kingston, New York

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1.0 GENERAL

1.1 Introduction

This Site Health and Safety Plan (HASP) was developed as part of the Fuss & O'Neill of New York P. C. (Fuss & O'Neill) Remedial Investigation Work Plan (RIWP) for the Island Dock site in Kingston, New York. This HASP has been developed for Fuss & O'Neill personnel. All on-site contractors not associated with Fuss & O'Neill must develop their own HASP, applicable to their work activities.

The procedures and protocols in this plan have also been established to provide a mechanism to protect project personnel from potential exposure to known site contaminants encountered during site activities. This plan addresses activities conducted by Fuss & O'Neill and its subcontractors. Compliance with this HASP is required of all authorized Fuss & O'Neill project personnel who enter the working areas of this project. Fuss & O'Neill will provide resources and personnel for the implementation of this HASP. As such, Fuss & O'Neill will make recommendations to those personnel not working under contract with Fuss & O'Neill pertaining to the safe execution of the proposed scope of work, as warranted. No one may enter an established exclusion zone without meeting the requirements of an appropriate HASP.

This HASP meets applicable requirements of Occupational Safety and Health Administration (OSHA) safety and health standards: OSHA 29 CFR 1926 Construction Industry and OSHA 29 CFR 1910 General Industry. This HASP is designed to cover those special and/or unique health and safety procedures arising from actual or potential contact with contaminated materials and those requirements pursuant to OSHA 29 CFR 1910.120 and 1926.65, Final Rule "Hazardous Waste Operations and Emergency Response".

The content of this HASP may change or undergo revision based upon additional information made available to health and safety (H&S) personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed by designated Project Personnel as specified in the pertinent contract.

1.2 Project Personnel

Project Personnel - refers to all Fuss & O'Neill, Inc. operations and project management personnel, including Fuss & O'Neill subcontractors whose responsibilities are to conduct construction activities within the work site.

Project Personnel are divided into two categories: Contact Project Personnel and Non Contact Project Personnel.

Contact Project Personnel - Refers to Project Personnel who may come into contact with hazardous materials (contaminated soil & water which may pose an unacceptable health risk potential). The specific job task will be evaluated to determine personnel classifications. The Health and Safety Manager (HSM) and/or the Health and Safety Supervisor (HSS) will assist with this determination.

Non Contact Project Personnel - Refers to Project Personnel who are not expected to come into contact with hazardous materials. The specific job task will be evaluated to determine personnel classifications. The HSM and/or the HSS will assist with this determination.

Project Support Personnel and Visitors - refers to all other persons who may enter the work site such as truck drivers, public officials, public utility workers, and emergency crews (police, fire, ambulance) as well as any other personnel designated as a project visitor.

Project Personnel Assignments

Fuss & O'Neill of New York, P.C.

Fuss & O'Neill Project Manager & Health and Safety Manager (HSM):

- Richard S. Totino: (845) 452-6801 (Ext. 4204)

Fuss & O'Neill Project Director and Alternate HSM:

- James D. McIver, Jr.: (845) 452-6801 (Ext. 4205)

Fuss & O'Neill Corporate Health and Safety Officer:

- Kevin W. Miller, Ph.D.: (845) 452-6801 (Ext. 5201)

Fuss & O'Neill Site Health and Safety Supervisor:

- Greg Toothill: (518) 218-0600 (Ext. 4107)

Fuss & O'Neill Site Contact & Health and Safety Officer:

- Greg Toothill: (518) 218-0600 (Ext. 4107)

Site Owner Contact:

- Robert Iannucci (718) 596-0504

Medical Consultant:

CorpCare Occupational Health Center, an affiliate of Manchester Memorial Hospital, located in Manchester, Connecticut.

1.3 Emergency Phone

Fuss & O'Neill Site Phone:	To be determined
Emergency	911
Local Police	911
Fire Department:	911
EMS:	911
Hospital:	Benedictine Hospital 105 Mary's Avenue Kingston, New York 12401
	845-338-2500 (non-emergency)
Poison Control Center:	1-800-343-2722
USCG/ DOT National Response Center:	1-800-424-8802

A route map for the listed emergency facility is provided in Appendix A.

2.0 HEALTH AND SAFETY PERSONNEL

2.1 Health and Safety Personnel Designations

The following briefly describes the health and safety designations and general responsibilities which may be employed for this project.

2.2 Project Health and Safety Manager (HSM)

The Project Manager is, by designation, the Site Health and Safety Manager and will be the single point of contact for the project. The HSM has overall responsibility for the development and implementation of the site-specific HASP in conjunction with the other Fuss & O'Neill project personnel. Although the writing of the HASP may be delegated to another member of the team, the HSM shall approve any changes in the plan. This individual has the overall responsibility for the Contractor's performance.

The HSM is also responsible for the following:

1. Discussing any unusual safety and health concerns with the Company Health and Safety Officer prior to completion of the HASP.
2. Assuring that all personnel on-site have been made aware of the potential hazards and are provided appropriate personal protective equipment.
3. Monitoring the performance of personnel and the compliance with this HASP on a periodic basis, and correcting deficiencies.
4. Submit all project reports, including: progress, accident, incident and contractual. A copy of the Supervisor's Report of Accident Investigation form is located in Appendix B.

The alternate HSM is James D. McIver, Jr. who is the project director. The alternate HSM will be available if the primary HSM is unavailable during the project activities.

2.3 Site Health and Safety Supervisor (HSS)

The Site Health and Safety Supervisor (HSS) will be the field scientist, field chemist, engineer or hydrogeologist or other staff member, who will be involved in the on-site activities. The HSS shall be on-site for all work covered by this HASP. He will supervise activities at every phase of work taking place on the project. He will establish and maintain lines of communication at the job site. Before personnel may work in designated exclusion zones, he will obtain the appropriate documentation meeting the medical and health and safety training requirements specified in OSHA 29 CFR 1910.120 and 1926.65 (Hazardous Waste Operations and Emergency Response).

The HSS has the stop-work authorization which he will execute upon his determination of an imminent safety hazard, emergency situation, or other potentially dangerous situations, such as extreme weather conditions. Authorization to proceed with work will be issued by the HSM after such action. The HSS will initiate and execute all contact with support facilities and personnel when this action is appropriate.

The HSS responsibilities will include:

1. Overall responsibility for oversight and day to day enforcement of this HASP.
2. Conduct the initial site specific training of project personnel.
3. Evaluating air monitoring data and recommending changes to engineering controls, work practices and PPE.
4. Daily review of safety operations on-site and completion of a daily record of site activities. A copy of the Daily Record of Site Activities form is located in Appendix C.
5. Reporting and investigation of all accidents or incidents occurring on the site. Reporting of any unsafe acts or conditions. All incidents must be reported to the HSM.
6. Follow up of any corrective action required to reduce identified hazards.

2.4 Site Health and Safety Officer (HSO)

The Site Health and Safety Officer (HSO) may be appointed by the HSM or HSS to conduct some of the daily duties of the HSS.

2.5 Corporate Health and Safety Officer

The Corporate Health and Safety Officer helped develop the health and safety plan. The corporate health and safety officer will provide support and guidance to other project personnel on health and safety issues during the completion of site work.

2.6 Medical Consultant (MC)

The MC meets the requirements of OSHA 29 CFR 1910.120 and 1926.65. The MC will be available to consult with local emergency medical services and will be available, as necessary, to provide medical examinations of project personnel.

3.0 SITE HISTORY AND PHYSICAL DESCRIPTION

3.1 Site History and Physical Description

The subject site, commonly known as Island Dock, is located on the south side of Abeel Street in the City of Kingston, New York. A site location map is provided as Figure 1.

According to the City of Kingston Tax Assessor's records, the subject site consists of three parcels. Parcel 1 is a 0.7-acre triangular-shaped parcel. Parcels 2 and 3 (Upper Island Dock, Lower Island Dock) make up Block Island, including Island Dock Road, which is used to access the island. Parcels 2 and 3 measured 9.2 and 7.9 acres, respectively.

Records at the City of Kingston Tax Assessor's office Do not specify a zoning classification for the subject site. Surrounding properties are zoned as vacant and recreation and entertainment. Zoning

for the site is Rondout Waterfront District. Structures located on the subject site include an abandoned concrete block factory and an abandoned trailer on Parcel 1, and an abandoned trailer on Parcel 2.

Historic use of the subject site includes a coal storage yard, lumber production company and storage yard, and concrete block manufacturing facility. The mainland parcels have been in industrial use since approximately 1887. The island was constructed in approximately 1898. A site map showing site features is provided in the Site Investigation Work Plan.

3.2 Site Air Monitoring

Field activities associated with the site investigation at the site may pose hazardous conditions, such as the release of hazardous substances into the workers' breathing zone. These substances may be in the form of vapors, dusts, or mists that can enter the body through ingestion, inhalation, or direct contact with the skin or eyes. If the Health and Safety Officer, relying on observations and odor, determines that a condition exists in which workers may be exposed to airborne hazardous materials, monitoring will be performed to determine appropriate personal protective measures.

The following describes the monitoring parameters to be evaluated during the initial walk-through. All instruments to be used during site activities will meet the established requirements set forth by OSHA, NIOSH, and state agencies where applicable.

3.2.1 Initial Determinations

Observations will be made during the site walk-through with direct reading organic vapor meters, combustible gas indicators, and/or oxygen detectors as necessary to assess the background or initial conditions.

All site monitoring will be conducted by or under the direction of the Site Health and Safety Officer or designated representative. All readings obtained will be recorded in a dedicated site notebook maintained by the Field Operations Leader/HSS. The Field Operations Leader/HSS will maintain all monitoring instruments throughout the site investigation to maintain their reliability and proper operation.

3.3 Scope of Work

The portion of work covered by this HASP includes environmental sampling. The tasks covered by this HASP include the following:

- * *Environmental Sampling – Soil, Groundwater, and Sediment*
- * *Test Pits, Soil Borings, Well Installations, and Staff Gauge Installation*

3.4 Results of Past Investigations

Past investigations have revealed that shallow soils at the site may be contaminated with metals, SVOCs and VOCs. Some possible chemical contaminants at the site and the exposure limit for each contaminate of concern are presented in Appendix D.

Symptoms of exposure to hazardous wastes and in particular to the contaminants above will be reviewed with all site personnel. Symptoms of both acute and chronic exposures will be covered. In addition, the on-site coordinators will be advised to watch for outward evidence of changes in workers' health. These outward symptoms may include fatigue, loss of appetite, nervousness or irritability, skin irritation or discoloration, eye irritation, or muscular soreness.

Note that the number and nature of potential contaminants mandate that contact of waste materials with the exposed skin must not be allowed to occur under any circumstances.

4.0 HAZARD ASSESSMENT

4.1 Introduction

As discussed previously in Section 3.4, there may be areas where contaminated soil or water may be encountered. The probability of worker exposure to a chemical hazard varies with the job task. The job tasks that involve contact with potentially contaminated soil are expected to have a greater potential for exposure than job tasks that do not come into contact with the soil. Site workers may be exposed to chemicals by inhalation, ingestion, and/or dermal contact. To protect potentially exposed personnel, dust control measures may be implemented, respirators and personal protective equipment may be worn, and decontamination procedures will be followed.

The following is a general discussion of the hazards that may be encountered on-site. A list of specific compounds detected on-site is found in Appendix D.

4.2 Task Specific Hazard Assessment

Because the potential for coming into contact with contaminated site media will vary with each job task, the probability of exposure will be assessed on an individual task basis. To simplify the hazard assessment two categories will be established; it is anticipated each job task will fit in one of the two categories. The site HSS will assist with determinations as necessary.

Category 1 Construction Activities; Limited Soil Contact:

It is anticipated that the following activities require minimal contact with contaminated media, and presents a low risk of exposure to potentially contaminated site media. These activities should not require additional health and safety considerations beyond good practices already in place for this type of construction project. These tasks may include:

- * Construction of an access road
- * Grade work area
- * Air sampling
- * Delivery of Supplies
- * Site Walkovers

Potential exposure to contaminated site media is not anticipated; however these operations will be evaluated and monitored by the HSS. Access to the work zone is limited to Project Personnel, Project Support Personnel, and Authorized Visitors.

Personnel must meet the training requirements as defined in this HASP. Personal protective clothing will not be required unless exclusion zones are established or as determined by the HSS.

Category 2 Construction Activities; Contact with Soil and/or Groundwater:

It is anticipated that personnel working in the following activities have some reasonable potential to come into contact with potentially contaminated site media. These activities may include:

- * Environmental Sampling - Soil, Water, Containers.
- * Decontamination of Equipment and Personnel
- * Geoprobe® Sampling
- * Drilling
- * Soil Gas Surveys

These activities may result in potential exposures to contaminated site media. These activities will be evaluated and monitored by the HSS and exclusion zones established as required. All Contact Project Personnel required to work in designated exclusion zones must meet the training requirements for working in an exclusion zone as outlined in this HASP. Personal protective clothing will be worn as determined by the HSS.

TASK DESCRIPTION	POTENTIAL CHEMICAL HAZARDS
<i>Environmental Sampling for Soil</i>	<i>Inhalation and absorption hazards associated with contacting contaminated soil.</i>
<i>Soil Excavation and displacement</i>	<i>Inhalation and absorption hazards associated with contacting contaminated soil.</i>

5.0 ZONES/SITE CONTROL

5.1 Site Control

Three zones will be used to restrict access to construction areas where potential contamination may be present and to prevent the accidental spread of contaminated materials. The three zones are identified as 1) the construction work zone, 2) the construction exclusion zone, and 3) the contamination reduction zone (CRZ). Initially, exclusion zones will not be established for the site construction activities. Exclusion zones will be established if certain conditions are met, including the exceeding of project air monitoring action levels or the encountering of odorous or visibly contaminated materials. The designation of project zones will be by the HSS. If used, these zones will be monitored by the HSS.

5.2 Construction Work Zone (Restricted Area)

The construction work zone is the entire project work area or construction area. All project work activities will be conducted within the construction work zone. The construction work zone is restricted to project (contact and non contact) personnel, and project support personnel and visitors as defined in this document. Unauthorized people will be prohibited from entering the site.

All personnel (project personnel, project support personnel, visitors) entering the construction work zone will be briefed by the HSS prior to their initial entry. All Contact Project Personnel entering the construction work zone must meet the Training and Medical requirements as outlined in Sections 10.0 and Section 15.0. The protective work clothing and equipment to be worn is defined in Section 6.0 or as required by the HSS. All Contact Project Personnel and equipment exiting the construction work zone must clean-up before leaving the site or as determined by the HSS. These are general good health and safety work practices.

Activities defined as Category 1 will be performed within the construction work zone. The HSS will monitor those activities which may have an unacceptable hazard potential. Construction exclusion zones will be established for these operations by the HSS or designee if the action levels listed in Section 7.0 are exceeded, if there are visible signs of contamination and/or if there are changes in operations or the knowledge of the site, which would increase the probability of worker exposure.

5.3 Construction Exclusion Zones

A Construction Exclusion Zone will be established within the construction work zone for 1) tasks and operations occurring on or around areas of known contamination, 2) operations that significantly disturb the subsurface soil, and 3) operations where personnel will come into contact with the subsurface soil and or groundwater. Construction Exclusion Zones will be established during all Category 2 activities and/or as designated by the HSM or HSS. The HSS will monitor all construction exclusion zone activities.

Exclusion Zones will be established around work areas where there is a realistic probability of exposure to hazardous contaminants.

The area will be marked and isolated using barriers, tape, or other appropriate markers. Entry to this area will be only through the contamination reduction zone (CRZ). Air monitoring will take place in all exclusion zones as described in Section 7.0. All personnel working in an exclusion zone must meet the training and medical requirements as outlined in Section 10.0 and Section 15.0. All personnel and equipment exiting the exclusion zone will go through field decontamination (Section 12.0) before exiting the exclusion zone and the contaminant reduction zone. Once the excavation or designated operation has been completed, the exclusion zone may be removed by the HSS pursuant to the air monitoring protocols in Section 7.0.

Access to a construction exclusion zone will be limited to Contact Project Personnel that meet the Training and Medical requirements as outlined in Section 10.0 and Section 15.0. All Contact Project Personnel entering the construction exclusion zones will be briefed by the HSS prior to their initial entry into the exclusion area.

The protective work clothing and equipment to be worn is defined in Section 6.0 or as required by the HSS. All personnel and equipment exiting the construction exclusion zone will be decontaminated (Section 12.0) in the CRZ as exiting the construction exclusion zone or as the HSS determines is necessary.

Once the excavation or designated operation has been completed, the construction exclusion zone will be removed by the HSS or designee.

5.4 Contamination Reduction Zone (CRZ)

The CRZ is the transition area between the contaminated area and the clean area. The CRZ is marked off as a corridor between the exclusion zone and the support zone where personnel go through decontamination. There is one Access Control Point where personnel enter and exit the exclusion zone through the CRZ. When personnel exit the exclusion zone, they must go through field decontamination which is set up in the CRZ. Access to this zone will be limited to Contact Project Personnel exiting the Construction Exclusion Zone and Decontamination Technicians assisting with decontamination.

6.0 PERSONNEL LEVELS OF PROTECTION

6.1 General

In accordance with 29 CFR 1910.120 and 1926.65(g)(5), Fuss & O'Neill, Inc. has developed a written Personal Protective Equipment (PPE) program which addresses the elements listed in the regulation. This document is attached as Appendix E. A Respiratory Protection Program which meets the requirements of 29 CFR 1910.134 and 1926.103 can be found in Appendix E. The level of protection to be utilized is determined by the task-specific hazard and will be determined by the HSS. It is expected that initially all site work where the employee may come into contact with potentially contaminated soil or ground water will be performed utilizing Modified Level D protection in an exclusion zone.

Safety equipment and protective clothing shall be used as directed by the Site Health and Safety Officer. All such equipment and clothing will be cleaned and maintained in proper condition by the personnel. The Site Health and Safety Officer will monitor the maintenance of personnel protective equipment.

Modified Level D is the minimum accepted level of protection for this site. Modified Level D provides minimal dermal protection. Respiratory protection is optional unless air-monitoring data indicated otherwise. Modified Level D includes:

Shirt

Tyvek suits (optional)

Nitrile, PVC, or vitron gloves (when water or soil contact)

Boots/shoes, leather or chemical resistant (steel toe and shank optional)

Approved industrial safety glasses or chemical splash goggles

Hard hat (during drilling and when overhead fall or bump hazard exist)

Hearing protection (during drilling or jackhammering operations)

If circumstances warrant upgrading to Level C, the following is required:

Full-face, air purifying respirator with a combination type acid/gas/organic vapor and particulate filter

Chemical resistant coveralls

Gloves (outer), chemical resistant

Gloves (inner), chemical resistant

Boots (inner), leather work shoe with steel toe and shank.

Boots (outer), chemical resistant

Hard Hat (during drilling and when overhead fall or bump hazard exist)

Taping between suit and gloves, and suit and boots

Action levels found in [Table 1](#) in [Section 7.0](#) determine levels of respiratory protection only. The level of protection of PPE for each job task is determined visually by the HSS.

Procedures for the proper donning and doffing of PPE are provided in [Appendix E](#).

Tasks or locations which require level A or B protection will not be entered by Fuss & O'Neill employees.

The On-Site Safety Officer may make changes to the levels of protection required based on the identification of known substances and any required changes to the scope of work. The Site Safety Officer will revise those levels of protection, up or down, based on air monitoring results and on-site assessment of actual exposures.

6.2 Definition of Levels of Protection

Respirators:

Level D: No respirator is required.

Level D Modified: No respirator is required

Level C: Full face, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor/acid gas cartridges.

PPE:

Level D: Coveralls/dedicated work clothing
Gloves
Boots/shoes*
Hardhat
Safety Glasses or chemical splash goggles

*May be substituted with work boots with chemically resistant outer boots or chemically resistant rubber boots.

Level D Modified: Tyvek disposable coveralls or equivalent
Coveralls/dedicated work clothing
Boots/shoes inner
Boots outer, chemically resistant (may be disposable)
Gloves inner, surgical
Gloves outer, chemically resistant
Hardhat
Safety glasses or chemical splash goggles

Level C: Polytyvek disposable coveralls or equivalent
Coveralls/dedicated work clothing
Boots/shoes inner
Boots outer, chemically resistant (may be disposable)
Gloves inner, surgical
Gloves outer, chemically resistant
Hardhat
Safety glasses or chemical splash goggles

7.0 MONITORING PROCEDURES AND ENGINEERING CONTROLS

7.1 Monitoring Procedures

Atmospheric air monitoring results are used by the HSS to provide data in determining when exclusion zones are established and when certain levels of personal protective equipment are required. For all instruments there are site specific action level criteria which are used by the HSS as guidelines in making field health and safety determinations. Other data, such as the visible presence of contamination and/or the steady state nature of air contaminant concentration, is also used by the HSS in making field health and safety decisions. Therefore it is possible that the HSM and HSS may establish exclusion zones and/or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established action levels. HASP action levels are located in Table 1

Monitoring will be performed by the HSS. Air monitoring instrumentation will be utilized in all site work areas to monitor the worker breathing zone. Personal air sampling for specific airborne contaminants may be performed at the direction of and under the supervision of the HSS. The types of instruments used and the contaminants they can detect are illustrated in Table 2. All air monitoring will be recorded on the Field Air Monitoring Logs located in Appendix E. This information will also be recorded daily by the HSS in the Daily Record of Site Activities in Appendix C.

Table 1. Instrumentation Action Levels:

INSTRUMENT	ACTION LEVEL	LEVEL OF PROTECTION OR ACTION REQUIRED
PID	>Bkgd - <5 ppm (5 min)**	Level D Respiratory Protection
PID	5 ppm - <30 ppm (5 min)**	Level C Respiratory Protection, establish an exclusion zone ^a .
PID	>30 ppm**	Leave the area, monitor continuously.
O ₂	<19.5%**	Leave the area; provide ventilation.
HAM	>1.5 mg/m ³ (5 min)	Implement dust control measures or Level C Respiratory Protection.

Sampling Locations

* samples taken at the excavation area.

** samples taken at the breathing zone relative to organic interference.

*** samples taken next to sources of ignition.

NOTE^a- If a zone has not yet been established.

Table 2. Air Monitoring Instrumentation

Air Monitoring Instrument Name	Acronym	Contaminant(s) Monitored
Detector Tubes		Gases, Organic vapors, others
Photoionization Detector	PID(OVM)	Organic Vapors
Handheld Aerosol Monitor	HAM	Dust, Particulate Material
Flame Ionization Detector	FID(OVA)	Organic Vapors

Exclusion Zone Monitoring

The frequency of real-time monitoring in exclusion zone work areas will be determined by the HSS and/or according to the task being conducted and whether potentially hazardous soil or contaminated groundwater will be contacted/disturbed. Real-time monitoring in the exclusion zone work areas will be conducted daily and minimally under the following conditions: during an activity which would have the highest probability of worker exposure as determined by the HSS; visible presence of contamination; or at the discretion of the HSS. Engineering controls as discussed in Section 7.2 may be implemented to reduce worker exposure potential in the exclusion zones.

Construction Work Zone (Restricted Area)

The frequency of real-time monitoring in restricted zone work areas will be determined by the HSS. Real-time monitoring in restricted zone work areas will be conducted under the following conditions: prior to the beginning of any new job task; prior to the beginning of a job task in any new area; periodically for a long-term job task; during an activity which would have the highest probability of worker exposure as determined by the HSS; visible presence of contamination; or at the discretion of the HSS.

Background Monitoring

Real-time monitoring will occur at locations such as in the main staging area as part of determining atmospheric background levels. Background levels will be established before conducting real-time monitoring in any restricted or exclusion zone work area.

Instrument Calibration and Maintenance

All monitoring equipment will be calibrated minimally once per day before each day's use. The calibration results will be recorded using the Calibration Log in Appendix F. Monitoring equipment will be maintained on a schedule corresponding to the manufacturer's suggested maintenance schedule.

7.2 Engineering Controls

When airborne contaminants are detected in the breathing zone of workers or when LEL readings on the CGI are greater than 10%, engineering controls may be utilized to reduce the exposure potential to the worker and to prevent shutting down an operation. Various types of engineering controls may be utilized on a project such as this. Some available methods are listed below; however, this list does not provide the only types of engineering controls that may be available. Other methods may be implemented that are more effective and/or efficient than the ones listed below.

- Utilization of water to soak down area to minimize dust
- Utilization of intrinsically safe blowers to provide ventilation
- Utilization of polysheeting to cover stockpiles
- Utilization of calcium chloride

It is more desirable to reduce employee exposure potential than to increase levels of employee personal and respiratory protection. The implementation of engineering controls will reduce employee exposure potential and not require a greater level of protection of workers.

7.3 Dust Suppression Techniques

Dust suppression may include utilization of water. The exclusion zone areas and access roads can be wetted when required by visible reference or as an action level is approached or exceeded.

During intrusive activities, such as soil sampling, project team members will conduct air monitoring in the working zone utilizing a photo-ionization detector (PID). If PID readings in the work zone indicate concentrations of volatile organic vapors of 5 parts per million for a sustained period of 5 minutes, that activity will be shut down until field conditions stabilize and mitigation arrangements can be made to upgrade to an appropriate safety level. If warranted, field personnel will don splash

protective clothing, including Tyvek® suits, chemical resistant gloves and boot covers, and safety glasses equipped with side shields.

Dust control measures including applying water to work areas will be implemented to control dust levels.

The approach for air monitoring and the establishment of appropriate action levels will be determined prior to commencement of work at the site.

8.0 SAFETY EQUIPMENT AND COMMUNICATIONS

8.1 Safety Equipment

Basic emergency and first aid equipment will be available at each exclusion zone. This shall include at a minimum: first aid kit; emergency eyewash; and fire extinguisher.

8.2 Communications

Communications will be maintained between work being performed in the exclusion zones and the restricted zone utilizing hand-held radios, cellular phone, or other appropriate form of communications.

9.0 COMMUNITY AIR MONITORING PROGRAM

This section describes activities, equipment, and procedures employed to combat hazards to the health and safety associated with the site as they pertain to local residents, tenants of the site, and nearby businesses.

9.1 Ground Intrusive Activities

For on-site ground intrusive activities, including drilling, jack-hammering, and any activity disturbing normal surface and subsurface conditions, the following air monitoring activities will be conducted to assess potential emissions to the ambient air, which may impact local residents, tenants of the site, and nearby businesses in addition to site workers.

Volatile organic compounds: Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 parts per million (ppm) above background levels, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan ([Section 9.3](#)). All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

Particulates: Particulates should be monitored continuously upwind, downwind, and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m³ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

9.2 Non-Intrusive Activities

For non-intrusive activities on-site, with the exception of drilling, jack-hammering, and any activity disturbing normal surface and subsurface conditions, air monitoring activities will be conducted to assess emissions to the ambient air, which may impact local residents, tenants of the site, and nearby businesses in addition to site workers.

All procedures, identified under the ground intrusive activities to this section, apply except that volatile organic compounds must be monitored at the downwind perimeter of the work area daily at 2 hour intervals (as opposed to continuously).

9.3 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background levels at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background levels, work activities can resume. If the organic vapor levels are greater than 5 ppm above background levels but less than 25 ppm above background levels at the perimeter of the work area, activities can resume provided:

The organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm above background levels.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring, as directed by the HSO, will be implemented to assess vapor emission, which may impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission: If any organic levels greater than 5 ppm above background levels are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If following the cessation of the work activities, or as the result of an emergency, organic levels persist above background levels 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect; if organic vapor levels are approaching 5 ppm above background levels.

However, the Major Vapor Emission Response Plan shall immediately be placed into effect if organic vapor levels are greater than 10 ppm above background levels.

Major Vapor Emission Response Plan:

Upon activation, the following activities will be undertaken:

Emergency services will be notified. Emergency phone numbers are identified in the Emergency Services section on page 2 of this Plan.

The local police authorities will immediately be contacted by the HSO and advised of the situation.

Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

10.0 TRAINING

10.1 Basic Training Required

All contact project personnel that are required to work within exclusion zones are required to have received a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor pursuant to OSHA 29 CFR 1910.120(e) and 1926.65. Non contact personnel are not required to meet these initial training requirements unless directed otherwise by the HSS.

All personnel above are required to have successfully completed refresher training requirements pursuant to OSHA 29 CFR 1910.120(e) and 1926.65. All "supervisory" personnel as identified by Fuss & O'Neill will be required to have successfully met the supervisory training requirement pursuant to OSHA 29 CFR 1910.120(e) and 1926.65.

Fuss & O'Neill personnel shall have completed 40 hours of OSHA training and be current with their 8 hour refreshers in accordance with 29 CFR 1910.120. On-site personnel must also be familiar with the procedures and requirement of this HASP. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices that afford the highest level of protection.

The objectives of the training program are to: communicate the potential hazards workers may encounter; provide the knowledge and skills necessary to perform the work with minimal risk to worker's health and safety; communicate the purpose and limitations of safety equipment; and communicate an emergency plan.

All employees and contractors engaged in site field work must sign an acknowledgement form to indicate that they have read this HASP, understand the content of this HASP, and agree to abide by the precautionary measures stated in this HASP. The Project Manager, Field Operations Leader, and Health and Safety Officer shall also sign-off on this HASP to verify that the content is factual.

Documentation of these employees training certificates are to be maintained by F&O.

10.2 Site-Specific Training

10.2.1 Initial

All project personnel are required to have initial site-specific training while the potential for exclusion zone activities exist. This training will be provided on-site for all project personnel by the

HSS prior to commencement of on-site field activities. The training will address the activities, procedures, monitoring, and equipment for the site operations. It will include site layout, chemical hazards (identification of, detection of, and physiological responses to), physical hazards and emergency services at the site, and will detail all provisions contained within this HASP.

All personnel must sign the Field Team Member form in Appendix G following the site specific training and review of the HASP. Personnel who do not receive initial site training will not be permitted to enter the restricted, CRZ or exclusion, zones.

10.2.2 Periodic Safety Briefings

The HSS will conduct daily safety briefings for site workers conducting operations in the restricted zone or in any exclusion zone. These informal briefings will generally be held in the support areas of the designated work areas. The content of these briefings will change as directed by the HSS and will generally include relevant health and safety topics affecting that day's operations.

11.0 PHYSICAL HAZARDS AND SAFETY CONSIDERATIONS FOR SITE OPERATIONS

11.1 Weather

The site activities may proceed through all seasons; therefore, precautions are to be taken to address both heat and cold stress. Monitoring of site personnel for the symptoms associated with each will be continuous.

If severe weather occurs that may affect the safety of site workers, the HSS shall stop such field operations. The HSS will resume operations when weather conditions improve to acceptable levels.

11.2 Heat Stress/Cold Stress

Heat and/or cold stress may be a potential problem for this project. The HSS may implement heat and cold stress programs and recommend that adequate rest breaks and liquid (i.e., water, Gatorade) consumption occur. The heat and cold stress program is in Appendix H.

The proposed work/rest schedule will be dependent upon the weather conditions encountered and the level of personal protective equipment being utilized by on-site personnel. There will be a designated break area. The work/rest schedule will be established and adjusted by the HSS.

11.3 Slip, Trip and Fall Hazards

In any work area it is expected that the ground may be uneven, with platforms and other obstacles existing in the midst of the work environment. Therefore, the potential for slipping, tripping and falling is high, especially considering that respirators may be used, which can impede vision.

11.4 Confined Space

If entering a confined space is required at any time during this project, the HSS will ensure that appropriate confined space entry procedures are followed by appropriately trained confined space individuals in accordance with OSHA 29 CFR 1910.146 (Appendix I).

11.5 Electrical Hazards

To control the potential for electrical hazards, procedures will be followed in accordance with OSHA 29 CFR 1926 Subpart K.

Ground-Fault Circuit Interrupters (GFCI) shall be used on all sites that have temporary wiring or a power supply per 29 CFR 1926.400 (h)(2). All 120-volt, single-phase 15- and 20-ampere receptacle outlets on-sites, which are not part of the permanent wiring of the building or structure and are in use by Fuss & O'Neill employees or subcontractors to Fuss & O'Neill shall have UL[®] approved GFCI for personal protection.

11.6 Trenching, Shoring and Excavations

Excavations will be in accordance with OSHA 29 CFR 1926 Subpart P. Prior to excavating, utility companies and other responsible authorities will be contacted to locate and mark the locations of underground installations.

11.7 Traffic

Different types of traffic (trains, delivery vehicles and heavy equipment) may be present at the job site. All work will be performed in accordance with State and Federal laws.

Vehicular traffic may be a hazard during the work covered by this HASP. Traffic cones will be used to block off areas around roadways to protect personnel and equipment. All signs shall meet the State and Local regulations regarding traffic safety. During work along highways or congested roadways, personnel shall wear orange safety vests and hard hats.

11.8 Pathogens

Although not expected, if pathogenic wastes (i.e. suspect medical wastes, sharps) are encountered during this project, workers will stop work in that area and inform the HSS.

11.9 Explosives

If explosives are encountered during this project workers will immediately stop work and qualified explosive handling personnel will be contacted.

11.10 Smoking Policy

Under no circumstances will smoking be permitted inside any established Exclusion Zone.

11.11 Hearing Protection

Hearing protection will be available to all site workers/visitors.

11.12 Drum/Container Handling

The procedures utilized for the movement and disposal of drums will comply with 29 CFR 1910.120(j) and 1926.65. This section specifies that drums and other containers of hazardous materials be handled in a manner to reduce possible rupture and minimize the potential for a spill.

11.13 Guarding of Machinery and Equipment

Machinery and equipment guarding will be installed and maintained in accordance with 29 CFR 1910 and 1926. Various OSHA standards specify machine and equipment guarding that must be in place to reduce potential injuries. All manufacturer's machine guards will remain intact and not be removed by any employee. Any damaged or missing guard will be replaced and the equipment will not be operated until the proper protection is provided.

11.14 Illumination

If work activities occur before sunrise or after sunset, sufficient lighting will be provided to meet the requirements of 29 CFR 1910.120(m) and 1926.65. Table H-120.1 - Minimum Illumination Intensities in Foot-Candles should be used as a guide for providing proper lighting in site operations. These minimums range from 3 to 30 foot-candles, depending on the area or operation performed.

11.15 Spill Cleanup

If a spill occurs the HSS will immediately notify the HSM. Immediate containment actions will be implemented to minimize the effects of a leak or spill. All cleanup procedures will be in accordance with applicable local, state and federal regulations. Spill clean up kits will be available on-site.

11.16 Drilling and other Underground Operations

The HSM shall contact New York Dig Safely (NYDS) prior to any drilling or digging activities. Fuss & O'Neill will provide notification a minimum of three business days prior to starting work. The following required Location Request information is needed: Town, Street Address, and Nearest Street intersection, Type of Work, Name of Caller & Company, Phone Number, and Start Date & Time.

Documentation of the NYDS notification, including the confirmation #, date, time and the person who called should be recorded on the form in Appendix J.

12.0 DECONTAMINATION/WASH-UP PROCEDURES

This section can be classified into four areas: 1) procedures for decontaminating heavy equipment that has entered exclusion zones; 2) decontamination procedures for personnel exiting exclusion zones; 3) wash-up procedures for all personnel; and 4) instrument decontamination.

12.1 Heavy Equipment Decontamination

Heavy equipment that has entered exclusion zones shall be clean on arrival and will be decontaminated prior to leaving the site. As necessary, equipment that has been in contaminated areas of the project site will be decontaminated before leaving the project site. The water that is generated as part of decontamination may be allowed to drain back into the pre-existing site soil (not onto the clean soil). The decontamination area will be located in a known contaminated area of the site.

12.2 Personnel Field Decontamination

Personnel field decontamination facilities will exist at the exits to all established exclusion zones in contamination reduction zones (CRZs). If possible, these field decontamination facilities will be located upwind of the exclusion zone. The field decontamination facilities will be under the control of the HSS. The detailed extent of the decontamination will be a site-specific decision by the HSS based on the extent of personnel contamination.

Once removed, disposable PPE will be collected at the field decontamination-site in a drum or large plastic bag. The drum or plastic bag will be secured in order to prevent the accidental spread of contamination. Disposable PPE that has been worn in an exclusion zone must be removed and placed in the disposal container before leaving the CRZ. Disposable PPE may not be re-used.

12.3 Wash-up Facility

A portable wash-up apparatus and/or facility will exist in the main support area of the construction work zone. The facility will be under the control of the HSS.

After exiting a field decontamination facility, personnel may now use the "wash up" setup. All personnel working at the site must wash their hands and faces prior to eating, drinking or smoking and practice good personal hygiene. Potable water will be available at the site.

12.4 Instrument Decontamination

Instruments will be decontaminated whenever they have contacted soil or dust. Instrument decontamination will occur in the same area for personnel decontamination and will consist of the removal of any dust or soil from the surfaces of the instruments.

13.0 DISPOSAL PROCEDURES

13.1 General

A waste staging area will be located on-site in an area approved by Fuss & O'Neill. This area will be segregated from the support areas to control the potential for waste migration beyond the perimeter of this area. The area will be considered an exclusion zone requiring periodic air monitoring as deemed necessary and the appropriate level of protection pursuant to the protocols in this plan.

All waste materials shall be handled in such a way to avoid potentially spreading contamination, creating a hazard or littering the site. All disposable PPE will be placed in plastic bags during decontamination and site activities for disposal.

All disposal will be in accordance with local, state, and federal hazardous waste regulations, as well as the Resource Conservation and Recovery Act (RCRA).

13.2 Soil/Sludge

Generation of soil/sludge requiring management is not anticipated. All soil that has visible signs of contamination will be classified by the HSS as potentially contaminated material and will be stockpiled. The stockpiled soil will remain in place until the analytical results of samples collected by Fuss & O'Neill are made available to the Contractor. Within 30 days of waste classification finding the soil unsuitable for re-use the soil will be removed and disposed.

13.3 Water

Generation of decontamination liquids requiring management is not anticipated. All dewatering liquids will be containerized, stored in the staging area and/or disposed onsite if appropriate. Waste classifications will be made by F&O. The liquids will be disposed of or treated with methods approved by F&O.

14.0 EMERGENCY PLAN

14.1 General

All operations required have the potential to create an emergency situation. Emergency situations can be characterized as a Fire or Explosion; Environmental Release (spill or cloud); or Accident and/or Injury to one of the field personnel.

14.2 Site Emergency Coordinator

The Site Emergency Coordinator is: HSS

The emergency coordinator or alternate will be on-site during all working hours. The emergency coordinator shall implement the emergency plan whenever conditions at the site warrant such action. The coordinator will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units and the appropriate project and management staff designated in Section 1.0.

14.3 Evacuation

In the event of an emergency situation, a specific emergency signal (such as air horn blasts) will sound and all personnel in all work zones will evacuate and assemble near the entrance of the construction work zone or other support area location determined prior to the beginning of the daily operating tasks.

For efficient and safe site evacuation and assessment of the emergency situation, the emergency coordinator will have authority to initiate proper action when outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the construction work zone once the emergency signal has been given. The emergency coordinator will ensure that access for emergency equipment is provided and that all combustion apparatus (e.g.; operating machinery) has been shut down once the alarm has been sounded. The emergency coordinator will notify the Fire Department and other emergency response organizations by telephone of the emergency.

The emergency coordinator or designee will make a headcount of all site personnel at the assembly point. If a worker or site visitor is unaccounted for, the emergency coordinator will report this information to the emergency responders. The site evacuation plan shall be rehearsed as part of the overall training program for site operations.

14.4 Incipient Firefighting

Fire extinguishers will be located at every exclusion zone. Appropriate contractor project personnel will be trained in the use of fire extinguishers. All fire extinguishers will be inspected daily to make sure it is fully charged and in working order.

Fuss & O'Neill employees may fight incipient fires (small, just starting that can be extinguished easily with a portable fire extinguisher, like a garbage can fire) and clean up incidental spills (usually less than 1 gallon) that occur while working on-site. If a fire or spill of this type becomes larger and there is a potential for a hazardous substance release, Fuss & O'Neill employees will sound the emergency alarm and evacuate the area immediately. Emergency Coordinator will contact the responsible party in the event the emergency response is beyond their competency level.

14.5 Emergency Response Coordination

The emergency coordinator or designee will report any emergency immediately to the local emergency response organizations and will be available to brief them immediately upon their arrival as to the location of the emergency, nature and extent of the emergency, personnel involved, hazardous substances involved, and any other pertinent information.

14.6 Personnel Injury/Personnel Exposure/First Aid

Any minor cuts or abrasions are to be washed and treated immediately. First aid shall be given on-site as deemed necessary. If needed the individual will be decontaminated and transported to the nearest medical facility. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. In any life-threatening situation, the life-saving treatment of personnel is the immediate priority. The emergency coordinator or designee will be available to brief the rescue squad immediately upon their arrival as to the location of the injured person(s), nature and extent of the injury(ies), personnel involved, hazardous substances involved, and any other pertinent information. The HSS will supply medical data sheets and chemical hazard information to appropriate medical personnel and complete an incident report on the accident or injury.

In case of personnel exposure, the following procedures are to be provided:

SKIN CONTACT: Use copious amounts of water. Wash/rinse affected area thoroughly and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water.

INHALATION: Move to fresh air and/or, if necessary decontaminate/transport to hospital.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate, if possible and transport to emergency medical facility.

15.0 MEDICAL SURVEILLANCE:

All contact project personnel that are designated to work in the exclusion zones outlined in section V are required to meet the medical surveillance requirements of OSHA 29 CFR 1910.120 and 1926.65 and OSHA 29 CFR 1926.103 (respiratory protection), and to furnish documentation to that effect. In addition, a medical data sheet in Appendix K must be completed prior to beginning work on the site. The medical data sheet shall be kept on-site with the HSS and will accompany the employee whenever medical treatment is required.

All examining physicians must meet the requirements of 1910.120 and 1926.65. The physician performing medical examinations will determine the specific requirements of the physical. The employees must be given the results of their examination. Attached as Appendix K is the Fuss & O'Neill Written Medical Surveillance Program.

16.0 RECORDKEEPING

The HSS will maintain Health and Safety Records for the site. The following information will be recorded on the Daily Record form in Appendix C):

- Weather conditions (temp., wind speed and direction, precipitation)
- Air monitoring equipment calibration records
- Air monitoring results (date, time, location, data, instrument, person conducting sampling)
- Description of operation(s)
- Level of PPE
- Non-compliance with the HASP
- Personnel exposure incidents
- Description of accident(s) (OSHA 200 log)

All accidents and personnel exposures, regardless of the extent, will be reported to the HSS, who will complete a Supervisor's Report (Appendix B) on the incident.

17.0 AUTHORIZATIONS

Personnel authorized to enter the construction work zones and construction exclusion zones at this site must be approved by the HSS. Authorization will involve completion of appropriate training courses and medical examination requirements as stipulated by this HASP, and review and approval of this HASP.

18.0 SIGNATURES

This plan was reviewed and approved by:

Project Director – James D. McIver, Jr. Date:

Project Manager – Richard S. Totino Date:

Corporate Health and Safety Officer – Date:
Kevin W. Miller, Ph.D.

APPENDIX A

SITE MAPS
(IN WORK PLAN)

APPENDIX B

SUPERVISOR S REPORT OF
ACCIDENT INFORMATION

SUPERVISOR'S (HSS) REPORT OF ACCIDENT INVESTIGATION

Injured Employee _____ Date of Report _____
Occupation _____ Age _____ Sex _____
Length of Employment _____ Years _____ Months _____
Date of Accident _____ Time of Accident _____
Exact Location? _____

Description of Accident (Detail what employee was doing and what tools, equipment, structures or fixtures were involved.)

Description of Injuries _____

Date Reported to Supervisor and First Aid _____

Date First Aid Received _____

Delayed? _____ Yes _____ No

If Yes, Why? _____

Type of First Aid Received? _____

Circle Accident Cause Listed Below that Apply:

Struck by / Against _____	Chemical Contact / Burn _____
Slip, Trip and/or Fall _____	Lifting / Lowering _____
Caught in / by _____	Motor Vehicle Accident _____

What would you recommend to prevent the recurrence of this type of accident in the future?

SUPERVISOR S (HSS) REPORT OF ACCIDENT INVESTIGATION
CONTINUED

Are recommendations above being implemented? _____

Supervisor S Comments: _____

Supervisor S Signature _____
Date: _____

APPENDIX C

DAILY RECORD OF SITE ACTIVITIES

DAILY RECORD OF SITE ACTIVITIES

SITE: _____ DATE: _____

PROJECT NO.: _____

TASK PERFORMED: _____

PERSONNEL ON-SITE: _____

A. WEATHER CONDITIONS: _____

B. EQUIPMENT LIST (TYPE OF INSTRUMENT(S), PERSON(S) CONDUCTING
SAMPLING AND DATA COLLECTION): _____

C. LEVEL OF PPE:

D. TASK:

E. NONCOMPLIANCE TO THE HASP GUIDELINES:

F. PERSONNEL EXPOSURE INCIDENTS:

G. ACCIDENT DESCRIPTION (if any):

APPENDIX D
CONTAMINATION CHARACTERIZATION
(TO BE PROVIDED)

APPENDIX E

PERSONAL PROTECTIVE
EQUIPMENT PROGRAM

PERSONAL PROTECTION PROGRAM

Overview

Personal Protective Equipment (PPE), such as, clothing and respiratory protection help control on-site workers from coming in contact with contaminants and other hazards. It is imperative that PPE be appropriate to protect against the known potential hazards for each investigation and each work site. The selection of PPE will be based upon the types, concentrations, and routes of personal exposure that may be encountered. The appropriate level of protection for initial site entry will be based upon a conservative assessment of the best available site contamination information. The NIOSH Pocket Guide to Chemical Hazards is supplied to the HSS and field scientists that have completed the 40-hour and 8-hour health and safety training courses for use as a source of general industrial hygiene and medical surveillance information. The responsibility of selecting the proper PPE, including respiratory protection, is that of the HSM and HSS. During field activities, the HSS has the authority to upgrade or downgrade the current PPE and respiratory protection.

In responding to an incident where the type(s) and concentration(s) in the ambient atmosphere of substances injurious to human health are unknown, a determination must first be made by the HSM and HSS if it is necessary to have personnel enter the site (close proximity to the potential source of exposure). A requirement for on-site operations necessitates that personnel initially enter the site to characterize and define the hazardous environment that potentially exists.

Until qualitative and quantitative information is available for assessing the ambient atmosphere at a site, levels of protection may have to be based on the site hazard Assessment and gross measurements from portable instruments for organic vapor analysis (i.e. photoionizer detector (PID), organic vapor analyzer or monitor (OVA or OVM), gas chromatograph (GC)). A Field Air Monitoring Log and Air Monitoring Instrument Calibration Log to be completed at the site.

The following criteria will be used as a Guide to determine the level of PPE. It is emphasized that the following values should not be the sole criteria for selecting levels of protection. The level should be selected case-by-case, with special emphasis on potential exposure and chemical and toxicological characteristics of the known or suggested material. These criteria are established from prior experience at the site under investigation and current assessments of site hazards.

- Level C: If ambient breathing zone background concentrations are background to five (5) ppm (one (1) ppm for benzene or vinyl chloride) and meet the level C criteria listed in this document.
- Level D: If ambient background concentrations are at background. Total atmospheric vapor/gas concentrations are used for determining the appropriate level of protection. The background concentration will be measured prior to the commencement of field operations each day, and checked periodically through the day in the support zone to account for any variation resulting from the weather or other external factors.

There are four levels of personal protection recommended by the United States Environmental Protection Agency (USEPA). They range from Level D, used when little or no potential for exposure to contaminants exist; upgrading to Level C, when contamination levels require

protection levels from bodily contact and the filtering of breathing air; to Level B when contamination requires protection from bodily contact and the use of a supplied breathable air source; to Level A, which is used when the contamination levels require the highest available protection from bodily contact, respiratory and eye irritation. F&O personnel are supplied with equipment for Levels C and D. If conditions on site require upgrading to Levels A or B, personnel will be required to leave the area. The criteria for Levels C and D are provided below.

Level D

Level D protection is primarily a work uniform, though Tyvek™ could be used if conditions are i.e. muddy, dusty. Dust respirators are available if dusty conditions (modified level D) exist on site.

Level D Equipment

- a) Coveralls;
- b) Leather or chemical-resistant boots or shoes, steel toe and shank;
- c) Hard hat (face shield optional);
- d) Options as required:
 - 1) Gloves (nitrile, neoprene);
 - 2) Disposable overboots (latex);
 - 3) Safety glasses or chemical splash goggles.

Criteria for Use

- a) No indication of airborne health hazards present.
- b) Frequent air monitoring with field instrument(s) to confirm ambient background concentrations.
- c) Frequent visual observations of field personnel to prevent against weather related hazards, i.e. heat stroke.
- d) Normal work operations are not expected to create splashes, immersion or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level C

Level C protection will be selected when the types and concentrations of respirable material are known, or reasonably known not to exceed the equipments rated/NIOSH approval capabilities, and exposure to the unprotected areas of the body (i.e. neck and back of head) is unlikely to cause harm.

A range of background to greater than 5 ppm (1 ppm if benzene or vinyl chloride is present) above ambient background breathing zone concentrations of vapors/gas (non-methane) in the atmosphere has been established as guidance by USEPA for selecting Level C protection. Concentrations of unidentified total vapors/gases approaching or exceeding 5 ppm in the breathing zone would warrant upgrading respiratory protection to a self-contained breathing apparatus (Level B) or shut down and evacuation. Wind direction and atmospheric conditions (i.e. humidity) should be established prior to taking background readings with the field instrument(s).

Level C Equipment

- a) Full-face piece or half-face, though USEPA recommends full-face, air-purifying canister equipped respirator with appropriate chemical cartridge (i.e. organic vapor/acid gas/HEPA/dust/mist) that is MSHA/NIOSH approved. Splash shield and/or goggles if half-face respirator is used.
- b) Tyvek™ clothing or poly laminated Tyvek™, if liquid splash is an issue, with long sleeves and elastic at the wrists and ankles.
- c) Inner disposable gloves (i.e. vinyl or nitrile) and outer chemical-resistant gloves (i.e. nitrile or neoprene).
- d) Leather or chemical-resistant boots or shoes, steel toe and shank.
- e) Hard hat
- f) Options as required:
 - 1. Coveralls
 - 2. Disposable overboots (i.e. latex)

Criteria for Use

- a) Site is known to contain potential hazards not to exceed:
 - 1) Atmospheric contaminants, liquid splashes, or other direct contact that will not adversely affect or be absorbed through any exposed skin.
 - 2) Types and classes of air contaminants have been identified, concentrations measured, and an approved canister respirator is available that can remove the contaminants.
 - 3) Well-documented, reliable history of site or prior entry.

- 4) No evidence of acute or chronic effects to exposed personnel.
- 5) All criteria for the use of air-purifying respirators are met (i.e. no IDLH, no oxygen deficiency).

Total vapor readings are between 0 ppm and 5 ppm (0 ppm to 1 ppm for benzene or vinyl chloride) above ambient background concentrations on field instruments (i.e. PID, FID, gas chromatograph) as measured in the breathing zone.

Frequent air or personnel monitoring should occur while wearing Level C protection.

Respirator Maintenance Program

Respirators shall be inspected after each use by checking the condition of the face piece and all its parts. Parts should be inspected for pliability and signs of deterioration. Once a respirator has been used the wearer must clean it. All detachable parts such as straps, valves and gaskets are removed and cleaned separately. Cartridges cannot be cleaned. They can be used again if their service life has not been exhausted; however, it is recommended that on hazardous waste sites, worn cartridges be discarded at the end of each day.

The parts should go through two water rinses and left to air dry. When dry, parts are reassembled and the respirator is put in a clean plastic bag and stored where it will be protected from conditions that could alter the shape of the mask, such as extreme temperatures or very dusty environments. DO NOT store respirators in direct sunlight or the trunk of a vehicle. At times when the above maintenance cannot be performed, the face piece and other parts can be washed with respirator cleansing wipes provided in individual packs.

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or make adjustments or repairs beyond the manufacturer's recommendations. Any parts that require replacement will be returned by F&O to the manufacturer for repair. The manufacturer's instructions furnished with each respirator shall be read prior to field use.

APPENDIX F

FIELD AIR MONITORING LOG
AND CALIBRATION LOG

FIELD AIR MONITORING LOG

DATE: _____ SITE: _____ PAGE ____ OF ____
SITE SAFETY OFFICER: _____
SAFETY MONITORS: _____
WEATHER CONDITIONS: _____
INSTRUMENTATION CONDITION: _____

<u>ACTIVITY/REASON FOR MONITORING</u>	LOCATION	<u>TIME</u>	READING	INITIALS

AIR MONITORING INSTRUMENT
CALIBRATION LOG

Page ____ of ____

PROJECT NAME: _____ JOB NUMBER: _____
PROJECT LOCATION: _____
INSTRUMENT TYPE: _____ INSTRUMENT NUMBER: _____

Date Name	Cal Gas Conc.	Instrument Reading	Adjusted (Y/N/)	New Setting	New Reading	Maintenance Notes

APPENDIX G

FIELD TEAM MEMBER FORM

FIELD TEAM MEMBER FORM

Each field team member shall sign this section following review of the HASP and site training before being permitted to work on site.

I have read and understand the HASP and had the required health and safety training pursuant to OSHA 1910.120 and will comply with the provisions contained herein.

NAME PRINTED	SIGNATURE	DATE

APPENDIX H

HEAT AND COLD STRESS PROGRAM

THERMAL EXPOSURE

Overview

Adverse weather conditions are important considerations in planning and conducting site operations. Extremes in hot and cold weather can cause physical discomfort, loss of efficiency, and personal injury.

Heat Stress

Heat stress can result from working in a hot environment both indoors and outdoors whether protective clothing is or is not worn. Working under various levels of personal protection may require the wearing of low permeability disposable suits, gloves and boots. This type of clothing will prevent most natural body ventilation thereby causing discomfort due to increased sweating and eventually heat stress. Recommendations to reduce heat stress are to:

- a) Drink plenty of fluids (water or Gatorade™) to replace loss through sweating, and eat light foods.
- b) Wear cotton undergarments to act as a wick to absorb moisture and maximize natural cooling.
- c) Make adequate shelter available for taking rest breaks in order to cool off.
- d) The HSS shall develop an adequate and appropriate work and rest schedule for the field crew as needed.

For extremely hot weather, these additional recommendations should be followed:

- a) Install portable showers or hose down field crew to cool clothing and body.
- b) Shift working hours to early morning and early evening thereby avoiding the hottest part of the day.
- c) Rotate field crews wearing the protective clothing into a work versus rest schedule.
- d) Wear cooling devices to aid in ventilation (the additional weight may affect efficiency).

Some guidelines:

Action Work Time (min/hr)	
<u>Ambient Temperature (°F)</u>	<u>Level C Clothing</u>
75 or less	50
80	40
85	30
90	20
100	0

The following discusses the three types of heat stress: 1) Heat Exhaustion; 2) Heat Cramps; and 3) Heat Stroke.

Heat Exhaustion

Heat Exhaustion is brought about by the concentration of blood in the vessels of the skin. This condition may lead to an inadequate return of blood to the heart, and eventually, to physical collapse. The symptoms are:

- General weakness
- Excessive perspiration
- Dizziness
- Pale and clammy skin
- Weak pulse
- Rapid and shallow breathing
- Appearance of having fainted

To treat for heat exhaustion, place the individual in a cool place and remove as much clothing as possible. The individual should drink cool water, Gatorade™ drink, or similar liquids. The individual should be fanned; however, do not over cool or allow chilling. Treat the individual for shock and remove to a medical facility if condition persists.

Heat Cramps

Heat Cramps are usually caused by loss of salt when an individual has perspired a great deal. Cramps usually in the leg and abdominal muscles can also be caused by drinking iced liquids quickly or in large amounts. The symptoms of cramps are as follows:

- Pain and cramps in legs or abdomen
- Faintness
- Profuse perspiration

Heat Stroke

Heat Stroke is a breakdown of the body's heat-regulating mechanism causing high fever and collapse. This condition, which is an IDLH (Immediately Dangerous to Life and Health) condition, can result in unconsciousness, convulsions, and even death. Persons in poor physical condition or of advanced age are particularly susceptible. The symptoms of heat stroke are:

- Muscle twitching or convulsions
- Dry hot skin
- Flushed skin
- High body temperature
- Loss of consciousness
- Deep breathing, then shallow or absent
- Dilated pupils

Heat stroke is a medical emergency situation. Medical emergency personnel should be contacted immediately in order that the person can be transported to a medical facility. In the interim, steps can be taken by the HSS. The individual should be removed to a cool environment and the body temperature reduced immediately by dousing the body with water or by wrapping in a wet sheet. If ice is available, it should be placed under arms and around the neck and ankles. If the victim is conscious, Gatorade™ drink or other similar liquids containing electrolytes should be provided. Intake of these liquids will be monitored by the HSS so as not to be excessive. Steps should be taken to protect the victim from injury in the event of convulsions, such as removing any objects in the area of the victim.

To avoid problems from heat stress during conditions of high temperature and humidity, the HSS should assure that the field crew drink plenty of electrolyte fluids before and during field activities, breaks should be provided pursuant to the schedule outlined by the HSS, and should revise work schedules as necessary to take advantage of the cooler parts of the day.

Cold Exposure

Cold exposure can occur in temperatures at or below freezing. If prolonged exposure to cold occurs without proper protection, the effects of cold exposure can occur in temperatures above freezing. Exposure to cold can cause severe injury (frostbite) or overall drop in body temperatures (hypothermia). The extremities (fingers, toes and ears) are most susceptible to frostbite.

Both the outdoor temperature and the wind velocity play a part in cold injuries. Wind chill is used to describe the chilling effect of moving air in combination with low temperatures. Cold exposure can be a serious threat to a field crew that removes protective clothing and exposes perspiration soaked underclothing to the cool air. Water conducts heat 240 times faster than air, thus rapidly cooling the body. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Cold exposure symptoms (hypothermia) are usually seen in the following five stages:

- 1) Shivering
- 2) Apathy, listlessness, sleepiness and rapid body cooling

- 3) Unconsciousness, glassy stare, slow pulse and respiratory rates
- 4) Freezing of the extremities
- 5) Death

Recommended actions to avoid suffering the effects of cold exposure are:

- a) Wear cotton, or even better, wool or synthetics (polypropylene) undergarments to absorb perspiration from the body.
- b) Wear additional layers of light clothing as needed for warmth. The layering effect holds in air, trapping body heat, and some layers could be removed as the temperature rises during the day.
- c) Pay close attention to body signals and feelings (hypothermia symptoms), especially to the extremities. Correct any problem indications by breaking from the work activity and moving to a rest area to warm up and add additional clothing.
- d) Install a wind break at the drill site to minimize cold winds from blowing directly at the drilling crew.
- e) Maintain good eating and drinking habits enabling the body to operate at top capacity.
- f) Provide a sheltered area for resting and warming up.

APPENDIX I

CONFINED SPACE ENTRY PROCEDURE

CONFINED SPACE ENTRY PROCEDURE

- 1) OSHA defines a "Permit-Required" confined space as:
 - An area large enough for an employee to enter and perform work;
 - An area with limited or restricted means for entry or exit; and,
 - An area that is not designed for continuous human occupancy.
- 2) The characteristics of a Permit-Required confined space are:
 - The space or area contains, or has a known potential to contain, a hazardous atmosphere;
 - The space or area contains a material with the potential to engulf an entrant;
 - The area has an internal configuration such that an entrant could be trapped by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross-section; and,
 - The area contains any other recognized serious hazard.

Upon establishing that the area is a confined space or Permit-Required confined space and may contain one or more of the above characteristics, initial and subsequent atmospheric monitoring of the confined space shall be implemented prior to entry.

Monitoring shall be conducted using instruments that measure gases. Examples would be an oxygen meter and explosimeter. The need for respiratory protection and other protective equipment such as head protection, retrieval systems or self-contained or airline supply breathing apparatus shall be established through air monitoring.

- 1) Evaluation - This includes the initial monitoring of a confined space for harmful gases or vapors with instruments that measure gases in the area. Evaluation also includes determining how monitoring will be performed by employees and if any respiratory protection is required. Additional protective equipment may include head protection, retrieval systems or self-contained or airline supply breathing apparatus.
- 2) Control - This step involves the design of a confined space area. Industries with a permit-required confined space may want to consider controlling the space by changing its design, if possible. For example, a company could add ventilation to improve air quality in spaces that contain hazardous gases.
- 3) Monitoring - Ongoing monitoring is needed to assess the atmospheric quality for workers in confined spaces. Through monitoring, industries can verify the results of their initial evaluations to ensure worker protection.

Monitoring shall be conducted in the order listed:

- 1) Measure oxygen deficiencies. OSHA's standards call for a minimum oxygen (O₂) level of 19.5% by volume and a maximum of oxygen (O₂) level 23.5%.
- 2) Measure combustible gases. OSHA standards state that employees must not enter a confined space containing more than 10% of the lower explosive limit (LEL). Note that for combustible gases to cause an explosion, the vapors must be within the limits of the LEL and the upper explosive limit (UEL).

NOTE: Even if a combustible level is below the 10% LEL, the combustible gas can still present a toxic hazard. To help ensure a combustible gas measurement is correct, it is important to take oxygen measurements first, since low levels of oxygen, below approximately 10% by volume, can cause erroneous combustible gas readings. This level is far below what are safe atmospheric conditions for human life.

Safety equipment needed for confined space entry may include the following:

- a) Confined Space Entry Permit
- b) Oxygen Deficiency Meter (Gastec)
- c) Hardhat with Flashlight
- d) Ladder (folding)
- e) Tripod with recovery system, Body Harness and Safety Line
- f) Propane powered blower and ventilation duct work

Safety procedures before entering a confined space:

- 1) Check oxygen (O₂), carbon monoxide (CO), lower explosive limit levels (LEL) and hydrogen sulfide (H₂S) in the confined space by lowering the meter or sampling tube as low as possible to the bottom of the space.
- 2) Record in a field book and on the Confined Space Entry Permit form.

Record: Time, Readings: % Oxygen ____; % LEL ____; carbon monoxide ____ PPM; and hydrogen sulfide ____ PPM;

If % LEL and carbon monoxide values are 0.0, record 0.

- 3) Remove sampling tube from the confined space; take a reading in ambient air and record values.
- 4) One person is to remain out of the confined space (attendant) at all times to observe and watch the person(s) (entrant) working in the confined space.
- 5) Instrument (oxygen meter) is to be left operating while entrant(s) is (are) in the confined space.
- 6) If a problem arises, the person(s) working in the confined space must leave immediately.

- 7) If work has ceased within the confined space for more than 15 minutes, repeat Steps 1 through 3 above to insure that no harmful gases/vapors have collected in the confined space before entering again.
- 8) At the end of the work shift, submit a copy of the air monitoring test information and Confined Space Entry Permit to the HSS and/or HSS.

NOTE: For confined space entry work conducted at a facility that has a confined space entry program, the HSS shall insure compliance with that program.

APPENDIX J

NY DIG SAFELY

Confirmation No. _____

Date _____

Time _____

Person Called _____

NY Dig Safely

These companies shall be called in case of an EMERGENCY. DO NOT CALL NY Dig Safely. NY Dig Safely may dictate additional and/or different utility companies than listed. The list below is intended as guidance only.

UTILITY COMPANY	
ELECTRIC COMPANY	
TELEPHONE	
GAS	
CABLE TV	
LOCAL WATER AND SEWER	
LOCAL WATER CO.	
MUNICIPAL DEPT. OF PUBLIC WORKS	
ON-SITE UTILITY CLEARANCE	

APPENDIX K

MEDICAL SURVEILLANCE PROGRAM
MEDICAL DATA SHEET

MEDICAL SURVEILLANCE PROGRAM

Federal regulations and F&O policy require all employees who participate in field activities in situations where there is a potential exposure to hazardous materials, with or without a respirator; 30 days or more per year must undergo physical examinations, including a base and termination exam. At a minimum, the physical exam complies with the requirements of OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response.

The following tests are performed under the supervision of a licensed physician:

- a) Physical exam
- b) Hearing (base and as needed)
- c) Chest x-ray (base and as deemed necessary by the attending physician)
- d) Electrocardiogram (base and as needed)
- e) Pulmonary function (base and as needed)
- f) Urine analysis
- g) Complete blood count

In the event F&O personnel are exposed to hazardous constituents, the person(s) would immediately go through the necessary exams for those particular constituents. An arranged physical exam pursuant to OSHA 29 CFR 1910.120 program has been developed between F&O and CorpCare Occupational Health Center. The medical data sheet, attached, must be completed by all company field personnel prior to working on-site. One copy of the form should be kept by the HSS, and a second copy by the HSS. Field personnel must be informed of the location of the medical data sheet while working on-site. Copies of employee physical exam reports are maintained at F&O by the HSM CorpCare Occupational Health Center, an affiliate of Manchester Memorial Hospital, located in Manchester, Connecticut.

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all on-site personnel and kept at the site during field operations. This data sheet must accompany personnel when medical assistance is needed or if transport to hospital facilities is required.

PROJECT NAME: _____

PROJECT LOCATION: _____

NAME: _____

HOME TELEPHONE: _____

ADDRESS: _____

AGE: _____

HEIGHT: _____ WEIGHT: _____

IN CASE OF EMERGENCY, NOTIFY:

SPOUSE OR FAMILY CONTACT: _____

PHONE: _____

SPOUSE OR FAMILY CONTACT: _____

PHONE: _____

ALLERGIES INCLUDING PRESCRIPTION MEDICATION: _____

PARTICULAR SENSITIVITIES: _____

DO YOU WEAR CONTACTS: _____

ANY PREVIOUS ILLNESSES OR EXPOSURE TO HAZARDOUS CHEMICALS (EXPLAIN):

PERSONAL PHYSICIAN:

NAME: _____

PHONE: _____

ADDRESS: _____

I am the individual described above:

Signature

Date

BCP CITIZEN PARTICIPATION PLAN
ISLAND DOCK
308-322 ABEEL STREET
KINGSTON, NEW YORK

NYSDEC BCP Site - TBD

October 2005

Prepared For:
Kingston Historical Waterfront, Island Dock, LCC

For Submittal To:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Prepared By:
Fuss & O'Neill of New York, P.C.
80 Washington Street, Suite 301
Poughkeepsie, New York 12601

CITIZENS PARTICIPATION PLAN
ISLAND DOCK
308-322 ABEEL STREET
KINGSTON, NEW YORK

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CITIZENS PARTICIPATION PLAN
ISLAND DOCK
308-322 ABEEL STREET
KINGSTON, NEW YORK

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1.0 INTRODUCTION

This document presents the site-specific Citizen Participation Plan (CPP) for the Island Dock site located in the City of Kingston, Ulster County, New York (Figure 1). This plan was generated to meet the requirements for citizen participation as outlined in Section 8 of the Draft Brownfield Cleanup Program Guide dated May 2004. The intent of this Citizen Participation Plan is to promote public understanding of the New York State Department of Environmental Conservation's (Department) responsibilities, planning activities, and remedial activities at its Brownfield Cleanup Program (BCP) sites. The Citizen Participation process provides an opportunity for the Department to learn from the public and provides the public with information that will enable the Department to be certain that the investigation and selected remedial alternative are sufficiently protective of the public health and the environment.

1.1 Site History

The Island Dock site was most recently used by Concrete Blocks, Incorporated to manufacture various types of concrete blocks. The blocks were formed with different concrete of different textures and colors, dried in large walk-in ovens, and then stockpiled in the yard and on the island portion of the property. Crushed blocks and other debris were dumped on the island. There is currently one building remaining on the property, the former block manufacturing factory. These features are depicted on the Site Plan (Figure 2) attached to this CPP.

The site was occupied by the concrete block manufacturing company for many years. Prior to those activities, previous occupants include a boat and lumber storage company. The mainland portion of the site was initially established as a coal storage yard.

Several investigations have been performed on the property. The results of the investigations indicated that past uses of the property have resulted in impacts to soil and to a lesser extent, groundwater. The information contained in the available studies for the property suggests that additional remedial investigation be conducted. The BCP application, available at the document repositories listed below, includes copies of the recent investigations. Based on the findings contained in the reports, the Department believes that the site may be an eligible brownfield site and that a Remedial Investigative and Alternative Analysis work plan must be submitted for Department review and the investigations conducted. The work will be done through the NYSDEC's Brownfield Cleanup Program (BCP). The current site owner, Historic Kingston Waterfront, Island Dock, LLC, intends to revitalize the site with a mixture of commercial, residential, and limited recreational use. Historic Kingston Waterfront, Island Dock, LLC is simultaneously going through the site plan approval process with the various City and Town reviewing agencies before constructing the facilities.

2.0 SITE BACKGROUND

2.1 Site Setting

The site consists of three separate parcels of land, totaling 17.8-acres. The mainland portion is a 0.7-acre parcel located along the south side of Abeel Street, and is part of the Rondout Creek Shoreline. A storage lot, separated from the mainland parcel by Island Dock Road, is located east of the main entrance. Both lots on this parcel consist of fill material. The lots are currently vacant with the exception of numerous concrete block stockpiles. The former concrete block factory

building is located on the mainland parcel. The building is now dilapidated and abandoned.

The other two parcels, upper and lower Island Dock, form an island in the Rondout Creek. The island portion of the site contains a number of piles of debris and broken pieces of equipment used in the concrete block-making process. An unpaved access road runs through the center of the island. A large building foundation, an abandoned trailer, and other of piles of crushed block and construction debris can be found on the island as well.

2.2 Historic and Future Use of the Site

The historic use of the site and properties in the surrounding area has been commercial or industrial in nature. The mainland portion of the site is cut-and-fill land initially established as a coal storage yard prior to 1887. Plates 1 and 2 are lithographs depicting historic coal storage operations. The island portion of the site is an artificial island constructed circa 1898, which was also initially used as a coal storage yard. After 1930, the site was used as a boat and lumber storage facility, and a concrete block manufacturing facility.

Adjacent to the site, there is a parcel to the north that was previously occupied by an auto repair shop and is now a small storage garage and private residence. Along the northwest side of the island and to the east are commercial marinas on Rondout Creek. A public park is also located north of the site (Block Park).

Preliminary information indicates that soils at the site have been impacted by metals, petroleum-related volatile organic compounds (VOCs) and petroleum or coal related semi-volatile organic compounds (SVOCs) released at the site during the periods that the site was used for coal storage, lumber storage and concrete block manufacturing. The presence of SVOCs at the site is indicative of coal or coal slag storage activities. During the period that the site was used for lumber production and storage, it is likely that the handling and storage of treated wood occurred on unpaved surfaces. Therefore, all shallow soil at the site has potentially been impacted by releases of contaminants to the surface. The detections of arsenic and chromium in soils are consistent with the use of the site as a lumber production and storage facility. The extent of VOC compounds has not been fully characterized; however, impacts appear to be concentrated in the area of a former fuel storage tank. The cradle where the tank sat and the secondary containment walls are still intact.

Three electrical transformer casings were found on the island portion of the site. The age of these transformers is unknown. They are rusted and no labels or utility company contact information was observed. Old transformers can possibly contain polychlorinated biphenyls (PCBs). It is possible that PCB fluid contained in the transformer casings was released to the surface soils.

Potable water in the surrounding area is provided by the Kingston Water District; however there are no municipally supplied potable water connections to either the mainland or island portions of the site. Some piping structures including valve boxes are present but it is unknown what function this piping system performed.

To date, no groundwater studies have been performed to assess potential impacts resulting from historical site activities. At this time, it appears that the predominant transport mechanism for potential off-site impacts to adjacent resource areas (e.g., Rondout Creek) is through overland flow and not via groundwater. Assessment activities will include the installation of monitoring wells to investigate the presence or absence of contaminant impacts to groundwater.

The intended re-use of the property is for residential, recreational and commercial services. Future use is likely to involve multi-story residential units with parking or other amenities located at the ground floor level. This will consist of approximately 100 to 200 apartments or condominiums and some commercial and recreational facilities to provide services for local residents. The proposed re-use of the site will be consistent with applicable zoning laws and development plans, and will capitalize on the proximity of the site to the Rondout Creek waterfront.

3.0 SITE DESCRIPTION

3.1 Geology of Site

The Surficial Geologic Map of New York, prepared by Cadwell (1989), identifies the unconsolidated deposits in the vicinity of the site as either fluvial sand and gravel deposits (along the Hudson River) or glacial till consisting of sand, silt and gravel. These deposits exhibit variable texture. The till deposits are typically poorly sorted and consist primarily of clay, silt-clay and boulder-clay mixes with sporadic bedrock outcrops intertwined. The Surficial Geologic Map indicates that the soils in the vicinity of the site are likely fill material. If not fill, the soils are listed as either lacustrine deposits or glacial till. The Ulster County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. There is also an area of some "Bath-Nassau-Rock outcrop complex, hilly" soils located near the northwest edge of the site.

According to the Geologic Map of New York, Lower Hudson Sheet, prepared by Fisher et al. (1970), bedrock below the site is likely to consist of Undifferentiated Lower Devonian and Silurian Rocks, with some of the Austin Glen Formation. The Austin Glen formation consists of interbedded layers of greywacke and shale. The outcrops observed on site were more consistent with interbedded greywacke and shales. The outcrops appeared to consist of interbedded competent siltstone layers alternating with less competent shale.

3.2 Hydrogeology of Site

Groundwater likely exists in the shallow sediments and bedrock formation underlying the site; however, groundwater is not used as a potable resource in the area. Little information is currently available regarding groundwater quality beneath the site. Assessment activities will include the installation of monitoring wells to investigate the presence or absence of contaminant impacts to groundwater.

The substantive sensitive receptors in the vicinity of the site, besides human users of the property, are groundwater and the Hudson River and Rondout Creek estuarine environment and the associated flora and fauna. The existing information suggests that groundwater flows towards the east discharging into the Hudson River; however, the river is tidal at this location, so the groundwater elevation may vary substantially over the course of a day. This tidal fluctuation may affect contaminant distribution beneath the property. An issue to be considered would be the potential for contaminants to leach into groundwater and find their way into the adjacent surface water bodies and sediment.

4.0 PROJECT DESCRIPTION

A preliminary project schedule for this project is presented in Figure 3. The first phase of the project will consist of a Remedial Investigation (RI). The RI includes procedures to characterize the quality of surface and subsurface soil, sediment, groundwater and surface water. The data will be used in public health and environmental impact evaluations and provide the basis for an Alternatives Analysis Report and Remedial Work Plan. Based on the Remedial Investigation Report, an appropriate draft remedial work plan will be developed. The public will be advised of the availability of the Remedial Work Plan and have the opportunity to comment it.

After the Department has considered any comments provided by the public, remedial action can begin.

4.1 Objectives of the remedial program

The project objectives are to determine whether contaminants, hazardous materials or wastes have been or may be released from the Island Dock site and to determine a cleanup program based on the findings that is sufficiently protective of human health and the environment, is consistent with the proposed re-use of the property, and can be implemented by the Historic Kingston Waterfront, Island Dock, LLC.

4.2 Key Decision Points

Milestones in the BCP process are summarized below:

- Acceptance into the BCP/BCP Agreement
- Development and Approval of the Remedial Investigation Work Plan
- 30 Day Comment Period and Fact Sheet
- Department accepts RIWP
- Complete Remedial Investigation & Submit Remedial Investigation Report
- Department Reviews and Accepts Report
- 45 Day Comment Period and Fact Sheet on Remedial Work Plan
- Remedial Action Work Plan Finalized
- Construction Fact Sheet and Construction Begins
- Fact Sheet; Remedial Action Completed, Report Under Review
- Engineers Report and Fact Sheet
- OM&M Plan (if required)
- Certificate of Completion and IC/EC Fact Sheet (as warranted)

As warranted, the Department may present the findings of any of the above stages to the public through Citizens Participation meetings.

4.3 Available Documents

The following list documents the reports and submittals that are currently available in the document repositories:

- The BCP Application which includes as attachments:
 - A Limited Phase II Environmental Site Assessment and Supplemental Subsurface Investigation (Fuss & O'Neill of New York, P. C., 2005)
 - Phase I Environmental Site Assessment (Fuss & O'Neill of New York, P. C., 2005)
 - A Draft Remedial Investigation Work Plan - RIWP (Fuss & O'Neill of New York, P.C., 2005)

5.0 BROWNFIELD SITE CONTACT LIST

The following section presents the project contact list. Questions, comments or other information about the project is available from the following contacts:

- *Environmental Concerns* – Mr. Bradley Brown - NYSDEC Project Manager, NYSDEC Central Office, 11th Floor, 625 Broadway, Albany, New York 12233 (518) 402-9564, Hours 8am-4pm By Appointment
- *Health Related Concerns* – Ms. Kristin Kulow – NYSDOH Public Health Specialist II, NYSDOH, 28 Hill Street, Suite 201, Oneonta, NY 13820-9804
- *Citizen Participation Specialist* – Mr. Michael J. Knipfing - NYSDEC Region 3 Office, 21 South Putt Corners Road, New Paltz, New York 12561, (845) 256-3154, Hours M-F, 9-4 by appointment

6.0 PUBLIC MAILING LIST

A summary of the site contact list is provided below and a complete contact list is provided in Appendix A.

Recipient	Number of Mailings	Type of Mailing
Federal Representatives	3	Fact Sheets
State Elected Officials	2	Fact Sheets
Ulster County Representatives/Officials	20	Fact Sheets
Town of Kingston	2	
City of Kingston	17	Fact Sheets
NYSDEC & NYSDOH	18	Fact Sheets
Environmental Groups	16	Fact Sheets
Media Outlets	26	Fact Sheets
Adjacent Property Owners	3	Fact Sheets
Repositories	3	Fact Sheets, Reports, Work Plans and other documents of public record
TOTAL	110	

7.0 IDENTIFICATION OF DOCUMENT REPOSITORIES

Documents related to the remedial program for the Site are available for public review at the locations listed below. As documents are created during the remediation process, they will be added to the repositories.

NYSDEC Central Office 11 th Floor, 625 Broadway Albany, New York 12233 Attn: Mr. Bradley Brown (518) 402-9564 Hours: 8-4 by appointment	NYSDEC Region 3 Office 21 South Putt Corners Road New Paltz, New York 12561 Attn: Mr. Michael Knipfing (845) 256-3154 Hours: M-F, 9-4 by appointment
Kingston Area Library 55 Franklin Street Kingston, NY 12401 (845) 331-0507 Hours: M & Th 10-6, Tu & W 10-8, F 10-5, Sa 10-4, Closed Sunday	

8.0 DESCRIPTION OF SPECIFIC CITIZEN PARTICIPATION ACTIVITIES

NYSDEC and NYSDOH are committed to keeping the public informed and involved throughout the process of site investigation and alternative analysis of this site. At the minimum, the Citizen Participation Activities will include:

- Establishment of document repositories.
- Creation of this Citizen Participation (CP) Plan with inclusion of a Public Mailing List and a contact list of persons the public can contact for further information.
- Other meetings or Fact Sheets as warranted by the NYSDEC

A citizen participation fact sheet summarizing CP milestones during the project is provided in Appendix B.

At any time during the remediation process, the public is encouraged to contact the officials listed in Section 5.0 of the CP Plan to express any concerns or questions they may have regarding this project.

FIGURE 1
Site Location Map

FIGURE 2

Site Plan

FIGURE 3
Preliminary Project Schedule

A summary of proposed key milestones for the Remedial Investigation is presented below:

Task	Anticipated Date
Submission of Remedial Investigation Work Plan to NYSDEC	October 2005
NYSDEC approval of Remedial Investigation Work Plan	November 2005
Initiation of Remedial Investigation	November 2005
Submission of Remedial Investigation Report to NYSDEC	January 2006

Note that the schedule is subject to change based on results of field assessment activities and conditions encountered in the field.

PLATES 1 and 2

Historical Photographs (Lithographs) Circa 1887

APPENDIX A

Contact List for Interested/Affected Public

Contact List for Interested/Affected Public

Brownfield Site Contact List

The Brownfield Site Contact List (BSCL) (below) summarizes at a minimum persons to be contacted about the Remedial Investigation proposed for the Island Dock BCP Site.:

FEDERAL REPRESENTATIVES

Senator Charles E. Schumer
757 3rd Avenue, Suite 1702
New York, NY 10017

Senator Hillary Rodham Clinton
780 3rd Avenue, Suite 2601
New York, NY 10017-2024

Congressman, 22nd District
Maurice Hinchey
291 Wall Street
Kingston, NY 12401

STATE ELECTED OFFICIALS

Assemblyman Kevin Cahill
1 Albany Avenue, Suite G-4
Governor Clinton Hotel
Kingston, NY 12401

Senator William Larkin
1093 Little Britain Road
New Windsor, NY 12553

ULSTER COUNTY REPRESENTATIVES/OFFICIALS

Clerk of the Legislature
Ellen DiFalco
PO Box 1800
Kingston, NY 12402-1800

Chairman of Legislature
Richard A. Gerentine
PO Box 1800
Kingston, NY 12402-1800

County Clerk
Albert Spada
PO Box 1800
Kingston, NY 12402-1800

Planning Board Director
Dennis Doyle
PO Box 1800
Kingston, NY 12402-1800

Health
Dean N. Palen, P.I., M.B.A., Director
300 Flatbush Avenue
Kingston, NY 12401

Public Works Administration
Lynda F. Bertling, Controller
315 Shamrock Lane
Kingston, NY 12401

Environmental Management Council
Rick Fritschler, Chairman
c/o Ulster County Community College
PO Box 557
Stone Ridge, NY 12484-0557

Soil & Water Conservation
Gary M. Capella, Executive Director
652 Route 299, Suite 103
Highland, NY 12528

Ulster County Development Corporation
Chester J. Straub Jr., President
5 Development Court
Kingston, NY 12401

District 12 –City of Kingston
Honorable David B. Donaldson
148 Henry Street
Kingston, NY 12401

District 12 –City of Kingston
Honorable Peter M. Loughran
36 Liberty Street
Kingston, NY 12401

District 6 –City of Kingston
Honorable Jeanette Provenzano
34 Hanratty Street
Kingston, NY 12401

District 6 –City of Kingston
Honorable Frank R. Dart
135 Second Avenue
Kingston, NY 12401

District 5 –City of Kingston, Town of Ulster
Honorable Michael G. Berardi
PO Box 1163
Kingston, NY 12402

Ulster County Administrator
Arthur J. Smith, III
PO Box 1800
Kingston, NY 12402-1800

District 5 –City of Kingston and Town of
Ulster
Honorable James F. Maloney
16 Dirk Lane
Kingston, NY 12401

District 4 - Towns of Kingston, Saugerties
and Ulster
Honorable Robert T. Aiello
14 Birchwood Drive West
Saugerties, NY 12477

District 4 - Towns of Kingston, Saugerties
and Ulster
Honorable Joan Feldmann
131 Main Street
Saugerties, NY 12477

District 4 - Towns of Kingston, Saugerties
and Ulster
Honorable Joseph P. Roberti, Jr.
15 Ebel Court
Saugerties, NY 12477

District 4 - Towns of Kingston, Saugerties
and Ulster
Honorable Alice Tipp
421 Old Stage Road
Saugerties, NY 12477

TOWN OF KINGSTON REPRESENTATIVES/OFFICIALS

Supervisor
Dennis Weiss
906 Sawkill Road
Kingston, NY 12401

Town Clerk
Laura L. Joy
906 Sawkill Road
Kingston, NY 12401

CITY OF KINGSTON REPRESENTATIVES/OFFICIALS

Clerk
Kathy Janeczek
420 Broadway
Kingston, NY 12401

Community Development
Daniel Mills, Exec. Director
420 Broadway
Kingston, NY 12401

Fuss & O'Neill of New York, P.C.

City Engineering
John Kwak, P.E., City
420 Broadway
Kingston, NY 12401

Mayor
James M. Sottile
420 Broadway
Kingston, NY 12401

Planning
Suzanne Cahill, City Planner
420 Broadway
Kingston, NY 12401

Water
Judith Hansen, Supt.
111 Jansen Avenue
Kingston, NY 12401

Public Works
Steve Gorsline, Superintendent
25 East O'Reilly
Kingston, NY 12401

Councilman Chris Gonyea
Second Ward
45 North Front St.
Kingston, NY 12401

Councilman Clinton Brown
Fourth Ward
37 Franklin Street
Kingston, NY 12401

Councilman John Martino
Sixth Ward
78 Roosevelt Avenue
Kingston, NY 12401

Councilman Christopher Burns
First Ward, Minority Leader
369 Washington Avenue
Kingston, NY 12401

Councilman Leonard Walker, Third Ward
Leonard Walker
15 Overlook Drive
Kingston, NY 12401

Councilwoman Ann Marie DiBella
Fifth Ward
116 Fair Street
Kingston, NY 12401

Councilman William P. Reynolds
Seventh Ward, Majority Leader
181 Clifton Avenue
Kingston, NY 12401

Councilwoman Jennifer Primo-Gilbert
Eighth Ward
34 Hanratty Street
Kingston, NY 12401

Councilman Michael Madsen
Ninth Ward
61 Brewster Street
Kingston, NY 12401

James L. Noble, Jr.
Alderman-at-Large
420 Broadway
Kingston, NY 12401

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AND NEW YORK STATE DEPARTMENT OF HEALTH**

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Catskill Watershed Corp.
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Margaretville, NY 12455

Clearwater, Inc.
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Poughkeepsie, NY 12601

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78 N. Broadway
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Empowerment Institute
157 Glenford Wittenberg Road
Glenford, NY 12433

Enviro-Science
367 Violet Avenue
Poughkeepsie, NY 12601

Environmental Citizens Coalition
33 Central Avenue
Albany, NY 12210

Greenway Conservancy
Capitol Building
Capitol Station, Rm 254
Albany, NY 12224

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Albany, NY 12210

Hudson River Sloop Clearwater Inc
112 Market Street
Poughkeepsie, NY 12601

The Nature Conservancy
Eastern NY Chapter
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Mt. Kisco, NY 10549

Rondout-Esopus Land Conservancy
17 Creek Road
High Falls, NY 12440

Scenic Hudson Inc
1 Civic Center Plaza
Poughkeepsie, NY 12601

Student Conservation Association
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New Paltz, NY 12561

Wallkill Valley Land Trust
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New Paltz, NY 12561

Environmental Consultants
12 Raymond Ave.
Poughkeepsie, NY 12601

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City Editor
Hudson Valley Business Journal
86 E. Main Street
Wappinger's Falls, NY 12590

City Editor
Daily Freeman
79-97 Hurley Avenue
Kingston, NY 12401

City Editor
Hudson Valley Newspaper, Inc.
P. O. Box 945
Highland, NY 12528

City Editor
Mid Hudson Times
P.O.Box 434
Walden, NY 12586

Fuss & O'Neill of New York, P.C.

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Times Herald Record
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WDST
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Ulster County Townsman
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WCKL/WCTW/WHUC/WTHC
5620 Rte. 9G
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WELV/WTHN
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News Director
Kingston Public Access
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LOCAL REPOSITORY REFERENCE LIBRARY

NYSDEC Central Office
11th Floor, 625 Broadway
Albany, New York 12233
Attn: Mr. Bradley Brown
(518) 402-9564
Hours: 8-4
By Appointment

Kingston Area Library
55 Franklin Street
Kingston, NY 12401
(845) 331-0507
Hours: M & Th 10-6, Tu & W 10-8, F 10-5,
Sa 10-4, Closed Sunday

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APPENDIX B:
Citizen Participation Fact Sheet

FACT SHEET

Brownfields Cleanup Program (BCP) CITIZEN PARTICIPATION

(see also ECL §27-1417)

Citizen participation activities occur at several milestones during a BCP project.

When BCP Application Deemed Complete

- Develop public contact list and establish a document repository;
- Publish a notice of Applicant's request to participate in the BCP in a local newspaper, the Environmental Notice Bulletin (ENB), and to those on the public contact list;
- 30-day public comment period; and
- Develop FSP Plan before beginning investigation and alternative analysis.

Before NYSDEC DER Finalizes Remedial Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing plan, and
- 30-day public comment period.

Before NYSDEC DER Approves Proposed Remedial Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing the site investigation and alternative analysis work plan.

Before NYSDEC DER Finalizes Proposed Remedial Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing plan;
- 45-day public comment period; and
- Public meeting, if requested.

Before Applicant Starts Construction

- Notice to contact list announcing the start of investigation and alternative analysis.

Before NYSDEC DER Approves Final Engineering Report

- Notice and fact sheet to contact list describing the engineering report (the report describes any institutional or engineering controls included in the site investigation and alternative analysis).

Certificate of Completion (when institutional / engineering controls are used)

- Notice and fact sheet to contact list describing such controls within 10 days of issuance of certificate.

Technical Assistance Grants (TAGs)

- TAGs of up to \$50,000 are available to qualifying community groups to obtain independent technical assistance for significant threat BCP sites.

QUALITY ASSURANCE PROJECT PLAN

ISLAND DOCK
ABEEL STREET, KINGSTON
ULSTER COUNTY, NEW YORK

NYSDEC BCP Site - TBD

Prepared for:
Historic Kingston Waterfront, Island Dock, LLC

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

October 2005

1.0 TITLE PAGE

Document Title: QUALITY ASSURANCE PROJECT PLAN
ISLAND DOCK
CITY OF KINGSTON, ULSTER COUNTY, NEW YORK

Prepared by: FUSS & O NEILL OF NEW YORK, P.C.
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POUGHKEEPSIE, NY 12601

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QUALITY ASSURANCE PROJECT PLAN
ISLAND DOCK
KINGSTON, NEW YORK

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- A Quality Assurance Project Plan Checklist
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- F Sample Field Data Forms
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2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following is a list of key personnel for the sampling program to be implemented in this study. Any questions regarding project status should be directed to the principle contact.

Principle Contact: Robert Iannucci
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3.0 INTRODUCTION

The following Quality Assurance Project Plan (QAPP) provides a framework for assessing the quality of data from the environmental sampling programs for the Former Concrete Block, Inc., Island Dock Site in Kingston, Ulster County, New York. The format for this document was developed from the United States Environmental Protection Agency (US EPA) Brownfields Quality Assurance Project Plan Guidance Document, the New York State Department of Environmental Conservation (NYSDEC) Brownfield Guidance Document, and NYSDEC Draft DER-10. This document defines the field and laboratory procedures to be used for this project and contains several attachments including field sampling Standard Operating Procedures (SOPs), laboratory SOPs, and field sampling forms. A Quality Assurance Project Plan Checklist is included in Appendix A.

3.1 Site Description and History

The subject site, commonly known as Island Dock, is located on the south side of Abeel Street in the City of Kingston, New York. A site location map is provided as Figure 1.

According to the City of Kingston Tax Assessor's records, the subject site consists of three parcels. Parcel 1 is a 0.7-acre triangular-shaped parcel. Parcels 2 and 3 (Upper Island Dock, Lower Island Dock) make up Block Island, including Island Dock Road, which is used to access the island. Parcels 2 and 3 measured 9.2 and 7.9 acres, respectively.

3.2 Project History and Description

Historic use of the subject site includes a coal storage yard, lumber production company and storage yard, and concrete block manufacturing facility. The mainland parcels have been in industrial use since approximately 1887. The island was constructed in approximately 1898.

A Phase I Environmental Site Assessment (ESA) was completed by The Chazen Companies for the subject site in November of 2001. Fuss & O'Neill of New York, P.C. (Fuss & O'Neill) was retained to conduct a supplemental Phase I ESA, and a Limited Phase II ESA of the property in April of 2005.

Findings and data generated during these previous investigations are summarized in the March 2005 Site Investigation Work Plan (SIWP) prepared by Fuss & O'Neill.

3.3 Plan Objective and Data Quality Objectives

This QAPP is designed to guide site-wide quality of environmental sampling; therefore, project descriptions of sampling locations, constituents of concern, analytical requirements, regulatory criteria, and data quality objectives will be developed in project sampling plans.

The objective of this QAPP is to outline a structure for data quality such that the data collected will support decisions and to provide procedures for planning, implementing, and evaluating field sampling and analytical procedures.

The generation and use of quality data is important in the assessment of constituent impact on the site and, if necessary, in the selection of adequate responses to concentrations in soil, groundwater, sediment, or surface water.

4.0 SAMPLING DESIGN

An essential aspect of any sampling program is to provide high quality representative data. This section of the QAPP provides a description of sampling techniques, procedures, and equipment used during field sampling programs. These techniques and procedures are consistent with guidelines outlined in the EPA document "A Compendium of Superfund Field Operations Methods" and with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Numbers 4007, 4008, 4015, 4019, 4032, and 4051 (draft) and others as applicable.

4.1 Sampling Design Rationale

The project-specific Work Plan provides the sampling rationale for every sampling event including that for the following tasks:

- Sampling environmental media
- Determination of constituents to be measured in each environmental media
- Sampling locations
- Sample depths and types
- Number and frequency of samples to be collected

The specifics of a field investigation (e.g., sampling locations, target depths, analytical methods, and a reference map) are provided in the SIWP.

4.2 Number of Samples

This QAPP is designed to address site-wide quality management of sampling; therefore, lists of number of samples, sampling locations, constituents of concern, analytical requirements, regulatory criteria, and data quality objectives are provided in the SIWP.

4.3 Sampling Locations

Proposed sampling locations will be identified in the Field Sampling Plan.

The Health and Safety Plan (HASP) discusses procedures for clearing sampling locations. The procedures include notifying "NY Dig Safely" and having the location checked by an authorized site official. The procedure outlined in the HASP will be followed before any intrusive work with mechanized equipment is initiated.

5.0 SAMPLING AND ANALYTICAL PROCEDURES AND REQUIREMENTS

5.1 Sampling Procedures

The Fuss & O'Neill SOPs pertaining to sample collection are listed in Table A1 and included in Appendix B.

5.1.1 Preventive Maintenance –Field Equipment

The SOPs pertaining to preventive maintenance of field equipment are referenced in Table A2 and Table A3 and are provided in Appendix C.

Field measurement equipment will be maintained in accordance with SOPs and manufacturer instructions. The field personnel will be responsible for confirming that equipment is operating properly during use by inspecting the instrument for physical damage and performing instrument performance checks. Problems encountered with field measurement equipment will be documented in the field logbook. An attempt will be made to correct problems with the instrument while in the field. If the instrument's problem is not remedied in the field, it will be taken out of service and replaced.

The field measurement equipment is inspected, cleaned, and calibrated on a daily basis prior to being used on site. The calibration information is recorded on calibration forms which are kept at Fuss & O'Neill's office in the project file. The daily preventive maintenance checklist may include some of the following, but is instrument specific:

- Visual battery check of battery low indicator
- Replacement of batteries as necessary (spare batteries are kept on hand at Fuss & O'Neill)
- pH electrode is cleaned and calibrated on a daily basis and cleaned and re-calibrated after a noticeably dirty sample (full decontamination)
- Temperature is checked using a certified calibrated mercury thermometer, and, if necessary, the sensor is replaced
- If the specific conductance electrodes are determined to be losing their platinum coating, the electrodes are replatinized according to manufacturer's instructions with 3 percent chloroplatinic acid and the instrument is then re-calibrated
- The conductivity electrode of the SC meter will be cleaned on a daily basis and cleaned and re-calibrated after a noticeably dirty sample (full decontamination)

5.1.2 Calibration –Field Equipment

SOPs for the calibration of field instruments to be used during this project are referenced in Table A2 and included in Appendix C. Calibration frequency, acceptance criteria and corrective action are included in Table A4.

Field instrument calibration is performed in accordance with manufacturer's instructions and Fuss & O'Neill SOPs. Soil samples will be screened using a hand-held NITON XLP-702 Multi-element Soils Analyzer and an Organic Vapor Monitor.

Field instruments will be calibrated before initial use. Calibration will be recorded in the appropriate calibration log provided in Appendix D.

Calibration acceptance criteria for field instrumentation are established by the respective instrument manufacturer. If a calibration check determines that any field instrument is outside of the criteria, the instrument will be re-calibrated. If a calibration cannot occur within the acceptance criteria a back-up instrument will be used.

5.2 Analytical Procedures

The analytical laboratory for the project will be Severn Trent Laboratories of Newburgh, New York, a NY state certified laboratory. The contract laboratory's SOPs for analytical methods for this project are consistent with the NYSDEC ASP. The SOPs and the laboratory Quality Systems Manual are available upon request.

Where applicable, data collection and laboratory samples for this project will be analyzed in accordance with the NYSDEC ASP, SW-846 (U.S. EPA, 1986), or EPA (U.S. EPA, 1983b) analytical methods. Sampling and analytical method requirements including container types, preservation and hold times are listed in Table A5.

5.2.1 Preventive Maintenance –Laboratory Equipment and Calibration

Preventive maintenance, calibration, measurement systems, and corrective action procedures for laboratory equipment are provided in the laboratory's QA Manual and SOPs. Fixed laboratory SOPs are available upon request.

5.3 Laboratory Data Package Deliverables

Data package deliverables from the contract laboratory will consist of the following elements:

- Cover letter /letter of transmittal signed by project manager of designee
- SDG narrative signed by project manager or designee
- Field and internal laboratory chain-of-custody records
- Data results sheets
- Laboratory matrix spike and matrix spike duplicate results
- Laboratory control samples and control duplicate results
- Method blank results
- Surrogate recoveries
- Serial dilutions

6.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

6.1 Documentation of Field Activities

All field personnel will record sampling and other project observations in a bound, water-resistant field notebook. The field notebook will document site-specific information such as:

- Project name and location

- Time and date of arrival at the site
- Sampling locations and corresponding sample numbers
- Conversations with individuals on site
- Any unusual events or observations
- All information not recorded on field data sheets
- Time of departure from the site

Additional sample collection documentation forms that will be used during the project are discussed in the following sections.

6.2 Sample Identification

Each sampling location will be assigned a unique number by which samples can be identified. An example of a sample identification number is as follows:

402 040401-01

This 11-digit number contains three types of information about the sample location. The first three digits in the number represent the employee identification number for the sampler or sampling event supervisor. This is followed by the year, month and day of sample collection. The last two digits represent a chronological sample number. If necessary, the number can be expanded to three digits; this should be determined before sampling begins in order to assure that all samples have the same format.

Samples collected at one time from the same sample location will have the same sample identification number. Some common situations are listed below:

- Multiple containers required for various analytical parameters
- Sampling events which require the sample to be submitted to two or more laboratories, as in the case of a split sample discussed below.
- Sampling events that require sampling at the same location over two or more days due to insufficient sample volume available per day.

6.3 Sample Location Identification

Each sampling location will be assigned a unique identifier (site ID). The Site ID will be recorded on the field data form in addition to the sample number and will primarily be used for graphical display of sample results as well as internal data processing.

In general, the Site ID will consist of a one- or two-letter prefix referring to the type of media sampled and a serial number indexing the sampling location. The following prefixes will be used for the indicated sampling media as applicable:

B	Soil Boring
TP	Test Pit
MW	Sampling Well or Monitoring
SD	Sediment

PZ Piezometer
SG Staff Gauge

Sample locations within each class of sampling media will be assigned a two- or three-digit serial number in the order in which they are sampled. Examples of sample location IDs are as follows:

B-01, B-02, B-03	Soil boring locations 01, 02, and 03
SD-12	Sediment sampling location 12
MW-01, MW-02	Monitoring wells 01 and 02

Samples collected at multiple depths at the same location will have the same sample location ID. The depth or range of depths at which samples are collected will be recorded on the appropriate field data forms and chain-of-custody forms. Sample depth information will also be included on data tables.

6.4 Sample Labels

A sample label will be affixed to each sample container at the time of collection. The following information will be recorded on each label with waterproof ink:

- Sample identification number
- Client/project name
- Project location
- Project number
- Date of sample collection
- Time of sample collection
- Name of sample collector
- Sample location
- Type of preservation
- Analysis to be performed

An example of a sample label is included in Appendix E

6.5 Field Data Forms

Samples will have a field data form documenting their collection. This record will be completed by field personnel at the time of sample collection. Examples of sampling field data forms are provided in Appendix F

6.6 Chain-of-Custody Records

Control of samples shall be maintained at all times. The chain-of-custody will be used to document all transfers of the sample between the sample collector and the laboratory. The form, consisting of four copies, will include the following information:

- Chain-of-custody identification number
- Project/client name
- Project location

- Project number
- Laboratory conducting analysis
- Name/location of party to receive laboratory report
- Name/location of party to receive laboratory invoice
- Sample identification number
- Sample type
- Number and type of sample containers
- Type of preservatives
- Signature and affiliation of sampler
- Date and time of collection
- Signatures of people involved in chain of possession
- Dates and times of sample transfers

The samples will remain in the custody of the sample collector until that person relinquishes them to the laboratory or sample delivery person. With each transfer of custody of the samples, the person receiving the samples will sign the COC. After verifying that each sample listed on the COC is present, the appropriate transfer box will be checked to indicate that all samples are accounted for.

To reduce the potential for sample tampering, coolers will be shipped to the laboratory with chain-of-custody seals on the edges of the cooler between the lid and the sides. One copy of the chain-of-custody record will be retained by Fuss & O'Neill personnel, while the original and two copies will be relinquished with the samples. A completed record will be returned to Fuss & O'Neill with the sample analysis report. An example chain-of-custody form is presented in Appendix G. Copies of all shipping papers will be retained by the sampler.

6.7 Sample Containers and Preservation

Samples will be collected in lab-supplied containers. The type of container utilized will depend upon the analysis to be conducted as indicated in the Quality Assurance Plans for the laboratories and referenced in Table A5. The preservatives listed in each table apply only to aqueous samples, and not to solid samples. Containers will be pre-cleaned and certified clean (I-Chem 300 or equivalent).

For aqueous samples, appropriate preservatives will be added by the laboratory prior to shipping the containers to the site in accordance with NYSDEC ASP or SW-846 standard methods. The pH of the samples will be verified in the field by pouring a small amount of the sample onto a piece of pH paper. If the pH is not at the appropriate level, additional preservative, as supplied by the laboratory, will be added to the container.

Liquid samples collected for volatile organic analyses will be preserved with HCl to a pH < 2. Any acid utilized for preservation will be added to the VOA vial before the sample is collected to ensure that adequate mixing occurs. VOA vials will not be reopened in the field once properly sealed.

Once the samples have been collected and labeled, they will be stored in a cooler to reduce the sample temperature to less than 4°C. Sample temperature upon reaching the laboratory is dependent on how much time has passed since the sample was collected and placed in the cooler. It is possible that the time between sample collection and delivery to the laboratory may

not be long enough for the sample to reach 4°C. Samples may be transferred and stored by Fuss & O'Neill in a refrigerated environment (maintained nominally at 4°C) until they are relinquished to the contract laboratory.

6.8 Sample Custody at the Laboratory

Samples for analytical chemistry will be delivered to the contract laboratory either by a commercially available courier, laboratory supplied courier or by Fuss & O'Neill personnel. An internal chain-of-custody form will be generated as the samples are assigned locations within the specific laboratory. Procedures for sample log-in, internal sample tracking and sample disposal at the contract laboratory are included in their QC Manual.

7.0 QUALITY CONTROL REQUIREMENTS

The number and type of Quality Assurance and Quality Control (QA/QC) samples submitted to the laboratory will be in accordance with the SIWP.

QA/QC samples submitted to the laboratory will include equipment blanks, trip blanks and field duplicates. The purpose of these samples is to confirm that laboratory results reflect the condition of the various media in the environment and are not the result of poor sampling or laboratory technique. Additionally, duplicate samples will be collected in order to check the accuracy of the laboratory.

Each QA/QC sample will be given its own sample code. The identity of these samples will be withheld from the laboratory conducting the analysis. When more than one QA/QC sample is submitted with a set of samples, they will be interspersed within those samples so that they are not easily identifiable by the laboratory.

7.1 Equipment Blanks

Equipment blanks will be collected for sampling events in which non-dedicated sampling equipment is used. Equipment blanks may be obtained from equipment that has a potential to come into direct contact with samples. Equipment blanks are generally obtained from sampling equipment which is decontaminated between sample locations.

Blanks are prepared in the field during the sampling event. Laboratory-supplied deionized water is pored through and/or over the decontaminated equipment which has been utilized during sampling. The water will then be collected from that piece of equipment directly to the sample container.

Equipment blanks will be analyzed for the same parameters as samples collected with the corresponding piece of sampling equipment. For most parameters, the sampling device is the only piece of equipment that comes into contact with the sample. The frequency of equipment blank collection will be approximately one per 20 samples collected by piece of equipment for solid sampling events and for water sampling events.

7.2 Trip Blanks

Trip blanks for VOCs will be obtained for each day of sampling to determine whether samples have been exposed to contamination as a result of sample container handling or transport. Trip blanks will be submitted and analyzed only if VOCs make up a portion of the analyte list on the day of sampling. The blank will be prepared by the laboratory and will accompany the sample containers from the time they leave the lab until the time it will be returned to the lab as a sample. The trip blank sample is labeled as a sample and submitted blind to the laboratory for analysis.

7.3 Duplicate Samples

Duplicate samples for analysis will be collected for each matrix (e.g., liquid, solid) sampled to check the precision of the laboratory analysis. Duplicate samples will be collected at the same time as the original sample and will be analyzed for the same parameters. The duplicate sample will be assigned a different sample number than the original set so that the sample identity is blind to the laboratory. One duplicate sample by matrix will be collected nominally per 20 samples per matrix submitted to the laboratory. Sampling will be in the order of decreasing parameter volatility by alternating between containers in the original set and those in the duplicate set.

7.4 Field Sample Control Limits

The standard Fuss & O'Neill field sample control limits for quality control are specified below. If the control limits are not met, the Quality Assurance Officer will investigate the cause of the exceedance and determine the validity of the associated data.

Quality Control Sample	Control Limit
Trip Blank	Less than detection limit*
Equipment Blank	Less than detection limit*
Field Duplicates	± 30% Percent Difference for Water; Acceptable Percent Difference will be equal to Matrix Spike Recovery Values for Matrices other than Water **

* With the exception of common laboratory contaminants of acetone, 2-butanone, methylene chloride, phthalates and toluene which will have a control limit of 5X detection limit.

** Discrepancies will be addressed on a case-by-case basis.

7.5 Laboratory Internal Quality Control

The laboratory Quality Assurance Plan explains the type of quality control checks which are routinely followed. This includes such items as analysis of client reference standards, matrix spikes, blanks, the use of internal standards and surrogate spikes. All calibrations are checked before sample analysis can begin. If the analytical system does not pass the initial QC limits, then the system is determined to be out of control and the cause of the problem must be determined and corrected before measurements can continue. Once the problem is corrected, QC measurements are repeated to verify the calibration. If the system still does not meet control limits, the system is re-examined until the problem is corrected. The QA/QC

procedures and analytical precision and accuracy of the methods to be used for this project are provided the contract laboratory's SOPs for analytical methods and QC limits.

8.0 DATA MANAGEMENT AND DOCUMENTATION

8.1 Data Classes

Many different classes of data may be generated during site investigations. Data generated include documentation of field activities, paperwork associated with environmental samples and investigations, and analytical data. The data classes in this section include:

- Field Logbooks
- Sample Identification Numbers
- Field Data Forms
- Fuss & O'Neill Sample Logbook
- Refrigerator Logbook
- Chain-of-Custody
- Analytical Data
- ArcView™ Drawings
- AutoCAD Drawings

8.1.1 Field Logbooks

Field logbooks will be utilized by field personnel to document field activities. Fuss & O'Neill logbook practices are standardized and Fuss & O'Neill field personnel are familiar with these standards.

8.1.2 Sample Numbers

Every sample collected will be assigned a unique sample number by which it can be identified. Sample number formats are discussed in Section 6.2.

8.1.3 Sample Location Identification

Each sampling location will be assigned a unique identifier (Site ID). The Site ID will be recorded on the field data form and in the field logbook, in addition to the sample number. Sample location IDs will primarily be used for graphical or tabular presentation of sample results as well as for internal data handling.

8.1.4 Field Data Forms

Field data forms will be utilized to record information pertinent to the type of field activity being conducted. Each sample will have a field data form documenting its collection. The field data form will be completed by field personnel at the time of sample collection. Example field data forms are provided in Appendix F.

8.1.5 Fuss & O'Neill Sample Logbook

The Fuss & O'Neill sample logbook serves as a central repository of general information on all environmental samples collected by Fuss & O'Neill personnel. The sample logbook is located in Environmental Field Services office area. Samples collected in the field which are relinquished to a fixed laboratory will be recorded in the sample logbook. Samples collected in the field and given directly to the mobile lab for analysis will be recorded in the mobile laboratory sample logbook. Information recorded in the logbook includes sample number, job number, job name, sample location ID, laboratory, date relinquished, and date received.

8.1.6 Chain-of-Custody

The Chain-of-Custody (COC) serves as a record of control of samples. The COC will be used to document all transfers of a sample between personnel, coolers, refrigerators, etc., from the point of collection to the point of receipt by a laboratory. A sample Chain-of-Custody is provided in Appendix G.

8.1.7 Field Data

Field data collected will be entered into a data management system. Further discussions of field data management are provided in Section 8.2.1 - Field Documentation.

8.1.8 Analytical Data

Analytical data generated by the contract laboratory will be provided in Excel spreadsheet format.

8.1.9 AutoCAD Drawings

AutoCAD drawings produced for the project are electronically filed on two separate network servers. An example directory structure is for an AutoCAD drawing is F:\DWG\P2005\0314\A1N and all associated subdirectories.

8.1.10 Graphical Outputs

An original copy of all graphical outputs, (i.e. line graphs, bar graphs, three-dimensional graphs) will be stored in the appropriate correspondence file.

8.2 Data Administration

Data administration as outlined below describes the flow of data, the plan for handling and presenting data and the internal data quality measures that will be implemented prior to final data output to tables, graphics and electronic output to other programs.

8.2.1 Field Documentation

The three sources of field data are the Chain-of-Custody, Field Data Forms, and the Field Log.

8.2.1.1 Chain-of-Custody

The COC will be generated in the field and travels with any environmental sample from the point of collection. When the samples leave the custody of field personnel, the field personnel will relinquish them (to refrigerator, cooler, other personnel or the laboratory). The orange copy of the COC will be retained by the personnel relinquishing the sample(s). The yellow copy will then be returned to the project hydrogeologist or engineer. A copy will be attached to the field data forms and forwarded to the project staff.

With each transfer of custody of the samples, the person receiving the samples will sign the COC. After verifying that each sample listed on the COC is present, the appropriate transfer box will be checked to indicate that all samples are accounted for.

8.2.1.2 Field Data Forms

Field data forms are typically generated in the field and completed by field personnel. Field data forms will be relinquished on a daily basis to the project staff, which will perform a completeness review of the forms.

8.2.1.3 Field Logs

The field log is utilized throughout the day by field personnel. The field log will then be photocopied and the copy will be attached to the field data forms and forwarded to the project staff. Field logs, when full, will be archived in the Environmental Field Services area.

8.2.2 Internal Data Management

8.2.2.1 Field Sampling Data

Once field sampling has occurred, all field data forms (including field staff logbook copies) will be forwarded to the Project Hydrogeologist or Engineer, who will review the field data for accuracy and completeness. If any field data forms are incorrect or incomplete, they will be returned to field personnel for completion.

8.2.2.2 Original Laboratory Data

When original laboratory data is received by the Project Manager, it will be reviewed for accuracy and completeness. Accuracy and completeness, as defined herein, means that the requested parameters were appropriately analyzed and that the Fuss & O'Neill sample numbers, date collected, date received, etc. are correctly identified on the laboratory report. Fuss & O'Neill may request that the laboratory deliver its report electronically by email or CD-ROM, along with a hardcopy of the report.

8.3 Data Presentation

Data presentation must occur in a clear and logical format to accurately interpret and evaluate field and analytical data collected. Types of data that may be provided include tabular data presentations, graphical data presentations, contour maps, geological cross sections, section view isopleths and three dimensional graphics.

9.0 ASSESSMENTS AND RESPONSE ACTIONS

The Project Manager is responsible for determining the need for and implementation of any corrective action measures to the sampling or analytical procedures. Corrective action will be implemented upon the identification of problems discovered through system audits by analytical data review. If a problem is identified, the QA Officer will:

- Report the problem to the Project Manager
- Evaluate the problem in accordance with data quality objectives
- Determine whether implementation of corrective action is required
- Assign and implement a corrective action
- Evaluate the effectiveness of the corrective action

The following is a list of possible occurrences that may require corrective action and the corresponding action that would likely take place.

- If any sample bottles break during transit such that insufficient sample is available to complete the analysis, that location will be re-sampled to replace the bottles that have been broken
- If meters or other sampling equipment break or malfunction during sampling, efforts will be made to repair, re-calibrate, or replace them with back-up equipment
- If the analysis of trip or equipment blanks indicates the presence of target analytes above acceptable concentrations, re-sampling and reanalysis of samples taken that day may be required.
- If there are unusual changes in detection limits, re-sampling and reanalysis may be indicated.

10.0 PROJECT REPORTS

10.1 Introduction

Project reports will be submitted to agencies specified by the client at a frequency specified by the client. An overview of information that may be included in project status reports, internal assessments, and project result summaries are described below.

10.2 Project Status Reports

Due to logistical and weather-related problems, deviation from the project schedule may occur. Status reports may be necessary to ensure that all parties are informed. Status reports may include but will not be limited to:

- Progress of the project to date
- Revised project schedule
- Deviations from the work plan
- Analytical data

10.3 Internal Assessments and Response Actions

Performance and system audits are a qualitative evaluation of all of the components of the sampling program to ensure proper implementation and usage of the intended data gathering and associated QA/QC procedures. Internal assessments and response actions may be presented in letter reports or attached as an appendix in the final report. The content for these evaluations is outlined separately for Field and Laboratory Audits.

10.3.1 Laboratory Performance and Audits

Laboratory performance and system audits are addressed in the laboratory QC Manual.

10.4 Project Results

Reports describing project results will include information for developing a conceptual model of the site. The content of the report will include but will not be limited to:

- Summary of Investigation Tasks
- Summary of Internal Assessments and Corrective Actions
- Summary of Site Geology and Hydrogeology
- Summary of Analytical Information
- Exceedances of Numerical Criteria
- Recommendations

11.0 DATA VERIFICATION AND VALIDATION

The objectives of data validation are to:

- Assess and summarize the analytical quality and defensibility of data for the end user
- Document factors contributing to analytical error that may affect data usability, such as: data discrepancies, poor laboratory practices that impact data quality, site locations for which samples were difficult to analyze
- Document any “sampling error” that may be identified by the data validation process, such as contaminated trip or equipment blanks, incorrect storage or preservation techniques, improper sampling containers, and improper sampling techniques

Data will be validated in accordance with the NYSDEC ASP.

11.1 Evaluation Criteria

11.1.1 Precision

Precision, which is defined as a measure of mutual agreement among individual measurements of the same property, can be described as reproducibility. In the case of laboratory analytical data, precision will be used to describe the reproducibility of the analytical data.

Field Measurement Systems

To assess precision in the field, a duplicate sample will be collected nominally for every 20 samples per matrix for all parameters. The collection of field duplicates measures a combination of field and laboratory precision, thereby exhibiting more variability than a laboratory duplicate. Calculation to determine Relative Percent Difference (RPD) between the two sample results is performed. RPD is used as a measure of precision. The laboratory will analyze duplicates on a one per 20 frequency, per matrix. Recovery limits are matrix and compound dependent.

RPD is defined as follows:

$$\frac{|Conc(p) - Conc(d)|}{(\frac{1}{2})(Conc(p) + Conc(d))} \times 100 = RPD$$

where,

- Conc(p) = Primary Sample Concentration, the first sample collected at that location
- Conc(d) = Duplicate Sample Concentration, the second sample collected at that location

For water sample analysis, the percent difference goal for the field will be 30 percent. For matrices other than water, however, there are no established percent difference goals; therefore, as a guide for sample analysis of other matrices, the percent difference goal for the field will be equal to the matrix spike percent recovery values. If a percent difference result falls outside the guidance range, the discrepancy will be addressed on a case-by-case basis since the results are laboratory, parameter, and matrix dependent.

Laboratory Measurement Systems

The objective concerning precision is to equal or exceed the precision demonstrated in the analytical methods on samples of similar matrix. RPD is used as a measure of precision. The laboratory will analyze matrix spikes/matrix spike duplicates on a one per 20 frequency, per matrix. Recovery limits are matrix and compound dependent.

RPD is defined as follows:

$$\frac{|MSR - MSDR|}{(\frac{1}{2})(MSR + MSDR)} \times 100 = RPD$$

where,

- MSR = matrix spike recovery
- MSDR = matrix spike duplicate recovery

The absolute value of the recovery difference is used in the above equation.

For organic analysis, the laboratory will be spiking with the matrix spike compound list and utilizing the recovery limits defined in the analytical SOPs. Inorganics utilize the recovery limits defined in the analytical SOPs. If necessary, corrective action by the laboratory will be performed according to the provisions of their Quality Assurance Plan.

11.1.2 Accuracy

Accuracy can be defined as the degree of agreement of a measurement with an accepted reference or true value. Accuracy is generally expressed as the ratio of the measured value to the true value, which gives a measure of bias inherent in the system. Accuracy can be assessed both in the field and in the laboratory. The data validation completeness checklist in Appendix A will be used to document the field calibration and laboratory calibration for each sampling event.

Field Measurement Systems

Accuracy will be measured for field activities to assess the correct performance of the project measurement systems. Before initial use, the instruments will be calibrated to a known standard. Additionally, at the end of a daily sampling event, the instruments will be calibrated with a known control to assess the accuracy of field measurement systems. The calibration acceptance criteria are defined in Table A4.

Laboratory Measurement Systems

The laboratory accuracy will be determined from spiked sample recoveries, published historical data, method validation studies, experience with similar samples, and project specific requirements. The goal for spiked sample recoveries will be the concentrations published in SW-846 Guidance Document. These concentrations vary from one compound to another.

11.1.3 Completeness

Completeness is a measure of the amount of valid data obtained from each sampling event, compared with the amount which was expected to be obtained under correct conditions. A goal of 95 percent completeness of valid analytical results will typically be set for all samples collected. The completeness of the sampling data set can be evaluated as a percentage of the number of valid analytes to the total number of expected analytes.

The equation for determining the completeness of analytical results will be:

$$\frac{(\text{Total Number of Valid Results})}{(\text{Total Number of Results})} \times 100 = \text{Completeness}$$

Completeness of analytical results will be evaluated by analytical method.

If analytical data completeness is below 95 percent due to laboratory or field error, corrective action will consist of evaluation of the results in question as they pertain to the sampling program and possible re-sampling.

Data completeness for field measurement systems will be set at 100 percent. If an instrument fails, a back-up instrument will be used.

11.1.4 Representativeness

Representativeness is defined as the degree to which data accurately and precisely represent a characteristic of a population. This can be stated as how well the chosen sampling points represent the actual conditions and variations within the study area. For example, if a batch of samples was broken in transit to the laboratory or the samples were compromised in some fashion at the laboratory, a representative sampling event may not have occurred. If this were the case, the need for a resampling event would be considered.

Data representativeness of both field and laboratory systems will be addressed through field and analytical procedures. Trip blanks will be evaluated for detectable contaminant concentrations. If contamination is present in the blank samples, the representativeness of the concentration in the sample media may be affected. Representativeness in laboratory measurement systems will be addressed by the Project Hydrogeologist or other qualified personnel who will record that the laboratory is using the proper analytical procedures and meeting holding times.

11.1.5 Comparability

Comparability is an expression of the confidence with which one data set can be compared to another. The comparability objective is to collect and analyze samples in a method which will address that the data are comparable to data collected in previous and future investigations for this study area. The comparability of data is addressed by using standard protocols for the collection of field samples and by using standard methodologies for analytical procedures which were used in past investigations. If, for instance, it is determined that the laboratory used a different method than one specified, an evaluation will occur and document whether this compromised the comparability of data.

12.0 DATA USABILITY

The purpose of this QAPP is to outline a systematic process and structure for data quality such that the data will support decisions. The generation and use of quality data is important in the assessment of constituent impact on the site and, if necessary, in the selection of adequate responses to the analytical results. The function of the data verification process is to identify sampling and "analytical error" and not to make final determinations about the overall usability of the data for the project (U.S. EPA, 1996). The usability assessment, if necessary, will be conducted by the QAO and the results of the assessment will be reported to the Project Manager. The usability assessment will report how validated project data is reconciled with the project quality objectives and limitations, if any, of the data. Reconciliation may require resampling or recommending the use of selected data even though it did not meet the data quality objectives (DQOs).

For example, assume that a sample is analyzed for SVOCs by Method 8270. The QC for benzo(a)pyrene (BAP) is not acceptable, while the QC for all other SVOCs is acceptable. It is possible that the results may be usable for SVOCs excluding BAP.

Quality control issues will be discussed in the usability assessment and the QA Officer will recommend the use or rejection of the data. Ultimately, the end user will determine the usability of the data based on an understanding of the project data quality objectives and the results of the data verification process.

A Data Usability Summary Report (DUSR) will be provided in accordance with the NYSDEC draft DER-10 guidelines.

13.0 REFERENCES

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TABLES

Table A1
Standard Operating Procedures
Sample Collection
Island Dock

SOP # and Appendix Reference	Project Sampling SOPs
1C	Sampling Equipment
2C	Field Parameters
5C	Low— Flow Groundwater Sampling –Peristaltic Pumps
7C	Soil Sampling with Scoop
8C	Soil Sampling with Hand Auger
9C	Soil Sampling with Direct Push Technology
12C	Sediment Sampling – Surficial Samples
16C	Soil Stockpile Sampling
17C	Obtaining Soil Samples from the Bucket of an Excavator
23C	Field Decontamination

Table A2
Standard Operating Procedures
Field Equipment Calibration and Preventive Maintenance
Island Dock

SOP # and Appendix Reference	Project Equipment SOPs
1D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: YSI Model 63 SCT Meter
2D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: YSI Model 550A DO Meter
3D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: YSI-600 Series Water Analyzer
4D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: Quanta Water Quality Monitoring System
5D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: LaMotte 2020 Turbidimeter
6D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: HF Scientific DRT-15 C Portable Turbidimeter
7D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: Thermo Environmental Instruments Model OVM 580B <u>Organic Vapor Meter</u>
8D	Fuss & O Neill, Inc. SOP for Calibration and Maintenance of: Niton XRF Multi-Element Analyzer

Table A3
Field Equipment
Preventive Maintenance
Island Dock

Instrument	Activity	Frequency	SOP Ref.
YSI Model 63 SCT Meter	Battery replacement	As needed	1D
	pH probe cleaning	As needed	1D
	Specific conductivity and temperature sensor cleaning	Daily	1D
YSI Model 550A DO	Battery replacement	As Needed	2D
	Sensor cleaning	Daily	2D
YSI-600 Series Water Analyzer	Probe or probe port replacement	As needed	3D
	Battery replacement	As needed	3D
	pH probe and ORP sensor cleaning	As needed	3D
	Specific conductivity and temperature sensor cleaning	Daily	3D
	DO sensor cleaning and membrane replacement	As needed	3D
Quanta Water Quality Monitoring System	Probe or probe port replacement	As needed	4D
	Battery replacement	As needed	4D
	pH probe and ORP sensor cleaning	As needed	4D
	Specific conductivity and temperature sensor cleaning	Daily	4D
	DO sensor cleaning and membrane replacement	As needed	4D
LaMotte 2020 Turbidimeter	Turbidity tube cleaning	Every use	5D
	Battery replacement	As needed	5D
	Lamp replacement	As needed	5D
HF Scientific DRT-15 C Portable Turbidimeter	Battery replacement	As needed	6D
	Lamp replacement	As needed	6D
Thermo Environmental OVM 580B	Lamp cleaning	Each calibration	7D
	Lamp replacement	As needed	7D
	Battery recharging	As needed	7D
Niton XRF Multi-Element Analyzer	Battery recharging	As needed	8D

Table A4
Field Equipment
Calibration and Corrective Action
Island Dock

Instrument	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref.
YSI Model 63 SCT Meter	pH calibration	Every use	<u>±0.15 pH units</u>	<u>Recalibrate</u>	1D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	1D
YSI Model 85 DO + SCT Meter	DO calibration	Every use	<u>8 - 10 mg/L</u>	<u>Recalibrate</u>	2D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	2D
YSI-600 Series Water Analyzer	pH calibration	Every use	±0.15 pH units	Recalibrate	3D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	3D
	DO calibration	Every use	8 - 10 mg/L	Recalibrate	3D
	ORP calibration	Every use	±10 mV	Recalibrate	3D
Quanta Water Quality Monitoring System	pH calibration	Every use	±0.15 pH units	Recalibrate	4D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	4D
	DO calibration	Every use	8 - 10 mg/L	Recalibrate	4D
	ORP calibration	Every use	±10 mV	Recalibrate	4D
LaMotte 2020 Turbidimeter	Calibration	Every use	±5% of calibration solution	Recalibrate	5D
HF Scientific Turbidimeter	Calibration	Every use	±5% of calibration solution	Recalibrate	6D
Thermo Environmental OVM 580B	Calibration	Every use	<u>±5% of calibration gas</u>	Recalibrate	7D
Niton XRF Multi-Element Analyzer	Calibration	Every use	Low Standard: 18.9 +/- 0.5 Med. Standard: 1162 +/- 31 High Standard: 5532 +/- 80	Recalibrate	8D

Table A5
Sampling and Analytical Methods Requirements
Island Dock

Parameter	Matrix	No. of Samples ⁽⁴⁾	Analytical Method	Container	Preservation	Hold Time
VOCs	Soil	select locations based on field observations	8260	4 oz Glass/T	4°C	14 days
	Water	12	8260	2 x 40 mL VOC Vial	1:1 HCl pH<2, 4°C	
	Sediment	5	8260	4 oz Glass/T	4°C	
SVOCs	Soil	select locations based on field observations	8270	4 oz Glass/T	4°C	14 days(x)/ 40 days
	Water	12	8270	2 x 1000 mL Glass/T	4°C	7 days(x)/ 40 days
	Sediment	5	8270	4 oz Glass/T	4°C	14 days(x)/ 40 days
Metals	Soil	1 in 5 samples collected	6010	4 oz Glass	4°C	6 months
	Water	12	6010	500 mL Plastic	HNO ₃ (pH<2), 4°C	
	Sediment	5	6010	4 oz Glass	4°C	
TCLP Metals	Soil	1 in 20 samples collected	1311/6010	4 oz Plastic or Glass	4°C	6 months

Notes:

1. All samples are to be stored at 4°C
2. T = Teflon lined cap
3. (x) indicates holding time prior to extraction
4. No. of samples subject to change based on results of field investigation and analytical results

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN
CHECKLIST

Quality Assurance Project Plan Checklist
(Based on Quality Assurance Guidance for Conducting Brownfields Site Assessments)

QAPP title and date: Island Dock, October 2005
QAPP prepared by: Fuss & O'Neill, of New York, P.C.

PROJECT MANAGEMENT		Section
Form A	Title Page	1.0
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Form C	Problem Definition	3.0
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MEASUREMENT DATA ACQUISITION		
Form E	Sampling Design	4.0
Form F-1	Sampling and Analytical Methods Requirements	5.0
Form F-2	Method and SOP Reference Table	Table 5.1
Form G	Preventative Maintenance – Field Equipment	5.1.1
Form H	Calibration and Corrective Action – Field Equipment	5.1.2
Form I	Preventative Maintenance – Laboratory Equipment	5.2.1
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Form R	Data Usability	12.0

QAPP Elements	Comments
PROJECT MANAGEMENT	
Form A – Title Page	Completed
- U Project Title - U Prepared for, prepared by - U Plan date and revision number	
Form B – Project Organization and Responsibility	Completed
Identify <u>key</u> individuals in all organizations participating in the project, including: data users, decision makers, QA managers, leaders responsible of implementing the project, subcontractor leads, etc. (Chart, table, or text format acceptable, or any combination) - U Identify the title/position, name of key individual, organization they work for, and contact information (telephone number and email). - U Indicate lines of communication and authority between key individuals. - U For complex projects, consider defining roles and responsibilities of key individuals.	
Form C – Problem Definition	Completed
- U Provide sufficient background information from a historic, scientific, and/or regulatory perspective. - U Identify specific primary contaminants of concern (i.e., lead as opposed to just metals), and indicate magnitude of contamination present. - U Provide historic maps and summary data, as appropriate to illustrate problem. - U Present the current understanding of the conceptual site model (CSM) for the project, and indicate how contamination may be acting in the environment. (Note, reference any important documents/reports used in development of the CSM and sampling design for the project.) - i Clearly state the problem(s) to be solved, decision(s) to be made, and outcome(s) to be achieved.	i Project information is provided in Section 3.0. Reference is made to event-specific field sampling plans that will address information contained in a CSM.
Form D – Project Description	Completed

QAPP Elements	Comments
- U Provide an <u>outline</u> for tasks to be performed, including: - U State the principle use of the data. - U Identify the media and parameters being sampled. - U Identify field measurements, field analytical and off-site laboratory testing. - i Distinguish between the critical parameters on which decisions will be based (i.e., specific analytes or compounds of concern), and non-critical data used for supporting purposes. - U Identify action levels to be met for <u>known</u> primary contaminants of concern that will drive decisions. - U Define important conditions under which data should be collected (i.e., storm event, season, flow rate, etc.). - U Cite relevant regulatory standards or criteria that data will be compared against. - U Provide clear discussion on how project tasks relate to resolving problems/issues stated in the background section. - U Provide a projected timeline for field, laboratory and reporting activities to be completed. (Note, please allow for QAPP review and approval in timeline planning. A minimum of 3 weeks is recommended.)	i Information to be provided in event-specific Field Sampling Plans.
MEASUREMENT DATA ACQUISITION	
Form E – Sampling Design	Completed
Provide the details and design elements for the various project tasks to be performed, including the anticipated samples to be collected and/or the experiment to be conducted. (Note, a thorough site reconnaissance should be performed and results incorporated into the plan.) - i Explain the thought process behind the logic and rationale for the layout of the sample locations (discuss in terms of what individual locations are meant to represent, and globally in terms of what a set or series of samples are meant to represent). - i Explain any design assumptions being made, and the importance of any particular compounds/analytes to the project (e.g., an indicator for other contaminants). - U When sampling locations and/or choice of analytical parameters cannot be predetermined, document the decision logic or input that will be used in the field to make those decisions. - i Include detailed sampling maps and sample summary tables (form F-1) that clarify and <u>reflect</u> the design text.	i Information to be provided in event-specific Field Sampling Plans
Form F-1 – Sampling and Analytical Methods Requirements	Completed

QAPP Elements	Comments
Included sample summary table that clarifies and reflects the design text. Note, the table (or tables) can be of your own design, but they need to include: - U Sample Matrix - U Parameter - U Number of field samples to be collected for each parameter and matrix. - U Number of each type of field QC sample to be collected with each parameter and matrix. - U Analytical method reference (e.g., VOCs in soil – SW846 8260B) - U Sampling Method reference (refer to Form F-2) - U Sample containers (number per sample, size, and type) - U Preservation (temperature, light, chemical) - U Maximum holding times (preparation and analysis)	See Section 5.2 and Table A5. Also, event-specific Field Sampling Plans will contain the same information.
Form F-2 – Method and SOP Reference Table	Completed
Provide a table of references for the standardized procedures used to collect, prepare, and analyze the samples. Include: - U The analytical method references for the preparation and analysis of the samples. Include document title, method name and number, revision number and date. - U The corresponding laboratory SOP reference for each analytical procedure listed. Include document title, revision number, date and author (i.e., organization). - U The field SOPs for sample collection, sample preservation, equipment decontamination, etc. Include document title, revision number, date and author (i.e., organization). - U Provide appendices to the QAPP which includes copies of all field sampling and laboratory SOPs. - U Note, if any project-specific modifications are to be incorporated into the standard procedures, then please document those changes in the QAPP or, better yet, modify the SOP to reflect the actual procedures being used. - U For non-standard methods, attach the individual analytical SOPs.	See Section 5.2. Severn Trent Laboratories (STL) QA Manual Table A1 Appendices B-C, STL QA Manual
Form G – Preventative Maintenance – Field Equipment	Completed
List the inspection, acceptance testing, and preventative maintenance program for the various field equipment being used on the project. U Describes how problems are resolved and results documented.	See Section 5.1.1. Table A3
Form H – Calibration and Corrective Action – Field Equipment	Completed

QAPP Elements	Comments
Provide a field equipment calibration table for the various field equipment being used on the project that requires calibration. (Note, calibration records should be traceable to equipment.) Include: - U Type of calibration check (e.g., initial calibration with number of standards, independent calibration checks, continuing calibration checks, blank checks, etc.) - U Frequency - U Acceptance criteria (control limits) - U Corrective Actions when control limits are exceeded	See Appendix D Section 7.4, Table A4
Form I – Preventative Maintenance – Laboratory Equipment	Completed
Describe the inspection, acceptance testing and preventative maintenance program for the various laboratory instrumentation being used on the project. U Describes how problems are resolved and results documented.	See STL QA Manual See STL § SOPs for individual analytical methods and QC limits
Form J – Calibration and Corrective Action – Laboratory Equipment	Completed
Provide a laboratory instrument calibration table for the various laboratory instrumentation being used on the project that requires calibration. (Note, calibration records should be traceable to laboratory instrument.) Include: - U Type of calibration check (e.g., initial calibration with number of standards, independent calibration check, continuing calibration checks, blank checks, internal standard checks, interference checks, etc.). - U Frequency - U Acceptance criteria (control limits) - U Corrective actions when control limits are exceeded	See STL QA Manual See STL § SOPs for individual analytical methods and QC limits
Form K – Sample Handling and Custody Requirements	Completed
Describe chain-of-custody (COC) procedures between field preparation, transport, and laboratory receipt (can simply reference SOP, if available, and attach). - U Describe the sample numbering scheme that will be used throughout the project (i.e., sample number code that identifies location, matrix, depth, etc.). - U Provide example sample labels, COC forms, and custody seals.	See Section 6.0 Section 6.2 Appendix E and G
Form L – Analytical Precision and Accuracy	Completed

QAPP Elements	Comments
Complete an analytical precision and accuracy table for the various analyses being performed on the project. Include: - U Analyte or parameter - U Method reference (preparation and analysis) - U Detection Limit (aqueous and/or soil) - U Quantitation Limit (aqueous and/or soil) - U Laboratory Precision (aqueous and/or soil) - U Laboratory Accuracy (aqueous and/or soil) - i Note 1: primary contaminants of concern for the site should be completed individually. Non-critical analytes may be listed by broad parameter, their detection limits can be referenced to an attachment, and precision and accuracy values can represent the broad parameter. - i Note 2: the Quantitation Limit, often called Reporting Limit, is the minimum concentration the laboratory feels confident in reporting at (as opposed to the detection limit which is determined statistically).	i See STL's SOPs for individual analytical methods and QC limits
Form M –Field Quality Control	Completed
Provide a field sampling QC table. Break down by matrix and parameter as necessary to reflect actual project work. Include: - U Type of QC sample: field duplicates, split samples (sent to different labs), trip blanks, equipment blanks, cooler temperature blanks, etc. (Note, for soil samples, document field duplicates as either collocated (adjacent to each other), or as split of a single homogenized sample. Collocated duplicates are used to evaluate variability within an area of soil.) - U Frequency - U Acceptance criteria (control limits) - U Corrective Actions when control limits are exceeded	Event-specific Field Sampling Plans Sections 7.1-7.3 Section 7.4
Form M (Cont.) –Laboratory Quality Control	Completed
Provide an analytical QC table. Break down by method and matrix as necessary to reflect actual project work. Include: - U Type of QC sample (lab duplicates, matrix spikes, matrix spike duplicates, surrogates, lab control samples, method blanks, etc.) - U Frequency - U Acceptance criteria (control limits) - U Corrective actions when control limits are exceeded	Section 7.5 See Contest Laboratory's SOPs for individual analytical methods and QC limits and Table 7-1 (F&O Mobile Laboratory)
Form N –Data Management and Documentation	Completed

QAPP Elements	Comments
Describe the documentation and management of the data that is to be generated for the project, including field, laboratory, and final data manipulation. Field Documents and Records - U Describe the routine procedures used for taking field notes. - U List the remaining field documents and records that will be generated, collected, and managed in the project file. - U Briefly describe the process for collection and review of the field notes and other records as they are generated (include any QA checks for completeness, consistency, accuracy, etc.). - U Specify where the records will be stored and for how long. - U Provide an appendix to the QAPP which includes copies of all field forms and checklists to be used with the project. Laboratory Documents and Records Specify the contents of the laboratory data package deliverable that the laboratory is responsible for providing (note, establish report expectations for both client and customer). Types of information to request from the laboratory: - U Data Results Sheets - U Method Blank Results - U Surrogate Recoveries and Acceptance Limits - U Matrix Spike/Matrix Spike Duplicate Results and Acceptance Limits - U Spike/Duplicate Results and Acceptance Limits - U Laboratory Control Sample Results and Acceptance Limits - U Initial and Continuing Calibration Results and Acceptance Limits - U All Raw Data and Logbook Sheets - U Project Narrative which contains an explanation of any qualified data, and any observations or deviations encountered during analysis. Post Data Manipulation Describe the handling of electronic data (i.e., the flow of where it goes, and any data manipulation to transfer the data into tables, graphics, databases, models, etc.). Indicate where the data will be stored and identify applicable software as appropriate. Include: - U Field Data - U Lab Data - U Office Data (models, databases, etc.) - U Describe any checks that will be performed to detect and correct errors, and to prevent loss of data during data reduction, data reporting and data entry into forms/reports/databases.	Sections 8.1.1, 8.1.4 and 8.1.5 Sections 8.2.1, 8.2.2 Appendix D & Appendix F Section 5.3 Sections 8.2.2
ASSESSMENT / OVERSIGHT	
Form O – Assessments and Response Actions	Completed

QAPP Elements	Comments
Describe the assessment/oversight plan for the project, including: - U Types of assessments and oversight that will be performed, - U Frequency (approximate dates and/or timing), - U Individuals responsible for performing the assessments and oversight (e.g., field leader, QA officer, LEP), - U Individuals who will receive assessment/oversight report (indicate written or verbal) - U Identify individuals responsible for dealing with corrective actions, and follow up on assessments and oversight.	Sections 9.0, 10.3 Note: small one-time projects should include, as a minimum, field oversight (early on in the project) by an experienced field leader knowledgeable in the project objectives. More complex projects, with multiple concerns, should increase the level of oversight and target key areas for examination. Also consider laboratory audits for important analytical parameters.
Form P – Project Reports	
Identify the types of reports (written and verbal) that will be provided to management for the project (e.g., status reports, interim reports, final reports, Performance Evaluation sample results, assessment/oversight findings, data quality assessments). Include: - U Type of report - U Frequency - U Approximate due dates - U Individuals responsible for preparing reports - U Individuals and organizations receiving reports - U Detail the specific contents of the final project report to establish appropriate expectations for both client and customer	Section 10.0 i Information to be provided in event-specific Field Sampling Plans.
DATA VALIDATION AND USABILITY	
Form Q-1 – Verification of Sampling Procedures	
Describe the final data evaluation process that will be performed on the data collected in the field (field notes, boring logs, field screening and field analytical data, etc.) - U Indicate that all the field data will be collected and organized for the project file and reviewed to insure it is complete and compliant with the requirements specified in the QAPP. - U Indicate who will perform this task and how it will be documented (e.g., cover letter plus field data evaluation report), including any observations, trends, conclusions and limitations concerning the field data.	Section 11.0
Form Q-2 – Data Verification and Validation	

QAPP Elements	Comments
Describe the final data evaluation process that will be performed on the laboratory data. - U Indicate that all the laboratory data will be collected and organized for the project file and reviewed to insure it is complete and compliant with the requirements specified in the QAPP (Form N). - U Indicate that the data will be evaluated to determine if the data met the precision, accuracy, bias, and sensitivity criteria supplied in Forms J, L, and M. (Note data validation may also apply to field analytical data that is used in making critical decisions.) - U Define any data qualifiers that will be applied to the data, should acceptance criteria (or control limits) not be met (i.e., U, J, UJ, R, B, etc.). - U Indicate who will perform this task and how it will be documented (e.g., cover letter plus validation report), including any observations, trends, conclusions and limitations concerning the laboratory data.	Section 11.0
Form R – Data Usability	
Describe the project evaluation process that will be performed, using the complete data set as a whole, to determine if the objectives and criteria established for the project have been met. Including: - U Describe the data tables, graphs and statistical evaluations that will be prepared/performed on the project data to illustrate trends, anomalies, and gaps in the data. - U Indicate that important limitations on the use of the data, found during the data evaluation steps in Forms Q-1 and QC-2, will be documented and explained in the final report. - U Indicate that the representativeness of the data will be evaluated and the results documented in the final report (i.e., does the data characterize the environment well (at locations, to areas, to the site as a whole), or are data gaps evident and more data needed). - U Indicate the results of any comparability studies (i.e., data against data, data against regulatory standards, etc.) will be documented and explained in the final report. - U Indicate that the data will be reviewed to determine if the sampling design met the project's objectives and the results documented in the final report. - U Indicate that the overall usability of the data will be evaluated and the results documented in the final report. - U Indicate that the final report will analyze the project data and present observations, draw conclusions, identify data gaps, and describe any limitations in the way the data should be used or interpreted. - U Indicate who will be responsible for performing the project evaluation and reconciliation.	Section 12.0

APPENDIX B

STANDARD OPERATING PROCEDURES
FOR SAMPLE COLLECTION

Project Sampling SOP 1C
Fuss & O'Neill, Inc. SOP for
Sampling Equipment

The following list includes the equipment which may be necessary to perform groundwater, surface water, soil, and sediment sampling:

1. Documentation

- Field folders (maps, sampling and H&S plans, etc.)
- Bound, water-resistant field logbook
- Pen and permanent marker
- Field data forms
- Sample labels
- Analytical parameter request forms
- Chain-of-custody forms

2. Personal Equipment

- Disposable gloves
- Goggles or safety glasses
- Equipment and PPE required by Site Specific Health and Safety Plan
- Ruler or small tape measure
- Hand sprayers
- Paper towels
- Plastic garbage bags
- Bucket
- Scissors

3. Sampling Equipment

- Tape measure
- Water level measurement indicator
- Product/water interface probe
- Sample containers for field parameters
- Sample containers for laboratory parameters
- Sample preservatives
- Dedicated sampling scoops
- Sampling trowels
- Hand augers
- pH paper
- Field pH/specific conductance/temperature meters with probe, calibration solution, and control(s)
- Dissolved oxygen meter
- Turbidity meter
- Oxidation/reduction potential meter
- Photoionization detector (PID)

- XRF Multi-Element Analyzer
- Alpha horizontal water bottle
- Ponar® and Eckman grab samplers
- Wildco® core sampler
- Marsh-McBirney Current Meter
- Groundwater pumps (submersible, peristaltic, and/or bladder) with tubing and power source
- Stainless steel bailers
- Filter cartridges
- Coolers with ice packs or ice

4. Decontamination Equipment

- Non-phosphate detergent
- Nitric acid solution
- Methanol solution
- Deionized water
- Tap water
- Buckets
- Scrub brushes

Decontamination of equipment will be performed at the site when the equipment is to be used for the collection of multiple samples. Otherwise, decontamination will occur at Fuss & O'Neill, Inc. Decontamination will be performed in the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse followed by air drying.

Project Sampling SOP 2C
Fuss & O'Neill, Inc. SOP for
Field Parameters

Field parameters to be recorded during sampling events may include all or some of the following:

- Groundwater - pH, specific conductance, temperature, oxidation/reduction potential (ORP), dissolved oxygen, turbidity, and water
- Soil - organic vapor screening
- Sediment - sediment depth and sediment characterization (visual)
- Surface Water - pH, conductivity, temperature, dissolved oxygen, and water depth

The measurement of pH, specific conductance, temperature, ORP, DO, and turbidity will follow the instrument manufacturer's procedures, outlined in Appendix C.

Measurement of the water depth will be made at all sampling locations prior to groundwater sampling. The measurement of water depth will also be made inside and outside of river piezometers. The determination of the water depth will be made using a tape measure or electric water level indicator with graduations of 0.01 ft. The depth to water will be read from the survey reference point (top of well or piezometer pipe) and recorded on a Sampling Data Form.

For surface waters, measurement of water depth will be made at all surface water sampling locations prior to sampling. The determination of the water depth will be made using a tape measure with intervals of 0.01 ft.

Soil samples will be monitored for organic vapors during sample collection using an organic vapor meter (OVM). Monitoring of organic vapors will occur using the procedures presented in Appendix B. Volatile organic constituents will be analyzed by the laboratory at specific locations should information be available to indicate that organic compounds were managed or used at those specific locations. For other locations, soil samples will be screened using an OVM. Data collected from OVM screening will be used to help choose samples for laboratory analysis.

Project Sampling SOP 5C
Fuss & O'Neill, Inc. SOP for
Low-Flow Groundwater Sampling –Peristaltic Pumps

The purpose of low-flow sampling is to obtain a representative sample of the groundwater quality that includes both the dissolved and colloidal fractions that are migrating. Low-flow sample collection is a technique that allows samples to be collected without the bias of suspended solids and includes colloids.

The technique is based on the fact that laminar flow occurs through a well screen when the well is undisturbed. Samples are collected from the screen interval at flow rates that will not disturb the laminar flow or the fine grained material within the well or filter pack. Pumping stresses are minimized through controlled sampling operations. Objective criteria are used to determine when sampling should begin, thus variability between sampling events is minimized.

Peristaltic Pumps

A peristaltic pump will be used for low-flow purging and sampling of wells at sampling well locations where the well diameter is too small for bladder pumps and may be used when the static water level in the well is sufficiently shallow to permit sampling by peristaltic pump (i.e., water levels shallower than 25 feet)..

The low-flow sampling system for peristaltic pumps is comprised of dedicated polyethylene tubing which is suspended in each of the sampling wells. The top of the tubing is connected to a stainless steel fitting secured to a milled PVC plastic cap which loosely fits the top of the PVC well casing and prevents the cap from sliding off the PVC. A small slot is cut into the side of the cap to allow for a water level measuring instrument to be lowered into the well without removal of the cap. This allows measurement of water levels without any disturbance of the sampling apparatus. A stainless steel fitting at the top of the cap allows connection of the sampling apparatus to peristaltic pump tubing.

The bottom of the tubing is centered at the midpoint of the screen and at a minimum of two feet above the well bottom to minimize disturbance of any fine-grained sediments that may have settled to the bottom of the well. The tubing is connected to a stainless steel fitting secured to a piece of PVC of a slightly smaller diameter than the well casing (a centralizer). The PVC centralizer and an additional piece of the PVC, which slides on the tubing, provide weight to keep the bottom of the tubing centered at the appropriate depth.

Groundwater is removed from the well through the tubing by suction provided by a peristaltic pump. The silicone tubing within the peristaltic pump is dedicated, of the same inside diameter as the well tubing, and is removed from the peristaltic pump after each use. The two types of tubing are joined with a tubing connector. The silicone tubing is stored in a plastic bag within the protective steel casing between each use.

WELL STABILIZATION

Prior to low flow purging, the tubing must first be purged of standing water. The determination of this purge volume is as follows:

$$\begin{aligned}\text{Tubing radius} &= r &&= 0.0104 \text{ feet} \\ \text{Tubing volume (ft}^3\text{)} &= V(\text{ft}^3) &&= \pi r^2 \times \text{length of tubing} \\ \text{Tubing volume (L)} &= V(\text{L}) &&= V(\text{ft}^3) \times 28.316\end{aligned}$$

$$\text{Tubing Volume} = \text{Total Purge Volume}$$

Begin purging the well at the minimum pumping rate. Slowly increase the pumping rate to a level that does not cause the well to drawdown more than 0.3 foot. Continue purging until the total purge volume has been met.

Continue to note and record any changes to the drawdown and pumping rate. Water levels in the well casing will be obtained with a water level indicator while pumping with the peristaltic pump is in progress. The variable speed of the peristaltic pump allows the pump to obtain flow rates as low as 0.1 liter per minute.

Begin monitoring designated indicator field parameters at 3 to 5 minute intervals with a flow-through cell. Stabilization parameters are pH, dissolved oxygen (DO), specific conductance, temperature, and turbidity. Oxidation/reduction potential (ORP) will be recorded during the stabilization process, but will not be used as a stabilization parameter. Research by Runnells and Lindberg (1990) and Whitfield (1974) has shown that there are limitations on monitoring ORP in the field.

The well is ready to sample when the designated field parameters have stabilized. Indicator field parameters have stabilized when three consecutive readings, taken at 3 to 5 minute intervals, satisfy the following criteria:

Temperature	± 3%
pH	± 0.1 unit
Specific Conductance	± 3%
DO	± 10%
Turbidity	± 10% for values greater than 5 NTU

Oxidation/reduction potential (ORP) will be recorded during the stabilization process, but will not be used as a stabilization parameter. Research by Runnells and Lindberg (1990) and Whitfield (1974) has shown that there are limitations on monitoring ORP in the field.

The target turbidity is less than or equal to 5 NTUs and three consecutive readings within 10%. Every effort should be made to attain these levels, including decreasing the pumping rate and extending the purge time. In some instances, due to geologic conditions, the sample turbidity may not decrease to the desired level. In these cases, and with the approval of the Project Manager or Site Manager, completion of well purging will be based upon stabilization of the indicator parameters without attainment of the targeted turbidity.

Due to the configuration of the turbidity meter, it cannot be connected with the multi-parameter meter. Turbidity screening; therefore, must be conducted separately. To collect samples for measuring turbidity, the two-way valve located at the bottom of the flow-through cell is turned so that water will flow out through the sampling line. The water is collected and the turbidity is measured.

If, after 1 hour of purging, the indicator field parameters have not stabilized, then discontinue purging and proceed to sample the water. A groundwater sample with a detection of metals in the unfiltered sample may be filtered using a 0.45 micron glass wool filter and reanalyzed. The reanalysis is to determine if the metal is actually present in the dissolved state in groundwater, or has adhered to sediment particles during sample collection. All efforts used to stabilize the parameters will be fully documented.

SAMPLING

The following procedure will be followed for the collection of groundwater samples.

After stabilization of indicator parameters or 1 hour of purging, record comments pertinent to the color and any obvious odors associated with the water.

Arrange and label necessary sample bottles and ensure that preservatives are added, as required. Labeling must include a unique sample number, time and date of sampling, the initials of the sampling personnel, and the identity of the sample fraction. Additionally, provide any information pertinent to the preservation materials or chemicals used in the sample. The pH of preserved samples should be checked to ensure that the proper sample pH has been attained. For VOC samples, collect a test sample to determine the adequacy of the amount of preservative in the pre-preserve sample bottles. Where needed, adjust the amount of preservative added to a sample bottle.

Make sure that the sampling tubing remains completely filled during sampling and that the water does not descend back into the well. Minimize turbulence when filling sample containers, especially VOCs, by allowing the liquid to run gently down the inside of the bottle. Fill the labeled sample bottles, and immediately seal each sample and place it on ice in a cooler to maintain sample integrity.

Once all sampling is completed, recover all sampling equipment and decontaminate or set aside for subsequent decontamination in accordance with the prescribed procedures. Close and secure the well site. Review all sampling records. Ensure that all necessary data is completed. Add additional information as needed.

Project Sampling SOP 7C
Fuss & O'Neill, Inc. SOP for
Soil Sampling with Scoop

Scoops are either large stainless steel spoons or plastic disposable spoons. In general, a scoop will only be used where surficial samples are required, and where there is a need to obtain samples at hard to reach places.

- a. Insert the scoop into the soil at a 0 to 45° angle from horizontal. This orientation minimizes the spillage of the sample from the sampler. Extraction of the sample might require tilting of the sample containers.
- b. Slowly withdraw the scoop from the soil.
- c. Transfer the sample into a suitable sample container with the aid of a spatula and/or brush.
- d. Ensure that a Teflon® liner is present in the cap of the sample container.
- e. Place all labeled sample containers in an iced cooler.
- f. Record observations and soil type onto a Field Data Sheet.
- g. Measure the total volatile concentration inside a plastic zip closure bag using an Organic Vapor Monitor. Record readings on the Field Data Sheet.

Project Sampling SOP 8C
Fuss & O'Neill, Inc. SOP for
Soil Sampling with Hand Auger

A hand auger is a common sampling tool for shallow soils. The tool is composed of a bucket auger which comes in various shapes and sizes, a shaft, and a T-bar handle. Extensions of the shaft are available to allow sampling at deeper intervals. Typically, this tool is only effective to 5 feet since the sample hole usually begins to collapse at this depth.

- a. Begin collection of the sample by applying a downward pressure while rotating the auger clockwise. When the auger is full of solid material it should be removed from the hole, and the material transferred into a stainless steel bowl using a stainless steel spoon. Continue sampling in this manner until the bottom of the sampling interval is reached.
- b. At desired collection depths, collect the sample for VOC analysis immediately after removal from the auger and transfer to the appropriate glass container to minimize volatile loss.
- c. Composite the remaining material in the sampling bowl by using the stainless steel spoon to break apart any large chunks of material, then mix and stir the material enough to thoroughly homogenize the sample.
- d. Transfer the material into a labeled sample jar using the stainless steel spoon.
- e. Place all labeled sample containers in an iced cooler.
- f. Record observations and soil type onto a Field Data Sheet.
- g. Measure the total volatile concentration inside a plastic zip closure bag using an Organic Vapor Monitor. Record readings on the Field Data Sheet.

Project Sampling SOP 9C
Fuss & O'Neill, Inc. SOP for
Soil Sampling with Direct Push Technology

In general, direct-push technology will be employed using a Geoprobe® Soil Sampler. Direct-push technology will be used when the soil conditions are favorable (e.g., sandy soils), when the volume of soil required for analysis is less than 8 ounces, and when the depth of sampling does not extend more than 16 feet below ground level (BGL). The following procedure will be used.

- a. Assemble the Geoprobe® soil sampler lined with an acetate sleeve.
- b. The assembled sampler will be placed in the driving position beneath the anvil and driven using a slow throttle speed to ensure straight penetration of the sampler for the first two or four feet. In order to install the sampler, the throttle control will be adjusted for the remainder of the stroke as necessary to compensate for geologic conditions.
- c. Additional lengths of rod will be attached to the sampler and driven until the desired depth of sample collection is obtained.
- d. The stop pin will be removed by inserting extension rods inside the probe rods enabling the piston to retract into the sample tube while the sample is taken.
- e. The soil sampler will be advanced to the bottom of the sample interval. Care will be taken not to over-drive the sampler, to avoid compacting the soil sample in the sampler tube.
- f. The pull cap will be attached to the top of the drill string and lifted to remove the soil sampler from the ground.
- g. The acetate sleeve will be removed from the soil sampler and cut lengthwise with a razor knife to collect the soil sample. The sample will be transferred into the necessary containers using a dedicated wooden tongue depressor or similar method (i.e. dedicated gloves). Care will be taken to minimize disturbance of the soil during transfer.
- h. Sample labels will be attached to the sample containers. The containers will then be placed into a cooler and maintained at 4°C until they are delivered to the laboratory or the Fuss & O'Neill sample refrigerator. All information pertaining to the samples will be documented on field data sheets.
- i. The geology of the sample will be recorded on a boring log.
- j. The total VOC concentration of the excess soil will be measured inside a plastic zip closure bag using a photo-ionization detector (PID) or a flame-ionization detector (FID). This information will be recorded on the boring log.

Project Sampling SOP 12C
Fuss & O'Neill, Inc. SOP for
Sediment Sampling – Surficial Samples

Surficial sediment samples can be obtained using either a simple scoop/dipper or a dredge sampler such as a Ponar® or Ekman dredge. The protocol for collecting surficial sediment samples using a scoop or dipper is as follows:

- a. Affix a sample label to each container for that particular location immediately prior to sampling.
- b. If sampling in a stream or flowing body of water, approach the sampling location from downstream, being careful not to disturb any underlying sediment. When two or more sediment samples from the same stream are to be collected, the first sample collected should be at the furthest downstream location, with subsequent samples collected in a sequence progressing upstream.
- c. Push the scoop or dipper firmly downward into the sediment, then lift upward. Quickly lift the sampler out of the water.
- d. Transfer the sediment from the scoop/dipper to the sample containers using a dedicated tongue depressor. For composite samples, transfer the sediment directly into a stainless steel bowl for homogenization. Materials such as surface vegetation (grass, leaves and plant stalks), roots, gravel, and artificial fill materials (e.g., asphalt, wood, brick, glass, ceramic, etc.) should not be included in the samples.
- e. All labeled sample containers will be placed in an iced cooler.

A dredge sampler, such as a Ponar® or Ekman dredge, can be used to collect gross surficial, or bulk, sediment samples. Typically, a dredge sampler is used to obtain a sample from the first four inches of surficial sediments, those nearest the sediment-water interface. Collection of surficial sediment samples is typically performed for analysis of bulk sediment parameters such as benthic invertebrates, acid volatile sulfides and simultaneously extracted metals (AVS/SEM), and sediment toxicity.

The general procedure for collecting surficial sediment samples using a dredge sampler is as follows:

- a. Affix a sample label to each container for that particular location immediately prior to sampling.
- b. If sampling in a stream or flowing body of water, approach the sampling location from downstream, being careful not to disturb any underlying sediment. When two or more sediment samples from the same stream are to be collected, the first sample collected should be at the furthest downstream location, with subsequent samples collected in a sequence progressing upstream.

- c. Hold the sampling pole so the open sampler jaws are positioned several inches above the surface of the sediment, then firmly thrust the sampler downward. Depress the button at the top of the sampling pole to release the spring loaded jaws.
- d. Transfer the sediment from the dredge sampler to the sample containers using a dedicated tongue depressor. For composite samples, transfer the sediment directly into a stainless steel bowl for homogenization. Materials such as surface vegetation (grass, leaves and plant stalks), roots, gravel, and artificial fill materials (e.g., asphalt, wood, brick, glass, ceramic, etc.) should not be included in the samples.
- e. All labeled sample containers will be placed in an iced cooler.

Standard operating procedures for collecting surficial sediment samples using the Ponar® and Ekman dredge samplers are attached.

Sediment samples will be described in the field following ASTM D2488-69 methods. The color of the sediment will be determined by consulting a Munsell Color Chart, while the description of grain size will be based on a particle size chart. This descriptive information, along with a thorough explanation of the sample location and sampling conditions, will be recorded on a field data sheet.

Project Sampling SOP 16C
Fuss & O'Neill, Inc. SOP for
Soil Stockpile Sampling

- a. Affix a sample label to each container for that particular location immediately prior to sampling.
 - b. Scrape off the top one foot of the soil pile at each sample location using the scoop to ensure a fresh, non-volatilized sample.
- c. Begin collecting the sample by applying a downward pressure on the scoop handle until the desired sample depth is reached and then lift.
- c. Transfer the sample directly to the sample container if a sample is being collected.
- d. If a composite is being collected, calculate the volume of soil needed to fill the appropriate sample containers for the required laboratory analysis. Collect equal aliquots of the calculated volume at each of the discrete sample locations and add it to a stainless steel bowl. After all aliquots are added to the stainless steel bowl, homogenize the sample with a dedicated wooden tongue depressor. Once the composite sample is appropriately homogenized, transfer an aliquot of the composite to the sample container(s).
- e. Attach a sample label to the sample container(s) and place into an iced cooler.

Project Sampling SOP 17C
Fuss & O'Neill, Inc. SOP for
Obtaining Soil Samples from the Bucket of an Excavator

- a. Affix a sample label to each container for that particular location immediately prior to sampling.
- b. Scrape off the surface soil in the bucket using the scoop to ensure a fresh, non-volatilized sample.
- c. Begin collecting the sample by applying a downward pressure on the scoop handle and then lift.
- c. Transfer the soil directly to the sample container.
- d. If a composite is being collected, a maximum of three discrete sample locations per bucket of soil will be used. Calculate the volume of soil needed to fill the appropriate sample containers for the required laboratory analysis. Collect equal aliquots of the calculated volume at each of the discrete sample locations and add it to a stainless steel bowl. After all of the aliquots are added to the stainless steel bowl, homogenize the soil with a dedicated wooden tongue depressor or dedicated spatula. Once the composite sample is appropriately homogenized, fill the appropriate sample container(s). No composite samples will be collected for VOCs.
- e. Attach a sample label to the sample container(s) and place the sample into an iced cooler to maintain the temperature at 4°C.

Project Sampling SOP 23C
Fuss & O'Neill, Inc. SOP for
Field Decontamination

Field Decontamination of Personal Protective Equipment

All contaminated/soiled PPE will be discarded or decontaminated prior to leaving the site. The removal of this equipment will be undertaken outside of the exclusion zone, if one has been established, in the following order.

1. Tyvek suits will be removed and discarded.
2. Boots will be rinsed with water prior to being removed. The boot wash procedure will be upgraded depending on the nature of the contamination. Under some circumstances, disposable boots may be used and discarded prior to leaving the site.
3. When a respirator is utilized, it will be worn until all personal protective equipment except the gloves has been removed. The respirator will be washed with soap and water and wiped down with alcohol after use. Respirator cartridges will be discarded.
4. Gloves will be removed and discarded after all other personal protective equipment has been properly decontaminated and removed.

Field Decontamination of Sampling Equipment

Decontamination of field equipment must be conducted in the following two situations:

- when the same piece of sampling equipment is to be used at more than one sampling point
- prior to removing grossly contaminated equipment from a site

Decontamination of equipment will be performed at the site when the equipment is to be used for the collection of multiple samples. Otherwise, decontamination will occur at Fuss & O'Neill. General decontamination will be performed in the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse followed by air drying.

Equipment used for collecting samples containing VOCs will be decontaminated using the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse, methanol solution rinse, deionized water rinse followed by air drying.

Equipment used for collecting samples containing metals will be decontaminated using the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse, nitric acid solution rinse, deionized water rinse followed by air drying.

In general, equipment must be disassembled in order to be adequately decontaminated.

APPENDIX C

STANDARD OPERATING PROCEDURES FOR FIELD EQUIPMENT OPERATION

Project Equipment SOP 1D
Fuss & O'Neill, Inc. SOP for
YSI Model 63 SCT Meter

Principle of Operation.

The YSI-63 Series is a field portable pH, conductivity, salinity and temperature water analyzer.

The pH portion has a combination electrode consisting of a proton selective glass reservoir filled with a buffer at a pH of approximately 7 and a Ag/AgCl reference electrode that utilizes gelled electrolyte. A silver wire coated with AgCl is immersed in the buffer solution. Protons (H⁺ ions) on both sides of the glass (media and buffer reservoir) selectively interact with the glass, setting up a potential gradient across the glass membrane. Since the hydrogen ion concentration in the internal buffer solution is invariant, this potential difference, determined relative to the Ag/AgCl reference electrode, is proportional to the pH of the media.

The conductivity cell utilizes four pure nickel electrodes for the measurement of solution conductance. Two of the electrodes are current driven and two are used to measure the voltage drop. Conductivity expressed in micromhos/cm is the measure of the electric conductance that would be exhibited by a sample if it were measured between opposite faces of a 1 centimeter cube.

Instrument Maintenance

The following calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- Calibration of the instrument will be performed as described in the calibration procedure.
- The pH glass electrode require maintenance only when obviously coated with sediment or biological growth. The glass can be cleaned by carefully removing the guard and wiping with a soft cloth soaked with soapy water and rinsed with clean water, followed by a routine decontamination process. The glass electrode is very delicate, be sure to wipe the electrode gently and do not put the probe down until the guard is replaced. Then a moistened cotton swab can remove any material that may be blocking the reference electrode junction of the sensor.
- The temperature and specific conductivity portion of the probe have openings that allow fluid access to the conductivity electrodes and must be cleaned regularly. This is accomplished by inserting a small cleaning brush into each hole several times using a mild detergent with the brush if necessary. After cleaning and decontamination, the probe will be checked with a calibration standard.

Instrument Calibration

A complete calibration check will be performed before, after and once at a mid point of each sampling day at Fuss & O'Neill. Checks will be carried out in the field if there is a possibility that any memory has been cleared or readings seem anomalous.

1. pH Calibration using the 4, 7 and 10 pH buffer solutions

The pH calibration is accomplished by pressing MODE until pH is displayed. Using a thermometer, take the temperature of the standard solution and verify that the temperature displayed on the meter is the same as the temperature on the thermometer. Rinse the probe with de-ionized water and wipe dry or do a final rinse with pH 7 buffer solution. Place the probe in the pH 7 buffer solution. Simultaneously press the up down arrow keys to enter the calibration menu. Press ENTER. The pH of the buffer solution will be displayed. When the decimal point stops flashing press ENTER again. Remove and rinse the probe with de-ionized water and wipe dry. Place the probe in either a pH 4 or 10 solution. Press ENTER and the pH of the solution will be displayed and the decimal point will flash. When the decimal point stops flashing press and hold ENTER until the display reads SAVE. At the end of the calibration press MODE to begin pH measurements. Remove the probe and rinse with DI water and wipe dry. Return the probe to the last pH solution, press read and when the decimal point stops flashing record the pH. The pH should be within ± 0.15 pH units. Re-calibrate if outside of this range.

2. Specific Conductance Calibration

Turn the instrument on and allow it to complete its self test. Press MODE until conductivity is displayed. The proper display shows degrees C flashing. This is the temperature compensated mode. Insert the probe into the KCl calibration solution deep enough to cover both of the conductivity ports. Allow at least 60 seconds for the temperature reading to become stable. Move the probe from side to side to dislodge any air bubbles from the electrodes. Press the up arrow and down arrow simultaneously until the CAL symbol is displayed. Use the up arrow and down arrow keys to adjust the reading on the display until it matches the concentration of the solution being used for calibration. Once the display reads the exact value of the calibration solution being used press the ENTER key. The word SAVE will momentarily appear in the display indicating the calibration has been accepted. Remove the probe, rinse with DI water and dry. Place the probe back into the last solution and determine the Specific conductance. A correctly calibrated meter will read within ± 25 micromhos/cm of the true value. If the reading falls outside of this range it will need to be re-calibrated.

Project Equipment SOP 2D
Fuss & O'Neill, Inc. SOP for
YSI-550A Dissolved Oxygen Instrument

Principles of Operation

The YSI 550A Dissolved Oxygen (DO) Meter is a microprocessor-based digital instrument with a field replaceable DO probe or sensor. The sensor consists of a silver body (anode) and a circular gold cathode embedded in the end. The end of the sensor is filled with an electrolyte solution.

A thin, semi-permeable membrane is stretched over the sensor, isolating the electrodes from with environment while allowing gases to enter. When a polarizing voltage is applied to the sensor electrodes, oxygen that has passed through the membrane reacts at the cathode causing a current to flow.

The membrane passes oxygen at a rate proportional to the pressure difference across it. Since oxygen is rapidly consumed at the cathode, it can be assumed that the oxygen pressure inside the membrane is zero and the force causing the oxygen to diffuse through the membrane is proportional to the partial pressure of oxygen outside the membrane. As the oxygen partial pressure varies, so does the oxygen diffusion through the membrane causing the probe current to change proportionally.

Instrument Maintenance

The following daily calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- The instrument is inspected for physical damage or abnormalities and is then wiped down with a clean cloth dampened with deionized water. The probe is inspected and decontaminated with a solution of reagent grade methanol, HCl and deionized water.

Calibration

Calibration must be performed in an environment with known oxygen content and should be done at a temperature within $\pm 10^{\circ}\text{C}$ of the sample temperature. The instrument can be calibrated in mg/L or % saturation. The units are well correlated; therefore, calibration can be performed in % saturation and measurements can be obtained in mg/L or vice versa.

The approximate salinity of the water to be analyzed is required (salinity of fresh water is approximately zero; seawater is approximately 35 parts per thousand (ppt)).

The approximate altitude (in feet) for the region where the sampling will be done is also required.

1. Ensure that the sponge inside the instrument's calibration chamber is moist. Insert the probe into the calibration chamber.

2. Turn on the instrument and allow it to warm up for 15-20 minutes.
3. Press and release the ▲ and ▼ arrow keys simultaneously to get into the calibration menu.
4. Press the mode key until “%” is displayed on the right side of the screen for oxygen units. Press 8 .
5. The display will prompt you to enter the local altitude in hundreds of feet. Use the arrow keys to increase or decrease the altitude. When the proper altitude appears on the display, press 8 .
6. CAL will appear in the lower left corner of the screen. The calibration value in the lower right corner and the current DO reading (before calibration) will be the main display. Once the current DO reading is stable, press 8 .
7. The display will prompt you to enter the approximate salinity of the water to be analyzed (0 to 70 ppt). Use the arrow keys to increase or decrease the salinity setting then press 8 .
8. Once salinity is entered, the instrument will return to normal operation.

Salinity Compensation Calibration

1. Press the MODE key until salinity calibration is displayed on the screen.
2. Use the ▲ and ▼ arrow keys to adjust the salinity value to that of the samples you will be measuring (0-70 ppt).
3. Press 8 to save the calibration.
4. Press MODE to return to dissolved oxygen measurement.

Instrument Operation

A very small amount of oxygen dissolved in the sample is consumed during probe operation. It is therefore essential that the sample be continuously stirred at the sensor tip. If stagnation occurs, measurements will appear artificially low. The rate of stirring required is ½ foot (16 cm) per second.

1. Insert probe into the sample to be measured
2. Continuously stir or move the probe through the sample
3. Allow temperature and dissolved oxygen readings to stabilize
4. Observe/Record measurements
5. Rinse probe with clean water after each use

Precautions

- Membranes last longer if properly installed and regularly maintained. Erratic readings can result from loose, wrinkled, damaged, or fouled membranes, large (>1/8" diameter)

air bubbles in the electrolyte reservoir, or membrane coating by oxygen-consuming (bacteria) or oxygen-producing (algae) organisms. If unstable measurements or membrane damage occurs replace both the membrane cap and electrolyte solution.

- Chlorine, sulfur dioxide, nitric oxide, and nitrous oxide can affect measurements by behaving like oxygen at the probe
- Avoid acids, caustics, and strong solvents which may damage probe materials including the PE membrane, acrylic plastic, EPR rubber, stainless steel, epoxy, polyetherimide, and the PVC cable covering
- Always store the probe in the calibration/storage chamber with the moistened sponge

Probe Electrode Maintenance

SILVER ANODE

- The anode must be cleaned periodically to remove the layer of silver chloride (AgCl) that builds up reducing the sensitivity of the sensor. The cleaning can be chemical or mechanical. Chemical cleaning should be done no more than once per year.
 - o Chemical Cleaning
Remove the membrane cap and rinse the electrodes in deionized or distilled water. Soak the anode in 14% ammonium hydroxide solution for 2-3 minutes. Rinse heavily in cool tap water followed by a thorough rinsing with distilled or deionized water. The anode should be thoroughly wiped with a wet paper towel to remove the residual layer from the anode.
 - o Mechanical Cleaning
Sand off the dark layer from the silver anode with 400 grit wet/dry sandpaper. Wrap the wet sandpaper around the anode and twist the probe. Rinse the anode with clean water after sanding and wipe thoroughly with a wet paper towel.

GOLD CATHODE

- After extended use, the gold cathode can become tarnished or plated with silver. The cathode must be textured properly for the probe to operate properly. It can be cleaned using a Probe Reconditioning Kit or 400 grit wet/dry sandpaper.
 - o Using sandpaper, wet sand the gold cathode with a twisting motion about 3 times or until all silver deposits are removed and the gold appears to have a matte finish. Wipe the gold cathode thoroughly with a wet paper towel before putting on a new membrane cap.
 - o If the cathode remains tarnished, return the probe for service.

Replacement of the DO Electrodes

1. Remove the probe guard
2. Thoroughly dry the sensor preventing water from entering the probe port
3. Insert the long end of the hex key wrench into the small hole in the side of the DO sensor. Turn wrench counter-clockwise until the sensor is released.
4. Pull the DO sensor out of the probe. NOTE: The sensor is keyed with a flat side so it cannot be removed or inserted incorrectly.
5. Inside of connector and the o-ring of the sensor must be clean and dry with no contaminants, grease, or dirt

6. Insert new sensor
7. Tighten screw with hex key wrench, making sure that the screw does not stick out on either side of the DO sensor module
8. YSI 550A is shipped with a dry, protective membrane which must be replaced prior to use

SPECIFICATIONS

Display	Resolution	Range	Accuracy
Dissolved O ₂ mg/L	0.01 mg/L or 0.1 mg/L; user selectable	0 to 20 mg/L	±0.3 mg/L or ±2% of reading, whichever is greater
		20 to 50 mg/L	±6 of reading
Dissolved O ₂ %	0.1% or 1%; user selectable	0 to 200%	±2% air sat or ±2% of reading, whichever is greater
		200 to 500%	±6 of reading
Temperature °C	0.1 °C	-5 to 45°C	±0.3 °C
Temperature °F	0.1 °F	23 -13°F	±0.6 °F

Medium	Fresh, sea, or polluted water
Dissolved Oxygen Sensor	Steady-state polarographic
Dissolved Oxygen Probe	Field replaceable module
Dissolved Oxygen Response Time	95% of end value in 9 seconds
Temperature Units	°C or °F; user selectable
Parameter Compensation	Automatic temperature compensation Automatic salinity compensation (0-70 ppt) Altitude compensation for DO % calibration
Size	4.7 in x 9 in (w x l)
Weight with Batteries	2 lb
Power	4 alkaline C-cells
Battery Life	Over 2000 hours at 25°C
Cables	12,25,50 and 100 foot lengths

TROUBLESHOOTING

SYMPTOM	POSSIBLE SOLUTION
Instrument will not turn on, LCD displays "LO BAT", or main display flashes "OFF"	• Low battery voltage, replace batteries • Batteries installed incorrectly, check battery polarity • Return system for service
Instrument will not calibrate	• Replace membrane and electrolyte • Clean probe electrodes • Return system for service
Instrument "locks up"	• Remove batteries, wait 15 seconds for reset, replace batteries • Replace batteries • Return system for service
Instrument readings are inaccurate	• Verify calibration altitude and salinity settings are correct and recalibrate

	• Probe may not have been in 100% water-saturated air during calibration chamber and recalibrate • Replace membrane and electrolyte and recalibrate • Clean probe electrodes • Return system for service
Main display reads "Over " or "Undr "	• Sample O₂ concentration is more than 60 mg/L or 500% or less than -0.02 mg/L or -0.3% • Verify calibration altitude and salinity settings are correct and recalibrate • Replace membrane and electrolyte and recalibrate • Clean probe electrodes • Return system for service
Main display reads "Over " or "Undr " during calibration	• Replace membrane and electrolyte and recalibrate • Clean probe electrodes • Return system for service
Secondary display reads "Over " or "Undr "	• Sample temperature is less than -5°C or more than 45°C. Increase or decrease the sample temperature to bring within allowable range. • Return system for service
Main display reads "Err " and Secondary display reads "RO ", "RA ", or "AdC "	• Return system for service
Main display reads "Err " or "burn " and Secondary display reads "EEP "	• Return system for service

Project Equipment SOP 3D
Fuss & O'Neill, Inc. SOP for
YSI-600 Series Water Analyzer

Principle of Operation

The YSI-600 Series Water Analyzer consists of a sonde, a monitoring device that is placed in water to gather water quality data that is measured by individual probes, the probes and a 610-D display unit. The probes are fastened at the base of the sonde and take measurements of oxidation/reduction potential, dissolved oxygen, temperature, and temperature-compensated pH and specific conductance. Readings are displayed on the 610-D display unit in units of mV, mg/l, °C, S.U., and $\mu\text{Mhos/cm}$ ($\mu\text{S/cm}$) respectively.

Instrument Maintenance

The following calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- Calibration of the instrument will be performed as described in the calibration procedure.
- The Sonde must be thoroughly dried before removing or replacing a probe or probe port plug. When a probe or port are replaced, the connector port inside the Sonde is to be examined for moisture. If any moisture is found, the connector is to be completely dried. If any corrosion is found the unit will be replaced with another comparable unit. The cable connector port at the top of the Sonde should be covered at all times. Any moisture found in this area will be completely dried before continuing.
- The pH glass electrode and ORP platinum button, require maintenance only when obviously coated with sediment or biological growth. The glass and platinum can be cleaned by carefully removing the guard and wiping with a soft cloth soaked with soapy water and rinsed with clean water, followed by a routine decontamination process. The glass electrode is very delicate, be sure to wipe the electrode gently and do not put the probe down until the guard is replaced. Then a moistened cotton swab can remove any material that may be blocking the reference electrode junction of the sensor.
- The temperature and specific conductivity probe have openings that allow fluid access to the conductivity electrodes and must be cleaned regularly. This is accomplished by inserting a small cleaning brush into each hole several times using a mild detergent with the brush if necessary. After cleaning and decontamination, the probe will be checked with a calibration standard.
- Maintenance of the DO sensor is required when the instrument does not calibrate properly or when the membrane is dirty or damaged. Following cleaning and decontamination, recalibration is performed. The membrane and electrolyte is changed on a regular schedule to maximize the accuracy and life of the sensor.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill. Checks will be carried out in the field if there is a possibility that any memory has been cleared or readings seem anomalous.

When not in use, the YSI-600's sensors are protected with a screw on storage cup filled with tap water. This storage cap is utilized during all calibration procedures. A description of each calibration procedure is below.

1. pH Calibration

The pH calibration is accomplished by pressing ESC and scrolling through the menu to CAL MODE, and pressing enter. The pH is then entered from the calibration menu. A three point calibration is chosen, the display then prompts the user to enter pH buffer that will be checked first, typically the 7.00 buffer. Buffer 7.00 is poured into the storage cup and placed under the probe, the user then presses enter, the unit will then prompt user to press enter again and to enter the next buffer for calibration. The sensor and storage cup are then rinsed with deionized water and the same procedure is followed using pH 4 or pH 10 buffers. Following these steps, calibration checks of all buffers will be conducted.

2. Specific Conductance Calibration

The specific conductance calibration is accomplished by first rinsing the sensor and storage cup with deionized water several times, then filling the storage cup with KCl solution of a known standard molar concentration and specific conductance. When in CAL MODE the specific conductance, is chosen from the calibration menu and the known specific conductance value is entered in the display unit and the calibration is then saved. Following these steps, the storage cup is rinsed again with deionized water and then refilled with the standard KCl solution to recheck the calibration.

3. Dissolved Oxygen Calibration

The dissolved oxygen calibration is accomplished by filling the storage cup with tap water to a level just below the membrane and then capping the storage cap. When in the CAL MODE the Barometer reading for the day is entered. These values are used to determine the correct calibration value to be entered into the display unit. Once the correct pressure has been entered, press the ENTER key to save the value.

4. ORP Calibration

The ORP calibration is accomplished by filling the storage cup with Zobel solution to a level to cover the ORP probe, about one half inch. While in CAL MODE scroll to ORP and press enter. The unit will then prompt for a value to be entered (Zobel has a value of 225), after entering the value, press enter to calibrate.

When the values for all the parameters have all been entered for calibration, press ESC until the MAIN MENU is displayed. Scroll back to run and press enter. Check the calibration for all parameters before continuing.

YSI 600 Meter Documentation

Daily calibration will be documented. The unit #, date, and calibration information will be recorded in a calibration log. The following information will be recorded on a standard field data sheet as the specific conductance data is obtained:

- Project name and number.
- Operator's name.
- Date and time of specific parameter measurement.
- Meter ID number.
- Sample code
- Conductivity reading
- Dissolved oxygen reading
- Oxidation/Reduction potential reading
- pH reading
- Temperature reading

YSI 600 Component Specifications

600XL Sonde

Operating Environment

Medium:	Fresh, sea, or polluted water
Temperature:	-5 to +45 °C
Depth:	0 to 200 feet (61 meters)
Storage Temperature:	-40 to +60 °C for sonde and all sensors except pH and ORP -20 to +60 °C for pH and ORP sensors
Material:	Polyurethane, PVC, Stainless Steel
Maximum Diameter:	1.6 inches (4.06 cm)
Maximum Length:	20.75 inches (52.7 cm)
Maximum Weight:	4.9 pounds (2.22 kg)
Internal logging memory size:	384 KB (150,000 individual parameter readings)
Computer Interface:	RS-232C, SDI-12
Power:	External 12 VDC (8 to 13.8 VDC)

Conductivity Probe

Sensor type	4 electrode cell with autoranging
Range	0 to 100 mS/cm
Accuracy	+/- 0.5 % of reading + 0.001 mS/cm
Resolution	0.001 mS/cm to 0.1 mS/cm (range dependent)
Depth	200 meters

Temperature

Sensor Type	Thermistor
Range	-5 to 45 °C
Accuracy	+/- 0.15 °C
Resolution	0.01 °C
Depth	200 meters

Dissolved Oxygen, % saturation

Sensor Type	Rapid Pulse-Clark type, polarographic
Range	0 to 500 % air saturation
Accuracy	0-200 % air saturation, +/- 2 % of the reading or 2% air saturation, whichever is greater 200-500 % air saturation, +/- 6 % of reading
Resolution	0.1 % air saturation
Depth	200 meters

Dissolved Oxygen, mg / L

Sensor Type	(calculated from % air saturation, temperature and salinity) Rapid Pulse-Clark type, polarographic
Range	0 to 50 mg/L
Accuracy	0 to 20 mg/L, +/- 2 % of the reading or 0.2 mg/L, whichever is greater 20 to 50 mg/L, +/- 6 % of the reading
Resolution	0.01 mg/L
Depth	200 meters

Salinity

Sensor Type	Calculated from conductivity and temperature
Range	0 to 70 ppt
Accuracy	+/- 1.0 % of reading or 0.1 ppt, whichever is greater
Resolution	0.01 ppt

pH

Sensor Type	Glass combination electrode
Range	0 to 14 units
Accuracy	+/- 0.2 units
Resolution	0.01 units
Depth	200 meters

ORP

Sensor Type	Platinum button
Range	-999 to +999 mV
Accuracy	+/- 20 mV
Resolution	0.1 mV
Depth	200 meters

Project Equipment SOP 4D
Fuss & O'Neill, Inc. SOP for
Quanta Water Quality Monitoring System

Principle of Operation

The Quanta Water Quality Monitoring System consists of a transmitter and a display screen. The transmitter is a monitoring device that is placed in water to gather water quality data that is measured by individual probes. The probes are fastened at the base of the transmitter and take measurements of oxidation/reduction potential, dissolved oxygen, temperature, pH, salinity/total dissolved solids (TDS), specific conductance, and barometric pressure. Readings are shown on the Quanta display screen in units of mV, mg/l, °C, PSS, $\mu\text{Mhos/cm}$ ($\mu\text{S/cm}$), and mmHg respectively.

Instrument Maintenance

The following calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- Calibrations of the instrument will be performed as described in the calibration procedure.
- The Transmitter must be thoroughly dried before removing or replacing a probe or probe port plug. When a probe or port is replaced, the connector port inside the transmitter is to be examined for moisture. If any moisture is found, the connector is to be completely dried. If any corrosion is found, the unit will be replaced with another comparable unit. The cable connector port at the top of the transmitter should be covered at all times. Any moisture found in this area will be completely dried before continuing.
- The pH glass electrode and ORP platinum band, require maintenance only when obviously coated with sediment, oil or biological growth. The glass and platinum are cleaned by carefully removing the guard and wiping with a soft cloth soaked with soapy water and rinsed with clean water, followed by routine decontamination process. The routine decontamination process we use consists of: methanol, de-ionized water, HCL, and de-ionized water again. The glass electrode is very delicate and is handled carefully. Then a moistened cotton swab can remove any material that may be blocking the reference electrode junction of the sensor.
- The specific conductivity, salinity, and TDS probe are cleaned with a mild detergent using a small non- abrasive brush and then rinsed with water. This is followed by the routine decontamination process. After cleaning and decontamination, the probe will be calibrated and checked with a calibration standard.
- Maintenance of the dissolved oxygen sensor is required when the instrument does not calibrate properly or when the membrane contains air bubbles. Following cleaning and decontamination, re-calibration is performed. The membrane and electrolyte is changed on a regular schedule to maximize the accuracy and life of the sensor.
- The temperature and probes are cleaned by using a mild detergent with a non-abrasive brush and then rinsed with water. This is followed by a routine decontamination process and calibration check.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill. Checks will be carried out in the field if there is a possibility that any memory has been cleared or readings seem anomalous.

When not in use, the Quanta sensors are protected with a screw on storage cup containing a sponge soaked with tap water. This storage cap is utilized during all calibration procedures and is always rinsed first. A description of each calibration procedure is below.

1. pH Calibration

This is a two point calibration therefore a pH standard between 6.8 and 7.2 is used and treated as zero, all other values are treated as slope. The pH buffer representing "zero" is poured into the cup and the probe is submersed in the solution. The pH calibration is accomplished by using the arrow key to scroll over to the CALIB button and pressing enter. Once on this screen, the cursor is used to scroll down to pH and selected by pressing enter. A new screen appears with the present pH value that the probe is reading. Utilizing the up/down arrow key the pH value is adjusted to read the value of the buffer solution that the probe is submersed in. Once the appropriate value is reached the value is saved. The sensor and storage cup are then rinsed with de-ionized water and the same procedure is followed using pH 4 or pH 10 buffer. Once calibration is complete a check is done on the pH buffers just utilized.

2. Specific Conductance Calibration

The storage cup is filled with KCl solution of a known standard molar concentration and specific conductance (1000 is the standard usually used). The same steps are followed to reach the calibration screen as in the pH calibration. The up/down arrow key is used to scroll down to specific conductance and selected by pressing enter. A new screen appears showing the value that the probe is presently reading based on the calibration standard. This number is adjusted by using the up/down arrow key to reach the value that the standard equals. Once this value is reached the number is saved by pressing the enter key. Following these steps, the storage cup is rinsed again with de-ionized water and then refilled with the standard KCl solution to check the calibration.

3. Dissolved Oxygen Calibration

The barometric pressure is set at 760 mmHg as a default. The value of 8.4 mg/L is used as the calibration standard for dissolved oxygen. The dissolved oxygen calibration is accomplished by holding the probe in the ambient air. The same steps are followed for dissolved oxygen as for the other calibrations. Once the value reads 8.4 mg/L the enter button is pushed prompting 760mmHg to read on the screen, by pressing enter once more the 8.4mg/L value will be saved. This completes the calibration process. A check is now done to assure the operator that the value is saved.

4. ORP Calibration

The ORP calibration is accomplished by sufficient filling the storage cup with Zobel solution to cover the probe. While in CALIB mode scroll to ORP and press enter.

Then, using the up/down arrow key the number is adjusted to 225 mV; the value of the solution. Press enter and the value will be saved. A check is now done to assure that the value is saved in the memory.

When the values for all the parameters have all been entered and saved, ESC is pressed. The screen will take 5 seconds to power up followed by the appearance of the original screen. Any values that did not save will be calibrated until the values are held in the database.

Quanta Meter Documentation

Daily calibration will be documented. The unit number, date, and calibration information will be recorded in a calibration log. The following information will be recorded on a standard field data sheet as data is obtained:

- Project name and number
- Operator's name
- Date and time of specific parameter measurement
- Meter ID number
- Sample code
- Conductivity reading
- Dissolved oxygen reading
- Oxidation/Reduction potential reading
- pH reading
- Temperature reading

Quanta Component Specifications

Operating Environment:

Medium:	Fresh, sea, or polluted water
Temperature:	-5 to 50 °C
Depth:	0 to 328 feet (100 meters)

Materials Used: Polyurethane, PVC, Stainless Steel

Transmitter Diameter: 7.6 cm (3 in)

Screen Width: 12.7 cm (5 in)

Handle Width: 6.4 cm (2.5 in)

Screen Size (diagonal): 8.9 cm (3.5 in)

Screen Length: 26.9 cm 10.6 in)

Transmitter Length: 22.9 cm (9 in)

Screen Weight (w/batteries): 0.95 kg (2.1 lbs)

Transmitter Weight: 1.3 kg (3 lbs)

Memory Size
(1 frame stores all

parameter values):	100 data frames (nonvolatile flash)
Batteries:	3C alkaline, >15 hour life
Waterproof Rating:	NEMA 6 (IP67)
Operating Voltage Range:	7 to 14 VDC
Conductivity Probe	
Range	0 to 100 mS/cm
Accuracy	+/- 1 % of reading +/- 1count
Resolution	4 digits
Temperature	
Range	-5 to 50°C
Accuracy	+/- 0.2°C
Resolution	0.01 °C
Dissolved Oxygen	
Range	0 to 50 mg/L
Accuracy	+/- 0.2 mg/L less than or equal to 20 mg/L +/- 0.6 mg/L > 20 mg/L
Resolution	0.01 mg/L
Salinity	
Range	0 to 70 PSS
Accuracy	+/- 1 % of reading +/- 1 count
Resolution	0.01 PSS
pH	
Range	2 to 12 units
Accuracy	+/- 0.2 units
Resolution	0.01 units
ORP	
Range	-999 to 999 mV
Accuracy	+/- 25 mV
Resolution	1 mV

Project Equipment SOP 5D Fuss & O'Neill, Inc. SOP for LaMotte 2020 Turbidimeter

Introduction

The LaMotte 2020 Turbidimeter is a battery-operated, portable, microprocessor controlled nephelometer. A multi-detector optical configuration assures long term stability and minimizes stray light and color interferences. All readings are determined by the process of signal averaging over a 5 second period, minimizing fluctuations in readings attributed to large particles and enabling rapid, repeatable measurements. The microprocessor enables auto-ranging over the full range to Nephelometric Turbidity Units (NTU) and provides a direct digital readout with a resolution of NTU for the lowest range.

Principle of Operation

Turbidity, or cloudiness in water, can be interpreted as an absence of clarity or brilliance. It is caused by suspended or colloidal particles such as clay, silt, organic/inorganic material, and microscopic organisms. In surface and groundwaters, turbidity is an indicator of quality and productivity.

Light passing through clear water will travel in a straight line. Particles in turbid water will scatter the light and cause it to look cloudy. The turbidity of a sample is the measure of the amount of scatter that occurs when light is passed through the sample. High turbidity indicates greater scattering of the light.

Nephelometers are turbidimeters that measure the scattered light at a 90° angle from the light source. A reference beam passes through the sample and is measured at an 180° angle. The ratio of these two readings is converted to a turbidity measurement in NTU.

Calibration

1. Select a LaMotte AMCO J 2020 Standard in the range of the samples to be tested. (NOTE: Only LaMotte AMCO J Standards specific to this instrument are to be used.)
2. Fill a turbidity tube with the standard, cap, and wipe the tube clean with a lint-free cloth.
3. Open the lid of the meter. Align the indexing arrow on the tube with the indexing arrow on the meter and insert the tube into the chamber.
4. Close the lid. Push the READ button. If the displayed value is not the same as the value of the reacted standard ($\pm 1\%$), continue with the calibration procedure.
5. Push the CAL button for 5 seconds until CAL is displayed. Release the button. The display will flash. Adjust the display with the ▲ and ▼ buttons until the value of the standard is displayed.
6. Push the CAL button again to set the calibration. The 2020 display will stop flashing. Calibration is complete.

7. Turn the unit off by holding the READ button down for at least 1 second, or proceed to measure the test samples.
8. Prepare a sample of turbidity free water as described below to verify the calibration of the instrument.

Analysis Procedure

The 2020 turbidity meter has two operating modes. The standard mode displays the measured turbidity to the full resolution of the meter. The EPA mode displays the measured turbidity rounded to the reporting requirements of the EPA and Standard Methods compliance monitoring programs. To switch from one mode to the other, turn the instrument off, press and hold the CAL button while pressing the READ button to turn the meter on. When the EPA mode is selected, ▲ will be displayed.

1. Fill a clean container with at least 50 mL of sample water and cover. Set sample aside to allow it to equilibrate to air temperature and let the gases escape. Avoid contamination and analyze as soon as possible.
2. Rinse an empty turbidity tube with a portion of the sample. Shake out the excess water.
3. Fill the turbidity tube to the neck by carefully pouring the sample down the side of the tube to avoid creating bubbles.
4. Cap the tube and wipe it dry with a clean, lint-free tissue.
5. Open the lid of the meter. Align the indexing arrow on the tube with the indexing arrow on the meter and insert the tube into the chamber.
6. Close the lid. Push the READ button. The turbidity in NTU will be displayed within 5 seconds.
7. The instrument will turn off automatically 2 minutes after the last button push. To turn the meter off manually, hold the READ button down for at least 1 second, release when OFF is displayed.

NOTE: If the sample is higher than 1100 NTU, it must be diluted and retested.

Preparation of Turbidity Free Water

Turbidity free water is essential when dilution of samples is necessary. The introduction of any foreign matter will affect the turbidity reading. A filtering device with a special membrane is used to remove particulate matter. The filter, filter holder, and syringe are Aconditioned@ by forcing at least two syringes full of deionized water through the apparatus. The first and second rinses should be discarded.

1. Unscrew the top of the filter holder. The black O-ring should remain in the top part of the filter holder. Place a white membrane filter on the screen inside. Position the filter disk so that it covers the entire surface of the screen. Replace the top of the filter holder and screw on securely. (NOTE: The membrane filters are white and are packaged between two blue protective disks. Handle membrane filters with extreme caution.)
2. Remove the plunger from the syringe. Attach the filter holder to the bottom of the syringe.
3. Pour approximately 50 mL of deionized water into the barrel of the syringe. Replace the plunger and exert pressure on it to force the water through the filter. Collect the water in a clean container.
4. Remove the filter holder from the syringe then remove the plunger from the barrel. (Removal of the filter holder before the plunger is necessary to prevent rupturing the membrane as the plunger is removed.
5. Replace the filter holder and repeat steps 3 and 4 until the desired amount of turbidity free water is collected.
6. Periodically examine the membrane filter to insure that no holes or cracks are present. The membrane filter may be stored in the holder indefinitely and used as required.

Testing Tips

- C Samples should be collected in clean glass or polyethylene containers.
- C Samples should be analyzed as soon as possible after collection.
- C Discard tubes that are badly scratched.
- C Gently invert sample to mix before taking a reading. Avoid introducing air bubbles.
- C Turbidity readings will be affected by electric fields around motors.
- C Carbon in the sample will absorb light and cause low readings.
- C Observe shelf life of turbidity standards.
- C The turbidimeter should be placed on a surface free from vibration which can cause high readings.
- C Excessive color in a sample will absorb light and cause high readings.

Maintenance

1. Turbidity Tubes

- a. Turbidity tubes should always be washed prior to use. Use a mild detergent to remove any dirt or fingerprints. Dry the outside with a clean, lint-free tissue. Allow the tubes to air dry in an inverted position to prevent dust from entering the tube.
- b. Scratches, fingerprints, and water droplets on the turbidity tube or inside the light chamber cause stray light and false readings. Tubes can be acid washed periodically and special silicon oil is available to coat the tubes and mask imperfections in the glass. After a tube has been filled and capped, it should be held by the cap and the outside surface should be wiped with a clean, lint-free, absorbent cloth.

2. Battery Replacement

- a. Open the battery compartment lid (on the bottom of the case).
- b. Remove the standard 9-volt alkaline battery and disconnect from the polarized plug.
- c. Carefully connect the new 9-volt battery to the polarized plug and insert it into the compartment.
4. Close the battery compartment lid.

3. Lamp Replacement

The tungsten lamp included with the 2020 turbidimeter has a life of approximately 800 hours. If the display becomes unstable, call LaMotte Company for a return authorization number to have the lamp replaced and the unit examined.

Troubleshooting

PROBLEM	CHECK	ACTION
Meter won't turn on	<u>Battery</u>	Replace
	AC Adapter	Plug in
	AC Wall Outlet	Verify power source
	Contact LaMotte for Return Authorization	Return to LaMotte for repair
Suspect Calibration	Check calibration with standards	Use new standards
	Verify standards with Formazin	Run alternate test with Formazin
Suspect Calibration (continued)	Verify with another meter	Check other meter calibrations
	Check tube alignment	Re-align tube
	Check the sample tubes for dirt and scratches	Check, clean, and/or replace sample tubes
	Check to see if internal meter components are wet	Always dry tubes before inserting. Examine for visible moisture
	Contact LaMotte for Return Authorization	Return to LaMotte for repair
Er1	Very low battery	Replace
Er2	Over Range	Dilute sample
Er3	Burnt out bulb or misaligned tube	Check tube alignment Call LaMotte
BAT	Low battery	Replace

Project Equipment SOP 6D
Fuss & O'Neill, Inc. SOP for
HF Scientific DRT-15 C Portable Turbidimeter

Introduction

The DRT Turbidimeter is a direct reading nephelometric instrument which measures scattered light from particles in suspension in a liquid. The optical signal is stabilized and amplified to energize a meter. The instrument uses solid state electronic components and resists thermal variation and lamp aging. Turbidity readings are given in Nephelometric Turbidity Units (NTU) which are comparable to Jackson Turbidity Units (JTU) and Formazin Turbidity Units (FTU).

Personnel who use the HF Scientific DRT-15 portable turbidimeter will have read the factory manual and received training on the proper usage of the instrument in the field.

Principle of Operation

Turbidity, or cloudiness in water, can be interpreted as an absence of clarity or brilliance. It is caused by suspended or colloidal particles such as clay, silt, organic/inorganic material, and microscopic organisms. In surface and groundwaters, turbidity is an indicator of quality and productivity.

Light passing through clear water will travel in a straight line. Particles in turbid water will scatter the light and cause it to look cloudy. The turbidity of a sample is the measure of the amount of scatter that occurs when light is passed through the sample. High turbidity indicates greater scattering of the light.

Nephelometers are turbidimeters that measure the scattered light at a 90° angle from the light source. A reference beam passes through the sample and is measured at an 180° angle. The ratio of these two readings is converted to a turbidity measurement in NTU.

Operation and Description

Cuvettes used for instrument calibration and sample measurement should be matched or indexed. For accurate measurements in the low range, rotate the cuvettes in the well to obtain the minimum reading. Mark the cuvette with an adhesive dot provided to ensure identical orientation of the cuvettes with each measurement. To operate the instrument, switch to the A20" range and place the Reference Standard (0.02 NTU) in the optical well. With the light shield in place over the well, adjust the Reference Adjust knob to cause the meter to read the reference standard value on the scale. The calibration of the instrument should be checked using a turbidity free sample as a control. The unit is now ready for use in either range.

To make a measurement of a sample, clean one of the cuvettes and fill to within approximately 2" of the top with the sample. Place the top on the cuvette and carefully clean the outside surface with a lint free wiper such as KimWipes. Place the sample in the well and place the light shield over the well. Select the appropriate range for best readability.

If the instrument has been subjected to cold ($<10^{\circ}\text{C}$), and then brought indoors, it should be allowed to warm up before use since condensation may form on the various lenses. This can be aided by leaving the case open and the instrument on for approximately 30 minutes.

The DRT-15C is shipped complete with a 0-1 mA recorder output. The jack is located on the right side of the chassis. To use, connect the 1/8" miniplug provided to your recorder. Adjust R11 to obtain full scale output compatible to a full scale reading. Once this adjustment is made, the DRT-15C will always be set up for the recorder.

The cuvette should be a 28 mm o.d. glass sample container with a cover. The critical measuring area is the 1" wide band which starts 1/8" from the bottom of the container. This area of the cuvette should be kept clean and free of scratches and abrasions.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill.

A. Standard Formazin Solutions

The calibration of this instrument is based upon Formazin, a material which can be synthesized and reproduced repeatedly within one percent. When properly mixed, the number, size and shape of molecules are identical, thus making it ideal as a turbidity standard. Calibration samples may be obtained by diluting Formazin stock suspension using ATurbidity-Free water. Table 1 outlines the procedure for preparation of 198, 19.8 and 2.0 NTU stock calibration solutions.

TABLE 1
PROCEDURE FOR PREPARATION OF STANDARD
FORMAZIN SOLUTIONS

Value	Pipettes Required	Amount to Pipette into a 200 mL Volumetric Flask
198 NTU	10 mL graduated in 0.1 mL	9.9 mL of 4000 NTU stock solution. Add low turbidity water to 200 mL mark.
19.8 NTU	20 mL volumetric	Pipette 20 mL of the 198 dilution into another 200 mL volumetric flask. Add low turbidity water to the 200 mL mark.
2.0 NTU	2.0 mL volumetric	Pipette 2.0 mL of the 198 dilution into a 200 mL volumetric flask. Add low turbidity water to the 200 mL mark. (NOTE: Value includes 0.02 NTU added by the water.)

NOTE: When the prepared samples start to flocculate, they are unreliable and fresh ones must be made. This will occur more rapidly for the lower value diluted solutions.

B. Electronic Calibration Using Freshly Prepared Formazin Solutions

1. Fill, cap, and label three cuvettes, one for each of the standard solutions (198, 19.8, 2.0 NTU).
2. Invert each cuvette several times to mix the contents before placing it in the Optical Well for a reading.
3. Center the Reference Adjust control on the top of the instrument.
4. Insert the reference standard and turn the range control to the A20" range. Adjust the ACoarse Zero trimpot (R2) until a reading of 0.02 NTU is obtained.
5. Replace the reference standard with the 19.8 NTU standard and adjust the A20 Range Adjust trimpot (R7) to obtain a reading of 19.8 NTU $\pm$ 0.1 NTU.
6. Replace the 19.8 NTU standard with the reference standard and adjust the reference adjust control to obtain a reading of 0.02 NTU.
7. Repeat steps 6 and 7 until no further adjustments are necessary.
8. The 2.0 NTU Formazin Standard may be used to check the calibration for low readings.
9. Turn the range control to the 200 range. Insert the 198 NTU standard and adjust the A200 Range Adjust trimpot to obtain a reading of 198 $\pm$ 1 NTU.
10. Use a sample of turbidity free water as a control to verify the calibration of the instrument.

Trouble Shooting

Symptom	Possible Cause	Solution
Meter does not respond when a sample is set into the well.	1. Lamp is burned out.	Replace lamp** and recalibrate.
	2. Printed circuit board is faulty.	Replace printed circuit board and recalibrate.
	3. Battery is dead.	Replace battery.
Reference adjust knob does not have enough travel to adjust for the reference standard value.	1. Scratched or rubbed reference standard container or aged reference standard	Replace reference standard.
	2. Optics have aged.	Recalibrate.
	3. Faulty lamp.	Replace lamp** and recalibrate.
The display will not stabilize when the	1. Light shield is incorrectly placed over the well.	Reposition light shield.

Symptom	Possible Cause	Solution
reference standard is in the well.	2. Battery has lost its charge. (Low battery light should be on.)	Recharge battery.
	3. Cold sample causes condensation on the cuvette which affects the light reading being received by the detectors.	Allow sample to equilibrate to ambient conditions.
	4. Unit has not been given sufficient time to stabilize at ambient temperature conditions after a change of temperature.	Allow additional time for instrument temperature to equilibrate.

NOTE: The lamps used in this instrument have an extremely long life. Make sure the lamp is the problem before replacing.

Maintenance

A. Battery Replacement

Should the battery fail, it can be replaced. Make certain that the instrument is turned off. Remove all accessories from the foam holder. Remove the foam holder by placing fingers in the cuvette holes and pulling the rear of the foam forward, then up. Five Phillips head chassis screws should be removed then remove the chassis from the case by sliding the chassis all the way to the right and pulling up. The two screws on the right side of the chassis need to be removed to allow for the removal of the battery clamp and the old battery. Replace the battery by reversing the procedures described above. When connecting the battery, be certain to connect the red wire to the terminal marked (+) and the black wire to the terminal marked (-).

B. Lamp Replacement

The lamp source has an extremely long life. Before replacing the lamp, make certain that the battery is not in need of a charge and is not defective. To replace the lamp, remove the chassis as described above under Abattery replacement. Remove the lamp wires at TB1 terminals numbers 9 and 10. To remove the lamp, loosen the two set screws on the outermost barrel with a 5/64" hex wrench and pull the lamp straight out. Replace the chassis in the case and recalibrate as described in calibration procedures.

Specifications

<u>Ranges (NTU)</u>	<u>0-20 and 0-200 NTU</u>
Linearity	$\pm 1\%$ of full scale on either range
Repeatability	$\pm 1\%$ of full scale on either range
Response	Virtually immediate in all ranges.

Project Equipment SOP 7D
Fuss & O'Neill, Inc. SOP for
Thermo Environmental Instruments Model OVM 580B
Organic Vapor Meter

Introduction

The Model 580B Organic Vapor Meter (OVM) is a portable micro-processor controlled, photoionization instrument which is used to detect and measure volatile organic compounds in various atmospheres.

The analyzer is a single, self-contained unit with the probe assembly, detector, amplifying and recording assembly all housed in a single self-contained unit.

Personnel who operate the OVM 580B will have read the factory manual and have received training on the proper usage of the instrument in the field. All calibrations of the OVM 580B will be conducted in-house at Fuss & O'Neill prior to use of the instrument in the field. Personnel will have a cylinder of isobutylene in the field to periodically verify instrument calibration.

Principle of Operation

The OVM 580B measures the concentration of trace volatile organic gases by the principle of photoionization. The general operation of the OVM 580B is in a non-compound specific mode. That is, the detector, which has been calibrated to isobutylene (a benzene equivalent), can accurately measure isobutylene or benzene, but when exposed to other volatile organic compounds, will measure them qualitatively and not quantitatively. If the measurement of a specific volatile organic compound is desired, then a conversion factor can be calculated in the lab for the VOC of interest. This conversion factor can then be programmed into the OVM 580B's memory in the lab or in the field. However, in this case a correction factor will not be applied to convert from the calibration compound to the compound of interest. The field screening data collected with the OVM is a quantitative assessment of total VOC concentrations to be used in comparison to other OVM data from the same boring collected during similar weather conditions via similar methods. The potential variability associated with field screening is too high to simply correlate and compare laboratory data.

Photoionization occurs when an atom or molecule absorbs light of sufficient energy to remove an electron, leaving a positively charged atom or electron. This process will occur in the OVM 580B when the ionization potential of a compound (the energy in eV required to remove an electron) is less than the energy of the lamp in the unit. The lamps which Fuss & O'Neill use have ionization potentials of 10.6. Therefore, any volatile organic compound which has an ionization potential of less than 10.6 eV can be detected by the OVM 580B. Within the detection chamber of the OVM 580B is a positive-biased electrode. This electrode causes the ionized molecules to travel to a collector in the chamber. Here the ions create a current proportional to the concentration at the collector. This current is then amplified and the signal displayed on the meter.

Daily Calibration Procedure

Daily calibration and maintenance involve the following procedures which are carried out in-house prior to releasing an instrument for field use.

1. The instrument is cleaned with a cloth dampened with deionized water and inspected for physical damage or abnormalities.
2. The probe is then visually inspected for any physical damage. The probe tip is opened and inspected for any clogging with dirt or sediment and cleaned if necessary. The filter located in the probe tip is also inspected for any clogging and cleaned if necessary.
3. The housing of the OVM 580B is opened and the high voltage power supply is removed.
4. The lamp is removed for cleaning.
5. The lamp is then cleaned with the cleaning compound supplied by Thermo Environmental Instruments as specified below under "Maintenance".
6. The lamp and the power supply are reinstalled.
7. The instrument is zeroed.
8. The analyzer is calibrated with a cylinder and a regulator. The cylinder contains a calibration gas consisting of a mixture of isobutylene in zero air. The analyzer is turned on, and the span setting is set to match the ppm reading stamped on the side of the cylinder. This reading will set the instrument to an isobutylene standard.
9. Verify the calibration of the instrument with a check standard (e.g. a standard gas with a different lot number).

OVM 580B Meter Documentation

Daily calibration is documented with the date and calibration information recorded in an equipment log book. The following information is recorded on a standard field data sheet as the OVM 580B data are obtained.

- C Project name and number.
- C Operator's name.
- C Date and time of gas measurement.
- C Data values obtained.

Maintenance

Routine maintenance of this instrument involves the calibration of the instrument (see above), cleaning the lamp and lamp window, and maintaining the battery charge.

1. Lamp Cleaning and Replacement

Removal

- C Make sure the instrument is turned off.
- C Loosen the four screws holding the case top and bottom together. Place case bottom flat on the table and the top on its side next to the bottom.
- C Remove the high-voltage power supply by loosening the thumbscrews on each side and pulling the power supply towards the rear of the instrument.
- C Remove lamp by loosening the lamp nut.

Cleaning

- C Clean the lens surface of the lamp using the aluminum oxide scouring powder provided by Thermo Environmental Instruments.
- C Place a small amount of aluminum oxide on the lens of the lamp.
- C Gently scour in a rotary type motion with a soft cloth or tissue.
- C Gently blow the remaining powder from the lens.
- C Thoroughly wipe the lamp lens with a clean tissue to remove the last traces of cleaning powder.

Insertion

- C Place lamp flat against o-ring and fasten lamp nut to create a proper seal.
- C Insert the high-voltage power supply and tighten thumb screws. There are three pins protruding which should fit snugly into connectors located beneath the detector.
- C The lamp spring should make contact with the lamp ring.

2. Battery Recharging

When there is a flashing "B" in the lower left corner of the display while the instrument is in the run mode, the battery is low.

- C The battery is recharged by plugging the charger into the RUN/CHARGE plug at the rear of the instrument.
- C The instrument will run while charging.
- C The charger has an LED which indicates the amount of current being drawn. The LED gets brighter as more current is drawn and can therefore be used as a rough indication of the charge on the battery.

Instrument Operation

1. Press "ON" to turn instrument on. This will indicate to the microprocessor to turn on the lamp and pump. The microprocessor will send power to the lamp and pump and check to make sure the lamp is lit. If it does not light, the microprocessor will try again. If after 14 seconds, the lamp does not light, a lamp out condition will be indicated. Once the lamp is lit, the display will show the PPM on the bottom line. The top line will be either a bar graph or the maximum reading.

2. There are two run modes available: Max Hold and Concentration. In concentration mode, the top line of the display is a bar graph. The bar graph is a logarithmic bar graph over the range of 0-2000 ppm which is intended as a rough visual indicator of the current ppm. The bottom line will indicate the exact ppm.

In Max Hold mode, the top line of the display will indicate the maximum reading while the bottom line indicates the current ppm. Whenever a new maximum is seen, the top line will be updated. The Max Hold reading may be reset by pressing the RESET button while in the run mode.

3. The instrument has the capability to store up to 700 data points for review later. Each reading is assigned a date and time as well as a location code. This mode is entered by pressing the MODE/STORE switch while in the Run mode at which time the message "LOG THIS VALUE?" will appear on the top line and either ppm or max ppm will be on the bottom line.

Pressing "-/CRSR" will bring up the Main Menu.

4. Press "-/CRSR" again to enter the Parameters Mode. Press "-/CRSR" twice more to calibrate. Press RESET.
5. The instrument will ask whether you wish to restore backup. Press "-/CRSR".
6. Press RESET when ready to zero the gas. The display will read "Model 580 Zeroing" which will change to "Span ppm = 0098, "+" to continue". Make sure the span ppm = calgas ppm. Press "+/INC".
7. The message "Span Gas, Reset when ready" will appear. Attach the Tedlar bag of calgas to the probe. Press RESET. The display will show "Model 580 Calibrating". Press MODE/STORE.
8. You are now in "ready" mode. If the reading is not ± 5 percent of calgas, clean the bulb and check the filter for dirt.

OVM 580B Specifications

Detection Range:	0.1 to 2000 ppm by volume.
Ranges:	Digital readout (LCD) - auto ranging.
Resolution:	0.1 ppm 0-200 ppm range 1.0 ppm 200-2000 ppm range
Response Time:	2.0 seconds at 400 mL/min. sample flow.
Sampling Rate:	Nominal flow 400 mL/min.
Power Requirements:	Internal battery or AC.
Battery Operating Time:	8 hours on full charge

Project Equipment SOP 8D
Fuss & O'Neill, Inc. SOP for
Niton XLp-702

APPENDIX D

CALIBRATION LOG SHEETS

APPENDIX E

SAMPLE LABEL FORMAT

FUSS & O'NEILL, INC., ENVIRONMENTAL SERVICES
80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

Date: Preservative: ICE / Hcl / HNO3 /
H2SO4 / FHN03
Project: Sampler:
Location: Time:
Project #: Sample ID:

FUSS & O'NEILL, INC., ENVIRONMENTAL SERVICES
80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

Date: Preservative: ICE / Hcl / HNO3 /
H2SO4 / FHN03
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Date: Preservative: ICE / Hcl / HNO3 /
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Project: Sampler:
Location: Time:
Project #: Sample ID:

FUSS & O'NEILL, INC., ENVIRONMENTAL SERVICES
80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

Date: Preservative: ICE / Hcl / HNO3 /
H2SO4 / FHN03
Project: Sampler:
Location: Time:
Project #: Sample ID:

APPENDIX F

SAMPLE FIELD DATA FORMS

Monitoring Well Sample Log

Low Flow Sampling

Client/Project Name:		Fuss & O'Neill Inc.  Consulting Engineers
Project Location:	PROJECT #:	
Sample#:	WELL ID:	

Purge Data Sample Data

Date:	Container	Quantity	Preservative
Start time: _____ Stop time: _____ Sample time: _____			
Pump Rate: _____ (ml/m) Depth Sampled: _____			
Total time purged: _____ Sampler: _____			
Volume Purged: _____ (ltr)			
Purge Device: Dedicated / Nondedicated Weather: _____			
Device Type: Bladder / Peristaltic / Submersible			
Appearance:			
Well Yield: High / Moderate / Low / Dry			
Comments:			

Field Parameter Data

Instrument ID#

Water Level (ft)	Time	Turbidity (ntu)	Dissolved Oxygen (mg/L)	pH	Temp. (deg C)	Specific Conductivity (uS)	ORP(mV)

Well Condition Checklist

(circle appropriate item(s), cross out if not applicable)

General Condition: Good / Needs Repair Protective Steel: OK / Cracked / Leaking / Bent / Loose/ None Well # Visible?: Y / N Well Cap: Good / Broken / None Evidence of rain water between steel and PVC?: Y / N Evidence of ponding around well?: Y / N Gopher type holes around collar?: Y / N Comments:	Is well plumb?: Y / N Lock: Good / Broken / None Rust around cap: Y / N PVC Riser: Good / Damaged / None Concrete collar: OK / Cracked / Leaking / None Other evidence of: Rodents / Insects / None Curb Box: N / Y (key is: Hex / Pent / Other)

Sediment Sampling Field Data

Client/Project Name:		 Fuss & O'Neill Inc. Consulting Engineers
Project Location:	PROJECT #:	
Sample#:	Sampling Location	

Sample Location Info

Sample Data	Container	Quantity	Preservative
Date: _____ Sampler: _____ Time: _____ Weather: _____ Sampling Device: Auger / Core Sampler / Shovel / Ponar Dredge / Eckman Dredge / Other _____ Field decon: Yes / No / Dedicated Type of Sample: Grab / Composite / Other _____ Sample Depth: _____			

Comments:

Trip Blank Field Data

Client/Project Name:	PROJECT #:	
Project Location:		
Sample#:	<u>Well ID</u> Trip Blank	

Sample Data	Container	Quantity	Preservative
Date: _____ Time: _____ Sampler: _____ Weather: _____ Blank Water Supplied By: Lab / F&O / Other _____ Comments:	Voa	2	HCl

Comments:

Equipment Blank Field Data

Client/Project Name:	PROJECT #:	
Project Location:		
Sample#:	<u>Well ID</u> Equip Blank	

Sample Data	Container	Quantity	Preservative
Date: _____ Time: _____ Sampler: _____ Weather: _____ Blank Water Supplied By: Lab / F&O / Other _____ Equipment Used: Bailer / Filter / Pump / Other _____ Filtered in Field? No / @ Vehicle Method of Filtration: Pressure / Vacuum / Syringe Pump ID #: Filter: Disposable / Other _____ Appearance: Comments:			

* - Organic-free DI water used in these containers.

Comments:

FUSS & O NEILL, INC. CONSULTING ENGINEERS MANCHESTER, CT 06040		BORING LOG		SITE ID: _____ SHEET: _____ of _____ PROJECT NO: _____	
		PROJECT: _____			
		LOCATION: _____			

CONTRACTOR: _____ OPERATOR: _____ F&O REPRESENTATIVE: _____ DRILLING METHOD: _____ SAMPLING METHOD: _____ HAMMER WT: _____ HAMMER FALL (IN) _____ BORING LOCATION: _____ GROUND ELEVATION: _____ DATE STARTED: _____ DATE FINISHED: _____ SAMPLE PREFIX: _____			WATER LEVEL MEASUREMENTS			
	DATE	MS. PT.	WATER AT	TIME		
					Time and Date of Completion: _____	

DEPT H (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/ PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	LITHO- LOGIC CODE	FIELD TESTING

BORING DIAMETER	BORING METHOD	DEPTH	REMARKS Field Instrument = _____ If refusal is encountered, describe all efforts used to confirm.

PROPORTIONS USED: TRACE 0 to 10% SOME 20 to 35% Little 10 to 20% AND 35 TO 50%		
Reviewed by Staff: _____		<u>BACKFILL</u> Native Material _____ To _____ See Monitoring Well Bentonite Grout/Chips _____ To _____ Completion Report Concrete/Asphalt _____ To _____ Other _____ To _____

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: _____ Site ID (Boring/Well ID): _____
Project Location: _____ Project No.: _____
F&O Engineer/Geologist: _____ Ground Surface Elevation: _____
Date of Completion: _____ Permit #: _____
Boring Location: _____ E1 Top of Steel Casing: _____
Drilling Contractor: _____ E1 Top of PVC Casing: _____
Drilling Method: _____ Measuring Point: TPS / PVC
Well Cover (see codes): _____

WELL CONSTRUCTION

<u>Well Casing/Riser</u>	<u>Sump (below screen)</u>	<u>Protective Casing</u>	
Diameter: _____ in.	Diameter: _____ in.	Diameter: _____ in.	Type: _____
Type: _____	Type: _____	Stick-up: _____ ft	Depth to Bottom: _____ ft
Stick-up: _____ ft.	Length: _____ in.	Seal Material: _____	

Screen Intervals

Screen Interval: _____ ft Diameter: _____ in. Slot Size: _____ in.
Description: PVC / Other: _____
Type: Perforated / Slotted / Wire-Wrap / Other: _____

ANNULAR FILL

Surface Seal

(Approximate volumes if available)

Interval: _____ ft. Tremied: Y / N Volume: _____ bags
Description: Concrete / Other: _____

Backfill

Interval: _____ ft. Tremied: Y / N Volume: _____
Description: Bentonite Grout / Fill / Other: _____

Lower Seal

Interval: _____ ft. Tremied: Y / N Volume: _____ bags
Description: Bentonite / Bentonite Pellets / Grout / Other: _____

Filter

Interval: _____ ft. Tremied: Y / N Volume: _____ bags
Description: Sand Filter (type: _____) / Other: _____

Lower Backfill

Interval: _____ ft. Tremied: Y / N Volume: _____ bags
Description: Bentonite Grout / Fill / Other: _____

Soil Sampling Field Data

Client/Project Name: Project Location: Date:	Weather:	PROJECT #:	Fuss & O'Neill Inc.  Consulting Engineers

Sample #:	Container	Quantity	Preservative
Sample Location:			
Sampler: _____ Time: _____ Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other _ Field decon: Yes / No / Dedicated Type of Sample: Grab / Composite / Other _____ Generic Soil Description: _____ Sample Depth: _____ PetroFLAG / OVM _____			

Sample #:	Container	Quantity	Preservative
Sample Location:			
Sampler: _____ Time: _____ Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other _ Field decon: Yes / No / Dedicated Type of Sample: Grab / Composite / Other _____ Generic Soil Description: _____ Sample Depth: _____ PetroFLAG / OVM _____			

Sample #:	Container	Quantity	Preservative
Sample Location:			
Sampler: _____ Time: _____ Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other _ Field decon: Yes / No / Dedicated Type of Sample: Grab / Composite / Other _____ Generic Soil Description: _____ Sample Depth: _____ PetroFLAG / OVM _____			

Sample #:	Container	Quantity	Preservative
Sample Location:			
Sampler: _____ Time: _____ Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other _ Field decon: Yes / No / Dedicated Type of Sample: Grab / Composite / Other _____ Generic Soil Description: _____ Sample Depth: _____ PetroFLAG / OVM _____			

Analytical Parameter Request

Project #:	Date Sampled:	Fuss & O'Neill Inc.  <i>Consulting Engineers</i>
Project Name:	Date Submitted:	
Laboratory	Submittor: Fuss & O'Neill, Inc.	

Report To:	Attention:

Invoice to: Mailing Address: City, State, Zip: Special Instructions:	Attention: Phone #:

COC #	Sample ID	COC #	Sample ID	COC #	Sample ID

Comments:	
	Blank(s) included in sample
	Duplicate(s) included in sample

Requested Parameters

APPENDIX G

SAMPLE CHAIN-OF-CUSTODY FORMS

FUSS & O'NEILL, INC.
146 HARTFORD ROAD
MANCHESTER, CT 06040
(860) 646-2469

CHAIN-OF-CUSTODY RECORD
No 56289

[illegible]

REMEDIAL INVESTIGATION WORK PLAN

ISLAND DOCK

308-322 ABEEL STREET
KINGSTON, NEW YORK

Prepared For:
Kingston Historic Waterfront, Island Dock, LLC

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Prepared By:
Fuss & O'Neill of New York, P.C.
80 Washington Street
Poughkeepsie, New York 12601

October 2005

REMEDIAL INVESTIGATION WORK PLAN
ISLAND DOCK
308-322 ABEEL STREET, KINGSTON, NEW YORK

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REMEDIAL INVESTIGATION WORK PLAN
ISLAND DOCK
308-322 ABEEL STREET, KINGSTON, NEW YORK

TABLES

Table 1	Historical Soil Sampling Data
Table 2	Summary of Sampling Issues

PLATES

Plate 1	2004 Aerial Photograph
Plate 2	Historical Photograph Circa 1900
Plate 3	Historical Photograph Circa 1900

FIGURES

Figure 1	Site Location Map
Figure 1A	Tax Parcel Map
Figure 2	Site Plan and Historic Sample Locations
Figure 3	Proposed Sampling Plan

APPENDICES

A	Quality Assurance Project Plan
B	Health and Safety Plan
C	Citizen Participation Plan

1.0 INTRODUCTION

This document presents a Remedial Investigation Work Plan (RIWP) designed to assess environmental conditions at Island Dock (the Former Concrete Block Inc. facility) in the City of Kingston, New York. The site is in the process of entering into the Brownfield Cleanup Program (BCP). Future use is likely to involve multi-story residential units with parking or other amenities located at the ground floor level. Plans include apartments or condominiums and some commercial and recreational facilities to provide services for local residents. As the site enters into the BCP, Kingston Historic Waterfront, Island Dock, LLC will enter the BCP Program as a Volunteer.

The purpose of this RIWP is to provide specific guidelines and to establish procedures for the remedial investigation. The proposed investigation incorporates results of previous site investigations undertaken by Fuss & O'Neill of New York, P.C. (Fuss & O'Neill) of Poughkeepsie, NY on behalf of Kingston Historic Waterfront, Island Dock, LLC.

The objective of the proposed investigation is to further assess known areas of concern and fully characterize the nature and extent of impacts at the site. Ultimately, results of these investigations will be used to develop a Remedial Work Plan that is consistent with proposed re-use of the property.

2.0 BACKGROUND

2.1 Site Location

The subject site, commonly known as Island Dock, is located on the south side of Abeel Street in the city of Kingston, New York. The site encompasses Island Dock Road. A Site Location Map is provided as Figure 1. A tax parcel map is provided as Figure 1A.

2.2 Site Description

The site consists of three separate parcels of land, totaling 17.8-acres. The mainland portion is a 0.7-acre parcel is located on the south side of Abeel Street, and is part of the Rondout Creek Shoreline. A storage lot, separated from the mainland parcel by Island Dock Road, is located east of the main entrance. The lots are currently vacant with the exception of numerous concrete block piles, and are generally covered with gravel, asphalt or concrete. The former concrete block factory building is located on the mainland parcel. The building is now dilapidated and abandoned. A 2004 aerial photograph is provided as Plate 1, and depicts most of the current conditions.

The other two parcels, upper and lower Island Dock, form an Island in the Rondout Creek. The island contains a number of piles of debris and broken pieces of equipment formerly used in the concrete block-making process. An unpaved access road runs through the center of the island. A large building foundation, an abandoned trailer, and other of piles of crushed block and construction debris can be found on the western portion of the Island.

2.3 Site History

2.3.1 Historic Use of Site

The historic use of the site and properties in the surrounding area has been commercial or industrial in nature. The mainland portion of the site is cut-and-fill land initially established as a coal storage yard prior to 1887. The island portion of the site is an artificial island constructed circa 1898, which was also initially used as a coal storage yard. Plates 2 and 3 are photographs circa 1900, in which large stockpiles of coal are visible throughout the site. Historical aerial photographs indicate that the Rondout Creek formerly flowed completely between the island and the mainland, prior to the construction of Island Dock Road. After 1930, the site was used as a boat and lumber storage facility, and a concrete block manufacturing facility.

2.3.5 Previous Owners

The site is currently owned by Kingston Historic Waterfront, Island Dock, LLC. According to the deed reference, the property was transferred from Miron Building Products, Inc. to the current owner in 2003. Previous owners include Island Dock Lumber Company and Cornell Boat and Lumber Company.

3.0 SITE DESCRIPTION

3.1 Geology of Site

The Surficial Geologic Map of New York, prepared by Cadwell (1989), identifies the unconsolidated deposits in the vicinity of the site as either fluvial sand and gravel deposits (along the Hudson River) or glacial till consisting of sand, silt and gravel. These deposits exhibit variable texture. The till deposits are typically poorly sorted and consist primarily of clay, silt-clay and boulder-clay mixes with sporadic bedrock outcrops intertwined.

The Surficial Geologic Map indicates that the soils in the vicinity of the site are likely fill material. If not fill, the soils are listed as either laustrine deposits or glacial till. The Ulster County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. There is also an area of "Bath-Nassau-Rock outcrop complex, hilly" soils located near the northwest edge of the site.

According to the Geologic Map of New York, Lower Hudson Sheet, prepared by Fisher et al. (1970), bedrock below the site is likely to consist of Undifferentiated Lower Devonian and Silurian Rocks, and partially Austin Glen Formation. The Austin Glen formation consists of interbedded layers of greywacke and shale. The outcrops observed on site were more consistent with interbedded greywacke and shales. The outcrops appeared to consist of interbedded competent siltstone layers alternating with less competent shale.

The surficial topography of the subject site is relatively flat fill material, but gradually slopes southward toward the Rondout Creek (Topographical Survey, USGS, 1963). The regional topography generally slopes down noticeably to the southeast, toward the Hudson River.

3.2 Hydrogeology of Site

During the Phase II ESA conducted by Fuss & O'Neill, groundwater was typically encountered at depths of 2 to 9 feet below the ground surface. Given regional topography and the immediate proximity of surface water bodies, it is assumed that shallow groundwater flows from east to west across the site and discharges to the Rondout Creek. Because the reach of Rondout Creek adjacent to the site is tidally influenced, it is likely that groundwater flow at the site is affected by tides.

Groundwater is not used as a potable water supply in the area. Little information is available to date regarding groundwater quality beneath the site. Impacts to groundwater typically associated with industrial or commercial use would be based on the historical industrial use of this land and the surrounding properties.

3.3 Previous Investigations

A Phase I Environmental Site Assessment (ESA) was completed by The Chazen Companies for the subject site in November of 2001. Fuss & O'Neill was retained to conduct a supplemental Phase I ESA and a Limited Phase II ESA of the property in April of 2005. Significant findings of these investigations were incorporated into this document as warranted. An overview of sampling results from the Fuss & O'Neill Limited Phase II ESA is provided below. A summary of historical analytical results is presented in Table 1. Historical sample locations are identified on Figure 2.

Results obtained during the Limited Phase II ESA indicate the presence of contamination consistent with the use of the site for coal storage, lumber production and storage, and concrete block manufacturing. Concentrations of metals and semi-organic compounds (SVOCs) were found that exceed their respective TAGM 4046 Guidance Values. All of the detected metals occurred within the 0-4' sample interval, and maximum levels of chromium were detected within the 0-0.5' interval. Metals impacts were most noticeably present on and generally evenly distributed across the island portion of the site.

SVOC impacts were identified in both the mainland portion and island portion of the site. SVOCs were found in the vicinity of the existing building and near the former location of a large (unknown size) aboveground petroleum storage tank (AST). The tank cradle and secondary containment walls are still intact. On the island portion of the site, SVOCs were detected in 8 of 12 samples generally distributed across the island, with the maximum value found in the central northern section of the island in SB-05.

Petroleum impacted soil also has been identified in one area on the site. Low levels of petroleum-related volatile organic compounds (VOCs) were identified in the vicinity of the former AST in SB-01 and SB-02.

4.0 REMEDIAL INVESTIGATION WORK PLAN

4.1 Conceptual Site Model

The use of the site and properties in the surrounding area has historically been commercial or industrial in nature. The mainland portion of the site is cut-and-fill land initially established as a coal storage yard prior to 1887. The island portion of the site is an artificial island constructed circa 1898, which was initially used as a coal storage yard. Historical aerial photographs indicate that the Rondout Creek formerly flowed completely between the island and the mainland, prior to the construction of Island Dock Road. After 1930, the site was used as a boat and lumber storage facility, and a concrete block manufacturing facility. The existing building is rectangular with an approximate three story tall tower on the northern side containing what may have been a cement or raw materials chute. Large (4 ft by 6 ft) metal plates were found on the floor under the cement chute. It is unknown whether floor drains are located under the plates. The first floor of the building had small spills of red or orange concrete dye powder, and staining suggesting small oil spills. A boiler room with one large boiler and a water tank are located on the second floor. The staircase to the second floor of the building is unsafe for use; therefore, portions of the second floor were not inspected during the Phase I ESA.

Adjacent to the site, there is a parcel to the north previously occupied by an auto repair shop but is currently a small storage garage and private residence. This existing residential area is upgradient from the site and is not likely to be impacted by any contaminants that may be observed at the subject site. Along the shoreline to the east and west of the subject property are commercial marinas. Also north of the property is a public park, Block Park.

Results from the Phase II ESA indicate that surface soils at the site have been impacted by metals, petroleum-related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). In several locations, coal and coal slag were observed in soil borings and test pits within shallow soils less than 2.0 feet below ground surface. The presence of SVOCs at the site is indicative of coal or coal slag impacts. During the period that the site was used for lumber production and storage, it is likely that the handling and storage of treated wood occurred on unpaved surfaces. Therefore, soil at the site has potentially been impacted by surface releases of contaminants relating to pressure-treated wood. Arsenic and chromium were identified in shallow soils. Vertically, soil analytical results indicate that metals impacts decrease with depth, which is consistent with the use of the site as a lumber production and storage facility. Low levels of petroleum-related VOCs were identified in the vicinity of the former AST. The extent of VOC compounds has not been fully characterized; however, impacts appear to be contained to the general area.

Although the Phase I ESA report indicated an active underground petroleum bulk storage tank (UST) on site, no evidence of a UST was observed. The current facility owner has indicated that the tank was removed in 2004; however this has not been confirmed. An aboveground petroleum bulk storage tank (AST) of unknown size was located on the western side of the existing building. The cradle where the tank sat and the secondary containment walls are still intact.

Three electrical transformer casings were found on the island portion of the site. The age of these transformers is unknown. The casings are rusted and no labels or utility company contact information is available. Old transformers often contain polychlorinated biphenyls (PCBs). It

is possible that PCB fluid contained in the transformer casings was released to the underlying surface soils.

Potable water in the surrounding area is provided by the Kingston Water District; however there are no municipally supplied potable water connections to either the mainland or island portions of the site. Some piping structures including valve boxes and junctures were observed during the Phase I ESA but it is unknown what function this piping system performed.

To date, no groundwater studies have been performed to assess potential impacts resulting from historical site activities. At this time, it appears that the predominant transport mechanism for potential off-site impacts to adjacent resource areas (e.g., Rondout Creek) is through overland flow and not via groundwater. Future assessment activities will include the installation of monitoring wells to investigate the presence or absence of contaminant impacts to groundwater, as described in Section 4.2.3.

The intended re-use of the property is for residential, recreational and commercial services. Future use is likely to involve multi-story residential units with parking or other amenities located at the ground floor level. This will consist of apartments or condominiums and some commercial and recreational facilities to provide services for local residents. The proposed re-use of the site will be consistent with applicable zoning laws and development plans, and will capitalize on the proximity of the site to the Rondout Creek waterfront.

The mainland portion of the site abuts the Rondout Creek, and has direct access from Abeel Street. A playground and public park are located north of the subject site on Abeel Street. The island is a long, relatively flat, narrow parcel. The channel between the island and the mainland provides an excellent docking area for small recreational boats. The site has a significant natural tree cover, interspersed with open, grassy or shrub areas. The former NYS Route 9W Bridge spans approximately 400 feet over the north section of the island, although no bridge support structures are actually on the island.

4.2 Intent of the Investigation

The scope of work for the Remedial Investigation Work Plan (RIWP) is consistent with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and with NYSDEC Technical Administrative Guidance Memorandum TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels. This site investigation will also conform to the provisions of the United States Environmental Protection Agency (EPA) Triad Approach.

The Triad Approach uses streamlined approaches to sampling, analysis and data management activities during site assessment and remediation. Ultimately, the EPA expects to institutionalize these approaches and use these principles to guide the way data are collected and analyzed in future site cleanup decisions. This three-pronged approach incorporates the following:

- Systematic Planning – Uses a Conceptual Site Model (CSM) as the planning tool to ensure that the end goals for each project are clearly identified and the most resource-effective course is chosen to meet those goals. The CSM identifies the information that is already known about the project, which is used to determine what additional

information must be obtained in order to make project decisions. The CSM will be updated as new information becomes available so that the next course of action can be planned in the most efficient manner.

- Dynamic Work Plan – The application of a dynamic work strategy guides project teams in making decisions in the field about the progress of investigation and remediation activities. This allows them to focus efforts on those areas that are most relevant to achieving the project goals, and reducing efforts on those areas which are determined in the field to be less relevant.
- On-Site Analytical Tools – Rapid sampling platforms and on-site data interpretation are used by field personnel to focus data collection on relevant matrices. When a large amount of field data is needed to make project decisions, real-time information support is necessary. The implementation of state of the art analytical screening instruments enables an experienced field staff to rapidly develop project models in time-sensitive conditions.

The remedial investigation will involve sampling of surface and subsurface soil, groundwater, and sediment. In addition to the investigating areas where sampling has not yet been performed, approximately 20% of previously sampled locations will be re-sampled (See Figure 3). If it is determined that newly obtained results are comparable to historic data, the remaining 80% of previous samples will be considered adequate for site characterization, and will not be resampled. If discrepancies continue to be found between historic and new data, previous sample locations will be resampled as warranted. A summary of the sampling plan is provided in [Table 2](#).

4.3 Scope of Work

This section details the sampling protocol, sampling locations, and the quality assurance/quality control (QA/QC) processes necessary to accomplish the objectives of the Remedial Investigation at Island Dock located in Kingston, New York. The accompanying Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP) together comprise a detailed part of the SIWP and are attached as [Appendix A](#) and [Appendix B](#), respectively.

This section will provide the Field Operations Leader, Site Manager, and other operational personnel with clearly defined sampling objectives and methodologies that apply to field operations. Where appropriate, the RIWP makes reference to the QAPP, which contains detailed protocols for sampling, decontamination, and other QA/QC protocols.

4.3.1 Utility Subsurface (DigSafe) Notifications

As required by law, DigSafe New York, a state-wide underground utility locating service will be contacted prior to commencement of subsurface sampling activities to mark the location of public underground utilities within the project area. As a courtesy to the City of Kingston, Fuss & O'Neill will provide to the City of Kingston Building Department a verbal description of the work to be performed and the dates that work will be performed.

4.3.2 Soil Sample Collection and Analysis

In order to provide adequate areal sampling coverage of soils at the site, a 100-foot on center regularly spaced grid, designated with an alpha-numeric identification system, will be established over the site as depicted on the Proposed Sampling Plan, [Figure 3](#). Surficial geologic and chemical data will be collected at each 100-foot grid node location by using a GeoProbe direct push sampling system.

At each 100-ft. grid location, a shallow soil sample will be obtained at the surface. Attempts will be made to limit the shallow soil sampling interval to the top 0.5 feet of surface soil. To characterize vertical conditions, samples will be collected at approximately 1-3 foot interval depths down to and including the saturated zone. In areas where there are concrete slabs, foundations or paved drying areas on the ground surface, the surficial interval will begin immediately beneath the pavement or concrete. If additional sample volume is required, several samples can be collected within a 1-meter radius of the grid node location.

Once a sufficient number of samples have been obtained from the 100-ft. grid spacing and evaluated, additional samples will be collected in areas where evidence of soil contamination was observed through field screening. Additional samples will be collected laterally on a 50-ft. grid spacing and vertically at depths corresponding to depths of the initial detections, in order to delineate the extent and magnitude of contamination with as much confidence as possible. The soil sampling approach for this site is structured such that there is no formal summary of proposed samples, as the final number of samples collected and analyzed will be dependent on field observations. This method is consistent with the Triad approach to site characterization. The Site Plan, shown in [Figure 3](#), depicts the 100 and 50-ft. grid spacing. Once field screening of sample locations begins, decisions on the progress and direction of sample collection can be determined in the field, at the time of sample collection. The field sampling program will also include the use of Quality Assurance/Quality Control (QA/QC) samples including field duplicates, MS/MSD samples, trip blanks and equipment blanks. Data quality objectives and field protocols are discussed in Section 5.0.

Soil cores will be logged in the field and evidence of soil staining, odor, changes in lithology, moisture content, etc. will be recorded. If evidence of soil contamination (e.g. at petroleum impacted areas) is observed in the saturated zone, the boring may be extended to document the vertical extent of impacts through visual, olfactory, and/or field screening methods.

Sample points may be altered slightly due to field conditions or obstructions. In the event that refusal is encountered at a given sample point, the boring will be off-set approximately 1 meter and reasonable attempts to advance a replacement boring will be made.

Metals Analysis

Metals impacts, specifically arsenic, chromium, and selenium, were identified over much of the site. Therefore, field sampling for metals will be focused on characterizing this large area, including defining the vertical extent of contamination, while addressing the need for rapid sample processing and data interpretation.

Samples collected will be field screened for the presence of metals using a hand-held NITON XLp-702 Multi-element Soils Analyzer, or equivalent. This instrument will provide the majority

of field sampling results. Samples from the uppermost intervals will be analyzed first. After evaluating these results, additional analysis of the deeper intervals will continue until contamination is no longer observed. Initially, samples from approximately 1 in 5 sample locations will be submitted to a NYSDOH ELAP certified laboratory for analysis, and 1 in every 20 sample locations will be submitted for TCLP analysis. The number of samples submitted for laboratory analysis may be altered depending on correlation between field screening and laboratory results. Samples submitted for TCLP analysis will be chosen from the locations with the highest field screening results. Due to the extended holding times allowable for metals, it is likely that most samples will be temporarily held until an estimate of impacts can be made. In this way, samples submitted for confirmatory laboratory analysis can be focused on relevant areas. A summary of the sampling plan is provided in [Table 2](#).

Organic Compounds

Soil samples will be screened in the field for the presence of volatile organic compounds using headspace analysis with a hand-held organic vapor meter (OVM). Soil samples will be logged in the field and evidence of soil staining, odor, changes in lithology, moisture content, etc. will be recorded.

Selected soil samples will be submitted to a NYSDOH ELAP certified laboratory for analysis of volatile and semi-volatile organic compounds (VOCs/SVOCs). Sample intervals and specific analyses will vary based on depth, existing chemical data, and area of concern at the site. Soil samples not specifically designated for analysis will be submitted on hold to the laboratory in the event that additional analyses are required to complete the vertical characterization of metals impacts. A summary of the sampling plan is provided in [Table 2](#).

4.3.3 Monitoring Well Installation and Groundwater Sampling

Following the advancement of the soil boring using the GeoProbe DPT rig, approximately 12 of the proposed soil borings will be completed as shallow unconsolidated aquifer monitoring wells. Proposed well locations are shown on [Figure 3](#).

Proposed monitoring wells will be constructed with either 5 or 10-foot long well screens set approximately 3-12 feet into the groundwater table. As necessary, the annular space around the well screen will be backfilled with size-appropriate filter pack sand to a height of approximately 1 foot above the screen. Bentonite chips will be placed within the remaining annular space to prevent vertical migration of surface water.

Monitoring wells may be completed as PVC stick-ups with protective steel risers or completed at grade with flush-mount curb boxes. As necessary, selected wells can be modified during the remediation/site redevelopment stage of the project if specific wells need to serve as long-term monitoring points.

Following installation, monitoring wells will be developed by surge and purge techniques to remove fines and to improve hydraulic connection between the formation and the well screen. Each well will be developed until the well is producing water below 50 nephelometric units (NTUs) and the field parameters (i. e., temperature, pH, conductivity etc.) have stabilized. There shall not be any limits for the duration of development or the total volume of water removed in order to achieve the required water quality parameters.

Groundwater samples will be collected following well installation and development. Groundwater samples will be collected from newly installed monitoring wells by low-flow methods using a peristaltic pump technique. Prior to collection of groundwater samples, the depth of the water table will be measured. A summary of the sampling plan is provided in [Table 2](#).

One round of groundwater samples will be taken from the newly installed monitoring wells. Based on historic analytical results, groundwater samples will be analyzed for the following parameters and methods using ASP Category B protocols:

- VOCs by Method 8260B
- SVOCs by Method 8270C
- RCRA 8 suite of metals including copper (Total metals) by Method 6010B;

4.3.4 Sediment Sampling

Sediment samples will be collected at 5 locations along the Rondout Creek shoreline abutting the site. Proposed sediment sampling locations are identified on [Figure 3](#). Sediment samples will be analyzed for the following parameters and methods using ASP Category B protocols:

- VOCs by Method 8260B
- SVOCs by Method 8270C
- RCRA 8 suite of metals including copper (Total metals) by Method 6010B;

4.3.5 Off-Site Exposure Assessment

To evaluate the potential contamination of properties adjacent to the subject property as a result of actions on the subject property, information obtained during the remedial investigation will provide for an off site exposure assessment. This will include the collection of soil samples at the site boundaries, placement of monitoring wells such that off-site migration of groundwater can be assessed and monitored, and review of historic information to determine the extent of site activities.

4.3.6 Tide Monitoring

Because the Hudson River, and subsequently the mouth of the Rondout Creek, is tidally influenced at this site, it is likely that water table elevations and groundwater flow at the site are affected by tidal changes. To assess the potential effect of tides on groundwater underlying the site, a gauging station will be established in an accessible location in the Rondout Creek. The staff gauge will be installed by hand and will be surveyed for elevation. Periodic water level measurements will be recorded from the newly installed monitoring wells (Section 4.2.3), and will be compared to the water elevations recorded at the staff gauge, as well as tide schedules published by the U. S. Coast Guard.

Data obtained during this study will document whether tidal changes in the Hudson River are likely to significantly affect groundwater flow potentials within the shallow unconsolidated

aquifer underlying the site and provide information on possible contaminant fate and transport mechanisms.

4.3 Mapping and Location Survey

Sampling and monitoring locations (e.g., groundwater, soil, and sediment) will be survey located in the field and these locations will be added to the base map maintained by Fuss & O'Neill. At monitoring wells, PVC measuring point elevations will be determined so that groundwater elevations can be calculated from water level data recorded at monitoring wells. Additionally, efforts will be made to verify the location of any existing underground storage tanks. If sufficient field evidence can be obtained regarding the physical location of historical sampling points, these locations will be confirmed by field survey.

4.4 Human Health Exposure Assessment

The potential impacts to future users of the property, based on proposed site development, will be evaluated in the context of the potential exposure pathways and contaminants of concern. The Human Health Exposure Assessment (HHEA) will evaluate the potential exposure to site contaminants of concern during redevelopment and reasonably anticipated future site. The HHEA will focus on the contaminants present at the site, and will present an analysis and evaluation of the potential risks and hazards to human health that may exist.

5.0 PROTOCOLS AND METHODS

The following sections provide details on, data quality objectives, sampling and analytical protocols and health and safety measures to be used in this investigation. In addition, methods for data validation and handling of investigation derived wastes are documented.

5.1 Data Quality Objectives

The data quality objectives of this Work Plan include:

- Define the nature and extent of impacted media
- Assess compliance with applicable cleanup criteria
- Generate the data necessary to conduct a remedial action alternatives assessment and to develop a Remedial Work Plan

Environmental media to be sampled as part of this investigation include soil, groundwater, and sediment. Standards and criteria to be considered during the evaluation of analytical results include:

- The New York State Department of Environmental Conservation Brownfield Soil Cleanup Objectives under TAGM 4046
- The New York State Department of Environmental Conservation Groundwater Standards as provided in TOGS 1.1.1

Analytical detection limits will be low enough to allow for the comparison of laboratory results to applicable criteria. Laboratory analysis for this project will be provided by a NYSDOH

ELAP certified laboratory. NYSDEC will be notified of the approved laboratory to be used in conjunction with this project.

5.2 QA/QC Procedures

Fuss & O'Neill's quality assurance/quality control (QA/QC) procedures are documented in the project QAPP, attached as Appendix B. The field sampling program will include the use of field duplicates, MS/MSD samples, trip blanks and equipment blanks. Approximately one field duplicate and one MS/MSD sample will be collected for every 20 sample locations. In general, the field sampling program will include the collection of one VOC trip blank for each day that VOC sampling occurs. A summary of QA/QC samples proposed at this site is presented in Table 2.

5.3 Analytical Methods

Based on historic uses of the site, the target compounds for this investigation include volatile and semi-volatile organic compounds (VOCs and SVOCs) and metals:

- Volatiles will be analyzed by Method 8260B
- Semi-volatiles will be analyzed by Method 8270C
- Metals will be analyzed by Method 6010
- Metals in soil also will be assessed by the Toxicity Characteristic Leaching Procedure (TCLP), if warranted.

Samples will be analyzed by a NYSDOH ELAP certified laboratory. Standard operating procedures for the laboratories are referenced in the project QAPP

5.4 Data Usability

This Work Plan outlines a systematic process for assessing data generated during monitoring and environmental investigation activities at the site. The generation and use of quality data is important in the assessment of areas of concern and the selection of appropriate corrective measures.

The function of the data verification process is to identify sampling and analytical error and not to make final determinations about the overall usability of the data for the project. The usability assessment will be conducted by the Quality Assurance Officer (QAO) and the results of the assessment will be reported to the project manager. The usability assessment will report how validated project data is reconciled with the project quality objectives and limitations, if any, of the data. Reconciliation may require re-sampling or recommending the use of selected data even though it did not meet the project DQOs.

Quality control issues will be discussed in the usability assessment and the QAO will recommend the use or rejection of the data. Ultimately, the project manager will determine the usability of the data based on an understanding of the project DQOs and the results of the data validation process. The results of the usability assessment will be summarized in the Data Usability Summary Report (DUSR).

Data from this investigation may be validated by the Project Quality Assurance Officer (QAO). The results summarized in the Data Usability Summary Report (DUSR) will address the following:

- Assess and summarize the analytical quality and defensibility of data for the end user
- Document factors contributing to analytical error that may affect data usability, such as: data discrepancies, poor laboratory practices that impact data quality, site locations for which samples were difficult to analyze
- Document “sampling error” that may be identified by the data validation process, such as contaminated trip or equipment blanks, incorrect storage or preservation techniques, improper sampling containers, and improper sampling techniques

5.5 Investigation Derived Waste

Soil cutting generated during the soil boring and monitoring well installations will be containerized and characterized for off-site disposal. Any borehole not completed as a monitoring well will be backfilled with bentonite pellets.

All waste water will be contained and characterized for proper off-site disposal. All decontamination water will be contained and disposed of properly. If separate phase petroleum is observed on purge water or development water, this investigation derived waste will be segregated and contained for later disposal.

Liquid and soil waste will be placed in clearly labeled Department of Transportation-approved drum(s). The drums will be covered and secured except when material is being added or removed. Characterization of wastes will consist of an evaluation of existing analytical results, location relative to known contaminant sources, and laboratory results. Waste materials that cannot be immediately classified as hazardous or non-hazardous will be labeled “Pending Hazardous Waste Analysis – Being Tested.” Drums containing wastes generated at the property will be stored in a designated staging area on site.

5.6 Health and Safety Plan

The site Health and Safety Plan (HASP) for the project is provided in Appendix B. The HASP addresses the requirements of Occupational Safety and Health Administration safety and health standards: OSHA 29 CFR General Industry. This HASP is designed to cover those special and/or unique health and safety procedures arising from actual or potential contact with contaminated materials and those requirements pursuant to OSHA 29 CFR 1910.120.

6.0 REMEDIAL INVESTIGATION REPORT AND DATA MANAGEMENT

Field and laboratory data collected during the investigation will be entered into GIS/Key™, an environmental data management system. GIS/Key™ is the database system used by Fuss & O'Neill to sort, query, and produce output of selected data. Data entered into the database are verified by the operator by comparing the database output to the original field data sheets and hard copy laboratory results. Once the data has been verified, GIS/Key™ can be used to present the data in a variety of ways, including: tabular data presentations, graphical data presentations, contour maps, geological cross sections, section view isopleths and three

dimensional graphical representations of contaminant distribution. Output from GIS/Key™ can be enhanced using software utilities such as MS Excel, AutoCAD, and ArcView.

Output from GIS/Key™ will be used to refine the CSM for the site. The following information will be included in the Remedial Investigation Report:

- Description of setting and historical information regarding site activities and potential release mechanisms
- Documentation of environmental field assessment activities and laboratory data generated during the investigation
- Updated CSM describing the nature and extent of impacts associated with identified release areas at the site
- Documentation that data generated during the investigation are appropriate for comparison to applicable standards
- Evaluation of environmental data to determine compliance with the NYDEC Brownfield Cleanup Criteria

This information may be summarized in tabular form and presented on maps and cross-sections, as appropriate, showing contaminant distribution and other features which could affect contaminant migration. A complete summary report including assessment activities and findings will be prepared at the completion of the investigation for submittal to the NYSDEC. Ultimately, this report will provide a basis for the evaluation and implementation of remedial action(s) at the site.

7.0 PROJECT SCHEDULE

A summary of proposed key milestones for the Remedial Investigation is presented below. Note that the schedule is subject to change based on results of field assessment activities and conditions encountered in the field.

	Months after Authorization																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Task																		
BCP Program																		
1) BCP Application																		
2) Supplemental RI and Report																		
3) Remedy Scoping & RAWP																		
4) Site Remediation																		
5) Engineers Report and Certification																		

8.0 REFERENCES

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U.S. EPA, Region I, July 1, 1993. Tiered Organic and Inorganic Data Validation Guidelines.

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U.S. EPA, October 1998. Quality Assurance Guidance for Conducting Brownfield Site Assessments.

TABLES

FIGURES

PLATES

APPENDIX A

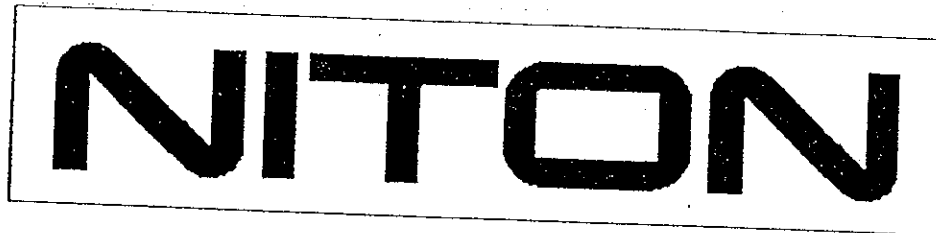
Quality Assurance Project Plan

APPENDIX B

Health and Safety Plan

APPENDIX C

Citizen Participation Plan



LLC

Training Outlined

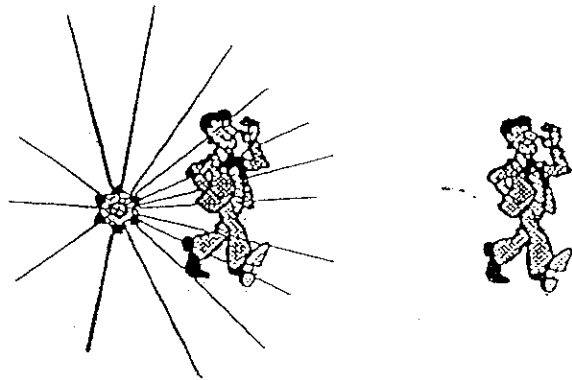
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ken@niton.com

These materials are classroom handouts and are not intended for any use except to provide students with a convenient way to take notes in class. All operational directions and procedural methods are provided in the NITON Instruction Manual.

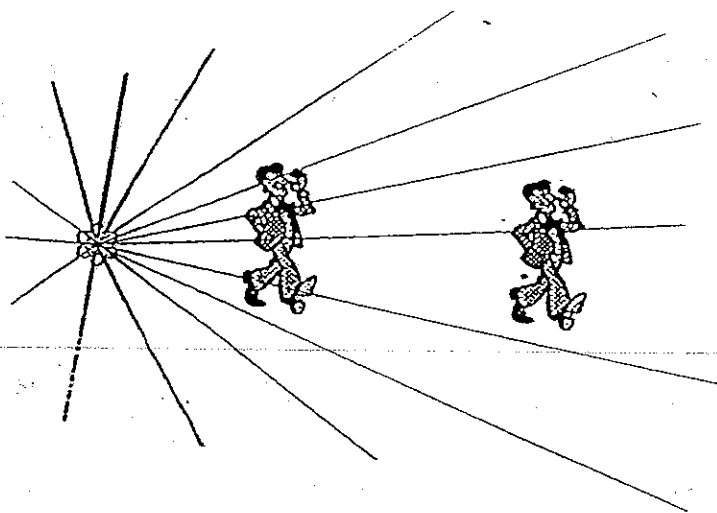
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Basic Methods of Radiation Protection



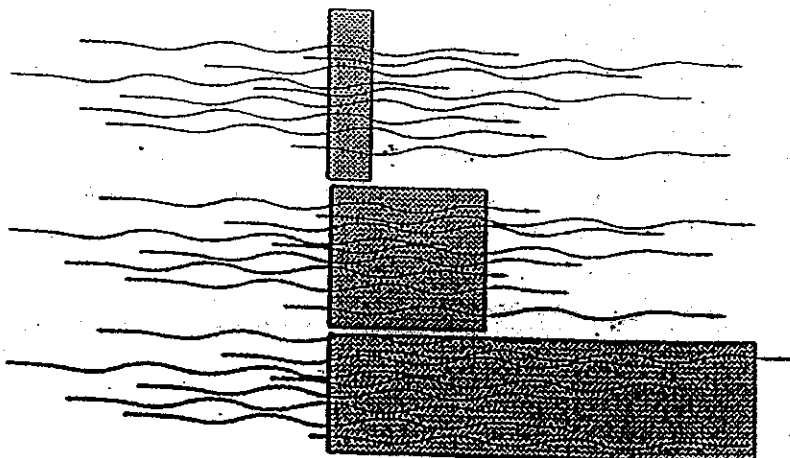
TIME

Decreasing the time of exposure. There is a linear relationship between the length of time that a person is exposed and their total dose. The longer you are exposed, the higher your dose.



DISTANCE

Increasing the distance between the source of radiation and the person. Radiation is spreading out at all directions from a radioactive source. As you travel further away from the source, fewer of the radioactive particles will strike you. For a point source, your exposure will be reduced by the ratio of the exposure levels divided by the respective distances, squared, between two locations.



SHIELDING

Increasing the amount of shielding between the source of radiation and the person. For X-Rays and Gamma rays, increasing the thickness of shielding will reduce the penetration of those photons. While not 100% shielded, the level can be reduced to acceptable levels.

ALARA

ALARA is a policy to lower exposure to radiation. It stands for "As Low As Reasonably Achievable". It means that, regardless of the exposure level, reasonable steps should be taken to further reduce exposure (even if you are below the regulatory limits)

EXPOSURE LEVELS

There are exposure limits for various parts of the body.

OSHA exposure limits that would be of concern to NITON XRF users are:

Whole body exposure	5,000 mREM/yr	1,250 mREM/ quarter
Extremities	75,000 mREM/yr	17,500 mREM/ quarter

Individual states may have limits set for the exposure of the public. The lowest of these is 100 mREM/yr and 1 mREM/ day.

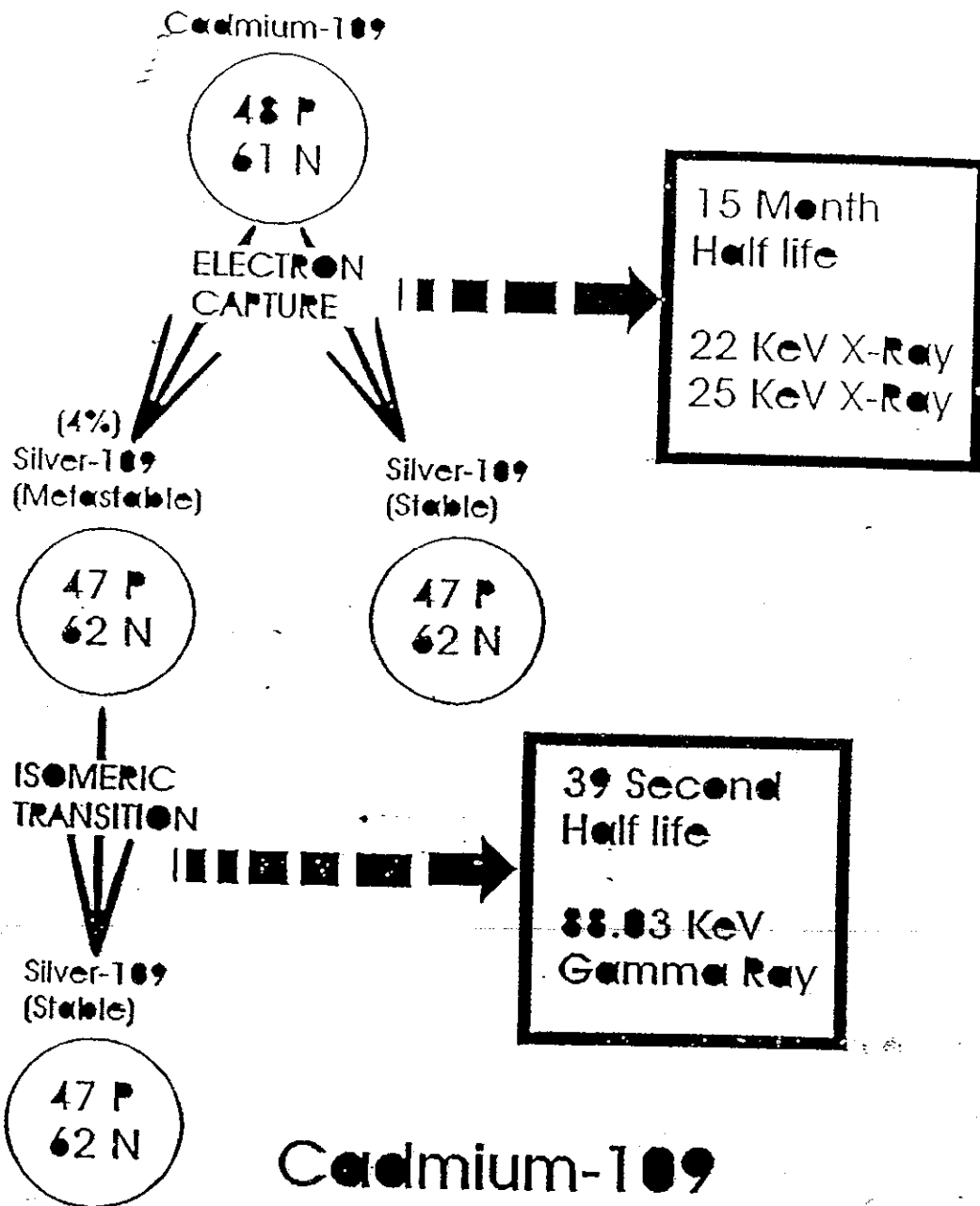
Example

Let's say, for example, you were to measure an exposure level (of X-rays) of a person of 0.1 mRAD/HR with a Geiger counter. You would need to know how long a person was exposed at that level to calculate their dose (let's say 3 hours for this example). So, 0.1 mRAD/HR multiplied by 3 hours gives 0.3 mRAD. Since the QF=1, their dose would be 0.3 mREM.

SPECIFIC SAFETY PRACTICES FOR NITON XRFs

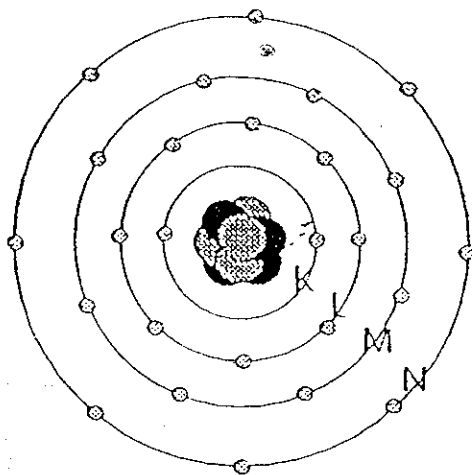
Some safety practices should be followed with the use of the NITON XRF:

- Never point the XRF at yourself or anybody else with the shutter open when they or you are within a distance to be exposed.
- Stand to the rear or side of the XRF when the shutter is open.
- Do not fix the shutter in an open position (except in provided test stands).
- Do not leave the XRF unattended.
- Store the XRF in a safe place. Do not drop the machine (or put the instrument in a position where it will be likely to be dropped).
- Wear a dosimeter ring (if regulations require).
- Perform wipe tests, per manufacturer's instructions.
- Women of child bearing age should be aware of the potential damage to a developing fetus from radiation exposure.
- Transport XRF in a shock-proof case.
- Follow all manufacturer's training and instructions.

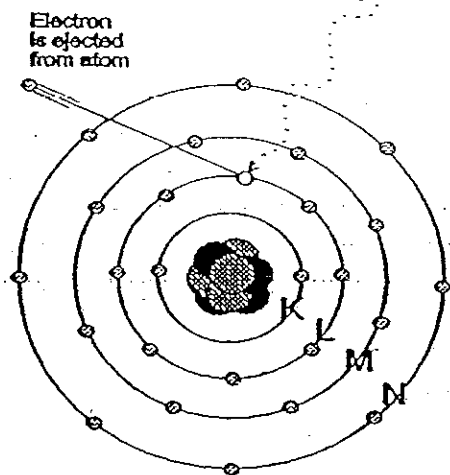


Cadmium-109 Decay Information

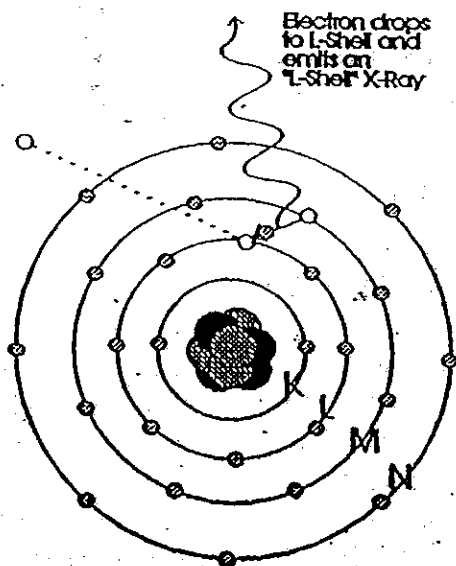
The ^{109}Cd undergoes radioactive decay in a two step process. The ^{109}Cd decays to Silver-109 (^{109}Ag). In doing so, X-rays of two energies are released, 22 KeV and 25 KeV. Both of these X-rays have enough energy to cause L-shell fluorescence in the lead atom. Approximately four percent of the time the ^{109}Ag that is formed is not stable. This unstable ^{109}Ag further decays (almost immediately) to the stable form of ^{109}Ag . In doing so, it releases a Gamma Ray with an energy of 88.03 KeV. This Gamma Ray has enough energy to cause K-shell fluorescence in the lead atom.



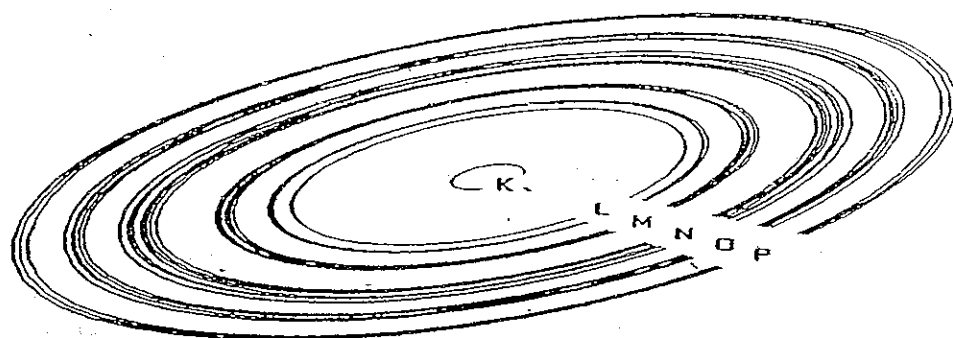
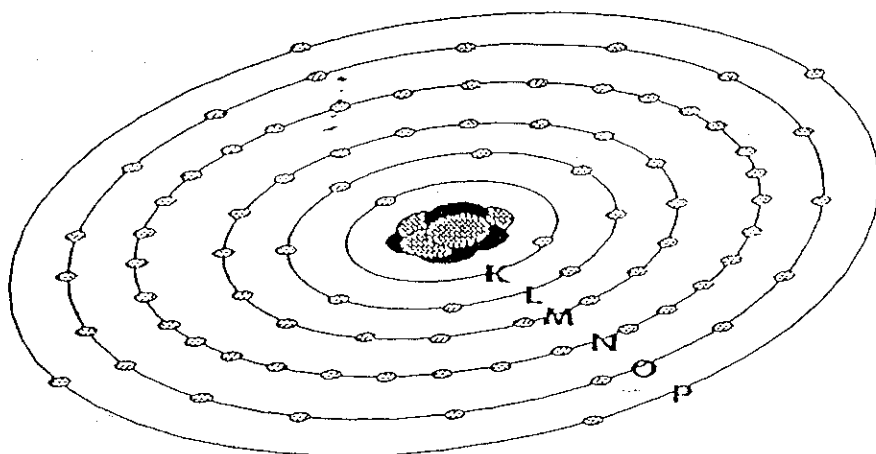
The center of an atom (the nucleus) is occupied by protons and neutrons. Electrons orbit around the nucleus of the atom. For an uncharged atom, the number of electrons equals the number of protons. For each element, the electrons are orbiting the nucleus at different energy levels. These "orbits" or "shells" each contain a specific number of electrons. The shells closest to the nucleus get filled first and the shells get filled from the inner-most to the outer-most shell. Shells are named with the inner-most being the K-shell, then L-shell, etc., alphabetically named. The K-shell electrons can be thought of as having the lowest level of stored energy. The further out the electron shells are, the higher the energy level they have stored (the L-shell electrons have more stored energy than the K-shell electrons, the M shell electrons have more stored than the L shell, etc.).



A photon of high enough energy hits a K-shell or L-shell electron and knocks it out of the atom. For lead, to remove K-shell electrons require 88 KeV and to remove L-shell electrons requires 16 KeV. In the NITON XRFs the photons of energy that cause fluorescence is provided by a radioactive source (^{109}Cd) in the instrument. The Cadmium-109 is a source of photons at 22 KeV, 25 KeV, and 88.03 KeV. For lead atoms, these photons cause fluorescence and generate both K-shell and L-shell X-rays.



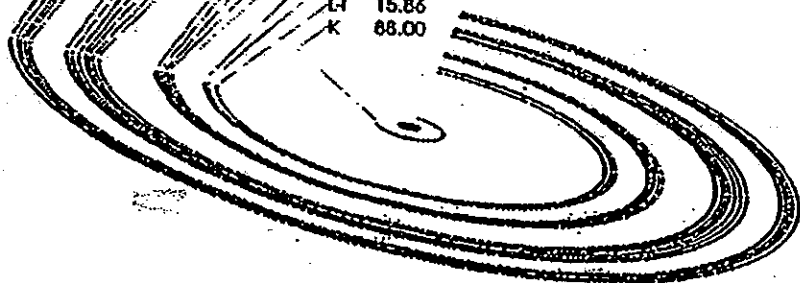
The vacancy that is created from the electron being ejected is filled by a more outer shell electron. In dropping to the lower energy level, the electron gives off energy in the form of an X-ray (for K-shell and L-shell for lead atoms). This X-ray is detected by the XRF, identified as being from lead, and the number of X-rays detected are used to determine the lead concentration.



This depiction shows the different energy levels in the lead atom. Note that most of the shells have more than one energy level within it for its electrons.

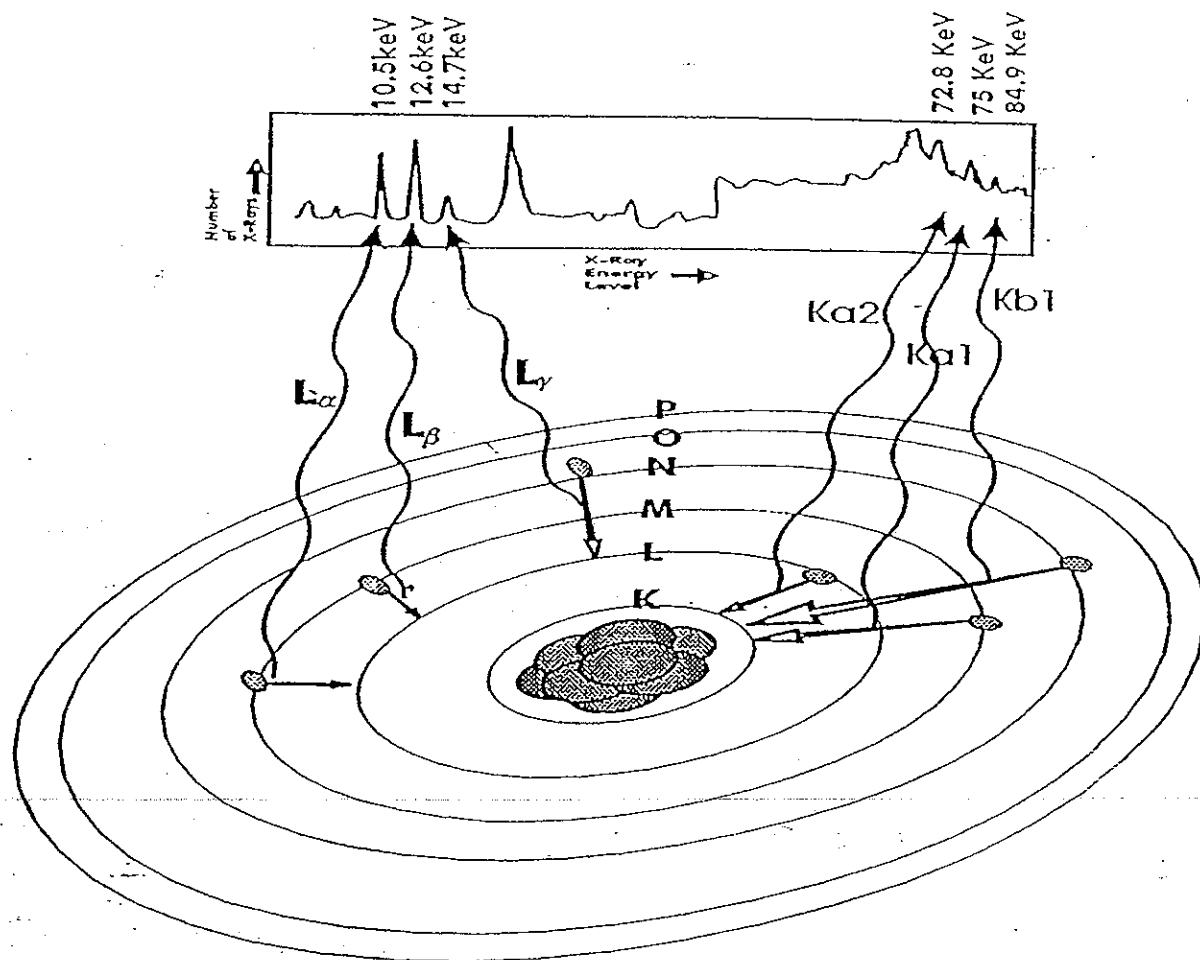
ENERGY
LEVEL KeV

O-V	0.02
O-IV	0.02
O-III	0.08
O-II	0.11
O-I	0.15
N-VI	0.14
N-V	0.14
N-IV	0.41
N-III	0.43
N-II	0.64
N-I	0.76
M-III	0.89
M-V	2.48
M-IV	2.59
M-II	3.07
M-I	3.55
M	3.85
L-III	13.04
L-II	15.20
L-I	15.86
K	68.00



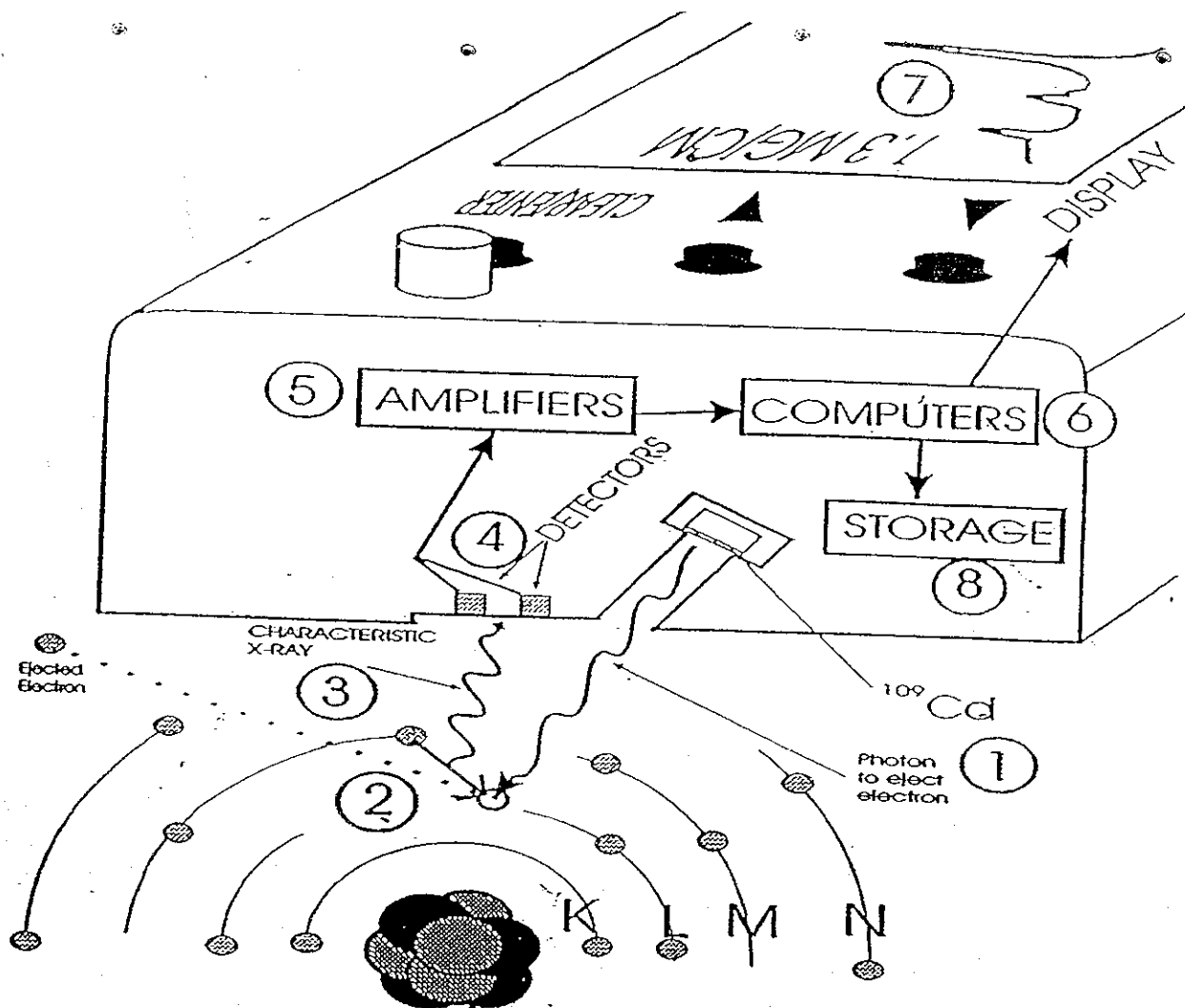
This depiction gives the different binding energy levels in the lead atom. After an electron is ejected from an atom, its vacancy is filled by an electron from an outer shell. The resultant photon will have the energy of the difference in energy levels of the vacated electron and the electron that fills that vacancy. Since the energy levels of the shells are unique for each atom, the differences will be unique. (This is only mostly true, since there can be the same energy difference from two different shells of another atom.)

After the X-rays are measured by the NITON XRFs they are stored as an energy spectrum. The energy spectrum has the number of X-rays displayed on the Y-axis and the energy level of those X-rays on the X-axis. The NITON XRFs are classified as "spectrum analyzers". To determine the elemental concentration the instrument examines only the energy region where that element's X-rays are located. The number of returning X-rays determines the concentration.

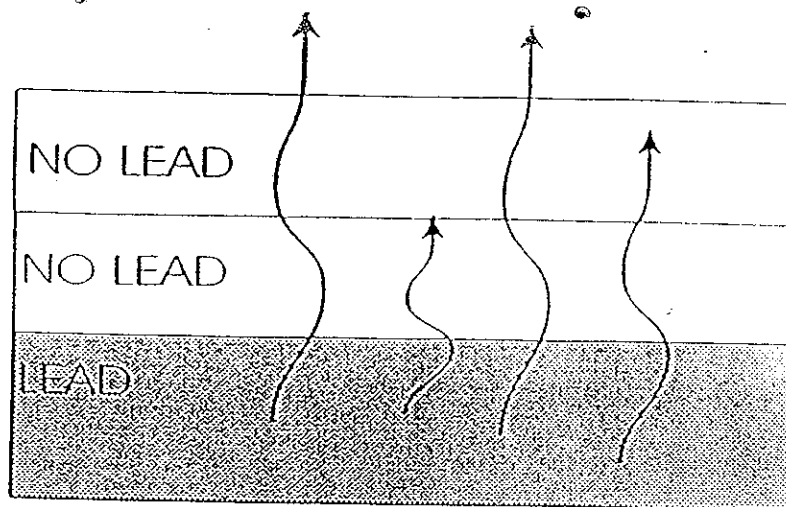


An electron may be ejected from more than one L-shell energy level (but only one for K-shell). Also, the electron vacancy can be filled by an electron in the next higher shell or can be filled by an electron from an even higher shell. As a result of this, K-shell and L-shell fluorescence results in each having several distinct energies of X-rays being generated. The relative occurrence of these peaks is in a constant ratio. We can use the fact that several peaks must be present at the same time and in a certain ratio to further confirm the identity of the element that we are trying to measure.

With the NITON XRF there are three L-shell X-rays that are generated with enough frequency that allow them to be measured. Similarly, there are three K-shell X-rays that occur often enough to be measured. L-shell X-rays are at 10.5 KeV (L-alpha), 12.6 KeV (L-beta), and 14.7 KeV (L-gamma). The K-shell X-rays are at 72.8 KeV (K-alpha-2), 75 KeV (K-alpha-1), and 84.9 KeV (K-beta-1).



1. ^{109}Cd source emits photons with energies high enough to cause K-shell and L-shell fluorescence.
2. K-shell and L-shell electrons are ejected from the atom. Some photons are scattered by the material being tested.
3. An electron from a higher energy shell drops down to fill the vacancy created by the ejected electron. This electron gives off its excess energy in the form of a characteristic X-ray.
4. The two detectors each count and measure the energies of the X-rays that hit them.
5. The amplifier sections amplify the signals from the detectors and convert them to digital form for input into the computer section.
6. The computers take the digital signal and convert it into an energy spectra. The portions of the spectra that the characteristic X-rays for lead appear are examined and a lead concentration is independently calculated for both L-shell and K-shell X-rays. In STANDARD MODE one answer is given.
7. The result and sample number are given, along with other information (depending upon which mode you are in). The L-shell portion of the energy spectra is displayed (except in STANDARD MODE, where no spectra is displayed).
8. The readings, energy spectra for lead, and information that is entered through the bar code system are stored.



PAINT

XRFs measure the concentration of lead in paint by looking through all of the layers of paint and measuring the lead content. The standard way that XRFs report lead concentration is as milligrams of lead per square centimeter of surface area measured (mg/cm^2).

A feature that most painted surfaces have in common is that they are not homogeneous. Different paints are made from different materials, in different concentrations.

The X-rays that are generated by the lead in the paint need to travel through the non-lead paint to reach the detectors. The lower the energy of these X-rays, the more they will be shielded by the layers of paint.

The L-shell X-rays are of an energy level that they are partially shielded by the layers of paint on top of the lead. Because of this, a patented algorithm was developed by NITON to calculate lead concentration for L-shell X-rays, for paint. The algorithm compares the ratio of the L-beta (12.6 KeV) to the L-alpha peak (10.5 KeV). Both of these X-rays are partially shielded by the upper layers of paint. Because the L-beta X-rays are a higher energy level than the L-alpha X-rays, they are shielded to a lesser degree. By looking at the ratio of the number of these X-rays, the amount of shielding can be calculated. Once this is known, a correction can be made to the number of X-rays counted (in this case the L-beta X-ray) to determine the correct lead concentration in the paint.

For K-shell X-rays, the number of K-shell X-rays that are measured by the detector is counted. The X-rays are such high energy that they are relatively unaffected by the layers of paint on top of the lead paint. One disadvantage of using the K-shell X-rays is that they are affected by the sample substrate (to a larger or lesser degree, depending upon the substrate). Another disadvantage is the relatively small number of K-shell X-rays that are detected by the instrument.

Performance Characteristic Sheet

EFFECTIVE DATE: April 17, 1998

EDITION NO.: 4

MANUFACTURER AND MODEL :

Make: *Niton Corporation*

Models: *XL-309, 701-A, 702-A, and 703-A Spectrum Analyzers*

Source: ^{109}Cd (10 - 40 mCi initial source strength)

Note: This Performance Characteristic Sheet (PCS) is applicable to the listed Niton XRF instruments which have an operating software version of 5.1 (or equivalent) using a variable-time mode, and to Niton instruments having an operating software version of 1.2C (or equivalent) using a fixed-time mode. This sheet supersedes all previous sheets for the XRF instruments made by the Niton Corporation and the 1993 testing of XL prototypes reported in the document titled: *A Field Test of Lead-Based Paint Testing Technologies: Technical Report* (EPA Report No. 747-R-95-002b, May 1995).

FIELD OPERATION GUIDANCE

This PCS provides supplemental information to be used in conjunction with Chapter 7 (Lead-Based Paint Inspection) of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown in this sheet are applicable only when operating the instrument using the manufacturer's instructions and the procedures described in Chapter 7 of the HUD Guidelines.

OPERATING PARAMETERS:

Use of variable-time paint test mode ("K & L + Spectra" mode) on instruments running software version 5.1 (or equivalent) using the "Combined Lead Reading" with the instrument's display of a 95%-confident (2-sigma) *Positive* or *Negative* determination versus the action-level as the stopping point of the measurement.

Use of nominal 20-second readings for L-shell results or 120-second readings for K-shell results on instruments running software version 1.2C (or equivalent) in a fixed-time mode.

XRF CALIBRATION CHECK LIMITS:

0.9 to 1.2 mg/cm ² (inclusive) for instruments running software version 5.1 (or equivalent)
0.9 to 1.1 mg/cm ² (inclusive) for instruments running software version 1.2C (or equivalent)

SUBSTRATE CORRECTION :

(applicable to instruments running software versions 5.1 (or equivalent) or 1.2C (or equivalent))

For XRF results below 4.0 mg/cm², substrate correction recommended for:

None.

Substrate correction is not recommended for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

THRESHOLDS:

(applicable to instruments running software versions 5.1 (or equivalent) or 1.2C (or equivalent))

DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm ²)
Results not corrected for substrate bias	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0
For instruments running software version 1.2C (or equivalent), application of the decision making methodology recommended in this PCS can result in inconclusive results regardless of whether decisions are based on L-shell readings, K-shell readings, or both.		

BACKGROUND INFORMATION**EVALUATION DATA SOURCE AND DATE**

Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Three rounds of tests were conducted on approximately 150 test locations in each round.

One round of testing was conducted March 1995 using a single instrument with an October 1994 source at 10 mCi initial strength while running software version 1.2C in a fixed-time mode with nominal 20-second readings for L-shell results or 120-second readings for K-shell results.

The two other rounds of testing were conducted December 1997 using three different instruments, each running software version 5.1. Two of these instruments had new sources installed November 1997, the other instrument had a new source installed December 1997, all with 10 mCi initial strength. The December 1997 testing was performed in the variable-time paint test mode "K & L + Spectra" using the "Combined Lead Reading" with 2-sigma confidence interval as the stopping point of the measurement.

XRF CALIBRATION CHECK:

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm² in the NIST Standard Reference Material (SRM) (e.g., for NIST SRM 2579, use the 1.02 mg/cm² film). Measurements should be bracketed by successful XRF calibration check readings. XRF calibration checks are performed at the beginning and end of the day's inspections or at extended delays in testing, and (at least) every four hours during inspections or at a frequency recommended by the manufacturer, whichever is more stringent. If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instrument into control before XRF testing proceeds. Measurements which are not bracketed by successful calibration checks should be considered suspect.

EVALUATING THE QUALITY OF XRF TESTING

Randomly select ten testing combinations for re-testing from each house or from two randomly selected units in multifamily housing. (A testing combination is a location on a painted surface as defined in Chapter 7 of the HUD Guidelines.) For testing combinations involving up to four walls in a room, each wall is classified on its individual XRF reading. (See Chapter 7 for testing procedures if there are more than four walls in a room, and for testing exterior walls.)

For instruments running software version 5.1 (or equivalent), conduct the test in the variable-time paint test mode "K & L + Spectra" using the "Combined Lead Reading" with 2-sigma confidence interval as the

stopping point of the measurement. For instruments running software version 1.2C (or equivalent) in the fixed-time mode, use either 20-second readings for the L-shell results or 120-second readings for the K-shell results, as described in the "Classifications of Results" section below.

Conduct XRF re-testing at the ten testing combinations selected for re-testing.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family and multifamily housing, a result is defined as a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten retest XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

BIAS AND PRECISION

Bias and precision data were not computed for instruments using software version 5.1 and taking variable mode readings. (See Appendix B, Section B.3.2 of the document titled *Methodology for XRF Performance Characteristic Sheets*, EPA-747-R-45-008, September 1997). During the 1997 testing, there were 12 testing locations with laboratory-measured lead levels equal to or greater than 4.0 mg/cm^2 lead which were tested using two instruments in the variable-time paint test mode. None of these testing locations had XRF readings less than 1.0 mg/cm^2 . These data are for illustrative purposes only. Substrate correction is not recommended for this XRF instrument.

The bias and precision data given below are for instruments running software version 1.2C (or equivalent) and were computed without substrate correction using the 20-second L-shell readings from samples with

reported laboratory results less than 4.0 mg/cm^2 lead. Readings reported by the instrument in the "x" or ">>x" format were not used in the computation. During the 1995 testing there were 15 test locations with a laboratory reported result equal to or greater than 4.0 mg/cm^2 lead. Of these, 12 readings were reported in the ">x" or ">>x" format, but of the 3 remaining, 1 had an XRF reading less than 1.0 mg/cm^2 .

Bias & Precision Results for Niton Model XL-309 Instruments Using Software Version 1.2C (or equivalent)

MEASURED AT	SUBSTRATE	BIAS (mg/cm^2)	PRECISION (mg/cm^2)
0.0 mg/cm^2	All	0.0	<0.1
0.5 mg/cm^2	All	0.0	0.2
1.0 mg/cm^2	All	0.0	0.3
2.0 mg/cm^2	All	-0.1	0.5
Precision at 1 standard deviation			

CLASSIFICATION OF RESULTS

This section describes how to apply information displayed by this instrument to determine the presence or absence of lead in paint using the procedures recommended in Chapter 7 of the HUD Guidelines. These guidelines recommend classifying XRF results as positive, negative, or inconclusive compared to the lead-based paint 1.0 mg/cm^2 standard.

For Niton Model XL-309, 701-A, 702-A, and 703-A instruments running software version 5.1 (or equivalent), XRF results are classified using a threshold. There is no inconclusive classification when using the threshold for instruments running software version 5.1. In single-family and multifamily housing, an XRF result is a single reading taken on each testing combination. (A testing combination is a location on a painted surface as defined in Chapter 7 of the HUD Guidelines.) For testing combinations involving up to four walls in a room, each wall is classified on its individual XRF reading. (See Chapter 7 for testing procedures if there are more than four walls in a room, and for testing exterior walls.) For computing the XRF result, use all digits that are displayed by the instrument as the "Combined Lead Reading." Results are classified as positive (i.e., $\geq 1.0 \text{ mg/cm}^2$), if greater than or equal to the threshold, or negative ($< 1.0 \text{ mg/cm}^2$) if less than the threshold. Threshold values, provided in the tables above, were determined by comparing XRF test results to the 1.0 mg/cm^2 standard.

For Niton Model XL-309 instruments running software version 1.2C (or equivalent), additional procedures are needed to classify readings because this software displays readings and ancillary information useful for classification purposes. An algorithmic procedure is described that makes use of the XRF reading and other displayed information.

The algorithm for classifying results is first applied to 20-second nominal L-shell readings followed by 120 second nominal K-shell readings to resolve inconclusive results, or to recommend laboratory analysis of paint-chip samples, if necessary. A listing of laboratories recognized by the EPA National Lead Laboratory Accreditation Program (NLLAP) for the confirmational analysis of inconclusive results is available from the National Lead Clearinghouse at 1-800-424-LEAD.

XRF results are classified using threshold values for the Model XL-309 software version 1.2C (or equivalent). Results are classified as positive if greater than or equal to the threshold, and as negative if less than the threshold. There is no inconclusive classification when using threshold values. However, in some cases, inconclusive results still may be obtained regardless of whether decisions are based on L shell readings, K-shell readings, or both, as described below. Use all digits that are reported by the instrument. Threshold values, which were determined for comparing results to the 1.0 mg/cm^2 standard are provided in the table above.

This instrument displays its lead-based paint measurements as both L-shell and K-shell readings based on

the corresponding L-shell and K-shell X-ray fluorescence (refer to Chapter 7 of the HUD Guidelines for more details). The L-shell readings (or L-readings) are displayed as a numerical result alone, or as a numerical result preceded by either one greater-than symbol (" $>$ ") or preceded by two greater-than symbols (" $>>$ "). The two greater-than symbols will only be displayed when the detected lead level is greater than 5.0 mg/cm². Since the maximum lead level reported by this instrument is 5.0 mg/cm², lead levels greater than 5.0 mg/cm² are displayed as " $>>5.0$ ". Other examples of how L-readings can be displayed (in mg/cm² units) are "0.6" and " >0.9 ". The numerical display alone implies that the instrument measured the lead in the paint at the displayed level using L-shell X-ray fluorescence; 0.6 mg/cm² in the example. A number preceded by a single greater-than symbol indicates that the measurable lead is deeply buried in the paint and the detected lead level is greater than the displayed value. In the example, >0.9 indicates that the instrument detected lead deeply buried in paint at a level greater than 0.9 mg/cm². K-shell readings (or K-readings) are displayed in one of two ways: 1) as a single K-reading plus and minus a "precision" value or 2) as an upper K-reading and lower K-reading.

The same method is used for testing in single-family and multifamily housing. The HUD Guidelines recommend taking a single XRF reading on a testing combination. (A testing combination is a location on a painted surface as defined in Chapter 7 of the HUD Guidelines.) For testing combinations involving up to four walls in a room, each wall is classified on its individual XRF reading. (See Chapter 7 for testing procedures if there are more than four walls in a room, and for testing exterior walls.)

A. Take a single 20-second nominal reading on each testing combination.

B. Classify the L-reading based on the type of information displayed.

If two greater-than symbols are displayed then:

- Classify the $>>5.0$ L-reading as POSITIVE

If one greater-than symbol is displayed then:

- Classify the L-reading as POSITIVE if the numerical result that follows the greater than symbol is equal to or greater than 1.0.

- Classify the L-reading as INCONCLUSIVE if the numerical result that follows the greater than symbol is less than 1.0.

if the numerical L-reading is displayed alone (that is, without any preceding greater-than symbols) then:

- Classify the L-reading as POSITIVE if the numerical result is equal to or greater than 1.0.

- Classify the L-reading as NEGATIVE if the numerical result is less than 1.0.

C. Resolution of results classified as inconclusive.

All results classified as inconclusive above require further investigation. Take a 120-second nominal XRF reading and use the K-shell reading. In multifamily housing, resolve the inconclusive classification with a single K-shell reading or laboratory analysis as described below.

- Classify the result as POSITIVE if either the K-reading minus the displayed precision value or the lower K-reading is equal to or greater than 1.0.

- Classify the result as NEGATIVE if either the K-reading plus the displayed precision value or the upper K-reading is less than 1.0.

- Classify the result as INCONCLUSIVE if neither of the above decision rules using the K-reading provided a classification which can occur when the upper K-reading is equal to or greater than 1.0 or the lower K-reading is less than 1.0.

- To resolve a remaining INCONCLUSIVE classification, remove a paint-chip sample as described in Chapter 7 of the HUD Guidelines and have it analyzed by a qualified laboratory as described in Chapter 7.

TESTING TIMES (FOR SOFTWARE VERSION 5.1)

For the variable-time paint test mode "K & L + Spectra," the instrument continues measuring until a positive or negative result is indicated relative to an action level (1.0 mg/cm^2 for archive testing) and the current precision, or until the reading is terminated by moving the instrument away from the testing surface. None of the variable mode readings were terminated because of the two-minute limit used for archive testing. The following table provides testing time information for this testing mode. Source strength and type of substrate will affect actual testing times.

Testing Times for Instruments Running Software Version 5.1						
Variable mode testing times (seconds)						
Substrate	All data			Median for laboratory—measured lead levels (mg/cm^2)		
	25 th Percentile	Median	75 th Percentile	Pb < 0.25	$0.25 \leq \text{Pb} < 1.0$	$1.0 \leq \text{Pb}$
Wood Drywall	6	8	15	6	20	5
Metal	6	13	20	13	20	6
Brick Concrete Plaster	6	11	20	9	18	6

DOCUMENTATION:

This PCS was developed in accordance with the methodology in the EPA report titled *Methodology for XRF Performance Characteristic Sheets* (EPA 747-R-95-008, September 1997). This report provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) under a grant from the U. S. Environmental Protection Agency and a separate contract between MRI and the XRF manufacturer. The U.S. Department of Housing and Urban Development (HUD) has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. While MRI reserves the right to revise this XRF Performance Characteristic Sheet at any time, HUD's statement of acceptance would not apply to a revision until HUD has reviewed the revision and made a determination of its acceptability.

Performance Characteristic Sheet

EFFECTIVE DATE: September 24, 2004

EDITION NO.: 1

MANUFACTURER AND MODEL:

Make: Niton LLC

Tested Model: XLp 300

Source: ^{109}Cd

Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLi and XLp series:

XLi 300A, XLi 301A, XLi 302A and XLi 303A.

XLp 300A, XLp 301A, XLp 302A and XLp 303A.

XLi 700A, XLi 701A, XLi 702A and XLi 703A.

XLp 700A, XLp 701A, XLp 702A, and XLp 703A.

Note: The XLi and XLp versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Lead-in-Paint K+L variable reading time mode.

XRF CALIBRATION CHECK LIMITS:

0.8 to 1.2 mg/cm² (inclusive)

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm² in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm² film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION:

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is not needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

INCONCLUSIVE RANGE OR THRESHOLD:

K+L MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm ²)
Results not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use the K+L variable time mode readings.

Conduct XRF retesting at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

TESTING TIMES:

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

Testing Times Using K+L Reading Mode (Seconds)						
	All Data			Median for laboratory-measured lead levels (mg/cm ²)		
Substrate	25 th Percentile	Median	75 th Percentile	Pb < 0.25	0.25 ≤ Pb < 1.0	1.0 ≤ Pb
Wood Drywall	4	11	19	11	15	11
Metal	4	12	18	9	12	14
Brick Concrete Plaster	8	16	22	15	18	16

CLASSIFICATION RESULTS:

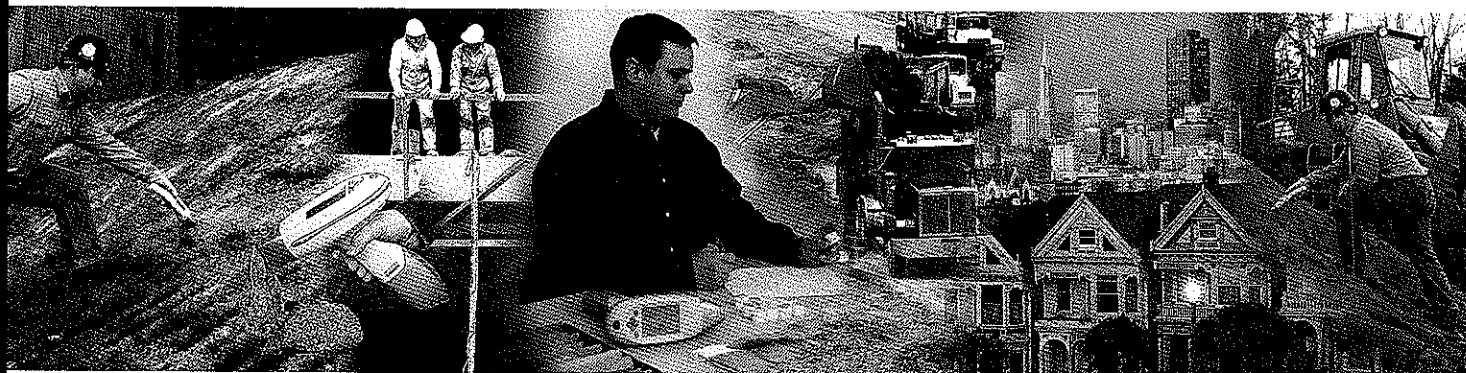
XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

DOCUMENTATION:

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

The New Standard in Portable Metals Analysis



The world's smallest, fastest, and easiest to
use tools for lead and other metals analysis

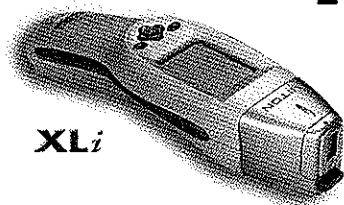
Lower detection limits – better site characterization

Immediate results – fastest analytical time of any method anywhere

Automatic correction – for all site conditions

Applications

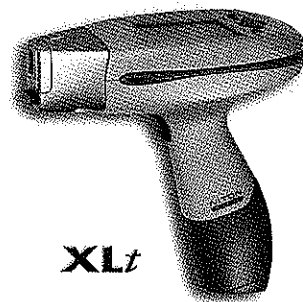
- Lead-based paint, dust wipe, soil analysis
 - Airborne metals analysis – OSHA compliance, TSP
 - Remediation monitoring
 - Emergency response
 - Metals in soil and coatings analysis
- Up to 25 elements, including all 8 RCRA elements



XLi

The NITON XLi Series – The ultimate in portability
with a variety of excitation options

The NITON XLt Series – Complete with miniaturized
X-ray tube and optional PERFECT technology for light
element analysis or optimizing detection limits for a
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XLt



2003
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Award
Winner



REAL-TIME WIRELESS
DATA TRANSFER

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Specifications

Weight	XLi 1.7 lbs (0.8 kg) XLt 3.0 lbs (1.4 kg)
Dimensions	XLi 11.5 x 3.5 x 3.0 inches (292 x 89 x 76 mm) XLt 9.75 x 10.5 x 3.75 inches (248 x 273 x 95 mm)
Excitation Source	XLi <i>Primary</i> ²⁴¹ Am Maximum 30mCi (1,110 MBq) – Infiniton, or ¹⁰⁹ Cd Maximum 40mCi (1,480 MBq) <i>Secondary</i> ²⁴¹ Am Maximum 14mCi (520 MBq) and/or ⁵⁵ Fe Maximum 20mCi (740 MBq) XLt Miniature x-ray tube and power supply (40kV/50uA maximum) with optional PERFECT (Programmable Excitation by Regulating Filter, Energy, Current and Time) Technology
X-ray Detector	High-performance Si-PIN detector, Peltier cooled
System Electronics	Hitachi SH-4 CPU ASICS high-speed DSP 4096 channel MCA
Batteries	(2) Rechargeable Lithium-ion battery packs with Quick-swap capability 6–12 hour (maximum depends on platform and duty cycle), 2 hour recharge cycle
Display	1/4 Backlit VGA touch screen LCD
Analysis Range	Up to 25 Standard elements in the range P(15) to Pu(94) Some Nonstandard in-range elements available at additional cost
Testing Modes	Bulk Sample Mode Thin Sample Mode, including Dust Wipe Mode, 37mm Filter Mode User-Defined Thin Sample Mode Empirical Mode
Data Storage	Internal: 3000 readings with x-ray spectra (maximum)
Standard Accessories	Soil Sampling Kit/Thin Sample Kit (varies by model and configuration) Lockable, shielded waterproof carrying case Shielded belt holster Spare lithium-ion battery pack with holster 110/220 VAC battery charger/adaptor PC interface cable NDT® (NITON Data Transfer) PC software Safety Lanyard Check/verification standards Integrated barcode scan engine for rapid/reliable entry of sample information
Training	U.S. – Call 1-800-875-1578 for schedule of no-cost radiation safety training in your area Outside U.S. – Please contact your local NITON representative for training information

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NITON XLp 300 Series Lead Analyzer



On-Site Analysis for the following lead applications:

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- Dust Wipes
- Airborne Lead

NITON LLC, the worldwide leader in portable X-ray Fluorescence (XRF) technology, is pleased to introduce the next generation of portable lead analyzer: the **XLp 300**. Building on the success of our award winning XL-300 Series analyzer, the XLp 300 charts new territory in speed, accuracy, precision, ergonomics and ease of use. These revolutionary analyzers provide rapid lead analysis for inspections, risk assessment and screening with unmatched portability and ease of use. With numerous Pb applications and no source replacement for up to 4 years, the XLp 300 Series analyzers provide the ultimate in flexibility and value and are the ideal on-site analytical companions for protecting the safety of children and the environment.

- Integrated touch-screen display with advanced and intuitive user interface
- Benchtop docking station to facilitate fixed-site or trailer use
- Lightweight and easy to operate
- High performance isotope configuration for fast results and less frequent source replacements
- Virtual keyboard, integrated barcode scanner and user configurable pull-down menus for effortless data entry
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- Complies with OSHA OSS 1 and proven proficient in EPA ETV and ELPAT testing for lead dust
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- Upgradable to multi-element analysis
- Optional Bluetooth™ wireless

Lightweight ■ Easy to Operate
Incredible Value

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The Leader in Portable Lead Analysis

NITON Transforms Lead Analysis, Again



NITON LLC

The Leader in Portable XRF Technology

NITON was founded in 1987 by Professor of Physics, Dr. Lee Grodzins, to develop and market instrumentation using innovative x-ray and gamma-ray technologies. The company's first two products were patented radon-gas detection systems. Later, after two years of intensive development assisted by a series of federal research grants, the company introduced the first ever, one-piece portable XRF analyzer, the NITON XL-309.

NITON built its initial reputation for quality, value and innovative design with this award-winning instrument, and continued this tradition with the introduction of its first hand-held multi-element environmental analyzer, the XL-700 in 1995.

In just a few years since that introduction, NITON has completely transformed the world of XRF analysis. NITON has thousands of XRF analyzers installed worldwide. Many are in use by businesses and government agencies who build their remediation and characterization strategies around these rugged and reliable instruments in order to ensure the health and safety of children, adults and the environment in which they live.

Specifications

Weight:	3.0 lbs (1.4kg)
Dimensions:	9.75 x 10.5 x 3.75 inches (248 x 273 x 95 mm)
Excitation Source:	40 mCi ¹⁰⁹ Cd (1,480 Mbq) Isotope half life 463 days, no source replacement for up to 4 years. Contact NITON for information on other available source strengths.
X-ray Detector:	High performance, electronically cooled, solid-state detector optimized for Pb L-shell and K-shell X-ray detection.
Batteries:	(2) Rechargeable Lithium-ion battery packs, 10-14 hour (maximum depends on duty cycle), 3 hour recharge cycle
Display:	1/4 VGA backlit touch screen LCD
Testing Modes:	Standard Paint Mode K&L Paint Mode
Optional Testing Modes:	Thin Sample Mode -Dust Wipe Analysis -Air Filter Analysis -Standard Thin Sample Analysis Bulk Sample Mode
Standard Accessories:	Lockable, shielded waterproof carrying case Shielded belt holster Spare Li-ion battery pack with holster 110/220 VAC battery charger/adaptor NDT (NITON Data Transfer) PC Software Interface cable Safety Lanyard NIST traceable Lead Paint Standards Integrated barcode scan engine
Training :	U.S.- Call 1-800-875-1578 for schedule of no cost radiation safety training in your area.

Specifications subject to change with continued product improvement.

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TABLE 2
SAMPLING PLAN SUMMARY
ISLAND DOCK SITE KINGSTON, NY

Table assumes a total of 90 sample locations on the 100-ft.grid.

	Metals		Organics	
Sampling Issue	Action	Number of Samples	Action	Number of Samples
Samples submitted for lab analysis following field screening	Initially submit 1 soil sample to the Lab for every 5 soil samples screened in the field. (1)	54	Initially submit 1 soil sample to the Lab for every 5 soil samples screened in the field. (1)	54
TCLP Analysis ⁽²⁾	Approx. 1 TCLP analysis for 1 in 20 soil initial sample locations.	15	N/A	15
Confirmatory ("End") Soil Sampling	Submit confirmatory soil samples to the Lab from the property boundary, and target areas throughout the property.	40	Submit confirmatory soil samples to the Lab from the property boundary, and target areas throughout the property.	40
Field Duplicates and MS/MSD	Collect 1 field duplicate and one MS/MSD sample per 20 sample locations, plus one for the twelve monitoring wells to be sampled.	15	Collect 1 field duplicate and one MS/MSD sample per 20 sample locations, plus one for the eight monitoring wells to be sampled.	15
Equipment Blanks	Collect 1 equipment blank per every 20 sample locations, plus one for the eight monitoring wells to be sampled.	15	One equipment blank for each of VOCs, SVOCs, and cyanide, plus one for the eight monitoring wells to be sampled.	15
Trip Blanks ⁽³⁾	Unopened trip blank for VOCs. One TB sent for each day VOCs are sampled (15 days).	15	Collect 1 soil trip blank for each day VOC sampling occurs, plus one for groundwater sampling.	15

⁽¹⁾ Approximately 90 soil sample locations, and approximately 3 samples per location.

⁽²⁾ TCLP analysis will be focused on samples with the highest concentrations measured during field screening.

⁽³⁾ Assume field sampling will occur 5 days per week, for 3 weeks, and that at least one VOC sample will be collected each day.

HYDROLAB CALIBRATION LOG

[illegible]

Comments:

YSI 550A CALIBRATION LOG

[illegible]

Comments:

OVM CALIBRATION LOG

[illegible]

Comments:

TURBIDITY CALIBRATION LOG

[illegible]

YSI 600XL CALIBRATION LOG

[illegible]

YSI 550A CALIBRATION LOG

[illegible]

Comments:

YSI 600XL CALIBRATION LOG

[illegible]

YSI 63 Calibration Log

[illegible]

Comments: