REMEDIAL ALTERNATIVES ANALYSIS

and

REMEDIAL WORK PLAN

for the former
A.C. Dutton Lumber Yard

NYSDEC Brownfields Program Site: C314081

Located at

1 Dutchess Avenue, Town of Poughkeepsie
2 Hoffman Street, City of Poughkeepsie
Dutchess County, New York

Date of Preparation: September 2008

ESI File: OP08022.41

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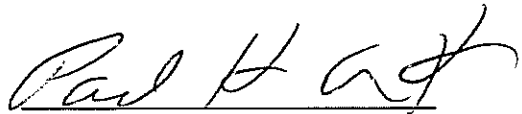
The undersigned has reviewed this
Remedial Alternatives Analysis and Remedial Work Plan
and certifies to The O'Neill Group – Dutton, LLC
that the information provided in this document
is accurate as of the date of issuance by this office.

Any and all questions or comments, including requests for additional information should be submitted to the undersigned.



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1.0 INTRODUCTION

1.1 Purpose

Ecosystems Strategies, Inc. (ESI) has prepared this Remedial Alternatives Analysis and Remedial Work Plan (RAA/RWP) in order to summarize an analysis of potential remedial alternatives, and present a Work Plan for proposed environmental response actions, at the "Former AC Dutton Lumber Yard" property, located at 2 Hoffman Street and 1 Dutchess Avenue, City and Town of Poughkeepsie, New York. The proposed environmental response actions address known environmental conditions at the Site, documented in the Supplementary Investigation Report (SIR), dated September 2008. All work was performed in general conformance with regulations specified in 6 NYCRR Part 375 (Environmental Remediation Programs) and applicable NYSDEC guidance documents (Draft Division of Environmental Remediation-10, Technical Guidance for Site Investigation and Remediation [DER-10] and Draft Brownfield Cleanup Program Guide [BCP Guide]). A list of referenced documents, abbreviations, and acronyms is provided as Appendix A of this RAA/RWP.

The Remedial Alternatives Analysis (RAA) identifies and evaluates alternatives for mitigating documented contamination and/or controlling the impacts of such contamination. Through a process of identifying potential remedies and screening each relative to a predetermined set of criteria, a remedial response is selected that is technically feasible, protective of human health and the environment, cost-effective, and consistent with the local objectives for the property. The Remedial Work Plan (RWP) presents a conceptual design for the selected remedial response, which is proposed in order to meet the objectives determined through the alternatives analysis. A Remedial Design Work Plan (RDWP) will be prepared in order to fully develop design components and technical specifications to execute the selected remedial response.

1.2 Site Information

1.2.1 Site Location and Description

The Former A.C. Dutton Lumber Yard property ("the Site") is an irregularly-shaped parcel, which has approximately 371 feet of frontage on the northern side of Dutchess Avenue and approximately 213 feet of frontage on the northern side of Hoffman Street. The Hudson River extends along the western edge of the property and a chain-link fence marks the northern boundary. Seven vacant structures, including two former lumber pressure treatment plant buildings, are present on-Site and much of the remainder of the Site is covered with concrete or asphalt pavement. The property is comprised of two lots (City of Poughkeepsie Tax ID: 6062-59-766443, and Town of Poughkeepsie Tax ID: 6062-02-763508). A Site Location Map is included as Figure 1 (Appendix B). Adjoining to the to the south is a former manufactured gas plant Site now owned by Central Hudson Gas and Electric corporation and operated as a natural gas regulation station. North Water Street extends along the eastern property line along the top of a steep bedrock outcrop, approximately 20 feet above the southeast portions of the Site. A boathouse owned by Vassar College adjoins to the north.

1.2.2 Site History

The Site was in industrial use between the mid-1800s until 1995. Prior to 1913, Site uses included an iron works and a glass works at the southern end of the parcel. Several kilns were associated with the glass works and kiln ash and slag was reportedly used as fill material on the Site. The on-Site pressure treatment of lumber using chromated copper arsenate (CCA) is reported to have been begun in 1966 by the A.C. Dutton Lumber Corporation and to have continued until 1995, when on-Site operations ceased. During lumber processing activities, raw lumber was brought to the Site by truck, boat and rail. Lumber was processed in the on-Site pressure treatment plants and then allowed to dry outside.

1.2.3 Proposed Future Usage of the Site

The Site is proposed for use as a residential waterfront development, which is anticipated to include three structures and may include limited retail facilities. All existing on-Site structures will be demolished.

2.0 SITE ENVIRONMENTAL CONDITIONS

This section provides a summary of known and suspected Site environmental conditions. The findings of all previous environmental investigations performed to date are detailed in ESI's SIR, which was performed according to the NYSDEC approved and the Supplemental Investigation Work Plan (SIWP).

2.1 Nature and Extent of Contamination

2.1.1 Soil

Metals

The historic on-Site pressure treatment of lumber using CCA has contaminated on-Site soils with arsenic and chromium. Other historic on-Site industrial activities and fill of unknown origin, which comprises much of the Site, may be additional sources of documented metals contamination. Data indicate limited metals contamination of groundwater.

- Based on an analysis of previous data, a Site background level (SBL) of 32 mg/Kg for arsenic was proposed in the SIR. Solid media located within the footprints of the two pressure treatment plants and containing concentrations of arsenic above 32 mg/Kg are therefore likely to have been directly impacted by process wastes. Such media are considered categorical hazardous waste and will require management as such.

- Data indicate a strong correlation between concentrations of arsenic and chromium supporting the conclusion that remediation of arsenic-contaminated solid media (i.e. concrete, asphalt, soil, and fill) to 32 mg/Kg will simultaneously reduce chromium concentrations to acceptable levels (i.e. at or below the "Restricted Residential Use" SCOs for chromium (180 mg/Kg) and hexavalent chromium (110 mg/Kg) per 6 NYCRR Subpart 375, Table 375-6.8[b]). This strong correlation between elevated arsenic and elevated chromium does not eliminate the possibility of areas with elevated chromium extending beyond the areas of proposed remediation. For this reason, post-excavation sampling will be for both arsenic and chromium.

- Solid media located on-Site, but outside the two former pressure treatment buildings, have been documented to contain total weight arsenic concentrations above the SBL of 32 mg/Kg. These materials are unlikely to have been directly impacted by process wastes and are not therefore categorically hazardous. These materials will be managed as non-hazardous, metals-contaminated waste.

Northern Pressure Treatment Plant

- Concentrations of arsenic above 32 mg/Kg have been documented in the Northern Pressure Treatment Plant at depths to at least 8'. Spatial distribution of these data indicates that contamination is concentrated towards the southern side of the building, adjacent to the secondary containment area. At this time it is anticipated that approximately 3,500 cubic yards of this material is categorically hazardous and will require management as hazardous waste.

- Asphalt cores collected from the floor of the Northern Treatment Plant exhibited staining throughout and a concrete core from the secondary containment area exhibited staining to a depth of 1'. At this time it is anticipated that entire floor of the Northern Treatment Plant (approximately 850 cubic yards) will require management as hazardous waste.

Southern Pressure Treatment Plant

- In the Southern Pressure Treatment Plant elevated concentrations of arsenic have been detected in sub-slab soils at locations where the integrity of the slab has been compromised. It is anticipated that approximately 1,000 cubic yards of sub-slab material will require management as hazardous waste.

- Concrete cores collected from the floor of the Southern Pressure Treatment Plant indicate staining to a depth of approximately ½". This material (approximately 45 cubic yards) will require scarification and off-site disposal as hazardous waste.

Remainder of Site (excluding Pressure Treatment Plants)

Clusters of samples containing concentrations of arsenic above the SBL of 32 mg/Kg have been documented to a maximum depth of approximately 3' at the following locations: around the northern pressure treatment plant and northwest of the southern pressure treatment plant. Arsenic concentrations in excess of 32 mg/Kg have been documented to a maximum depth of approximately 1' at the following locations: an eastern location between the two pressure treatment plants; west of the northern pressure treatment plant; along the eastern edge and southwest of the southern pressure treatment plant; and, along the entire length of the railroad spur.

Petroleum

Six areas of known or suspected petroleum impacted soil have been documented on-Site at the locations of known or suspected underground storage tanks (USTs). Limited associated groundwater contamination has also been documented. Petroleum impacted soils have been document at locations: south and southwest of the northern former pressure treatment plant building; beneath the brick office building at the western edge of the Site; under and around the large office building, to the south of the southern treatment plant; immediately northeast of the southern former pressure treatment plant building; and, southwest of the former garage/automotive repair building at the southern end of the Site. It is anticipated that not less than 500 cubic yards of petroleum-impacted soil will require excavation and removal from the Site. The removal of this source material will serve to remediate limited petroleum contamination of groundwater documented at the Site.

2.1.2 Groundwater

Metals

Low level exceedances of the TOGS 1.1.1 groundwater standard for arsenic of 25 ug/L have been documented west and southwest of the southwest corner of the northern former pressure treatment plant building. The highest concentration of arsenic detected in groundwater was 63.8 ug/L in a January 2006 sampling event. No other metals have been documented in on-site groundwater at levels exceeding guidance values. The removal of source material (subgrade material from beneath the pressure treatment plant building) will serve to remediate the degradation of groundwater quality documented this location.

Petroleum

Estimated low level exceedances of TOGS 1.1.1 groundwater standards for three SVOCs were documented in an August 2007 groundwater sampling event in MW-E8, located west of the northern former pressure treatment plant building. No field evidence of contamination was noted in the sample. The degradation of water quality at this location is likely to be fill related.

2.1.3 Sediment

Metals and petroleum in sediments along the waterfront have been documented. Degradation of sediments in the vicinity is likely to be the result of historical industrial activity and boat traffic in the area.

2.2 Contaminant Fate and Transport

Both former pressure treatment plant buildings contain small numbers of old chemical containers and visibly stained surface dust. The floor surfaces of both buildings have been documented to have absorbed process wastes. Releases through movement of dust and run off are therefore possible. At present the roofs of both buildings are largely intact, preventing extensive runoff from rainwater penetrating the buildings. An increased water accumulation was noted, however, in the secondary containment area of the Southern Pressure Treatment Plant after recent heavy rainfall. Groundwater has been documented at a depth of approximately 4' bsg in the vicinity of the Northern Pressure Treatment Plant, however, previous groundwater analysis has documented the absence of significant concentrations of metals in the groundwater.

2.3 Exposure Assessment

An exposure assessment was conducted to qualitatively assess the potential impacts of the existing Site on human health and the environment. For the human health component of the assessment, both current and future use scenarios were considered.

The primary contaminants present on the Site are metals present in solid media that originated with historic on-Site pressure treatment of lumber. There is currently the potential for trespassers at the Site to be exposed to contaminants through dermal contact with contaminated dust, equipment, or floor surfaces or through inhalation of contaminated dust and surface soil particles. Depending on future land use conditions at the Site, future residents and construction workers could be exposed to contamination in surface soil through dermal contact or inhalation of soil particles. Dermal contact or inhalation of subsurface soil particles could occur if excavation work is conducted at the Site. The implementation of a Health and Safety Plan (HASP), incorporating a Community Health and Safety Plan and Community Air-Monitoring Plan, would mitigate possible impacts to any potential receptor populations. Any Site-specific remedial designs that involve soil disturbance will require monitoring and mitigation plans to address potential dust generation and increased contaminant migration.

There is a potential for people and/or the environment to be exposed to contaminated media now and in the future if Site conditions change. The selection of an appropriate remedy should include the objective of minimizing or eliminating these potential exposure pathways.

3.0 REMEDIAL ALTERNATIVES ANALYSIS

Section 3.0 of this RAA/RWP summarizes the screening process for various remedial alternatives for the A.C. Dutton Site (Section 3.1 and Section 3.2), provides a brief description of each potential remedial alternative (Section 3.3), and presents a thorough analysis of the alternatives with the intent of selecting the most appropriate alternative for this Site (Section 3.4). This analysis presents remedial alternatives for Site, and relies on data generated in the SIR and on data presented in the Fuss and O'Neill Remedial Investigation Report, dated October 2007.

A detailed discussion of the methodology by which the remedial technologies and remedial alternatives will be evaluated (Section 3.1), and a detailed discussion of the criteria used in the evaluation process (Section 3.2), are discussed below.

3.1 Overview of Screening Process

In order to identify and screen potential remedial technologies, remedial objectives and clean-up criteria are established. These objectives and criteria are based on NYSDEC guidance documents, community input, and risk-based assessments. These criteria are also a function of known recognized environmental conditions (RECs) on the Site.

Based on the media that are subject to potential remediation, an initial screening of various potential technologies is conducted (Section 3.3). For each alternative, this screening considers three factors: the feasibility of each technology specific to the Site; the estimated cost of implementation; and, the effectiveness in achieving the Site-specific objectives. Remedial approaches that are determined not to be feasible, cost-effective, or sufficiently effective are dropped from further consideration.

The technologies that pass the initial screening are then assessed in greater detail (Section 3.4.) using the criteria set forth by the NYSDEC (Section 3.2.2). The various alternatives are also qualitatively compared to each other to assess which is most likely to be successful at achieving each individual criterion (Section 3.4.3). This comparative process is instrumental in identifying a preferred alternative (Section 3.4.4).

3.2 Screening Methodology

This section provides a discussion of the overall remedial objectives for this Site (Section 3.2.1) and the methodology used in screening potential remedial alternatives (Section 3.2.2 and Section 3.2.3). The goals specified below are consistent with NYSDEC remedial program procedures.

3.2.1 Remedial Objectives

The remedial objectives considered to be appropriate for this Site have been determined through a process established for this purpose by the NYSDEC. A significant element in that process is the proposed future use of a particular Site, so that potential remedial actions can be assessed, and a preferred remedial action can be ultimately recommended and selected that is compatible with the intended future use (restricted residential).

It is the overall objective of this project to implement remedial actions that provide for the appropriate level of protection of the public health and environment consistent with the proposed use of the Site. To the extent feasible and practical, such protection should be maintained for as long as the Site is used for the most sensitive purpose around which the protection was designed (i.e. restricted residential).

Objectives are set forth for each media of concern to ensure that appropriate levels of remediation are achieved. Objectives include the protection of public health and also the environmental health of the Site (including wildlife) and elimination of the potential for off-site migration of contaminated groundwater and soils. For this Site, the contaminated media warranting active remediation are asphalt/concrete, soil, and fill.

Based on the Site's proposed future use for residential, it is the objective of remedial activities to eliminate, to the extent practical, the potential for direct human or wildlife exposure to known contamination in on-Site media and to eliminate the potential for off-site migration of contaminated groundwater and soils.

3.2.2 NYSDEC Review Criteria

Potential technologies and specific Site remedial alternatives are analyzed relative to criteria developed by the NYSDEC. This section discusses each of these criteria, with particular concern for their relevance to this Site. The following review criteria have been developed to address the technical and policy considerations that are used in selecting the preferred remedial alternative:

1. Overall Protection of Human Health and the Environment The community's post-remedial exposure to affected materials is evaluated. The surrounding environment's exposure is also evaluated. All media that could directly or indirectly affect the community are evaluated: air, soil vapor, groundwater, soils, sediments, surface waters, and wildlife vectors.

2. Compliance with Standards, Criteria and Guidance Values (SCGs) Detected contaminants of concern are compared to relevant Federal, State or Local regulatory standards, guidance levels, or health risk limits. SCGs included in this RAA/RWP are derived from NYSDEC Remedial Program Soil Cleanup Objectives (SCOs) for Unrestricted and "Restricted Residential" Restricted Use, as provided in 6 NYCRR Subpart 375, Table 375-6.8(a) and Table 375-6.8(b), and (as warranted) on NYSDEC Technical and Administrative Guidance Memorandum #4046 (TAGM 4046), including subsequent NYSDEC memoranda.

3. Short-term Effectiveness Short-term effectiveness is measured relative to the level of protection afforded to the community during remediation activities. In addition, other impacts to the environment are assessed, as well as the time necessary to implement alternatives.

4. Long-term Effectiveness and Permanence Long-term effectiveness and permanence of the remedial action is assessed. Generally, a time frame of 30 years is used for purposes of comparison and analysis; however, the ultimate objective is to promote a remedial alternative that is effective for the time period that this Site is used for restricted residential development. In addition, residual risks are evaluated, and the adequacy and reliability of proposed controls are assessed as they relate to the proposed remedy and the surrounding community.

5. Reduction of Toxicity, Mobility, and Volume The reduction of several factors of concern is assessed including toxicity, mobility and volume of the identified contaminants of concern. The anticipated reduction in volume, and the post-remedial mobility and toxicity of remaining Site contaminants, is assessed.

6. Feasibility The suitability of each alternative is analyzed in relation to Site-specific conditions, as well as how reasonable is its implementation. As part of this assessment, the availability of services and materials, and the alternative's cost-effectiveness is considered.

7. Community Acceptance The people most directly impacted by the final selection of a Site remedy are the inhabitants of the local community. The concerns of the community are assessed in conjunction with the first six criteria. Community acceptance is evaluated following the public comment period. Within this RAA/RWP, the issues most likely to be of concern, or generate controversy, are discussed.

8. Land Use Consideration is given to the current and future land uses of the Site and its surroundings. Factors taken into consideration in the land use evaluation consist of: historical and recent development patterns; Brownfield Opportunity Areas; applicable comprehensive community master plans; proximity to residential, urban, commercial, agricultural, and recreational areas, cultural and natural resources and floodplains; environmental justice concerns; federal or state land use designations; population growth, accessibility to infrastructure; vulnerability of groundwater; geography and geology; and current institutional controls.

3.2.3 Determination of Costs

Finally, consideration is given to the costs associated with each potential remedial alternative (cost estimates for remedial alternatives are provided in Appendix C). A cost for each alternative is formulated based on reasonably foreseeable expenses (both initial and long term costs). Costs that cannot be easily quantified are also identified.

3.3 Identification/Preliminary Screening of Alternatives

This section identifies and assesses remedial alternatives that have been selected for possible implementation on the Site. These alternatives are identified utilizing the remedial response objectives (see Section 3.2 above) as a guide.

3.3.1 Identification of Possible Remedial Alternatives

This Section Presents preliminary analysis of four remedial alternatives a) no action b) removal of hazardous waste and removal of all soils with arsenic levels above 32 mg/kg (SBL) c) removal of hazardous waste and insitu immobilization of all soils with arsenic levels above 32 mg/kg (SBL) d) removal of hazardous waste and removal of all soils with arsenic levels above 13 mg/Kg (Unrestricted SCO). A summary of remedial options is provided in Table 1 below. Subsequent to this preliminary identification, a preliminary screening and comparison of the alternatives is provided below in Sections 3.3.2 and 3.3.3, and a detailed discussion of the alternatives is provided in Section 3.4.

Table 1: Summary of Alternative Technologies Subject to Screening
Cells shaded in red indicate a failure to meet the respective criteria and cells shaded in blue indicate that the criteria are likely to be met.

Assessment Criteria	Remedial Alternative			
	Alternative A No Action	**Alternative B** Removal of arsenic to 32 mg/Kg	**Alternative C** Immobilization of arsenic to 32 mg/Kg	**Alternative D** Removal of arsenic to 13 mg/Kg
Overall protection of human health and the environment	Not protective of health or environment	Protective of human health and the environment	Protective of human health and the environment	Protective of human health and the environment
Compliance with Standards, Criteria, and Guidance Values	Does not comply with Standards, Criteria, and Guidance Values	Complies with the requirement to remove hazardous waste from the Site and complies with SBL	Complies with the requirement to remove hazardous waste from the Site, but is unlikely to comply with Restricted use SCOs	Complies with the requirement to remove hazardous waste from the Site and complies with "Unrestricted Use" SCO
Short-term effectiveness	Not effective in the short term	Effective in the short term.	Difficult short-term management issues, particularly during construction	Effective in the short term.
Long-term effectiveness and permanence	Not effective in the long term	Effective in the long term. May restrict use of portions of the Site.	Effective in the long term; but requires maintenance. May restrict use of portions of the Site.	Effective in the long term.
Reduction of toxicity, mobility and volume	No reduction	Complete removal of hazardous waste and substantial reduction in arsenic toxicity, mobility, and volume throughout the Site.	Complete removal of hazardous waste. Reduction in mobility, but not toxicity and volume of arsenic at the remainder of the Site.	Complete removal of hazardous waste and effective removal of arsenic from the entire Site.
Feasibility	Easily implemented	Relatively simple to implement.	Immobilization technologies themselves are relatively simple, but management of immobilized soils during construction is potentially very difficult.	May be impossible to fully implement because the entire Site, regardless of depth could contain contaminant concentrations above restricted SCOs. This alternative has a potentially high cost.
Community acceptance	Not likely to be acceptable	Likely to be acceptable.	Unlikely to be acceptable, given that elevated concentrations of arsenic will remain on-Site.	May meet with resistance because of the large volume of truck traffic.
Cost	Low	Moderate	Moderate	High

3.3.2 Preliminary Screening of Alternatives

The alternatives identified above for this Site are summarized below, and are evaluated for effectiveness, implementability and cost. These alternatives are also thoroughly described and analyzed (as warranted) in Section 3.4.

3.3.2.1 Alternative A - No Further Action

Description

The No Further Action Alternative would involve no active remediation of the Site. The existing buildings would remain and all existing (and suspected) contaminated media would remain in place. No attempt to minimize, treat, or eliminate known on-Site contaminants would occur.

Consideration of this alternative is required by the NYSDEC to ensure that any costs and societal benefits (e.g., protection of human health, elimination of contaminant migration) associated with the selected alternative are justified.

Feasibility

The No Further Action Alternative would be simple to implement. No local approvals would be required for implementation.

Cost

Costs associated with this alternative include the installation and maintenance of a fence to secure the perimeter of the property and are anticipated to be $109,250.

The opportunity cost of not developing this property is estimated to be relatively high. Qualitatively, the opportunity costs include lost construction jobs, pre-construction costs, and property taxes.

Effectiveness of the No Further Action Alternative

The No Further Action Alternative is not considered to be protective of human health and the environment in either the short or long term. The potential will exist for contact by future Site users with metals-contaminated surfaces, dust and soils, which will remain on-Site.

Based on these findings, it is concluded that the No Further Action Alternative does not meet the requirement for long-term protection of public health from the known on-Site contaminants.

3.3.2.2 Alternative B - Partial Source Removal

This alternative would meet Track 4 criteria under the Brownfields Cleanup Program (BCP) including restricted residential use with a site specific cleanup objective for arsenic.

Description

The Partial Source Removal - Restricted Use Alternative would involve:

- A sweep of both pressure treatment buildings to remove residual process chemicals and dust;
- Demolition of all existing structures;
- Scarification of the floor of the Southern Pressure Treatment plant to a depth of 1” and removal of entire asphalt floor of Northern Pressure Treatment plant building;

- Removal of all arsenic-contaminated solid media containing concentrations of arsenic above the SBL of 32 mg/Kg beneath both pressure treatment plant buildings and off-site disposal as hazardous waste;
- Stabilization of the shore to prevent migration /erosion;
- Removal of asphalt across entire Site;
- Removal of all petroleum bulk storage tanks and associated petroleum-contaminated soil;
- Removal of the majority of on-Site soils containing arsenic concentrations above 32 mg/Kg;
- Backfilling of the excavations to grade to prevent exposures to low-level contamination remaining on the Site;
- Installation of two feet of clean soil cover (or equivalent);
- Installation and sampling of new groundwater monitoring wells, as warranted.
- Implementation of a Site Management Plan to ensure the long-term effectiveness of these response actions, including the maintenance of engineering controls including provisions for groundwater monitoring, periodic inspections and contingency plans for soil management; and,
- Restriction of future Site use through an environmental easement and maintenance of engineering controls.

It is anticipated that 5,500 cubic yards of subgrade material will require off-site disposal as hazardous waste. An additional 6,350 cubic yards of material containing total weight concentrations of arsenic above 32 mg/Kg will require off-site disposal as regulated waste and the same volume of clean fill will require importation to the Site. This material will be removed from areas documented to contain clusters of samples containing arsenic concentrations above 32 mg/Kg. Approximately 500 cubic yards of petroleum-contaminated soil will require off-site disposal. Use of the Site would be restricted by the need to implement engineering controls (the barrier layer). A Proposed Site Remediation Map – Excavation/Treatment for the Partial Source Removal Alternative is included as Figure 2 in Appendix B.

Feasibility

The Partial Source Removal Alternative is considered to be relatively simple to implement. Complicating factors will include the need to excavate material from beneath the groundwater table, which may require dewatering. Excavated soils slated for off-site disposal and imported clean fill will be transported via trucks. Soil excavation and treatment is likely to be implemented during the construction phase of the project using relatively simple technology.

Cost

The costs associated with this alternative include: the excavation, removal and proper disposal of contaminated soils; back-fill of excavated areas; and installation of a barrier layer. Professional and laboratory costs associated with the testing of excavation end points will also be incurred. The total costs for this option are anticipated to be $2,800,125.

Effectiveness

This alternative is effective for protecting human health and the environment and is not likely to significantly limit possibilities for future restricted residential Site development.

3.3.2.3 Alternative C - Partial Source Immobilization

This alternative would meet Track 4 criteria under the BCP including restricted residential use with a site specific cleanup objective for arsenic.

Description

The Partial Source Removal - Restricted Use Alternative would target the same media as those proposed for excavation in Alternative B and would involve:

- A sweep of both pressure treatment buildings to remove residual process chemicals and dust;
- Demolition of all existing structures;
- Scarification of the floor of the Southern Pressure Treatment plant to a depth of 1" and removal of entire asphalt floor of Northern Pressure Treatment plant building;
- Removal of all arsenic-contaminated solid media containing concentrations of arsenic above the SBL of 32 mg/Kg beneath both pressure treatment plant buildings and off-site disposal as hazardous waste;
- Bench testing of immobilization technology;
- Immobilization the majority of on-Site soils containing arsenic concentrations above 32 mg/Kg;
- Stabilization of the shore to prevent migration /erosion of Site materials;
- Removal of asphalt across entire Site;
- Installation of two feet of clean soil cover (or equivalent);
- Removal of all petroleum bulk storage tanks and associated petroleum-contaminated soil;
- Implementation of a Site Management Plan to ensure the long-term effectiveness of these response actions, including the maintenance of engineering controls including provisions for groundwater monitoring, periodic inspections and contingency plans for soil management; and,
- Restriction of future Site use through an environmental easement.

It is anticipated that 5,500 cubic yards of subgrade material will require off-site disposal as hazardous waste. An additional 6,350 cubic yards of material containing total weight concentrations of arsenic above 32 mg/Kg will require on-Site treatment prior to re-use. Approximately 500 cubic yards of petroleum-contaminated soil will require off-site disposal. Use of the Site would be restricted by the need to implement engineering controls (the barrier layer). A Proposed Site Remediation Map – Excavation/Treatment is included as Figure 2 in Appendix B.

Feasibility

The Partial Source Immobilization Alternative is considered to be relatively simple to implement. Arsenic immobilization can performed on Site using proprietary immobilization compounds that can be mixed with soils using standard excavation equipment already present on-Site (i.e. equipment used to excavate material from beneath the two pressure treatment plants). Complicating factors will include the need to excavate material from beneath the groundwater table, which may require dewatering. Bench testing will be required to verify the effectiveness of on-Site treatment. Excavated soils slated for off-site disposal and imported clean fill will be transported via trucks. Soil excavation and treatment is likely to be implemented during the construction phase of the project using relatively simple technology.

Cost

The costs associated with this alternative include: the excavation, removal and proper disposal of contaminated soils; back-fill of excavated areas; cost of immobilization compounds and the immobilization process itself, and installation of a barrier layer. Professional and laboratory costs associated with the testing of excavation end points will also be incurred. The total costs for this option are anticipated to be $2,516,650.

Effectiveness

This alternative is effective for protecting human health and the environment and is not likely to significantly limit possibilities for future Site development.

3.3.2.4 Alternative D - Full Source Removal

This alternative would meet Track 1 criteria under the BCP with no restrictions on development.

Description

The Full Source Removal - Unrestricted Use Alternative would involve:

- A sweep of both pressure treatment buildings to remove residual process chemicals and dust;
- Demolition of all existing structures,
- Removal of all soils from the AC-Dutton property contain contaminant concentrations above NYSDEC Remedial Program (Part 375) “unrestricted use” Soil Cleanup Objectives (SCO).

It is anticipated that as much as 100,000 cubic yards of soil would require removal in order to meet Track 1 levels. Material will be excavated until all metals and petroleum contaminated Site soils are removed and clean end points are encountered. The installation of a barrier layer and the implementation of a Site Management Plan are not required for this Alternative.

Feasibility

The Full Source Removal - Unrestricted Use Alternative is considered to be moderately difficult to implement. Soil removal is likely to be complex due to the potential large volume of soils to be excavated, and the need to excavate material in the proximity of the groundwater table. Achieving Unrestricted SCOs may be difficult because the whole Site is comprised of fill of unknown origin. Excavated soils and imported clean fill will be transported via trucks, resulting in logistical concerns for traffic, noise, and dust.

Cost

The costs associated with this alternative include the excavation, removal and proper disposal of contaminated soils, and the importation and handling of any needed fill materials. Professional and laboratory costs associated with the testing of excavation end points will also be incurred. The total cost for this option is likely to be not less than $21,998,800.

Effectiveness

This alternative is the most effective for protecting human health and the environment. It will also allow maximum flexibility for future development.

3.3.3 Preliminary Comparative Analysis of Alternatives

The No Further Action Alternative is not consistent with the goals of the NYSDEC Brownfields program, as it would not permit the re-use of the Site as planned by the Applicant (mixed-use waterfront development). Furthermore, this Alternative does not meet the criteria of public acceptance and long-term protection of public health and the environment. Therefore, the No Further Action Alternative is not considered to be an appropriate remedial strategy for this Site.

The Partial Source Removal Alternative, the Partial Source Immobilization Alternative and the Full Source Removal Alternative, all of which include remediation of soils likely to contain significant contaminant concentrations, are appropriate remedial strategies. These alternatives provide for effective long-term protection of public health and the environment.

The Partial Source Removal, Partial Source Immobilization, and Full Source Removal Alternatives are assessed in greater detail in Section 3.4, below.

3.4 Detailed Analysis of Remedial Alternatives

This Section provides a detailed analysis of the Partial Source Removal, Partial Source Immobilization and Full Source Removal Alternatives. A detailed analysis is not warranted for the No Further Action Alternative.

3.4.1 Common Elements and Considerations

Several work elements are common to the Partial Source Removal and Full Source Removal Alternatives. By reference, these common elements are incorporated in the detailed description and/or implementation of these alternatives provided in Section 3.4.2.

3.4.2 Detailed Analysis of Remedial Alternatives

3.4.2.1 Alternative B - Partial Source Removal (Track 4)

Description

The Partial Source Removal - Restricted Use Alternative would include the following tasks:

Site Clearing

All chemical and petroleum bulk storage tanks will be excavated (as necessary), cleaned and properly disposed of. A sweep of the buildings to remove residual hazardous materials and dust will be performed and any asbestos-containing materials will be properly identified and removed. The structures will be demolished.

Prior to any demolition, a HASP will be prepared for the selected alternative that provides comprehensive and appropriate protections for all on-Site personnel and surrounding populations. The HASP will detail known and possible areas of concern. The HASP will include safety and monitoring plans that conform to the standards and requirements of applicable agencies, including the New York State Department of Labor (NYSDOL) and the Occupational Safety and Health Administration (OSHA).

Soil Removal Activities and Confirmatory Soil Sampling

Following demolition, the floor of the Southern Pressure Treatment Plant will be scarified to a depth of 1". The entire floor of the Northern Pressure Treatment Plant will be removed. The wastes generated will be disposed of off-site as hazardous waste. Subgrade materials beneath the buildings with total weight concentrations of arsenic at or exceeding the SBL of 32 mg/Kg will be disposed of as hazardous waste (estimated volume 5,500 cubic yards). Additionally

approximately 6,350 cubic yards of on-Site contaminated soils outside the two pressure treatment buildings containing total weight concentrations of arsenic above the SBL of 32 mg/Kg will require off-site disposal as regulated waste. The soil slated for removal is to be excavated from areas where previously generated soil sample data indicate clusters of exceedances of the SBL of 32 mg/Kg for arsenic. Soils at locations where sample data indicate isolated exceedances will not be removed. The same volume of clean fill will require importation to the Site to fill the excavations. Approximately 500 cubic yards of petroleum contaminated soil will require excavation and off-site removal.

All soils will be excavated and disposed of in accordance with applicable regulations. Soil sampling will be conducted according to NYSDEC approved protocols prior to and during soil excavation to characterize soils for off-site disposal, and confirmatory endpoint sampling will be conducted to document the integrity of remaining soils.

Personnel performing soil excavation and sampling will be properly trained in accordance with OSHA and NYSDOL requirements. Site personnel will be informed of Site-specific concerns and properly instructed with regard to pertinent details. These concerns, details, and procedures will be detailed in a Remedial Design Work Plan (RDWP) to be prepared specific to the Site conditions. The NYSDEC will approve the RDWP prior to the start of any remedial activities.

Installation of Barrier Layer

The grade of the majority of the Site is to be raised by an average of 2' as a result of installing the barrier layer. The use of the barrier layer as an engineering control will be properly recorded in applicable public documents.

Shoreline Stabilization

The shoreline will be stabilized to ensure that the proposed soil cover (see above) can be appropriately maintained. The precise method and extent of stabilization selected will be a function of future construction design decisions regarding a) a potential pedestrian walkway along the river and b) the type of site cover installed adjacent to the shore.

Subslab Depressurization System

During the construction of the proposed on-Site buildings, subslab depressurization systems will be installed to mitigate any petroleum vapors evaporating from remaining petroleum-contaminated soils.

Implementation of Site Management Plan

The Site Management Plan (SMP) will consist of a groundwater monitoring plan and a soil management plan detailing activities necessary for any soils excavated in the future. Further, the SMP will contain a description of activities necessary to maintain and operate any subslab depressurization system installed in future on-Site structures.

Implementation Schedule

It is estimated that the time necessary to design and conduct demolition and soil removal would be twelve months. This time schedule is divided into a design phase of one month, a bid solicitation and award phase of one month, and a fieldwork phase of two months.

This schedule assumes no seasonal constraints. Should the project schedule result in the construction occurring in the winter, the total project schedule timetable will be extended.

Criteria Assessment

Short Term Effectiveness: The Partial Source Removal - Alternative is considered to be effective in protecting human health and the environment in the short term. This alternative would involve the removal of all hazardous sources of contamination as well as subgrade materials containing arsenic concentrations above the SBL and would thereby eliminate exposure to contaminant sources. The implementation of appropriate measures during building demolition and/or on-Site soil disturbance activities is likely to effectively prevent the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures are not likely to be significantly impacted by on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones). This alternative provides short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. The implementation of a HASP (incorporating a Community Health and Safety Plan) will serve to minimize potential short-term impacts to the surrounding community from site-generated traffic, dust/vapors, and noise.

Long Term Effectiveness: The Partial Source Removal - Alternative would remove the significant on-Site sources of contamination and substantially remove future concerns with regard to potential RECs. Land use will be limited to "Restricted Residential" and will include the implementation of institutional and engineering controls. Long-term impacts to the surrounding community will be positive because future threats to human health and the environment will be substantially eliminated.

Feasibility: This Alternative is considered to be relatively simple to implement given that the areas of contamination have been well defined; soil removal may pose limited difficulties, however, based on the potential need to excavate material in the proximity of the groundwater table (groundwater management will be necessary).

Supervision of demolition personnel during the demolition of the relevant structures in order to avoid accidental dispersion of impacted soils and/or human contact with these soils will be necessary. The Site has reasonably clear access for trucks to enter and exit and sufficient space for the loading and unloading (including temporary stockpiling) of materials.

Compliance with Standards, Criteria and Guidance Values: This alternative removes known sources of contamination (grossly impacted soils) and associated significantly contaminated soil from the Site. A soil cover will be employed to meet 6 NYCRR 375-3 and it is expected that the removal of source materials will allow groundwater standards to be met. Post-remedial conditions would meet or exceed cleanup requirements for Restricted Use sites.

Overall Protection of Human Health and the Environment: This alternative provides for the protection of human health and the environment in both the short and long term. Exposure to materials remaining on-Site subsequent to excavation and containing contaminant concentrations above SCGs will be prevented by the installation of the 2' barrier layer of clean fill. No significant impacts are therefore likely from low-level contamination remaining beneath the barrier layer.

Reduction in Toxicity, Mobility and Volume: The Partial Source Removal Alternative will eliminate all significantly contaminated on-Site material and significantly reduce the potential mobility of any remaining contaminants.

Community Acceptance: Community concern is most likely to focus on the anticipated increase in truck traffic during remedial activities.

Land Use: This alternative provides improvement in Site and local area land use area by transforming the Site from an abandoned industrial property to a residential waterfront development. This improvement is consistent with: the planned land use of the Site and adjacent

and surrounding land uses; recent development patterns and population growth projections. The proposed use of the Site is as a residential development comprised of three structures containing multiple apartments is consistent with the existing mixed land uses in the immediate vicinity of the property.

Cost

The costs associated with the Partial Source Removal Alternative would be costs resulting from the demolition of on-Site structures, removal of a sufficient volume of contaminated soil, the replacement of excavated soil with clean fill, and the installation of a barrier layer. For the purpose of cost calculations, a project lifetime of thirty years is assumed in this analysis. Total costs for this option are estimated at a present value of $2,800,125.

3.4.2.2 Alternative C - Partial Source Immobilization (Track 4)

Description

The Partial Source Immobilization Alternative would target the same media as those proposed for excavation in Alternative B and would include establishing and securing Site borders and utilities and the following tasks:

Site Clearing

All chemical and petroleum bulk storage tanks will be excavated (as necessary), cleaned and properly disposed of. A sweep of the buildings to remove residual hazardous materials and dust will be performed and any asbestos-containing materials will be properly identified and removed. The structures will be demolished.

Prior to any demolition, a HASP will be prepared for the selected alternative that provides comprehensive and appropriate protections for all on-Site personnel and surrounding populations. The HASP will detail known and possible areas of concern. The HASP will include safety and
monitoring plans that conform to the standards and requirements of applicable agencies, including the NYSDOL and the OSHA.

Soil Removal and Immobilization Activities and Confirmatory Soil Sampling

Following demolition, the floor of the Southern Pressure Treatment Plant will be scarified to a depth of 1". The entire floor of the Northern Pressure Treatment Plant will be removed. The wastes generated will be disposed of off-site as hazardous waste. Subgrade materials beneath the buildings with total weight concentrations of arsenic at or below the SBL of 32 mg/Kg will be disposed of as hazardous waste (approximately 5,500 cubic yards). An additional approximately 6,350 cubic yards of on-Site contaminated soils outside the two pressure treatment buildings containing total weight concentrations of arsenic above the SBL of 32 mg/Kg will require on-Site treatment. Bench testing will be required to determine whether available stabilization technologies will provide a cost effective alternative to off-site disposal. If a determination is made that immobilization will be effective, then proprietary compounds can be mixed with impacted soils on-Site using standard excavation equipment. The treatment will eliminate the possibility of leaching, however, elevated concentrations of arsenic will remain on-Site. These soils will require management during construction and will likely require all Site workers to be trained and wear protective clothing (PPE Level C). In addition, extensive runoff and dust suppression management systems will require to be implemented.

Approximately 500 cubic yards of petroleum contaminated soil will require excavation and off-site removal.

All soils will be excavated and disposed of in accordance with applicable regulations. Soil sampling will be conducted according to NYSDEC approved protocols prior to and during soil excavation to characterize soils for immobilization and/or off-site disposal, and confirmatory endpoint sampling will be conducted to document the integrity of remaining soils.

Personnel performing soil excavation and sampling will be properly trained in accordance with OSHA and NYSDOL requirements. Site personnel will be informed of Site-specific concerns and properly instructed with regard to pertinent details. These concerns, details, and procedures will be detailed in a RDWP to be prepared specific to the Site conditions. The NYSDEC will approve the RDWP prior to the start of any remedial activities.

Installation of Barrier Layer

The grade of the entire Site is to be raised by an average of 2' by the barrier layer. The use of the barrier layer as an engineering control will be properly recorded in applicable public documents.

Shoreline Stabilization

The shoreline will be stabilized to ensure that the proposed soil cover (see above) can be appropriately maintained. The precise method and extent of stabilization selected will be a function of future construction design decisions regarding a) a potential pedestrian walkway along the river and b) the type of site cover installed adjacent to the shore.

Subslab Depressurization System

During the construction of the proposed on-Site buildings, subslab depressurization systems will be installed to mitigate any petroleum vapors evaporating from remaining petroleum-contaminated soils.

Implementation of Site Management Plan

The SMP will consist of a groundwater monitoring plan and a soil management plan detailing activities necessary for any soils excavated in the future. Further, the SMP will contain a description of activities necessary to maintain and operate any subslab depressurization system installed in future on-Site structures.

Implementation Schedule

It is estimated that the time necessary to design and conduct demolition and soil removal/immobilization and treatment would be eighteen months. This time schedule is divided into a design phase of one month, a bench testing phase of one month, a bid solicitation and award phase of one month, and a fieldwork phase of two months.

This schedule assumes no seasonal constraints. Should the project schedule result in the construction occurring in the winter, the total project schedule timetable will be extended.

Criteria Assessment

Short Term Effectiveness: The Partial Source Immobilization - Restricted Use Alternative is considered unlikely to be effective in protecting human health and the environment in the short term. This alternative would involve the removal of all hazardous sources of contamination beneath the two former pressure treatment plant buildings above the SBL. All other soils would remain. The implementation of appropriate measures during on-Site treated soil disturbance activities is likely to be extensive and time consuming. Construction workers have the potential to be significantly impacted by on-Site contaminants as does the community and the river.

Extensive soil management, dust, and run off procedures will be required for much of the construction period.

Long Term Effectiveness: The Partial Source Immobilization would leave significant on-Site sources of contamination on-Site and concerns with regard to potential Recognized Environmental Conditions (RECs) would remain. Long-term impacts to the surrounding community will be beneficial because future threats to human health and the environment will be substantially contained.

Feasibility: This Alternative is considered to be relatively simple to implement given that the areas of contamination have been well defined; soil immobilization may pose substantial difficulties during construction, based on the need for dust suppression and the potential need to excavate material in the proximity of the groundwater table (groundwater management will be necessary).

Supervision of demolition personnel during the demolition of the relevant structures in order to avoid accidental dispersion of impacted soils and/or human contact with these soils will be necessary. The Site has reasonably clear access for trucks to enter and exit and sufficient space for the loading and unloading (including temporary stockpiling) of materials.

Compliance with Standards, Criteria and Guidance Values: This alternative removes known sources of contamination (hazardous soils) and significantly contaminated soil will be immobilized on-Site. A soil cover will be employed to meet 6 NYCRR 375-3 and it is expected that the removal/treatment of source materials will allow groundwater standards to be met.

Overall Protection of Human Health and the Environment: This alternative provides for the protection of human health and the environment in the long term, subject to the implementation of institutional and engineering controls. Exposure to materials remaining on-Site subsequent to excavation/treatment and containing contaminant concentrations above SCGs will be prevented by the installation of the 2' barrier layer of clean fill. No significant impacts are therefore likely from low-level contamination remaining beneath the barrier layer.

Reduction in Toxicity, Mobility and Volume: The Partial Source Immobilization - Restricted Use Alternative will eliminate all hazardous contaminated on-Site material and significantly reduce the potential mobility of any remaining contaminants.

Community Acceptance: Community concern is most likely to focus on the anticipated increase in truck traffic during remedial activities and the continued presence of elevated total weight arsenic concentrations.

Land Use: This alternative provides improvement in Site and local area land use area by transforming the Site from an abandoned industrial property to a residential waterfront development. This improvement is consistent with: the planned land use of the Site and adjacent and surrounding land uses; recent development patterns and population growth projections. The proposed use of the Site is as a residential development comprised of three structures containing multiple apartments is consistent with the existing mixed land uses in the immediate vicinity of the property.

Cost

The costs associated with the Partial Source Immobilization Alternative would be costs resulting from the demolition of on-Site structures, removal of a sufficient volume of contaminated soil, the treatment of soils targeted for immobilization, the replacement of excavated soil with clean fill, and the installation of a barrier layer. For the purpose of cost calculations, a project lifetime of thirty years is assumed in this analysis. Total costs for this option are estimated at a present value of $2,516,650.

3.4.2.3 Alternative D - Full Source Removal (Track 1)

Description

The Full Source Removal Alternatives would include the following tasks:

Site Clearing

All chemical and petroleum bulk storage tanks will be excavated (as necessary), cleaned and properly disposed of. A sweep of the buildings to remove residual hazardous materials and dust will be performed and any asbestos-containing materials will be properly identified and removed. The structures will be demolished.

Following demolition, the floor of the Southern Pressure Treatment Plant will be scarified to a depth of 1". The entire floor of the Northern Pressure Treatment Plant will be removed. The wastes generated will be disposed of off-site as hazardous waste. Subgrade materials beneath the buildings with total weight concentrations of arsenic at or above the SBL of 32 mg/Kg will be disposed of as hazardous waste. All other soils on the AC Dutton property with arsenic concentrations at or above the Unrestricted SCO of 13 mg/Kg will be excavated and disposed of off-site as regulated waste. In addition, all other soils/materials containing contaminants above SCOs defined in 6 NYCRR 375-6.8(a) will be removed from the Site.

Prior to any demolition, a HASP will be prepared for the selected alternative that provides comprehensive and appropriate protections for all on-Site personnel and surrounding populations. The HASP will detail known and possible areas of concern. The HASP will include safety and monitoring plans that conform to the standards and requirements of applicable agencies, including the NYSDOL and the OSHA.

Soil Removal Activities and Confirmatory Soil Sampling

All Site soils exceeding the Unrestricted Use SCOs will be excavated and removed. All soils will be excavated and disposed of in accordance with applicable regulations. Soil sampling will be conducted according to NYSDEC approved protocols prior to and during soil excavation to characterize soils for off-site disposal, and confirmatory endpoint sampling will be conducted to document the integrity of remaining soils. In total, an estimate that as much as 100,000 cubic yards of contaminated soil would be subject to removal in order for the Site to meet Track 1 levels. All soils removed as a regulated waste would need to be replaced with certified clean fill.

Personnel performing soil excavation and sampling will be properly trained in accordance with OSHA and NYSDOL requirements. Site personnel will be informed of Site-specific concerns and properly instructed with regard to pertinent details. These concerns, details, and procedures will be detailed in a RDWP to be prepared specific to the Site conditions. The NYSDEC will approve the RDWP prior to the start of any remedial activities.

Implementation Schedule

It is estimated that the time necessary to design and conduct demolition and soil removal would be twenty-four months. This time schedule is divided into a design phase of one month, a bid solicitation and award phase of one month, and a fieldwork phase of six months.

This schedule assumes no seasonal constraints. Should the project schedule result in the construction occurring in the winter, the total project schedule timetable will be extended.

Criteria Assessment

Short Term Effectiveness: The Full Source Removal is considered to be effective in protecting human health and the environment in the short term. This alternative would involve the removal

of all on-Site contaminated soils, and would eliminate exposure to contaminant sources. The implementation of appropriate measures during building demolition and/or on-Site soil disturbance activities is likely to effectively prevent the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures are not likely to be significantly impacted by on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones). This alternative provides short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. The implementation of a HASP (incorporating a Community Health and Safety Plan) will serve to minimize potential short-term impacts to the surrounding community from increased vehicle traffic and noise.

Long Term Effectiveness: The Full Source Removal Alternative would remove the on-Site sources of contamination and remove future concerns with regard to potential RECs. Long-term impacts to the surrounding community will be positive because future threats to human health and the environment will be eliminated.

Feasibility: Removing all on-Site contaminated soils is likely to be difficult, if not impossible, to implement. Soil removal is likely to be complex due to the potential large volume of soils to be excavated and the complications presented by excavating soils below or in the proximity of the groundwater table (dewatering and groundwater management will be necessary). In addition, there may be locations on the Site were achieving a 13mg/Kg concentration for arsenic is not possible. Historic records indicate that the entire Site (with the exception of the far eastern edge) is comprised of fill imported at different times from various locations. There may be locations at the Site where, irrespective of the depth of excavations, total weight arsenic concentration will not fall below 13 mg/Kg.

Supervision of demolition personnel during the demolition of the relevant structures in order to avoid accidental dispersion of impacted soils and/or human contact with these soils will be necessary. The Site has reasonably clear access for trucks to enter and exit and sufficient space for the loading and unloading (including temporary stockpiling) of materials.

Compliance with Standards, Criteria and Guidance Values: This alternative removes all known sources of contamination and associated soil containing contaminant concentrations above SCGs from the Site. Post-remedial conditions would meet or exceed cleanup requirements.

Overall Protection of Human Health and the Environment: This alternative provides for the protection of human health and the environment in both the short and long term by the removal of all soils/material from the Site containing contaminant concentrations above SCGs

Reduction in Toxicity, Mobility and Volume: The Full Source Removal Alternative will eliminate all contaminated on-Site material.

Community Acceptance: Community concern is most likely to focus on the anticipated large increase in truck traffic during remedial activities.

Land Use: This alternative provides improvement in Site and local area land use area by transforming the Site from an abandoned industrial property to a residential waterfront development. This improvement is consistent with: the planned land use of the Site and adjacent and surrounding land uses; recent development patterns and population growth projections. The proposed use of the Site is as a residential development comprised of three structures containing multiple apartments is consistent with the existing mixed land uses in the immediate vicinity of the property.

Cost

The costs associated with the Full Source Removal Alternative would be costs resulting from the demolition of on-Site structures, removal of all contaminated soils, and replacement of excavated soil with clean fill. For the purpose of cost calculations, a project lifetime of thirty years is assumed in this analysis. Total costs for the Full Source Removal - Unrestricted Use Alternative are estimated at a present value of not less than $21,998,800.

3.4.3 Comparative Analysis of Alternatives

In this Section, the strengths and weaknesses of the Full Source Excavation, Partial Source Removal and Partial Source Immobilization Alternatives are assessed relative to the No Further Action Alternative, for each analysis criteria.

3.4.3.1 Short-Term Effectiveness

The Partial Source Removal Alternative is considered to be effective in the short term in protecting human health and the environment. The Partial Source Immobilization Alternative could potentially be associated with negative short term impacts. The No Further Action Alternative is not considered to be effective in the short term in protecting human health and the environment. The Full Source Removal Alternative is potentially problematic in the short term. Given what is known about on-Site fill materials, the quantity of subgrade material that will require removal under this Alternative suggest that excavations to depths considerably greater than 2' across the Site might be required (for the purposes of cost calculations a 4' excavation depth across the entire site is assumed). It is likely that such excavations would extend below the level of the Hudson River and therefore create significant stabilization and de-watering problems.

3.4.3.2 Long Term Effectiveness

The Full Source Removal Alternative (D) is considered to be the best alternative with regard to long-term effectiveness (this Alternative is marginally better than the Partial Source Removal Alternative). Both the Partial Source Removal (B) and Partial Source Immobilization Alternatives (C) are protective of human health and the environment in the long-term by eliminating the potential for contact with or migration of on-Site contaminants. The Full Source Removal will result in the most flexibility in future Site uses. Alternatives B & C will require the implementation of engineering and institutional controls.

The No Further Action Alternative affords the least long-term effectiveness. Changes in Site usage and conditions over time could result in increased exposures.

3.4.3.3 Feasibility

The No Further Action Alternative is the most easily implemented option. The Partial Source Removal is considered relatively simple to implement. The Full Source Removal and Partial Source Immobilization Alternatives are considered to be somewhat difficult to implement. Given what is known about on-Site fill materials, the quantity of subgrade material that will require removal under Alternative D suggest that excavations to depths considerably greater than 2' across the Site might be required. It is likely that such excavations would extend below the level of the Hudson River and therefore create significant stabilization and de-watering problems.

3.4.3.4 Reduction of Toxicity, Mobility and Volume

The Full Source Removal and Partial Source Removal Alternatives (B&D) are the most successful at reducing toxicity, mobility, and volume of on-Site contaminants. In these alternatives, all areas of significant contamination will be removed. This would eliminate future toxicity and mobility concerns.

The Partial Source Immobilization Alternative (C) results in the reduction of the mobility of on-Site contaminants; however the toxicity and volume of on-Site contaminants are not reduced to the same degree as the Full Source Removal and Partial Source Removal Alternatives.

The No Further Action Alternative (A) reduces the volume of petroleum-contaminated material on-Site through natural degradation; this reduction, however, is uncontrolled and unpredictable, and maximizes the potential for long-term contaminant mobility. On-Site metals contamination is not expected to degrade naturally.

3.4.3.5 Compliance with Standards, Criteria and Guidance Values

The Full Source Removal Alternative best complies with established SCGs, by eliminating soil materials containing contamination above "Unrestricted Use" regulatory thresholds. Alternatives B and C would employ a soil cover in order to meet the requirements of 6 NYCRR 375-3. It is anticipated that Alternatives B & C would meet groundwater standards by removing and/or treating source materials.

The No Further Action Alternative does not meet basic SCGs.

3.4.3.6 Overall Protection of Human Health and the Environment

The Partial Source Removal best protects human health and the environment. Short periods will occur during remedial activities when dust generation and contaminant exposure have the potential to impact human health and the environment. However, the strict implementation of a NYSDEC-approved HASP and RAWP will mitigate these concerns. Alternative D would achieve protection of human health and the environment through the removal of all on-Site media containing contaminants above unrestricted SCGs. Alternatives B & C would achieve protection of human health and the environment through the removal/treatment of all arsenic-contaminated media at concentrations above the SBL of 32 mg/Kg. Exposure to and migration of contaminants remaining on-Site would be prevented by the installation of a 2' cover of certified clean soil (or impermeable equivalent) across the Site.

The No Further Action Alternative (A) would do little to safeguard human health or the environment from environmental concerns in the long-term.

3.4.3.7 Community Acceptance

Community acceptance cannot be definitively determined until public comment has been solicited and incorporated into this RAA/RWP. The presence of continued on-Site contamination and increased truck traffic are the potential issues most likely to generate public concern and controversy. With respect to these two issues, the Partial Source Removal Alternative is likely to have the highest level of community acceptance. This Alternative would result in no significant contamination left on-Site and soil containing arsenic concentrations above 32 mg/Kg will be buried beneath impervious surfaces or a 2' cover of certified clean fill. The Partial Source Immobilization Alternative may meet with community resistance since relatively elevated total weight concentrations of arsenic will remain on-Site. The Full source removal may meet with resistance because of the large volume of truck traffic.

It is anticipated that the No Further Action Alternative would be least accepted by the public. The public is likely to be concerned about taking no remedial actions for two significant reasons: 1) worry over the safety of contaminated dust and water leaving the Site, and 2) concerns for the safety of residents, especially children, that may be accidentally exposed to Site contaminants.

3.4.4 Recommendation of Preferred Alternative

The recommended remedial alternative for this Site is the Partial Source Removal Alternative, for the following reasons:

1. Based on available environmental data, this Alternative will lead to the removal of all significant on-Site contamination; any remaining contamination is likely to be minimal and will be buried beneath a barrier layer (structure foundations, pavement, and/or imported clean soils). This Alternative therefore provides effective protection of public health and the environment in both the short-term and the long-term.

2. This Alternative is technically feasible and least onerous of the three viable alternatives. The Partial Source Immobilization Alternative involves potentially complex impediments to efficient construction as a result of the need to manage soils containing elevated concentrations of total weight arsenic during construction. In addition, the Partial Source Immobilization Alternative anticipates leaving elevated concentrations of arsenic in on-Site soils, which will require indefinite management and maintenance and may generate community resistance.

3. The Full Source Removal Alternative has similar favorable outcomes as the Partial Source Removal Alternative; however, the Full Source Removal Alternative may be impossible to implement, will take significantly longer, and will involve a large volume of truck traffic to and from the Site. Costs and feasibility constraints associated with the Partial Source Removal Alternative are likely to be significantly less than the Full Source Removal Alternative.

4.0 REMEDIAL WORK PLAN

This portion of the RAA/RWP consists of the Remedial Work Plan (RWP) and presents a conceptual design for the proposed remedial response actions to address known and suspected environmental conditions on the Site, as detailed in ESI's SIR. A summary of Site environmental conditions is presented in Section 2.1, above. Response actions will be conducted consistent with the preferred Remedial Alternative as selected in Section 3.4.4, above (Partial Source Removal Alternative), which calls for removal of significantly contaminated soil during construction activities, and the installation of Sub-Slab Depressurization System (SSDS) beneath the foundation slabs of the three proposed on-Site structures. A Proposed Site Remediation Map (Figure 2), depicting relevant Site features and areas of proposed excavation, is provided in Appendix B. A RDWP will be prepared in order to fully develop design components and technical specifications to execute the preferred Remedial Alternative. All proposed work will be conducted according to a Site specific Health and Safety Plan (HASP), which will be a component of the RDWP.

For the purpose of the work detailed in this RWP, the "Volunteer" is defined as The O'Neill Group – Dutton LLC, which will contract with the environmental consultant and/or remediation firm (hereafter referred to as the On-Site Coordinator [OSC]) to provide the services detailed below.

4.1 Overview of Proposed Remediation Services

The Proposed Remedial Actions will consist of the following:

1. Preparation of full-scale Remedial Design (RD) drawings and specifications, as per the direction of the NYSDEC. RD components and deliverables will be established in the design process (see Section 4.4.1), which will occur in consultation with the NYSDEC and NYSDOH.

2. Demolition of the seven on-Site structures in accordance with applicable NYSDOL (12 NYCRR Part 56) and NYSDEC (6 NYCRR Part 360) regulations for asbestos and disposition of resulting debris, respectively.

3. The excavation and off-site disposal of:

    - categorically hazardous arsenic-contaminated media in and beneath the two former pressure treatment plant buildings;
    - the majority of: soils containing elevated concentrations of arsenic (above the SBL) outside the pressure treatment buildings; and,
    - grossly contaminated soils and soils containing individual SVOCs at concentrations above Restricted Residential Use SCOs.

    The volume of contaminated soil to be excavated, including non-hazardous and hazardous solid waste, is estimated at 12,350 cubic yards, based on existing data. Specific volumes are as follows:

    - Categorically hazardous arsenic contaminated sub-grade media in the footprints of the two former pressure treatment plant buildings. (~ 5,500 cubic yards);
    - Non-hazardous arsenic-contaminated soils in areas 3 through 7 (~6,350 cubic yards); and,
    - SVOC contaminated soils in areas 8-12 (~500 cubic yards).

4. Confirmatory endpoint samples will be collected to document the effectiveness of contaminant removal activities and the integrity of post-excavation soils.

5. The installation of a protective barrier layer (clean soil, building foundations, and paved areas) throughout the entire Site, to prevent exposures to any remaining contaminants.
6. Shoreline stabilization.
7. The installation of four on-site monitoring wells and subsequent groundwater monitoring to document post remedial groundwater quality.
8. A Final Remediation Services Engineering Report (Final Report, signed by a Professional Engineer [PE]) will be submitted to the Volunteer and the NYSDEC (Section 4.4.6).

4.2 Site Preparation Services

This section of the RWP provides details on activities and services that must be initiated and/or completed prior to the implementation of Site remediation services.

4.2.1 Agency Notification

The NYSDEC will be notified in writing at least five (5) business days prior to the initiation of any of the on-Site work and during the course of the fieldwork. Changes to fieldwork scheduling will be provided via facsimile transmission and/or email. All applicable local agencies will also be notified prior to the initiation of Site work. NYSDEC will have the opportunity to participate in all remediation project status meetings (adequate notice of these meetings will be provided).
Prior to the implementation of any of the remedial tasks outlined below, a request for a complete utility markout of the subject property will be submitted as required by New York State Department of Labor regulations. Confirmation of underground utility locations will be secured, and a field check of the utility markout will be conducted prior to the initiation of work. Any utilities on the Site will be protected (as necessary) by the contractor or Volunteer.

4.2.2 Equipment Calibration

Equipment

Prior to the initiation of fieldwork, all field equipment to be used during the work will be properly decontaminated in accordance with NYSDEC Analytical Services Protocol (ASP) [dated July 2005], and all field instruments will be properly calibrated in accordance with procedures set forth by the equipment manufacturer(s). Unless otherwise specified, a MiniRAE 3000 (Model PGM 7320) photo-ionization detector (PID), or equivalent, will be used for the screening of organic vapors and a DustTrak™ Aerosol Monitor (Dust Monitor, Model No. 8520), or equivalent, will be used to perform particulate monitoring. The PID and Dust Monitors are calibrated to read (respectively) parts per million calibration gas equivalents (ppm-cge) of isobutylene and milligrams per cubic meter (mg/m^3) of particulate matter. Instrument calibration will be performed no more than 24 hours prior to the commencement of fieldwork, and a written record of calibration results will be provided in the project files.

Laboratory

All samples will be collected in accordance with the QA/QC Plan (Appendix E) and will be submitted to a NYSDOH ELAP-certified laboratory using appropriate chain of custody procedures. Dedicated, laboratory supplied glassware will be used for sample collection. One trip blank and one field blank will be supplied for each day of fieldwork involving sample collection. Field personnel will complete all chain of custody forms.

Laboratory reports will include detailed Quality Assurance/Quality Control (QA/QC) analyses, which will be provided in the Final Report. Category B deliverables, as defined in the NYSDEC ASP, will be submitted for confirmatory and final delineation samples. In addition, Data Usability Summary Reports (DUSRs) will be prepared by a third, independent party, which maintains NYSDOH ELAP CLP Certification. Data validation by an independent validator will be conducted if requested by the NYSDEC.

4.2.3 Guidance Levels

Guidance levels for determining the integrity of post-excavation remaining soils will be based on NYSDEC Remedial Program Soil Cleanup Objectives (SCOs) for Restricted Residential Use (Track 2), as provided in 6 NYCRR Subpart 375, Table 375-6.8(b) with the exception of arsenic, which will be remediated to the Site-specific background level of 32 mg/Kg for arsenic (Track 4).

Background levels and procedures established in the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (GESVI) will be used to assess VOC concentrations and guide potential remediation of soil vapors.

Guidance levels for all compounds in water will be based on NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1).

Section 4.3.2 list analytes for which soils samples will be assessed after excavation. Section 4.3.3 and Section 4.3.4 list analytes to be assessed for soil vapors and groundwater, respectively.

4.2.4 Site Remediation Coordination Activities

Prior to the initiation of work, the identities and qualifications of the project managers and associated staff will be supplied to the NYSDEC. The Volunteer will ensure that qualified contractors are used. The NYSDEC will also be notified of any changes in the senior on-Site personnel. Prior to the initiation of fieldwork, a Site Health and Safety Officer will be designated by the Volunteer, and all on-Site personnel (including subcontractors) will review the Site-specific HASP (Section 4.2.5). All necessary insurance certificates will be secured from subcontractors by the Volunteer.

The Volunteer will ensure that appropriate coordination exits between remediation and Site development contractors and subcontractors. The outline below presents the order of events for remedial and Site development activities:

- Site clearing and demolition of on-Site structures will occur simultaneously with the excavation of contaminated soils. Of particular importance is the sequence of demolition of the two former pressure treatment plant buildings and remediation of hazardous materials in and beneath the floors.
- The installation of a vapor barrier and SSDS will occur prior to the construction of the slab foundation of the on-Site structures.

The sequence of remediation and Site development events will be fully developed in the RDWP.

An assessment of subsurface soil characteristics, including soil type, the presence of foreign materials, field indications of contamination (e.g., unusual coloration patterns, or odors), and instrument indications of contamination (i.e., PID readings) will be made by the OSC during all Site remediation work. The OSC will be responsible for identifying any soils that, in the opinion of the OSC, may contain elevated concentrations of contaminants and should, therefore, require special handling.

Those soils identified by the OSC will be removed to the soil stockpiling area for characterization and proper disposition. The OSC will monitor the removal of all contaminated soil, including monitoring the trucks and establishing the designated truck routes. The OSC will also ensure that any unforeseen environmental conditions are managed in accordance with applicable federal and state regulations.

4.2.5 Health and Safety Plan

The Site-specific HASP (incorporating a Community Health and Safety Plan) will be reviewed with Site personnel and appropriate sub-contractors prior to the initiation of fieldwork. A copy of this HASP is provided in Appendix D.

4.2.6 Community Air Monitoring Plan

The NYSDOH generic Community Air Monitoring Plan (CAMP, Appendix of the HASP) will be implemented during all fieldwork activities. The CAMP is designed to document the presence or absence of specific compounds in the air surrounding the work zone, which may migrate off-site due to fieldwork activities, and provides guidance on the need for implementing more stringent dust and emission controls based on air quality data.

Continuous air monitoring will be conducted for VOCs and dust during all ground intrusive activities and during the demolition of any structure known or suspected to be contaminated. Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil or groundwater samples (continuous monitoring may be conducted based on the proximity of potential sensitive receptors).

Monitoring for VOCs will occur at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified using a PID (upwind concentrations will be measured to establish background conditions). If concentrations of organic vapors at the downwind perimeter of the work area or exclusion zone exceed 5 ppm above background for the 15-minute average, work activities will be temporarily halted. Organic vapor concentrations persistently in excess of 5 ppm over background (but less than 25 ppm) will require identification of the source and corrective actions. Organic vapors 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less, minimum distance 20 feet) must be below 5 ppm over background for the 15-minute average. All work activities will stop if organic vapors are above 25 ppm at the perimeter of the work area.

Odors from the excavation of petroleum contaminated soil may be an issue at this Site. Odor control will be accomplished by wetting soils or through the use of commercially available odor-suppressing foam, which can be sprayed directly onto exposed soils. Thresholds for the implementation of odor-suppression measures will be based on the needs of Site personnel (i.e. odors interfere with work activities or have acute health impacts) and on the presence of significant objectionable odors at Site boundaries, which could impact off-site receptor populations. Odor suppression will be conducted at anytime that odor complaints are received from neighboring properties or local regulatory authorities, or if so directed by NYSDEC personnel.

At this time it is anticipated that the following dust monitoring procedures will be used on-Site, however, more restrictive measures may be implemented during the remedial design phase. Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less). Specific locations will change daily, depending on the work being conducted and the direction of the wind. Fugitive dust migration will also be visually assessed during all work activities. Dust suppression techniques will be employed if downwind particulate levels are 100 micrograms per cubic meter (mcg/m^3) greater than background or if airborne dust is

observed leaving the work area (work may continue with dust suppression techniques provided that downwind particulate levels are not greater than 150 mcg/m^3 above background and no visible dust is migrating from the work area). Work will be stopped and procedures will be re-evaluated if downwind particulate levels are greater than 150 mcg/m^3 above background.

4.2.7 Dust Suppression

Dust suppression activities will be conducted during remediation and construction activities that will disturb on-Site soils. Engineering controls will be used to control airborne contamination, including wetting soils with water and the placement of plastic sheeting over exposed soil and stockpiles (at a minimum, soils will be misted when Site conditions indicate dry soils could potentially generate fugitive dust). Evidence of visible dust leaving the Site will result in the implementation of more aggressive dust suppression activities including increased misting, reduction in soil movement, or cessation of excavation (see Section 4.2.6, above).

4.2.8 Hours of Operation

Remedial work will be conducted between the hours of 7 AM and 5 PM Monday through Friday. No remedial work will be conducted on the weekend (Saturday or Sunday) unless expressly permitted by the NYSDEC. Construction activities not related to Site remediation may occur on weekends and holidays, if so permitted by the local authorities.

4.3 Proposed Specific Remediation Services

This section of the RWP provides a detailed description of the remedial tasks that will be conducted at the subject property. During the course of all remedial activities, appropriate measures (e.g., vehicle traffic patterns, stormwater run-off controls) will be implemented to ensure that contaminated soil is minimally disturbed.

4.3.1 Design Process

A Remedial Design Work Plan will be completed prior to the start of remediation/construction activities. The RDWP will describe in detail the means of implementing the selected remedy and the quality control and quality assurance procedures and protocols to be applied to construction, including management of hazardous/regulated materials, Site control and safety, contingency plans, and construction practices. Relevant documents, specifications, permits and drawings to be prepared as part of the design process for the selected remedial action are provided below. Unless otherwise indicated, these components will be included with the submittal of the RDWP (anticipated submittal date December 2008):

- Media Sampling Protocols/Quality Assurance Project Plan
- Contingency Plan
- Specifications for Removal of Contaminated Soil (including dewatering specification (if necessary) and survey quality drawings)
- Specifications for Shoreline Stabilization
- Specifications for Design, Installation, Testing and Maintenance of the Vapor Barrier and Sub-Slab Depressurization System
- Environmental Easement (to be completed post remediation activities)

A Stormwater Pollution Prevention Control Plan, Stormwater Management Plan and Sediment and Erosion Control Plan (ECP) will be prepared by the Volunteer as part of the Site development activities. If remediation and development do not occur simultaneously, then adequate details of an ECP will be included in the design. In addition, appropriate permits (i.e. State Pollutant Discharge Elimination System (SPDES) permit for construction and remediation activities, etc.) will be secured by the Volunteer as part of Site development activities.

Site construction and remediation activities will be properly managed by developing an appropriate Site layout, and establishing adequate staging areas and exclusions zones. These components will be fully developed in the Work Plan for the Sequencing of Remedial and Site Development Activities, to be submitted as part of the RDWP.

4.3.2 Excavation of Contaminated Soils

Previous investigations have documented the presence of soils contaminated by arsenic, chromium, and SVOCs at several locations throughout the Site. The total volume of impacted soils is estimated to be approximately 13,000 cubic yards. These contaminated soils will be removed from the Site in accordance with applicable NYSDEC regulations (6 NYCRR Part 360 and Part 370). All appropriate disposal documentation will be maintained by the Volunteer for inclusion in the Final Report. The location of known contaminated soils subject to the removal procedures detailed below is provided on the Proposed Site Remediation Map, Figure 2, Appendix B.

1. Surface material such as concrete, metal, and other miscellaneous materials will be removed and stockpiled or properly disposed of off-site as exempt waste. Any subsurface debris encountered during the excavation of on-Site soils will be disposed of in a manner consistent with applicable Part 360 regulations. If any underground storage tanks are encountered during excavation, appropriate regulatory agencies will be notified and the tank(s) will be properly drained and cleaned prior to removal and off-site disposal. All tank closure activities will be properly documented, including tank condition, removal and disposal of the tank(s) and any wastes, and disposal of any encountered contaminated soils.
2. Twelve proposed excavation areas, presented in Table 2, have been identified.

Table 2: Proposed Excavation Areas

Area	Location	Contamination	Proposed Excavation Depth (bsg)
1	Footprint of Northern Pressure Treatment Plant Building	Arsenic/chromium	0-8’
2	Footprint of Southern Pressure Treatment plant	Arsenic/chromium	0-4’
3	Area immediately surrounding Northern Pressure Treatment plant	Arsenic/chromium	0-3’
4	Northwest of Southern Pressure Treatment Plant Building	Arsenic/chromium	1’-3’ feet
5	East side of Site between the pressure treatment plant buildings	Arsenic/chromium	0-1’
6	West of Northern Pressure Treatment Plant Building	Arsenic/chromium	0-1’
7	Railroad	Arsenic/chromium	0-1’
8	South of Northern Pressure Treatment Plant Building	Petroleum	Approximately 500 tons in total.
9	Northeast of Southern Pressure Treatment Plant Building	Petroleum	
10	North and south of main office building	Petroleum	
11	Southwest of former garage/automotive repair facility at southern end of Site.	Petroleum	
12	Beneath small brick building at western side of Site.	Petroleum	

Excavation of soils exhibiting field evidence of contamination will be conducted in a manner consistent with field conditions and technical observations from field personnel. Soils not indicating field evidence of contamination will be segregated, stockpiled, sampled, and analyzed to verify their integrity prior to off-site disposal.

3. Field screening and confirmatory sampling will be conducted (as appropriate) for remaining, post-excavation soils. Soil samples will be placed in laboratory-supplied glassware using decontaminated stainless steel trowels and dedicated, disposable latex gloves. Samples will be maintained at cold temperatures and shipped to a NYSDOH ELAP-certified laboratory within 24 hours under appropriate chain of custody. Laboratory analyses for excavated soils will be based on the requirements of the repository. Remaining post-excavation soils will be analyzed for the specific constituents of concern identified in Table 2 (i.e., soils proposed for removal because of elevated arsenic/chromium will result in post-excavation samples [walls and floor] to be analyzed for only arsenic and chromium). For those areas where multiple contaminants are present above guidance levels, all such compounds will be tested for in the confirmatory samples.

   The number of post-excavation soil samples will be determined in the field based on the size and dimensions of the excavation. At a minimum, one soil sample will be collected from each 30 feet of wall (minimum of one sample per wall) and one sample will be collected from every 900 square feet of floor (minimum of one sample per floor). Wall samples will be collected from a depth consistent with the depth of previously identified contamination; floor samples will be spatially distributed throughout the base of the excavation. Encountered soils that exhibit unusual field conditions will be additionally analyzed for specific compounds as determined by the field technician (in consultation with the NYSDEC Project Manager) to be most appropriate.

4. Dewatering at areas of proposed excavation may be necessary in order to excavate relatively dry material, observe and collect confirmatory samples, and backfill excavated areas. Approximately 3,925 cubic yards of saturated soil may necessitate dewatering (see Appendix C for calculations). It is anticipated that dewatering may be necessary in Area 1, 2, 3, 4, 7, and 12.

5. Necessary approvals for water discharge for construction and remediation activities will be secured by the Volunteer as part of Site development activities. Containerized water will be characterized and treated as necessary prior to discharge or disposal off-site. Dewatering (if necessary) designs and protocols will be fully developed in the RDWP.

6. Any excavated soils temporarily stored on-Site will be placed on double-lined, 6-mil plastic sheeting and covered with a single sheet of 6-mil plastic. The stockpile will be located to minimize the likelihood of direct contact with standing water or water resulting from a storm event. The integrity of the overlaying plastic will be periodically inspected, and replacement of the plastic will occur when appropriate until such time as all soils are removed from the Site. To the extent feasible, landfill approvals will be secured to permit direct loading of trucks.

7. Appropriate erosion and sediment controls and stormwater management will be implemented in accordance with the required NYSDEC SPDES permit and/or the approved RDWP. Sediment and erosion controls to minimize soil stockpile erosion and sedimentation include the use of stabilized construction entrances, stockpile protections, silt fencing, hay bale check dams, catch basin covers, and dewatering pits, if needed, to control for migration of sediment to groundwater or adjacent surface water.

8. All contaminated materials will be removed from the property by an appropriately licensed hauler who will be responsible for exiting the Site and traveling on a pre-determined truck route. Trucks will be covered and leak-proof and appropriate measures will be taken to control the generation of fugitive dust from the trucks during transport.

9. All soils (either regulated or exempt) removed from the Site will be documented with appropriate transportation manifests and weight tickets, as well as disposal/recycling certificates from the off-site facility, which will be included in the Final Report.

10. All wastes will be transported from the Site in a manner appropriate to reduce dust generation and/or fugitive discharges of soils onto City streets. The specific truck routes will be dependent on the location of the particular repository.

4.3.3 Excavation of Underground Storage Tanks (USTs)

Several underground storage tanks are present on the Site. The abandoned USTs, along with any appurtenant piping and/or petroleum impacted soil, will be excavated and removed from the Site, following the procedure outlined below (protocols for the handling and disposal of excavated soils, and post excavation confirmatory endpoint sampling, are detailed in Sections 4.3.1 above).

- The tanks and ancillary piping will be exposed with a backhoe or excavator and excavated soils will be field screened for contamination. Soils exhibiting field evidence of contamination (e.g., odor, discoloration, PID readings above background levels) will be segregated and stockpiled on plastic.

- The tanks will be opened and visually inspected. Encountered liquid will be identified and will be removed from the tank by a licensed liquid waste transporter/disposal firm. Based on prior fieldwork, it is anticipated that the tanks will contain petroleum-contaminated water, which will require off-site disposal as a regulated non-hazardous liquid waste. Any encountered sludge or "tank bottoms" will be appropriately containerized.

- The tanks will be removed from the ground, and a photographic record of the tanks will be made (a visual inspection of the tank interiors will be made, if possible). The tank will be cleaned of any residual product and removed from the Site for off-site disposal.

- Removal of contaminated soil will occur consistent with Section 4.3.2., above.

Proper tank and liquid disposal manifests will be prepared and signed by the OSC as representative of the Client and documentation will be provided to the Client for inclusion in the Final Report.

Specifications for the removal of chemical bulk storage tanks will be discussed in the RDWP.

4.3.4 Installation of Cover Layer

A cover of certified clean soil will be placed as a barrier layer at all areas that are not covered by the proposed on-Site structures contain low-level concentrations of metals and/or petroleum contamination, which remain on the Site following excavation of grossly impacted materials.

The OSC will be responsible for documenting the integrity of any certified clean soil imported to the Site by the owner. Any imported materials to be used as backfill under the clean-soil cover must meet the SCOs for Protection of Public Health, "Restricted Residential" Use, as specified in 6 NYCRR Part 375, Table 375-6.8(b).

A marker layer consisting of an easily identifiable, non-biodegradable layer such as high visible porous plastic mesh will first be placed on all areas that are targeted for the placement of the barrier layer. After the marker layer has been appropriately placed, a minimum of 24 inches of certified clean soil material will be placed on the site in the designated areas. Soil material will be placed and compacted in lifts not exceeding 12 inches compacted depth. For all covered areas having exposed soils, the top six inches of soil will contain sufficient organic matter to permit re-vegetation. This final layer may be replaced with topsoil in areas where final landscaping has been determined. All finished grades that receive topsoil shall be raked smooth, seeded and mulched, and water periodically as necessary to insure proper stabilization of soil areas.

The 24-inch soil barrier layer may also be substituted by any of the following:

- asphalt or concrete of sufficient thickness
- on-Site buildings

The specific thickness of each of these alternative materials will be dependent on ultimate Site development plans but will not be less than 6". The determination to utilize substitute materials will be made based on design considerations but will not be considered approved until written approval from the NYSDEC is received. A grading and cover plan illustrating the locations of structures, parking areas, landscaping and clean fill or equivalent substitute as well as the depth to contaminated soil will be provided to the NYSDEC after site development plans have been finalized. It will be the responsibility of the Volunteer to provide adequate justification for any and all proposed substitutes.

4.3.5 Installation of Vapor Barrier and Sub-Slab Depressurization System

It is anticipated that remedial excavation activities will result in the removal of all significant sources of volatile organic soil vapors. As a supplemental preventive measure, a vapor barrier underlain by a SSDS will be installed under the proposed on-Site structures in order to eliminate potential vapor migration.

The design and installation of the SSDS will be conducted in accordance with the concepts and practices outlined in (1) the Radon Prevention in the Design and Construction of Schools and Other Large Buildings (RP Document), prepared by the United States Environmental Protection Agency (USEPA) [dated June 1994] and (2) NYSDOH's GESVI, and will consider all soil and vapor sampling data.

4.3.5.1 System Design and Installation

The sub-slab vapor barrier will consist of a minimum 10 mil plastic liner (or equivalent), which overlies a highly porous substrate (e.g., gravel) containing a horizontal network of SSDS piping (perforated four-inch slotted PVC pipes). The horizontal piping network will be connected to non-perforated vertical piping which extends above the roofline of the proposed building. All vapor barrier penetrations and overlapping sections of plastic liner will be appropriately sealed, as will any penetrations or significant openings in sub-grade portions of foundation slabs or foundation walls. Low-grade vacuum pumps or fans, sized to maintain vacuum beneath the foundation slab, will be connected to the vertical piping system. System discharge points will be located above the roofline and at a sufficient distance from roof-mounted air intakes to prevent re-entrainment of airborne contaminants. A visual pressure indicator (U-tube manometer or magnehelic gauge) will be installed for regular inspection purposes. In addition, an audible and/or visual fail-safe system will be installed to alert maintenance personnel to conditions of insufficient vacuum, which may be cause by vacuum pump/fan failure. The precise system design will be developed following confirmation of final soil conditions.

4.3.5.2 System Start-up, Testing and Maintenance

System start-up and initial testing will occur after the concrete slab of the on-Site structures have been poured. The following activities will be conducted:

1. Prior to system start-up all visible system components will be visually inspected for verification of proper installation. The system will be temporarily started and all vacuum pumps/fans will be inspected for proper functioning. The system will be shut off and documentation of system conditions will be maintained in field logbooks.

2. Temporary monitoring points will be installed throughout the building by drilling ¼ inch – ½ inch diameter holes through the slab. An assessment of sub-lab pressure, both with the system off and with the system temporarily on, will be made at each monitoring point using a digital micro-manometer. A difference in pressure of -0.002 inches of water column at each monitoring point, or a sustained sub-slab pressure of at least -0.01 inches of water column with the system on, will indicate proper system functioning. Observed pressure readings that fall short of these standards may indicate the need for system modification.

3. Carbon filtration will be installed at each system discharge point if field observations indicate the potential for significant vapors in the emission. The system will be operated for a minimum of 12 hours and subsequently, pre- and post carbon filtration effluent air samples will be collected and analyzed for VOCs (USEPA Method TO-15). These data will be used to determine the need for and extent of an air quality permit (including the need for continued air discharge treatment).

4. The system will be permanently engaged following the completion of system modifications, the addition of any effluent air treatment, and the receipt of any necessary permits.

5. After the system has been permanently engaged the Volunteer will be responsible for inspections of the system's pressure. In addition, the system fans will be inspected periodically for signs of wear and/or failure.

4.3.5.3 Post-Construction Indoor/Outdoor Air Sampling

The Volunteer will conduct post-construction indoor and outdoor air quality sampling to document on-Site air quality both within the on-Site structure(s) and the exterior areas. The Volunteer will consult with the NYSDEC and the NYSDOH prior to sampling. Sampling of indoor air quality will be performed in accordance with established NYSDOH protocols, outlined in the GESVI, and will include analyses for the VOCs previously detected in on-Site soil.

Three air samples will be collected to determine external air quality. Prior to sample location, meteorological data on wind velocity and direction will be collected to provide quality assurance to the data set. Measurable precipitation and/or average wind speed in excess of ten miles per hour will be conditions which will necessitate rescheduling of outdoor air quality sampling. The sampling event will consist of one upwind location and two downwind locations. Internal air quality will be determined by collecting and analyzing three air samples at locations inside the structure. Samples will be analyzed for VOCs using USEPA Method TO-15. All sample locations will be shown on a Site map to be provided to the NYSDEC in the Final Report.

4.3.6 Shoreline Stabilization

The shoreline will be stabilized to ensure that the proposed soil cover (see above) can be appropriately maintained. The precise method and extent of stabilization selected will be a function of future construction design decisions regarding a) a potential pedestrian walkway along the river and b) the type of site cover installed adjacent to the shore.

4.3.7 Groundwater Monitoring

No active groundwater remediation is proposed in this RWP; existing data indicate low-level contamination of PAHs and low-level concentrations (below guidance levels) of metals which do not require an active response action. The Site Management Plan, to be developed following completion of remedial activities, will require that four monitoring wells be installed and wells be sampled on a quarterly basis over the next year following remediation activities. Quarterly sampling will commence after the completion of remediation. In addition, monitoring wells will be sampled periodically thereafter based on NYSDEC's review of the monitoring data for the first year to document any change in concentrations.

4.3.7.1 Groundwater Sampling and Analysis

Groundwater sampling will be conducted in a manner consistent with technical specifications outlined in the RDWP. Based on previous sampling data, which showed low-level contamination by low-level concentrations of SVOCs and metals, groundwater samples will be submitted for laboratory analysis of TAL metals (USEPA methods 6010 and 7471), and TCL SVOCs + 20 (USEPA method 8270).

4.3.8 Documentation of Site Remediation and/or Closure

At the completion of all services specified in the RDWP, a Final Remediation Services Engineering Report will be prepared. The Final Report will include, at a minimum, results of any laboratory analyses generated during activities described in the RDWP, waste transport/disposal manifests from all soil excavation and disposal activities, proof of vapor barrier and SSDS installation (e.g., photographs, field notes) and documentation of SSDS effectiveness, and maps illustrating Site closure activities.

The Final Report will be signed, certified and stamped by a PE licensed to practice in the State of New York and will affirmatively document that all remedial measures described in the RDWP have been properly implemented. The Final Report will be submitted to the NYSDEC for review and approval. In conjunction with the submission of the Final Report, a SMP and an Environmental Easement will be prepared for this Site. Detailed within the SMP will be the following:

- Specification of maintenance activities for the barrier layer and a methodology for managing soils encountered during any future excavation work on the Site;
- Groundwater use restrictions at the Site;
- Groundwater monitoring plan for any wells remaining after the construction of the new on-Site building;
- Maintenance and operations plan for the SSDS; and,
- An inspection and reporting schedule to document the continued integrity of these engineering controls.

An Environmental Easement will be prepared by the Volunteer, in conjunction with NYSDEC, to provide appropriate management of the proposed controls outline in the SMP. The Volunteer or subsequent property owner(s) must periodically certify to the NYSDEC that the institutional and engineering controls included in the Environmental Easement remain in-place and effective throughout the lifetime of the Site.

4.4 Project Schedule

Table 3, below, presents a conceptual schedule for implementing the actions detailed in this RWP. A more precise timetable and sequencing of tasks will be developed in the RDWP.

Table 3: Project Schedule

Months	Action	Deliverables
0 – 1	Design Process	Remedial Design Report
1 - 13	Soil Excavation/Removal	Weekly Status Memos on remedial actions (includes summary laboratory data)
14 – 36	Building Construction and Barrier Layer Installation	Milestones in building construction and barrier layer installation will be reported (as appropriate) in relevant reports
12 – 24	Monitoring well installation and Quarterly Groundwater Monitoring (following remedial activities)	Quarterly Status Memo for groundwater results
14 – 16	SSDS Installation/Testing	Status Memo on SSDS completion/effectiveness
16 – 136	Groundwater Monitoring (post first year quarterly sampling, 10 year schedule assumed)	Data to be included in the Final Report and in SMP related reports
37 – 41	Project Closure	Final Report with SMP and Environmental Easement

APPENDIX A

References

REFERENCES

Abbreviations and Acronyms

As	Arsenic
ASP	Analytical Services Protocol
BCP	Brownfield Cleanup Program
bsg	below surface grade
CCA	Chromated Copper Arsenate
CLP	Contract Laboratory Protocol
CQA	Construction Quality Assurance
CQC	Construction Quality Control
CY	Cubic Yard
DUSRs	Data Usability Summary Reports
EC	Engineering Controls
ELAP	Environmental Laboratory Approval Program
gpm	gallons per minute
IC	Institutional Controls
msl	mean sea level
mg/m^3	milligrams per cubic meter
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
OSHA	Occupational Safety and Health Administration
PE	Professional Engineer
PID	Photo-Ionization Detector
ppm-cge	parts per million calibration gas equivalents
RECs	Recognized Environmental Conditions
RD	Remedial Design

SCG	Standards, Criteria, and Guidance Values
SCOs	Soil Cleanup Objectives
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TPH-DROs	Total Petroleum Hydrocarbons – Diesel Range Organics
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
YR	Year
$\mu g/m^3$	micrograms per cubic meter

Documents and Publications

BCP Guide	Draft Brownfield Cleanup Program Guide, prepared by NYSDEC, dated May 2004.
CAMP	Community Air Monitoring Plan, prepared by NYSDOH (included in DER-10), dated December 2002.
DER-10	Draft Division of Environmental Remediation -10, Technical Guidance for Site Investigation and Remediation, prepared by NYSDEC, dated December 2002.
GESVI	Guidance for Evaluating Soil Vapor Intrusion in the State of New York, prepared by NYSDOH, dated October 2006.
HASP	Health and Safety Plan, prepared by ESI, dated October 2008.
QA/QC	Quality Assurance/Quality Control Plan, Prepared by ESI, dated October 2008.
RAA/RWP	Remedial Alternatives Analysis and Remedial Work Plan, prepared by ESI, dated October 2008.
RDWP	Remedial Design Workplan, to be prepared by ESI.
RIR	Remedial Investigation Report, prepared by Fuss & O'Neill, dated August 2007.
RIWP	Remedial Investigation Workplan, prepared by Fuss & O'Neill, dated October 2005.

SIWP	Supplementary Investigation Workplan, prepared by ESI, dated March 2008.
SIR	Supplementary Investigation Report, prepared by ESI, dated September 2008.
TAGM 4046	Technical and Administrative Guidance Memorandum #4046 including subsequent NYSDEC memoranda, prepared by NYSDEC, dated January 1994.
TOGS 1.1.1	Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, prepared by NYSDEC, dated June 1998.

APPENDIX B

Figures

Figure 1 Property Location Map
Former A.C. Dutton Lumber Yard
1 Dutchess Avenue and 2 Hoffman Street
Poughkeepsie, New York

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ESI File: OP08022.41

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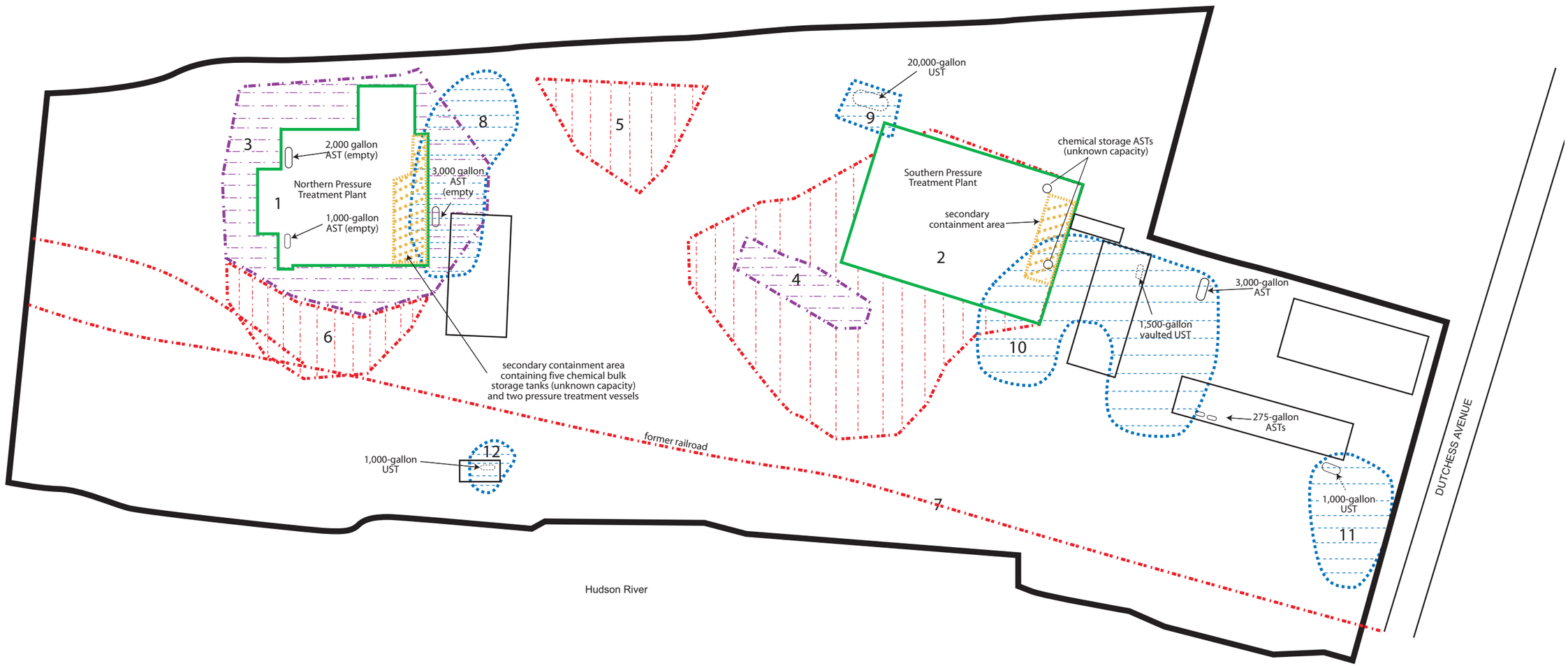
Appendix B



Legend:

- property outline
- pressure treatment plant buildings
- existing buildings
- area of petroleum impacts
- area of arsenic contamination above 32 mg/Kg (0-1')
- area of arsenic contamination above 32 mg/Kg (0-3')

1 = area #

Notes:

Map based on Fuss and O'Neill proposed "Remedial Action Map" (July 2006)

Figure 2 - Proposed Remediation Map - Excavation/Treatment (Partial Source Removal/Treatment - Arsenic Remediated to SBL of 32 mg/kg)

Former A.C. Dutton Facility
1 Dutchess Avenue and 2 Hoffman Street
Poughkeepsie, New York

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Ecosystems Strategies, Inc.

N

steep slope

DUTCHESS AVENUE

100 feet

Legend:

property outline

cover

Figure 3 - Proposed Remediation Map

Former A.C. Dutton Facility
1 Dutchess Avenue and 2 Hoffman Street
Poughkeepsie, New York

ESI File: OP08022.41

September 2008 | Appendix A

Ecosystems Strategies, Inc.

APPENDIX C

Cost Estimates for Remedial Alternatives
(Not Provided in Public Copies)

APPENDIX D

Health and Safety Plan
(incorporating a Community Health and Safety Plan)

HEALTH AND SAFETY PLAN

FOR

SITE REMEDIATION

(INCORPORATING COMMUNITY HEALTH AND SAFETY PLAN)

for the former
A.C. Dutton Lumber Yard

NYSDEC Brownfields Program Site: C314081

Located at

1 Dutchess Avenue, Town of Poughkeepsie
2 Hoffman Street, City of Poughkeepsie
Dutchess County, New York

September 2008

ESI File: OP08022.42

Appendix E of the Remedial Alternatives Report and Remedial Workplan

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Ecosystems Strategies, Inc.

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1.0 INTRODUCTION

1.1 Purpose

This Health and Safety Plan (HASP) has been developed to provide the requirements and general procedures to be followed by Ecosystems Strategies, Inc. (ESI) and designated subcontractors while performing remedial activities at the "Former A.C. Dutton Lumber Yard" Brownfields Cleanup Program (BCP) Site (Site Code: Site ID: C314081) located at 2 Hoffman Street and 1 Dutchess Avenue, City and Town of Poughkeepsie, New York. This document supersedes all other health and safety plans prepared by ESI for this Site.

ESI 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 HASP incorporates policies, guidelines, and procedures that have the objective of protecting the public health of the community during the performance of fieldwork activities, and therefore serves as a Community Health and Safety Plan (CHASP). The objectives of the CHASP are met by establishing guidelines to minimize community exposure to hazards during fieldwork, and by planning for and responding to emergencies affecting the public.

This HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be utilized by all personnel while on the Site. All on-site personnel and visitors shall follow the guidelines, rules, and procedures contained in this safety plan. The Project Manager or Site Health and Safety Officer (SHSO) may impose any other procedures or prohibitions believed to be necessary for safe operations. This HASP incorporates by reference the applicable Occupational Safety and Health Administration (OSHA) requirements in 29 CFR 1910 and 29 CFR 1926.

The requirements and guidelines in this HASP are based on a review of available information and evaluation of potential on-site hazards. This HASP will be discussed with Site personnel and will be available on-site for review while work is underway. On-site personnel will report to the Site Health and Safety Officer (SHSO) in matters of health and safety. The on-site project supervisor(s) are responsible for enforcement and implementation of this HASP, which is applicable to all field personnel, including contractors and subcontractors.

This HASP is specifically intended for the conduct of activities within the defined scope of work in specified areas of the Site. Changes in site conditions and future actions that may be conducted at the Site may necessitate the modification of the requirements of the HASP. Although this HASP can be made available to interested persons for informational purposes, ESI has no responsibility over the interpretations or activities of any other persons or entities other than employees of ESI or ESI's subcontractors.

1.2 Site Location and Description

The Site as defined in this HASP is the Former A.C. Dutton Lumber Yard property ("the Site") is an irregularly-shaped parcel, which has approximately 371 feet of frontage on the northern side of Dutchess Avenue and approximately 213 feet of frontage on the northern side of Hoffman Street. The Hudson River extends along the western edge of the property and a chain-link fence marks the northern boundary. Seven vacant structures, including two former lumber pressure treatment plant buildings, are present on-site and much of the remainder of the Site is covered with concrete or asphalt pavement. The property is comprised of two lots (City of Poughkeepsie Tax ID: 6062-59-766443, and Town of

Poughkeepsie Tax ID: 6062-02-763508). A Site Location Map and Proposed Site Remediation Maps are included as Attachment A of this HASP.

1.3 Work Activities

Environmental remediation activities are detailed in the Remedial Alternatives Analysis and Remedial Workplan (RAA/RWP) dated September 2008. The specific tasks detailed in the RAA/RWP are wholly incorporated by reference into this HASP. The RAA/RWP was prepared as a requirement of the Developers' participation in the New York State Department of Environmental Conservation (NYSDEC) BCP and describes tasks required to adequately remediate documented on-site environmental conditions. The Site has a long history of previous industrial use and contains two former lumber pressure treatment plant buildings. Contamination primarily consists of soils impacted by arsenic. Several locations have also been documented to contain low grade petroleum contamination.

The Scope of Work includes:

- A sweep of both pressure treatment buildings to remove residual process chemicals and dust;
- Demolition of all existing structures;
- Scarification of the floor of the Southern Pressure Treatment plant to a depth of 1" and removal of entire asphalt floor of Northern Pressure Treatment plant building;
- Removal of all arsenic-contaminated solid media containing concentrations of arsenic above the SBL of 32 mg/Kg beneath both pressure treatment plant buildings and off-site disposal as hazardous waste;
- Stabilization of the shore to prevent migration /erosion;
- Removal of asphalt across entire Site;
- Removal of all petroleum bulk storage tanks and associated petroleum-contaminated soil;
- Removal of the majority of on-site soils containing arsenic concentrations above 32 mg/Kg;
- Backfilling of the excavations to grade to prevent exposures to low-level contamination remaining on the Site;
- Installation of two feet of clean soil cover (or equivalent);
- Installation and sampling of new groundwater monitoring wells, as warranted.
- Implementation of a Site Management Plan to ensure the long-term effectiveness of these response actions, including the maintenance of engineering controls including provisions for groundwater monitoring, periodic inspections and contingency plans for soil management; and,
- Restriction of future Site use through an environmental easement and maintenance of engineering controls.

2.0 HEALTH AND SAFETY HAZARDS

Potential health and safety hazards are summarized below and considered in detail in Sections 3.0 through 11.0.

2.1 Hazard Overview for On-site Personnel

The potential exists for the presence of elevated concentrations of arsenic and/or chromium in on-site soils and petroleum compounds in groundwater. The possibility exists for on-site personnel to have contact with contaminated soils, groundwater, and vapor during site remedial work. Contact with contaminated substances may present a skin contact, inhalation, and/or ingestion hazard. Potential exposures to these contaminants are likely to be limited to those on-site personnel directly involved in demolition of the two former pressure treatment plant buildings, excavating/stockpiling contaminated soil, dewatering activities, well installation, and sampling. Potential exposure risks to other on-site personnel are expected to be minimal.

Additional potential hazards to on-site personnel include mechanical/physical hazards, electrical hazards from utilities, traffic hazards from fieldwork vehicles, ergonomic and thermal hazards from physical work conditions, noise impacts associated with operation of mechanical equipment, and hazards related to chemical oxidation treatments (hazards specifically related to chemical oxidation will be addressed in a separate Health and Safety Plan to be provided by the subcontractor; see Section 10.3).

2.2 Potential Hazards to the Public from Fieldwork Activities

The potential exists for the public to be exposed to contaminated soils, groundwater, and vapor, which may present a skin contact, inhalation, and/or ingestion hazard. Additional potential hazards to the public that are associated with fieldwork activities include mechanical/physical hazards, traffic hazards from fieldwork vehicles, and noise impacts associated with operation of mechanical equipment.

Impacts to public health and safety are expected to be limited to hazards that could directly affect on-site visitors and/or trespassers. These effects will be mitigated through site access and control measures (see Section 6.0, below). Specific actions taken to protect the public health are anticipated to minimize any potential off-site impacts from contaminant migration, noise, and traffic hazards.

2.3 Identified Chemical Contaminants

Contamination by metals and petroleum compounds has been documented at the Site. Elevated concentrations of arsenic and chromium have been were found in the two former pressure treatment buildings. Petroleum impacts are generally restricted to the locations of former or existing underground storage tanks (USTs).

Site groundwater has been locally impacted by low-level petroleum-based contamination. No significant metal concentrations are present in groundwater.

Table 1, below, summarizes significant contaminants detected in soil and groundwater samples. Hazardous property information for specific compounds is reported in Attachment B (Table 3).

Table 1: Significant Contaminant Concentrations in Soil
(Values for dust/soils reported in mg/kg [parts per million, ppm])

Media	Compound of Concern	Peak On-Site Concentration	Soil Cleanup Objective* Unrestricted/Restricted Residential Use
Dust	Arsenic	138,000	N/A
	Chromium	93,700	N/A
Soil	Arsenic	5,820	13 / 16
	Chromium	4,310	63 / 180
	Total SVOCs	35.5	500#

Notes:
* NYSDEC Remedial Program, Tables 375-6.8(a) and 375-6.8(b), Soil Cleanup Objectives (SCOs) for protection of public health; Restricted category based on restricted residential use
** peak concentrations in groundwater
*** Guidance levels based on NYSDEC TOGS 1.1.1 (June 1998) and subsequent Memoranda
# Based on TAGM 4046 (Remedial Program SCO not available)
n/a not available

3.0 PERSONAL PROTECTIVE EQUIPMENT

The levels of protection identified for the services specified in the RAA/RWP represent a best estimate of

exposure potential and protective equipment needed for that exposure. Determination of levels was based on data provided by previous studies of the Site and information reviewed on current and past Site usage. The SHSO may recommend revisions to these levels based on an assessment of actual exposures and may at any time require Site workers, supervisors, and/or visitors to use specific safety equipment.

The level of protective clothing and equipment selected for this project is Level D. Level D PPE provides minimal skin protection and no respiratory protection, and is used when the atmosphere contains no known hazard, oxygen concentrations are not less than 19.5%, and work activities exclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of chemicals. Workers will wear Level D protective clothing including, but not limited to, a hard hat, steel-toed boots, nitrile gloves (when handling soils and/or groundwater), hearing protection (foam ear plugs or ear muffs, as required), and safety goggles (in areas of exposed groundwater and when decontaminating equipment). Personal protective equipment (PPE) will be worn at all times, as designated by this HASP. Disposable gloves will be changed immediately following the handling of contaminated soils, water, or equipment. Protective Tyvek suits will be worn during activities likely to excessively expose work clothing to contaminated dust or soil (chemically-resistant over garments will be required in situations where exposures could lead to penetration of clothing and direct dermal contact by contaminants).

The requirement for the use of PPE by official on-site visitors shall be determined by the SHSO, based on the most restrictive PPE requirement for a particular Work Zones (see Section 5.0 for Work Zone definitions). All on-site visitors shall, at a minimum, be required to wear an approved hardhat and be provided with appropriate hearing protection as necessary.

The need for an upgrade in PPE will be determined based upon encountered Site conditions, including measurements taken in the breathing zone of the work area using a photo-ionization detector (PID). An upgrade to a higher level of protection (Level C) will begin when specific action levels are reached (see Section 5.0, below), or as otherwise required by the SHSO. Level C PPE includes a full-face or half-mask air-purifying respirator (NIOSH approved for the compound[s] of concern), hooded chemical-resistant clothing, outer and inner chemical-resistant gloves, and (as needed) coveralls, outer boots/boot covers, escape mask, and face shield. Level C PPE may be used only when: oxygen concentrations are not less than 19.5%; contaminant contact will not adversely affect any exposed skin; types of air contaminants have been identified, concentrations measured, and a cartridge or canister is available that can remove the contaminant; atmospheric contaminant concentrations do not exceed immediately dangerous to life or health (IDLH) levels; and job functions do not require self-contained breathing apparatus (SCBAs).

The need for Level A or Level B PPE is not anticipated for the planned remedial activities at this Site and ESI personnel and ESI's subcontractors will not engage in activities requiring Level A or Level B PPE. The selection and use of personal protective equipment, including a description of PPE levels, is summarized in Attachment C.

If any equipment fails and/or any employee experiences a failure or other alteration of their protective equipment that may affect its protective ability, that person will immediately leave the work area. The Project Manager and the SHSO will be notified and, after reviewing the situation, determine the effect of the failure on the continuation of on-going operations. If the failure affects the safety of personnel, the work site, or the surrounding environment, personnel will be evacuated until appropriate corrective actions have been taken.

4.0 CONTAMINANT CONTROL, MONITORING, AND ACTION LEVELS

This HASP specifies requirements and protocols designed to prevent exposure to contaminants and prevent contaminant migration. These goals will be achieved through establishment of Site Work Zones (Section 5.0) and work practices specified in relevant sections of this HASP. The SHSO will implement any necessary actions to prevent exposure to contaminants and prevent releases of contaminated media (including cessation of Site construction) and will maintain relevant logs regarding any such activities.

4.1 Airborne Contaminants

Precautions will be taken during dry weather to avoid generating and breathing dust-generated from soils. Engineering controls will be used to control airborne contamination. Dust releases will be controlled by wetting soils with water and the placement of plastic sheeting over exposed soil and stockpiles. Continuous air monitoring will be conducted for VOCs and dust during all ground intrusive activities (including soil/waste excavation and handling, test pitting/trenching, and installation of soil borings or monitoring wells) and during the demolition of any structure known or suspected to be contaminated. Concentrations of petroleum compounds and metals in the air are expected to be below OSHA Permissible Exposure Limits (PELs). Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil or groundwater samples (continuous monitoring may be conducted based on the proximity of potential sensitive receptors). Protocols for these monitoring activities are specified in the NYSDOH generic Community Air Monitoring Plan (CAMP), provided as Attachment D

Air monitoring will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. At this time it is anticipated that a PID and digital dust indicator (or equivalent equipment) will be used to monitor potential contaminant levels at the Site. All monitoring equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. All 15-minute and instantaneous readings (as appropriate) will be recorded and be available for review by NYSDEC and NYSDOH personnel.

PID readings consistently in excess of 5 ppm, and dust levels in excess of 150 ug/m^3, will be used as an indication of the need to initiate personnel monitoring, increase worker protective measures, and/or modify or cease on-site operations in order to mitigate off-site community exposure (preference will be given to preventing exposures by controlling source emissions, rather than increasing the use of worker PPE). PID and/or dust readings that consistently exceed background in the breathing zone (during any of the proposed tasks) will necessitate moving away from the source or implementing a higher PPE level.

Odors from the excavation of petroleum contaminated soil may be an issue at this Site. Odor control will be accomplished by wetting soils or through the use of commercially available odor-suppressing foam, which can be sprayed directly onto exposed soils. Thresholds for the implementation of odor-suppression measures will be based on the needs of Site personnel (i.e. odors interfere with work activities or have acute health impacts) and on the presence of significant objectionable odors at Site boundaries, which could impact off-site receptor populations. Odor suppression will be conducted at anytime that odor complaints are received from neighboring properties or local regulatory authorities, or if so directed by NYSDEC personnel.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations will be measured at the start of each workday and periodically during the day to establish background conditions. If ambient air concentrations of organic vapors at the downwind perimeter of the work area or exclusion zone exceed 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If organic vapors readily decrease (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring. If organic

vapors are persistently in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the vapor source identified and corrective actions enacted, and monitoring continued. Work activities can resume provided that organic vapors 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average. All work activities will stop if organic vapors are above 25 ppm at the perimeter of the work area.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less). The equipment will be equipped with an audible alarm to indicate exceedance of the action level. Fugitive dust migration will also be visually assessed during all work activities. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and work protocols will be re-evaluated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

4.2 Contaminants in Soil and Groundwater

The implementation of activity-specific/contaminant-specific Work Zones and appropriate fieldwork protocols, as specified in relevant sections of this HASP, will prevent and/or minimize exposure and movement of contaminated soil and groundwater. Access to contaminated areas will be limited, impacted media will be properly stockpiled and stored (as warranted) to prevent contaminant migration, personnel and equipment will be decontaminated as required for specific Work Zones, and erosion and sedimentation (E&S) Controls will be implemented during execution Site development and remediation activities.

The response to fugitive releases of soil or groundwater will be based on the assumption that such material is from a contaminated source, unless shown otherwise by laboratory analysis of samples or a determination has been made in consultation with NYSDEC personnel that releases material is not likely to be contaminated.

5.0 SITE CONTROL/WORK ZONES

Site control procedures will be established to reduce the possibility of worker/visitor contact with contaminants present in Site media, to protect the public in the area surrounding the Site and to limit access to the Site to only those persons required to be in the work zone. Notices will be placed near the Site warning the public not to enter fieldwork areas and directing visitors to report to the Project Manager or SHSO. Measures will be taken to limit the entry of unauthorized personnel into the specific areas of field activity and to safely direct and control all vehicular traffic in and near the Site (e.g., placement of traffic cones and warning tape).

The following Work Zones will be established:

Construction Work Zone

The entirety of the Site will be considered the Construction Work Zone, which will be delineated and protected by a temporary construction fence. This zone is restricted to project personnel only (development and remediation personnel and authorized visitors). All personnel in the Construction Work Zone will be properly trained for their specific tasks and will wear appropriate levels of PPE.

Exclusion Zone

An Exclusion Zone will be delineated by the SHSO for all areas where: 1) contaminated media or hazardous substances are present in surface soils at significant concentrations, or will be excavated, handled, or otherwise exposed (including excavations, stockpiling and dewatering areas); and 2) during groundwater sampling and chemical oxidation treatments.

Air-monitoring data, as well as visual observations and existing laboratory data, will be used by the SHSO when determining final boundaries. All areas where Level C respiratory protection is required for airborne contaminants (other than dust) must be delineated as Exclusion Zones (no work will be conducted in areas where PID readings in the breathing zone are greater than 30 ppm or where oxygen levels are below 19.5%).

Entry to the Exclusion Zone will be restricted by the SHSO to only necessary and required personnel, who have been properly trained and equipped with appropriate PPE. The Exclusion Zone will be delineated, as necessary, with barricade tape, cones, and/or barricades. The number and location of such zones will be determined in the field by the SHSO, in consultation with NYSDEC personnel, prior to and during fieldwork activities (the approximate location of Exclusion Zones will be provided in figures included in the final Remedial Design documentation).

Contaminant Reduction Zone

A Contaminant Reduction Zone will be established between all Exclusion Zones and the Construction Work Zone, in order to prevent spreading of contamination into clean areas and enhance worker safety. Entry to the Contaminant Reduction Zone will be restricted by the SHSO to only necessary and required personnel, who have been properly trained and equipped with appropriate PPE. All decontamination of PPE and construction equipment, and storage of discarded PPE prior to disposal, will occur within this area. The Contaminant Reduction Zone will be properly marked, with special attention paid to the delineation between this area and the Exclusion Zone.

6.0 DECONTAMINATION

Decontamination procedures will apply to all personnel and equipment that have entered exclusion zones or otherwise may have come into contact with contaminated media.

6.1 Decontamination of Site Personnel

All site personnel should minimize contact with contaminants. Personnel exiting established Exclusion Zones, or otherwise exposed to contaminated media, will undergo decontamination within the applicable Contamination Reduction Zone (at an upwind location if possible). Decontamination procedures will be determined by the SHSO based on known contamination and encountered Site conditions. All disposable PPE, or nominally non-disposal PPE that cannot be decontaminated, will be placed in secured plastic bags or drums pending off-site disposal (disposable PPE may not be re-used). At a minimum, gross removal of contaminants from the PPE, removal of the PPE, and washing of hands and face shall be required upon exiting the work area.

During emergencies the SHSO will weigh the risks of exposure against the need for a rapid response to accident or injury. The SHSO may determine that time lost or additional handling of an injured person during decontamination may cause greater harm to the individual than from potential exposure. The SHSO will maintain a record of any incidents where proper decontamination of personnel has not occurred.

A portable washing station and potable water source for Site personnel will be established in the Construction Zone. All Site personnel must wash their hands and faces prior to eating, drinking, or smoking and practice good personal hygiene.

6.2 Decontamination of Equipment

All on-site equipment will be clean prior to entering the Site and will be decontaminated and dry before leaving the Site. Decontamination may be accomplished using a NYSDEC approved cleaner, water, and/or steam. Trucks will be brushed to remove materials adhering to their surfaces (subcontractors will be responsible for decontamination of their own equipment used during field operations). Fluids generated during decontamination of grossly-contaminated equipment will be contained and stored in 55-gallon drums pending pre-disposal characterization; all other decontamination fluids will be handled as per specifications in the Remedial Design Report (RDR).

All undedicated sampling equipment and sampling instruments will be decontaminated whenever they have contacted soil or dust, or have come in contact with potentially contaminated groundwater. Sampling equipment will be segregated and, after decontamination, stored separately from splash protection equipment. Decontaminated or clean sampling equipment not in use will be covered with plastic and stored in a designated storage area.

7.0 NOISE CONTROL

All fieldwork activities will be conducted in a manner designed to reduce unnecessary noise generation, and to minimize the potential for both on-site and off-site harmful noise levels. The Project Manager and SHSO will establish noise reduction procedures (as appropriate to the Site and the work) to meet these requirements.

8.0 PERSONNEL TRAINING

All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910) and will additionally receive site-specific training. Personnel will be briefed by the SHSO as to the potential hazards to be encountered, including: availability of this HASP; general site hazards and specific hazards in the work areas, including those attributable to known of suspect on-site contaminants; selection, use, testing, care, and limitations of PPE; decontamination procedures; emergency response procedures and requirements; emergency alarm systems and other forms of notification, and evacuation routes to be followed; and, methods to obtain emergency assistance and medical attention.

9.0 RECORDKEEPING

The SHSO will establish a system appropriate to the Site, the work, and the work zones that will record, at a minimum, the following information:

- Personnel on the Site, their arrival and departure times, and their destination on the Site.
- Incidents and unusual activities that occur on the Site such as, but not limited to, accidents, spills, breaches of security, injuries, equipment failures, and weather-related problems.
- Changes to the HASP.

- Daily information generated such as: changes to work and health and safety plans; work accomplished and the current Site status; and monitoring results.

Templates for daily logs and incident reports are provided as Attachment E.

10.0 SPECIAL PRECAUTIONS AND PROCEDURES

The activities associated with this investigation may involve potential risks of exposure to both chemical and physical hazards. The potential for chemical exposure to hazardous or regulated substances will be significantly reduced through the use of monitoring, personal protective clothing, engineering controls, and implementation of safe work practices.

10.1 Heat/Cold Stress

Training in prevention of heat/cold stress will be provided as part of the site-specific training. The timing of this project is such that heat/cold stress may pose a threat to the health and safety of personnel. Work/rest regimens will be employed, as necessary, so that personnel do not suffer adverse effects from heat/cold stress. Special clothing and appropriate diet and fluid intake regimens will be recommended to personnel to further reduce this temperature-related hazard. Rest periods will be recommended in the event of high/low temperatures and/or humidity to counter the negative effects of heat/cold stress.

10.2 Heavy Equipment

Working in the vicinity of heavy equipment is the primary safety hazard at the Site. Physical hazards in working near heavy construction equipment include the following: overhead hazards, slips/trip/falls, hand and foot injuries, moving part hazards, improper lifting/back injuries, and noise. All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910). No workers will be permitted within any excavated areas without proper PPE, including, as warranted, any necessary Level C equipment (e.g., respirators and protective suits). Air monitoring for VOCs will be conducted in accordance with the CAMP.

10.3 Additional Safety Practices

The following are important safety precautions which will be enforced during all fieldwork:

- Medicine and alcohol can aggravate the effect of exposure to certain compounds. Controlled substances and alcoholic beverages will not be consumed during work activities. Consumption of prescribed drugs will only be at the discretion of a physician familiar with the person's work.
- Eating, drinking, chewing gum or tobacco, smoking, or other practices that increase the probability of hand-to-mouth transfer and ingestion of material are prohibited except in designated areas.
- Contact with potentially contaminated surfaces will be avoided whenever possible. Workers will not unnecessarily walk through puddles, mud, or other discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, vehicles, or the ground.
- Personnel and equipment in the work areas will be minimized, consistent with effective site operations.
- Unsafe equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.
- Work areas for various operational activities will be established.

11.0 EMERGENCY RESPONSE PROCEDURES

Note: Emergency telephone numbers and maps to the nearest hospital are provided in Section 12.0

11.1 Notification of Site Emergencies

In the event of an emergency, the SHSO will be immediately notified of the nature and extent of the emergency (the names and contact information for key site safety and management personnel, as well as other site safety contact telephone numbers, shall be posted at the Site).

Emergency Response Telephone Numbers and a map detailing the directions to the nearest hospital emergency room are provided in Section 12.0. This information will be maintained at the work Site by the SHSO. The location of the nearest telephone will be determined prior to the initiation of on-site activities. In addition to any permanent phone lines, a cellular phone will be in the possession of the SHSO, or an authorized designee, at all times.

11.2 Responsibilities

Prior to the initiation of on-site work activities, the SHSO will:

- Notify individuals, authorities, and/or health care facilities of the potentially hazardous activities and potential wastes that may develop as a result of the investigation.
- Confirm that first aid supplies and a fire extinguisher are available on-site.
- Have a working knowledge of safety equipment available.
- Confirm that a map detailing the most direct route to the hospital is prominently posted with the emergency telephone numbers.

The SHSO will be responsible for directing notification, response, and follow-up actions and for contacting outside response personnel (ambulance, fire department, or others). In the case of an evacuation, the SHSO will account for personnel. A log of individuals entering and leaving the Site will be kept so that everyone can be accounted for in an emergency. Upon notification of an exposure incident, the SHSO will contact the appropriate emergency response personnel for recommended medical diagnosis and, if necessary, treatment. The SHSO will determine whether and at what levels exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring.

11.3 Accidents and Injuries

In the event of an accident or injury, measures will be taken to assist those who have been injured or exposed and to protect others from hazards. If an individual is transported to a hospital or doctor, a copy of the HASP will accompany the individual.

The SHSO will be notified and will respond according to the severity of the incident. The SHSO will perform an investigation of the incident and prepare a signed and dated report documenting the investigation. An exposure-incident report will also be completed by the SHSO and the exposed individual. The form will be filed with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

11.4 Communication

No special hand signals will be utilized within the work zone. Field personnel will utilize standard hand signals during the operation of heavy equipment.

11.5 Safe Refuge

Vehicles and on-site structures will serve as the immediate place of refuge in the event of an emergency. If evacuation from the area is necessary, project vehicles will be used to transport on-site personnel to safety.

11.6 Site Security and Control

Site security and control during emergencies, accidents, and incidents will be monitored by the SHSO. The SHSO is responsible for limiting access to the Site to authorized personnel and for oversight of reaction activities.

11.7 Emergency Evacuation

In case of an emergency, personnel will evacuate to the safe refuge identified by the SHSO, both for their personal safety and to prevent the hampering of response/rescue efforts.

11.8 Resuming Work

A determination that it is safe to return to work will be made by the SHSO and/or any personnel assisting in the emergency, e.g., fire department, police department, utility company, etc. No personnel will be allowed to return to the work areas until a full determination has been made by the above-identified personnel that all field activities can continue unobstructed. Such a determination will depend upon the nature of the emergency (e.g., downed power lines -- removal of all lines from the property; fire -- extinguished fire; injury -- safe transport of the injured party to a medical facility with either assurance of acceptable medical care present or completion of medical care; etc.).

Before on-site work is resumed following an emergency, necessary emergency equipment will be recharged, refilled, or replaced. Government agencies will be notified as appropriate. An Incident Report Form will be filed.

11.9 Fire Fighting Procedures

A fire extinguisher will be available in the Construction Work Zone during all on-site activities. This extinguisher is intended for small fires. When a fire cannot be controlled with the extinguisher, the area will be evacuated immediately. The SHSO will be responsible for directing notification, response, and follow-up actions and for contacting ambulance and fire department personnel.

11.10 Emergency Decontamination Procedure

The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Whenever possible, minimum decontamination will consist of washing, rinsing, and/or removal of contaminated outer clothing and equipment. If time does not permit decontamination, the person will be given first aid treatment and then wrapped in plastic or a blanket prior to transport.

11.11 Emergency Equipment

The following on-site equipment for safety and emergency response will be maintained in the on-site vehicle of the SHSO: fire extinguisher; first-aid kit; and, extra copy of this Health and Safety Plan.

12.0 EMERGENCY TELEPHONE NUMBERS AND MAPS TO HOSPITAL

Table 2: Emergency Response Telephone Numbers

Emergency Agencies	Phone Numbers
EMERGENCY	911
St. Francis Hospital 41 North Road	(845) 485-5087
Poughkeepsie Police Department	(845) 451-4000 or 911
Poughkeepsie Fire Department	(845) 451-4081 or 911
City Hall	(845) 451-4200
City Mayor	(845) 451-4073
Water and Sewer	(845) 451-4111

Figure 1: Directions to Hospital / Map

		Dist	Turn		Road	Exit	Finish Time	Finish Dist
			Start	at	Hoffman St		00:02:53	0.94 mi
			Go straight (E)	on	Hoffman St		00:02:53	0.94 mi
	in	0.02 mi	Turn left (NNE)	on to	US 9		00:02:48	0.92 mi
	in	0.47 mi	Turn right (E)	on to	Manist Dr		00:01:41	0.45 mi
	in	0.12 mi	Turn right (SSE)	on to	SR 376 (North Rd)		00:01:13	0.33 mi
	in	0.06 mi	Turn left (NE)	on to	Baker Ave		00:01:04	0.27 mi
	in	0.17 mi	Turn right (SSE)	on to	Poplar St		00:00:23	0.10 mi
	in	0.07 mi	Turn right (W)	on to	Webster Ave		00:00:06	0.03 mi
	in	0.03 mi	Finish	at	Saint Francis Hospital		00:00:00	0.00 mi

Total Time: 00:02:53 Total Distance: 0.94 mi


W CEDAR ST
IRVING AVE
Mona Lisa's Gourmet Pizza & Wings
Yeung Ho No 2
Marina's Pizzeria
BAKER AVE
McCoys Ale House
MANIST DR
Saint Francis Hospital
KOHL AVE
COCKE ST
Dough Boy's Pizzaria
Saint Francis Hospital
NORTH
BEEKMAN ST
POPLAR ST
GARDEN ST
GREEN ST
FAIRVIEW AVE
Palace Diner
CLARK ST
376
SPRUCE ST
WHINFIELD ST
Sal's Little Italy Pizzeria & Restrnt
Northside Diner
9G
Pulaski Park
TAYLOR AVE
Hoffman St
TREDGE PL
DUTCHESS AVE
ORCHARD PL
VERMONT TER
BAIN AVE
Aloy's Garden Restrnt
Andy's Place
DUTCHESS AVE
FALMADGE ST
DUANE ST
GIFFORD AVE
FALLKILL PL
BROOKSIDE AVE
W OAKLEY ST
N HAMILTON ST
DAVIS ST
VERAZZANO BLVD
MARSHALL ST
Ksw Fast Foods
CROYDON CT
ELM PL
DELORME
Data use subject to license.
© 2004 DeLorme. Street Atlas USA® 2005.
www.delorme.com
MN (13.5° W)
ft
0
500
1000
Data Zoom 14-0

ATTACHMENT A

Maps

Site Location Map Former A.C. Dutton Lumber Yard 1 Dutchess Avenue and 2 Hoffman Street Town and City of Poughkeepsie Dutchess County, New York	N	ESI File: OP08022.42 September 2008 Attachment A

N

steep slope

DUTCHESS AVENUE

100 feet

Legend:

property outline

cover

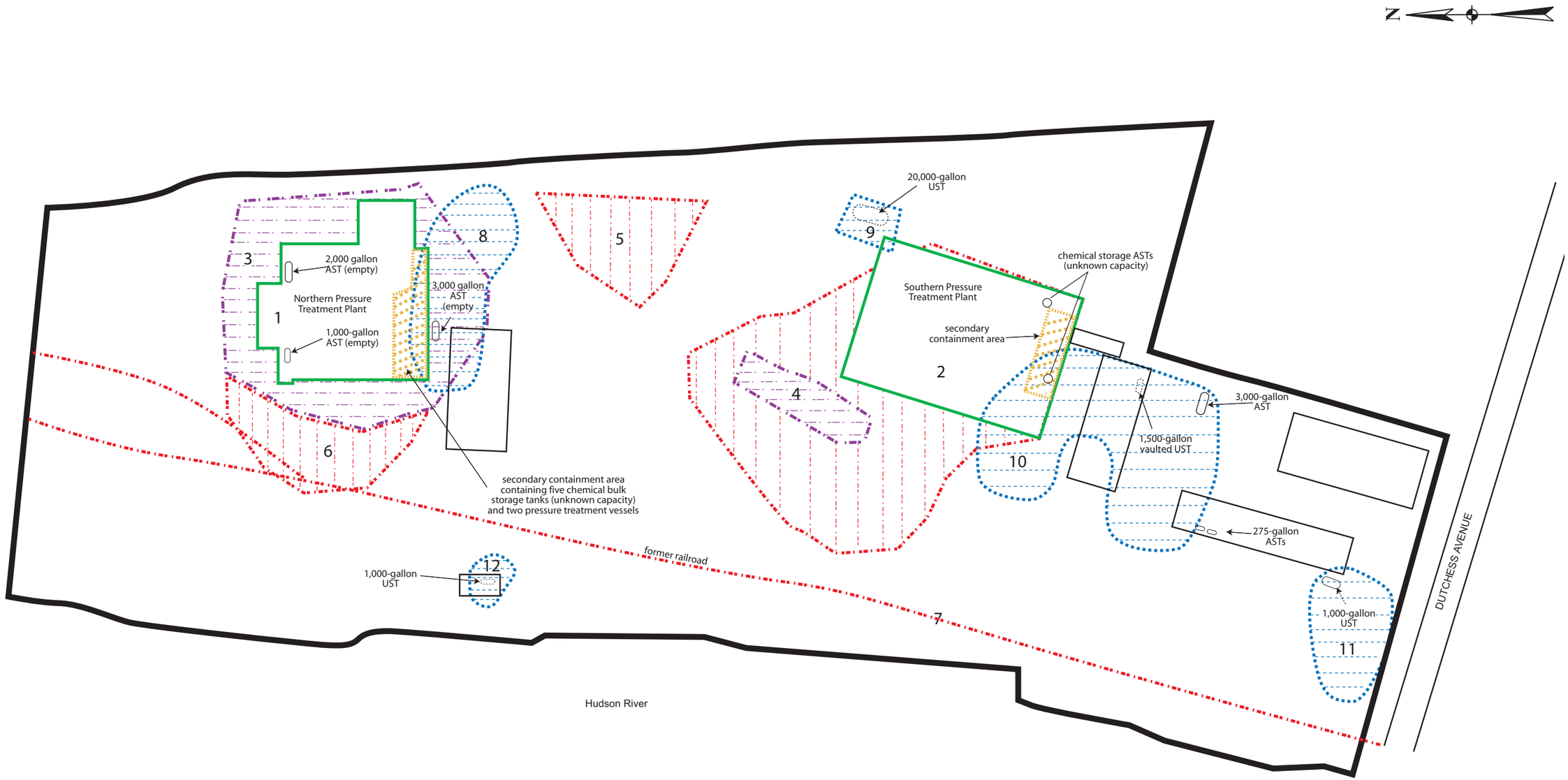
Proposed Remediation Map

Former A.C. Dutton Facility
1 Dutchess Avenue and 2 Hoffman Street
Poughkeepsie, New York

ESI File: OP08022.41

September 2008 | Attachment A

Ecosystems Strategies, Inc.



Legend:

- property outline
- pressure treatment plant buildings
- existing buildings
- area of petroleum impacts
- area of arsenic contamination above 32 mg/Kg (0-1')
- area of arsenic contamination above 32 mg/Kg (0-3')

1 = area #

Notes:

Map based on Fuss and O'Neill proposed "Remedial Action Map" (July 2006)

Proposed Remediation Map - Excavation/Treatment
(Partial Source Removal/Treatment - Arsenic Remediated to SBL of 32 mg/kg)

Former A.C. Dutton Facility
1 Dutchess Avenue and 2 Hoffman Street
Poughkeepsie, New York

ESI File: OP08022.41

September 2008 | Attachment A

Ecosystems Strategies, Inc.

ATTACHMENT B

Table 3, Hazardous Property Information for Specific Site Contaminants

Table 3: Hazardous Property Information for Specific Site Contaminants
(ppm = parts per million)

Compound of Concern	PEL-TWA# ---------- IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard Property	Dermal Toxicity	Acute Exposure Symptoms
Arsenic	0.010 mg/m^3 5 mg/m^3	---	CEG	CJG	ACDGJMOQR
Chromium	5 mg/m^3 not specified	---	CEG	CJG	ACDGJMOQR
Benzene	1 ppm 500 ppm	61-97	BCGO	CIG	BCDFHIKLMNOQR
Ethylbenzene	100 ppm 800 ppm	---	BCD	CIF	ABFHIKLMNPQR
Toluene	200 ppm 500 ppm	1.6	BC	BHE	DEFHIKLMNOPQ
Xylenes	100 ppm 900 ppm	0.62-40	BCD	H	ABFHIKLMNPQ
Diesel Fuel	not specified not specified	0.08	BC	ABC	IN
Gasoline	300 ppm not specified	0.005-10	CD	AB	IN
PCBs (generic)	0.5 mg/m^3 5 mg/m^3	---	CG	---	CHLPQ

Notes:

\# OSHA Time-weighted Average (TWA) Permissible Exposure Limits (PELs); PCB value defined by Relative Exposure Limit (REL-TWA) recommended by NIOSH.

Hazard Properties

A - corrosive
B - flammable
C - toxic
D - volatile
E - reactive
F - radioactive
G - carcinogen
H - infections

Dermal Hazards

Skin Penetration
- A - negligible penetration
- B - slight penetration
- C - moderate penetration
- D - high penetration

Systemic Potency
- E - slight hazard
- F - moderate hazard
- G - extreme hazard

Local Potency
- H - slight - reddening of skin
- I - moderate - irritation/inflammation of skin
- J - extreme - tissue destruction/necrosis

Acute Exposure Symptoms

A - abdominal pain
B - central nervous system depression
C - comatose
D - convulsions
E - confusion
F - dizziness
G - diarrhea
H - drowsiness
I - eye irritation
J - fever
K - headache
L - nausea
M - respiratory system irritation
N - skin irritation
O - tremors
P - unconsciousness
Q - vomiting
R - weakness

ATTACHMENT C

Selection and Use of Personal Protective Equipment

Selection and Use of OSHA-Required Personal Protection Equipment (PPE)

The selection of appropriate protective gear is based on both known and potential hazards. A general description of types of PPE components is presented below and a summary of USEPA "Levels of Protection" is presented on the following page.

Types of PPE

Head/Face Protection	Hardhats and face shields must meet ANSI specifications (Z89.1 1989 and Z87.1-1989) for protection. Face shields that attach to hardhats provide added protection; a combination that leaves no gap between the shield and the brim of the hardhat prevents overhead splashes from running down inside the face shield.
Eye Protection	Safety glasses must meet ANSI specifications (Z87.1-1989) for protection. They should be standard safety gear when the respiratory protection is a half-face mask with no face shield. Both safety glasses/goggles and a face shield are advisable as long as they do not impair visibility. Safety glasses should be of the type that incorporates face shields.
Ear Protection	Ear plugs or muffs should be worn when noise may be a problem, such as around heavy machinery and impact tools.
Foot Protection	Footwear worn during site activities (including leather work boots and rubber boots) must meet the ANSI specifications (Z41-1991) for protection. Protection against liquid hazardous chemicals requires a chemical resistant boot (neoprene, PVC, etc). Boots are available as pullover and shoe-boot; pullovers may be inexpensive enough to be considered disposable, otherwise they must be completely decontaminated. Wear pants outside/over chemical resistant boots to prevent liquids from entering.
Hand Protection	Gloves must resist puncturing/tearing and provide necessary chemical resistance. Heavy leather gloves may be worn over chemical protective gloves but must be discarded if they become contaminated. Jacket cuffs should be worn over glove cuffs to prevent entry of liquids. If hands are elevated above the head during work, the gloves should be sealed with tape to the coveralls or splash-suit. Two pair of gloves provides extra protection if the outer glove is torn/permeated and protect the hands when removing other PPE.
Body Protection	Clothing to protect the body against hazardous liquids, gases, or vapors is available in a variety of styles and materials: disposable Tyvek or durable Nomex coveralls when hazards are known to be minor or simply a nuisance, and splash suits made of PVC, neoprene or butyl-rubber when enhanced protection is needed. Toxic vapor/gases require the most complete protection (e.g., fully encapsulating suits).
Respiratory Protection	A respirator is designed as an enclosure that covers the nose and mouth or the entire face or head, and provides protection either by removing contaminants from the air before they are inhaled or by supplying an independent source of breathable air. Air purifying respirator types are: particulate removing, vapor and gas removing, and combination. Elements that remove particulates are called filters, while vapor and gas removing elements are called either chemical cartridges or canisters. Filters and canisters/cartridges can generally be removed and replaced once their effective life has expired. Combination cartridges and canisters are available to protect against particulates, as well as vapors and gases. Respirators can only provide adequate protection if they are: properly selected for the task; fitted to the wearer; consistently donned and worn properly; and properly maintained. Not all workers can wear respirators; an adequate fit and other considerations are important factors. Atmosphere-supplying respirators (devices that provide clean breathing air from an uncontaminated source) will not be used at this Site.

USEPA Levels of Protection

Personal protective equipment is designed to prevent/reduce skin and eye contact as well as inhalation or ingestion of the chemical substance. Protective equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories. Note: Levels A and B are not anticipated to be utilized by Site personnel.

LEVEL A: Highest level of respiratory, skin, eye and mucous membrane protection.
Personal Protective Equipment:

- Positive pressure, SCBA, or positive-pressure supplied air respirator with escape SCBA.
- Fully encapsulating chemical protective suit.
- Gloves, outer and inner, chemical resistant.
- Safety boots, chemical resistant.
- Underwear, cotton, long-john type (optional).
- Hard hat (under suit, optional).
- Coveralls (under suit, optional).
- Two-way radio communications (intrinsically safe/non-sparking, optional.

LEVEL B: Highest level of respiratory protection, but a lesser level of skin and eye protection.
Personal Protective Equipment:

- Positive-pressure SCBA, or positive-pressure supplied air respirator with escape SCBA.
- Chemical resistant clothing.
- Coveralls (under splash suit, optional).
- Gloves, outer and inner, chemical resistant.
- Safety boots, chemical resistant.
- Boot-covers, chemical resistant (disposable, optional).
- Two-way radio communications (intrinsically safe, optional).
- Hard hat and face shield (optional).

LEVEL C: Type of airborne substance known, concentration measured, criteria for using air-purifying respirators met, and skin/eye exposure is unlikely. Periodic air monitoring necessary.
Personal Protective Equipment:

- Full-face or half-mask, air-purifying respirator.
- Chemical resistant clothing.
- Gloves, outer and inner, chemical resistant.
- Safety boots, chemical resistant.
- Boot-covers, chemical resistant (optional).
- Coveralls (protective clothing optional).
- Two-way radio communications (intrinsically safe, optional).
- Hard hat (optional).
- Escape mask (optional).
- Face shield (optional).

LEVEL D: Primarily a work uniform used for nuisance contamination only (not worn where respiratory or skin hazards exist). Optional equipment based on Site conditions.
Personal Protective Equipment:

- Work coveralls
- Safety shoes/boots
- Chemical resistant clothing (optional).
- Gloves, chemical resistant (optional).
- Boot-covers, chemical resistant (optional).
- Two-way radio communications (intrinsically safe, optional).
- Hard hat (optional).
- Escape mask (optional).
- Face shield (optional).

Reasons to upgrade to a higher level of PPE (D is lowest, A is highest):
Known or suspected presence of dermal hazards, occurrence or likely occurrence of gas or vapor emission, change in work task that will increase contact or potential contact with hazardous materials, request of the individual performing the task.

Reasons to downgrade to a lower level of PPE:
New information indicating that the situation is less hazardous than was originally thought, change in site conditions that decreases the hazard, change in work task that will reduce contact with hazardous materials.

ATTACHMENT D

NYSDOH Generic Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to

leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

ATTACHMENT E

Templates for Daily Logs and Incident Reports

Ecosystems Strategies, Inc.

DAILY FIELD LOG

Site_____ **ESI File**_____ **Date**_____

Weather Conditions:

Site Personnel and Visitors

Name	Company/Affiliation	Site Assignment or Destination	Arrival	Departure

Fieldwork Activities

Environmental Fieldwork	Equipment/Operator	PPE Level
Construction / Remediation Activities	**Equipment/Operator**	**PPE Level**

NOTES

(Note non-compliance with HASP, changes to HASP/Workplan, exposure incidents, accidents, etc)

Ecosystems Strategies, Inc.

SUPERVISOR'S INCIDENT REPORT

(Injuries/Exposures or Significant Releases)

Site_____ **ESI File**_____ **Date**_____

Injuries and/or Exposures

1) Name, Age, Sex	
2) Date and Time of Accident	
3) Location of Accident	
4) Accident Details (actions occurring, tools/equipment in use, etc.)	
5) Description of Injuries	
6) Date and Time Reported to Supervisor	**7) Date and Time First Aid Received**
8) Supervisor's Comments	
9) Supervisor Name	**10) Supervisor Signature / Date**

Significant Releases

11) Nature of Release (media and potential compounds of concern)	
12) Date and Time of Release	
13) Location of Release	
14) Details (what occurred and how, exposures/impacts, notifications, corrective actions)	
☐**(continued on back)**	
15) Supervisor Name	**16) Supervisor Signature / Date**

APPENDIX E

Quality Assurance / Quality Control Plan

QUALITY ASSURANCE/QUALITY CONTROL PLAN

For

Former A.C. Dutton Lumber Yard

NYSDEC Brownfields Program Site: C314081

Located at

1 Dutchess Avenue, Town of Poughkeepsie
2 Hoffman Street, City of Poughkeepsie
Dutchess County, New York

Date of Preparation: September 2008

Ecosystems Strategies, Inc.
24 Davis Ave, Poughkeepsie, NY 12603 | 845.452.1658 | ecosystemsstrategies.com

ESI File: OP08022.41

TABLE OF CONTENTS

1.0 PROJECT MANAGEMENT

1.1 Project/Task Organization

The NYSDEC and the OSC are major participants in the project.

1.2 Principal Data Users

The principal users of the generated data in this project are listed below.

a. Residents of the City and Town of Poughkeepsie, especially those residing in the vicinity of the Site
b. The O'Neill Group – Dutton, LLC.

c. NYSDEC

1.3 Problem Definition/Background

The primary objective of the Remedial Action Work Plan (RAWP) is to provide a conceptual description of remedial actions to be performed at the Site in order to achieve NYSDEC Restricted Residential Soil Cleanup Objectives.

1.5 Quality Objectives and Criteria

The data collected in this project will be to document the post-remediation integrity of on-site soils and groundwater.

1.6 Documents and Records

Electronic and paper copies of all measurements will be retained by Ecosystems Strategies, Inc. Paper copies will also be included in the Final Engineering Report to be generated at the conclusion of remedial activities.

2.0 Data Generation and Acquisition

2.1 Sampling Methods

Soil and surface material samples will be collected in appropriately-sized glass jars provided by the laboratory, in the manner outlined in the (RAWP), dated September 2008. During the sampling procedure, samples will be stored in a cooler prior to transport to the approved laboratory.

2.2 Sample Handling and Custody

Samples will be handled by the OSC. After each sample is collected, it will be placed in a sample cooler that is maintained at approximately 4°C. For each sampling day, sampling personnel will be required to complete a sampling custody worksheet indicating all pertinent information about the samples collected, handling methods, name of the collector, and chain of custody. Upon the completion of each day of sample collection activities, all samples will be shipped via either courier or overnight delivery (per laboratory requirements) to a NYSDOH ELAP approved laboratory. Laboratory personnel will record the cooler temperature (approximately 4°C) upon receipt and analyze the samples prior to the expiration of the 6 month hold time for metals.

2.3 Analytical Methods

Soil samples will be analyzed for total weight arsenic and chromium (USEPA 6010). At locations where petroleum contamination is identified, samples will be sampled for PAHs (USEPA 8270) and VOCs (USEPA 8260).

2.4 Quality Control

Accuracy and precision will be determined by repeated analysis of laboratory standards, and matrix effects and recovery will be determined through use of spiked samples. With each sample run, standards, blanks, and spiked samples will be run.

One QA/QC sample for every 20 samples per medium (soil and surface) will be duplicated by ESI. One in 20 samples per medium will also be submitted for Matrix spike (MS) and Matrix Spike Duplicate (MSD) analysis. One rinse blank will be prepared for each given piece of sampling equipment for every 20 analytical samples collected using that piece of equipment. For each day of sampling, a trip blank will be included with each sample cooler.

2.5 Inspection/Acceptance of Supplies and Consumables

The following supplies and consumables will be used:

- One 2-oz clear glass jar will be used for each soil/surface sample. Duplicate soil/sediment samples will each require one additional sample volume. MS/MSD soil/sediment samples will each require two additional sample volumes,
- Disposable gloves (nitrile or equivalent).
- Distilled water (for decontamination and the preparation of rinse blanks)

All supplies and consumables will be inspected and tested (if necessary) by the QA manager upon receipt.

2.6 Data Management

For the purpose of data management, the data can be divided into field and laboratory data.

Field data will be recorded at the time of measurement on written field logs.

3.0 Assessment and Oversight

3.1 Reports to Management

The results of the assessments described above (surveillance, inspection, and performance evaluations) will be reported to the principal data users after the completion of fieldwork.

4.0 Data Validation and Usability

4.1 Data Review, Verification, and Validation

As a NYSDOH ELAP-certified certified laboratory, the approved laboratory will follow standard procedures regarding data validation and verification.

4.2 Verification and Validation Methods

4.2.1 Verification Method

Once collected, all data will go to the QA manager for review and verification. Review will involve determining that all data has been collected at the proper locations by the proper persons and

that all field and laboratory logs are complete. Data will be validated by an independent data validator.

4.2.2 Authority for Verification

Authority for verification, validation, and resolution of data issues will be distributed among the investigators. Authority to resolve issues regarding verification of field measurements will rest with the QA manager.

4.2.3 Transmittal to Users

Following review, validation, and verification, all data will be conveyed to users via the Final Engineering Report

4.2.4 Calculations

There are no project specific calculations required.

APPENDIX F

Resumes

Ecosystems Strategies, Inc.

Paul H. Ciminello, CEM, CAQS

PRESIDENT

EDUCATION

Master of Environmental Management, 1986
School of the Environment, Duke University, Durham, North Carolina

Master of Arts in Public Policy Sciences, 1986
Institute of Policy Sciences and Public Affairs, Duke University, Durham, North Carolina

Bachelor of Arts, 1980
Tufts University, Medford, Massachusetts

CERTIFICATIONS AND TRAINING

Certified Environmental Manager, Environmental Assessment Association, 2006
Certified Air Quality Specialist, Environmental Assessment Association, 2007
NJ Dept. of Environmental Protection Licensed Subsurface Evaluator (License Number: 0014686)
NYS Dept. of Labor Certified Asbestos Building Inspector (Cert. Number: AH92-14884)
Connecticut Department of Environmental Protection Interim Environmental Professional
NYS Department of State, Division of Licensing Services, Real Estate Instructor
In compliance with OSHA Hazardous Materials Safety (29 CFR 1910) requirements

PROFESSIONAL EXPERIENCE

President, Ecosystems Strategies, Inc., Poughkeepsie, New York *1992 to present*

Coordinates corporate strategic planning, financial management and marketing activities. Oversees corporate work on state and federal superfund sites and manages education/training services. Responsible for technical services in areas of pollution prevention, contaminant delineation and site remediation. Twenty years experience in the investigation and remediation of petroleum contamination at commercial and residential properties. Major recent projects of relevance include:

- Irvington Waterfront Park (Irvington, NY): Project Manager for site investigation and remedial design of abandoned industrial riverfront properties. Documented soil and groundwater contamination and designed remediation including soil removal and site capping. Project completed in 2000; project awarded the 2000 Gold Medal Award by Consulting Engineers Council of New York State, Inc.

- Greyston Bakery Site (Yonkers, NY): Project Manager for site investigation and remedial design of former manufactured gas plant site for future use as a bakery. Documented soil, groundwater and soil gas contamination. Remedial systems included installations of a DNAPL collection system, a barrier layer, a subslab depressurization system under the building, and groundwater monitoring. Project completed in 2004.

- 400 Block Redevelopment (Poughkeepsie, NY): Project Manager for site investigation and remedial design of multi-use industrial development property (boiler repair, clothing manufacturer, auto repair) for future retail/residential use. Documented soil (petroleum, PCBs, metals) and groundwater (petroleum) contamination. Remedial systems include: soil (and tank) removal, installation of a barrier, and groundwater monitoring. Project completed in 2006.

- Parkview Commons Site (Bronx, NY): Project Manager for site investigation and remedial design of former gas station/auto repair facility for future use as a residential/commercial building. Remedial investigation and design is currently on-going. Project completed in 2006.

Senior Hazardous Waste Specialist, U.S. Hydrogeologic, Inc., Poughkeepsie, New York 1986 to 1992

Supervisor for corporate hazardous and solid waste investigatory and remedial services. Major projects included:

- Coordination of subsurface investigations at a New York State Superfund site (former industrial facility); project manager in charge of site reclassification (delisted as of January, 1991).
- Coordination of petroleum storage tank management plan for Dutchess County (NY) Department of Public Works, including an assessment of regulatory compliance, product utilization and physical conditions of more than 100 tanks at over 20 facilities.
- Environmental compliance Audit of 42,000-square foot printing facility with specific remediations for solvent handling/disposal, inks storage and metal recovery processes.

Adjunct Professor, (various institutions) *1991 to Present*

Dutchess Community College, Poughkeepsie, New York
Marist College, Poughkeepsie, New York
Vassar College, Poughkeepsie, New York

Courses: Macroeconomics, Environmental Economics (DCC)
Introduction to Environmental Issues (Marist)
Environmental Geology (Vassar)

Policy Intern, Southern Growth Policies Board, North Carolina *1985*

Prepared several in-depth and short analyses of environmental and economic issues, with specific concern for their impact on Southern state policies. Analyses included: hazardous waste facility setting policies and environmental impacts of "high tech" industries on host communities.

Research Assistant, University of Oregon, Eugene, Oregon *1983*

Analyzed (with Dr. John Baldwin, Chairman of the Department of Planning, Public Policy and Management, U. of Oregon) the "Oregon Riparian Tax Incentive Program". Designed survey, conducted interviews and analyzed data. Summary paper with programmatic recommendations, was presented at the Annual Conference of the National Association of Environmental Educators.

RELATED EXPERIENCE

Research Assistant, School of the Environment, Duke University, North Carolina *1986*

Assisted in the design and evaluation of risk assessment models to estimate the impact of landfill leachate on human health. Monte Carlo simulation and pollutant transport models used in the analyses.

Research Assistant, USDA Forest Service, Duke University, North Carolina *1985*

Collected economic data and assisted in statistical analyses for a study isolating research as a variable in timber production functions.

Research Assistant, School of the Environment, Duke University, North Carolina *1984*

Preliminary research on the use of mathematical models by water resource administrators.

Teacher, Eugene, Oregon *1980-1983*

PRESENTATIONS

- "Environmental Risks in Lending" Training Session for Pawling Savings Bank employees, December 18 and 19, 1989; and July 1, 1993.
- "Identifying Environmental Concerns in Appraisals", Workshops for Lakewood Appraisal Corporation, October, and November, 1989 and April, 1990.
- "State and Local Groundwater Protection Strategies", Annual meeting of the New York State Association of Towns, February, 1990.
- "Environmental Audits on Orchards and Agricultural Properties", Resource Education Institute, Inc., Real Estate Site Assessment and Environmental Audits Conference, December 4, 1990.
- "Environmental Audits on Orchards and Agricultural Properties", National Water Well Association Annual Conference, July 29-31, 1991.
- "Principles of Environmental Economics for Ground Water Professionals", National Groundwater Association Outdoor Action Conference, May 27, 1993.
- "Impact of Environmental Liabilities on Real Estate Transactions", a NYS Department of Education approved course for licensed real estate professionals, March 1995; April 1995; May 1995; October 1995.
- "Brownfields Redevelopment in New York: A Discussion of Two Case Studies", New England Environmental Conference 1996, March, 1996.
- "Quantifying Environmental Liabilities", a NYS Department of Education approved course for licensed real estate professionals, March 1997.
- "Environmental Assessments in Urban Settings", Vassar College, Fall 1999 and Fall 2000.
- "Navigating Property Contaminant Problems", Land Trust Alliance Rally 2001, Oct 2001

ARTICLES

Ciminello, P. 1993. A Primer on Petroleum Bulk Storage Tanks and Petroleum Contamination of Property, ASHI Technical Journal, Volume 3, No. 1

Ciminello, P. 1991. Environmental Audits on Orchard and Other Agricultural Properties, Proceedings of the National Water Well Association Annual Conference

Ciminello, P. 1991. Property Managers Should Carefully Examine Current Fuel Storage Practices, NYS Real Estate Journal, Vol. 3, No. 9

Ciminello, P. 1991. New DEC Regulations Affect Development of Agricultural Lands, NYS Real Estate Journal, Vol. 3, No. 6

Ciminello, P., Hodges-Copple, J. 1986. Managing Toxic Risks From High Tech Manufacturing, Growth and Environmental Management Series (Southern Growth Policies Board)

Ciminello, P. 1986. State Assistance in Financing Water Treatment Facilities, Growth and Environmental Management Series (Southern Growth Policies Board)

Ciminello, P. 1985. Plants Amid Plantings: The Future Role of Environmental Factors in Business Climate, Ratings, Southern Growth ALERT (Southern Growth Policies Board)

Ciminello, P., J. Baldwin, N. Duhnkrack,1984, An Incentive Approach to Riparian Lands Conservation, Monographs in Environmental Education and Environmental Studies (North American Association of Environmental Educators)

PROFESSIONAL AFFILIATIONS

American Water Resources Association
National Groundwater Association
Hazardous Materials Control Research Institute
Environmental Assessment Association

ADDITIONAL INFORMATION

Member, Dutchess County (NY) Youth Board (1987-1992); Chairman, 1992
Member, City of Poughkeepsie (NY) School District Ad Hoc Committee on Teen Parents and Pregnancy Prevention (1991)
Member, City of Poughkeepsie School District Budget Advisory Committee (1994 to 2000)
Member, City of Poughkeepsie PTA and Middle School Building Level Team

Ecosystems Strategies, Inc.

Richard Hooker
Project Manager

PROFESSIONAL EXPERIENCE

Project Manager, Ecosystems Strategies, Inc., Poughkeepsie, NY *2001 - present*

- Conducts Environmental Site Investigations and prepares final site assessment reports. Over 300 Investigations and Final Reports completed to date.
- Investigates site histories.
- Conducts facility inspections.
- Reviews regulatory agency records.
- Documents facility compliance with relevant State and Federal regulations.
- Conducts Phase II Technical Environmental Investigations and prepares technical reports.
- Researches field and regulatory information.
- Manages tank removals.
- Coordinates subcontractors.
- Oversees fieldwork and handles collection of material, soil and water samples.

EDUCATION

Ph.D. from the University of St. Andrews, St. Andrews, Scotland *1997*
BA from Staffordshire University, Stoke-on-Trent, England *1989*

SELECT PROJECTS

Former Fur Processing Facility, Bronx, NY

Documented the presence of chlorinated hydrocarbon, petroleum, and metals contamination beneath and/or near a former industrial structure. Coordinated the sampling and removal of multiple drums of hazardous and non-hazardous material from the structure and secured NYCDEP approval. Developed a Workplan for site remediation and directed environmental restoration activities, including: excavation and removal of both aboveground and underground storage tanks, removal of contaminated soils, installation of a barrier layer soil cap, and pre-demolition removal of asbestos materials.

Jamaica Hospital Medical Center, Queens, NY

Coordinated and supervised the removal of two, large underground storage tanks and documented site conditions through soil and groundwater sampling. Secured NYSDEC approval of PBS tank closure and registration requirements.

The Point CDC, Bronx, NY

ESI assisted with the open space for community access to the waterfront in revitalization of a former fur processing plant. Activities included subsurface investigation, hazardous waste characterization/disposal program. Worked with architects, engineers, and demolition contractors to demolish existing structure and assisted with site redesign as a multi-purpose community access point to the Bronx River.

PROFESSIONAL CERTIFICATIONS

- OSHA Hazardous Waste Site Operations
- OSHA Emergency Response Training
- 29 CRF 1910.120 (e) – 40 Hour Hazwoper

Ecosystems Strategies, Inc.

Emery Lawson
Project Manager

PROFESSIONAL EXPERIENCE

Project Manager, Ecosystems Strategies, Inc., Poughkeepsie, NY *2007 - present*

- Conducts Environmental Site Investigations and prepares final site assessment reports.
- Investigates site histories.
- Conducts facility inspections.
- Reviews regulatory agency records.
- Documents facility compliance with relevant State and Federal regulations.
- Conducts Phase II Technical Environmental Investigations and prepares technical reports.
- Researches field and regulatory information.
- Coordinates subcontractors.
- Oversees fieldwork and handles collection of material, soil and water samples.

Environmental Engineer, Terracon Consultants, Inc., Bettendorf, IA *2006 - 2007*

- Conducted Environmental Site Investigations and prepares final site assessment reports.
- Conducted Phase II Technical Environmental Investigations and prepares technical reports.
- Conducted Industrial Permitting and Auditing Projects.

Complex Environmental Manager, Tyson Foods, Inc., Waldron, AR *2002- 2005*

- Management of all environmental permits and programs to ensure compliance with Federal, State and local environmental laws and regulations.
- Oversight of the wastewater treatment plant.
- Conducted plant-wide environmental training.
- Member of the plant hazmat response team.

Field Engineer, Arkansas Highway Transportation Department, Waldron, AR *2001- 2002*

- Oversight of highway construction projects to ensure that projects were built to plans and specifications.

Engineer in Training, Water Resources Department, PBS&J, Austin, TX *1999- 2001*

- Hydrology and Hydraulics design for projects including: FEMA floodplain investigations, TxDOT roadway projects, and residential projects.

EDUCATION

Masters of Science in Civil Engineering, Texas A&M University *1999*
Bachelors of Science in Environmental Science, Oklahoma State University *1997*

PROFESSIONAL CERTIFICATIONS

- 29 CRF 1910.120 (e) – 40 Hour Hazwoper