POST REMEDIATION OPERATION AND MAINTENANCE PLAN,ERIE CANAL INDUSTRIAL PARK ROCHESTER, NEW YORK

Developed By:

Haley & Aldrich of New York
Rochester, New York

Developed For:

City of Rochester
Div. of Environmental Services
Rochester, New York

File No. 70606-000
August 1999

TABLE OF CONTENTS

I. INTRODUCTION AND SITE BACKGROUND

1-01. Document Purpose

This document has been developed to implement post-remediation Operation and Maintenance (O&M) at the Erie Canal Industrial Park (ECIP), located in Rochester, New York. O&M is to be performed by the City of Rochester including:

- Implementing deed restrictions to ensure development and continued use of the site consistent with the Voluntary Cleanup Agreement between the City and the New York State Department of Environmental Conservation (NYSDEC) dated 17 June 1997, under which the ECIP has been remediated.

- Assisting developers and designers in planning for development, characterizing waste-fill materials that may be excavated during development, and managing excavated waste-fill at the ECIP.

- Establishing and maintaining Limited Access Areas that are to be left as open space, parking lots, loading docks, or similar consistent use.

- Providing guidance for vapor barriers or sub-slab ventilation systems where buildings may overlie low concentration volatile organic compound (VOC) residues.

- Providing for continued monitoring of potential petroleum free product at a well where it has been observed in the past.

The ECIP is presently a partly developed area encompassing four city blocks flanking Smith and Oak Streets in Rochester, New York. The ECIP property includes two parcels, Blocks 2 and 3, which flank Oak Street on its west and east sides and are approximately 11 and 4 acres, respectively (see O&M Figure 1, attached). These parcels were the subject of the VCA between the City and NYSDEC. Investigations completed in 1997 updated on-going studies were performed in the past by the City of Rochester to characterize the type, nature, extent, and impact resulting from waste contained in ECIP. The investigations included soil vapor sampling, test pit and soil boring explorations, and soil and groundwater sampling programs, which indicated a limited area of hazardous waste on Block 2 and areas of petroleum impact on Blocks 2 and 3. These areas were the subject of remediation performed in late 1998 which resulted in removal of the primary areas of soil contamination described.

A significant portion of ECIP was historically developed over the years in the form of railroad and coal/coke activities and light industrial operations, including gasoline stations, auto repair and junk/scrapyard facilities. These activities are now gone and their associated structures long ago demolished. Essentially the Block 2 and 3 parcels remain as undeveloped acreage. Therefore, it is expected that development will include primarily new building development. Such development within the confines of the Blocks 2 and 3 footprint means that waste-fill may need to be excavated and properly managed for purposes of continued site development. Such new development is more feasible since completion of the 1998 remediation and it is intended by the City to be performed consistent with the VCA.

1-02. Site Background Summary

The ECIP Block 2 and 3 site occupies approximately 15 acres and is located on the northwestern side of center of the City of Rochester, New York. The site location and study area that has been used for past investigations are shown on Figures 1 through 4 of the Brownfield Conceptual Redevelopment Report for this site (August 1997 - see reference listing at the end of this document). The study area is roughly bounded by Lind Street and railroad right-of-way/light industry on the north, several residences and Broad Street on the west, Smith Street on the south, and residences along Saratoga Street to the east. The ECIP footprint is divided by the north-south traversing Oak Street which separates Block 2 (west) from Block 3 (east) of the ECIP property.

Prior to its present condition, the ECIP area was relatively flat lying city blocks occupied by various industries and businesses present within this area. At present the site is vacant land that is surrounded by various residences, smaller industrial/commercial facilities, and railroad right-of-way, as well as other undeveloped land.

The ECIP property has a long history of industrial usage. Various excavation and filling activities in the past have created a cover layer of heterogeneous fill material that varies in thickness across the site, overlying native material. A section of abandoned Erie Canal bed lies in the Block 2 footprint and runs roughly northwest-southeast through the center of the parcel. In addition, the former Kent Street right-of-way passes north-south through the Block 3 parcel.

As mentioned, this site was primarily used through its history for light industry. As part of construction, excavation and backfilling operations, a fill material covering has accumulated across the site. Also, the presence of low concentrations of various chemical and petroleum constituents related to the past activities at the site in subsurface soil and groundwater has been observed. Site conditions, based on available investigation data indicate the following:

- Fill - Soil, rock, construction and demolition, and miscellaneous other fill is present across the site to variable depths. Depths range from less than 3 feet up to more than 11 feet depending upon location. The variable fill character (both in terms of structural stability for future development and chemical quality for an environmental risk evaluation) need to be factored into potential risks and potential development scenarios. Fill depths and types are also fairly well characterized for potential development scenarios.

  The general type of fill encountered in investigations at the ECIP site include predominantly construction demolition (C&D) debris. This generally consists of soil and rock fill with lesser amounts of paper, plastic, metal, wood, concrete, bricks, tiles, asphalt, cinder/slag, etc. Construction and demolition debris observed in past investigations generally fits the definition of construction demolition debris contained in NYSDEC's Part 360. Future development is expected to occur on specific portions of the ECIP property. Presence of fill material at the ECIP site requires, however, that development planning make reasonable consideration of existing site data and history. Guidance for such consideration is described below.

- Chemical Quality - Chemical analyses of the fill have shown sporadic detections of volatile organic compounds (VOCs), PCBs, and low levels of metals. Specific portions of Block 2 once had concentrations of these compounds so as to exceed Appropriate, Relevant and Applicable Regulations (ARARs) such as NYSDEC Technical Administrative Guidance Memorandum No. 4046 and current soil cleanup criteria for similar industrial sites. Fill at the south central portion of Block 2 exhibited levels of PCBs which exceed guidance values, and fill at the northeast corner of Block 2 showed results for TCLP lead and total lead which exceeded TAGM 4046 criteria. In addition, areas of petroleum stained soil were located at the southeast and northwest ends of Block 3. Analyses for soil from both areas detected exceedances of STARS guidance nuisance criteria. These soils were removed in late 1998 so that remaining soils meet the NYSDEC TAGM and STARS criteria. Overall, chemical quality data is available for most areas of the site from a shallow to moderate depth range (2± feet up to 10±). Groundwater quality data is also available, along with apparent flow information.

Locations of the various past site explorations are shown on O&M Figure 1, attached. The figure legend lists the dates and parties responsible for the exploration – all reports documenting the explorations are available from the City of Rochester, and summaries of the past work appear in the "Final Engineering Report on Remediation Performance", dated September 1999, for the site.

II. DEVELOPMENT AND PRE-EXCAVATION PLANNING

2-01. Site Planning and Deed Restrictions

Planning Information - Development site planning should first consider the intended location of proposed development and information from past ECIP investigations that may be available for the development location, and specifically should consider existing data sources in the course of development planning, building design, and construction planning. Extensive records of previous investigation conducted by the City of Rochester are available from various locations. A list of several summary investigation reports is appended to this document. An example site plan for the south end of Block 3 is also attached to provide guidance on incorporation of features of site conditions with desired building information.

The references above, as well as various other records pertaining to operating history of the ECIP, industrial park design and development, and site investigation reports may be accessed at:

- City of Rochester
  30 Church Street
  Rochester, New York 14614
  Contact: Department of Environmental Services

- Monroe County Department of Health
  111 Westfall Road - Rm. 908

Rochester, New York 14692
Contact: Richard Elliott

- New York State Department of Environmental Conservation
  Region 8
  6274 East Avon-Lima Road
  Avon, New York 14414
  Contact: Regional Hazardous Waste Remediation Engineer or
  Regional Solid Waste Engineer

- Erie Canal Industrial Park Document Repository
  Lyell Avenue Branch Library
  956 Lyell Avenue
  Rochester, New York 14606

Information available from these entities generally includes reports of past investigations, historical information, subsurface exploration data (test pit reports, boring logs, groundwater well elevation information), and environmental quality data. The environmental quality data, in particular, includes laboratory analyses for media sampled within the ECIP site.

Deed Restrictions - In accordance with the Section X of the Voluntary Cleanup Agreement (IN: B8-0490-96-03) between the City, NYSDEC, and Attorney Generals Office, the City will record an instrument in the County Clerk's Office restricting future site uses to industrial and commercial activities, unless express written waver of such prohibition is issued by the NYSDEC. Limited-use areas have been identified and long-term operations and maintenance requirements are described herein and will be included by reference in the deed restriction as well.

As part of this O&M plan, the City will conduct or require notification to and approval by the NYSDEC for construction or physical alterations to the site, and identify to developers the deed restrictions on the property.

The City intends to sell the ECIP parcels for industrial or commercial redevelopment. The City will append the voluntary cleanup agreement to its Purchase/Sale agreements and require the successors to abide by the requirements and restrictions of the VCA. Specific contractual language identifying O&M responsibilities will be developed for each transfer.

New owners will be responsible for conducting construction, operations, and maintenance work in accordance with the recommended site soil/waste management criteria of this plan (Section III), which applies to future excavation and construction work.

The City has established a procedure for flagging property tax account numbers that require special environmental reviews as a result of hazardous waste or substance contamination. The reviews are conducted as referrals to the City's Environmental Quality unit for any permit applications for properties where soils management plans or environmental contingency plans need to be established and followed during construction activities.

The City will flag the parcels on Block 2 and 3 of the ECIP that are subject to the

requirements of this O&M plan. A special notation will be added to the City's mainframe computer database of property information for the site parcel tax account numbers, 105.75-02-6.1, 105.76-01-50.1, and 105.76-01-57. The notation will appear as a flag to City staff who receive various building and site preparation permit applications. The flag will require a referral to the City's Division of Environmental Quality before the application can be processed for approval. DEQ staff will review the permit for consistency with the O & M plan, limited-use areas and land-use restrictions. If NYSDEC wishes, the City can also include a notification to the NYSDEC at the time the permit is reviewed.

2-02. Construction/Design Considerations

Past investigations and laboratory analyses of the waste-fill material in the ECIP have shown the majority of the material present consists of non-hazardous solid waste. However, hazardous waste has also been encountered at limited locations. The primary occurrences of these wastes have been removed from Blocks 2 and 3, however there is a possibility of encountering localized occurrences of waste that were not detected or observed by the extensive past site sampling. Any waste material that is excavated during construction or site development, must be properly managed. Therefore, the development process can be greatly simplified by planning to minimize excavation needed for construction and anticipating the waste-fill that will be handled during excavation and construction.

Hazardous waste that is generated as part of the excavation cannot be replaced on the site and must be properly characterized, managed, and disposed off-site at a permitted facility. The party responsible for generating the excavated material (developer or property owner) would be responsible for such characterization, management, and proper disposal. Accordingly, construction planning and development design that allows minimal site excavation means less material needs to be handled on-site (if solid waste) or needs to be disposed off-site (if hazardous waste).

The extent and nature of fill at the site is a limiting factor on the types of structures which can be placed at the site and requires that careful consideration be given to foundation design of proposed structures so that adequate structural support is maintained. Therefore, developers and design engineers will need to carefully balance the extent and methods of subsurface excavation that will be necessary for foundation construction against the goal of minimizing the amount of fill that needs to be excavated and properly managed during construction. General geotechnical guidance for foundations and paved areas has been developed and is presented in the Brownfield Conceptual Redevelopment Report (see reference list). Documentation of past remediation appears in the Final Engineering Report on Remediation Performance, dated August 1999.

Developers and design engineers for planned development should also consider that waste characterization and management may affect the following elements of construction:

- Schedules: Scheduling of construction will need to allow for potential sampling, monitoring, and management of fill material that is excavated during the course of construction. Sampling, in particular, may lead to laboratory analysis. Analytical results typically take from several days to several weeks to be generated. Therefore, design and construction schedules should allow for adequate sample analysis turn-

around time.

- Construction De-Watering: Groundwater in some areas of the ECIP property has been found to contain potentially hazardous constituents. A past detection of free petroleum product at the north end of Block 2 is the subject of a skimming system remediation in an existing well (well TB-90-5). Construction design and planning should consider existing data regarding groundwater quality and depths to allow for proper management of groundwater flow into excavations during construction, if de-watering is necessary for construction purposes.

- Fill Variability: Construction schedules should allow contingency time and measures to address potential unanticipated conditions.

2-03. Limited Use Areas

Two Limited Use Areas have been designated at the ECIP site, both located on Block 2. The two areas are shown on O&M Figure 2 (attached) and in the "Final Engineering Report on Remediation Performance", dated September 1999. The function of the Limited Use Areas is to restrict constructed surface improvements that may include habitable spaces. Each of these areas has shown low but persistent past detection of VOCs in some soil and groundwater, and the Limited Use is intended to avoid having to construct elaborate vapor barriers or subsurface ventilation systems. Conceptual development evaluation of the Block has shown that other areas of the site are better suited to building construction and these areas of VOC presence are better left as open space, parking lots, loading dock or similar low-intensity uses. In the event such areas cannot be avoided, general descriptions of ventilation systems or sub-slab vapor barriers is included in this O&M Plan.

2-04. Past Removals, Backfill and Compaction

As indicated previously, remediation was completed in 1998 that included excavation and removal of soil with residues of lead, PCB, and petroleum. The "Final Engineering Report on Remediation Performance", dated September 1999, fully documents the removal actions and confirmation sampling. The removals were performed from five separate areas as shown on O&M Figure 2 attached. At each removal location, the material being remediated was excavated until removal could be confirmed with analyses of side wall and bottom samples, and the excavation was then backfilled with select material suitable for structural support. Backfilled material consisted of "Recycled Concrete Stone" supplied by Dolomite Products Inc. The material meets the gradation limits shown on the cut sheet attached to this plan. The material was placed in 1-ft. lifts and compacted using several passes of a vibrating roller. Note that the lower two lifts of the Block 3-North area were placed in 2-ft thickness and compacted between lifts. Subsequent shallower lifts were placed in 1-ft. thickness.

III. WASTE-FILL CHARACTERIZATION

3-01. Pre-Construction Sampling

Data from previous investigations may not be available for the specific location where development is planned. Further, even if data is available, fill materials may vary

considerably from one location to the next over relatively short distances. Therefore, some pre-construction investigation is recommended to characterize the type of material that is expected to be excavated during actual construction. The overall objective of such characterization is to obtain, observe, and analyze samples that are representative of the waste-fill that will be excavated during construction. This section contains guidance on sampling methods, sample frequency, and laboratory analysis that may be used to characterize waste-fill.

3.1.1 Sampling Methods

Conventional subsurface exploration methods consisting of test pits, test borings, or other methods may be used for sampling waste-fill materials. Overall, the intent of such explorations is to view materials that may be excavated during construction for observable signs of contamination. Such signs typically include:

- Staining
- Chemical Odors
- Fumes or vapors that are detectable by volatile organic compound monitoring instruments
- Observable sheens

These explorations are also intended to gather samples that can be used for laboratory analysis for hazardous waste characteristics. The overall intent of sampling is to obtain a sufficient number of samples to be representative of the total mass of material that is expected to be excavated during construction. If laboratory analysis for hazardous waste characteristics show the samples to be non-hazardous, then the material excavated should be manageable on-site, if desired.

The observations and sample collection described above should be documented on test pit logs, test boring logs, or other field notes by a qualified geologist, soil scientist, engineer, or environmental scientist.

The developer and/or design engineer is cautioned that test pit or test trench type explorations should be limited only to the depth and extent of anticipated construction excavation. Such excavation should not be advanced deeper than anticipated construction excavation, nor should they be placed in areas within the footprint of the proposed structure where intended to provide future structural support. Excavation and replacement of material without consideration of the type of material being disturbed, control replacement, and compaction will compromise its potential bearing strength.

3.1.2 Sample Frequency

In order to generate samples that are representative of the overall waste-fill mass that will be excavated, regular sampling along foundation elements is recommended. Samples may consist of either "grab" or "composite" samples. Grab samples are obtained from a specific location and are representative of the conditions at that location. A composite sample consists of material collected from several locations

which are then combined and homogenized to represent an "average" from the sampled locations. Both types of samples may be used for characterizing waste-fill material intended for excavation.

The designer/developer is cautioned that information derived from grab and composite samples may be limited as a result of the method of sampling. Grab samples are representative of a single location and conditions at that location may vary from similar-appearing material located nearby the sample location. Composite samples tend to average conditions from the locations that the composite represents and, therefore, may result in laboratory analytical results that dilute elevated contaminant concentrations or obscure non-detect results. These limitations should be considered in developing a sample plan.

Footers - In general, sampling is recommended at a frequency of one grab sample per 100 linear feet of foundation footer (for slab-on-grade type construction). For typical footer excavation of 4 to 5 ft. in depth, and 4 to 5 ft. width, this represents one sample per approximately 100 in-place cubic yards.

Smaller structures (generally less than 100 ft. on a side) or materials that appear to be extremely variable in nature may be amenable to composite sampling to keep laboratory analytical costs at a reasonable level.

Column Supports - If column footers, grade beams, or other structural supports are intended for the proposed building footprint, and these elements will require excavation, sampling is also recommended on a regular basis. Such sampling may consist of periodic grab samples (for example: one grab sample for every third column) or as composited samples (for example: one composited sample derived from three to four adjacent column footer locations).

Sample Integrity - The number of samples, sampling schedule, and intended analyses should be coordinated with a qualified environmental laboratory so that appropriate sample containers, preservation methods, shipping, and holding times may be observed. Several qualified environmental analytical laboratories are present in the Rochester area that are capable of supporting this type of work.

Generally, sample collection will require use of dedicated stainless steel collection implements (trowels or spoons to place samples in jars). If dedicated sampling equipment is not available, sampling implements will need to be cleaned and properly decontaminated between samples locations. For the types of materials that have been encountered in previous ECIP investigations, decontamination using an alconox/water wash and deionized water rinse is generally adequate. However, specific procedures should be reviewed with the analytical laboratory prior to collection and submittal of samples.

3-02. Sample Analyses

The intent of laboratory analysis of samples is to determine whether the waste material excavated is hazardous or non-hazardous. By USEPA and NYSDEC regulation, a generator of such waste is allowed to make this determination using knowledge of the waste and/or

laboratory analysis. Therefore, previously gathered data for an intended development site, as well as the history of operation of the site may be used to form knowledge of the waste. Site specific information may be generated via laboratory analyses of samples.

Generally the waste-fill material excavated at the ECIP site will be considered to be non-hazardous solid waste, provided laboratory analysis does not show it to be a "Characteristic Hazardous Waste". It is also possible that waste encountered in the fill, such as a labeled drum, may be a "Listed Hazardous Waste" - note however that no such materials have been observed in past explorations. The generator of the waste will need to use knowledge of the waste and how it was generated to determine if a listed waste is present. Please note that "Characteristically Hazardous" and "Listed Hazardous Waste" are both defined terms within USEPA and NYSDEC regulation.

Solid waste will be considered as hazardous if it exhibits a Hazardous Characteristic, namely, ignitability, corrosivity, reactivity, or toxicity. If Listed Waste is contained within the solid waste sample, the mixture may also be considered as hazardous waste. Accordingly, laboratory analysis should consider analysis for hazardous waste characteristics or to verify if listed waste could be present.
If it is determined that listed waste is present in the excavated soil, the NYSDEC's Technical Administration Guidance Memorandum No. 3028 of November 30, 1992, "Contained-In" Criteria for Environmental Media, provides guidance on how the listed waste may be delisted and/or otherwise managed.

Past analyses from the ECIP site (prior to the 1998 remediation) have generally identified waste as hazardous when they exhibit a hazardous waste characteristic by toxicity test (see below). In most cases, it should be possible to limit laboratory analyses for waste to be excavated during site development to the following parameters:

- Hazardous Waste Characteristics - ignitability (liquids only), corrosivity (liquids only), reactivity, toxicity (see next item)

- Hazardous Waste Characteristic of Toxicity - this analysis is performed by using the Toxicity Characteristic Leaching Procedure (TCLP).

- Volatile Organic Analysis - by EPA Method 8010/8020 or 8260.

The majority of waste-fill within the ECIP site, if containing contaminants, consists of low-level contamination within fill-soils material, and waste analyses did not show the characteristics of ignitability, corrosivity or reactivity to be present other than in localized areas which were removed in 1998. Potential leachability of heavy metals has been the primary reason that a sample may be characterized as hazardous waste by the TCLP procedure. Therefore, it may be possible to limit TCLP analyses to metal constituents. If there is suspicion that volatile organic compounds (VOCs) are present, then it would be appropriate to also include the VOC constituent portion of the TCLP analyses. The developer/designer should consider past site information and these factors in planning lab analyses.

Volatile analyses would be appropriate and should be performed if VOC presence is suspected

based on observable odors, sheens, staining, or positive detections by field VOC-monitoring equipment (see Section 4-02 below).

Disposal facility requirements for analysis should also be determined when sampling the excavated soil.

3-03. Construction Sampling

Sampling of excavated waste-fill materials during construction should be considered if either of the following conditions exist:

- No pre-construction planning or sampling was performed.
- If conditions during actual construction are significantly different than those observed during pre-construction exploration.

The recommended frequency of sampling during construction (if not otherwise done before construction) should follow the guidelines of sample frequency described above.

IV. MONITORING DURING EXCAVATION

Monitoring of materials being excavated during construction is generally needed for three purposes: 1) protection of health and safety site workers during construction; 2) to determine that excavated waste-fill materials are consistent with the pre-construction characterization; or 3) if no pre-construction characterization was performed.

4-01. Health and Safety Monitoring

Past investigations of the ECIP site have shown that hazardous materials may potentially be encountered during subsurface exploration, utility installation, and construction activities that disturb soil, rock and fill materials. These particularly include materials that could be associated with the fill contained within the ECIP site as well as materials that are naturally occurring from bedrock at the site methane or hydrogen sulfide gas). Generally materials that are associated with the ECIP fill that may be considered as potential hazardous materials subject to health and safety planning may include:

- Volatile organic compounds - these include petroleum derived constituents as well as a limited number of chlorinated volatile organic compounds.
- Heavy metals - a variety of heavy metals are present in detectable concentrations in the fill. Past analyses of soils have only shown lead and chromium to be present at concentrations that exceed TCLP toxicity limits, although these areas were removed in the 1998 remediation. Health and safety planning should generally consider measures to prevent exposure to heavy metals through engineering controls (dust suppression) or use of personnel protective equipment, or other measures.
- PCBs - one localized area of elevated PCB concentrations was found in the south

central portion of Block 2 (see Brownfield Report), and it was removed in the 1998 remediation.

Health and safety planning should also give consideration to other construction related issues, such as but not limited to trenching safety (as is required under OSHA regulations 29 CFR 1910.1926), or other construction-related OSHA regulations.

Overall, basic health and safety planning must be performed. A written plan should be developed for construction activities based on sample analytical results, information specific to the parcel being developed, specific construction tasks to be performed, and the potential for exposure for site workers and adjoining community areas. NYSDEC requires that the plan be submitted for review and approval by NYSDOH and the Monroe County Dept. of Health. The plan must provide for healthy and safe conduct of site tasks by on-site personnel, as well as for health and safety of adjoining potentially-affected community. Previous investigations and construction activities have routinely been performed. These previous activities have shown that overall, the potential for worker exposure exists, but is relatively low. However, all contractors and developers should consider the extent of health and safety planning needed relative to their specific development, and planned activities and tasks.

4-02. Waste-Fill Characterization

Monitoring of waste-fill excavated during construction should be performed for two reasons:

- To determine that the waste-fill actually excavated during construction is consistent with the characterization of fill developed prior to construction.

- To allow characterization of solid waste excavated in the event that no pre-construction planning, sampling, or analysis was performed.

Monitoring should generally consist of documentation of the same types of observations as those recommended for pre-construction characterization. Namely, observations documented during excavation should include visible characteristics of the waste-fill excavated including obvious staining, sheens, observable odors, or other indicators of contamination.

Several portable monitoring instruments are available to assist in field monitoring of excavated material. Such instruments are primarily used for detection of volatile organic compounds. Since such compounds have been detected in the past at the ECIP site, this instrumentation is also appropriate for construction excavation monitoring. Types of instruments available for this purpose include:

- Photoionization detector instruments (PID) - these instruments operate by drawing a sample of ambient air or gas into a chamber where the gas is ionized using a light source of a specific energy (either 10.2, 10.7 or 11.7 eV). The intensity of ionization energy is then measured and converted to a signal and a scale reading in parts-per-million (ppm) of total volatile organics concentration.

- Flame ionization detector instruments (FID) - these instruments operate on a similar principle as the PIDs, however, the ionization is caused by a flame produced from a controlled gas source.

- Colorimetric tubes - these are small glass tubes which contain chemical salts formulated to react with specific volatile and some non-volatile compounds. A sample of air is drawn through the tube. The presence of a target chemical causes a reaction and a color change of the chemical salts in the tube. A scale on the side of the tube indicates the apparent concentration of the gas sampled, usually in ppm.

These instruments are generally available in the Rochester area and can be rented from several sources. However, they should only be operated by individuals trained and experienced in their use, limitations, and capabilities for data generation.

Any readings generated from such monitoring instruments should be recorded in the field along with the other observations described above. As long as excavation monitoring shows waste-fill material to be consistent with pre-construction characterization, then the fill should be manageable as determined prior to construction. If conditions materially different than those anticipated are encountered, then sampling and additional characterization as described above may be necessary.

V. MANAGEMENT OF EXCAVATED MATERIAL

5-01. On-Site Management of Solid Waste

As indicated above, non-hazardous solid waste excavated as part of a construction project may be maintained and replaced on-site with similar materials, or otherwise within the footprint of the site. Accordingly, site development plans and designs should allow for placement of the waste-fill as backfill and subsequent grading and covering of the material with soil and vegetation, or a structure (building, parking lot, etc.). The objective of placing cover over the solid waste material is to prevent routine contact with the waste. Therefore coverage should generally consist of approximately 18 inches of clean soil cover and vegetation, or a substantial barriers consisting of concrete slab, the building slab, or asphalt cover. As with the Health and Safety Plan, the backfill, grading and cover plans should be reviewed by the NYSDEC before beginning work.

Appropriate measures to consider in materials management should include a possible need to temporarily stockpile excavated solid or hazardous waste and measures to prevent its contamination of other materials. Measures to consider for such control include:

- Stockpile locations away from storm sewers, downwind property boundaries, and drainage courses.
- Placement of stockpiles on impervious material (plastic) with perimeter berms.
- Covering stockpiles or exposed waste areas to prevent migration by wind-blown dust or storm water runoff until final placement and final cover is established.

5-02. Off-Site Disposition of Solid or Hazardous Waste

If quantities of excavated non-hazardous solid waste material are too great to be incorporated in site grading, then placement off-site within the ECIP footprint may be possible. Such placement, however, is subject to being placed within the confines of the ECIP footprint, and will require permission of the receiving property owner, NYSDEC, and possibly the City of Rochester and Monroe County Department of Health. The proposed method of placement and cover material will need to be identified to the agencies. Therefore, wherever possible, site development should allow for replacement of excavated solid waste-fill back on the site to be developed.

As indicated previously, it is possible that hazardous waste could be encountered during site development. If such waste is encountered and excavated, it will be the responsibility of the site developer or owner (as the generator of the hazardous waste) to properly handle this waste. Management of such hazardous waste will require characterization, management, and off-site disposal at an appropriate approved facility, consistent with NYSDEC and USEPA hazardous waste management regulations.

VI. VAPOR BARRIERS / VENTING SYSTEMS

6-01. Fill / System Types

Two general fill conditions may exist on areas to be constructed on Blocks 2 or 3, those exhibiting relatively thick fills that will require more complex or elaborate foundation systems and areas of relatively thin fill that will not require such complexity. These circumstances and general foundation types are:

- Relatively Thick Fill: fills up to several feet thick, having a higher potential to contain compressible or other undesirable soils, or solid waste.

  Anticipated Foundation Type: Higher potential to require piers, caissons, or similar foundations due to the potential for settling.

- Relatively Thin Fill: fills up to only a few feet in thickness, with lower potential to have compressible or other undesirable soils, or solid waste.

  Anticipated Foundation Type: Higher potential for slab on grade foundations.

6-02. Description of Conceptual Systems

Based on the general foundation designs described above, the vapor / ventilation system may be one of two following types:

Type I - System consists of an impermeable vapor barrier of 20 mil polyethylene sheeting that inhibits migration of vapors into the sub-slab area. A geotextile material will be placed both above and below the sheeting for protection.

Type II - System consists of a crushed stone sub-base with a network of air intake and exhaust piping to ventilate the sub-slab area. Crushed stone should be placed above and below the piping network, and will act as a higher permeability zone through which the gases can migrate to the exhaust piping.

The Type I system is only appropriate if the foundation is a slab on grade type. Implementation of a polyethylene vapor barrier is not feasible if the foundation utilizes caissons or piers due to the difficulty of providing adequate seals seams around the caisson/pier intrusions.

The Type I system consists of a 20 mil polyethylene sheeting sandwiched between two layers of protective non-woven geotextile material.

For the Type II system, air intakes should be located on the sides of the buildings near ground level and exhaust turbines should be located on the roof. The elevation difference between the air intake and exhaust points will take advantage of natural draft resulting from stack-effect. This effect will induce a small air flow at the intakes, through the sub-slab, and up through the exhaust. Wind-driven turbines should be installed at the exhaust pipe discharge to induce additional exhaust capacity.

According to the National Weather Service, Rochester's average wind speed is 12.5 mph. Assuming an 8 inch diameter turbine is used for ventilation, these are rated at 255 cfm under a nominal 4 mph wind (with no back pressure). The turbines should maintain an adequate flow for ventilation even with the addition of back pressure associated with the sub-slab piping. The configuration of the intake and exhaust-piping network will vary due to each building's unique design.

A piping layout in general should include:

- Alternating the intake and exhaust piping.
- Designing the layout of the piping so that the spacing between each intake and exhaust piping length is approximately 50± feet.
- Providing vertical exhausts to the roof turbine at intervals of approximately 150 to 200 feet along the horizontal exhaust piping.

6-03. General Recommendations for Installation and Maintenance

The following are installation and maintenance recommendations for the sub-slab ventilation system:

Installation:

- Avoid sharp items (e.g. larger stones, rebar) that could damage the integrity of the vapor barrier or piping, as appropriate.
- Adjust the location of an air intake if it is near any other air emission source (e.g. loading dock, exhaust vents), as appropriate.

Maintenance:

- Inspect and perform maintenance activities (as specified by the manufacturer) on a yearly basis (minimum), as appropriate.
- Clear snow from air intakes, as required and appropriate.

VII. GROUNDWATER MONITORING

7-01. Water Level Monitoring

Elevation of groundwater in well TB-90-5 is believed to be integral to the past observations of petroleum free-product in the well. High water levels likely force residual petroleum out of pore spaces sufficiently to accumulate on the water table. However, when water levels are low, insufficient petroleum is present to accumulate in an observable thickness on the water table. Accordingly water levels should be gathered routinely when monitoring operation of the free product skimmer described below.

Water levels should be gathered on a monthly to quarterly basis. Each monitoring event should include the following:

- A well maintenance check to determine if repair is needed to the well.
- Use of a clean electronic water level meter to determine the depth to groundwater, within 0.01 ft. The depth should be consistently measured from the same reference location on the well casing each time. The information should be recorded in a field notebook or form dedicated to use for this purpose. Weather and other pertinent observations should be recorded as well.
- Water level data should be compiled on a spreadsheet over time to evaluate trends in level vs. observation of free-product in the well (see below).

7-02. TB-90-5 Skimmer Operation

A KLEER Remedial Support skimmer is installed in Well TB-90-5 on Block 2. This model skimmer separates hydrocarbon fluids floating on water by using a filter membrane located under a slotted filter chamber at the top of the skimmer. The lower portion of the skimmer is a containment chamber which accumulates any product which infiltrates through the slotted filter portion of the skimmer. The skimmer is positioned in the well so that the slotted portion spans any fuel/water interface present in the well. Periodic adjustments to the skimmer are required based on rise and fall of the water table in order to keep the slotted chamber positioned at any fuel/water interface. Information on installation and method of operation of the KLEER skimmer is attached.

VIII. SUMMARY AND LIMITATION

In summary, significant future development is anticipated at the ECIP site. Past investigations at the ECIP site has shown the waste-fill to contain primarily non-hazardous solid waste. NYSDEC regulations allow such solid waste to be excavated and replaced during the course of construction and development. However, hazardous waste has occasionally been encountered at the site and excavation for construction purposes creates the potential for additional generation of hazardous waste. Further, it is desirable to reduce the potential for individual exposure to even non-hazardous solid waste. Accordingly, this guidance document has been developed to assist developers and designers in planning for development, characterizing materials that may be encountered during excavation, and planning for the management of those materials.

The guidance information contained in the document is neither to be considered as specific direction or policy binding on any of the agencies or firms mentioned in the document. Significant investigation has been performed at the site in the past to develop a general understanding of subsurface conditions. However, such conditions can vary significantly between locations sampled. Further, conditions at a single location can change with time. Therefore, responsibility for properly characterizing excavated materials, planning construction, and appropriately managing any materials encountered, generated, or handled during site development is solely the responsibility of the site developer, owner, and designer.

Information in this document regarding implementation or follow-up on deed restrictions and performance of groundwater monitoring is binding on the City of Rochester to provide ongoing use of the ECIP Block 2 and 3, consistent with the intent and requirements of the Voluntary Cleanup Agreement with NYSDEC dated 17 June 1997.

G:\Projects\70606\Restored\AppI-O&M.doc

SOURCES OF INFORMATION

1. Final Engineering Report on Remediation Performance, Erie Canal Industrial Park - Blocks 2 and 3, Rochester, New York. Haley & Aldrich of New York, September 1999

2. City of Rochester Brownfield Pilot: Report on Investigation and Conceptual Development, Erie Canal Industrial Park. Blocks 2 and 3, Rochester, New York. Haley & Aldrich of New York, August 1997

3. Phase I Environmental Assessment, Erie Canal Industrial Park, Block No. 2 Smith & Oak Streets, City of Rochester, New York, ECCO, 18 Dec. 1989

4. Phase II Environmental Assessment, Erie Canal Industrial Park, Block No. 2 South & Oak Streets, City of Rochester, New York, ECCO, 15 June 1990

5. Groundwater Investigation for City of Rochester, 940 Broad Street, Rochester, New York, prepared by Day Engineering, P.C., June 1991

6. Phase II Supplemental Investigation, Erie Canal Industrial Park, Day Hamptom Associates, July 1994.

7. Phase II Investigation, Smith & Oak Streets, Rochester, New York, Day Engineering, Oct. 91.

8. Smith & Oak Street Environmental Audit, prepared for Thomas McGuire prepared by Day Engineering, P.C., May 1988

9. NYSDEC - Title 6 of the New York State Official Compilation of Codes, Rules and Regulations (6NYCRR), Part 360 - Solid Waste Management Facilities. October 1993.

10. NYSDEC - Title 6 of the New York State Official Compilation of Codes, Rules and Regulations (6NYCRR), Part 371 - Identification and Listing of Hazardous Wastes.

11. NYSDEC - TAGM No.3028 - "Contained In" Criteria for Environmental Media. November 1992.