LABELLA Associates, D.P.C.
Engineering
Architecture
Environmental
Planning

Remedial Alternatives Analysis & Remedial Action Work Plan NYSDEC BCP Site No. C828189

Location:

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Avenue
Rochester, New York

Prepared for:

M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC
312 State Street
Rochester, New York 14614

LaBella Project No. 214539

Revised
September 2015

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Certification

I, Daniel P. Noll, P.E., certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Report [Remedial Alternatives Analysis and Remedial Work Plan] was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Daniel Noll, P.E.	September 15, 2015
Printed Name	Date

Signature

1.0 INTRODUCTION

This Remedial Alternatives Analysis & Remedial Action Work Plan (RAA & RAWP) has been prepared by LaBella Associates, D.P.C. (LaBella) on behalf of M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC (together, "M+M") as part of its participation in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). This RAA and RWP summarizes remedial alternatives evaluated and selects remedial actions to be implemented for the property known as the Former Michelsen Furniture Co. Site and located at 182 Avenue D and 374 Conkey Avenue in the City of Rochester, Monroe County, New York and defined in the BCP Application (as amended) as the "Site." A Site Location Map is included as Figure 1.

The Site was entered into the BCP as Site No. C828189 in September 2014, based upon previous environmental investigations that identified the presence of chlorinated volatile organic compounds (VOCs) and petroleum related VOCs and semi-volatile organic compounds (SVOCs) in subsurface soil and groundwater at the Site.

The remedial alternatives and actions were evaluated based on the data obtained during a recent Remedial Investigation (RI) conducted at the Site. This RAA & RWP summarizes the findings of the Remedial Investigation Report for the Site; however, the RI Report should be referenced for greater details about the investigation.

2.0 BACKGROUND

2.1 Site Description

The Site consists of two parcels encompassing approximately 0.62 acres. Property information for the Site and surrounding area are depicted on Figure 2. The Site is located in a primarily residential urban neighborhood in the City of Rochester. It is bounded by Avenue D to the south, Conkey Avenue to the east, residential property to the north, and the El Camino Trail and City of Rochester Avenue D Recreation Center to the east. The Site is currently owned by M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC.

Parcel 1, addressed 182 Avenue D, encompasses approximately 0.4 acres. Parcel 1 is improved with an approximately 44,000 square foot, four story brick warehouse building currently undergoing renovation. Parcel 2 is a vacant lot addressed 374 Conkey Avenue. Parcel 2 encompasses approximately 0.22 acres.

2.2 Areas of Concern

This section summarizes the investigation completed at the Site. Based on the data obtained from this work, the Areas of Concern (AOCs) remaining at the Site are presented. These AOCs will be subsequently evaluated for remedial alternatives.

Summary of Remedial Investigation

The RI activities were conducted in accordance with a NYSDEC approved RI Work Plan (RIWP) last revised January 2015. This report was also completed in accordance with the NYSDEC Division of Environmental Remediation (DER) BCP Guide dated May 2004 and the DER-10 (*Technical Guidance for Site Investigation and Remediation*) dated May 3, 2010.

Prior to being entered into the NYSDEC BCP, the following investigations were performed at the Site:

- *Phase II Environmental Site Assessment, 182 Avenue D, Rochester, NY, LaBella Associates, P.C., November 2012* – This investigation consisted of the advancement of six (6) direct push soil borings, installation of two shallow overburden groundwater monitoring wells, and collection and laboratory analysis of soil and groundwater samples. The findings of the investigation identified petroleum impacts proximate the northern property line of Parcel 2. However, given the lack of an access agreement at that time with the City of Rochester, the investigation could not continue to Parcel 2. Additionally, chlorinated volatile organic compounds (CVOCs) were identified in soil and groundwater at Parcel 1. At the time of the investigation it could not be determined if the CVOCs detected at the Site were attributable to historical Site operations or if they were from an off-site source.

- *Additional Subsurface Investigations, 182 Avenue D and 374 Conkey Avenue, Rochester, NY, LaBella Associates, D.P.C, January & March 2014* – LaBella performed additional investigation activities at both Site parcels in January and March 2014. It should be noted that a report has not been generated relative to these activities, however copies of all figures, data summary tables, laboratory reports, and field logs are included in the BCP Application.

  The January and March 2014 investigations consisted of additional soil borings and overburden monitoring wells, advancement of test pits and installation of one bedrock groundwater monitoring well. The findings of the test pit investigation at that time indicated that USTs were not present, and the approximate extent of petroleum impacts was identified. Laboratory analysis of soil samples from Parcel 2 indicate that petroleum related VOCs and SVOC are present in soil at concentrations below NYSDEC Commissioner Policy 51 (CP-51) and 6 NYCRR Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (SCOs). Laboratory analysis of groundwater samples indicated the presence of significant concentrations of CVOCs (in particular trichloroethene (TCE) in overburden and bedrock groundwater. The findings of investigations performed up until that time were indicative of a release in the vicinity of the facility loading dock and ramp into the Site building basement. However, additional investigation was required to refine the conceptual site model, including further delineation of this potential source area and identification of other potential on-site sources of CVOC impacts.

The BCP RI fieldwork included advancement of eighteen (18) direct push soil borings, eight (8) soil borings with a rotary drill rig, installation of four (4) overburden groundwater monitoring wells, installation of five (5) bedrock-overburden interface wells and installation of three (3) bedrock wells at the Site. To evaluate conditions at the Site, the following soil and groundwater samples were submitted for laboratory testing:

Sampled Media	Sample Quantities
Soil Boring Soils	17
Overburden Groundwater	5
Interface Groundwater	5
Bedrock Groundwater	3

All samples were submitted for analysis of a combination of the following parameters:

- USEPA TCL VOCs

- USEPA TCL SVOCs
- PCBs
- Pesticides
- TAL Metals

Two Interim Remedial Measures (IRMs) have been implemented at the Site:

1. UST Removal – Two (2) 3,000 gallon heating oil USTs were removed, decommissioned and disposed as scrap steel. Approximately 550 gallons of residual heating oil was removed and disposed at Industrial Oil Tank Services in Oriskany, New York.
2. Soil Removal – A total of 1,917.06 tons of soil was characterized, removed from the Site and transported to Mill Seat Landfill in Riga, New York for disposal as non-hazardous waste.
3. Sub Slab Depressurization System (SSDS) – The IRM Work Plan contained design criteria for a sub slab depressurization system (SSDS). The system has been installed in conjunction with the Site redevelopment work. Pursuant to the approved IRM Work Plan, upon activation performance testing was performed to ensure the effectiveness of the SSDS. The performance testing indicated that sufficient negative pressure has been obtained to establish that the SSDS is effectively preventing vapor intrusion to the Site building.

Further detail associated with these IRMs is included in the Construction Completion Report to be combined with the Final Engineering Report.

Based on the work completed it was determined that the predominant contaminants of concern include chlorinated volatile organic compounds (CVOCs) (specifically Trichloroethene (TCE) and its breakdown compounds) in soil and groundwater. Based on these findings, it appears the source of the VOC plume is in the area between the Site building and the ramp to the basement. CVOCs are present in soil at concentrations exceeding Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs but below Part 375-6.8(b) Restricted Residential SCOs. CVOC concentrations exceed Part 703 Groundwater Standards.

Semi-volatile organic compounds were detected in one (1) subsurface soil sample (i.e., IW-3 at a depth of 4’ to 10’ bgs) at concentrations exceeding Part 375-6.8(b) Restricted Industrial SCOs and Protection of Groundwater SCOs.

Based on the results of the RI the following conclusions were made:

1. The soil and groundwater impacts at the Site have been delineated and the primary contaminants at the Site consist of CVOCs.
2. Subsurface soil sampling at the Site only identified one area of soil that contains SVOCs above the SCGs. This area is located beneath the parking lot at the Site.
3. Subsurface VOC impacts in soil were not identified at concentrations above the NYSDEC Part 375-6.8(b) Restricted Residential SCOs. However, low concentrations of VOCs above the NYSDEC Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (SCOs) Part 375-6.8(b) Protection of Groundwater SCOs in soil were detected beneath the Site building.
4. Groundwater at the Site is impacted by CVOCs at concentrations above Part 703 groundwater standards. The groundwater flow at the Site is to the north, towards adjacent residential

properties. While the results of on-Site sampling indicate groundwater contamination may be moving off-Site, off Site sampling is necessary to confirm the nature and extent.

5. Based on the concentrations of VOCs in soil and groundwater beneath the Site building a completed exposure pathway does appear to exist for VOCs. However, while, data is not available documenting current concentrations of VOCs in sub slab vapor or indoor air, the installation of the sub slab depressurization system and ventilation of the underground parking garage addresses any potential vapor intrusion concerns.

Soil samples containing exceedances of Part 375-6.8 SCOs are presented on Figure 2. Exceedances of Part 703 Groundwater Standards for VOCs are presented on Figure 3.

Areas of Concern

The cumulative findings of the pre-BCP investigations and the RI performed at the Site have identified four (4) areas of concern (AOCs) remaining at the Site that warrant further consideration. The data discussed below is included in the RI Report, submitted under separate cover. The nature and extent of impacts for these areas have been defined and are summarized below:

AOC #1: Subsurface Soils Impacted with CVOCs

Based on laboratory analysis of subsurface soil samples collected, CVOCs are present in subsurface soils at concentrations exceeding Part 375-6.8(a) Unrestricted Use SCOs but below Part 375-6.8(b) Restricted Residential SCOs.

AOC #2: Groundwater Impacted with CVOCs

Based on the results of laboratory analysis of groundwater samples collected during the RI, CVOCs are present at the Site at concentrations exceeding Part 703 groundwater standards. The highest concentrations of CVOCs in groundwater were detected in the area between the building and the ramp to the basement.

AOC #3: Potential Vapor Intrusion Concern

Given the presence of CVOCs in soil and groundwater beneath the Site building the presence of sub slab vapors at concentrations requiring mitigation are assumed. IRMs performed at the Site included installation of an SSDS, which addresses any potential vapor intrusion concerns. The piping associated with the SSDS has been installed, however the fans have yet to be installed and the system is not yet active. Pursuant to the approved IRM Work Plan, upon activation performance testing will be conducted to ensure the effectiveness of the SSDS.

AOC #4: SVOCs in Subsurface Soil

Based on laboratory analysis of subsurface soil samples collected, SVOCs are present in subsurface soils at concentrations exceeding Part 375-6.8(b) Restricted Industrial SCOs in the vicinity of IW-3.

3.0 OBJECTIVE

The objective of this RAA & RWP is to evaluate remedial alternatives to address the AOCs presented above and select remedial actions to be implemented. As defined in NYSDEC DER-10 (Section 4.0), remedial alternatives will be evaluated based on the following criteria:

1.) Overall Protection of Public Health and the Environment: This criterion evaluates exposure and residual risks to human health and the environment during or subsequent to implementation of the alternative.

2.) Compliance with SCGs: This criterion evaluates whether the remedial alternative will ultimately result in compliance with SCGs, to the extent practicable.

3.) Long-Term Effectiveness and Permanence: This criterion evaluates if the remedy is effective in the long-term after implementation (e.g., potential rebound). In the event that residual impacts will remain as part of the alternative, then the risks and adequacy/reliability of the controls are also evaluated.

4.) Reduction of Toxicity, Mobility, or Volume with Treatment: This criterion evaluates the reduction of contaminant toxicity, mobility or volume as a result of the remedial alternative. In addition, the reversibility of the contaminant destruction or treatment is evaluated.

5.) Short-Term Effectives: This criterion evaluates if the remedial alternative protects the community, workers and the environment during implementation.

6.) Implementability: This criterion evaluates the remedial alternative based on its suitability, implementability at the specific site, and availability of services and materials that will be required.

7.) Cost: This criterion evaluates the capital, operation, maintenance, and monitoring costs for the remedial alternative. The estimated costs are presented on a present worth basis.

8.) Community Acceptance: A summary of the public participation program completed as part of the project. In addition, any public comments concerns and overall perception are addressed as part of the criteria.

[*Note: The public participation work completed to date included public notice of both the BCP Application and RI Work Plan. The public notice did not result in any comments from the public. As such, each alternative will be evaluated for community acceptance. In the event that any public comments are received, these will be addressed.*]

4.0 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific standards, criteria, and guidance (SCGs) established by NYSDEC and/or New York State Department of Health (NYSDOH).

Soil RAOs

The RAOs for soil used in this RAA & RAWP are:

- NYCRR Part 375-6.8(b) Remedial Program Soil Cleanup Objectives (RPSCOs) for the Protection of Public Health/Restricted Residential Use

Groundwater RAOs

The RAOs for groundwater used in this RAA & RAWP are:

- NYCRR Part 703 Groundwater Standards

5.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES

This section develops the remedial alternatives being considered for addressing the AOCs identified for the Site.

Alternative #1 – No Action

The no action alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative no remedial or monitoring activities would occur. No environmental easement would be recorded to run with the land including institutional or engineering controls to further manage residual contamination. This area would remain virtually as it is and change in use would not be limited except by existing land use controls such as zoning.

Alternative #2 – Unrestricted Use: BCP Cleanup Track 1

To meet the requirements of a Track 1 cleanup the following would be required for each AOC:

AOC #1: Subsurface Soils Impacted with CVOCs

Under this alternative, subsurface soils impacted with CVOCs above Unrestricted Use SCOs would be treated via in-situ chemical oxidation in conjunction with treatment of impacted groundwater in AOC#2. A solution of sodium or potassium permanganate would be injected into the subsurface with a direct push drill rig and high pressure injection pump to chemically destroy VOCs.

AOC #2: Groundwater Impacted with CVOCs

Under this alternative in-situ chemical oxidation would be utilized to treat CVOC impacts in groundwater. A solution of sodium or potassium permanganate would be injected into existing monitoring wells to chemically destroy VOCs. A groundwater monitoring program would be implemented to monitor VOC concentrations over time to verify the effectiveness of the treatment and additional injections would be performed as needed.

AOC #3: Potential Vapor Intrusion Concern

Under this alternative the sub slab depressurization system (SSDS) installed as an IRM will be activated to prevent vapor intrusion into the Site building. Pursuant to the approved IRM Work Plan, upon

activation performance testing will be conducted to ensure the effectiveness of the SSDS.

AOC #4: SVOCs in Subsurface Soil

Under this alternative, subsurface soils impacted with SVOCs above Unrestricted Use SCOs would be excavated and transported off-Site to a disposal facility. Confirmatory soil samples would be collected to verify the effectiveness of the remedial work and the area would be restored.

Alternative #3 – Restricted Residential Use with Limited Groundwater Treatment: BCP Cleanup Track 4

To meet the requirements of a Track 4 cleanup the following would be required for each AOC:

AOC #1: Subsurface Soils Impacted with CVOCs

Under this restricted use alternative the CVOC impacted soil would be addressed with a cover system consisting of asphalt pavement, concrete or a minimum 2 foot thick layer of clean imported material. In addition, institutional controls (e.g., an Environmental Easement) would be implemented and a Site Management Plan (SMP) would be developed to protect against exposure and control Site use.

AOC #2: Groundwater Impacted with CVOCs

Under this restricted use alternative in-situ chemical oxidation would be utilized to treat CVOC impacts in groundwater. A network of injection wells will be installed in the area of highest CVOC impacts (i.e., between the building and ramp to basement) and a solution of sodium or potassium permanganate would be injected to chemically destroy VOCs. In addition, permanganate would be injected into the three (3) bedrock monitoring wells installed along the northern property line to reduce migration of contaminants off-Site. A groundwater monitoring program would be implemented to monitor VOC concentrations over time to verify the effectiveness of the treatment and additional injections would be performed as needed.

AOC #3: Potential Vapor Intrusion Concern

Same as Alternative #2.

AOC #4: SVOCs in Subsurface Soils

Under this restricted use alternative the isolated area of SVOC impacted soil would be addressed with a cover system consisting of asphalt pavement, concrete or a minimum 2 foot thick layer of clean imported material. In addition, institutional controls (e.g., an Environmental Easement) would be implemented and a Site Management Plan (SMP) would be developed to protect against exposure and control Site use.

6.0 DETAILED EVALUATION OF ALTERNATIVES

Alternative #1 – No Action

Description

Under this alternative the impacted soil in AOCs #1 and 4 would remain as is and future Site use and development would not be limited. In addition, remedial and monitoring activities as well as placement of institutional controls at the Site would not be implemented, with the exception of a groundwater use restriction.

Assessment

This alternative may not be protective of human health or the environment. Soil samples collected from AOCs #1 and 4 were found to exceed NYSDEC Part 375 Soil Cleanup Objectives and in the event that this area is disturbed in the future with no action, there is a potential for human exposure to the impacts and potentially the environment.

With the exception of possible natural attenuation of VOCs, this alternative would not result in the reduction of contaminant toxicity, mobility or volume and therefore would not be in compliance with chemical-specific RAOs.

There would be no increased short-term risks associated with the no action alternative since remedial activities are not implemented and there does not appear to be a current exposure pathway with these impacts; however, this alternative may not be effective in the long-term and is not a permanent remedy.

Based on the findings of the studies performed to date it is anticipated that this alternative would not be acceptable to the community.

Of the alternatives being considered, the no action alternative is not effective for the long-term and does not reduce toxicity, mobility, or volume of contaminants. The estimated cost for this alternative is summarized below:

Estimated Cost of No Action ..... $

Alternative #2 – Unrestricted Use: BCP Cleanup Track 1

Description

Under this alternative, subsurface soils impacted with CVOCs above Unrestricted Use SCOs would be treated via in-situ chemical oxidation in conjunction with treatment of impacted groundwater in AOC#2. A solution of sodium or potassium permanganate would be injected into the subsurface with a direct push drill rig and high pressure injection pump to chemically destroy VOCs. Prior to implementing the full scale injection a pilot test would be performed to determine injection rates and quantities of permanganate solution injected in each point. It is anticipated that an approximately 10% permanganate solution would be injected in the areas of highest concentration and a 5% solution in areas of lower concentration. Subsequent to injection soil borings would be advanced in the treatment area to collect soil samples for laboratory analysis to evaluate the effectiveness of the treatment and determine the need for additional injection(s).

The SSDS installed as an IRM will be activated and performance testing will be conducted to ensure the effectiveness of the system.

Groundwater would be treated via in-situ chemical oxidation as described above. In addition to the injections required to treat soil in the vicinity of the Site building and ramp to the basement, additional injections would be performed throughout the groundwater plume to reduce CVOC concentrations to levels below groundwater standards.

The impacted soil in AOC #4 would be removed and disposed of off-site in accordance with applicable regulations. For the purpose of this evaluation, it is assumed that a total of approximately 100 cubic yards of soil would be removed and disposed from AOC #4. Subsequent to collection of confirmatory soil samples the excavation would be backfilled.

Assessment

This alternative should be protective of human health and the environment. Soil with contaminant concentrations above unrestricted use SCOs on-site would be chemically treated or removed.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the soil. Therefore, the area of soil removal would be in compliance with chemical-specific SCGs.

This alternative would increase short-term risks for the workers implementing the alternative. However, this alternative would be effective in the long-term. The soil removal and disposal, soil treatment and groundwater treatment alternatives would be a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community.

Of the alternatives being considered, the soil treatment alternative for AOC #1 and groundwater treatment alternative for AOC #2 may be feasible. The injection of chemical oxidants into the subsurface, while feasible, would result in disruptions to residents of the newly renovated building and advancement of injection equipment would cause damage to the parking lot. In addition, a pilot test is necessary to verify that only one round of injections would be necessary and determine the number of injection points and amount necessary for proper soil treatment. Therefore, the cost estimate provided below may require adjustment following pilot testing.

The soil removal alternative for AOC #4 is not feasible, given the close proximity of the soil to a water main, sidewalk and the concrete ramp to the basement. While technically possible, substantial costs would be incurred to secure or replace the section of water main adjacent to the excavation and replace sidewalks, pavement and the ramp to the basement.

The cost for this alternative is summarized below:

Estimated Cost of Unrestricted Use: BCP Track 1 Cleanup $373,375

Alternative #3 – Restricted Residential Use with Limited Groundwater Treatment: BCP Cleanup Track 4

Description

Under this alternative the impacted soil in AOC #1 and AOC #4 would not be removed, rather, impacted soil would be addressed with a cover system consisting of asphalt pavement, concrete or a minimum 2 foot thick layer of clean imported material. In addition, institutional controls (e.g., an Environmental Easement) would be implemented and a Site Management Plan (SMP) would be developed to protect against exposure and control Site use.

A network of injection wells will be installed in the area of highest CVOC impacts (i.e., between the building and ramp to basement) and a solution of sodium or potassium permanganate would be injected to chemically destroy VOCs. In addition, permanganate would be injected into the three (3) bedrock monitoring wells installed along the northern property line to reduce migration of contaminants off-Site. A groundwater monitoring program would be implemented to monitor VOC concentrations over time to verify the effectiveness of the treatment and additional injections would be performed as needed. The presence of the network of injection wells will facilitate additional injections should the groundwater monitoring program indicate they are warranted.

The SSDS installed as an IRM will be activated and performance testing will be conducted to ensure the effectiveness of the system.

Assessment

This alternative should be protective of human health and the environment. Soil with contaminant concentrations above Restricted Residential Use SCOs on-site would be managed with a cover system.

This alternative would result in the reduction of the toxicity, mobility, and volume of CVOCs in the soil. However, SVOCs would remain at concentrations above RAOs.

This alternative would increase short-term risks for the workers implementing the alternative. However, this alternative would be effective in the long-term. With installation of a cover system, activation of the SSDS and implementation of an SMP, this is a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community.

Of the alternatives being considered, the cover system alternative for AOCs #1 and #4 would be feasible. The combination of the Site building, sidewalks and concrete aprons associated with the Site development would result in the majority of the Site being covered with impervious surfaces. Remaining areas (e.g., landscaped areas) would be covered with 2 feet of clean soil. The groundwater treatment alternative for AOC #2 may be feasible as well. While the injection of chemical oxidants into the subsurface would result in some disruptions to residents of the newly renovated building, the network of injection wells proposed would be installed in a grass area prior to completion of Site work, thereby limiting these disruptions. The presence of the network of injection wells would ensure that additional injections could be performed in the future should groundwater monitoring determine it is necessary.

The cost for this alternative is summarized below:

Estimated Cost of Restricted Residential Use: BCP Track 4 Cleanup $220,375

7.0 COMPARATIVE EVALUATION OF ALTERNATIVES AND RECOMMENDED ACTIONS

This section of the report compares the remedial alternatives proposed and presents the recommended action.

1. **Alternative #1 – No Action** The no action alternative may not be protective of human health and the environment and would likely not be acceptable to the community. This alternative is not a permanent remedy and with neither removal or institutional controls the potential exists that future ground intrusive activities at the Site will result in exposure to impacted soil and groundwater.

2. **Alternative #2 – Unrestricted Use: BCP Cleanup Track 1** The Unrestricted Use alternative should be protective of human health and the environment and would likely be acceptable to the community. This alternative would be a long-term and permanent remedy. However, the estimated costs do not justify the benefits of Site wide in-situ chemical oxidation or soil removal in AOC #4. The cover system over most of the Site greatly limits exposure to Site contaminants. This alternative is not considered practicable.
3. **Restricted Residential Use with Limited Groundwater Treatment: BCP Cleanup Track 4** The Restricted Use, Residential alternative with limited groundwater treatment would be protective of human health and the environment and would likely be acceptable to the community. Subsurface soil containing concentrations above RAOs would be covered to prevent exposure and the SMP and institutional controls would manage the risk realized during future ground intrusive work at the Site. Groundwater monitoring will aid in management of the risk. Activation of the SSDS will remove the potential for vapor intrusion to the Site building.

The recommended remedial action is Alternative #3 – Restricted Use, Residential with Limited Groundwater Treatment: BCP Cleanup Track 4.

8.0 SUMMARY OF RECOMMENDED FINAL REMEDIAL ACTIONS

Based on the above recommendations, this section summarizes the overall final remedial strategy for the Site.

Subsequent to NYSDEC approval and completion of construction of the cover system, a Final Engineering Report would be submitted with an SMP.

The estimated cost to complete the work are shown below.

Area of Concern	Recommended Action	Estimated Cost
AOC #1 (Subsurface soils impacted with CVOCs)	Installation of cover system*, SMP/Institutional Controls	$2,000 (Not including SMP/Easement)
AOC #2 (Groundwater impacted with CVOCs)	Limited In-Situ Chemical Oxidation, Groundwater Monitoring	$110,000
AOC #3 (Vapor Intrusion Concern)	Activation of SSDS, SMP/Institutional Controls	$2,000 (Not including SMP/Easement)
AOC #4 (Subsurface soils impacted with SVOCs)	Installation of cover system*, SMP/Institutional Controls	$2,000 (Not including SMP/Easement)
Site wide requirements for completion of BCP (costs include estimated regulatory fees and contingencies)	FER, SMP, Environmental Easement	$104,375
	Total	**$220,375**

*Installation of the coverer system is already included in plans for the redevelopment of the Site, as such only costs for monitoring the installation and ensuring compliance with BCP requirements are presented here.

9.0 REMEDIAL ACTION WORK PLAN

This section presents the Remedial Action Work Plan (RAWP) for the recommended actions for the Site. This RAWP has been developed in accordance with Brownfield Cleanup Program Guide dated May 2004 and NYSDEC DER-10 dated May 2010.

9.1 Installation of Cover System

A cover system will be installed to address the CVOC impacts in soil in AOC #1 and the limited SVOC impacts in AOC #4. The cover system will consist of asphalt pavement, sidewalks and concrete aprons. Areas not covered by impervious surfaces (e.g., landscape areas) will be covered with a minimum 2 foot thick layer of clean imported material.

For each source of backfill that is imported to the Site, laboratory analysis will be completed in accordance with Table 5.4(e)10 of DER-10. The results for each new source of fill will meet the values provided in Appendix 5 of DER-10 for Restricted Residential use and will receive approval by the NYSDEC. Crushed stone meeting the criteria set forth in Section 5.4(e)5.i. of DER-10 will not require laboratory testing.

9.2 In-Situ Chemical Oxidation

9.2.1 Installation of Injection Wells

Six injection wells will be installed in the area between the building and the concrete ramp to the basement as detailed on Figure 4. Each injection well will be constructed of two inch Sch 40 PVC with

0.020 inch machine slotted screens. Each well will be installed to a total of five (5) feet into bedrock to straddle the bedrock/overburden contact. A quartz sand pack will be placed around the screen section of each well followed by a two foot bentonite seal. The remainder of the annulus will be grouted to the surface. Each injection well will be piped to a valve box to facilitate injection at a later date.

9.2.2 Chemical Injection

The In-Situ Chemical Oxidation (ISCO) process includes the injection of a chemical oxidant into the subsurface to chemically oxidize contaminants of concern (i.e., TCE) and enhance degradation, as shown in the chemical reactions depicted below:

Trichloroethene:

$$2NaMnO_4 + C_2HCl_3 \rightarrow 2CO_2 + 2MnO_2 + 2Na^+ + 3Cl^- + H^+$$

Dichloroethene:

$$8NaMnO_4 + 3C_2H_2Cl_2 \rightarrow 6CO_2 + 8MnO_2 + 8Na^+ + 6Cl^- + 2H_2O + 2OH^-$$

Vinyl Chloride:

$$10NaMnO_4 + 3C_2H_2Cl_2 \rightarrow 6CO_2 + 10MnO_2 + 10Na^+ + 3Cl^- + H_2O + 7OH^+$$

To facilitate the ISCO process in AOC #2, a total of approximately 13,200 pounds (lbs) sodium permanganate ("RemOx® L") will be pumped at a 10% concentration, evenly distributed into the six injection wells. In addition, the solution will be injected into the three bedrock monitoring wells on the property line and wells GP-34 and GP-36. The volume and injection concentrations were estimated by the chemical vendor (Carus Corporation) using analytical data (including "Permanganate Natural Oxidant Demand") and the known geology of the Site with the vendor's proprietary algorithm for estimating permanganate mass necessary to degrade the contaminants and to overcome the natural oxidant demand within the soil. A copy of the Carus Corporation ("Carus") calculation sheet and MSDS for the sodium permanganate ("RemOx® L") are included in Appendix 1.

The solution will be provided in 55-gallon drums of solution containing approximately 40% RemOx® L: A total of approximately 1,200-gallons of this solution (containing approximately 13,200 lbs of RemOx® L) is recommended by Carus. This solution will be mixed with water to further dilute the RemOx® L to a concentration of approximately 10%. It should be noted that the final dilution percentage may be decreased based on field conditions. Approximately 4,600-gallons of water are estimated to be required to dilute the 40% solution to the recommended 10%. The 40% solution will be pumped into one (1) 1,000-gallon plastic "batch tank" or polyethylene drums for mixing with water. When properly diluted, the 10% solution will be pumped via hoses to each injection well. Drums holding the RemOx® L and the batch tank will be kept in a secondary containment berm capable of holding at least 110% the volume of the drums and batch tank.

9.2.3 Regulatory Requirements for Injection

In order to comply with the USEPA's underground injection control (UIC) program, a letter of notification and an injection well inventory form will be submitted to the USEPA's UIC division at least 30-days prior to injection.

A letter of notification will also be submitted to the City of Rochester Fire Department at least one week prior to injection.

9.3 Health and Safety Plan and Community Air Monitoring Plan

The remedial work will be conducted under the existing Site specific Health and Safety Plan (HASP) for the Site, which was implemented as part of the RI and IRM work. In addition, the Site specific Community Air Monitoring Plan (CAMP) will also be implemented during all remedial work at the Site.

In addition to the typical safety activities outlined in the HASP and CAMP, due to the potential hazards associated with the transport, storage and usage of sodium permanganate, the following additional safety activities will be completed prior to and during injection.

- RemOx® L is classified by the Hazardous Materials Transportation Board as an oxidizer and is shipped as Freight Class 70. Containers holding the solution will not be stored on-Site when not in use.
- Sandbags will be utilized to create small berms around each point at which the solution is actively being introduced. This will be completed to prohibit surface migration of any material inadvertently released during the introduction of the solution to the subsurface infrastructure.
- The 40% RemOx® L solution will be diluted in water in 1,000-gallon batches. The 40% solution will be pumped as needed from the drums to one (1) 1,000-gallon plastic tank or polyethylene drums to be utilized for dilution and pumped into the injection wells. The tank will have quantity indicators and the volume of solution fed into the infrastructure will be monitored and recorded. The batch tank will also be kept within the secondary containment berm.
- Field personnel actively involved with the dilution and/or injection of the treatment chemical will be required to wear personal protective equipment (PPE) including chemical-resistant suits, gloves and boots and face shields. All other field personnel are required to wear at least Class D PPE.
- The secondary containment berm in which the RemOx® L solution will be held will be able to hold a volume at least 110% of the volume of the largest container with solution. The berm anticipated to be used at the Site will be a Spillguard™ Portable Containment Berm. This Spillguard is a one-piece, heat-welded berm with permanently attached support legs and reinforced seams. The material used to construct the berm is a heavy duty 35-mil polyurethane coated fabric. The berm material is chemically resistant to the diluted sodium permanganate solution. Specifications for the berm are included in Appendix 4. A sump will be constructed within the berm to pool stormwater which may accumulate in the berm. Any significant stormwater which accumulates in the sump will be pumped to the batch tank. The secondary containment berm will be inspected at least once daily.
- The work area will be cordoned off using chain link fence to keep bystanders away. The fence will be locked during non-working hours for security purposes. All field personnel will be notified whenever the solution is in use.
- A neutralizing agent (e.g., sodium thiosulfate) will be made readily available in the event that a spill of the sodium permanganate occurs. However, the agent will not be kept in the same containment berm as the permanganate. The secondary containment will be similar in construction to that in which the sodium permanganate will be stored. The neutralizing agent will only be applied in a diluted form. Prior to applying the neutralizing agent any release of

sodium permanganate will first be heavily diluted with water. The manufacturer recommends the permanganate solution be diluted to 6% or less permanganate prior to applying any neutralizing agent.

- Additional safety information obtained from Carus Corporation can be found in Appendix 1.

9.4 Final Engineering Report

A Final Engineering Report (FER) documenting the active remedial work conducted will be developed and submitted to NYSDEC subsequent to completing the soil removal work. The FER will include the IRM Construction Completion Report, the laboratory data, DUSRs, and other monitoring data. The FER will include as an Appendix the SMP for managing the Site (see below).

9.5 Long Term Groundwater Monitoring

Groundwater samples will be collected from the following wells: IW-2, IW-3, IW-4, IW-5, BW-02, BW-03 and BW-04. It is anticipated that groundwater samples will be collected quarterly for a period of approximately two (2) years and annually for a period of approximately five (5) years after that.

Samples will be collected using passive diffusion bags and will be analyzed for TCL VOCs by USEPA Method 8260. Sodium permanganate does not pass through the passive diffusion membranes, nor does it degrade it. Subsequent to receipt of validated data a groundwater monitoring report will be prepared summarizing all sampling activities and submitted to NYSDEC.

9.6 Site Management Plan/Institutional Controls

The remedy for the Site assumes that a SMP will be utilized for long-term management of the residual impacts at the Site. A SMP coupled with Institutional Controls will be developed for the entire Site, including all AOCs not part of the remedy. The intent of this document will be to manage any soil impacts remaining at the Site at levels above the Part 375-6 Unrestricted Use SCOs and to restrict groundwater use at the Site (i.e., AOC #3). The SMP will include the following:

- Identify specific areas of residual impacted soil and groundwater that remain on-site (based on the RI and remedial data) and illustrate these areas on mapping.
- Identify proper handling, characterization, transportation and disposal requirements of the various impacted material should such material be encountered during any site redevelopment or future construction activities (e.g., underground utility work).
- Indicate that groundwater cannot be used as a source of drinking water or extracted for any reason without prior approval from regulatory agencies.
- Indicate that additional injection of oxidant or other amendments will be performed in the event that contaminants rebound significantly.
- Indicate that these measures are included in an Environmental Easement that is recorded with the Monroe County Clerk.
- Indicate that a certification be submitted to NYSDEC every three years certifying that the requirements of the SMP were adhered to.
- Record an Environmental Easement with the Monroe County Clerk that indicates the above requirements

The SMP and Environmental Easement to be recorded with the Clerk will be provided to NYSDEC prior to finalizing/recording these documents.

J:\URBAN LEAGUE OF ROCHESTER ECONOMIC DEVELOPMENT\214539 - MICHELSON BCP SITE RI & REMEDIATION\REPORTS\RAA-RAWP\RPT_RAA-RAWP_C828189_FORMER MICHELSEN FURNATURE CO. SITE_FINAL_SEPTEMBER2015.DOCX

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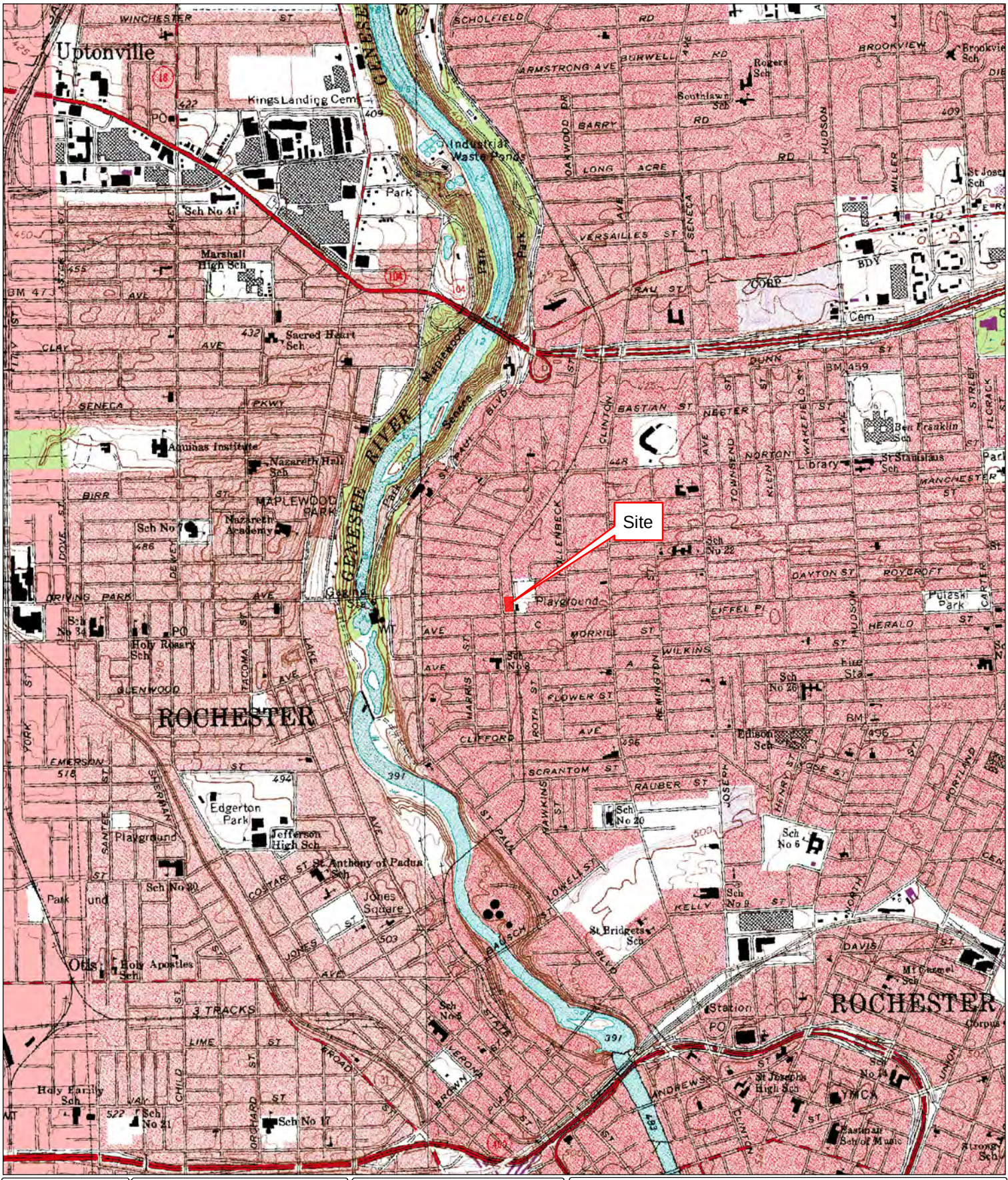
FIGURES



PROJECT/DRAWING NUMBER

214539

FIGURE 1

DRAWING TITLE

SITE LOCATION MAP

ISSUED FOR: DRAFT

DESIGNED BY: DKE

DRAWN BY: DKE

REVIEWED BY:

DATE: 03/19/2015

PROJECT/CLIENT

Remedial Alternatives Analysis & Remedial Action Work Plan

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Ave.
Rochester, New York

Client: Urban League of Rochester Economic Development Corp.

LABELLA Associates, D.P.C.
300 STATE STREET
ROCHESTER, NY 14614
P: (585) 454-6110
F: (585)454-3066
www.labellapc.com

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

N W E S

Path: J:\Urban League of Rochester Economic Development\214539 - Michelson BCP Site RI & Remediation\Drawings\RAA-RAWP\Fig. 1 - Site location.mxd

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ROCHESTER, NY 14614
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Remedial Alternatives Analysis
&
Remedial Action Work Plan

Former Michelsen
Furniture Co. Site

182 Avenue D
&
374 Conkey Avenue
Rochester, New York

Urban League of Rochester
Economic Develoment
Corporation

Title:

Location of Soil Samples
Exceeding Part 375-6.8 SCOs

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1 inch = 25 feet

214539

Figure 2

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Remedial Alternatives Analysis
&
Remedial Action Work Plan

Former Michelsen
Furniture Co. Site

182 Avenue D
&
374 Conkey Avenue
Rochester, New York

Urban League of Rochester
Economic Develoment
Corporation

Title:

Location of Groundwater
VOC Samples Exceeding
Part 703 Groundwater
Standards

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1 inch = 25 feet

214539

Figure 3

Legend

- Proposed Injection Wells
- SiteBoundary

Notes:
1. Site Boundary determined using 2011 City of Rochester Tax Parcel data.
2. 2009 Aerial photograph obtained from NYS GIS Clearinghouse.

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Remedial Alternatives Analysis
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Economic Develoment
Corporation

Title:

Proposed Injection Wells

N W E S

10 0 10

1 inch = 25 feet

214539

Figure 4

Path: J:\Urban League of Rochester Economic Development\214539 - Michelson BCP Site RI & Remediation\Drawings\RAA-RAWP\Fig 4 - injection wells.mxd

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TABLES

TABLE 1

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Avenue
Rochester, New York

ESTIMATE OF COST FOR REMEDIAL ALTERNATIVES

Alternative	Subcontractor Cost	Laboratory Analytical & Equipment Cost	Professional Services Cost	Estimated Regulatory Fees	Contingency	Estimated Cost
No Action	$0	$0	$0	$0	$0	$0
Unrestricted Use: BCP Track 1 Cleanup	$173,500	$12,000	$64,500	$48,375	$75,000	$373,375
Restricted Residential Use with Limited Groundwater Treatment: BCP Track 4 Cleanup	$60,000	$12,000	$60,500	$45,375	$44,000	$220,375

TABLE 2

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Avenue
Rochester, New York

Unrestricted Use, BCP Track 1 Alternative

Sub-contractor Costs		
Permits/Inspections	$	2,000
Soil Excavation, AOCs 4 (est. 100 yds^3)	$	2,000
Soil Transportation and Disposal, Non Haz. (est. 150 tons)	$	6,000
Supply/Install Backfill (est. 150 tons)	$	3,000
Pilot Study	$	5,000
Sodium Permanganate (est. 70,000 lbs @ $1.25/lb.)	$	87,500
Permanganate Injection	$	65,000
Follow Up Soil Borings	$	3,000
Sub-contractor Costs Subtotal	**$**	**173,500**
Laboratory & Equipment Costs		
Soil Oxidant Demand Samples	$	1,500
Low-flow Sampling Equipment (8 events @ $500)	$	4,000
Quarterly Groundwater Samples (estimate 2 years)	$	5,500
Confirmatory Soil Samples (1)	$	1,000
Laboratory & Equipment Costs Subtotal	**$**	**12,000**
Professional Costs		
Work Plan	$	5,000
Oversight and Sampling ($75/hr x 350 hours)	$	26,250
Quarterly Sampling (initial plus estimate 2 years, total 150 hours x $75/hr)	$	11,250
Groundwater Monitoring Reports (8 @ $1,500)	$	12,000
Final Engineering Report	$	5,000
Environmental Easement	$	5,000
Professional Costs Subtotal	**$**	**64,500**
Estimated Regulatory Fees (75% of Professional Cost)	$	48,375
25% Contingency	*$*	*75,000*
Total Estimated Costs	**$**	**373,375**

Notes:

(1) Assumes analysis for United States Environmental Protection Agency (USEPA) Target Compound List (TCL) & New York State Department of Environmental Conservation (NYSDEC) Commissioner's Policy 51 (CP-51)-list VOCs via Method 8260 and SVOCs via Method 8270C

TABLE 3

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Avenue
Rochester, New York

Restricted Residential Use with Limited Groundwater Treatment, BCP Track 4 Alternative

Sub-contractor Costs		
Drilling for Injection Wells	$	7,500
Piping & Material Installation	$	2,500
Potassium Permanganate (est. 32,000 lbs @ $1.25/lb.)	$	40,000
Permanganate Injection	$	10,000
Sub-contractor Costs Subtotal	**$**	**60,000**
Laboratory & Equipment Costs		
Low-flow Sampling Equipment (12 events @ $500)	$	6,000
Groundwater Samples (estimate 5 years*)	$	4,500
Laboratory Costs Subtotal	**$**	**10,500**
Professional Costs		
Work Plan	$	5,000
Oversight and Sampling ($75/hr x 140 hours)	$	10,500
Groundwater Sampling (estimate 5 years*, total 200 hours x $75/hr)	$	15,000
Groundwater Monitoring Reports (10 @ $1,500)	$	15,000
Final Engineering Report	$	5,000
Environmental Easement	$	5,000
Environmental Management Plan (including Health and Safety Plan)	$	5,000
Total Professional Costs	**$**	**60,500**
Estimated Regulatory Fees (75% of Professional Cost)	$	45,375
25% Contingency	*$*	*44,000*
Total Estimated Costs		**$220,375**

*****Anticipate quarterly sampling for a period of approximately 2 years, followed by annual sampling for three additional years.

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APPENDIX 1

Permanganate Data

CRT
Carus Remediation Technologies

RemOx® S and RemOx® L
ISCO Reagents
Estimation Spreadsheet

Input data into box with black font

Site Name: Michelsen Site
Date:

	Estimates	Units
Treatment Area Volume		
Length	**65**	ft
Width	**40**	ft
Area	2,600	sq ft
Thickness	**10**	ft
Total Volume	963	cu yd
Soil Characteristics/Analysis		
Porosity	**35**	%
Total Plume Pore Volume	68,073	gal
Avg Contaminant Conc	**3**	ppm
Mass of Contaminant	1.70	lb
PNOD	**4**	g/kg
Effective PNOD	**20**	%
Effective PNOD Calculated	0.800	
PNOD Oxidant Demand	2,288.00	lb
Avg Stoichiometric Demand	**2.4**	lb/lb
Contaminant Oxidant Demand	4.09	lb
Theoretical Oxidant Demand	2,292.09	lb
Confidence Factor	**2.5**	
Calculated Oxidant Demand	5,730.23	

	Estimates	Units
Injection Volume for RemOx S		
Injection Concentration	**1.0%**	%
Total Volume of Injection Fluid	68,708	gal
Pore Volume Replaced	100.93	%
Amount of RemOx S Estimated:	**5,730**	**pounds**
Injection Volume for RemOx L		
Injection Concentration	**10.0%**	%
Calculated Specific Gravity	1.06	g/ml
Total Volume of Injection Fluid	5,819	gal
Pore Volume Replaced	8.55	%
Amount of RemOx L Estimated:	**12,864**	**pounds**
	1,125	**gallons**

SAFETY DATA SHEET

1. Identification

Product identifier	**RemOx® L ISCO Reagent**
Other means of identification	Not available.
Recommended use	Liquid oxidant recommended for applications that require a concentrated permanganate solution.
Recommended restrictions	Use in accordance with supplier's recommendations.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer/Supplier	CARUS CORPORATION
Address	315 Fifth Street, Peru, IL 61354, USA
Telephone	815 223-1500 - All other non-emergency inquiries about the product should be directed to the company
E-mail	salesmkt@caruscorporation.com
Website	www.caruscorporation.com
Contact person	Dr. Chithambarathanu Pillai
Emergency Telephone	For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at CHEMTREC®, USA: 001 (800) 424-9300 CHEMTREC®, Mexico (Toll-Free - must be dialed from within country): 01-800-681-9531 CHEMTREC®, Other countries: 001 (703) 527-3887

2. Hazard(s) identification

Physical hazards	Oxidizing liquids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	May intensify fire; oxidizer. Harmful if swallowed. Causes severe skin burns and eye damage. May cause respiratory irritation.

Precautionary statement

Prevention	Keep away from heat. Take any precaution to avoid mixing with combustibles. Keep/Store away from clothing//combustible materials. Use only outdoors or in a well-ventilated area. Do not breathe mist or vapor. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.
Response	In case of fire: Use water for extinction. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If swallowed: Rinse mouth. Do NOT induce vomiting. If inhaled: Remove person to fresh air and keep comfortable for breathing.
Storage	Store locked up. Store in a well-ventilated place. Keep container tightly closed.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1

Supplemental information

Hazard symbol

Hazard statement Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Avoid release to the environment.

Response Collect spillage.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Sodium permanganate	10101-50-5	36 - 40

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Move to fresh air. For breathing difficulties, oxygen may be necessary. Call a physician or poison control center immediately. Get medical attention immediately. Call a physician if symptoms develop or persist. Get medical attention if symptoms persist.

Skin contact Take off immediately all contaminated clothing. (Caution: Solution may ignite certain textiles). Immediately flush skin with plenty of water. Get medical attention immediately. Wash contaminated clothing before reuse.

Contact with skin may leave a brown stain of insoluble manganese dioxide. This can be easily removed by washing with a mixture of equal volume of household vinegar and 3% hydrogen peroxide, followed by washing with soap and water.

Eye contact Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyelids wide apart. Continue rinsing. Get medical attention immediately.

Ingestion Immediately rinse mouth and drink plenty of water. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention immediately.

Before using, read Material Safety Data Sheet (MSDS) for this product. Rinse container at least three times to an absence of pink color before disposing.

Most important symptoms/effects, acute and delayed Contact with this material will cause burns to the skin, eyes and mucous membranes. Corrosive effects. Irritation of eyes and mucous membranes. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause temporary blindness and severe eye damage. Permanent eye damage including blindness could result. Show this safety data sheet to the doctor in attendance.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen. Decomposition products are alkaline. Brown stain is insoluble manganese dioxide.

General information In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. For personal protection, see Section 8 of the MSDS. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Flood with water from a distance, water spray or fog.

Unsuitable extinguishing media The following extinguishing media are ineffective: Dry chemical. Foam. Carbon dioxide (CO2). Halogenated materials.

Specific hazards arising from the chemical May intensify fire; oxidizer. May ignite combustibles (wood, paper, oil, clothing, etc.). Contact with incompatible materials or heat (135 ºC / 275 ºF) could result in violent exothermic chemical reaction. Oxidizing agent, may cause spontaneous ignition of combustible materials. By heating and fire, corrosive vapors/gases may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions

Move container from fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Dike fire control water for later disposal. Water runoff can cause environmental damage.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep upwind. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid inhalation of vapors and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up

Keep combustibles (wood, paper, oil, etc.) away from spilled material. Should not be released into the environment. This product is miscible in water.

Large Spills: Stop leak if possible without any risk. Dike the spilled material, where this is possible. Proceed with either of the following two options depending upon the size of the spill and the availability of the neutralizing agents:

Option # 1: Dilute to approximately 6% with water, and then reduce with sodium thiosulfate, a bisulfite or ferrous salt solution. The bisulfite or ferrous salt may require some dilute sulfuric acid (10% w/w) to promote reduction. Neutralize with sodium carbonate to neutral pH, if acid was used. Decant or filter and deposit sludge in approved landfill. Where permitted, the sludge may be drained into sewer with large quantities of water.

Option # 2: Absorb with inert media like diatomaceous earth or inert floor dry, collect into a drum and dispose of properly. Do not use saw dust or other incompatible media. Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to permanganates.

To clean contaminated floors, flush with abundant quantities of water into sewer, if permitted by federal, state, and local regulations. If not, collect water and treat as described above. Cover with reducing agent (e.g. sodium bisulphite/thiosulphate or a ferrous salt plus 2M H_2SO_4). Transfer to container with water and neutralize with soda ash. Otherwise, absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Do not use sawdust or other combustible material. Following product recovery, flush area with water. Prevent product from entering drains.

Small Spills: Cover with reducing agent (e.g. sodium bisulphite/thiosulphate or a ferrous salt plus 2M H_2SO_4). Transfer to container with water and neutralize with soda ash. Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. Never return spills in original containers for re-use.

Environmental precautions

Do not allow to enter drains, sewers or watercourses. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling

Take any precaution to avoid mixing with combustibles. Keep away from clothing and other combustible materials. Do not get this material in your eyes, on your skin, or on your clothing. Do not breathe mist or vapor. If clothing becomes contaminated, remove and wash off immediately. Spontaneous ignition may occur in contact with cloth or paper. When using, do not eat, drink or smoke. Good personal hygiene is necessary. Wash hands and contaminated areas with water and soap before leaving the work site. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store locked up. Keep container tightly closed and in a well-ventilated place. Store in a cool, dry place. Store away from incompatible materials (See Section 10). Follow applicable local/national/international recommendations on storage of oxidizers. Store in accordance with NFPA 430 requirements for Class II oxidizers.

8. Exposure controls/personal protection

Occupational exposure limits

No exposure limits noted for ingredient(s).

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sodium permanganate (CAS 10101-50-5)	Ceiling	5 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Sodium permanganate (CAS 10101-50-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

US NIOSH Pocket Guide to Chemical Hazards: Recommended exposure limit (REL)

Components	Type	Value	Form
Sodium permanganate (CAS 10101-50-5)	TWA	1 mg/m3	Fume.

US NIOSH Pocket Guide to Chemical Hazards: Short Term Exposure Limit (STEL)

Components	Type	Value	Form
Sodium permanganate (CAS 10101-50-5)	STEL	3 mg/m3	Fume.

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines Follow standard monitoring procedures.

Appropriate engineering controls Provide adequate general and local exhaust ventilation. An eye wash and safety shower must be available in the immediate work area.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). Wear face shield if there is risk of splashes.

Skin protection

Hand protection Wear chemical-resistant, impervious gloves. Use protective gloves made of: Rubber or plastic. Suitable gloves can be recommended by the glove supplier.

Other Wear appropriate chemical resistant clothing. Rubber or plastic apron.

Respiratory protection In case of inadequate ventilation or risk of inhalation of vapors, use suitable respiratory equipment. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA 29 CFR 1910.134.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using, do not eat, drink or smoke. Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance Dark purple liquid.

Physical state Liquid.

Form Aqueous solution.

Color Dark purple.

Odor Odorless.

Odor threshold Not available.

pH 5 - 8

Melting point/freezing point < 24.8 °F (< -4 °C)

Initial boiling point and boiling range > 213.8 °F (> 101 °C)

Flash point Does not flash.

Evaporation rate As water.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - upper (%) Not applicable.

Vapor pressure 760 mm Hg (105 °C)

Vapor density Not available.

Relative density 1.37 - 1.4 (20 °C) (Water = 1)

Solubility(ies) Miscible with water.

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature Not available.

Decomposition temperature Not available.

Viscosity Not available.

Other information

Explosive properties	Not explosive. Can explode in contact with sulfuric acid, peroxides and metal powders.
Oxidizing properties	Strong oxidizing agent.

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions.
Possibility of hazardous reactions	Contact with combustible material may cause fire. Can explode in contact with sulfuric acid, peroxides and metal powders.
Conditions to avoid	Contact with incompatible materials or heat (135 °C / 275 °F) could result in violent exothermic chemical reaction.
Incompatible materials	Acids. Peroxides. Reducing agents. Combustible material. Metal powders.
Hazardous decomposition products	By heating and fire, corrosive vapors/gases may be formed. Contact with hydrochloric acid liberates chlorine gas.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Causes digestive tract burns. Harmful if swallowed. Ingestion causes burns of the upper digestive and respiratory tracts.
Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Symptoms related to the physical, chemical and toxicological characteristics	Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Causes severe skin burns and eye damage. Causes burns. Harmful if swallowed. Health injuries are not known or expected under normal use. Harmful if swallowed.

Components	Species	Test Results
Potassium permanganate (CAS 7722-64-7)		
Acute		
Dermal		
LD50	Rat	2000 mg/kg
Oral		
LD50	Rat	2000 mg/kg

Toxicity data are not available for sodium permanganate. Toxicity is expected to be similar to that of potassium permanganate.

Skin corrosion/irritation	Causes severe skin burns.
Serious eye damage/eye irritation	Causes serious eye damage.
Respiratory sensitization	Not classified.
Skin sensitization	Not classified.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Not classified.
Specific target organ toxicity - single exposure	May cause irritation of respiratory tract.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not classified.
Further information	Chronic effects are not expected when this product is used as intended. Prolonged exposure, usually over many years, to manganese oxide fume/dust can lead to chronic manganese poisoning, chiefly affecting the central nervous system.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Potassium permanganate (CAS 7722-64-7)			
Aquatic			
Fish	LC50	Bluegill (Lepomis macrochirus)	2.7 mg/l, 96 hours, static
			2.3 mg/l, 96 hours, flow through
			2.3 mg/l, 96 hours
			1.8 - 5.6 mg/l
		Carp (Cyprinus carpio)	3.16 - 3.77 mg/l, 96 hours
			2.97 - 3.11 mg/l, 96 hours
		Goldfish (Carassius auratus)	3.3 - 3.93 mg/l, 96 hours, static
		Milkfish, salmon-herring (Chanos chanos)	> 1.4 mg/l, 96 hours
		Rainbow trout (Oncorhynchus mykiss)	1.8 mg/l, 96 hours
			1.08 - 1.38 mg/l, 96 hours
			0.77 - 1.27 mg/l, 96 hours
		Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.275 - 0.339 mg/l, 96 hours

Toxicity data are not available for sodium permanganate. Toxicity is expected to be similar to that of potassium permanganate.

Persistence and degradability Expected to be readily converted by oxidizable materials to insoluble manganese oxide.

Bioaccumulative potential Potential to bioaccumulate is low.

Mobility in soil The product is miscible with water. May spread in water systems.

Mobility in general The product is miscible with water. May spread in water systems.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Rinse container at least three times to an absence of pink color before disposing.

Hazardous waste code D001: Ignitable waste
The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Do not allow this material to drain into sewers/water supplies. Dispose of in accordance with local regulations.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Rinse container at least three times to an absence of pink color before disposing. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN3214
UN proper shipping name Permanganates, inorganic, aqueous solution, n.o.s. (Sodium permanganate)
Transport hazard class(es) 5.1
Subsidiary class(es) -
Packing group II
Environmental hazards
Marine pollutant Yes
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions 26, 353, IB2, T4, TP1
Packaging exceptions 152
Packaging non bulk 202
Packaging bulk 242

IATA

UN number UN3214
UN proper shipping name Permanganates, inorganic, aqueous solution, n.o.s. (Sodium permanganate)
Transport hazard class(es) 5.1
Subsidiary class(es) -
Packing group II
Environmental hazards Yes
Labels required 5.1
ERG Code 5L

Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN3214
UN proper shipping name	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. (Sodium permanganate)
Transport hazard class(es)	5.1
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	
Marine pollutant	Yes
Labels required	5.1
EmS	F-H, S-Q
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	This substance/mixture is not intended to be transported in bulk.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

CERCLA/SARA Hazardous Substances - Not applicable.

Drug Enforcement Administration (DEA) (21 CFR 1310.02 (b) 8: List II chemical.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium permanganate (CAS 10101-50-5) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Sodium permanganate	10101-50-5	36 - 40
Potassium permanganate	7722-64-7	2

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Sodium permanganate (CAS 10101-50-5)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Sodium permanganate (CAS 10101-50-5) 6588

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Sodium permanganate (CAS 10101-50-5) 15 % wt

DEA Exempt Chemical Mixtures Code Number

Sodium permanganate (CAS 10101-50-5) 6588

Food and Drug Administration (FDA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Sodium permanganate (CAS 10101-50-5) 500 lbs

US. Pennsylvania RTK - Hazardous Substances

Not regulated.

US. Rhode Island RTK

Sodium permanganate (CAS 10101-50-5)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

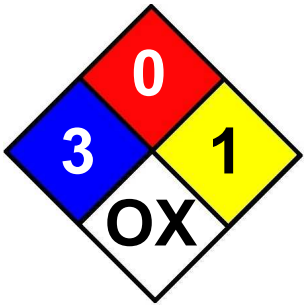
16. Other information, including date of preparation or last revision

Issue date 27-November-2013

Revision date -

Version # 01

NFPA Ratings



References HSDB® - Hazardous Substances Data Bank
Registry of Toxic Effects of Chemical Substances (RTECS)
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

This safety data sheet was prepared in accordance with the Safety Data Sheet for Chemical Products (JIS Z 7250:2005). The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CORPORATION DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CORPORATION MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Corporation, and shall be the sole responsibility of the holder or user of the product.

LABELLA Associates, D.P.C. | Engineering Architecture Environmental Planning

APPENDIX 2

Health & Safety Plan

Site Health and Safety Plan

Location:

Former Michelsen Furniture Co. Site
182 Avenue D and 374 Conkey Avenue
Rochester, New York

Prepared For:

M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC
312 State Street
Rochester, New York 14614

LaBella Project No. 214539

September 2015

Site Health and Safety Plan

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September 2015

LaBella Associates, D.P.C.
300 State Street
Rochester, New York 14614

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SITE HEALTH AND SAFETY PLAN

Project Title:	Former Michelsen Furniture Co. Site - Brownfield Cleanup Program
Project Number:	214539
Project Location (Site):	182 Avenue D & 374 Conkey Ave Rochester, New York
Environmental Director:	Gregory Senecal, CHMM
Project Manager:	Dave Engert, CHMM
Plan Review Date:	_____
Plan Approval Date:	_____
Plan Approved By:	_____ Mr. Richard Rote, CIH
Site Safety Supervisor:	Jennifer Gillen
Site Contact:	To Be Determined
Safety Director:	Rick Rote, CIH
Proposed Date(s) of Field Activities:	To Be Determined
Site Conditions:	Level, encompassing approximately 0.62 acres
Site Environmental Information Provided By:	• Phase I Environmental Site Assessment, LaBella, 2011 • Phase II ESA, LaBella, 2012 • Follow Up Subsurface Investigation Activities, LaBella, 2014
Air Monitoring Provided By:	LaBella Associates, D.P.C.
Site Control Provided By:	Contractor(s)

EMERGENCY CONTACTS

	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Rochester General Hospital	585-922-8000
Poison Control Center:	Upstate New York Poison Control Center	1-800-222-1222
Police (local, state):	Rochester Police Department	911
Fire Department:	Rochester Fire Department	911
Site Contact:	Kathy Wood	585-454-5710 x 2002
Agency Contact:	NYSDEC – Todd Caffoe, P.E. NYSDOH – Dawn Hettrick	585-226-5350 518-402-7860
Environmental Director:	Greg Senecal, CHMM	Direct: 585-295-6243 Cell: 585-752-6480
Project Manager:	Dave Engert, CHMM.	Direct: 585-295-630 Cell: 585-737-3293
Site Safety Supervisor:	Steven Rife	Direct: 585-295-7004 Cell: 585-755-9244
Safety Director	Rick Rote, CIH	Direct: 585-295-6241

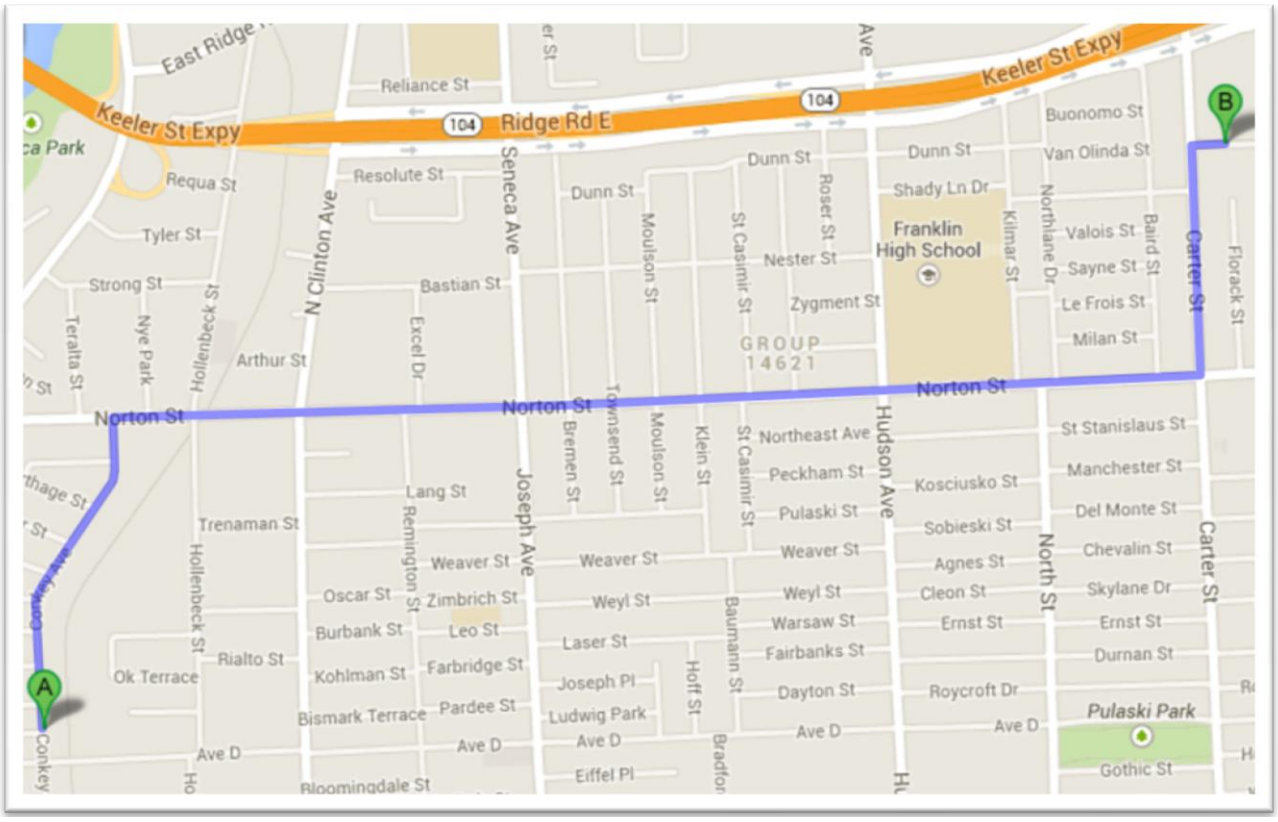
MAP AND DIRECTIONS TO THE MEDICAL FACILITY
ROCHESTER GENERAL HOSPITAL

Total Time: 6 minutes
Total Distance: 2.1 miles

Directions:

1. Turn Right onto Conkey Avenue, travel north 0.4 miles
2. Turn Right onto Norton Street, travel east 1.3 miles
3. Turn Left onto Carter Street, travel north 0.3 miles
4. Turn Right into Rochester General Hospital

Map:



1.0 Introduction

The purpose of this Health and Safety Plan (HASP) it to provide guidelines for responding to potential health and safety issues that may be encountered during the Remedial Investigation (RI) at the Former Michelsen Furniture Site, located at 182 Avenue D and 374 Conkey Avenue in the City of Rochester, Monroe County, New York. This HASP only reflects the policies of LaBella Associates D.P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications and the Community Air Monitoring Plan (CAMP) are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of the HASP were developed in general accordance with 29 CFR 1910 and 29 CFR 1926 and do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or and other regulatory body.

2.0 Responsibilities

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The HASP is applicable only to activities of approved LaBella personnel and their authorized visitors. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures.

3.0 Activities Covered

The activities covered under this HASP are limited to the following:

- Management of environmental investigation and remediation activities
- Environmental Monitoring
- Collection of samples
- Management of excavated soil and fill.

4.0 Work Area Access and Site Control

The contractor(s) will have primary responsibility for work area access and site control. However, a minimum requirement for work area designation and control will consist of:

- Drilling (Geoprobe®/Rotary) – Orange cones to establish at least a 10-foot by 10-foot work area
- Test Pitting – Orange cones and orange temporary fencing to establish at least 10-feet of distance between test pit and fencing.

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and his or her instructions must be followed.

5.1 Hazards Due to Heavy Machinery

Potential Hazard:
Heavy machinery including trucks, excavators, backhoes, etc will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:
Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required.

5.2 Excavation Hazards

Potential Hazard:
Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:
Personnel must receive approval from the Project Manager to enter an excavation for any reason. Subsequently, approved personnel are to receive authorization for entry from the Site Safety Officer. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable. All excavations will be backfilled by the end of each day. Additionally, no test pit will be left unattended during the day.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 Cuts, Punctures and Other Injuries

Potential Hazard:
In any excavation or construction, work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:
The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. The Site Safety Officer is responsible for arranging the transportation of authorized on-site personnel to medical facilities when First Aid treatment in not sufficient. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager. Serious injuries are to be reported immediately to the Site Safety Officer

5.4 Injury Due to Exposure of Chemical Hazards

Potential Hazards:
Volatile organic vapors from petroleum products, chlorinated solvents or other chemicals may be encountered during excavation activities at the project work site. Inhalation of high concentrations of organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:
The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0 and to the Modified CAMP in Appendix 7) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm is encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 Injuries Due to Extreme Hot or Cold Weather Conditions

Potential Hazards:
Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:
Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

5.6 Potential Exposure to Asbestos

Potential Hazards:
During ground intrusive activities (e.g., test pitting or drilling) soil containing asbestos may be encountered. Asbestos is friable when dry and can be inhaled when exposed to air.

Protective Action:
The presence of asbestos can be identified through visual observation of a white magnesium silicate material. If encountered, work should be halted and a sample of the suspected asbestos should be collected and placed in a plastic sealable bag. This sample should be sent to the asbestos laboratory at LaBella Associates for analysis.

5.7 Potential Exposure to Thorium^{232}

Potential Hazards:
During ground intrusive activities (e.g., test pitting or drilling) soil containing ^{232}Thorium may be encountered. ^{232}Thorium is a radioactive substance and poses an exposure risk to humans once encountered.

Protective Action:
Each test pit, soil sample, or other soil from the subsurface should initially be screened with the Ludlum meter to check the level of radiation on the soil as compared to the Site background level of radiation. Should the level of radiation on the soil sample exceed 2 times the Site background level, then work should be halted at the specified location and Mr. Rick Rote of LaBella Associates, P.C. should be contacted immediately (see page ii Emergency Contacts).

6.0 Work Zones

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.4), the following work zones should be established:

Exclusion Zone (EZ):
The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):
The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 Decontamination Procedures

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor's disposal container for disposal of PPE.

8.0 Personal Protective Equipment

Generally, site conditions at this work site require level of protection of Level D or modified Level D. However, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:
Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:
Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 Air Monitoring

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring will consist at a minimum of the procedures described in Appendix 7 "Site Specific CAMP". Please refer to the Site Specific CAMP for further details on air monitoring at the Site.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Work area ambient air will generally be monitored in the work area and downwind of the work area. Air monitoring of the work areas and downwind of the work areas will be performed at least every 60 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone, then either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hours of use or more frequently, if necessary. If PID readings are sustained, in the work area, at levels above 25 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If dust concentrations exceed the upwind concentration by 150 $\mu g/m^3$ (0.15 mg/m^3) consistently for a 10 minute period within the work area or at the downwind location, then LaBella personnel may not re-enter the work area until dust concentrations in the work area decrease below 150 $\mu g/m^3$ (0.15 mg/m^3), which may be accomplished by the construction manager implementing dust control or suppression measures.

10.0 Emergency Action Plan

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible and wait at the assigned 'safe area'. Follow the instructions of the Site Safety Officer.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 Medical Surveillance

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 Employee Training

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the remedial investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

J:\URBAN LEAGUE OF ROCHESTER ECONOMIC DEVELOPMENT\214539 - MICHELSON BCP SITE RI & REMEDIATION\REPORTS\RIWP\APPENDIX 4 HASP\HASP.DOCX

Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	0.2	0.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	0.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
Ethylbenzene	100	100	NA	1	6.7	2,000	Ether	2.3	8.76
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56
Metals									
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	Almond	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	Odorless	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA
Other									
Asbestos	0.1 (f/cc)	NA	1.0 (f/cc)	NA	NA	NA	NA	NA	NA

Table 1 Notes:

(a) Skin = Skin Absorption
(b) OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990
(c) ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.
(d) Metal compounds in mg/m3
(e) Lower Exposure Limit (%)
(f) Upper Exposure Limit (%)
(g) Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:

1. All values are given in parts per million (PPM) unless otherwise indicated.
2. Ca = Possible Human Carcinogen, no IDLH information.

LABELLA Associates, D.P.C. | Engineering Architecture Environmental Planning

APPENDIX 3

Community Air Monitoring Plan

Community Air Monitoring Plan

Location:

Former Michelsen Furniture Co. Site
182 Avenue D & 374 Conkey Avenue
Rochester, New York

Prepared for:

M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC
312 State Street
Rochester, New York 14614

LaBella Project No. 214539

September 2015

Community Air Monitoring Plan

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1.0 INTRODUCTION

This Site Specific Community Air Monitoring Plan (CAMP) has been prepared by LaBella Associates, D.P.C. on behalf of the M+M Housing Development Fund Corp. as Nominee for Mills and Michelsen LLC. This CAMP addresses potential Volatile Organic Vapor (VOC) and particulate emissions that may occur during implementation of the Remedial Investigation Work Plan (RIWP) at the Former Michelsen Furniture Co. Site located at 182 Avenue D and 374 Conkey Avenue which encompasses approximately 0.62 acres in the City of Rochester, Monroe County, New York herein after referred to as the "Site."

1.1 PURPOSE

Various levels of VOCs, semi-VOCs, and metals (collectively refered to as "constituents of concern (COCs)) have been detected in the soil and groundwater at the Site or are suspected to be contained in the soil and/or groundwater at the Site. The presence of these COCs through disturbance of soil and groundwater at the Site can potentially result in nuisance odors or health threats to the neighborhood in the immediate vicinity of the Site as well as to the various occupants of the Site.

This CAMP is specific to activities being conducted as part of the Remedial investigation at the Site. The CAMP describes the air monitoring activities to be completed in order to provide a measure of protection for any downwind receptors including Site occupants and occupants of neighboring properties. This CAMP is not intended to provide action levels for respiratory protection of workers involved with the RI. Rather, a Health & Safety Plan (HASP) has been developed and is included as Appendix 4 to the RIWP to cover workers directly involved with the RI work.

This CAMP includes the requirements of the New York State Department of Health (NYSDOH) Generic CAMP (included as Appendix 1A of the Draft DER-10 New York State Department of Environmental Conservation (NYSDEC) Technical Guidance for Site Investigation and Remediation dated December 2002).

Pursuant to the New York State Department of Environmental Conservation (NYSDEC) Technical Administrative Guidance Manual (TAGM) #4031 – Fugitive Dust Suppression and particulate Monitoring Program at Inactive Hazardous Waste Sites, (HWR-89-4031), this CAMP addresses methods that will be utilized to monitor particulate (dust) levels at the perimeter of, and within the work areas of the Site. If elevated levels of particulate emissions are encountered, this CAMP identifies the procedures that will be employed to mitigate elevated particulate levels.

Air monitoring procedures for these COCs are also included in this CAMP. Monitoring for COCs in, or near, the work areas of the Site will also be conducted per the HASP.

2.0 METHODOLOGY

This CAMP has been designed for remedial investigation activities at the Site. The CAMP pertains primarily to remedial investigation activities that disturb soil and groundwater at the Site. The following procedures will be implemented to monitor and, if necessary, mitigate the potential migration of fugitive particulate and/or COC emissions at the Site.

2.1 Site Background Monitoring

Each day of field work during the ground intrusive work a wind sock or flag will be used to monitor wind direction in the work areas. Based upon daily wind conditions three temporary monitoring points, one up wind, one downwind, and one in the direction of the closest sensitive receptor to the work areas, will be identified. The wind direction will be observed and noted frequently throughout the day and monitoring stations will be adjusted appropriately.

This CAMP will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total VOCs and a DustTrak tm Model 8530 aerosol monitor or equivalent for measuring particulates.

Each day, prior to the commencement of the ground intrusive work, background concentrations of particulates and VOCs will be measured and recorded as 15 minute averages at the identified three locations (one upwind, one downwind, and one in the direction of the closest sensitive receptor) with the typical equipment engines and any other gas/diesel engines operating on Site. This will be established as the Site background level for the day.

2.2 VOC Monitoring, Response Levels and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis. The PID will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. 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 will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
2. 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 will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will 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.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.
4. All 15-minute readings will be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

2.3 Particulate Monitoring, Response Levels and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The equipment will 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.

1. 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.
2. 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 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.
3. All readings will be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

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